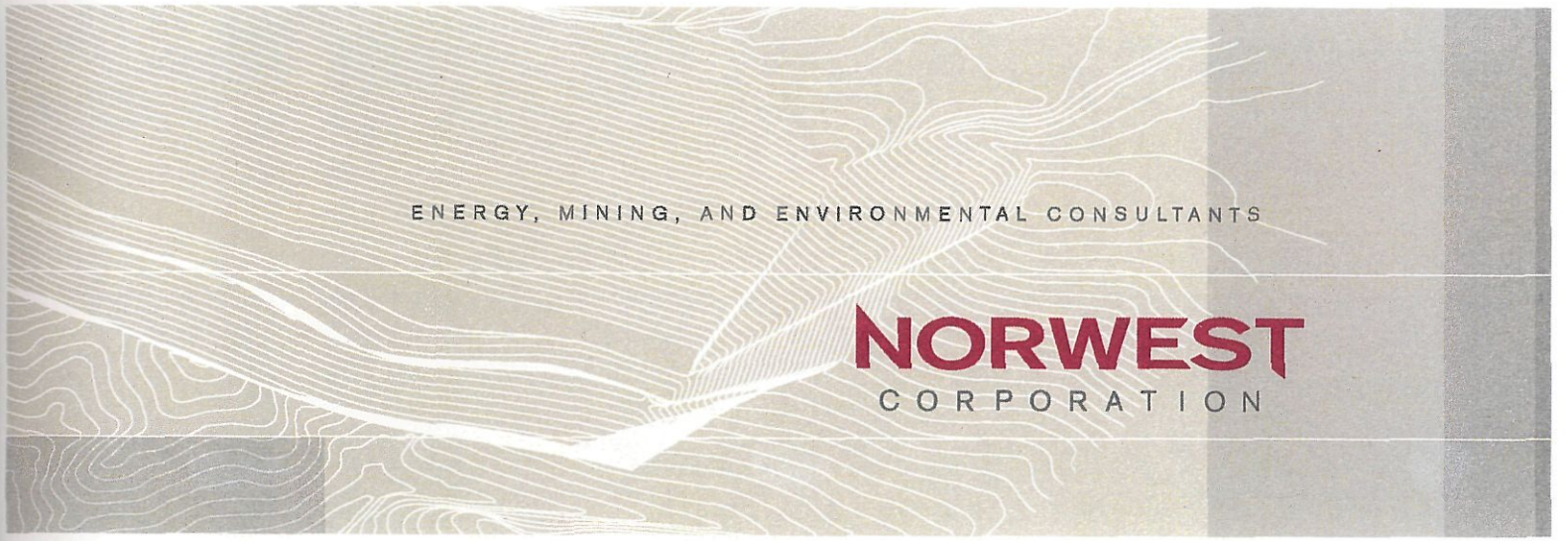
TECHNICAL REPORT

LOSSAN COAL PROJECT



35 pages of this report remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

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TECHNICAL REPORT

LOSSAN COAL PROJECT

Submitted to:
CLINE MINING CORPORATION

January 12, 2006

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NORWEST
CORPORATION

1 TITLE PAGE

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NORWEST
CORPORATION

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3 SUMMARY

The following report forms Volume 2, Geology, of a Mining Feasibility Study prepared by Norwest Corporation for Cline Mining Corporation. This Volume addresses the coal geology, resources and reserves of the Lossan Property, which is located southwest of the town of Chetwynd in northeastern British Columbia, as shown on Figure 4.1. The Lossan Property encompasses seams of metallurgical and thermal coal that occur within the Lower Cretaceous Gething Formation. Gething seams have long been a major target for coal exploration and mining in northeastern British Columbia.

Cline Mining has requested that Norwest Corporation produce a Feasibility Study of the Lossan Property that incorporates the results of Cline's 2005 drilling program, as well as the results of the previous exploration programs. The Terms of Reference for the present volume are that a geological model and interpretation should be completed such that the engineering work can proceed. In addition, Volume 2 should include an independent validation of the coal resources and reserves of the area, in compliance with the current reporting requirements of National Instrument 43-101. The report should address pertinent aspects of the geology, including those topics specified in NI 43-101F1.

The Lossan licence area covers strata of the coal-bearing Gething Formation in the Rocky Mountain foothills of northeastern British Columbia. The property is located about 70 km by road southwest of Chetwynd, British Columbia, as illustrated in Figure 4-1. The area is covered by NTS Map 93-O-08, and its approximate centre lies at longitude 122° 13' west and latitude 55° 26' north.

The stratigraphic sequence encompassed by the Lossan Property extends from the Minnes Group at the base, through a complete sequence the Bullhead Group, to the lowermost part of the Fort St. John Group at the top. The Gething Formation of the Bullhead Group hosts the coal seams that have been the focus of exploration on the property. The surface geology is summarized on Figure 9-1 and the stratigraphic sequence is illustrated on Figure 9-2.

As many as sixteen Gething Formation coal seams have been intersected by drilling and trenching on the Lossan Property. Five of those seams, referred to as Seam 1 to Seam 5 in descending order, have been shown to have adequate thicknesses and continuity to be considered for mining. A detailed description of Seam 1 to Seam 5 is provided in Item 11 of this report.

In the area north of Cross-Section 2250, five coal zones in the upper part of the Gething Formation, designated Seam 1 to Seam 5, have been identified as mining targets. All five zones consist of sequences of interbedded coal plies and rock bands. The thickness and

distribution of the coal plies and rock bands in all zones change across the property, and changes can occur over relatively short distances. Thicknesses of interseam strata also vary. These variations are due in part to changes in the original depositional environment, and in part to the tectonic effects of folding and faulting.

The area south of Cross-Section 2250 was addressed by Gulf Canada in exploration work that was completed in 1984 when a separate report specifically addressing that area was prepared. The main part of that area which contains the mining target seams immediately north of Brazion Creek is quite intensively drilled and no additional testing of it was conducted during the current exploration program. Gulf Canada evaluated the complete geology of the Gething Formation coal section in that area and identified sixteen seams in the sequence. Two of these, which they identified as Seams 1 and 5 were the principal mineable units. These two seams for that area are addressed in the present report as well but no modification of the structural interpretation of that area has been made. However, the current work has led to the conclusion that the seam that Gulf identified as Seam 5 is actually Seam 4. This seam, in the area north of Section 2250 has thus been redesignated. However, south of Section 2250, where no other interpretation changes have been made and no new exploration has been conducted, the original seam designation of Gulf Canada has been preserved.

In the area north of Section 2250, Seam 1 and Seam 3 are the primary mining targets on the Lossan Property. Seam 1 is thickest and thus the primary target in the southern part of the property, and Seam 3 is thickest and the primary target in the northwestern part. Seams 2, 4 and 5 are generally thinner, but each represents a significant resource in some areas of the property.

Seam 1

Seam 1 is the uppermost seam in the Gething Formation at Lossan. It lies about 30m to 60m below the base of the distinctive Bluesky Member. Where that unit is present, Seam 1 is easily recognized by its stratigraphic position.

Thicknesses in excess of 10m for the Seam 1 zone have been documented in a number of drill holes in the Brazion Creek area where surface exposures have clearly demonstrated the effects of tectonic thickening. There are other instances of such tectonic effects in other areas as well but the localized nature of such structural effects and the current drilling density is not sufficient to clearly define such zones. The natural thickness in an undisturbed setting in the central part of the property is illustrated in CL05-24 where the Seam1 zone was 8.6m thick, of which 7.5m was coal. At the Cline Adit, the zone was about 5.5m thick, of which about 4.6m was coal. In most areas where it is thick, the lower part of the zone consists of relatively clean coal, and the majority of the rock bands and sheared zones occur within the upper part. Seam 1 thins toward the northwest, where

thicknesses of 1.0m or less are typical. However Seam 1 has a thickness of more than 5m in this area on the east side of the property near Hole CL05-06.

Seam 3

Seam 3 lies about 80m to 100m below Seam 1. It is the thickest coal zone in the northwestern part of the Lossan Property, where it typically consists of two zones of clean coal, separated by a zone of carbonaceous mudstone or stoney coal up to about 1.0 m thick. This seam usually has a distinct and consistent signature and it is one of the more useful units that can be used for correlation in the northern part of the property. Its total thickness in most cases ranges from about 3.0m to 5.0m but there are three intersections in different drill holes in the north part of the property with thickness of up to 12.7m. The cause for these higher than normal thickness values is not known; they may be due to tectonic thickening or they may represent local areas of increased peat development in the original swamp. The roof and floor strata of Seam 3 consist of carbonaceous mudstone.

The coal-bearing strata are contained within a series of northwesterly trending folds that are cut by thrust faults. The dominant structure is a complex fold that is referred to as the Goodrich Synclinorium. This structure is well exposed on Mount Goodrich, to the south of the Lossan Property, and in that area it consists of a simple, very large, essentially concentric fold. The structure becomes more complex to the north where the synclinorium evolves. This synclinorium undergoes increasing structural modification and complexity on the Lossan Property. These complications take the form of tight folds which developed either after, or contemporaneously with faulting. The various cross-sections, Figures 9-4 through 9-7, as well as the geology map of Figure 9-1 illustrate these features. The Goodrich Synclinorium is a double plunging structure with the plunge reversal estimated to be in the vicinity of cross-section line N3250. The southern portion of the structure plunges north at 20^0 to 30^0 to the Brazion Creek valley. North of Brazion Creek, it shallows to 6^0. The northern portion of the structure has a southerly plunge of 7^0 south.

The principal mining targets for the present study are exposures or subcrop locations of the Seam 1 and Seam 3 where they approach the surface on the flanks of these structures. Only in a few instances is it possible to find hinge areas of these structures where the seams are shallow enough to mine. Thrust faults interrupt the continuity of the folded Gething Formation strata on the property, from place to place. These faults are typically high angle with a dip of about 60^0 to 70^0 to the west.

Cline Mining Corporation optioned the Lossan coal licences in 2004, and completed a drilling program during January to March of 2005. The drilling consisted of ten uncored holes, fifteen partially cored holes, and three fully cored holes. The Cline 2005 drilling

program is summarized on the following table. The details of the Cline drillholes are listed in Table A.2 of Appendix A in Section 20.

LOSSAN PROPERTY DRILLING ACTIVITY

Operator	Year	Holes Drilled	Metres Drilled	Metres Cored
Gulf Canada	1980	44	12,180	6,289
	1981	24	7,751	5,830
Cline Mining	2005	28	4,281	861
TOTAL		96	24,212	12,980

The drillhole density from the Gulf programs was high in the southern part of the property, but decreased toward the north, and coverage in the northernmost areas was low. Cline's 2005 drilling program therefore focused improving the drilling density in the central and northern areas.

The previous testing showed that Seam No.1 is a medium volatile bituminous coal, according to the ASTM system of rank classification. The characteristics of the seam allowed it to be considered for use for both metallurgical and thermal purposes. Core sample analyses showed a marked difference in the coking properties between the upper portion of the seam and the lower portion. The upper portion generally exhibited poorer coking characteristics, with an average F.S.I. of about 2.5, at an S.G. of 1.65 and an F.S.I. of about 3 at an S.G. of 1.4. The lower portion of the seam showed average F.S.I. values of about 4 and 5.5 at the same S.G. values.

Based on the limited data that was previously available, Seam No. 3 was determined to be a low volatile bituminous coal. Volatiles ranged from 20% to 26% on a dry-mineral matter-free-basis. The average F.S.I. was about 5, at 5% ash, but these results may change significantly once a more representative data base is available.

The in-place resource within the Lossan Property, summarized in the following table, covers a modelled area of approximately 3,800 ha. The resource and reserve areas are shown on Figure 19-1. These resources include all coal seams intended for mining within the Project Area with minimum thickness consistent with the recommendations of GSC 88-21. The resources are reported inclusive of the coal reserves.

IN-PLACE COAL RESOURCES SUMMARY (MTONNES)
AS AT NOVEMBER 30, 2005

AREA	ASTM GROUP	IN-PLACE COAL RESOURCES (MTONNES)		
		MEASURED	INDICATED	INFERRED
Lossan Property	Medium Volatile Bituminous	108.8	77.3	53.5
Total		**186.1**		**53.5**

A coal reserve is the economically mineable part of a Measured or Indicated coal resource demonstrated by at least a Preliminary Feasibility Study, which includes information on mining, processing, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified (CIM Definition Standards). Coal reserves are sub-divided in order of increasing confidence into 'Probable' and 'Proven' reserves, respectively. A 'Probable' coal reserve is the economically mineable part of an 'Indicated' resource, and in some cases of a 'Measured' resource. A 'Proven' coal reserve is the economically mineable part of a 'Measured' resource.

A preliminary mine design and financial analysis have been completed for the Lossan Property. Norwest has designed pits using the following minimum mining criteria:

- Minimum coal seam thickness: 1.0m;
- Maximum included diluting material (rock parting in coal): 0.30m; and
- Bulk Density as determined by seam ash%.

In addition to the application of mining criteria, coal seam recovery and plant yield factors were used to estimate clean saleable reserves on a seam by seam basis.

The clean saleable surface mineable reserves in the Lossan Property are estimated to be 13.93 mt. The distribution and classification of the reserves with respect to mining blocks as configured by Norwest are provided in the following table. The resource and reserve areas are shown on Figure 19-1.

**CLEAN SALEABLE SURFACE MINEABLE COAL RESERVES SUMMARY (MTONNES)
AS AT NOVEMBER 30, 2005**

AREA	ASTM GROUP	CLEAN SALEABLE SURFACE MINEABLE COAL RESERVES (MTONNES)	
		PROVEN	PROBABLE
Lossan Property	Medium Volatile Bituminous	8.96	4.97
Total		13.93	

The exploration of the recent program achieved several of the original objectives but some issues still require further work to secure satisfactory answers.

- One of the most important of the initial objectives was to upgrade the resource classification so that a significantly greater portion of the resource would be classified in the measured and indicated categories. This has been achieved but there is the potential to further increase this, especially since more coal licenses have been applied for since the start of the exploration campaign.

- The recent program also showed that the geology is more complicated, both structurally and stratigraphically than previously known. For example, it was found that thrust faults do not always trend along the main structural grain and that Seam 3 becomes the dominant seam in the north where Seam 1 rapidly reduces its thickness and commercial significance. The lack of natural exposure in the Lossan area places a particularly heavy burden on the production of geological interpretations.

- The exploration experience shows that it will be necessary to conduct more exploration by drilling to adequately reduce the exploration risk inherent in all mining projects. The necessary drilling density is that which has been found to suitably reduce the mining risk for other Foothills coal properties of similar levels of tectonic disturbance. This is a spacing of 100m with closer distance where specific geological problems are encountered.

4 INTRODUCTION AND TERMS OF REFERENCE

The following report forms Volume 2, Geology, of a Mining Feasibility Study prepared by Norwest Corporation for Cline Mining Corporation. This Volume addresses the coal geology, resources and reserves of the Lossan Property, which is located southwest of the town of Chetwynd in northeastern British Columbia, as shown on Figure 4.1.

The Lossan Property encompasses seams of metallurgical and thermal coal that occur within the Lower Cretaceous Gething Formation. Gething seams have long been a major target for coal exploration and mining in northeastern British Columbia.

The original Lossan coal licenses were acquired by the principals of Lossan Exploration Ltd. in 1979, and in 1980 they were optioned to Gulf Canada Resources Ltd. Between 1980 and 1984, Gulf Canada completed a series of programs of drilling and geological mapping over the Lossan Property, as described in Items 8, 12 and 13 of this report. A preliminary feasibility study was completed by Gulf Canada, but the anticipated economic opportunity did not materialize. Gulf Canada allowed its option to the Lossan Property to lapse, and the coal licences reverted to Lossan Exploration Ltd.

Demand for coal increased strongly during 2004, and Cline Mining Corporation optioned the Lossan coal licences. In early 2005, Cline completed a program of drilling and bulk sampling on the property. The purpose of that work was to expand on results obtained by Gulf Canada in earlier programs. The recent work is the primary focus of the present report but much of the earlier exploration is also discussed.

Cline Mining has requested that Norwest Corporation produce a Feasibility Study of the Lossan Property that incorporates the results of Cline's 2005 drilling program, as well as the results of the previous exploration programs. The Terms of Reference for the present volume are that a geological model and interpretation should be completed such that the engineering work can proceed. In addition, Volume 2 should include an independent validation of the coal resources and reserves of the area, in compliance with the current reporting requirements of National Instrument 43-101. The report should address pertinent aspects of the geology, including those topics specified in NI 43-101F1.

The sources of geological information used in this report come from Cline's 2005 drilling program, Gulf's coal exploration reports and feasibility study, and a variety of published reports on the geology of the region. A complete list is provided in Item 23 of this report.

The author, a qualified person for coal exploration, has conducted site visits and inspections in this area on numerous occasions. He is very familiar with the exploration procedures that were

applied at Lossan because he participated in the Gulf coal exploration projects during the early 1980's, as well as in Cline's 2005 exploration program.

5 DISCLAIMER

This report has been prepared for Cline Mining Corporation by Norwest Corporation. The findings and conclusions are based on information developed by Norwest available at the time of preparation and data supplied by outside sources. Norwest staff has conducted field work for the preparation of this report and has also relied on the results of exploration documented in various public and company reports. These include all of the reports listed in the references of Item 23 of this report. These reports apply to exploration completed in the years 1979 to 1985.

Some of the data and studies described in Item 25 were originally produced by other consultants, reporting directly to Cine Mining Corporation. In each instance, where Norwest has relied upon such information, the source of the data and studies is clearly stated.

The present report is intended to be used by Cline Mining Corporation only, subject to the terms and conditions of its contract with Norwest.

6 PROPERTY DESCRIPTION AND LOCATION

The Lossan licence area covers strata of the coal-bearing Gething Formation in the Rocky Mountain foothills of northeastern British Columbia. The property is located about 70 km by road southwest of Chetwynd, British Columbia, as illustrated in Figure 4-1. The area is covered by NTS Map 93-O-08, and its approximate centre lies at longitude 122° 13' west and latitude 55° 26' north.

Cline Mining Corporation has entered into a purchase option agreement with Lossan Exploration Ltd. with respect to the coal licenses described in the following table. Those licenses are currently held by or are under application to Lossan Exploration Ltd. The option agreement, dated August 11, 2004, includes several financial obligations that must be met by Cline Mining Corporation to retain its interest in the property. The following extract from that agreement describes Cline Mining's financial obligations to Lossan:

> *"This is to set out the agreement between Cline Mining Corporation ("Cline") and Lossan Exploration Ltd. ("Lossan") with respect to the coal properties described on the attached Schedule (the "Coal Lands") which are owned by Lossan and the related information and data base in its possession ("Data Base"). The Lossan Coal Lands and the Data Base together comprise the "Lossan Coal Property". The agreement terms are as follows:*
>
> 1. *Grant of Option*
> *Lossan grants to Cline the exclusive option to purchase the Lossan Coal Property on the terms and conditions set out below (the "Option")*
>
> 2. *Initial Payment*
> *Cline will pay Lossan $150,000 (the "Initial Payment") following Closing as set out below. However, if Cline does not exercise its Option to purchase than the Initial Payment will be retained by and be the property of Lossan as a break fee*
>
> 3. *Exercise of the Option*
> *Cline may exercise its Option to purchase the Lossan Coal Property at any time on or before November 15, 2005 (the "Option Exercise Date").*
>
> *Upon Cline exercising its Option to purchase the Lossan Coal Property, then:*
> *(i) Lossan will transfer and assign the Lossan Coal Property to Cline and Cline will pay Lossan $900,000.00 (the "Second Payment"), and*
> *(ii) Cline will issue from its Treasury, or cause to be assigned and transferred to Lossan or its order, 250,000 fully paid and non assessable common shares of Cline.*

If Lossan elects to receive the Second Payment as provided in paragraph 4 below, then Lossan will transfer and assign the Lossan Coal Property to Cline upon the exercise of the Option by Cline and Cline will pay Lossan the Second Payment in as Lossan may have directed under paragraph 4.

Extension of Option Exercise Date. Cline shall have the right to extend the Option Exercise Date of November 15, 2005 to May 15, 2006 by paying Lossan $50,000.00 and shall have the further right to9 further extend the Option Exercise Date of May 15, 2006 to November 15, 2006 by paying Lossan an additional $50,000.00.

4, *Lossan May Apportion Payments*
Lossan may and will have the right to decide upon and advise Cline as to whether any or which part or all of the Initial Payment and/or the Second Payment are paid by way and in the nature of advance Royalty Payments and/or the purchase price of the Lossan Property. The purchase payment of $900,000.00 will consist of 2 or 3 separate payments designated by Lossan totalling $900,000.00.

5. *Royalty Payments*
If Cline exercises its Option and acquires the Lossan Coal Property then Cline will thereafter pay Lossan $1.50 a tonne production Royalty (the "Production Royalty Payment") on all coal mined and sold from the Lossan Coal Lands and any Cline Coal Licenses which Cline may acquire in the Area of Interest as described and defined below:

Minimum Royalty Payments. Cline will pay Lossan a minimum Royalty payment (the "Minimum Royalty Payment") at the rate of $100,000 per year, commencing as set out below, until such time as First Commercial Mine Production commences from any of the Lossan Coal Lands and/or the Cline Coal Licenses in the Area of Interest. First Commercial Mine Production means the first year in which Cline sells and delivers 200,000 tonnes of coal from the Lossan Coal Lands and/or the Cline Coal Licenses in the Area of Interest into the market. The Minimum Royalty Payments and/or the Production Royalty Payments will be paid to Lossan quarterly within 30 days of the end of each quarter. All Royalty payments will be calculated and payable commencing with respect to the first quarter following the date on which Cline exercises its Option and acquires the Lossan Coal Property. For clarity, it is understood that the Royalty payment to be paid with respect to each quarter will be the greater of the amount of the Minimum Royalty Payment for the quarter and the amount of any Production Royalty Payment due with respect to that quarter."

The following table lists the tenure and application numbers of the coal licences and applications, as well as the legal description for each of them. The licence tenures and applications are located in northeastern British Columbia and are covered by British Columbia Coal Map 93-O-08. Figure 6-1, and Map 1 in the map pocket, show the location of both the coal licences granted and those under application.

TABLE 6.1
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
COAL LICENSES AND TENURES

NTS Map Sheet	Coal Map	Block	Units	Hectares	Number
Coal Licences:					**Tenure Number**
93-O-08	93O040	G	65,66,75,76	294	405841
93-O-08	93O050	G	85,86,95.96	294	327215
93-O-08	93O049	G	87,88,97,98	294	327217
93-O-08	93O049	J	7,8,17,18	294	413996
93-O-08	93O049	J	9,10,19,20	294	327280
93-O-08	93O049	J	29,30,39,40	294	401630
93-O-08	93O049	K	1,2,11,12	294	343892
93-O-08	93O049	K	21,22,31,32	294	401629
Coal Licence Applications:					**Application Number**
93-O-08	93O039	G	67,68,77,78	294	App#412760
93-O-08	93O049	G	89,90,99,100	294	App#411623
93-O-08	93O049	K	23,24,33,34	294	App#411622
93-O-08	93O049	K	41,42,51,52	294	App#412002
93-O-08	93O049	K	43,44,53,54	294	App#413215
93-O-08	94O040	G	63,64,73,74	294	App#416901

Although the area described in the above table was surveyed in the past, in the configuration of the present application it has not yet been legally surveyed.

The author is not aware of any rights, payments or encumbrances that this property is subject to, except coal production royalties payable to the provincial government on production and those that apply to the agreement with Lossan Exploration Ltd.

The Lossan coal property is not in production, although it has been the subject of several coal exploration drilling programs, as described in Items 8 and 13 of this report. The only development activity that has occurred at Lossan is the construction of exploration trails, camp sites, drill pads, adits and related features, most of which have been abandoned and reclaimed. The exception is the 2005 adit, which is being maintained to allow additional bulk samples to be taken. The map in Figure 6-1 shows all exploration infrastructure on the Lossan Property. The author is not aware of any environmental liabilities that this property may currently be subject to.

Future exploration on the Lossan coal licences will require the application for and approval of appropriate permits for exploration work. Application must be made to the British Columbia Ministry of Energy, Mines and Petroleum Resources, on the standard form titled "Mineral & Coal Notice of Work and Reclamation Program" and its various attachments.

7 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

7.1 ROAD ACCESS

The Lossan Property is located in northeastern British Columbia, about 70 km by road southwest of the town of Chetwynd as shown on Figure 4-1. It is reached from Chetwynd by driving west along British Columbia Highway 97, the John Hart Highway, for a distance of 26 km. From there, the Hasler Road, a good-quality, unpaved forestry road, runs southeastward, entering the southern end of Lossan Property at a distance of about 44 km from the highway. At a distance of about 50 km from the highway, the Boulder Road diverges to the northwest and extends across the length of the property. Like the Hasler Road, the Boulder Road is a good-quality, all-weather, gravel road that is suitable for use by four-wheel-drive vehicles, forestry trucks, and other industrial traffic. Smaller exploration trails connect most of the drilling sites to the forestry roads.

7.2 CLIMATE

The mean daily temperature in the region is about 15°C in July, and an extreme maximum of about 30°C is reached occasionally. In January, the mean daily temperature is about -20°C, with an extreme minimum of about -50°C. The average frost-free period is less than 60 days per year. Mean annual precipitation is about 425mm, and mean monthly precipitation ranges from about 15mm to 65mm. Most of the precipitation occurs as snow between October and March, with maximum snowfalls of up to 36cm in 24 hours.

7.3 LAND USE

The major land uses in the region are forestry, natural gas production, and coal mining. Two open-pit coal mines are currently operating in the area. The Willow Creek Mine of Pine Valley Ming Corporation, which lies about 45 km west of Chetwynd, commenced commercial-scale production in July, 2004. The Dillon Mine of Western Canadian Coal Corporation, which lies about 60 km southwest of Chetwynd, began operations in December, 2004. Coal mine planning and permitting are in progress for Western Canadian Coal Corporation's Wolverine Property, which lies about 25 km northwest of the town of Tumbler Ridge, and Northern Energy and Mines Inc.'s Trend Property, which lies about 25 km south of Tumbler Ridge. Several other companies also hold coal licences in the region and have been conducting major coal exploration programs.

Commercial logging activities are common throughout the region. Logging on and around the Lossan Property is being done by Canfor Corp., and parts of the Lossan Property area have been clear-cut in recent years. There are deep natural gas wells northeast of Lossan, and two natural gas pipelines cross the property, connecting those wells to a gas processing plant on the Hasler Road. The area also hosts minor hunting, trapping, and recreational activities such as

snowmobiling, four-wheel driving, and camping. The agricultural capability of the land is poor due to the high elevations, short growing season, rugged topography and generally thin soils.

7.4 PHYSIOGRAPHY

The Lossan Property lies within a northwesterly trending valley, flanked by ridges to the northeast and southwest. It is crossed by three drainages of significant size: Beaudette Creek, which flows in a northwest direction from the northern part of the property; Brazion Creek, which flows across the southern end of the property; and Axis Creek, which flows southwest from the centre of the property into Brazion Creek.

Elevations range from about 1000m at the confluence of Axis and Brazion Creeks, to more than 1520m along southwestern edge of the property. The highest points near the property are Mt. Stephenson, Mt. Le Hudette, and Mt. Goodrich, all with elevations of more than 2000m.

7.5 ENVIRONMENT

The property lies within the Subboreal Forest Zone, and its forest cover is dominated by white spruce, Englemann spruce, alpine fir, and lodgepole pine. There is little underbrush in most of the forested areas, but thickets of willow, alder and aspen are common along roads and in clear-cut areas. Open muskeg swamps with scattered black spruce exist between the headwaters of Beaudette and Axis Creeks, where drainage is poor. The treeline occurs at elevations of about 1500m to 1650m, and higher elevations are characterized by an alpine tundra flora dominated by small herbaceous plants, with small stands of stunted spruce and fir.

The region includes a broad range of big-game animals, fur-bearers, waterfowl, and upland game-birds. Big-game species include moose, elk, mountain goat, mountain caribou, mountain sheep, mule deer, whitetail deer, grizzly bear and black bear. Fur-bearing animals include beaver, marten, fisher, weasel, wolverine, lynx and squirrel. Upland game birds include blue grouse and two species of ptarmigan. Several species of ducks, geese, and possibly swans migrate through the region or nest in its wetlands. Sportfish species in the region include arctic grayling, mountain whitefish, Dolly Varden trout, and northern pike. The Lossan Property itself supports few fish, however, because of waterfalls and rapids downstream from the area.

7.6 LOCAL AND REGIONAL RESOURCES

The town of Chetwynd is the local supply centre. It is situated in the Pine River Valley, and has a population of about 2700. The paved airstrip at Chetwynd is suitable for prop-driven aircraft and small private jets; several companies provide charter helicopter service from this location.

The town of Tumbler Ridge has been a centre for coal mining and exploration activities since it was established in the early 1980's. Tumbler Ridge has a population of about 2500, and is located about 100 km southeast of Chetwynd via Highway 29.

The cities of the region are Dawson Creek, Fort St. John, and Prince George. Dawson Creek, with a population of about 11,200, is located on Highway 97 about 100 km east of Chetwynd. Fort St. John, with a population of about 17,300, is located about150 km by road northeast of Chetwynd via Highway 29. Prince George, with a population of about 77,000, is located about 300 km southwest of Chetwynd on Highway 97. All of these cities have good airports with regular service by commercial airlines. Skilled workers, supplies and equipment are available throughout the region to support the existing forestry, natural gas, and coal mining industries.

7.7 INFRASTRUCTURE

The British Columbia Railway operates a rail line through the Pine River Valley to service the Peace River District. It runs through Chetwynd, subparallel to Highway 97. That rail line provides direct access to the Port of Vancouver, and indirect access, via the Canadian National Railway at Prince George, to the Ridley Island Coal Port at Prince Rupert, B.C.

Coal loading facilities are located on the rail line at the Pine Valley Mine, 45 km west of Chetwynd. Coal would be moved from the Lossan Property to the loading facilities by truck haulage. Haulage distance via the existing forestry roads would be about 53 km. However, Cline is looking into the feasibility of constructing a new Mine access road to the north, adjacent to Beaudette Creek. This route will reduce the distance from the coal deposits at the north end of the Property to the proposed wash plant site to as little as 15 km. At the loading facility, the rail line lies on the south side of the Pine River, so no major bridge construction will be needed for the Pine River.

Electric power and natural gas supplies are not available on the property at present. Electric power is available from hydroelectric generating facilities along the Peace River, north of Chetwynd, which combined produce more than 3000MW of electric power for use throughout the region. The nearest connection point to this power source is to the north in the Pine River Valley, close to the proposed wash plant site.

There are two natural gas processing plants in the area that could serve as natural gas supply points, if needed. The Pine River Gas Plant is located near the Hasler Road, and is about 19 km, in a direct line, from the property. The Burlington Resources Ltd. gas plant is located closer to Lossan Property, at about Km 41 on the Hasler Road.

8 HISTORY

The first coal licences in the Lossan Property were acquired by the present owners in 1979, and the first geological mapping project in late 1979 confirmed the presence of potentially mineable seams of coking and thermal coal. Originally the coal seams were thought to be part of the Minnes Group, as shown on existing geological maps at that time. Subsequently they were shown to belong to the Gething Formation and were then judged to have considerably greater economic potential as a result.

The licences were optioned by Gulf Canada Resources Ltd. in 1980, and Gulf completed a series coal exploration programs during the early 1980's. A total of sixty-eight holes, of which forty-one were fully cored, were drilled during 1980 and 1981, as detailed in Item 13 of this report. Numerous drill core samples were analyzed to establish the coal quality. In 1982, an adit was constructed to obtain bulk samples for additional coal-quality testing. Gulf's helicopter-supported geological mapping program continued through 1984. Gulf's data have been obtained from assessment reports that are publicly available from the British Columbia Ministry of Energy, Mines and Petroleum Resources. These reports are listed in Item 23 of this report.

Gulf's exploration efforts led to the completion of a preliminary feasibility study in 1982, even as exploration activities continued on the property. Production was targeted for a window of opportunity that was expected to exist in the mid to late 1980's, but that opportunity did not materialize due to low coal prices and competition from other coal producers. Gulf returned its focus to the petroleum industry, and allowed its option to the Lossan coal licenses to lapse.

No further drilling was done on the Lossan Property until rising coal prices led Cline Mining Corporation to option the Lossan coal licences in 2004. During January to April of 2005, Cline completed twenty-eight drillholes and constructed one adit, as detailed in Items 12 and 13 of this report. The drillhole density from the earlier Gulf programs was judged to be sufficient in the southern part of the property for the desired resource classification, but was inadequate toward the north. Cline's 2005 drilling program therefore focused on improving the drilling density in the central and northern areas.

Trails were constructed from the Boulder Road to provide vehicle access to all drill sites. The work was done during winter when the ground was frozen, which facilitated construction and vehicle access in poorly drained, swampy areas in the northern part of the property. All trails were closed and reclaimed after completion of the program.

Geophysical logs were recorded in all of the drillholes. The suite consisted of natural gamma, density, calliper, and neutron logs. It was possible to log most of the holes under open-hole

conditions but some holes had to be logged through the rods due to unstable ground conditions. Directional surveys were recorded in most of the non-vertical holes.

In addition to the drilling described above, a track-mounted blast-hole drill was used to locate seam subcrops beneath overburden cover. Uncored blast-holes, up to 35 m deep, could be drilled quickly, and coal seams were easily recognized by the change in penetration rate and the colour of the cuttings. Although the data from the blast-hole program was used only for qualitative purposes, such as identifying optimal locations for the larger drills, and determining seam subcrop locations for the geological map, it proved to be a very useful and cost-effective approach.

In March and April of 2005, Cline constructed an adit in Seam 1 to obtain bulk samples of unoxidized coal for quality testing. A second group of samples was taken in August. The geology, construction and sampling of the adit, and the results of analytical testing to date, are presented in Section 18.

Cline's exploration camp consisted of six trailers and could accommodate up to about 20 people at one time. The following contractors supplied services for the program:

- Field camp and catering were provided by Frontier Catering Northern Ltd. of Dawson Creek, B.C.;
- Fuel was obtained through United Farmers of Alberta in Grande Prairie, AB.;
- Drinking water was provided by Chetwynd Fresh Water of Chetwynd, B.C.;
- Communication equipment was leased from Cardinal Telecom (2000) Inc. of Chetwynd, B.C.;
- Anderson Air Drilling of Fort St. John, B.C. drilled eleven partially cored holes;
- Cora Lynn Drilling Co. Ltd. of Strathmore, AB, drilled fourteen uncored holes;
- Target Drilling Inc of Calgary, AB. drilled three fully cored holes;
- Rowan Drilling and Blasting of Kamloops, B.C. drilled a series of shallow, uncored test holes;
- Geophysical logging was supplied by Roke Oil Enterprises Ltd. of Calgary, AB.;
- Water trucks to support the drills were obtained from Anderson Air Drilling Ltd. of Fort St. John, B.C. and Little Valley Holdings Ltd. of Dawson Creek, B.C.;
- Adit drivage and sampling was done by WGB industries of Cowley, AB.;
- Adit re-sampling was done by DeVrial Resources Inc. of Grande Cache, AB.;
- Coal Analysis was performed by Elk Valley Environmental Services Ltd. of Sparwood, B.C. and GWIL Industries Birtley Coal and Minerals Testing Division of Calgary, AB.; and
- Coke and carbonization tests were performed by CANMET in Ottawa, Ont.

Geological supervision was supplied by Norwest Corporation of Calgary, AB. and Cline Mining Corp. of Vancouver, B.C. and surveying and construction supervision were provided by BV Solutions of Smithers, B.C.

9 GEOLOGICAL SETTING

The geological setting of the Lossan Property has been established from geological mapping and drilling data. The bedrock at Lossan is well exposed along the ridges, and good outcrops exist along some of the larger creeks. Drilling and trenching programs have provided data where the bedrock is obscured by forest cover.

The Lossan Property encompasses strata of latest Jurassic to Early Cretaceous age. It includes a complete section of the coal-bearing Gething Formation, which has long been a target for coal exploration and mining in northeastern British Columbia. Five coal seams in the upper Gething Formation, Seam 1 to Seam 5, have sufficient thickness, lateral extent, and quality to be considered for extraction at Lossan. Other coal seams and coaly horizons are also present in the lower Gething formation and underlying Minnes Group, but while they may achieve thickness suitable for mining from place-to-place, they have not been considered to be of economic interest in this report.

At Lossan, the Gething Formation is contained within a large, north-westerly trending synclinorium. The strata are tightly folded, and are overturned in a few areas. They are cut by several thrust faults, and the coal is often intensely deformed or thickened near faults and in the cores of folds.

9.1 REGIONAL STRATIGRAPHY

The stratigraphic sequence encompassed by the Lossan Property extends from the Minnes Group at the base, through a complete sequence the Bullhead Group, to the lowermost part of the Fort St. John Group at the top. The Gething Formation of the Bullhead Group hosts the coal seams that have been the focus of exploration on the property. The surface geology is summarized on Figure 9-1 and the stratigraphic sequence is illustrated on Figure 9-2.

9.1.1 The Minnes Group

The Minnes Group is of latest Jurassic to earliest Cretaceous age, and has a maximum thickness of about 1000m in the Lossan Property. It is subdivided into the Monteith, Beattie Peaks, Monach, and Bickford Formations, which are exposed on the ridges along the northeast and southwest flanks of the property.

The Bickford Formation at the top of the Minnes Group, which consists primarily nonmarine sediments, contains some thin coal seams that are discussed in Item 9.2 of this report. The other formations of the Minnes Group consist primarily of tidal flat, delta front, prodeltaic, and/or marine sediments, and they contain no economically significant coal occurrences (Stott and Gibson 1980; Stott 1981).

9.1.2 Bullhead Group

The Bullhead Group is of Early Cretaceous age, and was deposited primarily in nonmarine environments (Stott 1968, 1972). In the Lossan Property, its contact with the underlying Minnes strata appears to be conformable. The Bullhead Group is subdivided into the Cadomin and Gething Formations.

9.1.3 Cadomin Formation

The Cadomin Formation forms the base of the Bullhead Group. It was referred to as the Dresser Formation in the Gulf reports (Gulf 1980-1984), which followed the stratigraphic terminology of Hughes (1967). That terminology was never widely adopted, however, so the name Cadomin Formation is used in the present report.

The Cadomin Formation is approximately 200m thick in the Lossan Property, and probably represents the distal part of a sequence of alluvial fan deposits. It consists mainly of coarse clastic sediments: medium- to very coarse-grained sandstone, grit, and chert-pebble to cobble conglomerate. At Lossan, conglomeratic sediments are predominant in the upper part of the formation, but intervals of fine-grained sediments and thin, discontinuous coal seams occur throughout the formation. The Cadomin Formation coal seams are discussed in Item 9.2 of this report.

9.1.4 Gething Formation

The Gething Formation is of Early Cretaceous, Aptian to early Albian age. It was deposited primarily in nonmarine lower delta-plain environments, although a zone of near-shore marine strata is present in the upper portion of the formation (Gibson 1992). Gibson subdivided the Gething Formation into three members, the Gaylard, Bulmoose and Chamberlain Members, and he included several cores from the Lossan Property in his study (DDH80-39, DDH81-06, and DDH8-08). The present report uses Gulf's terminology (Gulf 1980-1984), however, rather than Gibson's, to maintain continuity with the Gulf reports.

The Gething Formation conformably overlies the Cadomin Formation, and is about 475m thick on the Lossan Property. It consists primarily of dark grey mudstone and siltstone, interbedded with lesser amounts of argillaceous, very-fine to medium-grained sandstone, mudstone, and coal seams. There are minor beds of bentonitic claystone, coarse-grained sandstone, and argillaceous conglomerate in some areas. Upward-fining sedimentary cycles are typical, reflecting deposition in fluvial environments.

As many as sixteen Gething Formation coal seams have been intersected by drilling and trenching on the Lossan Property. Five of those seams, referred to as Seam 1 to Seam 5

in descending order, have been shown to have adequate thicknesses and continuity to be considered for mining. A detailed description of Seam 1 to Seam 5 is provided in Item 11 of this report.

Above Seam 1, there is a thick sequence of dark grey mudstone with interbeds of lighter grey siltstone. Scattered stringers and clasts of coal and carbonaceous mudstone are common throughout these beds. There are also worm burrows, siderite concretions, and fossil bivalves. This zone was deposited in a marginal marine environment, and is sometimes referred to as the Gething marine tongue, or the Bullmoose Member of Gibson (1992). This zone overlies Seam 1 and is about 30 m thick on the Lossan Property.

9.1.5 Fort St. John Group

The Fort St. John Group consists of the Moosebar, Gates, Hulcross, Boulder Creek, Hasler, Goodrich, and Cruiser Formations. Only the lower part of the Moosebar Formation is present on the Lossan Property, however. Although the other formations are present in surrounding areas, they have been removed by erosion within the Lossan Property itself.

9.1.6 Bluesky Member

The Bluesky Member of the Moosebar Formation was mapped by Gulf (1980-1984) as base of the Fort St. John Group. Although this unit was later redefined as the Chamberlain Member of the Gething Formation by Gibson (1992), the present report follows Gulf's terminology.

The Bluesky is a very distinctive stratigraphic marker bed in the Lossan Property. It ranges from about 2 to 5m thick, and lies about 30 m above Seam 1. It consists of an upward-coarsening sequence of fine- to medium-grained silty sandstone that is glauconitic in some areas. Thin conglomeratic beds with clasts of mudstone or quartzite are typically present in the upper part. The sequence is interpreted to represent shoreface or barrier island deposits (Gibson 1992).

9.1.7 Moosebar Formation

The Moosebar Formation conformably overlies the Bluesky Member. It consists of dark to medium grey mudstone and argillaceous siltstone that were deposited during a major regional transgression by the boreal Moosebar-Clearwater Sea (Gibson 1992). Intervals of lower Moosebar strata more than 270m in thickness have been drilled on the Lossan Property to date. That part of the sequence includes many as six bands of light-coloured tuff up to 10cm thick that serve as marker beds in drill core and on geophysical logs. Five of those bands occur within 20m to 30m above the top of the Bluesky Member.

9.2 COAL OCCURRENCES

On the Lossan Property, five of the coal seams in the Gething Formation have been shown to have sufficient thickness and continuity to be suitable for mining. Thinner coal seams are also present in the Gething Formation, and throughout the Bickford and Cadomin Formations, but are not considered to be of commercial interest in this study. The general seam stratigraphy is shown on Figure 9-3. Detailed correlation charts are included in Section 26.

9.2.1 Gething Coal Occurrences

Two primary coal zones and three subordinate coal zones in the upper part of the Gething Formation have been identified as mining targets at Lossan. They are described individually in Item 11 of this report. Seams in the lower part of the Gething are too thin to be of economic interest at the present time.

Correlation of the coal zones has been difficult in some areas of the Lossan Property, because the strata are tectonically deformed, and there is a lack of marker beds to aid correlation, and some uncertainties remain, particularly in the northern part of the property where drillhole spacing is still fairly wide. The previous correlation was fully revised for the present study, based on drilling and logging data acquired this year. The most significant correlation change is that the seam designated as No. 5 by Gulf is now shown to be Seam 4 in the Cline work. The Gething sediments in the Lossan Property are rather monotonous and consist mainly of upward-fining cycles of argillaceous fine-grained sandstone that grade into siltstone and mudstone. The coal seams themselves are usually the best available markers, but none of them have a consistently distinctive appearance in core or on geophysical logs. Seam thicknesses vary across the property, and sudden changes due to tectonic thickening or faulting have been encountered. Rock bands are common all coal seams, but their thickness and distribution within any seam is quite variable, and does not result in a distinctive pattern.

9.2.2 Other Coal Occurrences

Numerous coal occurrences have been reported from outcrops and trenches within Bickford Formation of the Minnes Group on the Lossan Property, but they are too thin to be of economic interest at present. In drillhole DDH 8108, in the eastern part of the property, approximately 150m of upper Bickford strata were cored, and although coal seams were found to be numerous, all were less than one metre thick. The thickest Bickford seam found to date had a true thickness of 1.17m in a trench in the eastern part of the property.

Coal seams have also been found to be numerous within the Cadomin Formation, but thicknesses rarely approach 1 m. A complete section of the Cadomin Formation was

cored in DDH 8108, and Cadomin Formation coal seams were noted at a variety of other locations during geological mapping.

9.3 STRUCTURAL GEOLOGY

9.3.1 Tectonic Environment

In northeastern British Columbia, deformation occurred during Late Cretaceous to Late Eocene time, and was characterized by high lateral compressive stresses that had a near-horizontal orientation. Depth of burial was not excessive, resulting in brittle to semi-brittle styles of deformation.

Large sheets of strata became detached during deformation and were displaced to the northeast along thrust faults. These thrusts generally have a staircase geometry, with wide flats almost parallel to bedding, connected by narrow ramps oblique to bedding that cut up-section toward the northeast. The tendency is for the faults to be subparallel to bedding in weak lithologies such as coal, mudstone and shale, and to be more oblique to bedding in competent lithologies such as sandstone.

Concentric, angular and box folds are typical fold geometries. The dip of fold limbs can vary from nearly horizontal to overturned, but is usually in the range of 20^0 to 50^0. Fold axes trend northwesterly. Plunge oscillates between northerly and southerly over the length of a large-scale fold, and is usually shallow, but can steepen locally to as much as 35^0. The major folds persist for large distances, in several cases more than 50km, and usually have an en echelon alignment. Illustrations showing typical structural styles for the Lossan Property are presented in Figures 9-4 through 9-7.

Concentric folds are roughly U-shaped, and in concentric folding both the competent and incompetent layers maintain a reasonably constant thickness throughout the structure. Chevron folds are V-shaped, with relatively short hinge areas and straight limbs. Strain in the hinge zone is usually accommodated by limb faults, the development of bulbous hinge zones, or boudinage of incompetent layers. The latter can produce localized tectonic thickening and thinning of coal seams. Examples of all of these features have been found associated with chevron folds on the Lossan Property, but have been simplified for portrayal on the cross-sections.

9.3.2 Structure of the Lossan Property

On the Lossan Property, the coal-bearing strata are contained within a series of northwesterly trending folds that are cut by thrust faults. The dominant structure is a complex fold that is referred to as the Goodrich Synclinorium. This structure is well exposed on Mount Goodrich, to the south of the Lossan Property, and in that area it consists of a simple, very large, essentially concentric fold. The structure becomes more

complex to the north where the synclinorium evolves. This synclinorium undergoes increasing structural modification and complexity on the Lossan Property. These complications take the form of tight folds which developed either after, or contemporaneously with faulting. The various cross-sections, Figures 9-4 through 9-7, as well as the geology map of Figure 9-1 illustrate these features. The Goodrich Synclinorium is a double plunging structure with the plunge reversal estimated to be in the vicinity of cross-section line N3250. The southern portion of the structure plunges north at 20^0 to 30^0 to the Brazion Creek valley. North of Brazion Creek, it shallows to 6^0. The northern portion of the structure has a southerly plunge of 7^0 south.

Exploration to date shows that the Goodrich Synclinorium consists of four primary fold structures. These are, from west to east, the Lossan Anticline and Syncline, Goodrich Anticline, Axis Creek Syncline, and the Brazion Creek Anticline. A further syncline located adjacent to and west of the Lossan Anticline may exist.

The marine Moosebar and coal-bearing Gething Formations are contained in the Lossan Anticline, Lossan Syncline, and the Axis Creek Syncline. Middle Gething strata is present in the Goodrich Anticline.

The principal mining targets for the present study are exposures or subcrop locations of the Seam 1 and Seam 3 where they approach the surface on the flanks of these structures. Only in a few instances is it possible to find hinge areas of these structures where the seams are shallow enough to mine. Thrust faults interrupt the continuity of the folded Gething Formation strata on the property, from place to place. These faults are typically high angle with a dip of about 60^0 to 70^0 to the west.

The Pyramis Thrust forms the western limit to the mining targets of the coal measures strata; it causes Lower Gething Formation rocks to be thrust from the west against Moosebar rocks in the Lossan Syncline. This fault has a vertical displacement of at least 300m. The eastern limit to the mineable seam targets is also fault defined. A thrust fault, similar in configuration to the Pyramis Thrust, truncates the east limb of the Axis Syncline; this fault has been named the Brazion Thrust. The amount of displacement on this fault is much lower than that of the Pyramis Thrust being only about 30m. This fault is, however, the focus for a significant change of the structural trend. To the west of this fault the fold axes and subcrop trend of the resistant units follows the normal northwesterly structural fabric for this area. However, to the east of this fault the trend of the fold axes is rotated into a more easterly orientation, especially towards the southern end of the property.

There are numerous other thrust faults on the Lossan Property that occur between the limits of the Pyramis Thrust and the Brazion Thrust. In most cases these faults have

displacements of about 10m or less and they are usually associated with the axial region of the synclines and anticlines that are found there. They represent one of the mechanisms of tectonic thickening and volume adjustment that occurs during the period of intense folding that has occurred. In most instances these structures don't affect the potentially mineable area as the coal in the hinge areas of the folds is usually too deep to be mined.

9.3.3 Small Scale Faulting

Small-scale faults with displacement of less than 6m have been observed in the Lossan Property drill core. Structures such as these have also been observed in surface exposures and trenches and have been intersected during adit driveage. Usually thrust repetition is a result of these tectonic processes but loss of section can also result. It is difficult to estimate the frequency of such structures from the amount of data available at present. Since the level of tectonic deformation appears to be greater on this property than on the Willow Creek Property, it should be anticipated that structures such as this, especially in the axial region of folds, will have a greater frequency.

9.3.4 Shearing

Most of the surface exposures on the property show that the coal has been sheared or tectonically disturbed to some extent. In general, scattered horizons within each seam are heavily sheared, as was found in the adit sections. Shear joints have also been seen throughout most of the coal sections. The degree to which to coal is sheared in this area is the primary reason why so many of the coal intersections are reported to have such low recoveries.

10 DEPOSIT TYPES

The definition of "Deposit Type" for coal properties is different from that applied to other types of geologic deposits. Criteria applied to coal deposits for the purposes of determination of coal resources include both "Geology Type" as well as "Deposit Type". This is an important concept because the classification of a coal deposit as a particular type determines the range of limiting criteria that may be applied during the estimation of Reserves and Resources.

"Geology Type" for coal deposits is a parameter that is specified in Geological Survey of Canada Paper 88-21 (Hughes et al. 1989), which is a reference for coal deposits as specified in NI 43-101. Coal "Geology Type" is a definition of the amount of geological complexity, usually imposed by the structural complexity of the area, and the classification of a coal deposit by "Geology Type" determines the approach to be used for the Resource/Reserve estimation methodology and the limits to be applied to certain key estimation criteria. The identification of a particular geology type for a coal property defines the confidence that can be placed in the extrapolation of data values away from a particular point of reference.

The classification scheme of GSC Paper 88-21 is similar to many other international coal reserve classification systems but it has one significant difference. This system is designed to accommodate differences in the degree of tectonic deformation of different coal deposits in Canada. Four classes are provided for that range from the first, which is for deposits of the Plains type with low tectonic disturbance, to the fourth which is for Rocky Mountains type deposits such as that of Byron Creek, which is classed as "severe". The third class is referred to as "complex"; the steeply dipping and moderately faulted strata of the Lossan Property are typical of this class.

"Deposit Type" as defined in GSC Paper 88-21 refers to the extraction method most suited to the coal deposit. There are four categories:

- surface,
- underground,
- non-conventional, and
- sterilized.

With respect to Deposit Type, the Lossan Property is considered to be a surface mineable deposit.

11 MINERALIZATION

For coal deposits, "mineralization" refers to coal development and coal seam stratigraphy. On the Lossan Property, the coal zones of economic interest lie within the upper part of the Gething Formation. In the lower part of the Gething Formation and some of the underlying formations, surface mapping and drilling data indicate that additional coal zones are present, but they tend usually to be thin and discontinuous across the property. Their depth means that there are few data points available to properly address their economic significance. As a result their commercial potential is not addressed in the present report. The distribution of the principal seams in the sequence is illustrated on the typical log of Figure 9.3 and the correlation of these seams is shown on the charts of Figures 11.1, 11.2 and 11.3 in Section 26.

At Lossan in the area north of Cross-Section 2250, five coal zones in the upper part of the Gething Formation, designated Seam 1 to Seam 5, have been identified as mining targets. All five zones consist of sequences of interbedded coal plies and rock bands. The thickness and distribution of the coal plies and rock bands in all zones change across the property, and changes can occur over relatively short distances. Thicknesses of interseam strata also vary. These variations are due in part to changes in the original depositional environment, and in part to the tectonic effects of folding and faulting.

The area south of Cross-Section 2250 was addressed by Gulf Canada in exploration work that was completed in 1984 when a separate report specifically addressing that area was prepared. The main part of that area which contains the mining target seams immediately north of Brazion Creek is quite intensively drilled and no additional testing of it was conducted during the current exploration program. Gulf Canada evaluated the complete geology of the Gething Formation coal section in that area and identified sixteen seams in the sequence. Two of these, which they identified as Seams 1 and 5 were the principal mineable units. These two seams for that area are addressed in the present report as well but no modification of the structural interpretation of that area has been made. However, the current work has led to the conclusion that the seam that Gulf identified as Seam 5 is actually Seam 4. This seam, in the area north of Section 2250 has thus been redesignated. However, south of Section 2250, where no other interpretation changes have been made and no new exploration has been conducted, the original seam designation of Gulf Canada has been preserved.

In the area north of Section 2250, Seam 1 and Seam 3 are the primary mining targets on the Lossan Property. Seam 1 is thickest and thus the primary target in the southern part of the property, and Seam 3 is thickest and the primary target in the northwestern part.

Seams 2, 4 and 5 are generally thinner, but each represents a significant resource in some areas of the property.

Seam 1

Seam 1 is the uppermost seam in the Gething Formation at Lossan. It lies about 30m to 60m below the base of the distinctive Bluesky Member. Where that unit is present, Seam 1 is easily recognized by its stratigraphic position.

Seam 1 is thickest in the southern parts of the Lossan Property, where in a few instances it has been tectonically thickened by folding and faulting. It usually includes several rock bands, particularly in the upper part, and some of the Seam 1 rock bands are distinctively tuffaceous. Seam 1 is overlain by a thick sequence of regularly interbedded siltstone, mudstone and carbonaceous mudstone, and usually has a seam floor of silty to sandy mudstone.

Thicknesses in excess of 10m for the Seam 1 zone have been documented in a number of drill holes in the Brazion Creek area where surface exposures have clearly demonstrated the effects of tectonic thickening. There are other instances of such tectonic effects in other areas as well but the localized nature of such structural effects and the current drilling density is not sufficient to clearly define such zones. The natural thickness in an undisturbed setting in the central part of the property is illustrated in CL05-24 where the Seam1 zone was 8.6m thick, of which 7.5m was coal. At the Cline Adit, the zone was about 5.5m thick, of which about 4.6m was coal. In most areas where it is thick, the lower part of the zone consists of relatively clean coal, and the majority of the rock bands and sheared zones occur within the upper part. Seam 1 thins toward the northwest, where thicknesses of 1.0m or less are typical. However Seam 1 has a thickness of more than 5m in this area on the east side of the property near Hole CL05-06.

Seam 2

Seam.2 lies approximately 30 to 50m below Seam 1. Seam 2 is generally about 1.0 to 2.0m thick throughout the Lossan property, and consists of coal interbedded with carbonaceous mudstones and shale. Individual coal plies are typically about 1.0 m thick or less.

Seam 3

Seam 3 lies about 80m to 100m below Seam 1. It is the thickest coal zone in the northwestern part of the Lossan Property, where it typically consists of two zones of clean coal, separated by a zone of carbonaceous mudstone or stoney coal up to about 1.0 m thick. This seam usually has a distinct and consistent signature and it is one of the more useful units that can be used for correlation in the northern part of the property. Its total thickness in most cases ranges from about 3.0m to 5.0m but there are three

intersections in different drill holes in the north part of the property with thickness of up to 12.7m. The cause for these higher than normal thickness values is not known; they may be due to tectonic thickening or they may represent local areas of increased peat development in the original swamp. The roof and floor strata of Seam 3 consist of carbonaceous mudstone.

Seam 4

Seam 4 lies about 110m to 140m below Seam 1. It reaches thicknesses in excess of 3.0 m in the northwestern part of the Lossan Property, where it typically consists of two coal plies separated by a zone of carbonaceous mudstone. For example, at CL05-10, the Seam 4 zone reached a total thickness of 7.6m, of which 4.6m was coal and the remainder was a zone of carbonaceous mudstone. Thicknesses range from about 0.5m to 3.0m in the remainder of the property. The roof of the Seam 4 zone is typically carbonaceous mudstone, and the floor is typically silty mudstone.

Seam 5

Seam 5 lies about 200m to 220m below Seam 1. It typically consists of a single ply of coal that is less than 1.0m, with a floor of carbonaceous mudstone. The maximum thickness of 2.0m for Seam 5 was intersected at CL05-06 in the northeastern part of the property.

12 EXPLORATION

12.1 THE GULF 1980-1984 EXPLORATION PROGRAMS

During the early 1980's, Gulf Canada Resources Ltd. held an option covering the Lossan coal licences. During that time, Gulf drilled sixty-eight holes on the property, and completed a variety of other exploration activities. The details of the drilling are provided in Item 13 of this report. A description of the other exploration activities is presented below.

Gulf's programs included helicopter-supported geologic mapping, aerial photography, surveying, and topographic mapping over the entire property. In addition, one hundred and forty four trenches were excavated in coal seams. However, data from the trenches was used only for qualitative purposes, such as seam identification and location, because many of the trenches were shallow, hand-dug structures, and seam thicknesses were subject to distortion by soil creep.

In 1982, Gulf constructed an adit. It was driven into Seam 1 for a distance of about 50 m, and bulk samples of unoxidized coal were taken for quality testing. Results of analytical work on the Gulf adit samples are presented in Item 18.

Gulf's efforts led to the completion of a preliminary feasibility study in 1982, while exploration continued on the property. Production was targeted for a window of opportunity that was expected in the mid to late 1980's, but that opportunity did not materialize due to low coal prices and competition from other coal producers. Gulf returned its focus to the petroleum industry, and allowed its option to lapse.

12.2 THE CLINE 2005 EXPLORATION PROGRAM

No further exploration was done at Lossan until rising coal prices led Cline Mining Corporation to option the Lossan coal licences in late 2004. During January to March of 2005, Cline completed a program of twenty-eight drillholes, as detailed in Item 13 of this report.

In March and April of 2005, Cline constructed one adit. It was driven into an outcrop of Seam 1 for a distance of about 50 m, where bulk samples of unoxidized coal was taken for quality testing. Results of analytical work on the Cline bulk sample are presented in Item 18 of this report.

Surveying, topographic mapping, and access studies are currently in progress, as this mining feasibility study is in preparation.

13 DRILLING

Gulf Canada Resources Ltd. completed drilling programs during 1980 and 1981. During the 1980 program, a series of uncored rotary drillholes was completed near the Hasler Road and Brazion Creek at the south end of the property. That was followed by a series of fully-cored diamond drillholes and additional uncored drillholes in the same area. During 1981, drilling was extended throughout the property, using helicopter support where necessary. In total, Gulf completed forty-one cored holes and twenty-seven uncored holes on the Lossan Property, as summarized on Table 13-1. The details of the Gulf drillholes are listed in Table A.3 of Appendix A in Section 20.

Cline Mining Corporation optioned the Lossan coal licences in 2004, and completed a drilling program during January to March of 2005. The drilling consisted of ten uncored holes, fifteen partially cored holes, and three fully cored holes. The Cline 2005 drilling program is summarized on Table 13-1. The details of the Cline drillholes are listed in Table A.2 of Appendix A in Section 20.

TABLE 13.1
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
LOSSAN PROPERTY DRILLING ACTIVITY

Operator	Year	Holes Drilled	Metres Drilled	Metres Cored
Gulf Canada	1980	44	12,180	6,289
	1981	24	7,751	5,830
Cline Mining	2005	28	4,281	861
TOTAL		96	24,212	12,980

The drillhole density from the Gulf programs was high in the southern part of the property, but decreased toward the north, and coverage in the northernmost areas was low. Cline's 2005 drilling program therefore focused improving the drilling density in the central and northern areas.

Trails were constructed from the Boulder Road to provide vehicle access to all drill sites. The work was done during winter when the ground was frozen, which facilitated trail construction and vehicle access in poorly drained, swampy areas. All trails were closed and reclaimed after completion of the program.

Geophysical logs were recorded in all of the drillholes. The suite consisted of natural gamma, density, calliper, and neutron logs. It was possible to log most of the holes under

open-hole conditions but some holes were logged through the rods due to unstable ground conditions. Directional surveys were recorded in most of the non-vertical holes.

In addition to the drilling described above, a track-mounted blast-hole drill was used to locate seam subcrops beneath overburden cover. A series of uncored blast-holes could be drilled relatively quickly, and coal seams were easily recognized by the change in penetration rate and the colour of the cuttings. More than one hundred holes reaching depths of up to 35 m were completed by the blast-hole drill.

Although the data from the blast-hole program was used only for qualitative purposes, such as identifying optimal locations for the larger drills, and determining seam subcrop locations for the geological map, it proved to be a very useful and cost-effective approach. The details of the blast-holes are not included in any of the summary tables.

14 SAMPLING METHOD AND APPROACH

All of the bulk samples and core samples that were collected and submitted for analysis by both Gulf and Cline were handled using methods that are standard for the coal industry. Norwest's staff supervised the sampling of the Gulf adit and also sampled many of the coal cores that were drilled on this property during the Gulf programs, and they have personal knowledge of the techniques that were applied on this property at that time. Norwest's staff also supervised the sampling of the Cline adit, and sampled many of the coal cores from the Cline program. Staff of Cline Mining Corporation participated in the collection or administration of the Cline core and bulk samples, but did not participate in any of the activities related to the collection or administration of the Gulf core or bulk samples.

All drill cores were of HQ or 3 inch size. The drillers placed them in appropriate-sized core boxes after they were retrieved to the surface, and the geologists moved the boxes to a shed for description and sampling. The core was measured and described in the core boxes, and the coal intervals were identified. The procedure for sampling of coal was to bag the complete core for each ply, which must be not less than 15cm in length in the case of coal, and not less than 5cm in the case of rock bands. These minimum sample lengths were specified so that, on crushing to standard product sizes, the coal samples would still be representative. The smaller sample size for the rock intervals was applicable because only the ash content and the content of waste components needed to be known.

Both the Gulf and Cline adits were driven sub horizontally into steeply dipping outcrops of Seam 1. Drivage continued until unoxidized coal was reached, as determined by field testing. The full section of the seam was then exposed, and bulk samples were taken from each subdivision of the seam, as described in the Adit Report of Section 18.

15 SAMPLE PREPARATION, ANALYSES AND SECURITY

The following is a description of the sample preparation and security procedures that were used during the Gulf exploration programs in the early 1980's, and during Cline's 2005 program. These are the standard methods used in the coal industry. It is not usual to employ special security methods for the shipping and storage of coal samples, because coal is a low-value bulk commodity.

After the geologists measured the coal cores and divided them into plies as described in Item 14 of this report, the samples for each ply were packaged in strong plastic bags and tagged with all relevant information. Where the samples were too large, multiple bags per ply were used. The samples were then dispatched by ground transportation to Elk Valley Environmental Services Ltd. in Sparwood, B.C. This is a commercial coal laboratory that uses coal industry standard ASTM testing procedures.

At the adits, bulk samples were packaged in drums, each with a capacity of about 350 lbs. They were then trucked to Birtley Coal and Minerals Testing in Calgary, a laboratory that uses standard coal testing procedures as specified by ASTM.

Analytical work included proximate analysis for ash, volatile matter, fixed carbon, and moisture content, sulphur content, Free Swelling Index, Hardgrove Grindability Index and specific gravity on both raw coal and washed fractions. Results are presented in Item 18 of this report.

16 DATA VERIFICATION

Geologists from Norwest were asked by Cline Mining to perform a review of all available geological information concerning the Lossan Property, and we have performed this task.

Information collected during the early 1980's by Gulf Canada Resources constitutes a significant proportion of the database for the Lossan Property. Both the raw data and the various geological interpretations prepared by Gulf's geologists were compiled in reports filed with the British Columbia Ministry of Energy, Mines and Petroleum Resources, that are now available to the public. Geologists now in the employ of Norwest participated in the Gulf exploration programs, and are familiar with the methods that were used.

Norwest reviewed the Gulf reports and independently checked the exploration data. This included verification of the seam depth and thickness data, by determining the depths and thicknesses from the geophysical logs, and comparing them with values given in the reports. No significant variations were found, and Norwest concluded that the Gulf reports are accurate with respect to seam thickness and depth data.

In the majority of cases, Norwest is in agreement with the interpretations that were produced by Gulf, and has concluded that the Gulf interpretations are a fair representation of the geology of the Lossan Property, as it was understood from the exploration data that were available at that time. Extensive modifications to the Gulf interpretations were needed where the drilling density is low. This especially occurs north of cross-section 5000N. The changes affected both the seam correlation and the interpretation of geological structure. In particular, it was found that it was necessary to revise the seam correlation such that Gulf's No.5 Seam was re-designated as Seam 4.

Gulf's drilling density in the southern part of the property was high, and Norwest has concluded that Gulf's interpretation for the southern area is acceptable without modification. In the central and northern part of the property, however, Gulf's drillhole density was relatively low, resulting in a lower degree of certainty for those areas. The Cline 2005 drilling program improved the drillhole density in those areas. Norwest geologists participated in the Cline drilling program, and are familiar with the procedures and methods used. They integrated the new information from the Cline 2005 program with the existing Gulf data, and prepared a revised interpretation for the central and northern areas.

17 ADJACENT PROPERTIES

No data or information is available for adjacent properties that is pertinent to the present report.

18 MINERAL PROCESSING AND METALLURGICAL TESTING

The equivalent terminology, which will be used in this report on coal in the Lossan Area, is "Coal Quality" and "Coal Processing.

18.1 COAL QUALITY FROM PREVIOUS INVESTIGATIONS

The description of coal quality for the Lossan Area presented below is based on data available from assessment reports of the Lossan Area submitted in the past by Gulf Canada Resources to the Government of British Columbia. The rank of this coal is described as medium volatile bituminous.

18.1.1 Coal Laboratory Test Results – Previous Programs

The original coal quality database was compiled from bulk samples of an adit and core recovered from drilling. The data base includes test results for proximate analyses, drill core washability tests, drill core FSI composite tests and one adit bulk sample test. Table 18.1 is a summary of the test results for that work.

Table 18.1
Cline Mining Corporation
Lossan Coal Project
Summary of Gulf Canada Drill Hole Coal Quality

Hole Name	Thickness (m)	Lithology	Seam Name	From (m)	To (m)	Moisture (%)	Volatile (%)	Ash (%)	Btu	Sulfur (%)	FC (%)	FSI
Seam 1 Quality												
DDH8030	0.70	C2	S1	158.33	159.03	0.76	22.35	23.22	11348	0.23	53.67	2.0
DDH8030	1.67	C4	S1	160.59	162.26	0.91	19.08	43.34	8371	0.22	36.68	3.5
DDH8030	2.37	Composite	S1			0.87	20.05	37.40	9250	0.22	41.70	
DDH8101	1.30	C2	S1	323.25	324.55	0.79	25.39	8.11	13743	0.29	65.71	1.5
DDH8101	1.04	C6	S1	324.55	325.59	0.63	21.80	21.95	11462	0.19	55.62	1.0
DDH8101	0.71	C2	S1	325.59	326.30	0.69	28.44	6.95	14357	0.25	65.32	3.0
DDH8101	0.41	SH	S1	326.30	326.71	0.70	15.50	65.85	3940	0.06	17.95	0.0
DDH8101	1.66	C3	S1	326.71	328.37	0.74	26.28	12.17	13361	0.24	60.83	4.5
DDH8101	0.46	CS	S1	328.37	328.83	0.68	25.65	50.53	6809	0.15	25.14	4.5
DDH8101	0.61	C1	S1	328.83	329.44	0.77	35.30	10.07	13701	0.40	56.77	8.5
DDH8101	0.84	C2	S1	333.64	334.48	0.66	30.16	14.10	13144	0.25	55.00	8.0
DDH8101	0.98	SH	S1	333.48	335.46	1.04	11.52	72.05	3545	0.10	15.30	1.0
DDH8101	0.65	C2	S1	335.46	336.11	0.67	33.65	10.09	13879	0.26	55.61	8.0
DDH8101	0.61	C5	S1	336.11	336.72	0.74	20.35	38.30	8423	0.17	40.11	1.0
DDH8101	2.08	C2	S1	336.72	338.80	0.90	22.25	17.59	12260	0.23	59.26	1.0
DDH8101	11.35	Composite	S1			0.78	24.35	23.25	11404	0.22	51.92	
DDH8102	2.06	C2	S1	305.52	307.58	0.80	24.44	18.99	11834	0.25	55.77	2.0
DDH8102	0.90	SH	S1	307.58	308.48	0.91	9.85	78.89	2490	0.13	10.35	0.0
DDH8102	1.39	C4	S1	308.48	309.87	0.73	20.92	30.25	10041	0.22	48.10	1.0
DDH8102	0.68	SH	S1	309.87	310.55	0.78	12.23	86.04	370	0.02	0.95	0.0
DDH8102	2.07	C1	S1	310.55	312.62	0.82	24.44	12.87	13003	0.26	61.87	2.0
DDH8102	1.48	CS	S1	312.62	314.10	0.76	11.81	70.94	2950	0.15	16.49	0.5
DDH8102	1.11	C1	S1	314.10	315.21	1.00	24.16	11.60	13261	0.29	63.24	1.5
DDH8102	1.11	C6	S1	315.21	316.32	1.01	17.27	57.74	5392	0.13	23.98	1.0
DDH8102	2.10	C2	S1	316.32	318.42	1.05	25.25	12.68	13137	0.33	61.02	5.0
DDH8102	1.09	C4	S1	318.42	319.51	0.90	27.07	27.62	10716	0.44	44.41	0.5
DDH8102	2.33	C2	S1	323.00	325.33	1.07	23.56	16.11	12625	0.34	59.26	4.5
DDH8102	1.70	C6	S1	325.33	327.03	0.97	22.08	42.69	8007	0.23	34.26	4.5
DDH8102	1.36	C6	S1	328.71	330.07	0.94	22.49	41.48	8338	0.21	35.09	1.0
DDH8102	19.38	Composite	S1			0.91	21.48	33.15	9621	0.25	44.46	
DDH8103	2.16	C1	S1	426.25	428.41	1.15	24.65	5.51	14224	0.31	68.69	1.5
DDH8103	0.61	C5	S1	428.41	429.02	0.92	16.98	42.59	7753	0.13	39.51	1.0

Table 18.1 (Cont'd)
Cline Mining Corporation
Lossan Coal Project
Summary of Gulf Canada Drill Hole Coal Quality

Hole Name	Thickness (m)	Lithology	Seam Name	From (m)	To (m)	Moisture (%)	Volatile (%)	Ash (%)	Btu	Sulfur (%)	FC (%)	FSI
DDH8103	1.84	C2	S1	429.02	430.86	1.05	24.45	12.79	12956	0.23	61.71	2.0
DDH8103	0.73	CS	S1	430.86	431.59	0.98	14.90	63.36	4554	0.10	20.76	1.5
DDH8103	3.11	C2	S1	431.59	434.70	1.10	23.39	16.99	12556	0.28	58.62	2.5
DDH8103	0.28	C6	S1	434.70	434.98	0.80	23.26	47.66	6441	0.14	28.28	2.0
DDH8103	0.89	C1	S1	434.98	435.87	1.06	28.51	7.57	14083	0.34	62.86	8.0
DDH8103	0.98	C3	S1	435.87	436.85	0.95	25.48	37.24	9159	0.31	36.35	8.0
DDH8103	1.76	C1	S1	436.85	438.61	1.02	33.73	7.82	14117	0.60	57.43	8.5
DDH8103	12.36	Composite	S1			1.05	24.95	18.68	12122	0.31	55.34	
DDH8105	3.80	C2	S1	166.50	170.30	1.28	23.90	10.24	13339	0.24	64.58	1.0
DDH8105	0.55	C4	S1	170.30	170.85	1.07	22.91	25.21	11189	0.63	50.81	3.0
DDH8105	0.75	CS	S1	170.85	171.60	0.65	18.41	60.94	4309	0.10	19.99	1.0
DDH8105	4.60	C1	S1	172.60	177.20	1.06	26.24	16.19	12741	0.24	57.55	4.0
DDH8105	9.70	Composite	S1			1.12	24.53	17.83	12235	0.25	57.02	
DDH8116	1.35	C2	S1	137.98	139.33	0.54	25.64	16.42	12700	0.44	57.40	7.0
DDH8120	4.15	C2	S1	215.91	220.06	0.68	24.62	16.46	12451	0.19	58.24	1.5
DDH8120	0.21	C1	S1	221.72	221.93	0.81	24.14	7.56	13680	0.10	67.49	1.5
DDH8120	0.28	C5	S1	221.93	222.21	0.46	38.51	35.09	6819	0.12	25.94	0.0
DDH8120	1.18	C1	S1	222.21	223.39	0.75	28.45	6.34	14063	0.26	64.46	7.0
DDH8120	0.07	SH	S1	223.39	223.46	0.62	11.55	72.86	3306	0.12	14.95	1.0
DDH8120	1.01	SH	S1	223.46	224.47	0.62	11.55	72.86	3306	0.12	14.95	1.0
DDH8120	0.35	C1	S1	224.47	224.82	0.64	25.65	10.03	13955	0.48	63.65	5.0
DDH8120	7.25	Composite	S1			0.68	23.87	23.37	11242	0.20	52.09	
DDH8122	5.27	C4	S1	233.59	238.86	1.09	20.45	37.55	8727	0.17	40.91	1.0
DDH8122	1.03	C1	S1	245.49	246.52	0.97	32.83	7.06	14245	0.52	59.14	8.5
DDH8122	2.12	C3	S1	262.53	264.65	0.87	28.14	24.71	11294	0.40	46.28	7.0
DDH8122	8.42	Composite	S1			1.02	23.90	30.59	10048	0.27	44.49	
Seam 3 Qaulity												
DDH8021	0.28	C2	S3	23.15	23.43	0.37	15.70	28.47	10850	0.50	55.46	1.0
DDH8021	0.54	SH	S3	23.43	23.97	0.70	9.28	76.83	2714	0.56	13.19	0.0
DDH8021	0.54	C2	S3	23.97	24.51	0.38	18.13	18.34	12312	0.20	63.15	0.5
DDH8021	2.90	C1	S3	27.98	30.88	0.55	22.14	3.17	14767	0.16	74.14	1.5
DDH8021	0.16	C2	S3	30.88	31.04	0.43	26.58	12.58	12574	0.35	60.41	0.0

Table 18.1 (Cont'd)
Cline Mining Corporation
Lossan Coal Project
Summary of Gulf Canada Drill Hole Coal Quality

Hole Name	Thickness (m)	Lithology	Seam Name	From (m)	To (m)	Moisture (%)	Volatile (%)	Ash (%)	Btu	Sulfur (%)	FC (%)	FSI
DDH8021	0.98	C1	S3	31.04	32.02	0.57	19.93	3.49	14692	0.38	76.01	0.5
DDH8021	0.17	CS	S3	32.02	32.19	0.79	11.12	67.83	4151	0.44	20.25	0.5
DDH8021	0.47	C2	S3	32.19	32.66	0.53	21.66	17.85	12178	0.41	59.94	4.5
DDH8021	0.15	SH	S3	32.66	32.81	0.73	10.12	72.54	2995	0.15	16.61	0.0
DDH8021	0.52	C2	S3	32.81	33.33	0.63	21.79	24.39	11389	0.45	53.19	7.0
DDH8021	6.71	Composite	S3			0.56	19.69	17.51	12397	0.29	62.25	
DDH8115	1.62	C1	S3	93.68	95.30	0.75	22.30	7.48	14179	0.41	69.47	8.0
DDH8115	0.30	SH	S3	95.30	95.60	1.47	7.69	82.55	1334	0.08	6.29	0.0
DDH8115	2.23	C1	S3	95.60	97.83	0.50	21.02	7.87	13964	0.34	70.68	1.5
DDH8115	4.15	Composite	S3			0.67	20.56	13.12	13135	0.35	65.55	

From 1979 through 1981 the evaluation of the coal quality on the Lossan Property was based on core samples from drilling. Most intersections tested were for Seam 1 but some of the analyses addressed Seam 3. An adit, ADT 82-1, was constructed in Seam 1 in the south central portion of the property in 1982 and extensive bulk testing was performed on large samples recovered from the seam at this site. In 1984 a series of large trenches were also bulk tested in the south of the property. These trenches were constructed on four of the seams in the sequence in that area. These were Seams 1, 5, 15 and 16, following the nomenclature used by Gulf Canada at that time. The results of all of the testing performed to that time on the property were summarized in the Assessment report for that year. That summary, and the test results presented in support of the findings, is reproduced below.

"**Summary of 1981 Data**
Coal Quality Specifications- Gething Seam No. 1

The Gething Seam No. 1 is a bituminous coal with unique coking and thermal coal properties that are attractive to potential export markets. A good quality thermal and metallurgical coal product can be obtained from the No. 1 Seam if selectively mined. The washability data indicates that a low ash (6.5%), medium volatile (27% to 30% dmmf basis), and low sulphur (<0.3%) coking coal with a free swelling index of 4-6, maximum fluidity of 40-300 ddpm and dilatation of 30-100% can be produced.

Petrographic studies of fourteen Goodrich coal samples indicated that the No. 1 Seam could produce a strong metallurgical coke. The mean reflectance averages 1.15 and ranges from 1.07 to 1.28 which places the Goodrich coal in the medium to high volatile category. The total reactives average is 64.0%.

Thermal coal production from the same seam is of similar high quality readily meeting all the Japanese Coal Development Company specifications, as shown on Gulf Canada Table 7.1.1. The No. 1 Seam has a volatile content in the upper range for medium volatile coals with a low fuel ratio averaging 2.3. In producing a product with 14% ash the calorific value is approximately 7100 Cal/g. The ash fusion temperatures exceed the required initial deformation and fluid temperatures in an oxidizing atmosphere.

Gulf Canada Table 7.1.1
Preliminary Specifications of Coal Quality
Seam No.1
(air-dried basis)

Item	Coking	Thermal	JCD's Spec.
Total Moisture	8.0%	8.0%	Max 10%
Residual Moisture	1.0%	1.0%	
Ash	6.5%	14.0%	Max. 20%
V.M.	29.0%	26.0%	
Fuel Ratio		2.3%	Max. 2.5
Calorific Value (Cal/g)	7800	7100	Min. 6200
Total Sulphur	0.3%	0.3%	Max 1.0%
Free Swelling Index	4 – 8		
Maximum Fluidity (DDPM)	40 - 300		
Total Dilatation	30 - 100		
Ash Fusion Temp.			
S.T.		1350°C	Min. 1200°C
F.T.		+1450°C	Min. 1300°C
Nitrogen		1.28%	Max. 1.8%
Na_2O in Ash		0.91%	0.1% – 3.0%
Basic/Acid in Ash		0.27	Max. 0.5%
HGI		64	Min. 45
Cl in Coal		0.03%	Max. 0.05%

Coal Quality Specifications – Gething Seam No. 5

The Gething No.5 Seam is a low volatile bituminous coal. The volatiles range from 20% to 27% on a dry mineral matter free (dmmf) basis. The average FSI obtained is 4.75 at a 5% ash level. The coal quality presented in Gulf Canada Table 7.1.2 is based on an average of four drill core samples drilled north of the Brazion Creek Property.

Gulf Canada Table 7.1.2
Preliminary Specifications of Coal Quality
Seam No. 5
(air-dried basis)

		JCD's Spec.
Total Moisture	8.0%	Max 10%
Residual Moisture	1.2%	
Ash	14.0%	Max. 20%
V.M.	21.0%	
Fuel Ratio	3.0	Max. 2.5
Calorific Value (Cal/g)	7100	Min. 6200
Total Sulphur	0.49%	Max 1.0%
Ash Fusion Temp.		
S.T.	1270°C	Min. 1200°C
F.T.	1350°C	Min. 1300°C
Na_2O inAsh	1.0%	0.1% – 3.0%
Basic/Acid in Ash	0.44%	
HGI		Min. 45
C1 in Coal	0.049%	Max. 0.05%

In 1982 the results of testing for the Gulf Canada Adit were published and the results were also summarized in the 1984 report. That summary is reproduced as follows:

"Coal quality analyses and washability tests performed by Birtley Coal and Minerals Testing show that excellent metallurgical and thermal coal products were obtained from an adit (ADT-82-1) bulk sampling program of the Gething Seam No.1 located north of the Brazion Creek Area.

Three unoxidized bulk samples were taken at the adit and tested for various product specifications. Results for the three samples, B2, B3A and B3B, are listed on Gulf Canada Table 7.2.1.

Summary of Metallurgical Coal Products

The metallurgical coal products from the entire seam sample (B2) Gulf Canada Table 7.2.1, were washed and tested separately at 9.5% and 6.5% ash levels. The volatile matter on a dry mineral matter free basis (dmmf) for both the 9.5% and 6.5% ash

product is about 26%, the free swelling index is 2 to 2.5, and the clean coal recoveries are 78% and 66% respectively.

Gulf Canada Table 7.2.1
Coal Quality Summary
B2 Sample (Entire Seam Mined)
(air-dried basis)

Product Specification	Thermal Coal 14% Ash Sub Sample 1	Met Coal 9.5% Ash Sub Sample 2	Met Coal 6.5% Ash Sub Sample 3a
Sample ID Number	3434	3375	3376
Air dried moisture	5.9%	5.5%	7.4%
PROXIMATE ANALYSIS			
Residual Moisture	1.8%	0.8%	0.8%
Ash	12.3%	9.3%	6.3%
Volatile matter	23.7%	24.4%	24.9%
Fixed Carbon	62.2%	65.5%	68.0%
Sulphur	0.32%	0.34%	0.32%
Free Swelling Index	2	2	2.5
Fuel Ratio	2.62	-	2.73
Calorific Value (cal/g)	7245	7589	7867
PHYSICAL PROPERTIES			
Hardgrove Index	62	65	61
Specific Gravity	1.36	1.37	1.33
ASH ANALYSIS			
P in Ash	0.08%	0.08%	0.027%
Cl in coal	0.02%		
N in coal	0.95%	0.92%	1.02%
DILATATION			
Soft Temperature	Not Tested	404 °C	407 °C
Maximum Temperature		-	-
Contr. Temperature		20% @ 500 °C	19% @ 491 °C
Maximum Dilatation		-	-
G Factor		-	-
FLUIDITY			
Start Temperature	Not Tested	1 ddpm @ 440°C	1 ddpm @ 448°C
Maximum Temperature		2 ddpm @ 460°C	2 ddpm @ 460°C
Final Temperature		0 ddpm @ 491°C	0 ddpm @ 488°C
Range		42	40
CLEAN COAL YIELD	86.7%	78.3%	66.7%

Gulf Canada Table 7.2.1 (cont'd)
Coal Quality Summary
B3 Sample (Selectively Mined)
(air-dried basis)

Product Specification	B3A Met Coal 6.5% Ash	B3B Thermal Coal 14.5% Ash Includes rejects From Sample B3A
Sample ID Number	3454	3474
Air dried moisture	4.8%	6.0%
PROXIMATE ANALYSIS		
Residual Moisture	0.9%	0.6%
Ash	6.3%	12.7%
Volatile matter	29.1%	23.3%
Vm (dmmf)	30.9%	25.92%
Fixed Carbon	63.7%	63.4%
Sulphur	0.32%	0.30%
Free Swelling Index	7	1
Fuel Ratio		2.72
Calorific Value (cal/g)	7954	7286
PHYSICAL PROPERTIES		
Hardgrove Index	69	60
Specific Gravity		1.40
ASH ANALYSIS		
P in Ash		0.09%
Cl in coal		0.04%
N in coal		
DILATATION		
Soft Temperature	383 °C	Not Tested
Maximum Temperature	461 °C	
Contr. Temperature	22% @ 431 °C	
Maximum Dilatation	32%	
G Factor	1.017	
FLUIDITY		
Start Temperature	1 ddpm @ 427°C	Not Tested
Maximum Temperature	333 ddpm @ 462°C	
Final Temperature	0 ddpm @ 495°C	
Range	68	
CLEAN COAL YIELD	21.7%	100%

Gulf Canada Table 7.2.1 (cont'd)
Coal Quality Summary
B1 Sample (Entire Seam, Oxidized)
(air-dried basis)

Sample ID Number	3617
PROXIMATE ANALYSIS	
Residual Moisture	3.8%
Ash	13.4%
Volatile Matter	28.0%
Fixed Carbon	54.8%
Sulphur	0.24%
CALORIFIC VALUE (cal/g)	5882
Fuel Ratio	1.96
Hardgrove Index	98
Specific Gravity	1.49
CLEAN COAL YIELD	44.6%

Although below average results were obtained from the clean metallurgical coal products from the entire seam, excellent coking characteristics were identified in the selectively mined metallurgical coal portion of Seam No.1.

The separately mined 6.5% ash metallurgical coal product tested as a high volatile (30.9% dmmf) coking coal with an FSI of 7, dilatation of 32%, and maximum fluidity of 333 ddpm. The coal products contain approximately 0.32% total sulphur and less than.0.03% phosphorus.

Summary of Thermal Coal Products

A high calorific thermal coal of greater than 7100 Cal/gm is attainable from the No.1 Seam regardless of the mining method.

Phosphorus and chlorine content in the thermal products are less than.0.09% and 0.04% respectively. Nitrogen content in the coal is less than 0.95%. The Hardgrove Index ranges, for all products, between 60 to 69.

The average ash fusion temperatures are shown in Gulf Canada Table 7.2.2.

Gulf Canada Table 7.2.2
Average Ash Fusion Temperature (°C)
Of Thermal Coal Product From Total Seam

Atmosphere	Initial Deform. Temp.	Softening Temp.	Hemispherical Temp.	Final Temp.
Oxidizing	1332.0	1423.9	1446.1	1460.0
Reducing	1237.8	1340.6	1390.6	1482.3

Mining the entire seam produced a run of mine coal with an ash level of 20.6%. At a clean coal ash level of 12.3% (well below the product specification) the total yield is 86.7%. In comparison, the selectively mined thermal portion of the No.1 Seam has a run of mine ash level of 12.7%. The tonnage of product coal produced is dependent on the thickness of the thermal portion of the seam. The thermal to metallurgical coal thickness ratio at the adit sampling location is 4.45/1.15 metres. This ratio varies within the mine area.

Exclusion of the Tuffaceous claystone zone that separates the thermal portion of the seam from the metallurgical portion is considered instrumental in the lower ash level of the selectively mined seam product.

Furthermore, a higher fuel ratio of 2.7 (versus the predicted value of 2.3 indicated by the drill core) and lower volatile contents are attributed to the below average thickness of metallurgical coal encountered at the bulk sampling point."

In 1984 Trenches in four of the seams in the Brazion Creek area were bulk sampled and tested and the results were reported in the Assessment report of that year. The discussion concerning those results is reproduced below:

"No new coal quality data was collected during the 1984 exploration program that would alter any previous predictions made for the Brazion Creek Area.

Six coal seams were intersected in trenches and were sampled in increments of 1.0 metre for preliminary coal quality analyses. In total 16 coal samples were analyzed for the following:

Proximate Analyses
Calorific Value
Sulphur
Free Swelling Index

All analyse were summarized in the following table."

Gulf Canada Table 7.0
Summary of 1984 Coal Quality Analysis
Air Dried Basis

Data Source	Seam No.	Interval (m)	Total Moisture %	Inherent Moisture %	Ash %	Fixed Carbon %	Volatile Matter %	Total Sulphur %	Gross Calorific Value MJ/kg	FSI
GDR-BC-TRC-84001	1	0.0 – 1.0	28.38	14.67	8.94	49.32	27.02	0.20	21.59	0.0
GDR-BC-TRC-84001		1.0 – 2.0	24.15	14.57	9.67	49.45	26.31	0.16	21.96	0.0
GDR-BC-TRC-84001		2.0 – 3.07	29.10	14.19	6.58	51.05	28.18	0.10	22.25	0.0
GDR-BC-TRC-84001		3.07 – 4.0	26.83	14.51	9.95	48.08	27.46	0.08	21.23	0.0
GDR-BC-TRC-84001		4.0 – 5.0	31.21	14.20	13.54	45.53	26.73	0.08	19.77	0.0
GDR-BC-TRC-84001		5.0 – 5.48	29.17	13.00	13.00	45.80	27.61	0.10	20.31	0.0
GDR-BC-TRC-84003	5	0.0 – 1.0	29.15	14.49	7.63	50.32	27.56	0.14	21.03	0.0
GDR-BC-TRC-84003		1.0 – 2.0	28.46	13.35	9.65	49.83	27.17	0.09	20.99	0.0
GDR-BC-TRC-84003		2.0 – 3.44	28.00	13.52	18.44	41.14	26.90	0.12	17.54	0.0
GDR-BC-TRC-84003		3.44 – 3.84	24.43	10.48	29.30	36.62	23.60	0.11	15.60	0.0
GDR-BC-TRC-84004	15	0.0 – 1.0	28.75	14.04	9.88	49.10	26.98	0.27	20.69	0.0
GDR-BC-TRC-84004		1.0 – 2.0	28.27	13.54	7.21	52.05	27.20	0.37	22.15	0.0
GDR-BC-TRC-84004		2.0 – 3.0	24.85	13.07	29.19	36.61	21.13	0.26	15.79	0.0
GDR-BC-TRC-84004		3.0 – 4.0	28.95	13.44	18.12	43.13	25.31	0.28	18.41	0.0
GDR-BC-TRC-84004		4.0 – 5.03	23.97	7.99	31.35	38.29	22.37	0.34	17.06	0.0
GDR-BC-TRC-84005	16	0.0 – 1.17	29.52	12.28	19.20	43.24	25.28	0.30	18.63	0.0

Based on the data from the Gulf Canada programs, the average raw coal quality and value ranges of Seam No.1, including inseam partings, for the 1981 core holes, are tabulated as follows:

TABLE 18.2
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
GULF CANADA RAW COAL QUALITY
SEAM NO.1

	Average	Minimum	Maximum
Moisture %	0.72	0.54	1.05
Ash %	26.38	16.42	35.49
Volatiles %	22.91	19.48	25.64
Fixed Carbon %	49.98	43.85	57.40
Sulfur %	0.26	0.20	0.44
F.S.I.	3	1.5	7.0
Heat Value (cal/g)	6009	5210	7069
H.G.I.	69	58	89
Fuel/Ratio (FC/VM)	2.19	1.96	2.56

The previous testing showed that Seam No.1 is a medium volatile bituminous coal, according to the ASTM system of rank classification. The characteristics of the seam allowed it to be considered for use for both metallurgical and thermal purposes. Core sample analyses showed a marked difference in the coking properties between the upper portion of the seam and the lower portion. The upper portion generally exhibited poorer coking characteristics, with an average F.S.I. of about 2.5, at an S.G. of 1.65 and an F.S.I. of about 3 at an S.G. of 1.4. The lower portion of the seam showed average F.S.I. values of about 4 and 5.5 at the same S.G. values.

Based on the limited data that was previously available, Seam No. 3 was determined to be a low volatile bituminous coal. Volatiles ranged from 20% to 26% on a dry-mineral matter-free-basis. The average F.S.I. was about 5, at 5% ash, but these results may change significantly once a more representative data base is available.

18.1.2 Petrographic Analysis

In 1982 Gulf Canada commissioned Pearson and Associates to conduct petrographic analysis on a selection of samples from Seam 1 on the Lossan Property. The results of Pearson's work and the table of analysis, as summarized by Gulf Canada, is reproduced below:

> "Petrographic results obtained from D. Pearson & Associates on six adit channel samples indicate that an average mean reflectance for the upper and lower portion of the No. 1 Seam is 1.12 and 1.00 respectively, while the average total reactives for the upper and lower portion of the No. 1 Seam are 45.8% and 73.3% respectively (Table 7.3.1)."

Gulf Canada Table 7.3.1
Summary of Petrographic Results
From ADT-92-1 Channel Samples
(off Property)

		Reflectance RO Max.	Reactives %	Inerts %
Station CS-00	Upper Portion (ID 02117)	1.13	49.3	50.7
	Lower Portion (ID 02118)	0.98	80.4	19.6
Station CS-11	Upper Portion (ID 04646)	1.10	42.9	57.1
	Lower Portion (ID 04647)	1.01	69.8	30.2
Station CS-28	Upper Portion (ID 04531)	1.12	45.1	54.9
	Lower Portion (ID 04536)	1.02	69.6	30.4
Averages	Upper Portion	1.12	45. 77	54.23
	Lower Portion	1.00	73.27	26.73

18.2 Coal Quality Testing in the Cline Exploration Program

The 2005 Exploration Program of Cline Mining included the sampling and testing of cores from certain of the holes drilled this year. It also included the construction of an adit into Seam 1 towards the north end of the property and extensive bulk testing of samples extracted from that adit.

20 OTHER RELEVANT DATA AND INFORMATION

The following are a series of appendices that are referred to in the text.

Appendix A

DATA TABLES

TABLE A.1
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
COAL LICENCE AND TENURE DATA

NTS Map Sheet	Coal Map	Block	Units	Hectares	Number
Coal Licences:					**Tenure Number**
93-O-08	93O040	G	65,66,75,76	294	405841
93-O-08	93O050	G	85,86,95.96	294	327215
93-O-08	93O049	G	87,88,97,98	294	327217
93-O-08	93O049	J	7,8,17,18	294	413996
93-O-08	93O049	J	9,10,19,20	294	327280
93-O-08	93O049	J	29,30,39,40	294	401630
93-O-08	93O049	K	1,2,11,12	294	343892
93-O-08	93O049	K	21,22,31,32	294	401629
Coal Licence Applications:					**Application Number**
93-O-08	93O039	G	67,68,77,78	294	App#412760
93-O-08	93O049	G	89,90,99,100	294	App#411623
93-O-08	93O049	K	23,24,33,34	294	App#411622
93-O-08	93O049	K	41,42,51,52	294	App#412002
93-O-08	93O049	K	43,44,53,54	294	App#413215
93-O-08	94O040	G	63,64,73,74	294	App#416901

TABLE A.2
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
DRILL HOLE SURVEY DATA

HOLE NUMBER	EASTING (NAD 83)	NORTHING (NAD 83)	COLLAR ELEVATION	TOTAL DEPTH	TOTAL CORED
CL05-01	547995.0	6143467.4	1310.0	201.3	16.0
CL05-02	548279.4	6142598.7	1309.6	158.0	112.6
CL05-03	547538.7	6142608.5	1291.6	115.5	62.6
CL05-04	549035.0	6141573.0	1193.0	145.4	30.1
CL05-05	549043.2	6141554.6	1193.0	244.0	
CL05-06	547374.6	6144410.1	1328.8	305.7	42.1
CL05-07	547242.2	6142672.5	1318.7	235.2	27.5
CL05-08	548351.2	6141919.7	1232.9	265.8	43.3
CL05-09	547059.9	6143268.7	1328.5	235.0	30.5
CL05-10	547057.3	6143264.0	1329.5	219.0	123.5
CL05-11	547056.5	6143271.8	1329.3	128.8	66.8
CL05-12	549096.4	6141120.1	1227.9	213.0	
CL05-13	547717.4	6142502.6	1280.6	122.0	
CL05-14	549089.3	6141584.8	1187.7	102.0	78.8
CL05-15	547563.2	6144225.7	1351.0	122.0	
CL05-16	548096.4	6143606.7	1316.1	158.9	
CL05-17	549143.9	6141163.3	1226.9	122.0	
CL05-18	549176.3	6141233.0	1225.4	61.5	
CL05-19	549173.7	6141219.7	1227.7	73.5	
CL05-20	547065.0	6143275.5	1329.6	171.0	167.4
CL05-21	547051.8	6143416.2	1317.2	110.5	
CL05-22	547266.6	6143001.4	1337.3	181.0	
CL05-23	548414.5	6141786.9	1230.7	197.0	
CL05-24	548405.4	6141781.0	1232.0	114.0	
CL05-25	549170.9	6141232.2	1223.2	61.7	59.4
CL05-26	547690.5	6142990.0	1333.9	71.0	
CL05-27	546822.3	6143526.4	1321.0	61.0	
CL05-28	546820.2	6143535.8	1331.8	85.5	
			TOTAL	4280.7	860.6

TABLE A.3
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
DRILL HOLE SURVEY DATA OF GULF CANADA

UNCORED DRILLHOLES:

HOLE NUMBER	EASTING (NAD 83)	NORTHING (NAD 83)	COLLAR ELEVATION	TOTAL DEPTH
RDH80-01	552224	6139778	1038	111
RDH80-02	552052	6139730	1039	256
RDH80-03	551965	6139715	1034	154
RDH80-08	550592	6139544	1030	281
RDH80-09	550221	6139312	1043	35
RDH80-10	550770	6139613	1030	263
RDH80-11	550326	6139395	1039	281
RDH80-12	550062	6139304	1046	263
RDH80-13	549900	6139150	1048	244
RDH80-14	550864	6139702	1032	258
RDH80-15	551027	6139760	1030	244
RDH80-16	550439	6140140	1049	267
RDH80-17	550785	6140195	1053	239
RDH80-51	550422	6139666	1033	244
RDH80-52	550791	6139653	1031	256
RDH80-53	550953	6139755	1031	280
RDH80-54	550280	6139996	1066	238
RDH80-55	550456	6140072	1045	304
RDH80-56	550264	6140326	1081	336
RDH80-57	550189	6140326	1090	293
RDH80-58	549606	6140381	1140	299
RDH80-59	549739	6140475	1131	244
RDH81-06	550903	6139730	1030	287
RDH81-07	550829	6139675	1031	317
RDH81-08	550231	6139316	1042	290
RDH81-09	549524	6141105	1190	366
RDH81-10	548825	6141629	1225	280

CORED DRILLHOLES:					
HOLE NUMBER	EASTING (NAD 83)	NORTHING (NAD 83)	COLLAR ELEVATION	TOTAL DEPTH	TOTAL CORED
DDH80-18	547290	6143040	1048	292	283
DDH80-19	550862	6139694	1031	340	307
DDH80-21	546548	6143702	1319	273	269
DDH80-22	551700	6138700	1067	391	300
DDH80-23	549531	6140886	1188	187	172
DDH80-24	547924	6143352	1333	304	300
DDH80-25	546924	6142812	1388	284	280
DDH80-26	550672	6139571	1021	202	197
DDH80-27	550729	6139594	1028	292	276
DDH80-28	550536	6140107	1048	321	255
DDH80-29	550417	6139395	1027	201	175
DDH80-30	549785	6141087	1164	333	256
DDH80-33	549988	6140628	1103	374	361
DDH80-34	545748	6143963	1357	130	105
DDH80-36	549737	6140325	1126	389	378
DDH80-37	546238	6144405	1307	385	378
DDH80-38	549120	6140626	1223	466	440
DDH80-39	547718	6142669	5676	477	473
DDH80-40	545636	6145065	1303	344	324
DDH80-41	546225	6143483	1350	270	258
DDH80-42	548946	6141730	1214	215	188
DDH80-43	551513	6139041	1068	320	314
DDH81-01	549262	6140741	1231	386	378
DDH81-02	548552	6141468	1250	331	310
DDH81-03	549025	6140551	1244	440	433
DDH81-04	548921	6140569	1267	244	232
DDH81-05	549403	6140809	1212	427	416
DDH81-06	548358	6141375	1273	325	298
DDH81-08	549628	6142575	1297	478	473
DDH81-10	547867	6142228	1310	200	193
DDH81-11	545901	6144122	1336	339	327
DDH81-13	547924	6142290	1310	133	129
DDH81-14	549103	6141875	1186	303	259
DDH81-15	546422	6143616	1329	194	182
DDH81-16	548006	6142794	1342	374	368
DDH81-17	547028	6142932	1372	412	406
DDH81-18	549936	6140622	1118	384	367
DDH81-19	548837	6141643	1223	380	352
DDH81-20	550680	6139905	1040	248	205
DDH81-21	550680	6139905	1040	273	200
DDH81-22	549274	6141287	1218	340	302

TABLE A.4
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
SUMMARY OF DRILLHOLE INTERCEPTS

		CL05-01	CL05-02	CL05-03	CL05-04	CL05-05	CL05-06	CL05-07	CL05-08	CL05-09	CL05-10	CL05-11	CL05-12	CL05-13	CL05-14
QUAT	BASE	40.00	12.00	34.00	27.00	21.00	6.00	14.00	14.00	1.00	1.00	1.00	5.00	16.00	17.00
KBS	TOP	–	–	–	–	–	–	–	–	–	–	–	185.00	–	–
	BASE	–	–	–	–	–	–	–	–	–	–	–	192.00	–	–
SEAM 1	ROOF	63.36	62.15	36.30	–	–	–	–	55.00	–	–	–		–	–
	FLOOR	66.44	80.76	37.30	–	–	–	–	68.80	–	–	–		–	–
SEAM 2	ROOF	122.50	132.70	72.00	37.80	50.10	27.90	–	130.10	–	29.70	19.40		55.70	47.00
	FLOOR	123.20	141.40	72.30	40.10	53.00	28.50	–	131.70	–	30.90	20.60		56.10	48.70
SEAM 3	ROOF	155.70		103.20	91.90	188.50	126.00	95.00	190.80	77.80	104.30	77.10		87.90	89.90
	FLOOR	156.10		104.90	95.00	212.00	127.10	97.80	196.20	82.00	107.80	81.10		89.90	94.30
SEAM 3R	ROOF									103.50		112.00			
	FLOOR									117.00		115.30			
SEAM 4	ROOF						194.20	140.30		140.20	130.10				
	FLOOR						195.30	141.80		143.90	138.20				
SEAM 4R	ROOF							186.50							
	FLOOR							190.30							
SEAM 5	ROOF						234.20			157.30	159.10				
	FLOOR						236.80			158.10	159.90				
OTHER	ROOF						294.10				198.70				
	FLOOR						296.00				199.30				
OTHER	ROOF										207.00				
	FLOOR										207.70				
TD		201.30	158.00	115.50	145.40	244.00	305.70	235.20	265.80	235.00	219.00	128.80	213.00	122.00	102.00

		CL05-15	CL05-16	CL05-17	CL05-18	CL05-19	CL05-20	CL05-21	CL05-22	CL05-23	CL05-24	CL05-25	CL05-26	CL05-27	CL05-28
QUAT	BASE	26.50	11.50	5.00	24.10	5.00	1.00	7.00	5.00	28.00	26.00	2.00	10.00	9.00	6.00
KBS	TOP	–	–	86.00	–	–	–	–	–	–	–	–	–	–	–
	BASE	–	–	92.50	–	–	–	–	–	–	–	–	–	–	–
SEAM 1	ROOF	–	–		32.50	54.40	–	–	34.00	85.10	74.60	44.90	31.00	–	–
	FLOOR	–	–		48.60	62.00	–	–	35.10	94.00	85.10	53.70	33.60	–	–
SEAM 2	ROOF	67.90	81.70				63.50	18.80	99.20	159.10				18.60	25.70
	FLOOR	68.00	82.90				64.10	20.00	100.30	161.20				19.50	26.50
SEAM 3	ROOF	81.80	100.90				73.10	30.40	165.00	179.80				24.50	31.30
	FLOOR	85.30	101.90				77.50	35.50	169.00	184.40				29.00	36.00
SEAM 3R	ROOF														
	FLOOR														
SEAM 4	ROOF	105.70	132.70				136.20	55.40						43.00	70.10
	FLOOR	106.60	134.00				137.90	56.00						47.10	72.50
SEAM 4R	ROOF														
	FLOOR														
SEAM 5	ROOF						151.50	78.60							
	FLOOR						152.30	79.50							
OTHER	ROOF														
	FLOOR														
OTHER	ROOF														
	FLOOR														
TD		122.00	158.90	122.00	61.50	73.50	171.00	110.50	181.00	197.00	114.00	61.70	71.00	61.00	85.50

TABLE A.5
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
COAL QUALITY ANALYSES FROM CORE

Sample Date	Tag Number	Seam Number	Driller's Depth Interval(m) From	Driller's Depth Interval(m) To	Log Depth Interval(m) From	Log Depth Interval(m) To	FSI	%ASH Dry Basis	Residual Moisture	Sample Wt. (Lb.)	%ASH (adb)	Moist. (%,adb)	Moist. (%,Tot)
HOLE CL05-01													
18-Mar-05	50501	S1	63.36	63.55	63.36	63.55	1	6.67	0.74	2	6.62	0.71	1.45
	Core Loss		63.55	65.86									
18-Mar-05	50502	S1	65.86	66.44	65.86	66.44	1 1/2	18.57	0.97	6	18.39	0.89	1.86
HOLE CL05-02													
07-Mar-05	S1	S1	61.49	61.91	62.25	62.67	1 1/2	9.97	0.88	4	9.89	2.13	3.01
07-Mar-05	S2	S1	61.91	62.02	62.67	62.78	0	72.47	0.83	2	71.87	5.20	6.03
07-Mar-05	S3	S1	62.02	62.83	62.78	63.59	2 1/2	11.63	0.87	7	11.53	4.37	5.24
	Core Loss				63.59	65.01							
07-Mar-05	S4	S1	62.83	65.76	65.01	65.64	0	72.25	1.00	11	71.53	2.27	3.27
07-Mar-05	S5	S1	65.76	66.26	65.64	66.14	1 1/2	6.92	0.89	6	6.86	3.91	4.80
	Core Loss				66.14	69.45							
07-Mar-05	S6	S1	66.26	69.48	69.45	69.57	0	82.12	1.26	2	81.09	6.01	7.27
07-Mar-05	S7	S1	69.48	69.84	69.57	69.93	2 1/2	13.12	0.93	3	13.00	4.55	5.48
07-Mar-05	S8	S1	69.84	70.41	69.93	70.50	4	6.45	0.87	7	6.40	2.58	3.45
07-Mar-05	S9	S1	70.41	70.61	70.50	70.70	1	65.53	0.64	3	65.11	3.51	4.15
07-Mar-05	S10	S1	70.61	70.76	70.70	70.85	7 1/2	14.33	0.75	2	14.23	0.03	0.78
HOLE CL05-08													
18-Mar-05	50801	S1	57.23	57.60	57.13	57.50	4	87.37	0.28	3.2	87.12	0.90	1.18
	Not sampled												
18-Mar-05	50802	S1	66.38	66.74	66.40	66.76	5 1/2	17.06	0.66	4.1	16.95	0.92	1.58
18-Mar-05	50803	S1	66.74	67.18	66.76	67.20	1 1/2	10.01	0.73	5.2	9.93	1.14	1.87
18-Mar-05	50804	S1	68.55	68.76	68.59	68.80	3 1/2	30.82	0.68	1.8	30.61	0.51	1.19
HOLE CL05-10													
07-Apr-05	CL-05-10-01	S3	104.51	104.74	106.94	107.07	0	67.66	0.93	2	67.03	0.92	1.85
07-Apr-05	CL-05-10-02	S3	104.51	105.12	107.07	107.27	0	2.43	0.86	2	2.41	1.55	2.41
07-Apr-05	CL-05-10-03	S3	105.12	105.27	107.27	107.65	0	3.07	0.85	4	3.04	1.47	2.32
07-Apr-05	CL-05-10-04	S3	104.41	104.51	107.65	107.80	5	30.10	0.86	2	29.84	0.68	1.54

TABLE A.6
CLINE MINING CORPORATION
LOSSAN COAL PROJECT
MODEL DATA - GULF DRILL HOLES

HOLE NUMBER	SEAM NO.	APPARENT THICKNESS			BCA DEGREES	TRUE THK	LITH
		FROM	TO	THK.			
DDH-80-18	S2	73.37	74.12	0.75	50.00	0.57	C
DDH-80-18	S3	145.95	147.28	1.33	47.87	0.99	C
DDH-80-18	S3	147.28	147.84	0.56	47.87	0.42	R
DDH-80-18	S3	147.84	150.40	2.56	47.87	1.90	C
DDH-80-18	S4	177.83	178.47	0.64	47.77	0.47	C
DDH-80-18	S4	178.47	179.80	1.33	47.77	0.98	R
DDH-80-18	S4	179.80	179.99	0.19	47.77	0.14	C
DDH-80-18	S4	179.99	180.39	0.40	47.77	0.30	R
DDH-80-18	S4	180.39	180.64	0.25	47.77	0.19	C
DDH-80-18	S4	180.64	181.16	0.52	47.77	0.39	R
DDH-80-18	S4	181.16	182.54	1.38	47.77	1.02	C
DDH-80-21	S3	27.98	31.55	3.57	48.87	2.69	C
DDH-80-21	S3	31.55	32.19	0.64	48.87	0.48	R
DDH-80-21	S3	32.19	33.33	1.14	48.87	0.86	C
DDH-80-21	S4	54.37	55.34	0.97	46.19	0.70	C
DDH-80-23	S2	90.90	93.49	2.59	27.35	1.19	C
DDH-80-24	S1	12.13	14.57	2.44	49.67	1.86	C
DDH-80-24	S3	217.74	218.90	1.16	51.40	0.91	C
DDH-80-25	S3	187.47	193.53	6.06	42.84	4.12	C
DDH-80-25	S3	193.53	231.44	37.91	42.67	25.69	R
DDH-80-25	S3	231.44	233.45	2.01	42.50	1.36	C
DDH-80-25	S1	48.47	49.72	1.25	59.17	1.07	C
DDH-80-30	S1	158.33	159.83	1.50	33.14	0.82	C
DDH-80-30	S2	226.55	228.46	1.91	35.16	1.10	C
DDH-80-33	S1	12.96	17.54	4.58	28.00	2.15	C
DDH-80-33	S1	17.54	19.00	1.46	23.14	0.57	R
DDH-80-33	S1	19.00	26.21	7.21	18.27	2.26	C
DDH-80-36	S1	331.18	335.32	4.14	60.41	3.60	C
DDH-80-36	S1	319.56	323.09	3.53	63.06	3.15	C
DDH-80-36	S1	323.09	323.46	0.37	63.06	0.33	R
DDH-80-36	S1	323.46	323.66	0.20	63.06	0.18	C
DDH-80-36	S1	323.66	324.51	0.85	63.06	0.76	R
DDH-80-36	S1	324.51	326.75	2.24	63.06	2.00	C
DDH-80-38	S1	208.73	211.56	2.83	46.48	2.05	C
DDH-80-38	S1	211.56	211.97	0.41	46.48	0.30	R
DDH-80-38	S1	211.97	214.66	2.69	46.48	1.95	C
DDH-80-38	S1	214.66	249.53	34.87	45.74	24.97	R
DDH-80-38	S1	249.53	260.04	10.51	44.99	7.43	C
DDH-80-38	S3	427.67	428.54	0.87	63.71	0.78	C
DDH-80-38	S4	430.57	431.68	1.11	65.49	1.01	C
DDH-80-39	S3	115.28	116.15	0.87	47.72	0.64	C
DDH-80-39	S3	116.15	116.61	0.46	47.72	0.34	R
DDH-80-39	S3	116.61	117.01	0.40	47.72	0.30	C
DDH-80-39	S4	181.83	183.39	1.56	46.63	1.13	C
DDH-80-39	S5	222.46	223.17	0.71	44.77	0.50	C

DDH-80-41	S1	73.27	74.40	1.13	34.80	0.64	C
DDH-80-41	S2	188.81	192.82	4.01	16.96	1.17	C
DDH-80-41	S3	199.92	207.86	7.94	17.58	2.40	C
DDH-80-41	S3	207.86	209.04	1.18	17.58	0.36	R
DDH-80-41	S3	209.04	216.27	7.23	17.58	2.18	C
DDH-80-42	S1	53.75	66.89	13.14	26.49	5.86	C
DDH-80-42	S3	167.76	170.52	2.76	72.34	2.63	C
DDH-81-01	S1	323.25	329.44	6.19	69.29	5.79	C
DDH-81-01	S1	329.44	333.64	4.20	71.32	3.98	R
DDH-81-01	S1	333.64	334.48	0.35	73.34	0.34	C
DDH-81-01	S1	334.48	335.46	0.33	73.34	0.32	R
DDH-81-01	S1	335.46	338.88	3.42	73.34	3.28	C
DDH-81-02	S1	305.52	307.58	2.06	56.01	1.71	C
DDH-81-02	S1	307.58	308.38	0.80	56.01	0.66	R
DDH-81-02	S1	308.38	309.87	1.49	56.01	1.24	C
DDH-81-02	S1	309.87	310.55	0.68	56.01	0.56	R
DDH-81-02	S1	310.55	312.62	2.07	56.01	1.72	C
DDH-81-02	S1	312.62	313.46	0.84	56.01	0.70	R
DDH-81-02	S1	313.46	319.51	6.05	56.01	5.02	C
DDH-81-02	S1	319.51	323.00	3.49	56.05	2.90	R
DDH-81-02	S1	323.00	327.03	4.03	56.10	3.34	C
DDH-81-02	S1	327.03	328.71	1.68	42.33	1.13	R
DDH-81-02	S1	328.71	329.28	0.57	28.55	0.27	C
DDH-81-02	S1	329.28	329.51	0.23	28.55	0.11	R
DDH-81-02	S1	329.51	330.07	0.56	28.55	0.27	C
DDH-81-03	S1	426.25	438.61	12.36	71.63	11.73	C
DDH-81-05	S1	166.50	177.22	10.72	54.34	8.71	C
DDH-81-05	S3	305.83	306.33	0.50	57.00	0.42	C
DDH-81-05	S4	378.90	382.79	3.89	27.07	1.77	C
DDH-81-06	S1	186.99	192.19	5.20	28.61	2.49	C
DDH-81-06	S1	192.19	193.39	1.20	28.61	0.57	R
DDH-81-06	S1	193.39	199.99	6.60	25.29	2.82	C
DDH-81-06	S1	199.99	201.95	1.96	36.21	1.16	R
DDH-81-06	S1	201.95	206.08	4.13	36.21	2.44	C
DDH-81-06	S2	244.16	245.51	1.35	45.93	0.97	C
DDH-81-06	S2	245.51	251.55	6.04	44.00	4.20	R
DDH-81-06	S2	251.55	252.95	1.40	42.18	0.94	C
DDH-81-06	S2	252.95	274.23	21.28	37.00	12.81	R
DDH-81-06	S2	274.23	275.68	1.45	32.08	0.77	C
DDH-81-10	S1	121.00	122.76	1.76	50.60	1.36	C
DDH-81-10	S2	188.19	189.35	1.16	37.74	0.71	C
DDH-81-13	S1	50.17	51.34	1.17	54.82	0.96	C
DDH-81-13	S1	51.34	54.41	3.07	56.50	2.56	R
DDH-81-13	S1	54.41	56.18	1.77	57.94	1.50	C
DDH-81-13	S2	118.55	120.01	1.46	66.61	1.34	C

DDH-81-14	S3	91.20	92.20	1.00	26.56	0.45	C
DDH-81-14	S3	92.20	93.00	0.80	26.56	0.36	R
DDH-81-14	S3	93.00	94.60	1.60	26.56	0.72	C
DDH-81-14	S5	208.20	210.50	2.30	38.13	1.42	C
DDH-81-15	S1	14.93	16.97	2.04	69.44	1.91	C
DDH-81-15	S3	90.65	91.47	0.82	85.00	0.82	C
DDH-81-15	S3	91.47	93.68	2.21	85.00	2.20	R
DDH-81-15	S3	93.68	97.83	4.15	85.00	4.13	C
DDH-81-15	S4	132.94	134.09	1.15	83.00	1.14	C
DDH-81-16	S2	137.98	139.33	1.35	45.93	0.97	C
DDH-81-16	S3	209.05	209.48	0.43	61.15	0.38	C
DDH-81-16	S3	209.48	209.92	0.44	61.15	0.39	R
DDH-81-16	S3	209.92	210.42	0.50	61.15	0.44	C
DDH-81-16	S4	254.98	255.95	0.97	68.10	0.90	C
DDH-81-17	S1	134.22	135.67	1.45	50.38	1.12	C
DDH-81-17	S3	312.76	314.32	1.56	55.47	1.29	C
DDH-81-17	S3	314.32	314.98	0.66	55.47	0.54	R
DDH-81-17	S3	314.98	316.96	1.98	55.47	1.63	C
DDH-81-17	S4	348.88	350.70	1.82	52.03	1.43	C
DDH-81-18	S1	45.70	46.40	0.70	14.96	0.18	C
DDH-81-18	S1	46.40	50.75	4.35	14.96	1.12	R
DDH-81-18	S1	50.75	68.98	18.23	14.96	4.71	C
DDH-81-18	S1	69.98	72.90	2.92	14.90	0.75	R
DDH-81-18	S1	72.90	75.00	2.10	14.84	0.54	C
DDH-81-18	S1	75.00	78.96	3.96	14.89	1.02	R
DDH-81-18	S1	78.96	83.15	4.19	14.94	1.08	C
DDH-81-19	S2	68.98	69.41	0.43	80.70	0.42	C
DDH-81-19	S2	69.41	69.86	0.45	80.70	0.44	R
DDH-81-19	S2	69.86	70.50	0.64	80.70	0.63	C
DDH-81-22	S2	164.88	166.38	0.60	34.52	0.34	C
DDH-81-22	S1	233.59	234.70	1.11	32.22	0.59	C
DDH-81-22	S1	234.70	235.39	0.69	32.22	0.37	R
DDH-81-22	S1	235.39	238.86	3.47	32.22	1.85	C
DDH-81-22	S1	238.86	245.49	6.63	37.90	4.07	R
DDH-81-22	S1	245.49	246.52	1.03	43.58	0.71	C
DDH-81-22	S1	246.52	262.53	16.01	34.95	9.17	R
DDH-81-22	S1	262.53	264.65	2.12	26.32	0.94	C
DDH-81-22	S1	264.65	281.34	16.69	42.27	11.23	R
DDH-81-22	S1	281.34	282.14	0.80	58.21	0.68	C
DDH-81-22	S1	282.14	296.03	13.89	50.66	10.74	R
DDH-81-22	S1	296.03	298.43	2.40	43.10	1.64	C
DDH-81-22	S1	298.43	303.45	5.02	49.46	3.81	R
DDH-81-22	S1	303.45	309.03	5.58	55.81	4.62	C

RDH-80-56	S1	309.91	313.91	4.00	84.00	3.98	C
RDH-80-57	S1	59.38	61.49	2.11	20	0.72	C
RDH-80-59	S1	143.56	149.68	6.12	51.00	4.76	C
RDH-80-59	S1	149.68	152.21	2.53	51.00	1.97	R
RDH-80-59	S1	152.21	157.29	4.98	51.00	3.87	C
RDH-81-09	S2	73.80	74.50	0.70	40	0.45	C
RDH-81-09	S2	74.50	75.20	0.70	40	0.45	R
RDH-81-09	S2	75.20	76.10	0.90	40	0.58	C

Appendix B

GEOPHYSICAL LOGS

This appendix includes various geophysical logs. Due to the large file size, they are not included in this report.

Appendix C-1

WRITTEN CORE DESCRIPTIONS

HOLE NO:	**CL05-01**
DATE STARTED:	**18-Jan-05**
DATE COMPLETED:	**20-Jan-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
63.30		0.00	63.30	90	63.30		64.97	1	"CL: CORE LOSS, not cored "
0.06		63.30	63.36	60	0.02			1	"SILT: SILTSTONE, calcite-filled factures"
0.04	1	63.36	63.40	60	0.02	1		1	"C4: COAL-DULL BANDED, broken"
0.15	1	63.40	63.55	60	0.06	1	65.97	1	"C4: COAL-DULL BANDED "
2.31	1	63.55	65.86	60	0.94			1	"CL: CORE LOSS, Coal"
0.21	1	65.86	66.07	60	0.09	2		1	"C4: COAL-DULL BANDED, core broken"
0.02	1	66.07	66.09	60	0.01	2		1	"C4: COAL-DULL BANDED, core powdered"
0.15	1	66.09	66.24	60	0.06	2		1	"C4: COAL-DULL BANDED"
0.08	1	66.24	66.32	60	0.03	2		1	"C3: COAL-DULL & BRIGHT"
0.12	1	66.32	66.44	60	0.05	2		1	"C4: COAL-DULL BANDED, core broken"
1.43		66.44	67.87	60	0.58		68.97	1	"SILT: SILTSTONE, med grey, some sand laminae, plant frags"
0.42		67.87	68.29	60	0.17			1	"SILT: SILTSTONE, as above"
0.08		68.29	68.37	65	0.03			2	"SILT: SILTSTONE, as above"
0.41		68.37	68.78	65	0.17			2	"FSS: FINE SANDSTONE, light grey, laminated"
1.14		68.78	69.92	65	0.46			2	"SILT: SILTSTONE, med gy, part sandy, some sand laminae"
0.62		69.92	70.54	65	0.25		71.97	2	"FSS: FINE SANDSTONE, light grey, laminated"
0.45		70.54	70.99	60	0.20			2	"FSS: FINE SANDSTONE, as above"
0.14		70.99	71.13	60	0.06			2	"SILT: SILTSTONE, med gy, part lam, some sand laminae"
0.15		71.13	71.28	60	0.07			3	"SILT: SILTSTONE, as above"
1.04		71.28	72.32	60	0.47			3	"SH: MUDSTONE, dk gy, coal frags, brn mud lenses at centre"
0.88		72.32	73.20	60	0.40			3	"SILT: SILTSTONE, med grey"
0.40		73.20	73.60	60	0.18		74.97	3	"FSS: FINE SANDSTONE, light grey, laminated"
0.26		73.60	73.86	60	0.12			3	"FSS: FINE SANDSTONE, as above"
0.50		73.86	74.36	70	0.15			4	"FSS: FINE SANDSTONE, as above"
1.79		74.36	76.15	70	0.52		77.97	4	"SH: MUDSTONE, dk gy, some coal frags, calc veins at top"
0.25		76.15	76.40	70	0.07			4	"SH: MUDSTONE, dk gy, core broken, abund slicks"
0.25		76.40	76.65	70	0.07			4	"SH: MUDSTONE, dk gy, scattered coal inclusions"
1.20		76.65	77.85	70	0.35			5	"SH: MUDSTONE, as above"
1.40		77.85	79.25	70	0.41		80.97	5	"SILT: SILTSTONE, m gy, silty sand lam, sandy in lower part"

HOLE NUMBER:	CL05-02
DATE STARTED:	21-Feb-05
DATE COMPLETED:	23-Feb-05
ORIENTATION:	55 SW
DESCRIBED BY:	G. Jordan, T. Kosaka, G. Harding

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
SEE CORE DESCRIPTION FOR ADIT HOLE - APPENDIX C2									

HOLE NO:	**CL05-03**
DATE STARTED:	**24-Jan-05**
DATE COMPLETED:	**27-Jan-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
50.00		0.00	50.00	90	50.00		50.00	1	"CL: CORE LOSS, not cored"
1.06		50.00	51.06	75	1.02			1	"SILT: SILTSTONE lt-m gy, calc-filled fract at centre"
1.56		51.06	52.62	75	1.51		52.57	1	"FSS: FINE SANDSTONE lt gy, laminated"
0.25		52.62	52.87	75	0.24			1	"FSS: FINE SANDSTONE as above"
0.65		52.87	53.52	75	0.63			2	"FSS: FINE SANDSTONE as above"
0.30		53.52	53.82	75	0.29			2	"MSS: MEDIUM SANDSTONE lt gy, subang-subround silt granules & pebbles"
0.30		53.82	54.12	75	0.29			2	"SILT: SILTSTONE m gy"
0.89		54.12	55.01	75	0.86			2	"MSS: MEDIUM SANDSTONE lt gy, laminated, w some m gy mud lenses"
0.09		55.01	55.10	75	0.09			2	"SILT: SILTSTONE m gy, laminated, w lt gy fine sand laminae"
0.14		55.10	55.24	75	0.14			2	"MSS: MEDIUM SANDSTONE lt gy, w med gy silt lenses"
0.07		55.24	55.31	70	0.07			2	"FSS: FINE SANDSTONE lt gy, laminated, w med gy silt laminae"
0.14		55.31	55.45	70	0.13		55.57	2	"MSS: MEDIUM SANDSTONE"
0.14		55.45	55.59	70	0.13			2	"MSS: MEDIUM SANDSTONE as above"
0.14		55.59	55.73	70	0.13			2	"FSS: FINE SANDSTONE lt-med gy, laminated"
0.80		55.73	56.53	70	0.75			3	"FSS: FINE SANDSTONE as above"
0.85		56.53	57.38	70	0.80			3	"MSS: MEDIUM SANDSTONE lt gy, laminated"
1.21		57.38	58.59	70	1.14		58.57	3	"CSS: COARSE SANDSTONE lt gy, some coaly inclusions & calc-filled fracs"
0.49		58.59	59.08	70	0.46			4	"CSS: COARSE SANDSTONE as above"
0.08		59.08	59.16	70	0.08			4	"SH: MUDSTONE dk gy"
0.43		59.16	59.59	70	0.40			4	"SILT: SILTSTONE m gy, laminated, w lt gy fine sand laminae"
1.12		59.59	60.71	70	1.05			4	"SH: MUDSTONE dk gy, w plant frags, scattered coal bands"
0.15		60.71	60.86	70	0.14			4	"SILT: SILTSTONE m gy"
0.43		60.86	61.29	70	0.40		61.57	4	"SH: MUDSTONE dk gy, w coaly frags"
0.08		61.29	61.37	70	0.08			4	"SH: MUDSTONE as above"
1.15		61.37	62.52	70	1.08			5	"SH: MUDSTONE as above"
1.35		62.52	63.87	70	1.27		64.57	5	"SH: MUDSTONE dk gy, w coal bands & stringers"
0.20		63.87	64.07	70	0.19			5	"SH: MUDSTONE as above"
0.05		64.07	64.12	70	0.05			5	"CS: CARBONACEOUS MUDSTONE dk gy, w coal bands & stringers"
0.10		64.12	64.22	70	0.09			6	"CS: CARBONACEOUS MUDSTONE as above"
0.23		64.22	64.45	70	0.22			6	"SH: MUDSTONE dk gy, scattered coal bands & stringers"
0.07		64.45	64.52	70	0.07			6	"SH: MUDSTONE as above, core broken"
1.20		64.52	65.72	70	1.13			6	"SH: MUDSTONE as above, not broken"
0.40		65.72	66.12	70	0.38			6	"SH: MUDSTONE m gy, w thick coal bands (~3cm) & lenses"

HOLE NO:	**CL05-03**
DATE STARTED:	**24-Jan-05**
DATE COMPLETED:	**27-Jan-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.40		66.12	66.52	70	0.38			6	"CL: CORE LOSS, rock"
0.50		66.52	67.02	70	0.47			6	"SILT: SILTSTONE m gy, w coal bands"
0.20		67.02	67.22	70	0.19		67.57	6	"SH: MUDSTONE dk gy w scattered coal bands & stringers"
0.10		67.22	67.32	70	0.09			6	"SH: MUDSTONE as above"
0.78		67.32	68.10	70	0.73			7	"SH: MUDSTONE as above"
0.63		68.10	68.73	70	0.59			7	"CS: CARBONACEOUS MUDSTONE dk gy-bk, w coal stringers"
0.63		68.73	69.36	70	0.59			7	"SH: MUDSTONE dk gy"
0.32		69.36	69.68	70	0.30		70.57	7	"SILT: SILTSTONE m gy, w fine sand laminae"
0.34		69.68	70.02	70	0.32			7	"SILT: SILTSTONE as above"
0.12		70.02	70.14	70	0.11			7	"SH: MUDSTONE dk gy, w coal frags"
0.86		70.14	71.00	70	0.81			8	"SH: MUDSTONE as above"
1.00		71.00	72.00	70	0.85			8	"CL: CORE LOSS, rock"
0.30	2	72.00	72.30	70	0.38			8	"C6: COAL-STONEY OR BONEY"
0.47		72.30	72.77	70	0.44		73.57	8	"SILT: SILTSTONE m gy"
0.64		72.77	73.41	70	0.60			8	"SILT: SILTSTONE as above"
0.30		73.41	73.71	70	0.28			8	"FSS: FINE SANDSTONE partly lam, calc-filled frac, scattered silt beds"
2.07		73.71	75.78	70	1.95		76.57	8	"FSS: FINE SANDSTONE as above"
0.88		75.78	76.66	58	0.75			9	"FSS: FINE SANDSTONE as above"
1.52		76.66	78.18	58	1.29			10	"FSS: FINE SANDSTONE as above"
0.37		78.18	78.55	65	0.34			10	"MSS: MEDIUM SANDSTONE, lam, subang-subround silt granules & pebbles
0.51		78.55	79.06	65	0.46		79.57	10	"FSS: FINE SANDSTONE lt gy, fine-med grained, w silt laminae"
0.46		79.06	79.52	65	0.42			10	"CSS: COARSE SANDSTONE as a, w coaly inclusions"
0.62		79.52	80.14	72	0.59			11	"CSS: COARSE SANDSTONE as above"
0.60		80.14	80.74	72	0.57			11	"CL: CORE LOSS, rock"
0.36		80.74	81.10	72	0.34			11	"SH: MUDSTONE dk gy, w scattered coaly frags, calc-filled fracs"
0.15		81.10	81.25	72	0.14			11	"FSS: FINE SANDSTONE lt gy, near-vertical coal-filled frac"
0.84		81.25	82.09	72	0.80		82.57	11	"SILT: SILTSTONE m gy, w scattered coal inclusions"
0.03		82.09	82.12	72	0.03			11	"SILT: SILTSTONE as above"
0.10		82.12	82.22	72	0.10			11	"FSS: FINE SANDSTONE lt gy, fine-med grained, normal grading"
0.20		82.22	82.42	72	0.19			11	"SILT: SILTSTONE m gy, w lt gy fine sand laminae"
0.21		82.42	82.63	72	0.20			11	"MSS: MEDIUM SANDSTONE lt gy, fine-medium grained"
0.18		82.63	82.81	72	0.17			11	"SILT: SILTSTONE m gy, partly sandy, lt gy fine sand laminae-layers"
0.46		82.81	83.27	72	0.44			12	"SILT: SILTSTONE as above"

HOLE NO:	**CL05-03**
DATE STARTED:	**24-Jan-05**
DATE COMPLETED:	**27-Jan-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.66		83.27	83.93	77	0.64			12	"MSS: MEDIUM SANDSTONE lt gy, fine-coarse, laminated"
0.15		83.93	84.08	77	0.15			12	"FSS: FINE SANDSTONE lt-m gy, laminated"
0.20		84.08	84.28	77	0.19			12	"SH: MUDSTONE dk gy"
0.25		84.28	84.53	77	0.24			12	"MSS: MEDIUM SANDSTONE lt gy, fine-med gr, laminated, calc-filled fracs"
0.18		84.53	84.71	77	0.18			12	"SH: MUDSTONE dk gy, irregular calc-filled fractures"
0.19		84.71	84.90	77	0.19			12	"MSS: MEDIUM SANDSTONE lt gy, laminated, cross-lam in upper part"
0.12		84.90	85.02	77	0.12		85.57	12	"SH: MUDSTONE dk gy, w scattered coaly inclusions"
0.08		85.02	85.10	77	0.08			12	"FSS: FINE SANDSTONE lt gy"
0.40		85.10	85.50	77	0.39			12	"SH: MUDSTONE dk gy, w scattered coaly inclusions"
0.17		85.50	85.67	77	0.17			13	"SH: MUDSTONE as above"
0.43		85.67	86.10	77	0.42			13	"FSS: FINE SANDSTONE lt gy, cross-laminated in lower part"
0.20		86.10	86.30	77	0.19			13	"SH: MUDSTONE dk gy"
0.35		86.30	86.65	77	0.34			13	"FSS: FINE SANDSTONE lt gy, laminated, w coal-filled fractures"
0.31		86.65	86.96	77	0.30			13	"SH: MUDSTONE dk gy, w scattered coal inclusions"
0.32		86.96	87.28	77	0.31			13	"FSS: FINE SANDSTONE lt gy, cross-laminated"
0.25		87.28	87.53	77	0.24			13	"SH: MUDSTONE fk gy, w scattered coal inclusions"
0.28		87.53	87.81	77	0.27			13	"FSS: FINE SANDSTONE lt gy, laminated"
0.23		87.81	88.04	77	0.22			13	"FSS: FINE SANDSTONE as above"
0.53		88.04	88.57	77	0.52			13	"CL: CORE LOSS, Rock"
0.10		88.57	88.67	77	0.10			13	SH: MUDSTONE dk gy"
0.08		88.67	88.75	77	0.08			13	"CS: CARBONACEOUS MUDSTONE dk gy, coal inclusions & stringers"
0.11		88.75	88.86	80	0.11			14	"SILT: SILTSTONE m gy, laminated"
1.00		88.86	89.86	80	0.98			14	SH: MUDSTONE dk gy, scattered coal inclusions"
0.07		89.86	89.93	80	0.07			14	"CS: CARBONACEOUS MUDSTONE dk gy-bk, coal bands & stringers, broken"
0.17		89.93	90.10	80	0.17			14	"SH: MUDSTONE dk gy, coal bands & stringers"
0.04		90.10	90.14	80	0.04			14	"C2: COAL-BRIGHT BANDED "
0.45		90.14	90.59	80	0.44			14	"CS: CARBONACEOUS MUDSTONE bk, wcoal bands"
0.03		90.59	90.62	80	0.03			14	"R: ROCK fine-medium grain, brownish gy"
0.07		90.62	90.69	80	0.07		88.57	14	"CS: CARBONACEOUS MUDSTONE bk, w coal bands"
0.05		90.69	90.74	80	0.05			14	"CS: CARBONACEOUS MUDSTONE as above"
0.38		90.74	91.12	80	0.37			14	"SH: MUDSTONE dk gy, w scattered coal inclusions & stringers"
0.05		91.12	91.17	80	0.05			14	"CS: CARBONACEOUS MUDSTONE bk, w coal stringers, broken"
0.41		91.17	91.58	80	0.40			15	"SH: MUDSTONE dk gy, w scattered coal inclusions"

HOLE NO:	**CL05-03**
DATE STARTED:	**24-Jan-05**
DATE COMPLETED:	**27-Jan-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.10		91.58	91.68	80	0.10			15	"CS: CARBONACEOUS MUDSTONE bk, w abund coal stringers"
0.33		91.68	92.01	71	0.31			15	"SH: MUDSTONE dk gy, w scattered coal inclusions"
0.55		92.01	92.56	71	0.52			15	"FSS: FINE SANDSTONE lt gy, laminated"
0.62		92.56	93.18	71	0.59			15	"SH: MUDSTONE dk gy, w scattered coal inclusions"
0.26		93.18	93.44	71	0.25		91.57	15	"SILT: SILTSTONE m gy, w lt gy sandy silt laminae"
0.03		93.44	93.47	71	0.03			15	"SILT: SILTSTONE as above"
0.10		93.47	93.57	71	0.09			15	"FSS: FINE SANDSTONE lt gy, laminated"
0.53		93.57	94.10	71	0.50			15	"SILT: SILTSTONE m gy, lam, partly sandy, lt gy fine sand laminae-layers"
2.47		94.10	96.57	71	2.34		94.57	16	"SILT: SILTSTONE as above"
0.25		96.57	96.82	71	0.24			16	"SILT: SILTSTONE as above"
0.14		96.82	96.96	71	0.13			16	"FSS: FINE SANDSTONE lt gy, laminated, w m gy silt laminae"
0.07		96.96	97.03	71	0.07			16	"SILT: SILTSTONE m gy, partly sandy, w lt gy fine sand laminae-layers"
0.76		97.03	97.79	76	0.74			17	"SILT: SILTSTONE as above"
1.02		97.79	98.81	76	0.99			17	"FSS: FINE SANDSTONE lt gy, w m gy silt laminae-layers"
0.35		98.81	99.16	76	0.34		97.57	17	"SILT: SILTSTONE m gy, partly sandy, fine sand laminae-layers,coal lenses"
0.32		99.16	99.48	76	0.31			17	"FSS: FINE SANDSTONE lt gy, m gy silt laminated-layers"
0.31		99.48	99.79	76	0.30			17	"SILT: SILTSTONE m gy, partly sandy, lt gy fine sand laminae-layers"
0.21		99.79	100.00	76	0.20			17	"FSS: FINE SANDSTONE lt gy, w m gy silt laminae"
0.27		100.00	100.27	76	0.26			18	"FSS: FINE SANDSTONE as above"
0.20		100.27	100.47	76	0.19			18	"CORE LOSS, Rock"
1.09		100.47	101.56	76	1.06			18	SH: MUDSTONE m gy, scattered coal inclusions & bands"
0.98		101.56	102.54	76	0.95		100.57	18	"SH: MUDSTONE dk gy, scattered coal inclusions & bands"
0.15		102.54	102.69	76	0.15			18	"SH: MUDSTONE as above"
0.08		102.69	102.77	76	0.08			18	"CS: CARBONACEOUS MUDSTONE bk w coal inclusions"
0.05		102.77	102.82	76	0.05			18	"SH: MUDSTONE brownish gy"
0.07		102.82	102.89	76	0.07			18	"C6: COAL-STONEY OR BONEY "
0.08		102.89	102.97	76	0.08			18	"CS: CARBONACEOUS MUDSTONE bk"
0.23		102.97	103.20	76	0.22			18	"CORE LOSS, rock"
1.70	3	103.20	104.90	76	1.65			19	"CORE LOSS, coal"
0.27		104.90	105.17	76	0.26			19	"SH: MUDSTONE dk gy, w coal bands, stringers & frags"
0.13		105.17	105.30	76	0.13			19	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.20		105.30	105.50	76	0.19		103.57	19	"SH: MUDSTONE dk gy, hard, curved calcite probably shell fossils"
0.05		105.50	105.55	76	0.05			19	"CS: CARBONACEOUS MUDSTONE bk w abund coal stringers"

HOLE NO:	**CL05-03**
DATE STARTED:	**24-Jan-05**
DATE COMPLETED:	**27-Jan-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.06		105.55	105.61	76	0.06			19	"SH: MUDSTONE dk gy w abund coal bands"
0.10		105.61	105.71	76	0.10			19	"CS: CARBONACEOUS MUDSTONE, crushed, w coal chips"
0.14		105.71	105.85	76	0.14			19	"SH: MUDSTONE dk gy, broken"
0.11		105.85	105.96	76	0.11			19	"SH: MUDSTONE dk gy, scattered coal inclusions"
0.67		105.96	106.63	76	0.65			19	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.15		106.63	106.78	76	0.15			19	"SILT: SILTSTONE m gy, scattered coal inclusions"
0.10		106.78	106.88	76	0.10			19	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.44		106.88	107.32	76	0.43		106.57	19	"SILT: SILTSTONE m gy, w lt gy fine sand laminae"
0.29		107.32	107.61	76	0.28			20	"SILT: SILTSTONE as above"
1.03		107.61	108.64	76	1.00			20	"SH: MUDSTONE dk gy, w scattered coal inclusions"
0.50		108.64	109.14	76	0.49			20	"SH: MUDSTONE dk gy, w coal bands & stringers, partly carbonaceous"
0.77		109.14	109.91	76	0.75		109.57	20	"SH: MUDSTONE dk gy, w scattered coal inclusions"
0.20		109.91	110.11	76	0.19			20	"FSS: FINE SANDSTONE lt gy"
0.22		110.11	110.33	76	0.21			21	"SILT: SILTSTONE m gy"
0.31		110.33	110.64	76	0.30			21	"MSS: MEDIUM SANDSTONE lt gy, fine-med gr, lamination disturbed at centre"
0.16		110.64	110.80	76	0.16			21	"SILT: SILTSTONE m gy, w lt gy fine sand laminae"
0.06		110.80	110.86	76	0.06			21	"SH: MUDSTONE dk gy, w coal stringers"
0.32		110.86	111.18	68	0.30			21	"SILT: SILTSTONE m gy, w lt gy fine sand laminae"
0.36		111.18	111.54	68	0.33			21	"FSS: FINE SANDSTONE lt gy, laminated"
0.04		111.54	111.58	68	0.04			21	"FSS: FINE SANDSTONE lt-m gy, silty, bedding not clear"
0.59		111.58	112.17	68	0.55			21	"FSS: FINE SANDSTONE lt gy, fine-med gr, w m gy silt laminae"
0.47		112.17	112.64	68	0.44		112.57	21	"SH: MUDSTONE dk gy, w coal frags"

HOLE NO:	**CL05-04**
DATE STARTED:	**28-Jan-05**
DATE COMPLETED:	**29-Jan-05**
ORIENTATION:	**55 SW**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
44.10		0.00	44.10	90	44.10		44.10		"CL: CORE LOSS, not cored"
1.12		44.10	45.22	72	1.07				"SILT: SILTSTONE m gy, w dk gy mud beds, coal stringers, partly laminated"
0.42		45.22	45.64	72	0.40				"SH: MUDSTONE dk gy, w occasional coal stringers & frags"
0.42		45.64	46.06	72	0.40				"SILT: SILTSTONE m gy, laminated in upper part, w scattered coaly inclusions"
0.15		46.06	46.21	72	0.14				"SH: MUDSTONE dk gy, w coal stringers and frags"
0.08		46.21	46.29	72	0.08				"CS: CARBONACEOUS MUDSTONE bk"
0.33		46.29	46.62	72	0.31				"SH: MUDSTONE dk gy, w coaly inclusions, broken, abund slickensides"
0.16		46.62	46.78	72	0.15				"CS: CARBONACEOUS MUDSTONE dk gy-bk, w abund coal stringers & bands"
0.10		46.78	46.88	72	0.10				"CS: CARBONACEOUS MUDSTONE as above"
0.67		46.88	47.55	72	0.64		47.25		"SH: MUDSTONE dk gy, broken, abund slickensides"
0.10		47.55	47.65	72	0.10				"SH: MUDSTONE as above"
0.26		47.65	47.91	72	0.25				"SH: MUDSTONE w coal inclusions"
0.35		47.91	48.26	72	0.33				"CS: CARBONACEOUS MUDSTONE dk gy-bk, w coal bands & stringers"
0.44		48.26	48.70	62	0.39				"SILT: SILTSTONE m gy, partly laminated, rusty on some fractures"
0.06		48.70	48.76	62	0.05				"SILT: SILTSTONE as above, core broken"
0.49		48.76	49.25	62	0.43				"SILT: SILTSTONE m gy, rusty on some fractures"
0.07		49.25	49.32	62	0.06				"SH: MUDSTONE dk gy, scattered coal inclusions & stringers, some rusty fracs"
0.73		49.32	50.05	62	0.64				"SH: MUDSTONE as above"
0.03		50.05	50.08	62	0.03		50.25		"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.04		50.08	50.12	62	0.04				"CS: CARBONACEOUS MUDSTONE as above"
0.08		50.12	50.20	62	0.07				"SILT: SILTSTONE m gy"
0.16		50.20	50.36	62	0.14				"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.55		50.36	50.91	60	0.48				"FSS: FINE SANDSTONE lt gy, w gy silt laminae-layers"
0.20		50.91	51.11	60	0.17				"SILT: SILTSTONE m gy"
0.77		51.11	51.88	60	0.67				"SH: MUDSTONE dk gy, w coal stingers, partly CS, rust stain in upper part"
0.70		51.88	52.58	60	0.61		53.25		"SH: MUDSTONE dk gy w coal stringers & inclusions, m gy silt interbeds"
0.38		52.58	52.96	60	0.33				"SH: MUDSTONE as above"
0.11		52.96	53.07	60	0.10				"CS: CARBONACEOUS MUDSTONE dk gy-bk"
1.36		53.07	54.43	60	1.18				"SH: MUDSTONE dk gy, coal stringers, plant frags, rusty color, partly CS"
0.41		54.43	54.84	72	0.39				"SILT: SILTSTONE m gy,partly laminated"
0.35		54.84	55.19	72	0.33				"FSS: FINE SANDSTONE lt gy, laminated"
0.22		55.19	55.41	72	0.21		56.25		"SH: MUDSTONE dk gy, scattered coal stringers & inclusions, broken"
0.05		55.41	55.46	72	0.05				"SH: MUDSTONE as above but broken"
0.45		55.46	55.91	72	0.43				"FSS: FINE SANDSTONE lt gy, cross-lamination"

HOLE NO:	**CL05-04**
DATE STARTED:	**28-Jan-05**
DATE COMPLETED:	**29-Jan-05**
ORIENTATION:	**55 SW**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.38		55.91	56.29	72	0.36				"SILT: SILTSTONE m gy"
0.10		56.29	56.39	72	0.10				"FSS: FINE SANDSTONE lt gy"
0.27		56.39	56.66	72	0.26				"SILT: SILTSTONE m gy"
0.48		56.66	57.14	72	0.46				"SH: MUDSTONE dk gy, abund plant frags & coal stringers, some fine sand lenses"
0.47		57.14	57.61	72	0.45				"SH: MUDSTONE as sbove"
0.50		57.61	58.11	72	0.48		59.25		"FSS: FINE SANDSTONE lt gy, cloudy, w m gy silt laminae"
0.59		58.11	58.70	72	0.56				"FSS: FINE SANDSTONE as above"
0.48		58.70	59.18	72	0.46				"SH: MUDSTONE w coal inclusions, sheared at base"
0.10		59.18	59.28	72	0.10				"SILT: SILTSTONE m gy"
0.10		59.28	59.38	72	0.10				"SILT: SILTSTONE m gy, broken, abund slickensides"
0.62		59.38	60.00	72	0.59				"SILT: SILTSTONE m gy"
1.00		60.00	61.00	72	0.95		62.25		"SILT: SILTSTONE as above"
0.16		61.00	61.16	72	0.15				"SILT: SILTSTONE as above"
0.87		61.16	62.03	72	0.83				"SH: MUDSTONE dk gy, scattered coal inclusions"
0.25		62.03	62.28	72	0.24				"SH: MUDSTONE as above, broken, abund slickensides"
0.05		62.28	62.33	72	0.05				"SH: MUDSTONE as above, core sheared"
0.13		62.33	62.46	72	0.12				"SH: MUDSTONE dk gy, scattered coal inclusions"
0.10		62.46	62.56	72	0.10				"SH: MUDSTONE as above, broken, abund slickensides"
0.30		62.56	62.86	72	0.29		65.25		"SH: MUDSTONE dk gy, scattered coal inclusions"
0.26		62.86	63.12	72	0.25				"SH: MUDSTONE as above"
2.45		63.12	65.57	65	2.22				"SILT: SILTSTONE m gy, rusty along some fractures"
0.31		65.57	65.88	65	0.28		68.25		"SILT: SILTSTONE as above"
0.30		65.88	66.18	65	0.27				"SILT: SILTSTONE as above"
0.20		66.18	66.38	65	0.18				"SH: MUDSTONE dk gy, abund slickensides"
0.69		66.38	67.07	65	0.63				"SILT: SILTSTONE m gy"
0.94		67.07	68.01	73	0.90				"FSS: FINE SANDSTONE lt gy, laminated, occasional calcite-filled fracs"
0.25		68.01	68.26	73	0.24				"MSS: MEDIUM SANDSTONE lt gy, laminated"
0.20		68.26	68.46	73	0.19				"MSS: MEDIUM SANDSTONE as above"
0.08		68.46	68.54	73	0.08		71.25		"FSS: FINE SANDSTONE lt gy, partly laminated, scattered calcite-filled fracs"
1.05		68.54	69.59	73	1.00				"FSS: FINE SANDSTONE as above"
0.33		69.59	69.92	65	0.30				"MSS: MEDIUM SANDSTONE lt gy, laminated"
1.26		69.92	71.18	65	1.14				"CSS: COARSE SANDSTONE lt gy, abund coaly inclusions"
0.46		71.18	71.64	65	0.42		74.25		"CSS: COARSE SANDSTONE as above"
2.61		71.64	74.25	65	2.61				"CL: CORE LOSS, rock"

HOLE NO:	**CL05-06**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**08-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
6.25		0.00	6.25	90	6.25		5.94	1	"CL: CORE LOSS; not cored"
0.16		6.25	6.41	61	0.14			1	"CS: CARBONACEOUS MUDSTONE dk gy-bk w abund c bands & strings"
0.56		6.41	6.97	61	0.49			1	"SH: MUDSTONE dk gy w scattered coal bands & stringers"
0.09		6.97	7.06	61	0.08			1	"C4: COAL-DULL BANDED "
0.07		7.06	7.13	61	0.06			1	"C3: COAL-DULL & BRIGHT "
0.07		7.13	7.20	61	0.06			1	"SH: MUDSTONE dk gy w coal bands"
0.08		7.20	7.28	61	0.07			1	"C3: COAL-DULL & BRIGHT "
0.07		7.28	7.35	61	0.06			1	"SH: MUDSTONE dk gy, w coal bands"
0.09		7.35	7.44	61	0.08			1	"C2: COAL-BRIGHT BANDED "
0.13		7.44	7.57	61	0.11			1	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands & stringers"
0.50		7.57	8.07	61	0.44			1	"CORE LOSS; Rock"
0.95		8.07	9.02	61	0.83		8.94	1	"SH: MUDSTONE dk gy, w plant frags, scattered coal bands & stringers"
0.42		9.02	9.44	61	0.37			1	"SH: MUDSTONE as above"
1.37		9.44	10.81	61	1.20			2	"SH: MUDSTONE as above"
0.09		10.81	10.90	61	0.08			2	CS: CARBONACEOUS MUDSTONE dk gy-bk, crushed, w calcite chips"
0.40		10.90	11.30	61	0.35		11.94	2	"SH: MUDSTONE dk gy, broken, rusty along fractures"
0.88		11.30	12.18	52	0.69			2	"SILT: SILTSTONE m gy, lt gy fine sand laminae-layers"
0.37		12.18	12.55	52	0.29			3	"SILT: SILTSTONE as above"
0.33		12.55	12.88	52	0.26			3	"FSS: FINE SANDSTONE lt gy, laminated"
0.44		12.88	13.32	52	0.35		14.32	3	"SILT: SILTSTONE m gy, w/ laminated, lt gy fine sand interbeds"
0.10		13.32	13.42	52	0.08			3	"SILT: SILTSTONE as above"
0.47		13.42	13.89	52	0.37		15.00	3	"SH: MUDSTONE dk gy, w scattered coal bands"
0.72		13.89	14.61	52	0.57			3	"SH: MUDSTONE as above"
0.64		14.61	15.25	52	0.50			4	"SH: MUDSTONE as above"
1.00		15.25	16.25	52	0.79			4	"CORE LOSS; Rock"
0.48		16.25	16.73	52	0.38			4	"CS: CARBONACEOUS MUDSTONE dk gy-bk, w coal bands & stringers"
0.10		16.73	16.83	52	0.08			4	"SH: MUDSTONE dk gy, w scattered coal bands & stringers"
0.05		16.83	16.88	52	0.04		18.00	4	"CS: CARBONACEOUS MUDSTONE dk gy-bk, w coal stringes"
0.09		16.88	16.97	52	0.07			4	"CS: CARBONACEOUS MUDSTONE as above"
0.75		16.97	17.72	52	0.59			4	"CORE LOSS; Rock"
0.43		17.72	18.15	52	0.34			4	"SH: MUDSTONE dk gy"
0.30		18.15	18.45	52	0.24			4	"FSS: FINE SANDSTONE lt gy, laminated"
0.47		18.45	18.92	52	0.37			4	"SH: MUDSTONE dk gy, w scattered coal band & stringers"
0.01		18.92	18.93	52	0.01			4	"CS: CARBONACEOUS MUDSTONE black"
0.07		18.93	19.00	52	0.06			4	"C4: COAL-DULL BANDED "

HOLE NO:	**CL05-06**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**08-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.04		19.00	19.04	52	0.03			4	"C3: COAL-DULL & BRIGHT "
0.02		19.04	19.06	52	0.02			4	"C4: COAL-DULL BANDED, broken"
0.05		19.06	19.11	52	0.04			5	"CS: CARBONACEOUS MUDSTONE, broken, abund coal chips at top"
0.41		19.11	19.52	52	0.32			5	"SILT: SILTSTONE, muddy, coal bands at top, lt gy fine sand laminae"
0.25		19.52	19.77	52	0.20		21.00	5	"FSS: FINE SANDSTONE lt gy, laminated"
0.43		19.77	20.20	52	0.34			5	"SILT: SILTSTONE m gy, w lt gy fine sand laminae-layers"
0.10		20.20	20.30	65	0.09			5	"FSS: FINE SANDSTONE lt gy, laminated"
0.39		20.30	20.69	65	0.35			5	"SILT: SILTSTONE m gy, w lt gy fine sand laminae-layers"
0.29		20.69	20.98	65	0.26			5	"FSS: FINE SANDSTONE lt gy, laminated"
0.90		20.98	21.88	65	0.82			5	"SH: MUDSTONE dk gy, w scattered calc veins ll to beds"
0.46		21.88	22.34	65	0.42			6	"SH: MUDSTONE as above"
0.41		22.34	22.75	65	0.37		24.00	6	"SILT: SILTSTONE m gy, w lt gy laminated fine sand interbeds"
0.41		22.75	23.16	65	0.37			6	"FSS: FINE SANDSTONE lt gy, laminated"
0.85		23.16	24.01	65	0.77			6	"SH: MUDSTONE dk gy"
0.23		24.01	24.24	65	0.21			6	"SH: MUDSTONE dk gy, w lt gy laminated, fine sand beds"
0.49		24.24	24.73	65	0.44			6	"SH: MUDSTONE dk gy"
0.80		24.73	25.53	65	0.73			6	"CORE LOSS; Rock"
0.11		25.53	25.64	65	0.10			6	"SH: MUDSTONE dk gy, darker than above"
0.06		25.64	25.70	65	0.05			7	"CS: CARBONACEOUS MUDSTONE, coaly shale"
0.05		25.70	25.75	65	0.05			7	"C3: COAL-DULL & BRIGHT "
0.12		25.75	25.87	65	0.11			7	"C2: COAL-BRIGHT BANDED "
0.22		25.87	26.09	65	0.20		27.00	7	"CS: CARBONACEOUS MUDSTONE dk gy-bk, c bands, calc veins ll to beds"
0.10		26.09	26.19	65	0.09			7	"FSS: FINE SANDSTONE lt gy, laminated"
0.41		26.19	26.60	65	0.37			7	"SH: MUDSTONE dk gy, silty at base"
0.31		26.60	26.91	50	0.24			7	"FSS: FINE SANDSTONE lt gy, laminated"
0.27		26.91	27.18	50	0.21			7	"SH: MUDSTONE dk gy, w scattered coal bands"
0.72		27.18	27.90	50	0.55			7	"CORE LOSS; Rock"
0.15	2	27.90	28.05	50	0.11			7	"C4: COAL-DULL BANDED, broken"
0.06	2	28.05	28.11	50	0.05			7	"C4: COAL-DULL BANDED "
0.03	2	28.11	28.14	50	0.02			7	"C3: COAL-DULL & BRIGHT "
0.04	2	28.14	28.18	50	0.03			7	"C4: COAL-DULL BANDED "
0.07	2	28.18	28.25	50	0.05			7	"C2: COAL-BRIGHT BANDED "
0.06	2	28.25	28.31	50	0.05			7	"CS: CARBONACEOUS MUDSTONE w abund coal bands"
0.19	2	28.31	28.50	50	0.15			7	"CORE LOSS; Coal"
0.32		28.50	28.82	50	0.25		30.00	7	"SH: MUDSTONE dk gy, scattered coal bands & stringers"

HOLE NO:	**CL05-06**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**08-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.35		28.82	29.17	50	0.27			7	"SH: MUDSTONE m gy, w plant frags"
0.37		29.17	29.54	50	0.28			8	"SH: MUDSTONE as above"
0.76		29.54	30.30	56	0.63			8	"SILT: SILTSTONE m gy, w lt gy fine sand laminae-layers"
0.11		30.30	30.41	56	0.09			8	"FSS: FINE SANDSTONE lt gy, laminated"
1.30		30.41	31.71	56	1.08		33.00	8	"SH: MUDSTONE dk gy"
0.27		31.71	31.98	56	0.22			8	"SH: MUDSTONE as above"
0.04		31.98	32.02	56	0.03			9	"SH: MUDSTONE as above"
0.52		32.02	32.54	56	0.43			9	"SILT: SILTSTONE m gy"
0.44		32.54	32.98	56	0.36			9	"SH: MUDSTONE dk gy"
0.34		32.98	33.32	56	0.28			9	"SILT: SILTSTONE m gy"
1.26		33.32	34.58	56	1.04		36.00	9	"SH: MUDSTONE dk gy, m gy, silty in lower part"
0.19		34.58	34.77	56	0.16			9	"FSS: FINE SANDSTONE lt gy, laminated, w gy silt laminae-layers"
1.19		34.77	35.96	54	0.96			10	"FSS: FINE SANDSTONE as above, steeper dip at the middle"
0.28		35.96	36.24	54	0.23			10	"MSS: MEDIUM SANDSTONE lt gy, laminated"
0.33		36.24	36.57	54	0.27			10	"MSS: MEDIUM SANDSTONE, as above, subangular-subround mud granules"
1.06		36.57	37.63	46	0.76		39.00	10	"MSS: MEDIUM SANDSTONE lt gy, laminated,c inclusions & calc-filled fracs"
1.49		37.63	39.12	46	1.07			11	"MSS: MEDIUM SANDSTONE as above"
0.65		39.12	39.77	46	0.47			11	"CSS: COARSE SANDSTONE, silt lenses, scattered c inclusions, silty sand"
0.13		39.77	39.90	55	0.11			11	"FSS: FINE SANDSTONE m gy, muddy, coal inclusions & calcite parallel to beds"
0.12		39.90	40.02	55	0.10			11	"CSS: COARSE SANDSTONE lt gy"
0.15		40.02	40.17	55	0.12			11	"SILT: SILTSTONE m gy, calcite-filled fractures"
0.25		40.17	40.42	55	0.20		42.00	11	"MSS: MEDIUM SANDSTONE lt gy, laminated"
0.13		40.42	40.55	55	0.11			12	"MSS: MEDIUM SANDSTONE as above"
0.10		40.55	40.65	55	0.08			12	"MSS: MEDIUM SANDSTONE lt gy, abund subangular-subround mud granules"
0.20		40.65	40.85	55	0.16			12	"MSS: MEDIUM SANDSTONE lt gy, laminated"
0.30		40.85	41.15	63	0.27			12	"FSS: FINE SANDSTONE lt gy F-MSS, laminated"
0.46		41.15	41.61	63	0.41			12	"FSS: FINE SANDSTONE m gy F-MSS, subangular-subround mud granules"
0.90		41.61	42.51	63	0.80			12	"CORE LOSS; Rock"
0.72		42.51	43.23	63	0.64			12	"SH: MUDSTONE dk gy, lt gy fine sand laminae-layers in lower part"
0.70		43.23	43.93	63	0.62			12	"CSS: COARSE SANDSTONE lt gy, crs to v crse, w c inclus & calc-filled fracs"
0.28		43.93	44.21	61	0.24			12	"SH: MUDSTONE dk gy"
0.21		44.21	44.42	61	0.18		45.00	13	"SH: MUDSTONE as above"
0.07		44.42	44.49	61	0.06			13	"SH: MUDSTONE as above"
0.57		44.49	45.06	61	0.50			13	"SH: MUDSTONE dk gy, w gy silty sand laminae-layers"
0.40		45.06	45.46	61	0.35			13	"FSS: FINE SANDSTONE lt gy, w m gy silt laminae"

HOLE NO:	**CL05-06**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**08-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
1.75		45.46	47.21	61	1.53			13	"SH: MUDSTONE dk gy, w scattered gy silt & lt gy fine sand layers"
0.17		47.21	47.38	61	0.15		48.00	14	"SH: MUDSTONE as above"

HOLE NO:	**CL05-07**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**12-Feb-05**
ORIENTATION:	**50 SW**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
97.50		0.00	97.50	90	97.50		97.50	1	"CL: CORE LOSS, not cored "
0.10	3	97.50	97.60	70	0.09			1	"C2: COAL-BRIGHT BANDED core broken, w/ CS blocks especially at base"
0.04	3	97.60	97.64	70	0.04			1	"CS: CARBONACEOUS MUDSTONE, core broken"
0.05	3	97.64	97.69	70	0.05			1	"C6: COAL-STONEY OR BONEY"
0.06	3	97.69	97.75	70	0.06			1	"R: ROCK lt brown, medium grained"
0.05	3	97.75	97.80	70	0.05		98.00	1	"CS: CARBONACEOUS MUDSTONE, coaly shale"
0.06		97.80	97.86	70	0.06			1	"R: ROCK lt brown, fine grained"
0.24		97.86	98.10	70	0.22			1	"SH: MUDSTONE dk gy, w coal frags"
0.12		98.10	98.22	70	0.11			1	"CS: CARBONACEOUS MUDSTONE w abund coal bands & stringers"
0.18		98.22	98.40	70	0.17			1	"SH: MUDSTONE dk gy, w coal frags"
0.08		98.40	98.48	70	0.07			1	"SH: MUDSTONE as above, core broken"
0.14		98.48	98.62	70	0.13			1	"CS: CARBONACEOUS MUDSTONE dk gy-bk, frequent coal bands & stringers"
1.03		98.62	99.65	70	0.95			1	"SH: MUDSTONE dk gy, w coal bands, partly CS"
0.08		99.65	99.73	70	0.07			1	"CS: CARBONACEOUS MUDSTONE dk gy-bk"
0.92		99.73	100.65	70	0.85			1	"CL: CORE LOSS, Rock"
0.35		100.65	101.00	70	0.32		101.00	1	"SH: MUDSTONE dk gy, coal stringers & bands, partly CS, some silty interbeds"
1.65		101.00	102.65	68	1.53			2	"SH: MUDSTONE as above"
0.38		102.65	103.03	68	0.35			2	"CS: CARBONACEOUS MUDSTONE w coal bands & stringers"
0.13		103.03	103.16	68	0.12			2	"SILT: SILTSTONE m gy"
0.72		103.16	103.88	68	0.67			2	"CS: CARBONACEOUS MUDSTONE dk gy-bk, w coal bands & stringers"
0.08		103.88	103.96	68	0.07		104.00	3	"CS: CARBONACEOUS MUDSTONE as above"
0.33		103.96	104.29	68	0.31			3	"CS: CARBONACEOUS MUDSTONE as above"
0.76		104.29	105.05	68	0.70			3	"SH: MUDSTONE w scattered coal bands & stringers"
0.10		105.05	105.15	68	0.09			3	"CS: CARBONACEOUS MUDSTONE w coal bands & stringers"
0.79		105.15	105.94	68	0.73			3	"SH: MUDSTONE dk gy, w coal frags"
0.23		105.94	106.17	68	0.21			3	"CS: CARBONACEOUS MUDSTONE w coal bands & stringers"
0.83		106.17	107.00	68	0.77			3	"CL: CORE LOSS, Rock"
0.09		107.00	107.09	68	0.08		107.00	3	"SH: MUDSTONE dk gy, w coal frags"
0.21		107.09	107.30	68	0.19			3	"SH: MUDSTONE as above"
0.13		107.30	107.43	68	0.12			3	"CS: CARBONACEOUS MUDSTONE dk gy-bk, w c bands & abund c stringers"
2.67		107.43	110.10	68	2.48		110.00	4	"SILT: SILTSTONE m gy"
0.20		110.10	110.30	68	0.19			4	"SILT: SILTSTONE as above"
0.10		110.30	110.40	68	0.09			5	"SILT: SILTSTONE as above"
0.28		110.40	110.68	68	0.26			5	"FSS: FINE SANDSTONE lt gy, w gy silt interbeds"

HOLE NO:	**CL05-07**
DATE STARTED:	**08-Feb-05**
DATE COMPLETED:	**12-Feb-05**
ORIENTATION:	**50 SW**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.61		110.68	111.29	68	0.57			5	"CSS: COARSE SANDSTONE lt gy, coaly stringers, silt granules at base"
0.68		111.29	111.97	66	0.62			5	"SH: MUDSTONE dk gy, silty in lower part"
0.34		111.97	112.31	66	0.31			5	"SILT: SILTSTONE m gy, w lt gy fine sand laminae-layers"
0.70		112.31	113.01	66	0.64		113.00	5	"FSS: FINE SANDSTONE lt gy, w m gy silt laminae"
0.30		113.01	113.31	66	0.27			5	"FSS: FINE SANDSTONE as above"
0.79		113.31	114.10	66	0.72			6	"FSS: FINE SANDSTONE as above"
0.78		114.10	114.88	66	0.71			6	"SILT: SILTSTONE m gy, w lt gy sandy silt laminae"
0.44		114.88	115.32	66	0.40			6	"FSS: FINE SANDSTONE lt gy, laminated"
0.75		115.32	116.07	66	0.69		116.00	6	"SILT: SILTSTONE m gy, partly sandy, gy fine sand laminae-layers"
0.14		116.07	116.21	66	0.13			6	"SILT: SILTSTONE as above"
0.87		116.21	117.08	61	0.76			7	"SILT: SILTSTONE as above"
0.81		117.08	117.89	61	0.71			7	"FSS: FINE SANDSTONE lt gy, laminated"
1.20		117.89	119.09	61	1.05		119.00	7	"SILT: SILTSTONE m gy-dk gy, scattered lt gy sandy silt laminae"
0.55		119.09	119.64	61	0.48			8	"SILT: SILTSTONE as above"
0.66		119.64	120.30	61	0.58			8	"SILT: SILTSTONE m gy"
0.37		120.30	120.67	61	0.32			8	"CS: CARBONACEOUS MUDSTONE dk gy-bk, coal bands & stringers"
0.28		120.67	120.95	61	0.24			8	"MSS: MEDIUM SANDSTONE lt gy, w coal inclusions"
0.14		120.95	121.09	61	0.12			8	"FSS: FINE SANDSTONE lt gy"
0.32		121.09	121.41	61	0.28			8	"SILT: SILTSTONE m gy, sandy, w lt gy fine sand lenses"
0.45		121.41	121.86	61	0.39			8	"MSS: MEDIUM SANDSTONE lt gy, steep dip (23) at top contact"
0.20		121.86	122.06	61	0.17		122.00	8	"FSS: FINE SANDSTONE laminated"
0.77		122.06	122.83	53	0.61			9	"FSS: FINE SANDSTONE lt gy-m gy, sandy silt interbeds, calc-rich at base"
1.00		122.83	123.83	53	0.80			9	"MSS: MEDIUM SANDSTONE lt gy, fine-coarse grained"
0.33		123.83	124.16	53	0.26			9	"CSS: COARSE SANDSTONE lt gy, coaly inclus, silt granules in upper part"
0.72		124.16	124.88	45	0.51		125.00	9	"CSS: COARSE SANDSTONE lt gy, laminated"

HOLE NO:	**CL05-08**
DATE STARTED:	**15-Feb-05**
DATE COMPLETED:	**16-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
33.97		0.00	33.97	90	33.97		30.40	1	"CL: CORE LOSS, not cored"
0.68		33.97	34.65	67	0.63			1	"CS: CARBONACEOUS MUDSTONE dk gy, w coal stringers"
0.42		34.65	35.07	67	0.39			1	"SILT: SILTSTONE m gy, w lt gy fine sand laminae"
0.29		35.07	35.36	67	0.27		31.70	1	"SH: MUDSTONE dk gy w plant frags & scattered coal bands"
1.19		35.36	36.55	67	1.10			1	"SH: MUDSTONE as above"
0.19		36.55	36.74	67	0.17			1	"SH: MUDSTONE as above, core broken"
0.08		36.74	36.82	67	0.07			1	"SH: MUDSTONE as above, not broken"
1.07		36.82	37.89	59	0.92			2	"SH: MUDSTONE as above, w gy laminated silt interbeds"
0.08		37.89	37.97	59	0.07			2	"CS: CARBONACEOUS MUDSTONE w abundant coal bands"
0.11		37.97	38.08	59	0.09		34.70	2	"SH: MUDSTONE dk dy, w coal bands & frgas"
0.02		38.08	38.10	59	0.02			2	"SH: MUDSTONE as above"
0.15		38.10	38.25	59	0.13			2	"C6: COAL-STONEY OR BONEY "
0.09		38.25	38.34	59	0.08			2	"C6: COAL-STONEY OR BONEY, broken, w carb shale frags"
0.06		38.34	38.40	59	0.05			2	"SH: MUDSTONE dk gy"
0.15		38.40	38.55	59	0.13			2	"FSS: FINE SANDSTONE lt gy, lam, calc-filled fracs, coal inclus"
0.30		38.55	38.85	59	0.26			2	"SH: MUDSTONE dk gy, scattered coal bands & frags"
0.27		38.85	39.12	59	0.23			2	"FSS: FINE SANDSTONE lt gy, laminated"
0.28		39.12	39.40	59	0.24			2	"SH: MUDSTONE dk gy, scattered coal bands"
0.32		39.40	39.72	59	0.27			3	"SH: MUDSTONE as above"
0.14		39.72	39.86	59	0.12			3	"CS: CARBONACEOUS MUDSTONE abundant coal bands"
0.09		39.86	39.95	59	0.08			3	"C5: COAL-DULL "
0.04		39.95	39.99	59	0.03			3	"CS: CARBONACEOUS MUDSTONE dk gy w abundant coal bands"
0.13		39.99	40.12	59	0.11			3	"C6: COAL-STONEY OR BONEY, broken"
0.06		40.12	40.18	59	0.05		37.70	3	"CS: CARBONACEOUS MUDSTONE, coaly shale"
0.05		40.18	40.23	59	0.04			3	"CS: CARBONACEOUS MUDSTONE, as above"
0.12		40.23	40.35	59	0.10			3	"SH: MUDSTONE dk gy, w coal frags, broken"
0.69		40.35	41.04	59	0.59			3	"SH: MUDSTONE dk gy, w plant frags & coal inclusions"
0.03		41.04	41.07	59	0.03			3	"SH: MUDSTONE dk gy, pulverized, w abund coal frags"
0.81		41.07	41.88	59	0.69			3	"SH: MUDSTONE dk grey, w plant frags & scattered coal bands"
0.10		41.88	41.98	59	0.09			3	"FSS: FINE SANDSTONE lt gy, w gy silt laminae"
0.27		41.98	42.25	66	0.25			4	"FSS: FINE SANDSTONE as above, calcite-filled fractures"
0.27		42.25	42.52	66	0.25		40.70	4	"SILT: SILTSTONE m gy"
0.40		42.52	42.92	66	0.37			4	"SILT: SILTSTONE as above, laminated in lower part"
0.96		42.92	43.88	66	0.88			4	"SH: MUDSTONE, scattered coal inclusions"

HOLE NO:	**CL05-08**
DATE STARTED:	**15-Feb-05**
DATE COMPLETED:	**16-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.34		43.88	44.22	66	0.31			4	"SILT: SILTSTONE m gy, probably shell fossils"
0.15		44.22	44.37	66	0.14			4	"SH: MUDSTONE m gy, w scattered coal bands"
0.09		44.37	44.46	66	0.08			4	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal bands"
0.08		44.46	44.54	66	0.07			4	"SH: MUDSTONE dk gy, scattered coal bands"
0.54		44.54	45.08	66	0.49		43.70	5	"SH: MUDSTONE as above"
0.10		45.08	45.18	66	0.09			5	"CS: CARBONACEOUS MUDSTONE w abundant coal bands"
0.31		45.18	45.49	66	0.28			5	"SH: MUDSTONE dk gy, coal bands in lower part"
0.13		45.49	45.62	66	0.12			5	"C5: COAL-DULL, core broken"
1.07		45.62	46.69	66	0.98			5	"SH: MUDSTONE dk gy, w scattered coal bands & stringers"
0.47		46.69	47.16	66	0.43			5	"CS: CARBONACEOUS MUDSTONE dk gy-bk, abund coal stringers"
0.10		47.16	47.26	66	0.09		46.70	6	"CS: CARBONACEOUS MUDSTONE as above"
2.25		47.26	49.51	50	2.06		49.70	6	"SH: MUDSTONE dk gy, scattered coal bands, stringers, frags"
0.14		49.51	49.65	50	0.13			6	"SH: MUDSTONE as above"
0.08		49.65	49.73	50	0.07			7	"SH: MUDSTONE as above"
0.30		49.73	50.03	50	0.27			7	"FSS: FINE SANDSTONE lt gy, w gy silt laminae"
1.19		50.03	51.22	50	1.09			7	"SH: MUDSTONE dk gy, w scattered coal bands"
0.97		51.22	52.19	50	0.91			7	"SILT: SILTSTONE m gy, dk gy mud interbeds, partly laminated"
0.14		52.19	52.33	50	0.13		52.70	7	"SILT: SILTSTONE m gy, laminated, w lt gy fine sand laminae"
0.21		52.33	52.54	50	0.20			7	"SILT: SILTSTONE as above"
0.26		52.54	52.80	50	0.24			8	"SILT: SILTSTONE as above"
1.19		52.80	53.99	50	1.11			8	"SILT: SILTSTONE med gy, w mud beds, scattered coal inclusions"
0.07		53.99	54.06	50	0.07			8	"CS: CARBONACEOUS MUDSTONE w abundant coal stringers"
0.04		54.06	54.10	50	0.04			8	"SH: MUDSTONE dk gy"
0.02	1	54.10	54.12	50	0.02			8	"C6: COAL-STONEY OR BONEY "
0.02	1	54.12	54.14	50	0.02			8	"C4: COAL-DULL BANDED "
0.01	1	54.14	54.15	50	0.01			8	"C6: COAL-STONEY OR BONEY "
0.04	1	54.15	54.19	50	0.04			8	"C3: COAL-DULL & BRIGHT "
0.47	1	54.19	54.66	50	0.44		55.70	8	"SH: MUDSTONE dk gy, w scattered coal bands & frags"
0.34	1	54.66	55.00	50	0.32			8	"CL: CORE LOSS, Rock"
2.13	1	55.00	57.13	50	1.99			8	"CL: CORE LOSS, Coal"
0.12	1	57.13	57.25	50	0.11	1		8	"C5: COAL-DULL "
0.14	1	57.25	57.39	50	0.13	1		8	"C4: COAL-DULL BANDED "
0.01	1	57.39	57.40	50	0.01	1		8	"C6: COAL-STONEY OR BONEY "
0.10	1	57.40	57.50	50	0.09	1		8	"C5: COAL-DULL, broken at base "

HOLE NO:	**CL05-08**
DATE STARTED:	**15-Feb-05**
DATE COMPLETED:	**16-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.25	1	57.50	57.75	50	0.23			8	"CS: CARBONACEOUS MUDSTONE dk grey, coal stringers"
0.45	1	57.75	58.20	50	0.42			9	"CS: CARBONACEOUS MUDSTONE as above"
0.12	1	58.20	58.32	50	0.11			9	"CS: CARBONACEOUS MUDSTONE as above"
0.67	1	58.32	58.99	50	0.63			9	"SH: MUDSTONE dk gy, scat coal bands, carbonaceous at centre"
0.37	1	58.99	59.36	50	0.35			9	"CS: CARBONACEOUS MUDSTONE dk gy-blk, abund coal bands"
0.30	1	59.36	59.66	50	0.28			9	"SH: MUDSTONE dk gy, scattered coal stingers"
0.28	1	59.66	59.94	50	0.26			9	"SH: MUDSTONE as above, broken"
1.06	1	59.94	61.00	50	0.99			9	"CL: CORE LOSS, Rock"
0.15	1	61.00	61.15	50	0.14			9	"CS: CARBONACEOUS MUDSTONE dk gy-blk, abund coal bands"
0.20	1	61.15	61.35	50	0.19		61.70	9	"SH: MUDSTONE dk gy, scattered coal bands & stingers"
0.13	1	61.35	61.48	50	0.12			9	"SH: MUDSTONE as above"
0.50	1	61.48	61.98	50	0.47			10	"SH: MUDSTONE as above"
0.09	1	61.98	62.07	50	0.08			10	"SH: MUDSTONE as above, broken"
1.30	1	62.07	63.37	50	1.21		64.70	10	"SILT: SILTSTONE gy, scat coal inclus, partly lam, mud interbeds"
1.01	1	63.37	64.38	50	0.94			10	"SILT: SILTSTONE as above"
1.22	1	64.38	65.60	50	1.13			10	"CL: CORE LOSS, Rock"
0.24	1	65.60	65.84	50	0.22			11	"CS: CARBONACEOUS MUDSTONE black"
0.08	1	65.84	65.92	50	0.07			11	"C5: COAL-DULL "
0.04	1	65.92	65.96	50	0.04			11	"CS: CARBONACEOUS MUDSTONE black"
0.44	1	65.96	66.40	50	0.41			11	"SH: MUDSTONE dk gy, coaly inclusions"
0.11	1	66.40	66.51	50	0.10	2		11	"C5: COAL-DULL "
0.07	1	66.51	66.58	50	0.06	2		11	"C2: COAL-BRIGHT BANDED "
0.04	1	66.58	66.62	50	0.04	2		11	C3: COAL-DULL & BRIGHT "
0.14	1	66.62	66.76	50	0.13	2		11	"C4: COAL-DULL BANDED "
0.03	1	66.76	66.79	50	0.03	3		11	"SH: MUDSTONE dk grey"
0.31	1	66.79	67.10	50	0.29	3		11	"C4: COAL-DULL BANDED "
0.10	1	67.10	67.20	50	0.09	3	67.70	11	"C3: COAL-DULL & BRIGHT "
1.39	1	67.20	68.59	50	1.29			11	"CL: CORE LOSS, Coal"
0.04	1	68.59	68.63	50	0.04	4		11	"C4: COAL-DULL BANDED "
0.03	1	68.63	68.66	50	0.03	4		11	"SH: MUDSTONE dk grey"
0.02	1	68.66	68.68	50	0.02	4		11	"CS: CARBONACEOUS MUDSTONE, coaly shale "
0.12	1	68.68	68.80	68	0.11	4		11	"C2: COAL-BRIGHT BANDED, core broken"
0.04		68.80	68.84	68	0.04			11	"CS: CARBONACEOUS MUDSTONE, broken "
0.75		68.84	69.59	68	0.70			11	"CS: CARBONACEOUS MUDSTONE dk gy-blk, abund coal bands"

HOLE NO:	**CL05-08**
DATE STARTED:	**15-Feb-05**
DATE COMPLETED:	**16-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.37		69.59	69.96	68	0.34			12	"CS: CARBONACEOUS MUDSTONE as above"
0.35		69.96	70.31	50	0.32		70.70	12	"SILT: SILTSTONE med grey"
2.03		70.31	72.34	50	1.88			12	"SILT: SILTSTONE as above, coarsening downward"
0.50		72.34	72.84	50	0.46			13	"SILT: SILTSTONE as above"
0.66		72.84	73.50	55	0.61		73.70	13	"FSS: FINE SANDSTONE lt-med grey"

HOLE NO:	**CL05-09**
DATE STARTED:	**16-Feb-05**
DATE COMPLETED:	**18-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
21.70		0.00	21.70	90	21.70		21.70	1	"CL: CORE LOSS; not cored"
0.02		21.70	21.72	83	0.02			1	"CS: CARBONACEOUS MUDSTONE w coal stringers"
0.35		21.72	22.07	83	0.35			1	"SILT: SILTSTONE m gy, w scattered coaly matter"
0.14		22.07	22.21	83	0.14			1	"FSS: FINE SANDSTONE lt gy, laminated"
0.19		22.21	22.40	83	0.19			1	"SILT: SILTSTONE m gy, scattered coaly matter, muddy in lower part"
0.06		22.40	22.46	83	0.06			1	"C4: COAL-DULL BANDED with pyrite bands, heavy"
0.69		22.46	23.15	83	0.68		22.90	1	"SILT: SILTSTONE m gy, w lt gy fine sand lam, calc ll to beds at top"
0.80		23.15	23.95	83	0.79			1	"SILT: SILTSTONE m gy, laminated in upper part, lt gy fine sand lam"
0.30		23.95	24.25	83	0.30			1	"SH: MUDSTONE dk gy, scattered coaly stringers, calc veins at base"
0.30		24.25	24.55	83	0.30			1	"SILT: SILTSTONE m gy, laminated at top, calcite at base"
1.52		24.55	26.07	85	1.51		25.90	2	"SH: MUDSTONE dk gy, scattered coal stringers, lam silt at centre"
0.13		26.07	26.20	85	0.13			2	"SH: MUDSTONE as above"
0.59		26.20	26.79	85	0.59			2	"SILT: SILTSTONE m gy,w lt gy fine sand laminae-layers"
0.36		26.79	27.15	85	0.36			2	"FSS: FINE SANDSTONE lt gy, w/ m gy silt laminae"
0.37		27.15	27.52	85	0.37			2	"SILT: SILTSTONE m gy, partly laminated"
0.25		27.52	27.77	85	0.25			3	"SILT: SILTSTONE as above"
0.16		27.77	27.93	85	0.16			3	"SH: MUDSTONE dk gy"
0.57		27.93	28.50	85	0.57			3	"CL: CORE LOSS, rock"
0.44		28.50	28.94	85	0.44			3	"CS: CARBONACEOUS MUDSTONE shaley at base, coal stringers"
0.05		28.94	28.99	85	0.05			3	"C4: COAL-DULL BANDED "
0.14		28.99	29.13	85	0.14		28.90	3	"CS: CARBONACEOUS MUDSTONE dk gy, coal bands, base broken"
0.04		29.13	29.17	85	0.04			3	"C3: COAL-DULL & BRIGHT, core broken"
0.06		29.17	29.23	85	0.06			3	"CS: CARBONACEOUS MUDSTONE dk gy, coal bands, core broken"
1.43		29.23	30.66	85	1.42			3	"SH: MUDSTONE dk gy, w scattered coal bands, stringers & frags"
0.18		30.66	30.84	85	0.18			3	"SILT: SILTSTONE med grey, sandy"
0.24		30.84	31.08	85	0.24		31.90	4	"SILT: SILTSTONE as above"
0.71		31.08	31.79	85	0.71			4	"SH: MUDSTONE dk gy, scattered coal & stringers & plant frags"
0.05		31.79	31.84	85	0.05			4	"SH: MUDSTONE as above, core crushed"
0.57		31.84	32.41	85	0.57			4	"SH: MUDSTONE as above, not crushed"
0.24		32.41	32.65	79	0.24			4	"SILT: SILTSTONE m gy, laminated"
0.28		32.65	32.93	79	0.27			4	"SH: MUDSTONE dk gy, scattered coal frags"
1.97		32.93	34.90	79	1.93			4	"CL: CORE LOSS, rock"
0.65		34.90	35.55	79	0.64		34.90	4	"FSS: FINE SANDSTONE lt gy, partly laminated, gy silt lami-layers"
0.70		35.55	36.25	79	0.69			5	"SILT: SILTSTONE m gy, partly laminated"

HOLE NO:	**CL05-09**
DATE STARTED:	**16-Feb-05**
DATE COMPLETED:	**18-Feb-05**
ORIENTATION:	**50 NE**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
1.65		36.25	37.90	79	1.62			5	"SH: MUDSTONE dk gy, occasional coal frags"
0.35		37.90	38.25	79	0.34		37.90	5	"SILT: SILTSTONE m gy"
0.14		38.25	38.39	79	0.14			6	"SILT: SILTSTONE as above"
0.17		38.39	38.56	79	0.17			6	"FSS: FINE SANDSTONE lt gy, laminated"
1.51		38.56	40.07	82	1.50			6	"SILT: SILTSTONE m gy, partly laminated, w/ dk gy mud interbed"
0.44		40.07	40.51	82	0.44			6	"SH: MUDSTONE dk gy, occasional coal band & stringers"
0.17		40.51	40.68	82	0.17			6	"SILT: SILTSTONE m gy, laminated, w/ lt gy sandy silt laminae"
0.34		40.68	41.02	82	0.34			6	"SH: MUDSTONE dk gy, coal bands & calcite parallel to bedding"
0.12		41.02	41.14	66	0.11			6	"SILT: SILTSTONE m gy, laminated, w/ lt gy sandy silt"
0.11		41.14	41.25	66	0.10		40.90	6	"SH: MUDSTONE dk gy, coal stringers, calcite parallel to beds"
0.15		41.25	41.40	66	0.14			7	"SH: MUDSTONE as above"
1.46		41.40	42.86	66	1.33			7	"SILT: SILTSTONE m gy, laminated, coal bandw, dk gy mud interbed"
0.15		42.86	43.01	66	0.14			7	"SILT: SILTSTONE as above, core broken"
1.23		43.01	44.24	66	1.12		43.90	7	"SH: MUDSTONE dk gy, coal bands, plant frags, calc parallel to beds"
0.02		44.24	44.26	66	0.02			8	"C1: COAL-BRIGHT, abundant slickensides"
1.13		44.26	45.39	66	1.03			8	"SH: MUDSTONE dk gy, scattered coal stringers at upper part"
0.48		45.39	45.87	66	0.44			8	"CS: CARBONACEOUS MUDSTONE, coaly, plant frags, calcite, py"
0.99		45.87	46.86	82	0.98			8	"SILT: SILTSTONE m gy,, lt gy fine sand laminae"
0.15		46.86	47.01	82	0.15		46.90	8	"FSS: FINE SANDSTONE lt gy, med gy silt layers"
0.22		47.01	47.23	82	0.22			9	"FSS: FINE SANDSTONE as above"
0.79		47.23	48.02	82	0.78			9	"SILT: SILTSTONE m gy"
1.02		48.02	49.04	82	1.01			9	"SILT: SILTSTONE m grey, sandy, lt gy fine sand laminae"
0.69		49.04	49.73	82	0.68			9	"MSS: MEDIUM SANDSTONE lt gy, fine-med grained, lt gy silt lam"
0.23		49.73	49.96	82	0.23			9	"MSS: MEDIUM SANDSTONE subang-subround granules & pebbles"
0.06		49.96	50.02	82	0.06			10	"MSS: MEDIUM SANDSTONE as above"
0.14		50.02	50.16	82	0.14		49.90	10	"SILT: SILTSTONE m gy, lt gy fine sand laminae"
0.19		50.16	50.35	82	0.19			10	"SILT: SILTSTONE as above"
0.73		50.35	51.08	82	0.72			10	"SH: MUDSTONE dk gy"
1.68		51.08	52.76	85	1.67		52.90	10	"FSS: FINE SANDSTONE m gy, sandy silt & fine sand lam & layers"

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
DATE COMPLETED:	**28-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
95.50		0.00	95.50	90	95.50		95.50	1	CL: CORE LOSS- not cored
0.20		95.50	95.70	70	0.19			1	SILT: SILTSTONE- medium grey
1.48		95.70	97.18	70	1.39			1	FSS: FINE SANDSTONE- light grey, w med grey silt laminae
1.24		97.18	98.42	70	1.17			1	MSS: MEDIUM SANDSTONE- light grey, w med grey silt laminae
0.07		98.42	98.49	70	0.07			2	MSS: MEDIUM SANDSTONE- light grey, w med grey silt laminae
0.04		98.49	98.53	60	0.04		98.50	2	SILT: SILTSTONE- med grey, lt grey fine sand laminae
0.45		98.53	98.98	60	0.42			2	SILT: SILTSTONE- med grey, lt grey fine sand laminae
0.15		98.98	99.13	60	0.14			2	FSS: FINE SANDSTONE- light grey, laminated
0.17		99.13	99.30	60	0.15			2	SILT: SILTSTONE- medium grey
1.94		99.30	101.24	60	1.68			2	FSS: FINE SANDSTONE- light grey, w layer of lt grey silt laminae
0.08		101.24	101.32	60	0.07		101.50	3	FSS: FINE SANDSTONE- as above
0.74		101.32	102.06	60	0.64			3	FSS: FINE SANDSTONE- as above
0.17		102.06	102.23	60	0.15			3	FSS: FINE SANDSTONE- coaly fragments, calc-filled fractures
0.26		102.23	102.49	58	0.22			3	SILT: SILTSTONE- med grey, lt grey fine sand laminae
0.60		102.49	103.09	58	0.51			3	SH: MUDSTONE- dk grey, scattered coaly inclusions
0.94		103.09	104.03	65	0.85			3	FSS: FINE SANDSTONE- light grey, w layer of lt grey silt laminae
0.09		104.03	104.12	65	0.08			4	FSS: FINE SANDSTONE- as above
0.18		104.12	104.30	70	0.16			4	SH: MUDSTONE- dk grey, scattered coaly inclusions
1.70	3	104.30	106.00	70	1.54			4	CL: CORE LOSS- coal
0.87	3	106.00	106.87	70	0.79			4	CL: CORE LOSS- rock
0.07	3	106.87	106.94	70	0.06		104.50	4	CS: CARBONACEOUS MUDSTONE- dk grey to black, core broken
0.10	3	106.94	107.04	70	0.09	1		4	C6: COAL-STONEY OR BONEY
0.04	3	107.04	107.08	70	0.04	2		4	C4: COAL-DULL BANDED
0.08	3	107.08	107.16	70	0.07	2		4	C3: COAL-DULL & BRIGHT
0.06	3	107.16	107.22	70	0.05	2		4	C4: COAL-DULL BANDED
0.05	3	107.22	107.27	70	0.05	2		4	C5: COAL-DULL
0.05	3	107.27	107.32	70	0.05	3		4	C4: COAL-DULL BANDED
0.11	3	107.32	107.43	70	0.10	3		4	C4: COAL-DULL BANDED- core broken
0.06	3	107.43	107.49	70	0.05	3		4	C4: COAL-DULL BANDED
0.12	3	107.49	107.61	70	0.11	3		4	C3: COAL-DULL & BRIGHT
0.04	3	107.61	107.65	70	0.04	3	107.50	4	C4: COAL-DULL BANDED
0.15	3	107.65	107.80	70	0.14	4		4	C4: COAL-DULL BANDED- crushed, w shale frags, slickensides
0.25		107.80	108.05	70	0.23			4	CS: CARBONACEOUS MUDSTONE- dk grey, rich in coaly frags
0.29		108.05	108.34	70	0.26			4	SH: MUDSTONE- dk grey, slightly carbonaceous, w coaly fractures

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
DATE COMPLETED:	**28-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.07		108.34	108.41	70	0.06			4	CS: CARBONACEOUS MUDSTONE- dk gy-black, abund coal bands
0.20		108.41	108.61	70	0.18			4	SH: MUDSTONE- dk grey, slightly carbonaceous, coaly inclusions
0.31		108.61	108.92	70	0.28			4	CS: CARBONACEOUS MUDSTONE- dk gy-black, abund coal bands
0.12		108.92	109.04	70	0.11			4	SH: MUDSTONE- dk grey, slightly carbonaceous, coaly inclusions
0.62		109.04	109.66	70	0.56			5	SH: MUDSTONE- as above
0.11		109.66	109.77	70	0.10			5	CS: CARBONACEOUS MUDSTONE- dk gy-black, abund coal bands
0.11		109.77	109.88	70	0.10			5	SH: MUDSTONE- dk grey, slightly carbonaceous, coaly inclusions
0.10		109.88	109.98	70	0.09			5	CS: CARBONACEOUS MUDSTONE- dk gy-black, abund coal bands
0.22		109.98	110.20	70	0.20		110.50	5	SH: MUDSTONE- dk grey, slightly carbonaceous, w coaly inclusions
0.83		110.20	111.03	70	0.75			5	SH: MUDSTONE- as above
0.14		111.03	111.17	70	0.13			5	SILT: SILTSTONE- med grey
0.42		111.17	111.59	65	0.38			5	FSS: FINE SANDSTONE- light grey, w lt grey silt laminae
0.72		111.59	112.31	65	0.65			6	FSS: FINE SANDSTONE- as above
0.42		112.31	112.73	65	0.38		113.50	6	SILT: SILTSTONE- light grey, w lt grey laminae of fine sand
0.39		112.73	113.12	65	0.35			6	SILT: SILTSTONE- as above
0.51		113.12	113.63	60	0.44			6	FSS: FINE SANDSTONE- lt grey, laminated, dk grey mud at centre
0.09		113.63	113.72	60	0.08			6	SH: MUDSTONE- dk grey
0.08		113.72	113.80	60	0.07			6	CS: CARBONACEOUS MUDSTONE- dark grey, abund coal inclus
0.44		113.80	114.24	60	0.38			6	SH: MUDSTONE- dk grey, slightly carbonaceous, coaly inclusions
0.24		114.24	114.48	60	0.21			7	SH: MUDSTONE- as above
0.87		114.48	115.35	60	0.75			7	SILT: SILTSTONE- light grey, w lt grey laminae of fine sand
0.10		115.35	115.45	60	0.09		116.50	7	FSS: FINE SANDSTONE- light grey, laminated
1.30		115.45	116.75	60	1.13			7	FSS: FINE SANDSTONE- as above
0.39		116.75	117.14	60	0.34			7	MSS: MEDIUM SANDSTONE- med-coarse, coal incl, calc-filled fracs
1.13		117.14	118.27	60	0.98			8	MSS: MEDIUM SANDSTONE- as above
0.58		118.27	118.85	60	0.50			8	MSS: MEDIUM SANDSTONE- subang/subround granules & pebbles
0.30		118.85	119.15	65	0.27			8	FSS: FINE SANDSTONE- light grey, laminated, med grey silt laminae
0.10		119.15	119.25	65	0.09			8	MSS: MEDIUM SANDSTONE- light grey, w numerous coal inclusions
0.24		119.25	119.49	20	0.08			8	F: FAULTED- sandy mudst, discont calc veins, beds v steep
0.50		119.49	119.99	20	0.17			8	CL: CORE LOSS- rock
0.38		119.99	120.37	70	0.36			8	MSS: MEDIUM SANDSTONE- lt gy, many coal incl & calc-filled fracs
0.39		120.37	120.76	70	0.37			9	MSS: MEDIUM SANDSTONE- basal contact v steep (~32) & irregular
0.32		120.76	121.08	70	0.30			9	SILT: SILTSTONE- light grey, w lt grey laminae of fine sand
0.09		121.08	121.17	70	0.08			9	FSS: FINE SANDSTONE- light grey, laminated

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
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ORIENTATION:	**Vertical**
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APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.10		121.17	121.27	70	0.09			9	FSS: FINE SANDSTONE- med grey
0.40		121.27	121.67	70	0.38		122.80	9	SH: MUDSTONE- dark grey
0.08		121.67	121.75	70	0.08			9	SH: MUDSTONE- as above, core broken
0.54		121.75	122.29	60	0.47			9	SILT: SILTSTONE- med grey, w lt grey laminae of fine sand
0.17		122.29	122.46	60	0.15			9	FSS: FINE SANDSTONE- light grey, laminated
0.64		122.46	123.10	58	0.54			9	SILT: SILTSTONE- med grey, w lt grey laminae of fine sand
0.17		123.10	123.27	58	0.14			9	SH: MUDSTONE- dk grey, scattered coal inclus & fine sand laminae
1.31		123.27	124.58	58	1.11		125.90	10	SH: MUDSTONE- as above
0.28		124.58	124.86	58	0.24			10	CL: CORE LOSS, Rock
0.20		124.86	125.06	58	0.17			10	CS: CARBONACEOUS MUDSTONE- dk grey, coaly inclus
0.10		125.06	125.16	58	0.08			10	CS: CARBONACEOUS MUDSTONE- as above, core broken
0.89		125.16	126.05	58	0.75			10	CS: CARBONACEOUS MUDSTONE- dk grey, w coal bands
0.29		126.05	126.34	58	0.25			10	SH: MUDSTONE- dk grey, coal inclusions, scattered coal bands
0.52		126.34	126.86	58	0.44			11	SH: MUDSTONE- dk grey, scattered coal inclusions & bands
0.11		126.86	126.97	58	0.09			11	SILT: SILTSTONE- med grey, ~5cm calcite vein across bedding
0.32		126.97	127.29	60	0.28			11	SILT: SILTSTONE- med grey, stepped calcite vein, minor movement?
0.25		127.29	127.54	36	0.15			11	F: FAULTED- med grey, numerous calc veins, dip steepens abruptly
0.17		127.54	127.71	48	0.13		129.00	11	SH: MUDSTONE- med grey
0.75		127.71	128.46	45	0.53			11	SH: MUDSTONE- dk grey, w coaly inclusions
0.27		128.46	128.73	45	0.19			11	CS: CARBONACEOUS MUDSTONE- black, coaly, crushed, slicks
0.07		128.73	128.80	45	0.05			11	CS: CARBONACEOUS MUDSTONE- dk gy to black, coal bands
0.23		128.80	129.03	45	0.16			12	C: COAL, UNDIFFERENTIATED- crushed, w shale chips, slicks
0.24		129.03	129.27	45	0.17		135.00	12	CS: CARBONACEOUS MUDSTONE- dk gy to black, coal bands
0.38		129.27	129.65	45	0.27			12	CS: CARBONACEOUS MUDSTONE- crushed, w coal bands
0.19		129.65	129.84	45	0.13			12	CS: CARBONACEOUS MUDSTONE- dk gy to black, coal bands
0.26		129.84	130.10	76	0.11		138.00	12	F: FAULTED- dk grey to black, coal inclusions; dip steepens abruptly
3.80	4	130.10	133.90	70	1.67			12	CL: CORE LOSS- coal
3.20	4	133.90	137.10	70	1.40			12	CL: CORE LOSS- rock
1.10	4	137.10	138.20	70	0.48			12	CL: CORE LOSS- coal
1.04		138.20	139.24	70	0.46			12	SILT: SILTSTONE- lt grey, massive
0.27		139.24	139.51	65	0.22			13	SILT: SILTSTONE- med grey, w lt grey sandy silt laminae
0.12		139.51	139.63	56	0.09			13	FSS: FINE SANDSTONE- light grey, w med grey silt laminae
0.83		139.63	140.46	55	0.68		141.00	13	SILT: SILTSTONE- med grey, w lt grey fine sand laminae
0.80		140.46	141.26	55	0.66			13	FSS: FINE SANDSTONE- lt grey, lam, calc-filled fracs

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ORIENTATION:	**Vertical**
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APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.75		141.26	142.01	55	0.64			13	SILT: SILTSTONE- med grey w dk grey beds, minor calc veins
0.36		142.01	142.37	55	0.16			13	FSS: FINE SANDSTONE- light grey, dip steepens abruptly
0.26		142.37	142.63	40	0.17			14	SH: MUDSTONE- med grey, irregular calcite veins at base
0.76		142.63	143.39	40	0.49			14	SH: MUDSTONE- dk grey w scattered coal inclusions
0.42		143.39	143.81	37	0.25		144.00	14	SILT: SILTSTONE- med grey, w lt grey fine sand laminae
0.46		143.81	144.27	40	0.30			14	FSS: FINE SANDSTONE- lt grey, lam, minor calcite veins
0.48		144.27	144.75	40	0.31			14	SH: MUDSTONE- dk grey, minor calcite veins
0.40		144.75	145.15	40	0.26			14	FSS: FINE SANDSTONE- many calc veins w BCA = 0, faulted
0.20		145.15	145.35	20	0.07			15	F: FAULTED- lt grey fine sandst, abund calc veins, probably faulted
0.58		145.35	145.93	20	0.20			15	FSS: FINE SANDSTONE- subvert mud beds, slicks, many calc veins
0.32		145.93	146.25	20	0.11			15	FSS: FINE SANDSTONE- lt grey, lam, abund calc veins, faulted
0.19		146.25	146.44	31	0.10			15	FSS: FINE SANDSTONE- lt grey, laminated, probably faulted
0.24		146.44	146.68	31	0.12		147.00	15	F: FAULTED- subvertical mud beds, slickensides at BCA = 0
0.24		146.68	146.92	31	0.12			15	F: FAULTED- subvertical mud beds, slickensides at BCA = 0
0.33		146.92	147.25	31	0.17			15	FSS: FINE SANDSTONE- subvert mud bed, slicks & calc on bedding
0.10		147.25	147.35	31	0.05			15	F: FAULTED- mudst w abund calc veins, brecciated
0.42		147.35	147.77	13	0.09			15	FSS: FINE SANDSTONE- laminated, abund calc veins, faulted
0.44		147.77	148.21	13	0.10			16	F: FAULTED- sandst, fault at BCA = 0, calc veins, beds deformed
1.43		148.21	149.64	19	0.47		150.00	16	FSS: FINE SANDSTONE- lt grey, lam, abund calc veins, faulted
0.34		149.64	149.98	19	0.11			16	FSS: FINE SANDSTONE- as above
0.13		149.98	150.11	45	0.09			16	FSS: FINE SANDSTONE- as above, dip more moderate
0.41		150.11	150.52	45	0.29			16	SH: MUDSTONE- dk gy, sheared, abund calc veins, probably faulted
0.20		150.52	150.72	45	0.14			17	SH: MUDSTONE- as above
0.64		150.72	151.36	45	0.45			17	FSS: FINE SANDSTONE- lt grey, laminated, w dk mudst interbeds
0.31		151.36	151.67	50	0.24			17	SH: MUDSTONE- dk grey, scattered coal incl, calc veins ll bedding
0.19		151.67	151.86	50	0.15			17	F: FAULTED- lt grey sandst, sheared, abund calc vein
0.70		151.86	152.56	50	0.54		153.00	17	FSS: FINE SANDSTONE- lt grey, lam, mud beds, calc-filled fracs
0.70		152.56	153.26	67	0.64			17	FSS: FINE SANDSTONE- as above
0.47		153.26	153.73	70	0.44			18	FSS: FINE SANDSTONE- as above
0.44		153.73	154.17	70	0.41			18	SH: MUDSTONE- dk grey, scattered coal inclusions
0.60		154.17	154.77	70	0.56			18	FSS: FINE SANDSTONE- lt grey, laminated, dk mudst layers
0.41		154.77	155.18	70	0.39			18	SH: MUDSTONE- dk grey, scattered coal inclusions
0.33		155.18	155.51	70	0.31		156.00	18	FSS: FINE SANDSTONE- lt grey, laminated
0.57		155.51	156.08	70	0.54			18	FSS: FINE SANDSTONE- as above

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
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ORIENTATION:	**Vertical**
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APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.06		156.08	156.14	70	0.06			18	SILT: SILTSTONE- med grey, w lt grey fine sand laminae
0.62		156.14	156.76	70	0.58			19	SILT: SILTSTONE- as above
0.14		156.76	156.90	70	0.13			19	FSS: FINE SANDSTONE- lt grey, laminated
0.15		156.90	157.05	66	0.14			19	SILT: SILTSTONE- med grey, w lt grey fine sand laminae
0.13		157.05	157.18	66	0.12			19	FSS: FINE SANDSTONE- lt grey, laminated
0.07		157.18	157.25	66	0.06			19	SH: MUDSTONE- dk grey
0.03		157.25	157.28	66	0.03			19	SH: MUDSTONE- calcite vein, laminated
0.72		157.28	158.00	73	0.69			19	SILT: SILTSTONE- med grey, w lt grey fine sand laminae
0.47		158.00	158.47	70	0.45		159.00	19	F: FAULTED- lt grey sandst, lg calc veins, coal-filled fracs
0.37		158.47	158.84	70	0.35			19	FSS: FINE SANDSTONE- lt grey, sheared
0.17		158.84	159.01	70	0.16			19	F: FAULTED- lt grey sandst, lg calc veins, coal-filled fracs
0.09		159.01	159.10	70	0.09			20	F: FAULTED- as above
0.80	5	159.10	159.90	70	0.77			20	CL: CORE LOSS, Coal
1.00		159.90	160.90	70	0.96			20	CL: CORE LOSS, Rock
0.10		160.90	161.00	70	0.10			20	FSS: FINE SANDSTONE- lt grey, coaly inclusions
0.19		161.00	161.19	70	0.18			20	CS: CARBONACEOUS MUDSTONE- dk grey, coal inclus & bands
0.12		161.19	161.31	70	0.11			20	SH: MUDSTONE- dk grey, coaly inclusions & frags, core broken
0.53		161.31	161.84	70	0.51			20	SH: MUDSTONE- dk grey, slightly carb, w coal bands & stringers
0.10		161.84	161.94	70	0.10			20	CS: CARBONACEOUS MUDSTONE- dk grey to black, coaly bands
0.12		161.94	162.06	70	0.11		162.00	20	SH: MUDSTONE- dk grey, slightly carb, w coal bands & stringers
0.09		162.06	162.15	70	0.09			20	SH: MUDSTONE- as above
0.10		162.15	162.25	70	0.10			20	CS: CARBONACEOUS MUDSTONE- dk gy to black, coal inclusions
0.34		162.25	162.59	70	0.33			20	SH: MUDSTONE- dk grey, slightly carb, scattered coaly inclusions
0.61		162.59	163.20	70	0.58			20	SH: MUDSTONE- med grey
0.12		163.20	163.32	70	0.11			20	SH: MUDSTONE- dk grey
1.20		163.32	164.52	70	1.15		165.00	21	SH: MUDSTONE- as above
0.16		164.52	164.68	70	0.15			21	SH: MUDSTONE- as above
0.25		164.68	164.93	70	0.24			21	CL: CORE LOSS- rock
0.46		164.93	165.39	70	0.44			21	SILT: SILTSTONE- med grey
0.93		165.39	166.32	70	0.89			21	FSS: FINE SANDSTONE- lt grey, massive
0.20		166.32	166.52	70	0.19			21	SH: MUDSTONE- dk grey
0.71		166.52	167.23	70	0.68			22	SH: MUDSTONE- as above
0.30		167.23	167.53	70	0.29			22	SILT: SILTSTONE- lt to med grey, sandy
0.23		167.53	167.76	70	0.22		168.00	22	SH: MUDSTONE- dk grey

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DATE STARTED:	**24-Feb-05**
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ORIENTATION:	**Vertical**
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APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.13		167.76	167.89	70	0.12			22	SH: MUDSTONE- as above
1.10		167.89	168.99	70	1.05			22	SILT: SILTSTONE- lt grey, scattered lt grey sand laminae
0.52		168.99	169.51	65	0.47			22	FSS: FINE SANDSTONE- lt grey, partly laminated
0.28		169.51	169.79	65	0.25			23	FSS: FINE SANDSTONE- as above
0.30		169.79	170.09	65	0.27			23	SILT: SILTSTONE- med grey
0.25		170.09	170.34	65	0.23			23	FSS: FINE SANDSTONE- lt grey
0.23		170.34	170.57	65	0.21			23	SILT: SILTSTONE- med grey
0.28		170.57	170.85	65	0.25		171.00	23	FSS: FINE SANDSTONE- lt grey, partly laminated
1.21		170.85	172.06	70	1.14			23	FSS: FINE SANDSTONE- as above
0.12		172.06	172.18	49	0.06			23	FSS: FINE SANDSTONE- lt grey, unconf at top, dip decreases down
0.37		172.18	172.55	45	0.21			23	FSS: FINE SANDSTONE- lt grey, laminated
0.37		172.55	172.92	45	0.26			24	FSS: FINE SANDSTONE- as above
0.16		172.92	173.08	55	0.13			24	SILT: SILTSTONE- med grey, w lt grey sandy laminae
0.12		173.08	173.20	78	0.12			24	MSS: MEDIUM SANDSTONE- small subang/subround mud pebbles
0.20		173.20	173.40	30	0.10			24	MSS: MEDIUM SANDSTONE- unconf at top, dip decreases down
0.58		173.40	173.98	70	0.55		174.00	24	MSS: MEDIUM SANDSTONE- lt grey, laminated
0.03		173.98	174.01	70	0.03			24	MSS: MEDIUM SANDSTONE- small subang-subround mud pebbles
0.25		174.01	174.26	72	0.24			24	MSS: MEDIUM SANDSTONE- unconform at top, small mud pebbles
0.23		174.26	174.49	72	0.22			24	MSS: MEDIUM SANDSTONE- lt grey, calcite-filled fractures
0.19		174.49	174.68	72	0.18			24	MSS: MEDIUM SANDSTONE- small subang-subround mud pebbles
0.30		174.68	174.98	72	0.29			24	MSS: MEDIUM SANDSTONE- lt grey
0.20		174.98	175.18	73	0.19			24	MSS: MEDIUM SANDSTONE- small subang-subround mud pebbles
0.15		175.18	175.33	73	0.14			24	MSS: MEDIUM SANDSTONE- med to coarse, small mud pebbles
0.16		175.33	175.49	73	0.15			25	MSS: MEDIUM SANDSTONE- as above
0.10		175.49	175.59	73	0.10			25	MSS: MEDIUM SANDSTONE- as above, poss unconformity at top
0.22		175.59	175.81	77	0.21			25	MSS: MEDIUM SANDSTONE- light grey, lam, poss unconf at top
0.80		175.81	176.61	75	0.77		177.00	25	SH: MUDSTONE- dk grey w scattered coal inclusions
1.48		176.61	178.09	75	1.43			25	SH: MUDSTONE- as above
0.60		178.09	178.69	75	0.58			26	SH: MUDSTONE- as above
0.12		178.69	178.81	75	0.12			26	SH: MUDSTONE- dk grey, coal inclus, many calc veins ll core axis
0.37		178.81	179.18	75	0.36			26	SH: MUDSTONE- dk grey w scattered coal inclusions
0.24		179.18	179.42	75	0.23			26	SH: MUDSTONE- dk grey, w lt rusty colour
0.08		179.42	179.50	75	0.08		180.00	26	SH: MUDSTONE- dk grey
0.86		179.50	180.36	80	0.85			26	SH: MUDSTONE- dk grey

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
DATE COMPLETED:	**28-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.42		180.36	180.78	80	0.41			26	SILT: SILTSTONE- med grey, w fine sand laminae, esp in lower part
0.21		180.78	180.99	80	0.21			26	SH: MUDSTONE- dk grey w scattered coal inclusions
0.31		180.99	181.30	80	0.31			27	SILT: SILTSTONE- med grey, w fine sand laminae & layers
0.44		181.30	181.74	80	0.43			27	FSS: FINE SANDSTONE- light grey, w silt laminae
0.18		181.74	181.92	80	0.18			27	SH: MUDSTONE- dk grey w scattered coal inclusions
0.61		181.92	182.53	80	0.60		183.00	27	SILT: SILTSTONE- med grey, w fine sand laminae & layers
0.70		182.53	183.23	80	0.69			27	SILT: SILTSTONE- as above
0.51		183.23	183.74	80	0.50			27	MSS: MEDIUM SANDSTONE- lt gy, fine-med sand, w silt interbeds
0.12		183.74	183.86	80	0.12			27	SILT: SILTSTONE- med grey, w fine sand laminae & layers
0.35		183.86	184.21	80	0.34			28	FSS: FINE SANDSTONE- light grey, cross-laminated, w silt laminae
0.53		184.21	184.74	80	0.52			28	SH: MUDSTONE- dk grey, w lt grey sandy silt layers
0.45		184.74	185.19	80	0.44			28	FSS: FINE SANDSTONE- lt grey, w med grey silty laminae & layers
0.15		185.19	185.34	80	0.15		186.00	28	FSS: FINE SANDSTONE- as above
0.22		185.34	185.56	80	0.22			28	MSS: MEDIUM SANDSTONE- lt grey fine to med sand, lam, bioturb
0.27		185.56	185.83	80	0.27			28	FSS: FINE SANDSTONE- lt grey, laminated
0.19		185.83	186.02	80	0.19			28	SILT: SILTSTONE- med grey, laminated
0.17		186.02	186.19	80	0.17			28	FSS: FINE SANDSTONE- dip steep, calc-fill fractures, fault?
0.30		186.19	186.49	80	0.30			28	FSS: FINE SANDSTONE- lt grey, w med grey silty laminae & layers
0.02		186.49	186.51	80	0.02			29	FSS: FINE SANDSTONE- as above
0.13		186.51	186.64	80	0.13			29	MSS: MEDIUM SANDSTONE- lt grey, laminated
0.10		186.64	186.74	80	0.10			29	FSS: FINE SANDSTONE- lt grey, laminated
0.08		186.74	186.82	80	0.08			29	SH: MUDSTONE- dk grey
0.08		186.82	186.90	80	0.08			29	MSS: MEDIUM SANDSTONE- lt grey, laminated
1.23		186.90	188.13	74	1.18			29	SH: MUDSTONE- dk grey, silty beds & coal inclus, calc-filled fracs
0.08		188.13	188.21	74	0.08		189.00	29	F: FAULTED- dip steepens, beds indistinct, calc-filled fracs, fault?
0.75		188.21	188.96	74	0.72			29	FSS: FINE SANDSTONE- lt grey, w med grey silty laminae & layers
0.20		188.96	189.16	74	0.19			29	SILT: SILTSTONE- med grey
0.21		189.16	189.37	74	0.20			29	FSS: FINE SANDSTONE- lt grey, laminated, calcite-filled frac
0.06		189.37	189.43	74	0.06			30	SH: MUDSTONE- dk grey
0.17		189.43	189.60	74	0.16			30	FSS: FINE SANDSTONE- lt grey, laminated
0.20		189.60	189.80	74	0.19			30	SILT: SILTSTONE- med grey, laminated in upper part
0.12		189.80	189.92	74	0.12			30	FSS: FINE SANDSTONE- lt grey, lam, fine grading to med at base
0.15		189.92	190.07	74	0.14			30	SILT: SILTSTONE- med grey, w lt grey sandy laminae & layers
0.13		190.07	190.20	74	0.12			30	MSS: MEDIUM SANDSTONE- lt grey, laminated

HOLE NO:	**CL05-10**
DATE STARTED:	**24-Feb-05**
DATE COMPLETED:	**28-Feb-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**T. Kosaka**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.66		190.20	190.86	74	0.63			30	SH: MUDSTONE- dk grey, w scattered silty beds & coal inclusions
0.15		190.86	191.01	74	0.14			30	FSS: FINE SANDSTONE- lt grey, fine to medium, laminated
0.75		191.01	191.76	74	0.72			30	CL: CORE LOSS- rock
0.27		191.76	192.03	74	0.26		192.00	30	SH: MUDSTONE- dk grey, w scattered coal inclusions
0.09		192.03	192.12	74	0.09			30	SH: MUDSTONE- as above
0.18		192.12	192.30	74	0.17			30	CS: CARBONACEOUS MUDSTONE- dk gy to black, coal inclusions
0.65		192.30	192.95	74	0.62			30	SH: MUDSTONE- dk grey, w scattered coal inclusions
1.24		192.95	194.19	74	1.19		195.00	31	SH: MUDSTONE- dk grey, w scattered coal inclusions & stringers
0.05		194.19	194.24	74	0.05			31	SH: MUDSTONE- as above
0.25		194.24	194.49	74	0.24			31	SH: MUDSTONE- as above, abund slickensides, calc-filled fracs
1.00		194.49	195.49	74	0.96			31	SH: MUDSTONE- dk grey, scattered coal inclusions, rare coal bands
1.26		195.49	196.75	74	1.21		198.00	32	SH: MUDSTONE- as above
1.95		196.75	198.70	74	1.87			32	CL: CORE LOSS- rock
0.60	6	198.70	199.30	74	0.58			32	CL: CORE LOSS- coal
0.72		199.30	200.02	74	0.69			32	SH: MUDSTONE- as above
0.19		200.02	200.21	74	0.18			32	CS: CARBONACEOUS MUDSTONE- dk grey to black, coaly inclus
0.07		200.21	200.28	74	0.07			32	SH: MUDSTONE- dk grey, w scattered coal inclusions
0.05		200.28	200.33	74	0.05			32	CS: CARBONACEOUS MUDSTONE- black, abund coaly stringers
0.02		200.33	200.35	74	0.02			32	C3: COAL-DULL & BRIGHT-
0.03		200.35	200.38	74	0.03			32	CS: CARBONACEOUS MUDSTONE- black, abund coaly stringers
0.05		200.38	200.43	74	0.05			32	SH: MUDSTONE- dk grey, w scattered coal inclusions
0.28		200.43	200.71	74	0.27			33	SH: MUDSTONE- as above
0.32		200.71	201.03	74	0.31			33	SILT: SILTSTONE- med grey
0.23		201.03	201.26	74	0.22		201.00	33	SH: MUDSTONE- dk grey, w scattered coal inclusions
0.23		201.26	201.49	74	0.22			33	SH: MUDSTONE- as above
0.24		201.49	201.73	74	0.23			33	SH: MUDSTONE- dk grey, w coal inclusions
0.43		201.73	202.16	74	0.41			33	CS: CARBONACEOUS MUDSTONE- dk grey to black, coaly inclus
0.38		202.16	202.54	74	0.37			33	SH: MUDSTONE- dk grey, w scattered coal inclusions
0.48		202.54	203.02	74	0.46			33	SH: MUDSTONE- med grey, calc-filled fracs
0.50		203.02	203.52	74	0.48			33	CL: CORE LOSS, Rock
0.40		203.52	203.92	74	0.38		204.00	34	SH: MUDSTONE- as above
0.87		203.92	204.79	74	0.84			34	SH: MUDSTONE- as above
0.04		204.79	204.83	74	0.04			34	SH: MUDSTONE- dk grey, w coal stringers
0.08		204.83	204.91	74	0.08			34	CS: CARBONACEOUS MUDSTONE- black, coal bands, pyrite vein

HOLE NO:	**CL05-10**
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ORIENTATION:	**Vertical**
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APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.07		204.91	204.98	74	0.07			34	CS: CARBONACEOUS MUDSTONE- black, sheared
1.02		204.98	206.00	74	0.98		207.00	34	SH: MUDSTONE- dk grey, w coal inclusions, bands & stringers
1.00		206.00	207.00	74	0.96			34	CL: CORE LOSS, Coal
0.70	7	207.00	207.70	74	0.67			34	CL: CORE LOSS, Rock
0.20		207.00	207.20	74	0.19			34	SH: MUDSTONE- as above
0.15		207.20	207.35	74	0.14			35	CS: CARBONACEOUS MUDSTONE- black, crushed, w coal chips
0.15		207.35	207.50	74	0.14			35	CS: CARBONACEOUS MUDSTONE- dk gy to blk, abund coal bands
0.17		207.50	207.67	74	0.16			35	SH: MUDSTONE- dk grey, w coal bands & stringers
0.70		207.67	208.37	74	0.67			35	SH: MUDSTONE- med grey, silty
0.79		208.37	209.16	74	0.76		210.00	35	SH: MUDSTONE- dk grey, w scattered coal bands & stringers
0.75		209.16	209.91	74	0.72			35	CL: CORE LOSS, Rock
0.17		209.91	210.08	74	0.16			35	SH: MUDSTONE- as above
0.08		210.08	210.16	74	0.08			35	CS: CARBONACEOUS MUDSTONE- black, numerous coal stringers
0.07		210.16	210.23	74	0.07			35	CS: CARBONACEOUS MUDSTONE- as above, core segmented
0.10		210.23	210.33	74	0.10			35	CS: CARBONACEOUS MUDSTONE- as above, core not broken
0.06		210.33	210.39	74	0.06			35	CS: CARBONACEOUS MUDSTONE- as above, core broken
0.10		210.39	210.49	74	0.10			35	CS: CARBONACEOUS MUDSTONE- as above, core not broken
0.35		210.49	210.84	74	0.34			35	SILT: SILTSTONE- med grey
0.99		210.84	211.83	74	0.95		213.00	36	SH: MUDSTONE- dk grey, w scattered coal bands
1.25		211.83	213.08	74	1.20			36	CL: CORE LOSS, Rock
0.37		213.08	213.45	74	0.36			36	SH: MUDSTONE- as above
0.33		213.45	213.78	74	0.32			36	SH: MUDSTONE- dk grey, calcite-filled fractures
0.53		213.78	214.31	74	0.51			36	SH: MUDSTONE- dk grey, w coal bands & stringers
0.47		214.31	214.78	74	0.45			36	SILT: SILTSTONE- med grey w lt grey sandy silt laminae
0.17		214.78	214.95	74	0.16			36	SH: MUDSTONE- dk grey, w scattered coal bands & inclusions
1.02		214.95	215.97	74	0.98		216.00	37	SH: MUDSTONE- as above
1.94		215.97	217.91	74	1.86			37	SH: MUDSTONE- as above
0.93		217.91	218.84	74	0.89		219.00	38	SH: MUDSTONE- as above

HOLE NO:	**CL05-11**
DATE STARTED:	**27-Feb-05**
DATE COMPLETED:	**01-Mar-05**
ORIENTATION:	**55 NE**
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APP THICK	Lith	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
60.75	CL		0.00	60.75	90	60.75			1	CL: CORE LOSS, not cored
0.41	SH		60.75	61.16	75	0.40			1	SH: MUDSTONE, dark grey, broken
0.02	R		61.16	61.18	75	0.02			1	ROCK: claystone, bentonitic, lt grey, crumbled
0.14	CS		61.18	61.32	75	0.14			1	CS:CARBONACEOUS MUDSTONE, dark grey
1.46	SH		61.32	62.78	75	1.41			1	SH: MUDSTONE, lam, silty layers, extension fract w lystric surf at base
0.27	SH		62.78	63.05	75	0.26		62.80	1	SH: MUDSTONE, calc veins, coal bands, lystric surfaces
0.49	CS		63.05	63.54	75	0.47			1	CS: CARBONACEOUS MUSDTONE; dk gy-brn, coaly bands
2.42	CS		63.54	65.96	75	2.34		65.80	2	CS: CARBONACEOUS MUSDTONE; dk gy-brn, coaly bands
0.53	CS		65.96	66.49	75	0.51			2	CS: CARBONACEOUS MUSDTONE; dk gy-brn, coaly bands
1.28	CS		66.49	67.77	75	1.24			3	CS: CARBONACEOUS MUSDTONE; dk gy-brn, coaly bands
0.04	C4		67.77	67.81	75	0.04			3	C4: COAL- DULL BANDED, broken
0.31	CS		67.81	68.12	75	0.30		68.80	3	CS: CARBONACEOUS MUDSTONE, dark grey
0.05	CS		68.12	68.17	75	0.05			3	CS: CARBONACEOUS MUDSTONE, dark grey
0.65	CL		68.17	68.82	75	0.63			3	CL: CORE LOSS, rock
1.26	FSS		68.82	70.08	75	1.22			3	FINE SANDSTONE, grey, w silty bands & muddy interbeds
1.51	FSS		70.08	71.59	75	1.46		71.80	4	FINE SANDSTONE, as above, laminated
1.46	FSS		71.59	73.05	75	1.41			4	FINE SANDSTONE, as above, laminated
0.11	FSS		73.05	73.16	75	0.11			5	FINE SANDSTONE, as above, laminated
0.10	FSS		73.16	73.26	75	0.10			5	FINES SANDSTONE, dk gy-black, brecciated, calc & pyrite
1.53	FSS		73.26	74.79	84	1.52		74.80	5	FINE SANDSTONE, grey, w silty bands & muddy interbeds
1.09	FSS		74.79	75.88	84	1.08			5	FINE SANDSTONE, coal stringers, calc-filled fracs
0.88	FSS		75.88	76.76	80	0.88			6	FINE SANDSTONE, extension fract at high angle
0.17	SH		76.76	76.93	80	0.17			6	MUSDTONE, grey to dark grey
0.03	SILT		76.93	76.96	80	0.03			6	SILTSTONE, grey
0.14	CS		76.96	77.10	80	0.14			6	CS: CARBONACEOUS MUDSTONE, dark grey to black
0.13	C4	3	77.10	77.23	80	0.13			6	C4: COAL-DULL BANDED
0.04	C3	3	77.23	77.27	80	0.04			6	C3: COAL-DULL & BRIGHT
0.28	C4	3	77.27	77.55	80	0.28		77.80	6	C4: COAL-DULL BANDED
0.72	CL	3	77.55	78.27	80	0.72			6	CL: CORE LOSS, coal
0.06	C4	3	78.27	78.33	80	0.06			6	C4: COAL-DULL BANDED, broken
0.08	CS	3	78.33	78.41	80	0.08			6	CS: CARBONACEOUS MUDSTONE, broken
0.09	C3	3	78.41	78.50	80	0.09			6	C3: COAL-DULL & BRIGHT, crushed
0.11	SH	3	78.50	78.61	80	0.11			6	MUDSTONE: dark brown-grey
0.09	CS	3	78.61	78.70	80	0.09			6	CARBONACEOUS MUDSTONE, broken, lystric surfaces

HOLE NO:	**CL05-11**
DATE STARTED:	**27-Feb-05**
DATE COMPLETED:	**01-Mar-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	Lith	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
2.40	CL	3	78.70	81.10	80	0.00			7	CL: CORE LOSS, coal
0.11	CS		81.10	81.21	80	0.11			7	CS: CARBONACEOUS MUDSTONE, black
1.62	SH		81.21	82.83	80	1.61			7	MUDSTONE, coaly stringers & silty beds
0.02	CS		82.83	82.85	80	0.02			7	CS: CARBONACEOUS MUDSTONE, black
0.60	CL		82.85	83.45	80	0.00			7	CL: CORE LOSS, Rock
0.36	SH		83.45	83.81	80	0.36		83.80	7	MUDSTONE, coaly stringers
0.53	SH		83.81	84.34	80	0.53			7	MUDSTONE, coaly stringers
0.24	SH		84.34	84.58	80	0.24			8	MUDSTONE, coaly stringers
0.18	CS		84.58	84.76	80	0.18			8	CS: CARBONACEOUS MUDSTONE, dark grey to black
2.01	SILT		84.76	86.77	80	2.00		86.80	8	SILTSTONE, w muddy interbeds
0.23	SH		86.77	87.00	80	0.23			8	MUDSTONE: dark brown-grey
0.19	CS		87.00	87.19	80	0.19			8	CS: CARBONACEOUS MUDSTONE, dark grey to black
0.79	CS		87.19	87.98	80	0.79			9	CARBONACEOUS MUDSTONE, broken in upper part
0.13	SH		87.98	88.11	80	0.13			9	mudstone, w calcite veining
0.52	FSS		88.11	88.63	68	0.48			9	FINE SANSTONE, laminated, w calcite-filled fractures
0.05	SH		88.63	88.68	68	0.05			9	MUDSTONE, broken, slickensided surfaces
0.88	MSS		88.68	89.56	68	0.82		89.90	9	MEDIUM SANDSTONE, lt grey, calcite-filled fractures
0.38	MSS		89.56	89.94	68	0.35			9	MEDIUM SANDSTONE, lt grey, calcite-filled fractures
0.38	MSS		89.94	90.32	68	0.35			9	MEDIUM SANDSTONE, lt grey, calcite-filled fractures
1.53	MSS		90.32	91.85	68	1.42			10	MEDIUM SANDSTONE, as above, coaly stringers in centre
1.25	SILT		91.85	93.10	74	1.20		92.80	10	SILTSTONE, laminated, with muddy interbeds
1.16	SILT		93.10	94.26	74	1.12			11	SILTSTONE, as above, with scattered coaly stringers
0.07	CS		94.26	94.33	74	0.07			11	CARBONACEOUS MUDSTONE, black, lystric surfaces
0.04	C4		94.33	94.37	74	0.04			11	C4: COAL- DULL BANDED, crumbled
0.08	C3		94.37	94.45	74	0.08			11	C3: COAL-DULL & BRIGHT
0.03	C6		94.45	94.48	74	0.03			11	C6: COAL-STONEY OR BONEY
0.04	SH		94.48	94.52	74	0.04			11	MUDSTONE
0.12	CS		94.52	94.64	74	0.12			11	CARBONACEOUS MUDSTONE, broken at top
0.40	SH		94.64	95.04	74	0.38		95.80	11	MUDSTONE, coaly stringers; calcite-filled fracs II bedding
0.75	CL		95.04	95.79	74	0.72			11	CL: CORE LOSS, rock
0.37	SH		95.79	96.16	74	0.36			11	MUDSTONE, coaly stringers; calcite-filled fracs II bedding
0.06	SH		96.16	96.22	74	0.06			11	MUDSTONE, broken & crumbled
0.39	FSS		96.22	96.61	74	0.37			11	FINE SANDSTONE, w mud laminae
0.79	FSS		96.61	97.40	74	0.76			12	FINE SANDSTONE, w mud laminae

HOLE NO:	**CL05-11**
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ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	Lith	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.34	FSS		97.40	97.74	74	0.33			12	FINE SANDSTONE, brecciated, calcite-filled fracs
0.04	SH		97.74	97.78	74	0.04			12	MUDSTONE, black, sheared
0.24	FSS		97.78	98.02	74	0.23			12	FINE SANDSTONE, brecciated, calcite-filled fracs
0.43	MSS		98.02	98.45	74	0.41			12	MEDIUM SANDSTONE, calcite veins x-cut bedding
0.31	MSS		98.45	98.76	74	0.30			12	MEDIUM SANDSTONE, lt grey
0.65	SILT		98.76	99.41	74	0.62			12	SILTSTONE, mud lam, brecciated, lystric surf, extension fault
0.37	SILT		99.41	99.78	80	0.36			13	SILTSTONE, mud lam, brecciated, lystric surf, extension fault
0.07	SH		99.78	99.85	80	0.07			13	MUDTONE, dark grey, slickensides
0.20	CS		99.85	100.05	80	0.19			13	CARBONACEOUS MUDSTONE, coal bands, sheared at top
0.66	SH		100.05	100.71	80	0.63			13	MUDSTONE, grey, coaly, heavliy sheared base, calcite
0.22	SH		100.71	100.93	80	0.21			13	MUDSTONE, grey, coaly bands
0.16	CS		100.93	101.09	80	0.15			13	CARBONACEOUS MUDSTONE, black, sheared, coal bands
0.97	SH		101.09	102.06	80	0.93			13	CARBONACEOUS MUDSTONE, black, sheared, coal bands
0.95	SH		102.06	103.01	80	0.91		103.28	14	CARBONACEOUS MUDSTONE, as above, crumbled in centre
1.54	SH		103.01	104.55	80	1.48		104.81	14	CARBONACEOUS MUDSTONE, black, sheared, coal bands
0.14	SH		104.55	104.69	80	0.13			14	CARBONACEOUS MUDSTONE, black, sheared, coal bands
1.00	CL		104.69	105.69	80				14	CL: CORE LOSS, rock
1.09	SH		105.69	106.78	80	1.05			15	MUDSTONE, fractured, lystric surfaces
0.14	CS		106.78	106.92	80	0.13		107.81	15	CARBONACEOUS MUDSTONE, crumbled, w coaly bands
0.27	SH		106.92	107.19	80	0.26			15	MUDSTONE, fractured
0.16	CS		107.19	107.35	80	0.15			15	CARBONACEOUS MUDSTONE, w coaly bands
0.18	C3		107.35	107.53	80	0.17			15	C3: COAL-DULL & BRIGHT, fractured
0.06	C4		107.53	107.59	80	0.06			16	C4: COAL- DULL BANDED, crumbled
0.07	C3		107.59	107.66	80	0.07			16	C3: COAL-DULL & BRIGHT, crumbled
0.36	CS		107.66	108.02	80	0.35			16	CARBONACEOUS MUDSTONE, w coaly bands
0.07	C4		108.02	108.09	80	0.07			16	C4: COAL- DULL BANDED
0.09	CS		108.09	108.18	80	0.09			16	CARBONACEOUS MUDSTONE, w coaly bands
0.04	C3		108.18	108.22	80	0.04			16	C3: COAL-DULL & BRIGHT, crumbled
0.28	SH		108.22	108.50	80	0.27			16	MUDSTONE, dk grey
0.04	CS		108.50	108.54	80	0.04			16	CARBONACEOUS MUDSTONE, w coaly bands
0.05	C3		108.54	108.59	80	0.05			16	C3: COAL-DULL & BRIGHT, crumbled
0.93	SH		108.59	109.52	80	0.89			16	MUDSTONE, fractured at base, lystric surfaces
0.57	SH		109.52	110.09	80	0.55			16	MUDSTONE, fractured at top
0.24	SH		110.09	110.33	80	0.23			17	MUDSTONE, dk grey

HOLE NO:	**CL05-11**
DATE STARTED:	**27-Feb-05**
DATE COMPLETED:	**01-Mar-05**
ORIENTATION:	**55 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	Lith	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
1.67	CL		110.33	112.00	80	1.61			17	CL: CORE LOSS, rock
1.23	CL	3	112.00	113.23	80	1.18			17	CL: CORE LOSS, coal
0.08	C6	3	113.23	113.31	80	0.08			17	C6: COAL-STONEY OR BONEY
0.04	CS	3	113.31	113.35	80	0.04			17	CARBONACEOUS MUDSTONE, w coaly bands
0.10	C5	3	113.35	113.45	80	0.10			17	C5: COAL- DULL
0.04	CS	3	113.45	113.49	80	0.04			17	CARBONACEOUS MUDSTONE, w coaly bands
0.12	C3	3	113.49	113.61	80	0.12			17	C3: COAL-DULL & BRIGHT
0.45	C4	3	113.61	114.06	80	0.43			17	C4: COAL- DULL BANDED, solid core
0.17	C3	3	114.06	114.23	80	0.16		113.80	17	C3: COAL-DULL & BRIGHT, solid core
0.12	C3	3	114.23	114.35	80	0.12			17	C3: COAL-DULL & BRIGHT, broken at base
0.03	CS	3	114.35	114.38	80	0.03			17	CARBONACEOUS MUDSTONE, w coaly bands
0.15	C3	3	114.38	114.53	80	0.14			17	C3: COAL-DULL & BRIGHT, broken
0.06	C2	3	114.53	114.59	80	0.06			17	C2: COAL- BRIGHT BANDED
0.14	C3	3	114.59	114.73	80	0.13			17	C3: COAL-DULL & BRIGHT
0.07	C2	3	114.73	114.80	80	0.07			17	C2: COAL- BRIGHT BANDED
0.12	C3	3	114.80	114.92	80	0.12			17	C3: COAL-DULL & BRIGHT, broken, sheared
0.19	C1	3	114.92	115.11	80	0.18			17	C1: COAL- BRIGHT
0.19	C3	3	115.11	115.30	80	0.18			17	C3: COAL-DULL & BRIGHT, broken, crumbled
0.41	SH		115.30	115.71	80	0.39			17	MUDSTONE, w coaly bands & stringers
0.06	CS		115.71	115.77	80	0.06			18	CARBONACEOUS MUDSTONE, w coaly bands
0.03	C6		115.77	115.80	80	0.03			18	C6: COAL-STONEY OR BONEY, crumbled
0.81	SH		115.80	116.61	80	0.78		116.80	18	MUDSTONE, dk grey
1.60	SH		116.61	118.21	80	1.54			18	MUDSTONE, dk grey
0.21	CS		118.21	118.42	80	0.20			18	CARBONACEOUS MUDSTONE, broken
0.42	CS		118.42	118.84	80	0.40			19	CARBONACEOUS MUDSTONE, crumbled at base
0.25	SH		118.84	119.09	80	0.24		119.80	19	MUDSTONE, w coaly bands
1.29	SH		119.09	120.38	80	1.24			19	MUDSTONE, w coaly bands
0.09	CS		120.38	120.47	80	0.09			19	CARBONACEOUS MUDSTONE, broken & crumbled at base
0.51	SH		120.47	120.98	80	0.49			19	MUDSTONE, dk grey
0.08	CS		120.98	121.06	80	0.08			19	CARBONACEOUS MUDSTONE, broken
0.44	CS		121.06	121.50	80	0.42			20	CARBONACEOUS MUDSTONE, dk grey
0.54	SILT		121.50	122.04	75	0.52		122.80	20	SILTSTONE, w mud laminae
0.22	SILT		122.04	122.26	75	0.21			20	SILTSTONE, grey
0.12	SH		122.26	122.38	75	0.12			20	MUDSTONE, calcite veinlets & fracture fillings

HOLE NO:	**CL05-11**
DATE STARTED:	**27-Feb-05**
DATE COMPLETED:	**01-Mar-05**
ORIENTATION:	**55 NE**
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APP THICK	Lith	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
1.61	SILT		122.38	123.99	75	1.55			20	SILTSTONE, grey
0.54	SH		123.99	124.53	75	0.52			21	MUDSTONE, coaly bands & calcite veins ll to bedding
0.43	SILT		124.53	124.96	75	0.41		125.80	21	SILTSTONE, grey
1.84	SILT		124.96	126.80	60	1.59			21	SILTSTONE, laminated, w mud beds
0.32	SILT		126.80	127.12	60	0.28			22	SILTSTONE, laminated, w mud beds
0.85	FSS		127.12	127.97	60	0.74		128.80	22	FINE SANDSTONE, coarsening downward

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
19.00		0.00	19.00	90	19.00		20.42	0	CL: CORE LOSS- not cored
0.70		19.00	19.07	3	0.01			1	FSS: FINE SANDSTONE- lt grey, w grit
0.24		19.07	19.31	3	0.01			1	SH: MUDSTONE- dark grey
0.12		19.31	19.43	3	0.01			1	SH: MUDSTONE- dark grey, core broken
0.33		19.43	19.76	3	0.02			1	SH: MUDSTONE- dark grey
0.13		19.76	19.89	3	0.01			1	F: FAULTED- mudst, broken, sheared, poss fault
0.13		19.89	20.02	3	0.01		21.64	1	FSS: FINE SANDSTONE- dk grey, contact irregular
0.18		20.02	20.20	3	0.01			1	SH: MUDSTONE- dk grey, w lt grey silt beds
0.87		20.20	21.07	21	0.31			1	SH: MUDSTONE- as above, graded beds, sheared
0.36		21.07	21.43	3	0.02			1	SH: MUDSTONE- as above, v steep beds
0.29		21.43	21.72	3	0.02			2	SH: MUDSTONE- as above
0.12		21.72	21.84	38	0.07			2	S: SHEARED- as above, w shear zone
0.40		21.84	22.24	44	0.28		22.56	2	SH: MUDSTONE- dk gy, lam, graded silt beds, burrows
1.08		22.24	23.32	44	0.75			2	SH: MUDSTONE- as above
0.03		23.32	23.35	44	0.02			2	F: FAULTED- mudstone, with calcite frags
0.69		23.35	24.04	44	0.48			2	SH: MUDSTONE- dk gy, lam, graded silt beds, burrows
0.17		24.04	24.21	52	0.13			3	SH: MUDSTONE- as above
0.21		24.21	24.42	52	0.17		24.99	3	SH: MUDSTONE- as above
0.75		24.42	25.17	52	0.59			3	SH: MUDSTONE- as above
0.46		25.17	25.63	52	0.36		26.52	3	SH: MUDSTONE- as above
0.69		25.63	26.32	52	0.54			3	SH: MUDSTONE- as above
0.23		26.32	26.55	52	0.18			4	SH: MUDSTONE- as above
0.50		26.55	27.05	52	0.39		28.04	4	FSS: FINE SANDSTONE- lt gy, lam, x-beds, calc-filled fracs
0.51		27.05	27.56	42	0.34			4	FSS: FINE SANDSTONE- as above
0.19		27.56	27.75	42	0.13		29.57	4	SH: MUDSTONE- dk grey, laminated, w graded silt beds
0.27		27.75	28.02	42	0.18			4	SH: MUDSTONE- as above
0.48		28.02	28.50	42	0.32			5	SH: MUDSTONE- as above
0.58		28.50	29.08	42	0.39		31.09	5	SH: MUDSTONE- dk gy, lam, graded silt beds, small burrows
0.62		29.08	29.70	42	0.41			5	SH: MUDSTONE- as above
0.92		29.70	30.62	42	0.62			5	SH: MUDSTONE- dk gy, laminated silt beds, rare burrows
0.27		30.62	30.89	42	0.18			5	SH: MUDSTONE- as above
0.21		30.89	31.10	42	0.14			5	SH: MUDSTONE- dk grey, lam, cloudy silt beds
0.86		31.10	31.96	46	0.62			6	SH: MUDSTONE- dk gy, lam, graded silt beds, small burrows
0.18		31.96	32.14	46	0.13		34.14	6	SH: MUDSTONE- dk gy, lam, cloudy silt beds, abund burrows

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.40		32.14	32.54	46	0.29			6	SH: MUDSTONE- as above
0.78		32.54	33.32	46	0.56			6	SH: MUDSTONE- dk gy, lam, graded silt beds, small burrows
0.06		33.32	33.38	46	0.04		35.66	6	SH: MUDSTONE- as above
0.42		33.38	33.80	46	0.30			7	SH: MUDSTONE- as above
0.24		33.80	34.04	46	0.17			7	FSS: FINE SANDSTONE- lt grey, laminated
1.05		34.04	35.09	46	0.76		37.19	7	SH: MUDSTONE- dk gy, lam, graded silt beds, small burrows
0.58		35.09	35.67	46	0.42			7	SH: MUDSTONE- as above
0.28		35.67	35.95	46	0.20			7	SH: MUDSTONE- as above
0.62		35.95	36.57	46	0.45		38.71	8	SH: MUDSTONE- as above
1.19		36.57	37.76	46	0.86			8	SH: MUDSTONE- as above
0.25		37.76	38.01	46	0.18		40.23	8	SH: MUDSTONE- as above
0.58		38.01	38.59	46	0.42			8	SH: MUDSTONE- as above
0.98		38.59	39.57	46	0.70		41.76	9	SH: MUDSTONE- as above
0.28		39.57	39.85	46	0.20			9	SH: MUDSTONE- as above
1.05		39.85	40.90	46	0.76			9	SH: MUDSTONE- as above, burrows rare
0.21		40.90	41.11	46	0.15		43.28	9	SH: MUDSTONE- as above
0.23		41.11	41.34	46	0.17			9	SH: MUDSTONE- as above
1.31		41.34	42.65	42	0.88			10	SH: MUDSTONE- as above
1.51		42.65	44.16	42	1.01		46.33	10	SH: MUDSTONE- as above
1.26		44.16	45.42	46	0.91			11	SH: MUDSTONE- as above
0.23		45.42	45.65	46	0.17			11	SH: MUDSTONE- dk grey, broken, abund slicks
0.19		45.65	45.84	46	0.14			11	SH: MUDSTONE- dk grey, abundant slickensides
0.06		45.84	45.90	46	0.04			11	SH: MUDSTONE- dk grey, minor coaly inclusions
0.05		45.90	45.95	55	0.04			11	R: ROCK- lt brn, broken, fine-med gr, coal & mudst frags
0.04		45.95	45.99	55	0.03			11	R: ROCK- lt brn, broken, fine-med gr, abund coal inclus
0.18		45.99	46.17	55	0.13		49.38	11	R: ROCK- lt brn, fine-med gr, coaly inclusions rare
0.03		46.17	46.20	55	0.02			11	R: ROCK- lt brown, fine-med grained
0.14	2	46.20	46.34	55	0.10			11	C4: COAL-DULL BANDED- broken, abund slicks
0.02	2	46.34	46.36	55	0.01			11	R: ROCK- lt brn, fine-med grained
0.12	2	46.36	46.48	55	0.09			12	R: ROCK- lt brn, fine-med gr, coaly inclus
0.13	2	46.48	46.61	55	0.09			12	C4: COAL-DULL BANDED- abund slicks
0.39	2	46.61	47.00	55	0.28			12	CL: CORE LOSS- Rock
1.70	2	47.00	48.70	55	1.22			12	CL: CORE LOSS- Coal
0.03	2	48.70	48.73	55	0.02			12	SH: MUDSTONE- dk grey

HOLE NO:	CL05-14
DATE STARTED:	14-Mar-05
DATE COMPLETED:	17-Mar-05
ORIENTATION:	63 SW
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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.08	2	48.73	48.81	55	0.06			12	SILT: SILTSTONE- med grey, laminated
0.11		48.81	48.92	55	0.08			12	CS: CARBONACEOUS MUDSTONE- blk, coal stringers
0.10		48.92	49.02	55	0.08			12	SILT: SILTSTONE- med grey, laminated
0.08		49.02	49.10	55	0.06			12	CS: CARBONACEOUS MUDSTONE- blk, coal inclus
0.33		49.10	49.43	55	0.25			12	SH: MUDSTONE- dk grey, coaly bands & inclusions
0.24		49.43	49.67	40	0.18			12	CS: CARBONACEOUS MUDSTONE- blk, abund coal inclus
0.20		49.67	49.87	40	0.15			12	SH: MUDSTONE- dk gy, coaly inclus, scat coal bands
0.02		49.87	49.89	40	0.02			12	S: SHEARED- mudst, carb, black, sheared
0.45		49.89	50.34	40	0.34		52.43	12	SH: MUDSTONE- dk gy, coaly inclus, scat coal bands
0.24		50.34	50.58	40	0.15			12	SH: MUDSTONE- as above
0.05		50.58	50.63	40	0.03			12	CS: CARBONACEOUS MUDSTONE- black, coaly inclus
0.08		50.63	50.71	40	0.05			12	SH: MUDSTONE- dk grey, coaly inclusions
0.94		50.71	51.65	40	0.60			13	SH: MUDSTONE- as above
0.14		51.65	51.79	64	0.13		53.95	13	SILT: SILTSTONE- med grey, laminated
0.30		51.79	52.09	64	0.27			13	SILT: SILTSTONE- as above
0.92		52.09	53.01	64	0.83			13	SH: MUDSTONE- dk grey
0.20		53.01	53.21	58	0.17		55.47	13	FSS: FINE SANDSTONE- lt grey, laminated
0.20		53.21	53.41	58	0.17			13	FSS: FINE SANDSTONE- as above
0.26		53.41	53.67	58	0.22			14	FSS: FINE SANDSTONE- as abv, rusty at base
0.64		53.67	54.31	58	0.54			14	SH: MUDSTONE- dk gy, scat coal inclus
0.46		54.31	54.77	60	0.40		57.00	14	FSS: FINE SANDSTONE- lt grey, laminated
0.43		54.77	55.20	60	0.37			14	FSS: FINE SANDSTONE- as above
0.63		55.20	55.83	60	0.55			14	SH: MUDSTONE- dk grey
0.26		55.83	56.09	60	0.23			14	SILT: SILTSTONE- med grey, laminated
0.05		56.09	56.14	60	0.04		58.52	15	SILT: SILTSTONE- as above
0.69		56.14	56.83	60	0.60			15	SILT: SILTSTONE- as above
0.70		56.83	57.53	60	0.61			15	SH: MUDSTONE- dk grey
0.10		57.53	57.63	60	0.09		60.05	15	FSS: FINE SANDSTONE- lt gy, lam, calc-filled fracs
1.09		57.63	58.72	60	0.94			15	FSS: FINE SANDSTONE- as above
0.03		58.72	58.75	60	0.03			16	FSS: FINE SANDSTONE- as above
0.43		58.75	59.18	60	0.37		61.57	16	SH: MUDSTONE- dk grey, minor silt laminae
2.00		59.18	61.18	60	1.73			16	CL: CORE LOSS- Rock
1.53		61.18	62.71	60	1.33		63.09	16	SH: MUDSTONE- as above
0.77		62.71	63.48	60	0.67			16	SH: MUDSTONE- dk gy, scattered coal inclus/bands

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.20		63.48	63.68	60	0.17			17	SH: MUDSTONE- as above
0.19		63.68	63.87	60	0.16			17	SILT: SILTSTONE- med grey, laminated
0.32		63.87	64.19	60	0.28		64.62	17	SH: MUDSTONE- dk gy, scat coal inclus & silt lams
2.08		64.19	66.27	60	1.80			17	CL: CORE LOSS- Rock
1.56		66.27	67.83	60	1.35		66.14	17	SH: MUDSTONE- as above
0.37		67.83	68.20	60	0.32			17	SH: MUDSTONE- as above
0.07		68.20	68.27	60	0.06			17	CS: CARBONACEOUS MUDSTONE- black, coal bands
0.20		68.27	68.47	60	0.17			18	CS: CARBONACEOUS MUDSTONE- as above
0.79		68.47	69.26	54	0.68		67.67	18	SH: MUDSTONE- dk gy, scat coal inclus & silt lams
0.21		69.26	69.47	54	0.18			18	SH: MUDSTONE- as above
0.20		69.47	69.67	54	0.16			18	FSS: FINE SANDSTONE- contact unclear, calc-filled frac
0.35		69.67	70.02	54	0.32			18	SH: MUDSTONE- dk grey, calcite-filled fractures
0.21		70.02	70.23	54	0.18		69.19	18	SILT: SILTSTONE- med grey, laminated
0.13		70.23	70.36	54	0.11			18	SILT: SILTSTONE- as above
0.32		70.36	70.68	54	0.28			18	SH: MUDSTONE- dk grey, coal inclusions & bands
0.18		70.68	70.86	54	0.15			19	SH: MUDSTONE- as above, slightly carbonaceous
0.07		70.86	70.93	54	0.06			19	CS: CARBONACEOUS MUDSTONE- black
0.33		70.93	71.26	54	0.30			19	SH: MUDSTONE- dk gy, slight carb, coal inclus/bands
0.02		71.26	71.28	54	0.02		70.71	19	CS: CARBONACEOUS MUDSTONE- black
0.05		71.28	71.33	54	0.04			19	C4: COAL-DULL BANDED- abund slickensides
0.07		71.33	71.40	54	0.06			19	C5: COAL-DULL- abund slickensides
0.04		71.40	71.44	54	0.03			19	C4: COAL-DULL BANDED- broken, abund slickensides
0.54		71.44	71.98	54	0.49			19	SH: MUDSTONE- dk gy, slight carb, coal inclus/bands
0.17		71.98	72.15	54	0.15			19	CS: CARBONACEOUS MUDSTONE- abund coal bands
0.22		72.15	72.37	54	0.20		72.24	19	SH: MUDSTONE- dk grey, w coal inclus & bands
0.05		72.37	72.42	54	0.04			19	SH: MUDSTONE- as above
0.28		72.42	72.70	54	0.17			19	CS: CARBONACEOUS MUDSTONE- dk gry-blk, v coaly
0.21		72.70	72.91	54	0.08			19	SH: MUDSTONE- dk grey, coal bands, slicks on fracs
0.15		72.91	73.06	54	0.06			20	SH: MUDSTONE- as above
0.32		73.06	73.38	54	0.14			20	SH: MUDSTONE- as above
0.13		73.38	73.51	72	0.05			20	SH: MUDSTONE- as above, broken, abund slickensides
0.10		73.51	73.61	72	0.04			20	SH: MUDSTONE- as above, not broken
0.13		73.61	73.74	72	0.05			20	SH: MUDSTONE- as above, broken
0.07		73.74	73.81	72	0.03			20	SH: MUDSTONE- as above, not broken

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.04		73.81	73.85	72	0.02		73.76	20	C6: COAL-STONEY OR BONEY
0.06		73.85	73.91	72	0.03			20	CS: CARBONACEOUS MUDSTONE- black
0.88		73.91	74.79	72	0.39			20	SH: MUDSTONE- dk gy, slight carb, coal inclus/bands
0.18		74.79	74.97	72	0.08			20	SH: MUDSTONE- as above, slicks on fracs
0.40		74.97	75.37	72	0.17		75.29	20	SH: MUDSTONE- as above, poss fold axis at centre
0.17		75.37	75.54	72	0.04			20	SH: MUDSTONE- dk grey, w coal inclus
0.14		75.54	75.68	72	0.04			21	SILT: SILTSTONE- med grey, laminated, microfault
0.89		75.68	76.57	72	0.26			21	SH: MUDSTONE- coal bands, abund fracs w slicks
0.15		76.57	76.72	72	0.04		76.81	21	SH: MUDSTONE- dk grey
1.38		76.72	78.10	72	0.40		78.33	21	SH: MUDSTONE- as above
0.17		78.10	78.27	72	0.05			21	SH: MUDSTONE- as above
0.72		78.27	78.99	72	0.21			22	SH: MUDSTONE- as above
0.45		78.99	79.44	72	0.14		79.86	22	SH: MUDSTONE- as above
0.06		79.44	79.50	72	0.02			22	SH: MUDSTONE- as above
1.57		79.50	81.07	72	0.49		81.38	22	CS: CARBONACEOUS MUDSTONE- coaly, plant frags
0.50		81.07	81.57	72	0.15			23	CS: CARBONACEOUS MUDSTONE- as above
0.04		81.57	81.61	72	0.01			23	C3: COAL-DULL & BRIGHT
0.04		81.61	81.65	72	0.01			23	CS: CARBONACEOUS MUDSTONE- black
0.05		81.65	81.70	72	0.02			23	C4: COAL-DULL BANDED
0.03		81.70	81.73	72	0.01			23	C3: COAL-DULL & BRIGHT
0.08		81.73	81.81	72	0.03			23	C4: COAL-DULL BANDED
0.15		81.81	81.96	72	0.05			23	C3: COAL-DULL & BRIGHT
0.18		81.96	82.14	72	0.06		82.91	23	SH: MUDSTONE- dk grey, scattered coaly inclusions
0.08		82.14	82.22	72	0.03			23	SH: MUDSTONE- as above
0.70		82.22	82.92	72	0.23			23	SILT: SILTSTONE- med grey, minor calc-filled fracs
0.59		82.92	83.51	72	0.19		84.43	23	SH: MUDSTONE- dk grey
1.40		83.51	84.91	72	0.46		85.95	24	SH: MUDSTONE- as above
1.28		84.91	86.19	72	0.42		87.48	24	SH: MUDSTONE- as above
0.89		86.19	87.08	72	0.29			25	SH: MUDSTONE- as above
0.21		87.08	87.29	72	0.07			25	SH: MUDSTONE- as above, broken
0.54		87.29	87.83	72	0.18		89.00	25	SH: MUDSTONE- as above, unbroken
1.25		87.83	89.08	72	0.41			25	SH: MUDSTONE- dk gy, scattered coal bands/inclus
0.14		89.08	89.22	72	0.05		90.53	26	SH: MUDSTONE- as above
0.10		89.22	89.32	72	0.03			26	F: FAULTED

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.58		89.32	89.90	72	0.19			26	SH: MUDSTONE- dk grey
0.21	3	89.90	90.11	72	0.07	1		26	CS: CARBONACEOUS MUDSTONE- coal bands/inclus
0.22	3	90.11	90.33	72	0.07	1		26	CS: CARBONACEOUS MUDSTONE- as above, broken
0.16	3	90.33	90.49	72	0.05	1	92.05	26	CS: CARBONACEOUS MUDSTONE- abund coal bands
0.11	3	90.49	90.60	72	0.04	1		26	CS: CARBONACEOUS MUDSTONE- as above
0.30	3	90.60	90.90	72	0.03	1		26	CS: CARBONACEOUS MUDSTONE- broken, abund slicks
0.37	3	90.90	91.27	72	0.15	2		26	CS: CARBONACEOUS MUDSTONE- abund coal bands
0.14	3	91.27	91.41	72	0.05	2		26	CS: CARBONACEOUS MUDSTONE- as above
0.09	3	91.41	91.50	72	0.03	2		27	CS: CARBONACEOUS MUDSTONE- broken, slicks
0.04	3	91.50	91.54	72	0.01	2		27	C4: COAL-DULL BANDED
0.02	3	91.54	91.56	72	0.01	2		27	CS: CARBONACEOUS MUDSTONE
0.05	3	91.56	91.61	72	0.02	2		27	C5: COAL-DULL
0.09	3	91.61	91.70	72	0.03	2	93.57	27	C4: COAL-DULL BANDED
0.37	3	91.70	92.07	72	0.12	2		27	C2: COAL-BRIGHT BANDED- abund slickensides
0.09	3	92.07	92.16	72	0.03	3		27	CS: CARBONACEOUS MUDSTONE- w coaly bands
0.10	3	92.16	92.26	72	0.03	4		27	C2: COAL-BRIGHT BANDED- slickensides
0.05	3	92.26	92.31	72	0.02	4		27	C3: COAL-DULL & BRIGHT
0.04	3	92.31	92.35	72	0.01	4		27	C4: COAL-DULL BANDED
0.04	3	92.35	92.39	72	0.01	4		27	C2: COAL-BRIGHT BANDED
0.02	3	92.39	92.41	72	0.01	4		27	C6: COAL-STONEY OR BONEY
0.02	3	92.41	92.43	72	0.01	4		27	C2: COAL-BRIGHT BANDED
0.77	3	92.43	93.20	72	0.25			27	CL: CORE LOSS- Coal
0.03	3	93.20	93.23	72	0.01	5		27	CS: CARBONACEOUS MUDSTONE
0.04	3	93.23	93.27	72	0.01	5		27	C3: COAL-DULL & BRIGHT
0.23	3	93.27	93.50	72	0.09	5		27	CS: CARBONACEOUS MUDSTONE
0.04	3	93.50	93.54	72	0.02	6		27	C3: COAL-DULL & BRIGHT- abund slickensides
0.02	3	93.54	93.56	72	0.01	6		27	CS: CARBONACEOUS MUDSTONE- coaly bands
0.05	3	93.56	93.61	72	0.02	6		27	C2: COAL-BRIGHT BANDED- broken, abund slicks
0.69	3	93.61	94.30	72	0.28			27	CL: CORE LOSS- Coal
1.00		94.30	95.30	72	0.41			27	CL: CORE LOSS- Rock
0.11		95.30	95.41	72	0.06		95.10	27	CS: CARBONACEOUS MUDSTONE- coaly bands
0.04		95.41	95.45	72	0.02			27	CS: CARBONACEOUS MUDSTONE- black
0.04		95.45	95.49	72	0.02			27	FSS: FINE SANDSTONE- lt grey
0.56		95.49	96.05	72	0.26			27	CS: CARBONACEOUS MUDSTONE- dk gy, v coaly

HOLE NO:	**CL05-14**
DATE STARTED:	**14-Mar-05**
DATE COMPLETED:	**17-Mar-05**
ORIENTATION:	**63 SW**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.34		96.05	96.39	72	0.17			28	CS: CARBONACEOUS MUDSTONE- as above
0.36		96.39	96.75	50	0.15			28	SILT: SILTSTONE- med grey, minor calc-filled fracs
0.09		96.75	96.84	50	0.04		96.62	28	SILT: SILTSTONE- as above
0.65		96.84	97.49	50	0.29			28	SH: MUDSTONE- dk grey
0.21		97.49	97.70	50	0.11			28	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coaly
0.30		97.70	98.00	50	0.14			28	SH: MUDSTONE- dk gy, scattered coaly bands
0.14		98.00	98.14	50	0.06			28	SH: MUDSTONE- as above
0.13		98.14	98.27	50	0.06			28	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coaly
0.12		98.27	98.39	50	0.05			28	SH: MUDSTONE- dk grey
0.13		98.39	98.52	50	0.05			29	FSS: FINE SANDSTONE- lt grey, laminated
0.24		98.52	98.76	50	0.11			29	SH: MUDSTONE- dk gy, scattered coaly inclus
0.13		98.76	98.89	50	0.06			29	SH: MUDSTONE- as above, broken, abund slicks
0.67		98.89	99.56	50	0.29		99.67	29	SILT: SILTSTONE- med grey
1.15		99.56	100.71	50	0.59		101.19	29	SH: MUDSTONE- dk gy, scattered coaly inclus
0.09		100.71	100.80	50	0.04			30	SH: MUDSTONE- as above
0.57		100.80	101.37	34	0.45			30	FSS: FINE SANDSTONE- lt grey, laminated
0.14		101.37	101.51	34	0.08			30	SH: MUDSTONE- dk grey
0.18		101.51	101.69	32	0.10			30	FSS: FINE SANDSTONE- lt grey, laminated
0.31		101.69	102.00	32	0.19		102.72	30	SH: MUDSTONE- dk gy, scattered coaly inclus

HOLE NO:	**CL05-20**
DATE STARTED:	**2005/31/18**
DATE COMPLETED:	**2005/31/24**
ORIENTATION:	**63 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
3.66		0.00	3.66	90	3.66		3.66	1	CL: CORE LOSS- not cored
0.72		3.66	4.38	55	0.60			1	SH: MUDSTONE- dk gy, rust on fractures
0.22		4.38	4.60	55	0.18			1	FSS: FINE SANDSTONE- lt gy, calcite-filled fracs
0.10		4.60	4.70	55	0.08			1	SH: MUDSTONE- dk gy, rust on fractures
0.19		4.70	4.89	55	0.16			1	SILT: SILTSTONE- rusty, calc filled-fracs, microfault
0.29		4.89	5.18	55	0.24		5.18	1	SH: MUDSTONE- dk gy, rust on fractures
0.44		5.18	5.62	55	0.36			1	SH: MUDSTONE- dk gy, rust on fracs, rare silt lam
0.18		5.62	5.80	55	0.15			1	FSS: FINE SANDSTONE- lt gy
0.24		5.80	6.04	55	0.20			1	SH: MUDSTONE- dk gy, scat coal bands, rusty fracs
0.12		6.04	6.16	55	0.10			2	SH: MUDSTONE- as above
0.55		6.16	6.71	66	0.51		6.71	2	SILT: SILTSTONE- lt gy, sand & mud layers, rusty fracs
0.06		6.71	6.77	66	0.05			2	SILT: SILTSTONE- as above
0.79		6.77	7.56	66	0.72			2	SH: MUDSTONE- dk gy, rare coal inclusions
0.54		7.56	8.10	66	0.49			2	FSS: FINE SANDSTONE- lt gy, partly lam, mud beds
0.15		8.10	8.25	66	0.14		8.30	2	SH: MUDSTONE- dk gy
0.06		8.25	8.31	66	0.05			2	SH: MUDSTONE- as above
0.12		8.31	8.43	66	0.11			2	FSS: FINE SANDSTONE- lt gy, laminated
0.18		8.43	8.61	66	0.16			2	SH: MUDSTONE- dk gy
0.04		8.61	8.65	66	0.04			3	SH: MUDSTONE- as above
0.30		8.65	8.95	66	0.27			3	FSS: FINE SANDSTONE- light, laminated
0.34		8.95	9.29	66	0.31			3	SH: MUDSTONE- dk gy
0.19		9.29	9.48	70	0.18		9.75	3	FSS: FINE SANDSTONE- lt gy, med gy silt lam
0.50		9.48	9.98	70	0.48			3	FSS: FINE SANDSTONE- as above
0.84		9.98	10.82	70	0.79			3	SH: MUDSTONE- dk gy, scat coal inclus & silt lam
0.02		10.82	10.84	70	0.02			3	SH: MUDSTONE- sheared
0.18		10.84	11.02	70	0.17		11.28	3	SH: MUDSTONE- dk gy, rusty fracs
0.40		11.02	11.42	70	0.38			3	SH: MUDSTONE- as above
0.35		11.42	11.77	70	0.36			4	SH: MUDSTONE- as above
0.73		11.77	12.50	70	0.69			4	SH: MUDSTONE- dk gy, scattered coal inclus
0.09		12.50	12.59	70	0.08			4	FSS: FINE SANDSTONE- lt gy, laminated
0.05		12.59	12.64	70	0.05		12.80	4	SH: MUDSTONE- dk gy
0.06		12.64	12.70	70	0.06			4	SH: MUDSTONE- as above
0.30		12.70	13.00	70	0.28			4	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coaly
0.16		13.00	13.16	70	0.17			4	SH: MUDSTONE- dk gy

HOLE NO:	**CL05-20**
DATE STARTED:	**2005/31/18**
DATE COMPLETED:	**2005/31/24**
ORIENTATION:	**63 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.63		13.16	13.79	70	0.63		14.33	4	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coal bands
0.09		13.79	13.88	70	0.08			4	CS: CARBONACEOUS MUDSTONE- as above
0.45		13.88	14.33	50	0.36			5	SH: MUDSTONE- dk gy, coal band & inclus
0.65		14.33	14.98	50	0.52			5	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coaly
0.12		14.98	15.10	50	0.09		15.85	5	C5: COAL-DULL
0.10		15.10	15.20	50	0.08			5	CS: CARBONACEOUS MUDSTONE- dk gy, coal bands
0.93		15.20	16.13	65	0.84			5	SILT: SILTSTONE- sandy lam & layers, esp at base
0.15		16.13	16.28	65	0.14			5	SH: MUDSTONE- dk gy, w coal bands
0.10		16.28	16.38	65	0.09		17.37	5	FSS: FINE SANDSTONE- lt gy, w silt lam & layers
0.17		16.38	16.55	65	0.15			5	FSS: FINE SANDSTONE- as above
0.31		16.55	16.86	65	0.28			6	FSS: FINE SANDSTONE- as above
0.18		16.86	17.04	65	0.16			6	SH: MUDSTONE- dk gy
0.44		17.04	17.48	68	0.41		18.00	6	SILT: SILTSTONE- med gy, w lt gy sand lam
0.19		17.48	17.67	68	0.18			6	FSS: FINE SANDSTONE- lt gy, laminated
0.84		17.67	18.51	68	0.78			6	SH: MUDSTONE- dk gy, w lam sand beds
0.52		18.51	19.03	68	0.48		20.42	6	SH: MUDSTONE- dk gy
0.31		19.03	19.34	68	0.29			6	SH: MUDSTONE- as above
0.50		19.34	19.84	68	0.46			7	SH: MUDSTONE- as above
0.62		19.84	20.46	68	0.57		21.95	7	SH: MUDSTONE- dk gy, scattered coal band & inclus
0.69		20.46	21.15	68	0.64			7	SH: MUDSTONE- as above
0.86		21.15	22.01	68	0.80		23.47	7	SH: MUDSTONE- dk gy, abund coaly bands & inclus
0.12		22.01	22.13	68	0.11			8	SH: MUDSTONE- as above
0.37		22.13	22.50	68	0.34			8	CL: CORE LOSS, Rock
0.11		22.69	22.80	68	0.10			8	CS: CARBONACEOUS MUDSTONE- black, v coaly
0.16		22.80	22.96	68	0.15			8	C4: COAL-DULL BANDED
0.04		22.96	23.00	68	0.04			8	CS: CARBONACEOUS MUDSTONE- blk, bright coal bands
0.11		23.00	23.11	68	0.10			8	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coal bands
0.75		23.11	23.86	68	0.70		24.99	8	SH: MUDSTONE- dk grey, rare coal inclus
0.67		23.86	24.53	68	0.62			8	SH: MUDSTONE- as above
0.10		24.53	24.63	68	0.09			8	CS: CARBONACEOUS MUDSTONE- dk gy to blk, coal bands
0.24		24.63	24.87	68	0.22			8	SH: MUDSTONE- dk gy, rare coal bands
0.13		24.87	25.00	68	0.09			8	CS: CARBONACEOUS MUDSTONE- black, coaly
0.32		25.00	25.32	68	0.30		26.52	8	SILT: SILTSTONE- med gy, rare coal inclus
0.11		25.32	25.43	68	0.10			9	SILT: SILTSTONE- as above

HOLE NO:	**CL05-20**
DATE STARTED:	**2005/31/18**
DATE COMPLETED:	**2005/31/24**
ORIENTATION:	**63 NE**
DESCRIBED BY:	**T. Kosaka**

APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.34		25.43	25.77	68	0.32			9	SH: MUDSTONE- dk gy
0.26		25.77	26.03	68	0.24			9	SILT: SILTSTONE- lt gy
0.37		26.03	26.40	68	0.34			9	SH: MUDSTONE- dk gy
0.19		26.40	26.59	68	0.18			9	FSS: FINE SANDSTONE- lt gy, laminated
0.12		26.59	26.71	68	0.11		28.04	9	SH: MUDSTONE- dk gy
0.27		26.71	26.98	68	0.25			9	SH: MUDSTONE- as above
0.10		26.98	27.08	68	0.09			9	SH: MUDSTONE- dk gy, broken, rare coal inclus
0.49		27.08	27.57	68	0.45			9	SH: MUDSTONE- dk gy
0.62		27.57	28.19	68	0.57			9	SILT: SILTSTONE- med gy, slight lam in upper part
0.09		28.19	28.28	68	0.08			10	SILT: SILTSTONE- as above
0.10		28.28	28.38	68	0.09		29.57	10	FSS: FINE SANDSTONE- lt gy, laminated
0.45		28.38	28.83	72	0.43			10	FSS: FINE SANDSTONE- as abv, some mud beds
0.97		28.83	29.80	72	0.92		31.09	10	SH: MUDSTONE- dk gy, scattered coal inclus
0.15		29.80	29.95	72	0.14			10	SH: MUDSTONE- dk gy, scattered coal inclus, broken
1.03		29.95	30.98	72	0.98			10	SH: MUDSTONE- dk gy, scattered coal inclus
0.37		30.98	31.35	72	0.35		32.61	11	SH: MUDSTONE- as above
0.24		31.35	31.59	72	0.23			11	SH: MUDSTONE- as above
0.57		31.59	32.16	72	0.54			11	SILT: SILTSTONE- med gy, scattered coal inclus
0.27		32.16	32.43	72	0.26			11	FSS: FINE SANDSTONE- lt gy, laminated
0.38		32.43	32.81	72	0.36		34.14	11	SH: MUDSTONE- dk gy, scattered coal inclus
0.87		32.81	33.68	72	0.83			11	SH: MUDSTONE- as above
0.22		33.68	33.90	70	0.21			12	SH: MUDSTONE- as above, calc ll bedding at base
0.16		33.90	34.06	70	0.15			12	FSS: FINE SANDSTONE- lt gy, laminated in lower part
0.27		34.06	34.33	70	0.25		35.66	12	SH: MUDSTONE- dk gy, scat coal bands, minor calc ll beds
1.47		34.33	35.80	68	1.36		37.19	12	SH: MUDSTONE- as above, silt & sand layers & beds
0.57		35.80	36.37	68	0.53			12	SH: MUDSTONE- as above
1.03		36.37	37.40	68	0.95		38.71	13	SH: MUDSTONE- as above
0.55		37.40	37.95	68	0.51			13	SH: MUDSTONE- as above
0.34		37.95	38.29	68	0.32			13	SH: MUDSTONE- dk gy, scat coal inclus, calc-filled fracs
0.50		38.29	38.79	68	0.46		40.10	13	SH: MUDSTONE- dk gy, scattered coal bands & inclus
0.42		38.79	39.21	68	0.39			13	SH: MUDSTONE- as above
0.05		39.21	39.26	68	0.05			14	SH: MUDSTONE- as above
0.35		39.26	39.61	68	0.32			14	CS: CARBONACEOUS MUDSTONE- black, coaly
0.28		39.61	39.89	68	0.26			14	SH: MUDSTONE- dk gy, scattered coal bands

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.49		39.89	40.38	68	0.45		41.76	14	SILT: SILTSTONE- med gy, w lt gy sand lam & layers
1.41		40.38	41.79	68	1.31		43.28	14	SILT: SILTSTONE- as above
0.13		41.79	41.92	68	0.12			14	SILT: SILTSTONE- as above
1.21		41.92	43.13	68	1.12			15	SILT: SILTSTONE- as above, some beds of fine sand
0.22		43.13	43.35	68	0.20		44.81	15	FSS: FINE SANDSTONE- lt gy, boundary not clear
0.80		43.35	44.15	68	0.74			15	FSS: FINE SANDSTONE- as above
0.65		44.15	44.80	68	0.60		46.33	15	SH: MUDSTONE- dk gy, rare silt lam
0.05		44.80	44.85	68	0.05			16	SH: MUDSTONE- as above
0.11		44.85	44.96	68	0.10			16	SH: MUDSTONE- dk gy, coal bands, v hard
0.01		44.96	44.97	68	0.01			16	SH: MUDSTONE- pug
0.32		44.97	45.29	68	0.30			16	SH: MUDSTONE- dk gy, scattered coal inclus
0.42		45.29	45.71	68	0.39			16	FSS: FINE SANDSTONE- lt gy, some mud layers
0.57		45.71	46.28	68	0.53		47.85	16	SILT: SILTSTONE- med gy, sand lam & layers
0.86		46.28	47.14	68	0.80			16	SILT: SILTSTONE- as above
0.49		47.14	47.63	68	0.45		49.38	16	FSS: FINE SANDSTONE- med gy, some silt & mud layers
0.85		47.63	48.48	68	0.79			17	FSS: FINE SANDSTONE- as above, lam in lower part
0.56		48.48	49.04	72	0.53		50.90	17	SILT: SILTSTONE- med gy, slight lam, w sandy silt
0.44		49.04	49.48	72	0.42			17	SILT: SILTSTONE- as above
0.89		49.48	50.37	72	0.85			17	SH: MUDSTONE- dk gy, silty sand lam & layers at top
0.36		50.37	50.73	72	0.34		52.43	18	SH: MUDSTONE- dk gy, rare coal inclus
0.88		50.73	51.61	72	0.84			18	SH: MUDSTONE- as above
0.10		51.61	51.71	72	0.10			18	CS: CARBONACEOUS MUDSTONE- blk, v coaly
0.54		51.71	52.25	72	0.51			18	CL: CORE LOSS, Rock
0.15		52.25	52.40	72	0.14			18	SH: MUDSTONE- dk gy
0.40		52.40	52.80	72	0.35		53.95	18	CS: CARBONACEOUS MUDSTONE- blk, v coaly
0.15		52.80	52.95	72	0.14			18	SH: MUDSTONE- dk gy, coal inclusions
0.54		52.95	53.49	72	0.51			18	SILT: SILTSTONE- med gy
0.43		53.49	53.92	72	0.41			19	SH: MUDSTONE- dk gy
0.11		53.92	54.03	72	0.10			19	SILT: SILTSTONE- lt gy, calcite-filled fracs
0.04		54.03	54.07	72	0.04		55.47	19	SH: MUDSTONE- dk gy
1.02		54.07	55.09	72	0.97			19	SH: MUDSTONE- as above
0.14		55.09	55.23	72	0.13			19	SILT: SILTSTONE- lt gy
0.38		55.23	55.61	72	0.36		57.00	19	SH: MUDSTONE- dk gy, scattered coal inclus
0.32		55.61	55.93	72	0.30			19	SILT: SILTSTONE- med gy, mudstone clasts

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.07		55.93	56.00	72	0.07			19	SH: MUDSTONE- dk gy
0.03		56.00	56.03	72	0.03			19	SH: MUDSTONE- dk gy, calcite-rich
0.52		56.03	56.55	72	0.49			20	SH: MUDSTONE- dk gy
0.46		56.55	57.01	72	0.44		58.52	20	SH: MUDSTONE- dk gy, silty sand lam, rare coal inclus
1.02		57.01	58.03	72	0.97			20	SH: MUDSTONE- as above
0.40		58.03	58.43	72	0.38			20	SH: MUDSTONE- dk gy, coal bands & inclus
0.19		58.43	58.62	72	0.18		60.05	20	FSS: FINE SANDSTONE- lt gy, laminated
0.25		58.62	58.87	72	0.24			20	FSS: FINE SANDSTONE- as above
0.18		58.87	59.05	72	0.17			21	FSS: FINE SANDSTONE- as above, base indistinct
0.88		59.05	59.93	72	0.84			21	SH: MUDSTONE- dk gy, scat coal inclus & slity sand lam
0.14		59.93	60.07	72	0.13		61.57	21	FSS: FINE SANDSTONE- lt gy, w med gy silt lam
0.16		60.07	60.23	72	0.15			21	FSS: FINE SANDSTONE- as above
0.63		60.23	60.86	72	0.60			21	SH: MUDSTONE- dk gy
0.59		60.86	61.45	80	0.56			21	SH: MUDSTONE- dk gy, coal band & inclus
0.13		61.45	61.58	80	0.12		63.09	21	SH: MUDSTONE- dk gy
0.09		61.58	61.67	80	0.09			21	SH: MUDSTONE- as above
0.23		61.67	61.90	80	0.22			22	SH: MUDSTONE- as above
0.53		61.90	62.43	80	0.52			22	CL: CORE LOSS, Rock
0.05		62.43	62.48	80	0.05			22	CS: CARBONACEOUS MUDSTONE- blk, coal stringers
0.30		62.48	62.78	80	0.35			22	SH: MUDSTONE- dk gy, rare coal inclus
0.25		62.78	63.03	80	0.24			22	CS: CARBONACEOUS MUDSTONE- black
0.30		63.03	63.33	80	0.28		64.62	22	SH: MUDSTONE- dk grey, w coal inclus
0.17		63.33	63.50	80	0.16			22	SH: MUDSTONE- as above
0.49	2	63.50	63.99	80	0.48			22	CL: CORE LOSS, Coal
0.05	2	63.99	64.04	80	0.05			22	C4: COAL-DULL BANDED
0.06	2	64.04	64.10	80	0.06			22	C6: COAL-STONEY OR BONEY
0.21		64.10	64.31	80	0.21			22	CL: CORE LOSS, Rock
0.30		64.31	64.61	80	0.28			22	SH: MUDSTONE- dk gy, w coal inclusions
0.67		64.61	65.28	75	0.63		66.14	22	FSS: FINE SANDSTONE- lt gy
0.06		65.28	65.34	75	0.06			22	FSS: FINE SANDSTONE- as above
0.09		65.34	65.43	75	0.09			22	SILT: SILTSTONE- med gy, laminated
0.04		65.43	65.47	75	0.04			23	SILT: SILTSTONE- as above
1.09		65.47	66.56	75	1.03		67.67	23	FSS: FINE SANDSTONE- lt gy, some silt & mud beds
1.52		66.56	68.08	75	1.44		69.19	23	FSS: FINE SANDSTONE- as above

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.12		68.08	68.20	75	0.11			23	FSS: FINE SANDSTONE- as above
1.28		68.20	69.48	75	1.21		70.71	24	FSS: FINE SANDSTONE- as above
0.09		69.48	69.57	75	0.09			24	FSS: FINE SANDSTONE- as above
0.32		69.57	69.89	75	0.30			24	FSS: FINE SANDSTONE- as above, calc filled fractures
0.50		69.89	70.39	80	0.46			24	SILT: SILTSTONE- med gy, graded silty sand lam/layers
0.12		70.39	70.51	80	0.11			24	FSS: FINE SANDSTONE- lt gy, laminated
0.43		70.51	70.94	80	0.40			24	SILT: SILTSTONE- med gy, silty sand lam & layers
0.09		70.94	71.03	80	0.08		72.24	24	SH: MUDSTONE- dk gy
0.39		71.03	71.42	80	0.36			25	SILT: SILTSTONE- silty sand lam & layers, scat coal inclus
0.25		71.42	71.67	80	0.23			25	SH: MUDSTONE- dk gy, w coal inclusions
0.16		71.67	71.83	80	0.15			25	SILT: SILTSTONE- med gy, w silty sand lam
0.68		71.83	72.51	80	0.63		73.76	25	FSS: FINE SANDSTONE- lt gy, partly lam, some silt beds
0.29		72.51	72.80	80	0.27			25	FSS: FINE SANDSTONE- as above
0.15		72.80	72.95	80	0.14			25	SH: MUDSTONE- dk gy, scattered coal inclus
0.15		72.95	73.10	80	0.14			25	CS: CARBONACEOUS MUDSTONE- black, v coaly
0.39	3	73.10	73.49	80	0.36	1		25	C4: COAL-DULL BANDED
0.12	3	73.49	73.61	80	0.11	1		25	C3: COAL-DULL & BRIGHT
0.18	3	73.61	73.79	80	0.17	1	75.29	25	C4: COAL-DULL BANDED
0.02	3	73.79	73.81	80	0.02	2		26	C1: COAL-BRIGHT- broken
0.04	3	73.81	73.85	80	0.04	2		26	C3: COAL-DULL & BRIGHT- broken
0.04	3	73.85	73.89	80	0.04	2		26	C4: COAL-DULL BANDED- broken
0.07	3	73.89	73.96	80	0.06	2		26	C2: COAL-BRIGHT BANDED- broken
0.11	3	73.96	74.07	80	0.10	2		26	C1: COAL-BRIGHT- broken
0.09	3	74.07	74.16	80	0.08	2		26	C4: COAL-DULL BANDED
0.03	3	74.16	74.19	80	0.03	2		26	CS: CARBONACEOUS MUDSTONE- blk, bright coal bands
0.04	3	74.19	74.23	80	0.04	2		26	C3: COAL-DULL & BRIGHT-
0.27	3	74.23	74.50	80	0.27			26	CL: CORE LOSS, Coal
0.04	3	74.50	74.54	80	0.04	3		26	CS: CARBONACEOUS MUDSTONE- black
0.26	3	74.54	74.80	80	0.23	3	76.81	26	SH: MUDSTONE- dk gy, coal inclus, broken at base
0.24	3	74.80	75.04	80	0.22	4		26	C4: COAL-DULL BANDED
0.10	3	75.04	75.14	80	0.09	4		26	C5: COAL-DULL
0.18	3	75.14	75.32	80	0.17	4		26	C4: COAL-DULL BANDED
0.14	3	75.32	75.46	80	0.13	4		26	C5: COAL-DULL
0.18	3	75.46	75.64	80	0.17	4	78.33	26	C4: COAL-DULL BANDED

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
1.36	3	75.64	77.00	80	1.34			26	CL: CORE LOSS, Coal
0.04		77.00	77.04	80	0.04			26	CS: CARBONACEOUS MUDSTONE- blk, coaly, slicks
0.18		77.04	77.22	80	0.17			26	SH: MUDSTONE- dk gy, coal bands & inclus
0.05		77.22	77.27	80	0.05			26	CS: CARBONACEOUS MUDSTONE- blk, coal bands
0.12		77.27	77.39	80	0.11			26	SH: MUDSTONE- dk gy, coal stringers
0.07		77.39	77.46	80	0.06			26	CS: CARBONACEOUS MUDSTONE- black, coaly
0.17		77.46	77.63	80	0.16			26	SH: MUDSTONE- dk gy, scattered coal inclusions
0.08		77.63	77.71	80	0.07			26	CS: CARBONACEOUS MUDSTONE- black, coaly
0.31		77.71	78.02	80	0.29			26	SH: MUDSTONE- dk gy, coal inclusions
0.19		78.02	78.21	80	0.18		79.86	27	SH: MUDSTONE- as above
0.08		78.21	78.29	80	0.07			27	SH: MUDSTONE- as above
0.13		78.29	78.42	80	0.12			27	SILT: SILTSTONE- med gy, w fine sand laminae
1.27		78.42	79.69	80	1.18		81.38	27	SH: MUDSTONE- dk gy, scat coal bands & inclus
0.13		79.69	79.82	80	0.12			27	SH: MUDSTONE- as above
0.14		79.82	79.96	80	0.13			27	CS: CARBONACEOUS MUDSTONE- black, coaly
0.27		79.96	80.23	80	0.25			27	SH: MUDSTONE- dk gy, scattered coal inclusions
0.14		80.23	80.37	80	0.13			27	CS: CARBONACEOUS MUDSTONE- black, coaly
0.15		80.37	80.52	80	0.14			27	SH: MUDSTONE- dk gy
0.10		80.52	80.62	80	0.09			27	CS: CARBONACEOUS MUDSTONE- black, coaly
0.19		80.62	80.81	80	0.18			27	FSS: FINE SANDSTONE- lt gy, partly laminated
0.33		80.81	81.14	80	0.31		82.91	28	FSS: FINE SANDSTONE- as abv, calc-filled fracs
0.74		81.14	81.88	70	0.70			28	FSS: FINE SANDSTONE- as above, as above
0.29		81.88	82.17	70	0.27			28	SILT: SILTSTONE- med gy, w fine sand laminae
0.10		82.17	82.27	70	0.09			28	FSS: FINE SANDSTONE- lt gy, laminated
0.42		82.27	82.69	70	0.39		84.43	28	SILT: SILTSTONE- med gy, slightly laminated
0.80		82.69	83.49	60	0.69			28	SH: MUDSTONE- dk gy, scat coal bands, calc-filled fracs
0.30		83.49	83.79	60	0.26			29	SH: MUDSTONE- as above
0.46		83.79	84.25	66	0.42		85.95	29	FSS: FINE SANDSTONE- lt gy, lam, calc-filled fracs
0.34		84.25	84.59	66	0.31			29	FSS: FINE SANDSTONE- as above
0.10		84.59	84.69	66	0.09			29	F: FAULTED- fine sandst, sheared, calc veins
0.20		84.69	84.89	66	0.18			29	FSS: FINE SANDSTONE- lt gy, calc veins x-cut bedding
0.80		84.89	85.69	66	0.73		87.48	29	MSS: MEDIUM SANDSTONE- lt gy, calc-filled fracs
0.31		85.69	86.00	66	0.28			29	MSS: MEDIUM SANDSTONE- as above
0.25		86.00	86.25	66	0.23			29	MSS: MEDIUM SANDSTONE- coal inclus, calc-filled fracs

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.97		86.25	87.22	66	0.89		89.00	30	MSS: MEDIUM SANDSTONE- as above
0.54		87.22	87.76	66	0.49			30	MSS: MEDIUM SANDSTONE- as above
0.24		87.76	88.00	66	0.22			30	MSS: MEDIUM SANDSTONE- subang-subrnd mud grans
0.56		88.00	88.56	66	0.51			30	MSS: MEDIUM SANDSTONE- coal inclus, calc-filled fracs
0.26		88.56	88.82	66	0.24		90.53	30	MSS: MEDIUM SANDSTONE- mudst granules & pebbles
0.17		88.82	88.99	66	0.16			30	MSS: MEDIUM SANDSTONE- as above
0.05		88.99	89.04	66	0.05			30	FSS: FINE SANDSTONE- med gy, muddy, lam, coal inclus
0.10		89.04	89.14	66	0.09			31	FSS: FINE SANDSTONE- as above
0.12		89.14	89.26	66	0.11			31	MSS: MEDIUM SANDSTONE- lt gy, coal inclus, mud lenses
0.13		89.26	89.39	66	0.12			31	MSS: MEDIUM SANDSTONE- lt gy, w coal inclusions
0.76		89.39	90.15	66	0.69			31	FSS: FINE SANDSTONE- scat silt lam/layers, coaly at base
0.01		90.15	90.16	66	0.01		92.05	31	C5: COAL-DULL
0.03		90.16	90.19	66	0.03			31	C5: COAL-DULL
0.02		90.19	90.21	66	0.02			31	SH: MUDSTONE- dk gy, w coal stringers
0.06		90.21	90.27	66	0.05			31	C2: COAL-BRIGHT BANDED
0.05		90.27	90.32	66	0.05			31	C4: COAL-DULL BANDED
0.20		90.32	90.52	66	0.18			31	SH: MUDSTONE- dk gy, w coal inclusions
0.11		90.52	90.63	66	0.10			31	CS: CARBONACEOUS MUDSTONE- blk, v coaly
0.20		90.63	90.83	66	0.18			31	SH: MUDSTONE- dk gy, w coal inclusions
0.15		90.83	90.98	66	0.14			31	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coaly
0.11		90.98	91.09	66	0.10			31	SH: MUDSTONE- dk gy, coal inclusions
0.10		91.09	91.19	66	0.09			31	CS: CARBONACEOUS MUDSTONE- base crushed
0.08		91.19	91.27	66	0.07		93.57	31	SH: MUDSTONE- dk gy, scattered coal inclusions
0.31		91.27	91.58	66	0.28			31	SH: MUDSTONE- as above
0.53		91.58	92.11	66	0.48			32	SH: MUDSTONE- as above
0.32		92.11	92.43	66	0.29			32	FSS: FINE SANDSTONE- lt gy, laminated
0.47		92.43	92.90	66	0.43		95.10	32	SILT: SILTSTONE- med gy, silty sand lam & layers
0.13		92.90	93.03	66	0.12			32	SILT: SILTSTONE- as above
0.33		93.03	93.36	69	0.31			32	SH: MUDSTONE- dk gy
0.62		93.36	93.98	69	0.58			32	SILT: SILTSTONE- m gy, silty sand & mud lam/layers
0.38		93.98	94.36	69	0.35			32	SH: MUDSTONE- dk gy, scattered coal inclus
0.03		94.36	94.39	69	0.03		96.62	33	SH: MUDSTONE- as above
1.11		94.39	95.50	69	1.04			33	CL: CORE LOSS, Rock
1.33		95.50	96.83	69	1.24			33	MSS: MEDIUM SANDSTONE- coaly fracs, irreg calc veins

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0.23		96.83	97.06	69	0.21		98.15	33	F: FAULTED- as above, sheared, probably fault
0.10		97.06	97.16	69	0.09			33	F: FAULTED- as above, probably fault
0.44		97.16	97.60	69	0.41			33	MSS: MEDIUM SANDSTONE- coaly fracs, irreg calc veins
0.63		97.60	98.23	28	0.30			33	MSS: MEDIUM SANDSTONE- calc-filled frac w pyrite
0.31		98.23	98.54	28	0.15		99.67	34	MSS: MEDIUM SANDSTONE- as above
0.40		98.54	98.94	28	0.19			34	MSS: MEDIUM SANDSTONE- as above
0.65		98.94	99.59	28	0.31			34	MSS: MEDIUM SANDSTONE- calc-filled fracs common
0.12		99.59	99.71	28	0.06			34	MSS: MEDIUM SANDSTONE- calc-filled fracs, microfault
0.28		99.71	99.99	28	0.13		101.19	34	MSS: MEDIUM SANDSTONE- bedding disturbed, fault?
0.21		99.99	100.20	26	0.09			34	MSS: MEDIUM SANDSTONE- calc-filled frac
0.72		100.20	100.92	14	0.17			34	FSS: FINE SANDSTONE- lt gy, mud beds, silt lam/layers
0.64		100.92	101.56	14	0.15		102.72	35	FSS: FINE SANDSTONE- as above, calc-filled frac
0.83		101.56	102.39	14	0.20			35	FSS: FINE SANDSTONE- as above
0.52		102.39	102.91	0	0.00			35	FSS: FINE SANDSTONE- two small fold axes, BCA ~0
0.16		102.91	103.07	19	0.05		104.24	35	FSS: FINE SANDSTONE- lt gy, silty mud lam, calc-filled frac
0.52		103.07	103.59	19	0.17			35	FSS: FINE SANDSTONE- as above
0.95		103.59	104.54	25	0.40			36	FSS: FINE SANDSTONE- as above
0.10		104.54	104.64	25	0.04		105.77	36	SILT: SILTSTONE- med gy, silty sand lam & layers
1.12		104.64	105.76	25	0.47			36	SILT: SILTSTONE- as above
0.27		105.76	106.03	25	0.11			36	SH: MUDSTONE- dk gy, abund slicks
0.05		106.03	106.08	25	0.02		107.29	36	SILT: SILTSTONE- sandy silt lam, cloudy sand beds
0.25		106.08	106.33	25	0.11			36	SILT: SILTSTONE- as above
0.12		106.33	106.45	26	0.05			37	SILT: SILTSTONE- as above
0.23		106.45	106.68	26	0.10			37	FSS: FINE SANDSTONE- lt gy, lam, calc-filled fracs
0.85		106.68	107.53	26	0.37		108.81	37	SILT: SILTSTONE- sand lam/layers, scat calc-filled fracs
0.17		107.53	107.70	26	0.07			37	SILT: SILTSTONE- as above
0.46		107.70	108.16	26	0.20			37	SH: MUDSTONE- dk gy, coal bands, inclus & stringers
0.12		108.16	108.28	26	0.05			37	C5: COAL-DULL
0.06		108.28	108.34	26	0.03			37	SH: MUDSTONE- dk gy, w coal inclusions
0.12		108.34	108.46	26	0.05			37	SH: MUDSTONE- as above, broken
0.07		108.46	108.53	26	0.03			37	CS: CARBONACEOUS MUDSTONE- black, coal bands
0.16		108.53	108.69	55	0.13		110.34	37	SH: MUDSTONE- dk gy, scattered coal bands & inclus
0.15		108.69	108.84	55	0.12			37	SH: MUDSTONE- as above
1.45		108.84	110.29	48	1.08		111.86	38	SH: MUDSTONE- as above

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.38		110.29	110.67	48	0.28			38	CL: CORE LOSS, Rock
0.88		110.67	111.55	48	0.65		113.39	38	SH: MUDSTONE- as above
0.25		111.55	111.80	48	0.19			38	SH: MUDSTONE- as above
0.08		111.80	111.88	48	0.06			38	CS: CARBONACEOUS MUDSTONE- black, coal bands
0.05		111.88	111.93	48	0.04			38	SH: MUDSTONE- dk gy
0.14		111.93	112.07	48	0.10			38	CS: CARBONACEOUS MUDSTONE- blk, abund coal bands
0.09		112.07	112.16	48	0.07			39	CS: CARBONACEOUS MUDSTONE- as above
0.26		112.16	112.42	48	0.19		114.91	39	SH: MUDSTONE- dk gy, coal inclusions
1.28		112.42	113.70	48	0.95			39	SH: MUDSTONE- as above, pulverized at base
0.12		113.70	113.82	48	0.09		116.43	39	SH: MUDSTONE- dk gy, w coal inclusions
0.52		113.82	114.34	48	0.39			39	SH: MUDSTONE- as above
0.08		114.34	114.42	48	0.06			39	CS: CARBONACEOUS MUDSTONE- coaly, slicks, broken
0.07		114.42	114.49	48	0.05			39	SH: MUDSTONE- dk gy, w coal band & inclusions
0.44		114.49	114.93	65	0.40			40	SH: MUDSTONE- as above
0.06		114.93	114.99	65	0.05			40	CS: CARBONACEOUS MUDSTONE- black, v coaly
0.07		114.99	115.06	65	0.06			40	C4: COAL-DULL BANDED
0.28		115.06	115.34	65	0.25		117.96	40	SH: MUDSTONE- dk gy, w coal inclusions
0.04		115.34	115.38	65	0.04			40	SH: MUDSTONE- as above
0.20		115.38	115.58	65	0.18			40	SILT: SILTSTONE- med gy, cloudy sand beds
0.04		115.58	115.62	65	0.04			40	CS: CARBONACEOUS MUDSTONE- blk, abund coal bands
0.40		115.62	116.02	65	0.36			40	SH: MUDSTONE- dk gy, half of core is C4 coal
0.06		116.02	116.08	65	0.05		119.48	40	SH: MUDSTONE- dk gy, scattered coal bands & inclus
0.14		116.08	116.22	65	0.13			40	SH: MUDSTONE- as above
0.35		116.22	116.57	65	0.32			40	SH: MUDSTONE- dk gy, abund slicks
0.38		116.57	116.95	65	0.34			40	SH: MUDSTONE- dk gy, coal bands, calc-filled fracs
0.35		116.95	117.30	65	0.32			41	SH: MUDSTONE- dk gy
0.17		117.30	117.47	46	0.12		121.01	41	SILT: SILTSTONE- m gy, mud beds, sheared, calc, fault?
0.30		117.47	117.77	46	0.22			41	F: FAULTED- med gy, mud beds, steep dip, abund slicks
0.59		117.77	118.36	46	0.42			41	SH: MUDSTONE- scat coal inclus, calc-filled fracs at base
0.14		118.36	118.50	46	0.10			41	CS: CARBONACEOUS MUDSTONE- coaly, calc-filled fracs
0.34		118.50	118.84	46	0.24		122.53	41	FSS: FINE SANDSTONE- lam, calc & py at top
0.90		118.84	119.74	60	0.78			41	FSS: FINE SANDSTONE- lt gy, silt lam & layers
0.18		119.74	119.92	60	0.16			42	FSS: FINE SANDSTONE- as above
0.43		119.92	120.35	60	0.37		124.05	42	SILT: SILTSTONE- med gy, lt gy silty sand lam

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.47		120.35	120.82	60	0.41			42	SILT: SILTSTONE- as above
0.08		120.82	120.90	60	0.07			42	SILT: SILTSTONE- calc veins perp & ll to beds
0.08		120.90	120.98	60	0.07			42	SILT: SILTSTONE- med gy, laminated
0.42		120.98	121.40	60	0.36			42	SH: MUDSTONE- dk gy
0.45		121.40	121.85	60	0.39		125.58	42	SILT: SILTSTONE- med gy, partly laminated
0.11		121.85	121.96	60	0.10			42	SILT: SILTSTONE- as above
0.24		121.96	122.20	60	0.21			42	FSS: FINE SANDSTONE- lt gy, w med gy silt lam
0.24		122.20	122.44	60	0.21			42	SILT: SILTSTONE- med gy, w silty sand lam & layers
0.60		122.44	123.04	60	0.52			43	SILT: SILTSTONE- as above
0.33		123.04	123.37	60	0.29		127.10	43	MSS: MEDIUM SANDSTONE- med to coarse, gr lam
1.26		123.37	124.63	60	1.09			43	MSS: MEDIUM SANDSTONE- as above
0.13		124.63	124.76	72	0.12			43	SH: MUDSTONE- dk gy, silty sand laminae
0.16		124.76	124.92	72	0.15		128.63	43	MSS: MEDIUM SANDSTONE- coal inclus, few calc-filled fracs
0.20		124.92	125.12	72	0.19			43	MSS: MEDIUM SANDSTONE- as above
0.09		125.12	125.21	72	0.09			43	MSS: MEDIUM SANDSTONE- w subang-subrnd mud granules
0.10		125.21	125.31	72	0.10			44	MSS: MEDIUM SANDSTONE- as above, as above
0.79		125.31	126.10	72	0.75			44	MSS: MEDIUM SANDSTONE- coal inclus, few calc-filled fracs
0.20		126.10	126.30	72	0.19		130.15	44	MSS: MEDIUM SANDSTONE- coal inclus, abund calc with py
0.32		126.30	126.62	72	0.30			44	MSS: MEDIUM SANDSTONE- as above
0.16		126.62	126.78	72	0.15			44	MSS: MEDIUM SANDSTONE- coal inclus, mud clasts
1.05		126.78	127.83	75	1.00		131.67	44	MSS: MEDIUM SANDSTONE- coal inclus, calc-filled fracs
0.14		127.83	127.97	75	0.13			44	MSS: MEDIUM SANDSTONE- as above
0.75		127.97	128.72	75	0.71			45	MSS: MEDIUM SANDSTONE- as above
0.03		128.72	128.75	75	0.03			45	SH: MUDSTONE- dk gy
2.45		128.75	131.20	75	2.37			45	CL: CORE LOSS, Rock
0.15		131.20	131.35	80	0.14			45	CS: CARBONACEOUS MUDSTONE- black, coaly, slicks
0.15		131.35	131.50	80	0.14			45	SH: MUDSTONE- dk gy
0.17		131.50	131.67	80	0.16		133.20	45	CS: CARBONACEOUS MUDSTONE- black, coal bands
0.03		131.67	131.70	80	0.03			45	CS: CARBONACEOUS MUDSTONE- as above
1.03		131.70	132.73	80	0.98			45	SH: MUDSTONE- dk gy, scat coal bands & silt lam
0.59		132.73	133.32	80	0.58			45	CL: CORE LOSS, Rock
0.35		133.32	133.67	80	0.33		134.72	45	FSS: FINE SANDSTONE- scat silt beds, calc-filled fracs
0.29		133.67	133.96	80	0.28			46	FSS: FINE SANDSTONE- as above
1.28		133.96	135.24	80	1.22		136.25	46	SH: MUDSTONE- dk gy, silt & sand lam & layers

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.12		135.24	135.36	80	0.11			46	SH: MUDSTONE- as above
0.10		135.36	135.46	80	0.10			46	CS: CARBONACEOUS MUDSTONE- black, w coal bands
0.14		135.46	135.60	80	0.14			46	C4: COAL-DULL BANDED- core broken
0.60		135.60	136.20	80	0.72		137.77	46	SH: MUDSTONE- dk gy, rare coal bands
0.86	4	136.20	137.06	80	0.85			47	CORE LOSS: Coal
0.03	4	137.06	137.09	80	0.03			47	CS: CARBONACEOUS MUDSTONE- blk, abund coal bands
0.07	4	137.09	137.16	80	0.07			47	SH: MUDSTONE- dk gy, w coal inclusions
0.23	4	137.16	137.39	80	0.25			47	CS: CARBONACEOUS MUDSTONE- abund coal stringers
0.09	4	137.39	137.48	80	0.09			47	SH: MUDSTONE- dk gy, w coal inclusions
0.05	4	137.48	137.53	80	0.05			47	CS: CARBONACEOUS MUDSTONE- abund coal stringers
0.08	4	137.53	137.61	80	0.08			47	SH: MUDSTONE- dk gy, w coal inclusions
0.02	4	137.61	137.63	80	0.02			47	C6: COAL-STONEY OR BONEY- w bright coal bands
0.01	4	137.63	137.64	80	0.01			47	SH: MUDSTONE- dk gy
0.05	4	137.64	137.69	80	0.05			47	C2: COAL-BRIGHT BANDED
0.06	4	137.69	137.75	80	0.06			47	C4: COAL-DULL BANDED
0.04	4	137.75	137.79	80	0.04			47	C2: COAL-BRIGHT BANDED
0.06	4	137.79	137.85	80	0.06			47	C4: COAL-DULL BANDED
0.02	4	137.85	137.87	80	0.02			47	C6: COAL-STONEY OR BONEY
0.03	4	137.87	137.90	80	0.03			47	CS: CARBONACEOUS MUDSTONE- blk, coal bands
0.40		137.90	138.30	80	0.38		139.29	47	SILT: SILTSTONE- med gy, w fine sand lam & layers
0.92		138.30	139.22	80	0.91			47	SILT: SILTSTONE- as above
0.42		139.22	139.64	80	0.40			47	FSS: FINE SANDSTONE- lt gy, silt lam & layers
0.16		139.64	139.80	80	0.15		140.82	48	FSS: FINE SANDSTONE- as above
0.12		139.80	139.92	80	0.11			48	FSS: FINE SANDSTONE- as above
0.46		139.92	140.38	80	0.44			48	SH: MUDSTONE- dk gy
0.69		140.38	141.07	80	0.67			48	FSS: FINE SANDSTONE- lt gy, silt lam & layers
0.31		141.07	141.38	80	0.29		142.34	48	SILT: SILTSTONE- med gy, fine sand lam/layers
0.62		141.38	142.00	80	0.60			48	SH: MUDSTONE- dk gy
0.39		142.00	142.39	80	0.37			48	FSS: FINE SANDSTONE- lt gy
0.38		142.39	142.77	80	0.36		143.87	49	FSS: FINE SANDSTONE- as above
1.30		142.77	144.07	68	1.27			49	FSS: FINE SANDSTONE- as above
0.19		144.07	144.26	68	0.18		145.39	49	SILT: SILTSTONE- med gy, fine sand lam/layers
0.26		144.26	144.52	68	0.24			49	SILT: SILTSTONE- as above
0.55		144.52	145.07	68	0.54			49	FSS: FINE SANDSTONE- lt gy, silt lam & layers

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APP THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	DESCRIPTION
0.27		145.07	145.34	68	0.25			50	FSS: FINE SANDSTONE- as above
0.33		145.34	145.67	68	0.31			50	SILT: SILTSTONE- med gy, fine sand lam/layers
0.03		145.67	145.70	68	0.03		146.91	50	FSS: FINE SANDSTONE- lt gy, silt lam & layers
0.58		145.70	146.28	68	0.57			50	FSS: FINE SANDSTONE- as above
0.48		146.28	146.76	77	0.49			50	SILT: SILTSTONE- med gy, fine sand lam/ayers
0.16		146.76	146.92	77	0.16			50	FSS: FINE SANDSTONE- lt gy, laminated
0.26		146.92	147.18	77	0.26		148.44	50	SILT: SILTSTONE- med gy, fine sand lam/ayers
0.72		147.18	147.90	77	0.73			50	SILT: SILTSTONE- as above
0.36		147.90	148.26	77	0.36			51	SILT: SILTSTONE- as above, muddy at base
0.35		148.26	148.61	77	0.35		149.96	51	FSS: FINE SANDSTONE- lt gy, laminated, bioturb
0.04		148.61	148.65	77	0.04			51	FSS: FINE SANDSTONE- as above
0.18		148.65	148.83	77	0.18			51	SH: MUDSTONE- dk gy, calc ll to bedding
0.72		148.83	149.55	77	0.73			51	SILT: SILTSTONE- med gy, fine sand lam/ayers
0.65		149.55	150.20	77	0.65		151.49	51	SH: MUDSTONE- dk gy, part silty, few fine sand beds
0.51		150.20	150.71	77	0.51			51	SH: MUDSTONE- as above
0.14		150.71	150.85	77	0.14			52	SH: MUDSTONE- as above
0.12		150.85	150.97	77	0.12			52	FSS: FINE SANDSTONE- lt gy, silt lam/layers
0.45		150.97	151.42	77	0.44			52	SILT: SILTSTONE- med gy, fine sand lam/layers
0.08		151.42	151.50	77	0.08		153.01	52	SH: MUDSTONE- dk gy, w coal stringers
0.04	5	151.50	151.54	77	0.04			52	C4: COAL-DULL BANDED- broken
0.01	5	151.54	151.55	77	0.01			52	SH: MUDSTONE- broken, slicks
0.03	5	151.55	151.58	77	0.03			52	C5: COAL-DULL- broken
0.02	5	151.58	151.60	77	0.02			52	C4: COAL-DULL BANDED- broken
0.02	5	151.60	151.62	77	0.02			52	C3: COAL-DULL & BRIGHT- broken
0.02	5	151.62	151.64	77	0.02			52	CS: CARBONACEOUS MUDSTONE- broken
0.66	5	151.64	152.30	77	0.64			52	CL: CORE LOSS, Coal
0.70		152.30	153.00	77	0.68			52	CL: CORE LOSS, Rock
0.71		153.00	153.71	77	0.69		154.53	52	SH: MUDSTONE- dk gy, coal bands & inclus
0.49		153.71	154.20	77	0.48			52	SH: MUDSTONE- as above
0.43		154.20	154.63	77	0.42			52	SILT: SILTSTONE- med gy, w plant frags
0.19		154.63	154.82	77	0.19		156.06	53	SH: MUDSTONE- dk gy
1.47		154.82	156.29	77	1.43		157.58	53	SH: MUDSTONE- as above
0.10		156.29	156.39	77	0.10			53	SH: MUDSTONE- as above
0.41		156.39	156.80	77	0.40			53	SILT: SILTSTONE- med gy, sandy

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0.39		156.80	157.19	77	0.38			53	FSS: FINE SANDSTONE- lt gy
0.28		157.19	157.47	77	0.27			53	SILT: SILTSTONE- med gy, partly sandy
0.23		157.47	157.70	77	0.22			54	SILT: SILTSTONE- as above
0.14		157.70	157.84	77	0.14		159.11	54	SH: MUDSTONE- dk gy
0.08		157.84	157.92	77	0.08			54	SH: MUDSTONE- as above
0.25		157.92	158.17	77	0.24			54	SILT: SILTSTONE- med gy, w lt gy sand lam
0.26		158.17	158.43	77	0.25			54	SH: MUDSTONE- dk gy
0.93		158.43	159.36	77	0.91		160.63	54	SILT: SILTSTONE- med gy, partly sandy
0.55		159.36	159.91	77	0.54			54	SILT: SILTSTONE- as above, sand beds in lower part
0.36		159.91	160.27	77	0.35			54	FSS: FINE SANDSTONE- lt gy, scat silt lam/ayers
0.57		160.27	160.84	77	0.56		162.15	55	FSS: FINE SANDSTONE- as above
0.56		160.84	161.40	77	0.55			55	FSS: FINE SANDSTONE- as above
0.90		161.40	162.30	77	0.88		163.68	55	MSS: MEDIUM SANDSTONE- lt gy, fine to med gr, lam
0.51		162.30	162.81	77	0.50			55	MSS: MEDIUM SANDSTONE- lt gy, med to coarse, lam
0.25		162.81	163.06	77	0.24			55	CSS: COARSE SANDSTONE- lt gy, rare coal inclus
0.44		163.06	163.50	77	0.43			56	MSS: MEDIUM SANDSTONE- lt gy, lam, w coal inclus
0.05		163.50	163.55	77	0.05			56	CSS: COARSE SANDSTONE- lt gy, w mudst granules
0.37		163.55	163.92	77	0.36		165.20	56	FSS: FINE SANDSTONE- lam of mud granules at centre
0.04		163.92	163.96	77	0.04			56	FSS: FINE SANDSTONE- lt gy, laminated
0.15		163.96	164.11	77	0.15			56	MSS: MEDIUM SANDSTONE- scat mud granules
0.05		164.11	164.16	70	0.05			56	FSS: FINE SANDSTONE- med gy, laminated
0.28		164.16	164.44	70	0.26			56	MSS: MEDIUM SANDSTONE- mud granules at top
0.16		164.44	164.60	70	0.15			56	MSS: MEDIUM SANDSTONE- scat mud grans, esp at base
0.38		164.60	164.98	70	0.36			56	MSS: MEDIUM SANDSTONE- mud grans, unconf at top
0.42		164.98	165.40	70	0.39		166.73	56	SH: MUDSTONE- dk gy, rare coal inclus
0.29		165.40	165.69	70	0.27			56	SH: MUDSTONE- as above
0.08		165.69	165.77	70	0.08			56	FSS: FINE SANDSTONE- lt gy
0.02		165.77	165.79	70	0.02			56	SH: MUDSTONE- dk gy, rare coal inclus
1.14		165.79	166.93	70	1.07		168.25	57	SH: MUDSTONE- as above
1.38		166.93	168.31	70	1.30			57	SH: MUDSTONE- as above
0.05		168.31	168.36	70	0.05		169.77	57	CS: CARBONACEOUS MUDSTONE- dk gy-blk, coal bands
0.30		168.36	168.66	70	0.28			57	SH: MUDSTONE- dk gy, rare coal inclus
1.20		168.66	169.86	70	1.13		171.30	58	SH: MUDSTONE- as above

HOLE NO:	**CL05-25**
DATE STARTED:	**25-Mar-05**
DATE COMPLETED:	**26-Mar-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**G. Harding**

APPAR THICK	SEAM NO.	DEPTH TOP	DEPTH BASE	BED/CORE ANGLE	TRUE THICK	SAMPLE NO.	MARKER BLOCK	CORE BOX	NOTES
1.34		0.00	1.34	90	1.34				"CL: CORE LOSS, not cored."
0.66		1.34	2.00	90	0.66			1	"OVB: OVERBURDEN light-medium brown, sandy soil"
0.13		2.00	2.13	90	0.13		2.13	1	"SILT: SILTSTONE light grey"
0.95		2.13	3.08	90	0.95			1	"SILT: SILTSTONE as above, rare calcite-filled fractures"
0.17		3.08	3.25	90	0.17			1	"SILT: SILTSTONE lt grey - lt brown, muddy at base, broken"
0.38		3.25	3.63	47	0.28		3.66	1	"SILT: SILTSTONE as above"
0.36		3.63	3.99	47	0.26			1	"SILT: SILTSTONE as above, core broken"
0.70		3.99	4.69	47	0.51		5.18	2	"SILT: SILTSTONE as above, fractured"
1.47		4.69	6.16	47	1.08		6.71	2	"SILT: SILTSTONE as above"
0.18		6.16	6.34	47	0.13			2	"SILT: SILTSTONE as above"
1.04		6.34	7.38	46	0.75			3	"SILT: SILTSTONE as above, muddy at base, laminated"
0.30		7.38	7.68	46	0.22		8.23	3	"SILT: SILTSTONE as above, laminated, OVB pebbles at top"
1.38		7.68	9.06	46	0.99			3	"SILT: SILTSTONE as above, laminated"
0.16		9.06	9.22	46	0.12		9.75	4	"SILT: SILTSTONE as above"
0.64		9.22	9.86	46	0.46			4	"SILT: SILTSTONE as above, med-dk gy, fine sand laminae"
0.76		9.86	10.62	34	0.42			4	"FSS: FINE SANDSTONE grey, fracs @ 60 deg., calcite-filled"
1.09		10.62	11.71	34	0.61			4	"FSS: FINE SANDSTONE as above, mud laminae"
0.36		11.71	12.07	34	0.20		12.80	5	"FSS: FINE SANDSTONE as above, silty at base"
1.59		12.07	13.66	46	1.14			5	"SILT: SILTSTONE lam, abund bioturb & soft-sed deformation"
0.69		13.66	14.35	46	0.50			5	"SILT: SILTSTONE broken/disturbed bedding"
0.78		14.35	15.13	46	0.56		15.85	6	"SILT: SILTSTONE as above, more broken at base, strong bioturb"
1.16		15.13	16.29	46	0.83			6	"SILT: SILTSTONE as above, broken bedding, mod bioturb"
0.32		16.29	16.61	46	0.23			6	"SILT: SILTSTONE fractured core, very broken"
0.15		16.61	16.76	58	0.13		17.37	6	"FSS: FINE SANDSTONE med-lt grey, laminated"
0.18		16.76	16.94	58	0.15			6	"FSS: FINE SANDSTONE as above"
1.42		16.94	18.36	58	1.20		18.90	7	"FSS: FINE SANDSTONE as above, bioturbated"
0.96		18.36	19.32	58	0.81			7	"SILT: SILTSTONE with mud interbeds"
0.26		19.32	19.58	58	0.22			7	"SILT: SILTSTONE fractured, lystric surfaces"
0.13		19.58	19.71	58	0.11			7	"FSS: FINE SANDSTONE laminated"
0.03		19.71	19.74	58	0.03		20.42	8	"FSS: FINE SANDSTONE as above"
1.49		19.74	21.23	58	1.26		21.95	8	"FSS: FINE SANDSTONE laminated, mod. bioturb in muddy beds"
1.21		21.23	22.44	58	1.03			8	"FSS: FINE SANDSTONE as above, calc-filled fracs at centre"
0.32		22.44	22.76	40	0.21		23.47	9	"FSS: FINE SANDSTONE as above, muddy at base"
1.47		22.76	24.23	40	0.94		24.99	9	"SILT: SILTSTONE grey, mod. - abundant bioturb"

HOLE NO:	**CL05-25**
DATE STARTED:	**25-Mar-05**
DATE COMPLETED:	**26-Mar-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**G. Harding**

APPAR	SEAM	DEPTH	DEPTH	BED/CORE	TRUE	SAMPLE	MARKER	CORE	
0.85		24.23	25.08	40	0.55			9	"SH: MUDSTONE grey - dk. grey, with silt laminae"
0.59		25.08	25.67	40	0.38		26.52	10	"SH: MUDSTONE as above mod. bioturb, laminated"
1.52		25.67	27.19	40	0.98		28.04	10	"SH: MUDSTONE as above, dk grey, calc-filled fracs at top"
0.68		27.19	27.87	40	0.44			10	"SH: MUDSTONE as above, calc-filled fracs at base"
0.78		27.87	28.65	40	0.50		29.57	11	"SH: MUDSTONE as above, few lysric surfaces"
1.34		28.65	29.99	40	0.86		31.09	11	"SH: MUDSTONE as above"
0.62		29.99	30.61	40	0.40			11	"SH: MUDSTONE as above"
0.97		30.61	31.58	40	0.62		32.61	12	"SH: MUDSTONE as above"
1.71		31.58	33.29	40	1.10		34.14	12	"SH: MUDSTONE as above, broken at base"
0.14		33.29	33.43	40	0.09			12	"SH: MUDSTONE as ab ove"
1.30		33.43	34.73	40	0.84		35.66	13	"SH: MUDSTONE as above"
1.41		34.73	36.14	40	0.91			13	"SH: MUDSTONE as above"
0.09		36.14	36.23	40	0.06		37.19	13	"SH: MUDSTONE w coaly & pyrite bands"
0.53		36.23	36.76	40	0.34			14	"SH: MUDSTONE grey"
0.25		36.76	37.01	40	0.16			14	"SH: MUDSTONE grey - dk grey, lystric surfaces, coaly bands"
0.48		37.01	37.49	40	0.31		38.71	14	"SH: MUDSTONE grey, coaly strings @ btm"
1.56		37.49	39.05	40	1.00			14	"SH: MUDSTONE dk gy-blk, coaly bands, lystric surfaces"
0.14		39.05	39.19	40	0.09		40.23	15	"SILT: SILTSTONE grey"
0.64		39.19	39.83	40	0.41			15	"SILT: SILTSTONE grey, laminated, few calc-filled fracs"
0.88		39.83	40.71	40	0.57			15	"SH: MUDSTONE grey, coal bands at centre"
0.13		40.71	40.84	40	0.08		41.76	15	"SH: MUDSTONE broken, lystric surfaces, coaly bands"
0.76		40.84	41.60	40	0.49			15	"SH: MUDSTONE as above"
0.75		41.60	42.35	40	0.48		43.28	16	"SH: MUDSTONE as above"
1.39		42.35	43.74	40	0.89		44.81	16	"SH: MUDSTONE as above"
1.39		43.74	44.90	40	0.89			16	"CL: CORE LOSS, Rock"
0.49	1	44.90	45.39	40	0.31	1		16	"C3: COAL-DULL & BRIGHT, broken & unbroken core"
0.38	1	45.39	45.77	40	0.24	2		17	"C3: COAL-DULL & BRIGHT, unbroken"
0.11	1	45.77	45.88	40	0.07	2		17	"C2: COAL-BRIGHT BANDED, broken"
0.19	1	45.88	46.07	40	0.12	2		17	"C3: COAL-DULL & BRIGHT, unbroken"
0.06	1	46.07	46.13	40	0.04	2		17	"C2: COAL-BRIGHT BANDED, broken"
0.52	1	46.13	46.65	40	0.33	2		17	"C3: COAL-DULL & BRIGHT, broken"
0.07	1	46.65	46.72	40	0.04	2	46.33	17	"C2: COAL-BRIGHT BANDED, broken"
0.04	1	46.72	46.76	40	0.03	3		17	"C2: COAL-BRIGHT BANDED, broken & unbroken core"
0.16	1	46.76	46.92	40	0.10	3		17	"C3: COAL-DULL & BRIGHT, unbroken"
0.65	1	46.92	47.57	40	0.42	3		17	"C2: COAL-BRIGHT BANDED broken, sheared"

HOLE NO:	**CL05-25**
DATE STARTED:	**25-Mar-05**
DATE COMPLETED:	**26-Mar-05**
ORIENTATION:	**Vertical**
DESCRIBED BY:	**G. Harding**

APPAR	SEAM	DEPTH	DEPTH	BED/CORE	TRUE	SAMPLE	MARKER	CORE	
0.12	1	47.57	47.69	40	0.08	4		17	"C4: COAL-DULL BANDED, powdered"
0.04	1	47.69	47.73	40	0.03	4		17	"C6: COAL-STONEY OR BONEY, broken"
0.20	1	47.73	47.93	40	0.13	4	47.85	17	"C4: COAL-DULL BANDED, crushed, powdered"
0.95	1	47.93	48.88	40	0.61	5		18	"C3: COAL-DULL & BRIGHT, sheared, broken"
0.31	1	48.88	49.19	40	0.20	5	49.38	18	"C2: COAL-BRIGHT BANDED, sheared, broken, crushed"
0.56	1	49.19	49.75	40	0.36	6		18	"C2: COAL-BRIGHT BANDED, sheared, broken"
0.08	1	49.75	49.83	40	0.05	6		18	"C3: COAL-DULL & BRIGHT, powdered"
0.27	1	49.83	50.10	40	0.17	6		18	"C4: COAL-DULL BANDED, sheared"
0.16	1	50.10	50.26	40	0.10	7	50.90	18	"R: ROCK- lt brown, silty - fine sand"
0.14	1	50.26	50.40	40	0.09	8		18	"C4: COAL-DULL BANDED, v sheared, broken"
0.74	1	50.40	51.14	40	0.48	8		19	"C4: COAL-DULL BANDED, v sheared, broken & unbroken"
0.36	1	51.14	51.50	40	0.23			19	"CL: CORE LOSS, coal"
0.70	1	51.50	52.20	40	0.45	9	52.43	19	"SH: MUDSTONE lt brown, silty, coaly bands common"
0.12	1	52.20	52.32	40	0.08	10		19	"SH: MUDSTONE as above"
0.08	1	52.32	52.40	40	0.05			19	"CL: CORE LOSS, rock"
0.84	1	52.40	53.24	40	0.54	11		19	"C3: COAL-DULL & BRIGHT, unbroken"
0.10	1	53.24	53.34	40	0.06			19	"CL: CORE LOSS, coal"
0.36	1	53.34	53.70	40	0.23	12		19	"CS: CARBONACEOUS MUDSTONE lt-dk brwn, sheared, coal bands"
0.39	1	53.70	54.09	40	0.25		53.95	20	"SH: MUDSTONE grey-brown, laminated, coaly stringers"
0.37	1	54.09	54.46	40	0.24			20	"SH: MUDSTONE as above, grey"
1.13	1	54.46	55.59	40	0.73		55.47	20	"SILT: SILTSTONE coal stringers, few calc-filled fracs, lyst surf"
0.12	1	55.59	55.71	40	0.08			20	"CS: CARBONACEOUS MUDSTONE, brown-black"
0.23	1	55.71	55.94	40	0.15	13		20	"C2: COAL-BRIGHT BANDED, unbroken"
0.10	1	55.94	56.04	40	0.06	13		20	"CS: CARBONACEOUS MUDSTONE, brown-black"
0.25	1	56.04	56.29	40	0.16	13		20	"C2: COAL-BRIGHT BANDED, broken & sheared at base"
0.21		56.29	56.50	40	0.13			21	"SH: MUDSTONE lt brown-grey, lam, coaly strings at top"
0.69		56.50	57.19	40	0.44		57.00	21	"SILT: SILTSTONE grey, calc. filled fractures"
1.46		57.19	58.65	40	0.94		58.52	21	"SILT: SILTSTONE grey, wavy lam, muddy at base"
0.33		58.65	58.98	40	0.21			21	"SILT: SILTSTONE as above"
1.24		58.98	60.22	40	0.80			22	"SH: MUDSTONE grey - dk grey"
0.93		60.22	61.15	40	0.60			22	"SH: MUDSTONE as above, coaly stringers at base"
0.18		61.15	61.33	48	0.13			22	"FSS: FINE SANDSTONE lt grey, x-bedded"
0.38		61.33	61.71	48	0.28			22	"SILT: SILTSTONE grey, calc- filled fracs parallel to bedding"

Appendix C-2

These illustrations which are diagrammatic representations of the recovered lithologies in the core drilling are not included with this report due to the large file size. The same intervals are described and quantified in the previous appendix.

Appendix C-3

This appendix includes photographs of the core. This material is not included with this report due to the large file size.

22 RECOMMENDATIONS

The exploration of the recent program achieved several of the original objectives but some issues still require further work to secure satisfactory answers.

One of the most important of the initial objectives was to upgrade the resource classification so that a significantly greater portion of the resource would be classified in the measured and indicated categories. This has been achieved but there is the potential to further increase this, especially since more coal licenses have been applied for since the start of the exploration campaign.

The recent program also showed that the geology is more complicated, both structurally and stratigraphically than previously known. For example, it was found that thrust faults do not always trend along the main structural grain and that Seam 3 becomes the dominant seam in the north where Seam 1 rapidly reduces its thickness and commercial significance. The lack of natural exposure in the Lossan area places a particularly heavy burden on the production of geological interpretations.

The exploration experience shows that it will be necessary to conduct more exploration by drilling to adequately reduce the exploration risk inherent in all mining projects. The necessary drilling density is that which has been found to suitably reduce the mining risk for other Foothills coal properties of similar levels of tectonic disturbance. This is a spacing of 100m with closer distance where specific geological problems are encountered.

23 REFERENCES

Gibson, D.W. 1992. Stratigraphy, sedimentology, coal geology and depositional environments of the Lower Cretaceous Gething Formation, northeastern British Columbia and west-central Alberta. Geological Survey of Canada, Bulletin 431.

Gulf Canada Resources Ltd. 1980. Goodrich Coal Project, Geological Report, December 1980. British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Report PDF 531.

Gulf Canada Resources Ltd. 1981. Goodrich Coal Project, Geological Report, December 1981. British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Report PDF 532.

Gulf Canada Resources Ltd. 1982. Goodrich Coal Property, Geological Report, 1982. December 1982. British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Report PDF 533.

Gulf Canada Resources Ltd. 1983. Goodrich Coal Property, Peace River Coalfield; Resource Area, Mining and Economic Assessments, February 1983. British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Report PDF 534.

Gulf Canada Resources Ltd. 1984. Goodrich Coal Property, Brazion Creek Block, October 1984. British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Report PDF 535a.

Hughes, J.E. 1967. Geology of the Pine Valley, Mount Wabi to Solitude Mountain, northeastern British Columbia. British Columbia Department of Mines and Petroleum Resources, Bulletin 52.

Hughes, J.D., Klatzel-Mudry, L. and Nikols, D.J. 1989. A standardized coal resource/reserve reporting system for Canada. Geological Survey of Canada, Paper 88-21.

Ontario Securities and Exchange Commission, 2001. National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1, Technical Report, and Companion Policy 43-101CP.

Norwest Resource Consultants Ltd. 1982a. Goodrich Coal Project, Preliminary Feasibility Study; Vol. 2, Geology. Report to Gulf Canada Resources Ltd., November 1982.

Norwest Resource Consultants Ltd. 1982b. Goodrich Coal Project, Preliminary Feasibility Study; Vol. 4, Coal Preparation. Report to Gulf Canada Resources Ltd., November 1982.

Norwest Corporation, 2004. Coal Geology and Resources of the Lossan Area Report to Cline Mining Corporation., November 2004.

Smith, G.G. 1989. Coal resources of Canada. Geological Survey of Canada, Paper 89-4.

Stott, D.F. 1968. Lower Cretaceous Bullhead and Fort St. John Groups between Smoky and Peace rivers, foothills of northern Alberta and British Columbia. Geological Survey of Canada, Paper 67-19.

Stott, D.F. 1972. The Cretaceous Gething delta. In: Proceedings of the First Geological Conference on Western Canadian Coal, Research council of Alberta, Information Series No. 60, p. 151-163.

Stott, D.F. 1981. Bickford and Gorman Creek, two new formations of the Jurassic-Cretaceous Minnes Group, Alberta and British Columbia. In: Current Research, Part B, Geological Survey of Canada, Paper 81-1B, p. 1-9.

Stott, D.F. and Gibson, D.W. 1980. Minnes coal, northeastern British Columbia. In: Current Research, Part C, Geological Survey of Canada, Paper 80-1C, p. 135-137.

24 CERTIFICATION AND DATE

CERTIFICATE of AUTHOR

I, Geoffrey R. Jordan, *P.Geol.*, do hereby certify that:

1. I am currently employed as Senior Vice President, Norwest Corporation, #400, 205 - 9 Avenue SE., Calgary, Alberta, Canada T2G 0R3.

2. I graduated with a Bachelor of Science degree from the University of *New South Wales* in 1971.

3. I am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, (Member #22095)

4. I have worked as a geologist for a total of thirty-four years since my graduation from university.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6. I am responsible for the preparation of all sections of the technical report titled Technical Report Lossan Coal Property and dated January 12, 2006 (the "Technical Report") relating to the property, with the exception of Section 25. I have visited this property on many occasions and participated in the fieldwork conducted at this site. The most recent visit occurred in December, 2004.

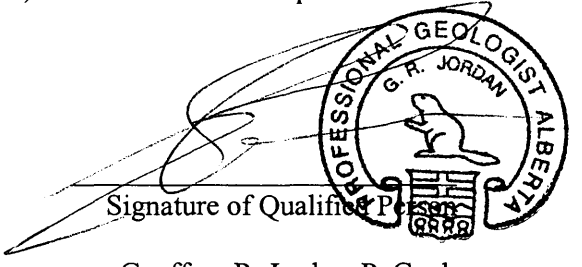
7. I have had prior involvement with this property for the previous leaseholder, Gulf Canada Resources. That work included the collection of drilling data, field mapping and the analysis and interpretation of geological results. I participated in the preparation of geological reports concerning this property.

8. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.

9. I am independent of the issuer applying all of the criteria of National Instrument 43-101.

10. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

Dated this 12th Day of January,2006.



Signature of Qualified Person

Geoffrey R. Jordan, P. Geol.
Print name of Qualified Person

NORWEST
CORPORATION

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, Geoffrey R. Jordan, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Technical Report Lossan Coal Property and dated January 12, 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 12th day of January, 2006

Signature of Qualified Person

Geoffrey R. Jordan, P. Geol.
Print name of Qualified Person

NORWEST
CORPORATION

CERTIFICATE OF QUALIFICATIONS

I, Craig P. Acott, of the City of Calgary, Alberta, do hereby certify that:

1. I am a mining engineer with Norwest Corporation, Suite 400, 205 - 9 Ave. S.E. Calgary, Alberta, T2G 0R3.

2. I am a member of the Association of Professional Engineers, Geologists and Geophysicists of the Province of Alberta - Registration Number M33264.

3. I am a graduate of the University of Alberta (Masters of Science, Mining Eng. 1981).

4. I have practised my profession as a mine engineer for twenty-five years in Canada. In particular, I have experience in the Western Canadian coal properties and coal mine operations. I have completed evaluations on coal and mineral properties on behalf of private and public companies. I am a qualified person for purposes of National Instrument 43-101.

5. I am responsible for the preparation of Section 25 of the technical report titled Technical Report Lossan Coal Property and dated January 12, 2006 (the "Technical Report") relating to the property.

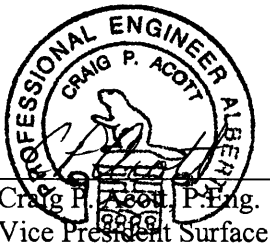
6. I have no direct or indirect interest in Cline Mining Corporation or any of its affiliates, nor do I expect to acquire any such interest. I am independent of the Company in accordance with the requirements of NI 43-101, Section 1.5

7. I have not been restricted in any way in my access to the Lossan Coal Property, or to persons, information, data or documents that I consider relevant to this report.

8. As at the date of this certificate, I am not aware of any material fact or material change not reflected in this report, the omission to disclose which would make this report misleading.

9. I have read National Instrument 43-101 and Form 43-101F1. The Technical Report is in compliance with NI 43-101 and Form 43-101F1.

Dated at this 12th day of January, 2006.



Craig P. Acott, P.Eng.
Vice President Surface Mining

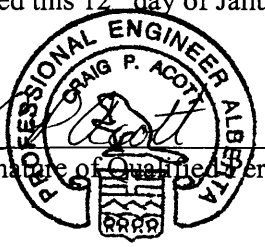
NORWEST
CORPORATION

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, Craig P. Acott, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Technical Report Lossan Coal Property and dated January 12, 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 12th day of January, 2006



Signature of Qualified Person

Craig P. Acott, P. Eng.
Print name of Qualified Person

25 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES

Additional work on this Property that describes planning for future production has been performed by Norwest Corporation. That work is described in Volumes 3 and 4 of the Feasibility Study conducted by Norwest. Mine planning and scheduling evaluations are included in Volume 3 and coal processing aspects are addressed in Volume 4. To fulfill the reporting obligations of Item 25, the text of these volumes are provided here. Figures and Maps referenced in these Volumes can be viewed in Section 26.

NORWEST
CORPORATION

LOSSAN COAL PROJECT
FEASIBILITY STUDY
VOLUME 3

MINE DESIGN/ COAL PROCESSING AND HANDLING/ INFRASTRUCTURE AND MINE DEVELOPMENT

Submitted to:
CLINE MINING CORPORATION

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1 SUMMARY

Volume 3 of this feasibility study documents the work that consists of the following components:

- Surface Mine Development – Norwest completed a mine development and production scenario based on the geological model developed for the Lossan Property. Potential mining areas were identified utilizing both Lerchs Grossmann and Floating Cone Analyses available in *MineSight®* computer mine planning software. The analyses were also used to determine the phasing and sequencing of the pits during the subsequent mine planning phase of the study.

- Mine and Construction Schedule – For the purposes of this feasibility study, Norwest developed a production schedule of 1.0 million clean tonnes per year over a fourteen year mine life. The schedule includes a profile of coal and waste volumes used to develop costs and revenue streams on an annual basis.

- Process and Infrastructure Design – Norwest has completed process and engineering work using the coal process capabilities from their US operations based in Salt Lake City, USA. The process design is based on the coal production from the surface mine planning component.

- Project Infrastructure and Mine Development – This section describes the infrastructure that will be needed to support the mining and processing activities, reviews the personnel requirements and presents the mine development schedule that has been used as a basis for developing the project economics.

This report provides the information realized from the completion of these tasks in order that the project owners and other interested parties are able to assess the benefits and risks associated with the development of the Lossan Property.

The work relies on certain cost and revenue assumptions carried out by third parties and provided to Norwest by Cline Mining. All significant third party sources are referenced in the report.

1.1 BACKGROUND

The Lossan coal mine project is located in the Peace River coalfield of northeastern British Columbia. The project is accessed on existing roads from the Municipality of Chetwynd a

distance of approximately 70 km. It is reached from Chetwynd by driving west along British Columbia highway 97, the John Hart Highway, for a distance of 26 km. From there, the Hasler Road, a good-quality, unpaved forestry road, runs south-eastward, entering the southern end of Lossan Property at a distance of about 44 km from the highway. At a distance of about 50 km form the highway, the Boulder Road diverges to the northwest and extends across the length of the property.

The Canadian National (CN) rail line, situated in the Pine River Valley adjacent to the John Hart Highway, provides coal freight services to bulk export terminals in Vancouver and Prince Rupert.

The Lossan Property, as shown in Figure 1-1, lies within a north-westerly trending valley, flanked by ridges to the northeast and southwest. It is crossed by three drainages of significant size: Beaudette Creek, which flows in a northwest direction from the northern part of the property; Brazion Creek, which flows across the southern end of the property; and Axis Creek, which flows southwest from the centre of the property into Brazion Creek.

Elevations range from about 1000m at the confluence of Axis and Brazion Creeks, to more than 1520m along the south-western edge of the property. The highest points near the property are Mt. Stephenson, Mt. Le Hudette, and Mt Goodrich, all with elevations of more than 2000m.

Electric power and natural gas supplies are not available on the property at present. Electric power is available from hydroelectric generating facilities along the Peace River, north of Chetwynd, which combined produce more that 3000MW of electric power for use throughout the region. The nearest connection point of this power source is to the north in the Pine River Valley, close to the proposed coal processing plant site.

There are two natural gas processing plants in the area that could serve as natural gas supply points, if needed. The Pine River Gas Plant is located about 19km from the property and Burlington Resources Ltd. operates a gas plant at Km 41 on the Hasler Road. Burlington also owns a collector gas pipeline that is situated within the Lossan mining area.

The coal grades at Lossan are Medium to Low volatile bituminous in rank, suitable for Pulverized Coal Injection (PCI) and Coking products. Both product types are used in the steelmaking process.

1.2 SURFACE MINE DESIGN

The Lossan Property will be developed using conventional "truck – shovel" open pit mining practices used elsewhere in B.C. The project will be evaluated at a production rate of 1.0 million tonnes per year. It is anticipated that mining and coal haulage will be done on a contract basis with coal processing and train loading undertaken by a small crew of company employees.

Evaluation of the site's geological conditions and topographical settings led to the decision to utilize truck/shovel methods for the project. Given the size of the seams, the desire to have selectivity in mining, and the desire to have flexibility by operating two separate waste fleets, it was decided that waste would be mined using relatively small mining equipment.

At the Lossan Property the multiple anticlinal/synclinal structures result in high variability of the bedding dips, especially in the steep and moderate ranges. However, the hardness of the Lossan coals should assist selective mining providing suitable extraction equipment and bench configuration is employed. The proposed mining operation at Lossan is designed for 10m benches with a berm every second bench at 20m high (i.e. double bench).

A dedicated access/raw coal haulroad from the north end of the property to the proposed plant and loadout site in the Pine River Valley will be constructed in the first year of mining along the east side of the Beaudette Creek. This will result in a raw coal haul of approximately 22km to 27 km and be suitable for medium capacity (40 to 50 tonne) coal haulers to be used.

Geotechnical design and analyses work completed for the Lossan property was conducted in 1982 by CGEI Geological Engineers Incorporated. Pit wall and waste dump slope angles were developed for the Lossan Property that were consistent with the recommendations provided by CGEI. The design criteria fall within the range of typical angles for bedded slopes in western Canada.

Lift sequencing for external waste dumps was based on construction and operating procedures that enhance stability and achieve the target factors of safety during construction. Inpit backfill will be maximized in order to reduce the external dump footprints and minimize waste haulage distances.

The volume of overburden waste, and recoverable coal tonnages including in-seam partings, was determined from the geological model. The recoverable tonnage, or Run of Mine tonnage (ROM), is the amount of coal that is expected to be extracted from the in-place tonnage during the mining process. The calculation of these tonnages takes into account various mining parameters, such as:

- coal losses that might occur during mining;
- introduction of in-seam and out-of-seam dilution;
- provision for oxidation; and
- thickness limits for mining.

The minimum mining thickness of separable partings was 0.30m. Partings thinner than this amount were included in the ROM feed. Similarly, coal plies less than 0.30m in thickness were discarded. To qualify as a mineable seam, a total coal thickness of 1.0m was required.

At the top and bottom waste contact within each seam, plus at the contacts of separable partings, the dilution thickness was estimated to be 10cm per interface based upon the factors listed above. Coal loss was also estimated at 10cm per interface using the above criteria. These estimates were used to develop ROM density and ash values for each mined seam on a local basis.

Washability testing results conducted on bulk samples obtained from the 2005 adit program were used to develop the relationship between specific gravity of the coal and coal processing yield. Table 1.1 lists the recoverable, or ROM coal tonnage, and the product tonnage by seam for the Lossan mining block.

TABLE 1.1
RECOVERABLE AND PRODUCT COAL BY SEAM

Coal Seam	Product Tonnage (million cmt)		
	PCI	Coking	Total
1	2.93	8.18	11.11
2 through 5	2.82	-	2.82
Total	5.75	8.18	13.93

1.2.1 Direct Ship Potential

The potential to direct ship coal in the initial years of mining was evaluated as part of this study. Evaluation of the 2005 Adit coal quality data indicates that only limited amount of these high ash plies can be added to the base product while maintaining the product ash specification of 9%. As a result of the low capture rate of coal suitable to attain the ash product specification of the direct ship coal, the mining strip ratio of the direct ship coal increased significantly. The resulting strip ratio of the direct ship product compared to the strip ratio of a "washed" product is shown in Table 1.2.

TABLE 1.2
STRIP RATIO COMPARISON

Product Strip Ratio	
Direct Ship	Fully Washed
14.3	7.6

A full cycle cost analysis was conducted for the direct ship product, inclusive of the coal stockpiled for future washing, and it was determined that it is more cost effective to commission the coal process plant at the onset of mining. This analysis was based on the data acquired from the 2005 adit only, and once further data is collected to improve the understanding of the Seam 1 coal ply ash distribution, the potential to provide a direct ship product should be re-evaluated.

1.2.2 Mine Operation

Based on discussions with Cline Mining, it was determined that the use of a contractor to carry out mining operations for the Lossan Property was the favoured option. For costing purposes a budgetary quotation was acquired from a qualified mining contractor. To confirm the projected mining costs, a more detailed costing estimate for the full scale operation was conducted independently by Norwest. Mine equipment fleets were selected, productivities assigned and operating hours calculated. The productivity calculations were calculated from first principles, including haulage simulation calculations for both the waste and coal truck fleets for each phase of mining. The scale of the equipment was selected to reflect the type of equipment that a contractor would most likely utilize for a project of this magnitude and duration. Finally, allowances were made for equipment ownership costs and contractor profit.

Based on Norwest's current understanding of the pit geology, site configuration and project economics, two Cat 777 class end-dump truck fleets were proposed for waste mining. The waste loading unit was assumed to be a Hitachi EX2500 class machine configured as a shovel front with a $15m^3$ bucket. The flexibility of the hydraulic shovel/truck mining method makes it ideal to accommodate the site conditions at Lossan, namely the complex nature of the geological structure and considerable topographical relief.

For coaling operations, a 40 tonne unit body construction hauler was utilized. The 40 tonne truck fleet is required as a result of the road width and haulage distance from the mining area to the coal processing facility. It was assumed that the 40 tonne trucks would be loaded directly in the pit; no staging area was incorporated for normal operations. Coal loading was

assigned to 3.8m^3 sized Cat 345C L hydraulic backhoes. The hoes will be outfitted with quick attach buckets such that they can be utilized for coal loading using 5m^3 coal buckets or for site ditching when outfitted with the 3.8m^3 rock bucket.

Drill operations will be carried out on a continuous basis as part of the normal mining operation and 85% of the mine waste material is projected to require blasting. Once full mine production levels are reached, drilling and blasting of approximately 6.4 million bcm to 9.7 million bcm per year will be required to maintain production levels.

The proposed Lossan Property mine is planned to operate on a continuous basis, with shutdowns for major holidays. The mine schedule includes a provision to allow for operating delays and maintenance shutdowns.

On-site mine maintenance will be conducted by the mining contractor. It will consist of a full scale preventative maintenance program for all production and support equipment. It has been assumed that all servicing, as well as any component change-outs will be conducted at the mine site by the contractor. Suitable maintenance facilities have been specified in this study to ensure that the full scale maintenance program is viable.

The mine schedule is based on a 1.0 million tonnes of product coal per annum over the entire 14 year mine life. The pit phasing has been developed with the intent of taking advantage of opportunities for pit backfill and to allow for access to the various pit phases. An example of the plans detailing the mining sequence can be found in Figures 2-34. Table 1.3 contains an overview of the phasing schedule.

TABLE 1.3
PIT AND PHASE SEQUENCING

	Year of Operation						
	1	2	3	4	5	6-10	11-25
Pit 1							
Pit 2A							
Pit 3							
Pit 4							
Pit 5							
Pit 6							
Pit 7							

1.2.3 Reclamation Planning

Topsoil/subsoil will be recovered prior to mining or placement of waste rock to create stockpiles of sufficient size to provide for reclamation. Preliminary work suggests that the

mineral root zone material, combined tree litter A and B horizon, be salvaged as a single lift, approximately 0.5m thick.

The topsoil salvage will occur prior to mining and dump construction either by dozer pushing of the soil to stockpiles or by loading and hauling of the material by backhoe and truck. Applying the 0.50m average thickness criteria results in an estimated total volume of 3.8Mbcm for the Lossan mining areas.

The conceptual water management plan for the Lossan pit areas is designed to minimize the amount of water which enters the pit and waste dump areas. Perimeter interceptor ditches are planned for the pits and dumps in order to direct surface water run-off away from these areas.

The mine reclamation plan consists of clearing, topsoil salvage of the pit and dump areas and placement in soil stockpiles. After mining, the dumps will be resloped to a 2H to 1V slope and the topsoil will be replaced and revegetated by seeding and planting of tree seedlings.

1.3 COAL PROCESSING AND HANDLING

The coal cleaning process that is described in this section has been designed to produce PCI and coking coal products with 6-9% ash range and 8% moisture. Based on these specifications and the coal quality information presented in the previous section, target specifications for the Cline Lossan product have been developed as shown in Table 1.4.

TABLE 1.4
TARGET SPECIFICATIONS FOR CLINE LOSSAN MINE PRODUCT

Coal Quality Parameters	Lossan PCI Coal	Lossan Metallurgical Coal
Moisture (as received)	8.0	8.2
Proximate Analysis (air dried basis)		
Ash	<8.0	8.5
Volatile Matter	24.0	26.5
Fixed Carbon	67.7	65.0
Sulphur	0.37	0.37
FSI	2	6

The Cline Lossan Processing Plant, conceptually developed by Norwest, will consist of the associated feed, refuse, and product material handling components as well as a hybrid of factory manufactured modular Parnaby units and custom designed individual components. The plant is designed to size into four main size fractions:

- Coarse Coal (150mm x 13mm);
- Small Coal (13mm x 1mm);
- Fine Coal (1mm x 0.15mm); and
- Ultra-fines (0.15mm x 0.045mm).

The wash plant is direct fed from a truck dump with an integral crusher. To mitigate surges and upset conditions, a 400 tonne surge bin is located at the feed end of the wash plant. Following the washery, a 150 tonne bin will collect the coarse and fine rejects produced by the plant. The plant waste material will be trucked from the refuse bin approximately 1.7km to the reject disposal area located west of Beaudette Creek. The cleaned product coal will be conveyed just over one kilometre to the Falling Creek stockpile area and rail load out. This stockpile and load out facility is to be shared with Western Canadian Coal Corporation. This facility will be located on the eastern side of the stockpile area and Cline Mining Corporation stockpiles will be located on the western side of the yard.

All of the existing B.C. plants producing metallurgical coal use fluidized bed thermal dryers to supplement mechanical dewatering. Today, fluid-bed thermal dryers are rarely built since they:

- require air-quality permits that may be difficult to obtain;
- are very expensive to operate due to high electric power requirements and non-recoverable once-through heat/high fuel costs;
- have high capital costs; and
- newer means of acceptable mechanical dewatering are now available.

The screenbowl centrifuge has now virtually replaced the filter processes for mechanical drying the minus 0.6mm coal. The screenbowls are similar in price and power usage as a vacuum filter, but its superior dewatering performance has been a major factor in the demise of thermal dryers. As a result, Norwest has incorporated the screenbowl centrifuge into the process design for achieving product moisture requirements to avoid the necessity of installing a thermal dryer.

1.4 PROJECT INFRASTRUCTURE

In addition to the rail-load out facility and heavy media process plant, the facilities that will be used for the Lossan operation entail a maintenance shop and warehouse complex, administration office, 25 kV power line, water management structures, ROM coal haul road and initial pit access routes. The project also includes pit roads, a coal haul-road, an ammonium nitrate silo and magazine, as well as other ancillary facilities. Prior to

development of the site, clearing and grubbing will be required along with logging of any salvageable timber.

1.4.1 Manpower

The contract operator is expected to provide all on site salaried personnel related to mining and maintenance. Norwest estimates that Cline Mining would need 11 administrative and technical personnel and three staff in the preparation plant during Lossan Property operations. The number of salary personnel at full production levels is estimated to be 14 for Cline and 13 for the mining contractor. In addition 50% of an accountant's time has been provided for in the contactor's totals.

The mining contractor (or his sub-contractor) is responsible for providing hourly personnel for mining and reclamation activities. Personnel levels increase from 66 people during mine development to 201 people at peak production but a gradual reduction in personnel levels will occur as waste production decreases towards the end of the mine life. Hourly personnel will work 12 hour shifts, 4 days on/4 days off. Hourly personnel costs are included in the site unit costs.

Cline will operate the preparation plant with an hourly workforce of 19. These workers will work 8 hour shifts, 5 days per week.

2 SURFACE MINE DESIGN

2.1 INTRODUCTION

This section presents the surface mine design for the Lossan Project based on providing clean coal production at a nominal 1.0 million tonnes per annum. The coal production will be comprised of both PCI and hard coking coal. The specific surface mine planning issues discussed in this section are summarized below as follows:

- Mining method
- Mine layout
- Design criteria including pits, dumps and haulroads
- Geo-mining conditions
- Mine scheduling
- Mining equipment
- Production and productivity levels

Additional parameters relating to infrastructure, manpower and costing are discussed in later sections.

2.2 SEAM MODEL COAL TONNAGE – STRIP RATIO RELATIONSHIPS

As part of the study evaluation, a series of pit shells were developed for the Lossan area to determine economic pit size and coal tonnage to strip ratio relationships for all areas of the property. The pit shells were identified utilizing both Lerchs Grossmann and Floating Cone analyses; the results of these analyses were also utilized for determination of pit phasing and sequencing.

The three dimensional geological model, described in Volume 2 – Geology, was used for volumetric calculations of the pits. Surface modeling of the deposit and subsequent economic pit definition work has identified recoverable coal reserves for each pit for each product stream.

Within the geological model, an overburden till surface was established at a minimum of 2 meters of depth or deeper wherever identified in the drilling information. The minimum depth was based on that encountered during the construction of the 2005 adit. Oxidized coal was measured in the adit to a depth of 7 m. Therefore, throughout the entire mining area, coal at depths less than 7 m was assumed to be oxidized. In areas where the overburden till depth was greater than 7 m, the coal was assumed to be oxidized 1 m below the till contact. The oxidized coal was included in the recoverable tonnage calculations, however, it was

assumed to be blended into the PCI product; no oxidized coal was blended into the coking coal product.

2.3 MINING METHOD AND DESIGN PARAMETERS

2.3.1 Selection of Mining Method

The selection of a mining method for the Lossan Property was based on consideration of a number of factors including:

- Topography and site access
- Coal seam configuration, thickness and spacing
- Desired production levels
- Project economics

Evaluation of these factors led to the decision to utilize truck/shovel methods for the project. Given the size of the seams, the desire to have selectivity in mining, and the desire to have flexibility by operating two separate waste fleets, it was decided that waste would be mined using relatively small mining equipment.

2.3.2 Bench Height

The bedding dip, seam thickness and mechanical properties of the coal and adjacent rock influences mineability in a number of ways. At angles of 60 degrees or greater, the ability to recover a clean product in the pit is enhanced as it is not necessary to drill and blast through the coal, which leads to reduced dilution. Shallow bedding dips allow for dozer access to the top of the seams, which is also beneficial to selective mining. Conversely, moderately dipping slopes make selective mining more difficult. At the Lossan Property the multiple anticlinal/synclinal structures result in high variability of the bedding dips, especially in the steep and moderate ranges. However, the hardness of the Lossan coals should assist selective mining providing suitable extraction equipment and bench configuration is employed. The proposed mining operation at Lossan is designed for 10m benches with a berm every second bench at 20m high (i.e. double bench).

2.3.3 Ultimate Pit Boundaries

The ultimate pit boundaries are shown in Figure 2-1. These boundaries are based on the pit shell limits selected based on the desired overall strip ratio by phase. The shell outlines have been adjusted to reflect on mining constraints including access, geo-mining conditions, pre-existing infrastructure, the interaction between the various pit phases as well as environmental constraints.

In general terms, the pits are constrained along strike by the plunge of the anticlinal and synclinal structures, as well as by a topographical high, south of Brazion Creek. The pits are constrained perpendicular to strike by the position of the synclinal limb on the east side of the property and by increasing strip ratio resulting from a steeply dipping monocline to the west.

2.4 MINE ACCESS AND HAULROADS

2.4.1 Haul Road Design Parameters

All roads are pioneered with a dozer as a balanced cut/fill. Mine haul roads are subsequently widened as required with suitable waste rock from the pit by end dumping. Material for surfacing is sourced from suitably sized waste rock from the pit.

The majority of mine haul roads are built on a side slope, thus design width allows for a single berm on the down-slope side only, and a drainage ditch on the up-slope side. Mine haul roads without an up-slope cut require additional width for a second berm. Mine haul roads have been designed using the following criteria:

- Two-way haulage at 3 times the maximum truck width, plus berms and ditching = 35m;
- Berm design based on maximum wheel height (1.5m);
- Maximum haulroad grades for normal design of 8%;
- Temporary roads up to 10% grade;
- Runaway lanes spaced as required for all roads over 5% grade; and
- Ditches incorporated into road designs as required.

A dedicated access/raw coal haulroad from the north end of the property to the proposed plant and loadout site in the Pine River Valley will be constructed in the first year of mining along the east side of the Beaudette Creek. This will result in a raw coal haul of approximately 22km to 27 km and be suitable for medium capacity (40 to 50 tonne) coal haulers to be used. This road was designed and costed by a qualified independent design firm familiar with conditions in the region.

2.4.2 Haul Cycle Parameters

Caterpillar's FPC haulage simulation computer software was used to determine the waste and coal truck haul times. All waste hauls were handled by a Caterpillar 777 equivalent haul truck. The rolling resistance within 50m of the loading face and 50m of the dump were estimated to be 6%; a speed limit of 20km/h was assigned in these areas. On-bench and on-lift roads were assigned a 4% rolling resistance and restricted to a 30km/hr speed limit. A 3% rolling resistance and 40km/hr speed limit were assigned to the permanent, out of pit roads.

These same parameters were applied to the 40 tonne coal haulers on the haul from the coal face to the main coal haul road to the plant. At that point, the coal haulers were assumed to average 50km/hr over the remainder of the haul. Because the main haul road is predominantly downhill to the plant, the loaded and return average speeds were kept the same.

Coal plant reject haulage from the coal processing facility to the reject disposal area was assumed to be conducted by a 40 tonne end dump truck. The truck productivity on the reject haul was matched to the plant reject output, which is less than the theoretical productivity of the truck.

2.4.3 Access

Access to the pit areas will be developed utilizing cut and fill for initial road development. Following initial road development, waste rock from the pit will be placed to widen the road to full width.

Development of the coal plant reject haulage to the disposal area will require the construction of a bridge or culvert crossing of Beaudette Creek.

2.5 GEO-MINING CONDITIONS AND GEOTECHNICAL DESIGN

2.5.1 Pit Wall Design

Geotechnical design and analyses work completed for the Lossan property was conducted by CGEI Geological Engineers Incorporated and documented in their 1982 report entitled "Preliminary Geotechnical Assessment of Pit Wall Stability of the Goodrich Coal Property, British Columbia". A comparison of the design recommendations developed by CGEI with recent work conducted at other foothills coal mines in western Canada with similar conditions encountered at Lossan was conducted. Consequently, pit wall angles have been developed for the Lossan Property, which fall within the range of typical angles for bedded slopes in western Canada.

Geotechnical evaluation and stability analyses completed to date indicate that the configuration of phasing of the pits at Lossan is suitable for the requirements of feasibility level evaluation. Additional detailed analyses and documentation will be required prior to mine development.

Footwall Slopes

The geotechnical findings by CGEI recommend that footwall slopes up to 200m in height can be constructed at a maximum of 55°. For footwall slopes of 200m to 400m in height, the maximum slope angle should not exceed 50°.

Where benching of the footwall is required, intermediate mine bench slopes were maintained at approximately 67°, which is typically a function of the digging configuration of the waste loading unit and the structural features of the rock units comprising the pit wall. Safety berms were established at 20m intervals and were designed at a minimum width of 8m.

Highwall Slopes

CGEI recommended maximum hanging wall slope angles of 60°, 55° and 50° for slope heights of up to 200m, 300m and 400m, respectively. A maximum highwall slope angle of 55° was used in this study. The pit wall configuration was designed using the same parameters as for a benched footwall; double bench heights of 20m at a face angle of 67°, with minimum 8m safety berms.

TABLE 2.1
PIT WALL DESIGN PARAMETERS

Pit Component	Criteria
Footwall unbenched height (m)	Up to 25m
Footwall bench height (m)	20m
Footwall bench face angle (deg)	67 degrees
Footwall berm width (m)	8m
Highwall bench height (m)	20m
Highwall bench face angle (m)	67 degrees
Highwall berm width (m)	8m
Typical Pit Depth (m)	35 – 70m

Note: Bench heights of 20m are based on heights between berms and are actually two times the mine operating bench height of 10m. Minimum berm widths of 8m are specified by BC Mines Safety Regulations (2003).

2.5.2 Rock Dump Design

A preliminary value of 35° is recommended by CGEI based on their evaluation of the natural rock scree and talus slopes in the mine area. They state in their findings that this value is based on the lithologies and does not take into account the foundation and drainage conditions which will be unique to each waste dump site. More detailed investigations and geotechnical evaluations will be required prior to development of the Lossan Property.

Dumps will be constructed by end-dumping directly over a safety berm with haul trucks. A dozer is used to maintain the safety berm and level the dump area as required. Active dump slopes are at the assumed 35° angle of repose. The dumps are placed "along-contour", meaning dumping occurs perpendicular to the natural slope. In-situ waste rock is assigned a swell factor of 20% for calculating dump volume requirements.

Dumps are designed and sequenced to minimize dump heights near areas with infrastructure. Lift sequencing for external dumps is based on construction and operating procedures that enhance stability and achieve the target factors of safety during construction. Inpit backfill will be maximized in order to reduce the external dump footprints and minimize waste haulage distances.

2.5.3 Overburden Slope Design

CGEI recommend that overburden slope heights of up to 20 m be limited to 42°, 20m to 40m slopes by limited to 37°, and 40m to 60m slope eights be limited to 32°. For the purposes of this report, overburden slopes have been limited to 37°, and a berm has been left at the overburden bedrock contact.

2.6 Mine Tonnages and Volumes

2.6.1 Methodology

The volume of overburden waste, and recoverable coal tonnages including in-seam partings was determined from the geological model as discussed in Volume 2. The recoverable tonnage, or Run of Mine tonnage (ROM), is the amount of coal that is expected to be extracted from the in-place tonnage during the mining process. The calculation of these tonnages takes into account various mining parameters, such as:

- coal losses that might occur during mining;
- introduction of in-seam and out-of-seam dilution;
- provision for oxidation; and
- thickness limits for mining.

An economic pit design meeting the design constraints was determined with the Lerchs Grossmann analysis tool available in *MineSight*® mine planning software. The pit shells identified with the Lerchs Grossmann analysis were used as a basis to conduct more detailed pit designs that incorporate safety berms and pit access. Floating Cone analyses were also conducted on the pit shells to assist in the development of pit phases as well as the sequencing of the phases. The overall coal and waste volumes were calculated using the *MineSight*® block model.

2.6.2 Recoverable Run-of-Mine Tonnage

The calculation of recoverable run of mine (ROM) coal tonnages is based on geological resource estimates and evaluation of realistic mining assumptions with due consideration of the expected mining conditions at the Lossan site and Norwest's experience with truck and shovel mining methods in western Canadian mountain coal mines.

The minimum mining thickness of separable partings was 0.30m. Partings thinner than this were included in the ROM feed. Similarly, coal plies less than 0.30m in thickness were discarded. To qualify as a mineable seam, a total coal thickness of 1.0m was required.

Dilution and coal recovery estimates were made based on consideration of a number of factors including:

- Quality of coal/waste contact interface rock;
- Equipment size and capability for selective mining;
- Seam dip and thickness;
- Experience with mining of steeply to moderately dipping seams in similar conditions; and
- Assumed in-seam and out-of-seam dilution rock density of 2.1t/m^3 (approximately 80% ash content).

At the top and bottom waste contact within each seam, plus at the contacts of separable partings, the dilution thickness was estimated to be 10cm per interface based upon the factors listed above. Coal loss was also estimated at 10cm per interface using the above criteria. These estimates were used to develop ROM density and ash values for each mined seam on a local basis. To develop these values, the geological source data was utilized to determine the number of separable partings within each coal seam for each drillhole. The number of coal/separable rock contacts was determined and this data was contoured over the property and used to populate the three dimensional block model.

The specific gravity of the ROM coal in each block was calculated taking into account the out of seam dilution added at each contact and the in-seam dilution resulting from the non-separable partings included within the seam. For the purposes of this calculation, the specific gravity of all "coal only" plies was established at 1.39. The specific gravity of the ROM coal was then used to determine the ROM tonnage in each block in order to calculate the recoverable tonnage within each pit.

2.6.3 Product Coal Tonnage

Washability testing results conducted on bulk samples obtained from the 2005 adit program were used to develop the relationship between specific gravity of the coal and coal processing yield. The specific gravity vs. plant recovery curve is presented in Figure 2-2. This recovery formula was applied to the individual blocks in the three dimensional block model so that product coal for each seam was derived directly from the model. Table 2.2 lists the recoverable, or ROM coal tonnage, and the product tonnage by seam for the Lossan mining block.

TABLE 2.2
RECOVERABLE AND PRODUCT COAL BY SEAM

Coal Seam	Product Tonnage (million cmt)		
	PCI	Coking	Total
1	2.93	8.18	11.11
2 through 5	2.82	-	2.82
Total	5.75	8.18	13.93

2.6.4 Direct Ship Product Potential

The potential to direct ship coal in the initial years of mining was evaluated as part of this study. The 2005 adit program served as the basis from which the product distribution, product quality and ROM coal recovery were developed to examine the economic benefits of direct shipping Seam 1 coals. Evaluation of the 2005 Adit coal quality data indicates that only limited amount of these high ash plies can be added to the base product while maintaining the product ash specification of 9%.

To determine the direct ship tonnage for each block, formulae were developed which were driven by the ROM tonnage and specific gravity in the geologic model. In addition to the PCI and hard coking coal products discussed previously it has been assumed that 50% of the coal lost to the cleaning operation can be captured and saved separate in a stockpile for future washing. The ash content of the cleanings from the adit section at 27% indicates that stockpiling for future washing is justified. The stockpile capture rate for future washing of 50% is experience based and will require considerable diligence to be achieved. These extended formulae were applied to the production schedule during those periods when the direct ship production technique was invoked.

As a result of the low capture rate of coal suitable to attain the ash product specification of the direct ship coal, the mining strip ratio of the direct ship coal increased significantly. The resulting strip ratio of the direct ship product compared to the strip ratio of a "washed" product is shown in Table 2.3.

TABLE 2.3
STRIP RATIO COMPARISON

Product Strip Ratio	
Direct Ship	Fully Washed
14.3	7.6

A full cycle cost analysis was conducted for the direct ship product, inclusive of the coal stockpiled for future washing, and it was determined that it is more cost effective to commission the coal process plant at the onset of mining. This analysis was based on the data acquired from the 2005 adit only, and once further data is collected to improve the understanding of the Seam 1 coal ply ash distribution, the potential to provide a direct ship product should be re-evaluated.

2.6.5 Overburden and Total Waste

Overburden thicknesses have been estimated based on field observations from the 2005 adit, trenches and drillhole information carried out as part of Cline Mining's exploration work. Within the geological model, an overburden till surface was established at a minimum of 2 meters of depth or deeper wherever identified in the drilling information. The minimum depth was based on that encountered during the construction of the 2005 adit. This is judged to be a reasonable estimate of overburden depth based on Norwest's understanding of the site.

Table 2.4 below summarizes the overburden quantities by pit and phase for the Lossan Property. Note that this quantity includes topsoil and subsoil volumes which exist within the pit limits. These quantities are discussed in greater detail in subsequent sections.

TABLE 2.4
OVERBURDEN QUANTITIES BY PIT AND PHASE

Pit / Phase	Overburden Volume (000's bcm)
Pit 1	14.7
Pit 2A	17.1
Pit 3	6.9
Pit 4	72.8
Pit 5 & 6	19.1
Pit 7	11.0
Total	141.6

2.6.6 Potentially Acid Generating Waste Rock

Geochemical characterization of the waste and coal has been carried out for the Lossan Property project area by Rescan Environmental Services Ltd. Rescan is an independent and qualified consulting firm with experience in geochemical characterization of mine waste materials. Characterization work was carried out for waste and coal materials within the Lossan Property area using drill core and adit samples. The characterization work has shown portions of the waste rock and coal partings to be of concern due to being potentially acid generating (PAG) and metal leaching.

To reduce the severity of the development of acidity and metal leaching ore at the Lossan Property, remedial steps may need to be implemented, such as encapsulating the PAG rock with non-acid generating rock within the active waste disposal areas.

For costing purposes, Norwest has assumed direct placement of the PAG material as part of the waste management strategy in order to avoid stockpiling and rehandle of this material.

2.6.7 Topsoil and Subsoil

Topsoil/subsoil will be recovered prior to mining or placement of waste rock to create stockpiles of sufficient size to provide for reclamation.

Preliminary work by Rescan suggests that the mineral root zone material, combined tree litter A and B horizon, be salvaged as a single lift, approximately 0.5m thick. This material would be stored in a 'topsoil' stockpile for later replacement, or directly replaced on recontoured suitable overburden, where mine development scheduling permits. The proposed handling of wetland organic soils, is under review, but for estimating purposes 0.5m thickness has been assumed.

The need for separate salvaging and stockpiling of suitable overburden material, to make-up for possible soil deficits during reclamation, will be determined as part of the development and reclamation plan. Organically amended overburden may be required of salvaged soil volumes are inadequate.

The topsoil salvage will occur prior to mining and dump construction either by dozer pushing of the soil to stockpiles or by loading and hauling of the material by backhoe and truck. Applying the 0.50m average thickness criteria results in an estimated total volume of 3.8Mbcm for the Lossan mining areas.

2.7 MINE OPERATION

Based on discussions with Cline Mining, it was determined that the use of a contractor to carry out mining operations for the Lossan Property was the favoured option. A contract mining operation was chosen for several reasons including:

- a desire for a rapid ramp-up of the Lossan Property open pit mining operations;
- minimize additional capital expenditures by Cline Mining;
- minimize infrastructure requirements for production increase; and
- availability of skilled equipment operators.

For costing purposes a budgetary quotation was acquired from a qualified mining contractor. To confirm the projected mining costs, a more detailed costing estimate for the full scale operation was conducted independently by Norwest. Mine equipment fleets were selected, productivities assigned and operating hours calculated. The productivity calculations were calculated from first principles, including haulage simulation calculations for both the waste and coal truck fleets for each phase of mining. The scale of the equipment was selected to reflect the type of equipment that a contractor would most likely utilize for a project of this magnitude and duration. Finally, allowances were made for equipment ownership costs and contractor profit. The overall development plan utilized to conduct this evaluation is predicated on the following criteria ranked by priority:

- Release required volumes of raw coal, by seam, to ensure flexibility in blending to meet customer specification, maximize plant yield and optimize overall project economics.
- Maximize in-pit backfilling, and ultimately achieve a reclaimed ecosystem, which adds value to the land, rather than reducing value for the public landowner.
- Minimize haulage distance to optimize mining costs.
- Produce a flexible mining schedule, which will provide the operator mining options through the accessibility of multiple faces in the relatively confined individual mining areas. This is critical for optimization of the coal cleaning operation and internal project economics.
- Schedule pit development to permit progressive reclamation, thereby establishing visual credibility with local stakeholders, and minimizing reclamation materials handling costs by direct placement.
- Design the water management facilities for the project as a closed loop, thereby maximizing the potential for water license compliance.

2.8 MINE EQUIPMENT

Based on Norwest's current understanding of the pit geology, site configuration and project economics, two Cat 777 class end-dump truck fleets were proposed for waste mining. In Norwest's judgement, a Cat 777 sized truck fleet would allow for waste mining at reasonable unit costs while meeting desired production levels. A single fleet comprised of larger sized trucks was considered but it was thought prudent to utilize two smaller sized fleets rather than one large scale fleet. The dual waste fleet provides better flexibility in the mining operation as waste removal is not limited to one active face in one pit. In addition, productivity is more consistent as the loading units can be scheduled such that if one shovel is in a low productivity area, i.e. mining of interburden between coal seams or development benches, the other shovel can be placed in a highly productive overburden face.

The waste loading unit was assumed to be a Hitachi EX2500 class machine configured as a shovel front with a $15m^3$ bucket. Consideration was given to the backhoe configuration for this machine but owing to the large proportion of steeply dipping strata, the shovel front was selected.

For coaling operations, a 40 tonne unit body construction hauler was utilized. The 40 tonne truck fleet is required as a result of the road width and haulage distance from the mining area to the coal processing facility. It was assumed that the 40 tonne trucks would be loaded directly in the pit; no staging area was incorporated for normal operations. However, a run of mine coal stockpile will be established near the divide at the north end of the mining area such that the coal operation can continue should weather conditions preclude coal haulage on the main access road.

Coal loading was assigned to $3.8m^3$ sized Cat 345C L hydraulic backhoes. The hoes will be outfitted with quick attach buckets such that they can be utilized for coal loading using $5m^3$ coal buckets or for site ditching when outfitted with the $3.8m^3$ rock bucket.

The equipment model types discussed in this section were selected according to their size and operating methodology in accordance with their suitability to the mining of the Lossan Property. Under no circumstances is this meant to be a recommendation as to the choice of the individual equipment manufacturer; suitable alternatives for each of the noted units are readily available in today's marketplace.

2.8.1 Waste Mining

The waste mining fleet has been configured as follows in order to meet production requirements:

Waste Mining Fleet

Waste Loading: 2 x $15m^3$ shovel front hydraulic excavator (Hitachi EX2500 or equivalent);

Waste Haulage: 11 x 96 tonne capacity rear-dump truck (CAT 777D or equivalent);

Drilling: 1 x Rotary blasthole drill 250mm hole diameter (Driltech D75KS diesel or equivalent).

The flexibility of the hydraulic shovel/truck mining method makes it ideal to accommodate the site conditions at Lossan, namely the complex nature of the geological structure and considerable topographical relief.

2.8.2 Coal Mining

The mine plan requires that a coal fleet be assigned to each mining face therefore each waste fleet would have a corresponding coal mining fleet. An additional backhoe has been included as backup for the coal loading plus for utility clean-up and site ditching. The configuration of the coal mining fleet is as follows:

Coal Mining

Coal Loading: 2 x 345 hp hydraulic backhoe outfitted with quick attach bucket attachment for 3.8m^3 rock bucket or 5m^3 coal bucket (Cat 345C L or equivalent);

Coal Haulage: 10 x 40 tonne, unit body construction end dump haulers.

The backhoe size has been based on the need for selective mining of the thinner coal seams to control dilution and maximize coal recovery. The capacity of the backhoe is less than optimum for loading the 40 tonne capacity trucks but this loss of efficiency is judged an acceptable trade-off to maintain mining selectivity. A focus on selective mining practices will be implemented to ensure recovery of the coal reserves. To reflect the cost impact of such a program, the backhoe productivities have been adjusted and an allowance for additional dozer time has been included. Additional manpower requirements to monitor and conduct regular periodic reconciliations of coal recovery have also been included in the schedule.

In order to meet coal production requirements, it may be necessary to supplement the coal loading capacity with larger waste loading equipment periodically. The larger loading units could be used for mining when thicker coal seams are encountered.

2.8.3 Support Equipment

Support equipment for the project would be required for the following tasks:

- Clean-up and support for in-pit waste and coal loading;
- Movement of waste on rock dumps and resloping of dumps;
- Layering and blending of PAG material on waste rock dumps;
- Maintenance of haulroads;
- Loading and control of raw and clean coal stockpiles;
- Maintenance of the run of mine coal haulroad; and
- Maintenance of mining equipment.

The exact size and configuration of the support equipment fleet would be determined by the mining contractor, however it is expected that the fleet would include the following:

- Cat D10T track-type dozers (or equivalent) for in-pit waste assist and waste dumps;
- D9 track-type dozers (or equivalent) for in-pit coal assist as well as general support work (tailings, soil stripping);
- Motor graders (CAT 16H or equivalent);
- Front end loaders (CAT 992 or equivalent) for plant and loadout support;
- Water truck for road dust control; and
- Various maintenance vehicles: lube truck, heavy forklifts, tow truck, flat deck truck.

Support vehicles required for loading of blastholes would be provided by the blasting contractor. Table 2.5 provides a listing of major mine equipment by year.

TABLE 2.5
CONTRACTOR FLEET MINING ESTIMATE

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 - 10	Years 11 - 14
Waste Trucks								
Caterpillar 777D class	2	7	8	8	11	11	11	8
Coal Trucks								
40 tonne class	0	7	7	7	9	10	8	8
Waste Loading								
Hitachi EX2500 class	1	2	2	2	2	2	2	2
Coal Loading								
Caterpillar 345C class	0	2	2	2	2	2	2	2

2.9 PRODUCTION AND PRODUCTIVITY LEVELS

2.9.1 Operating Efficiency

The proposed Lossan Property mine is planned to operate on a continuous basis, with shutdowns for major holidays. The mine schedule includes a provision to allow for operating delays and maintenance shutdowns.

The operational efficiency allows for all other non-maintenance delays. It is planned that the mine will operate on two twelve hour shifts per day. The time available for the mobile equipment per shift, is allocated as follows;

- Shift change of 30 minute;
- Lunch breaks totalling 60 minutes; and
- Delay time of 30 minutes.

The delay time incorporates time lost due to blasting delays, waiting on equipment or instructions, and safety meetings. The total operating efficiency is 83%, which is equivalent to 10 hours working out of a 12 hour shift.

2.9.2 Equipment Productivity

To determine truck fleet sizes, the total available hours for each unit were reduced by a 86% mechanical availability factor. The resulting available annual operating hours are approximately 6,000. Table 2.6 lists annual operating hours by major equipment. Truck hours were calculated by conducting load and haul simulations utilizing Caterpillar's FPC haulage simulation computer software program. The resulting cycle times were then used in conjunction with the scheduled coal and waste volumes to determine the truck productivity values and fleet size. Speed limits of 40km/hr were imposed on the haul fleet. The waste haulage simulations were conducted to estimate the travel time of the truck. Fixed waiting, loading and dumping times were added to project the full cycle time of the unit. Finally, an efficiency factor of 95% was applied to the truck productivity to account for delays resulting from bunching of the truck fleet and road conditions.

For run of mine coal haulage, haulage simulations were conducted to determine the cycle time from the coal face to the permanent coal haul road. An average speed of 50km/hr was used to calculate cycle times on the main access road. As was the case for the waste haul calculations fixed waiting, loading and dumping times were added to project full cycle haulage times.

TABLE 2.6
MAXIMUM ANNUAL OPERATING HOURS BY MAJOR EQUIPMENT

Primary Mining Equipment	Mechanical Availability	Operating Efficiency	Annual Operating Hours
WASTE MINING			
EX2500 Front Shovel	90%	83%	6400
10" Production Drill (D75KS)	85%	83%	5970
Dozer D10T/D9T	86%	83%	6060
Cat 777D	86%	83%	6060
COAL MINING			
Cat 345C L or equivalent	86%	83%	6060
Dozer D9T	86%	83%	6060
40 tonne haulers	86%	83%	6060
MINE SUPPORT EQUIPMENT			
Grader - bench/roads (16H)	86%	83%	6060
Water Truck/Sander (631)	85%	83%	6060
Backhoe-ditching etc (345)	86%	83%	6060
RECLAMATION EQUIPMENT			
Dozer D10T	86%	83%	6060
Grader - reclamation (16H)	86%	83%	6060
COAL PROCESSING PLANT			
Plant/Loadout Loader Cat 992	86%	83%	6060
Loadout Dozer D9T	86%	83%	6060
40t Truck Plant Refuse Haul	86%	83%	6060

Estimates have been prepared for equipment production and productivity based on the mine layout and Norwest's current understanding of planned production targets and plant capacity. Productivity levels have been evaluated based on the following parameters:

- 10m bench heights for waste loading;
- 5m bench heights for coal loading;
- 24 hour production, two 12 hour shifts; and
- 85 – 90% availability on major equipment.

Table 2.7 shows typical truck cycle times and hourly productivity levels.

TABLE 2.7
TYPICAL YEARLY CYCLE TIMES

Year	Coal 40 Tonne Hauler		Waste CAT777D	
	Cycle Time (min)	Productivity (ROMt/op hr)	Cycle Time (min)	Productivity (Bcm/op hr)
-1	N/A	N/A	15.4	156
1	68.7	34.9	13.4	179
2	71.4	33.6	12.6	190
3	75.5	31.8	11.2	214
4	84.8	28.3	14.1	171
5	86.2	27.8	14.7	164
6 - 10	77.8	30.9	13.2	182
11 - 14	77.8	30.9	13.2	182

The hydraulic shovel productivity for the waste fleets was calculated using the following criteria:

- Bucket size 15m^3;
- Fill factor 90%;
- Material swell 125%;
- Number of passes per load – 4; and
- Loading cycle 35 seconds per pass.

The productivity of the coal loading units was set at one half the ROM feed rate of the processing facility. This is thought to be a conservative approach but was implemented to provide additional backhoe time for coal cleaning. The projected hourly productivities for the waste and coal loading units are shown in Table 2.8.

TABLE 2.8
LOADING UNIT PRODUCTION

Fleet	# of units at full production	Waste Production (bcm/op hr)	Coal Production (ROMt/op hr)
Waste fleet	2	950	n.a.
Coal mining fleet	2	n.a.	200

It should be noted that these production levels represent production capacities based on the mine plan which requires some assumption of typical conditions over the mine life. As more detailed mine planning and evaluation work is completed and experience is gained during mine operations, more accurate productivity estimates for specific conditions can be made. In addition, production levels will vary as mining progresses throughout the property due to a variety of factors including changing pit geometries, haul distances, production constraints and other factors.

2.10 MINE MAINTENANCE

On-site mine maintenance will be conducted by the mining contractor. It will consist of a full scale preventative maintenance program for all production and support equipment. It has been assumed that all servicing, as well as any component change-outs will be conducted at the mine site by the contractor. Suitable maintenance facilities have been specified in this study to ensure that the full scale maintenance program is viable.

2.11 DRILLING AND BLASTING

2.11.1 Production Blasting

Drill and blast operations will be carried out on a continuous basis as part of the normal mining operation and 85% of the mine waste material is projected to require blasting. Once full mine production levels are reached, drilling and blasting of approximately 6.4 million bcm to 9.7 million bcm per year will be required to maintain production levels.

Blast design parameters were developed for the Lossan Property and included initial recommendations for the 250mm diameter drillhole size. A summary of the design parameters are listed in Table 2.9.

TABLE 2.9
LOSSAN BLAST DESIGN PARAMETERS

Parameter	Value
Borehole Diameter	250 millimetres
Explosive	85% ANFO/ 15% Emulsion
Pattern	6.5 x 7.5 Staggered
Bench Height	10 metres
Sub-drill	1.25 metres (no sub-drill at coal)
Collar Stemming	5 metres
Volume Blasted/Hole	488 BCM
Powder Factor	0.68 kilograms per BCM

Emulsion or plastic liners will be used for wet holes. For design and costing purposes it has been assumed that approximately 15% of the holes will be wet. Pattern spacing may have to be reduced when drilling through the harder sandstone and conglomerate layers. Based on experience at other mines in the region, powder factors in the harder sandstones and conglomerates could be expected to increase to approximately 0.7-0.9kg/bcm.

No blasting is planned through the coal seams. Production drilling will be stopped at the coal seam contact to minimize disturbance to the coal, and adjusted as conditions require.

2.11.2 Wall Control Blasting

Footwall blasting is designed to ensure the integrity of the footwall design and limit disturbance to the competent footwall sandstone. The final design row adjacent to the footwall will have no sub-grade. Depending on the strength of footwall material, the powder factor and hole spacing may be adjusted. Final design parameters for the footwall blasts will be a function of experience gained in the pit during initial mine operations.

Similarly, blast designs for the final highwall (design row) will be adjusted to reflect pit conditions. However, with bedding typically dipping in the range of 60 -70 degrees, it will likely require a tighter spacing and lighter loading on this design row. The blast sequence may require a post-shear or cushion blasting to achieve desired results.

2.11.3 Drilling Productivity

Drill productivity estimates developed for the 250mm diameter drill were based on data from drill performance at western Canadian coal mines as well as information provided by drilling suppliers. Typical drilling rates for the rock types found in the Lossan Property pit areas range from 18 – 20m per hour in hard sandstones to 23 – 25m per hour in softer sandstones

trains. WCCC product stockpile is on the western side of the facility, while the Cline stockpile area is on the eastern edge, closest to the rail loop. Both will have independent reclaim facilities; however the inclined conveyor will be shared by both facilities.

4 INFRASTRUCTURE AND MINE DEVELOPMENT

4.1 INTRODUCTION

This section describes the infrastructure that will be needed to support the mining and processing activities, reviews the personnel requirements and presents the mine development schedule that has been used as a basis for developing the project economics. The plant site and loadout area is developed near Falling Creek Flats and includes the rail loop, loadout and administration building. The warehouse and maintenance facilities will be located at the northern portion of the mining area between Pits 3 and 2A. The wash plant reject disposal area will be located on the west side of Beaudette Creek on a gently sloping plateau. Access to the disposal area will require a crossing over the creek.

4.2 PROJECT INFRASTRUCTURE

The facilities that will be used for the Lossan operation entail a new rail-load out facility, heavy media process plant, maintenance shop and administration office complex, 25 kV power line, water management structures, ROM coal haul road and initial pit access routes. Prior to development of the site, clearing and grubbing will be required along with logging of any salvageable timber.

A brief review that pertains to these facilities is included below; a more detailed discussion of the process plant and coal handling facilities is contained in Section 3.

4.2.1 Rail Load-Out Handling Facilities

Cline Mining is currently negotiating with Western Canadian Coal Corp. to jointly develop a coal transhipment facility in the Falling Creek Flats area. Clean coal will be conveyed from the coal processing plant located immediately south of the loadout facility at a projected rate of 1.0 million product tonnes per annum. The concept for the loadout facility include a travelling stacker, a trap loader reclaim operation using dozers, and a railcar loadout facility with weigh scale. Figure 3-14 shows the location of the rail loop and process plant. Drawings and more detailed description are contained in Section 3.

4.2.2 ROM Coal Haul Road and Powerline

Currently, the mine site is accessed via an all-weather gravel road referred to as the Boulder Road. The maintenance of this road is the responsibility of industrial users and Cline Mining will have to accept responsibility for a major portion of required road maintenance based on their planned extension to Falling Creek Flats. It may be possible to collect a user fee for this road from industrial users operating in the vicinity but no allowance for this has been included in the costing model for this study. This existing road and the planned extension

would be used for the clean coal haul to the Cline Mining rail load-out during mining operations. The current total haul distance ranges from 22km to 27km, depending on the pit being mined.

The extension of the Boulder Road has been designed by Allnorth Consultants Limited and is documented in the November 2005 report entitled "Beaudette Creek Mainline Preliminary Road Design".

The mining pits for the Lossan Property will not be electrified; all mining and support equipment has been specified as diesel powered. However, power will be required for the loadout, processing facilities and office complex located near Falling Creek Flats. This can be accomplished through an extension of a 25kV power line from Pine Valley's Willow Creek mine site to the rail load-out at Falling Creek Flats and then a short distance to the preparation plant, shops and offices. Approximately 14.2km of line would be constructed adjacent to the existing rail line and access road right-of-way to the rail load-out and a further 1.5km to the Lossan property. The maintenance facility and warehouse located near the mine will be supplied electricity via a natural gas or diesel powered generator.

4.2.3 Coal Processing Facilities and Support Buildings

A new 400 tonne per hour capacity coal preparation plant and associated coal handling system is planned for the Lossan Property. The plant site will be located in the Falling Creek area shown on Figure 1-1, which is relatively flat ground and down-slope from the Lossan Property mine area.

The main components of the new process facility include a raw coal handling system, the wash plant, refuse bin/conveyor system and a clean coal bin/conveyor system. These facilities are described in detail, complete with drawings in Section 3. The current plan calls for a cut and fill to accommodate these facilities.

Mine support facilities will also be located within the mine area. The current plan is to build an integrated facility for mining office space, warehouse and maintenance facility as shown in Figure 4-1. It is envisaged that the building would consist of a layout that provides the following functions:

- The mine/maintenance personnel will use a small office and meeting room (floor space of 186m^2). The structure will consist of modular trailer units.
- The mine shop will consist of three large truck bays capable of handling "box up" maintenance. An overhead crane will be installed in the shop to allow for removal of

large mechanical components. The area of the maintenance workshop is estimated at 660m^2 built to a two story height to allow room for the overhead crane;

- A warehouse for spare parts and consumable materials will be provided in an insulated tent structure located adjacent to the maintenance shop. The structure will also provide space for a tool crib, ambulance parking and tool storage. The warehouse will cover approximately 1,400m^2.

A small administrative office, comprised of modular trailers, will be assembled near the plant site. The office space will consist of approximately 370m^2. The office will provide a mustering area for the mine and maintenance personnel before they are shuttled up the hill to the maintenance shop and mine. During detailed design, requirements for this facility can be re-evaluated. It may be more desirable to situate the administration building at a different location.

4.2.4 Water Management Facilities

The current sediment pond facility locations are shown in a conceptual manner on Figure 2-1. The figure shows that there are two water management structures required to manage run-off from the disturbed mine and disposal areas for the Lossan Property. Construction of the embankment structures will be carried out using suitable overburden material from the upper benches of the pits, which conforms to the usual Western Canadian coal mining practice. Additional site investigation and more detailed engineering evaluations are required to support the design and to meet regulatory requirements. The ponds must also be properly sized to meet upstream drainage capacity. As a result, the size and locations of the ponds are proposed locations and may be subject to change.

4.3 PROJECT DEVELOPMENT SCHEDULE

The current project development schedule assumes the Lossan Property will prepare and submit a full scale mine permit application in 2006 such that the 1.0 million clean tonne production capacity of the mine can be attained by 2008. The schedule is subject to acquiring an Environmental Assessment Certificate and Lossan Property Permit prior to production. Major milestones in the Lossan Property development are summarized in Table 4.1.

Table 4.1
PROPOSED MINE DEVELOPMENT SCHEDULE

Time Period	Event Description
2006 First Quarter	Full mine permit application submitted.
2006 Third Quarter	Full mine permit received for Lossan
2006 Fourth Quarter	Commence detailed engineering for mine and plant.
2007 Second and Third Quarters	Joint venture rail loop and loadout facility is constructed. Beaudette Creek Mainline Road construction commences. Coal washing facility construction commences; Beaudette Creek crossing constructed in preparation for rejects disposal. Mine maintenance/office complex construction commences. Original mine fleet arrives and begins pre-stripping.
2007 Fourth Quarter	Loadout, washery, maintenance facilities completed. Site infrastructure completed.
2008 First Quarter	Second small mine fleet arrives and begins mining. Mine production commences at 1.0 million tonnes/annum.

4.4 MANPOWER SCHEDULE

Cline Mining has proposed to utilize contractors for mine operations and maintenance at the Lossan Property operation. Process plant operations, train loading, technical and administrative roles would be handled by Cline Mining employees.

The requirements for staff and hourly personnel for each area of the mine are discussed in more detail in the following sections.

Salary Personnel

The contract operator is expected to provide all on site salaried personnel related to mining and maintenance. Norwest estimates that Cline Mining would need 11 administrative and technical personnel and three staff in the preparation plant during Lossan Property operations. The number of salary personnel at full production levels is estimated to be 14 for Cline and 13 for the mining contractor. In addition 50% of an accountant's time has been provided for in the contactor's totals. Table 4.2 provides a breakdown of the positions, numbers and total salary for Cline Mining while Table 4.3 details the contractor's staff.

The shift schedule of the salary personnel is dependent upon their position. Mine operations foreman would work with the production crew they are responsible for on a 12 hour, 4 days on/4 days off shift. Cline's staff would work an 8 hour shift, 5 days per week.

TABLE 4.2
CLINE MINING STAFF PERSONNEL REQUIREMENTS

Salary Position	Manpower
Administration	
General Manager	1
Administration Assistant	1
Accounting Clerk	1
Contractor Administrator	1
Technical	
Planning Engineer	1
Surveyor	1
Technician/Grade Control	4
Environmental Technologist	1
Coal Processing	
Plant Supervisor	1
Plant Foremen	2
Total	**14**

TABLE 4.3
MINING CONTRACTOR STAFF PERSONNEL REQUIREMENTS AND COST

Salary Position	Manpower
Mine Operations	
Mine Superintendent	1
Mine Foremen	4
Mine Maintenance	
Mech/Elect Superintendent	1
Foremen	2
Accountant	0.5
First Aid/Security	4
Clerk	1
Total	**13.5**

Hourly Personnel

The mining contractor (or his sub-contractor) is responsible for providing hourly personnel for mining and reclamation activities. Personnel levels increase from 66 people during mine development to 201 people at peak production but a gradual reduction in personnel levels will occur as waste production decreases towards the end of the mine life.

It is expected that some personnel will remain on-site following the cessation of production to carry out reclamation activities. Hourly personnel will work 12 hour shifts, 4 days on/4 days off. Hourly personnel costs are included in the site unit costs.

Cline will operate the preparation plant with an hourly workforce of 19. These workers will work 8 hour shifts, 5 days per week.

Figure 2-2
Yield vs Specific Gravity

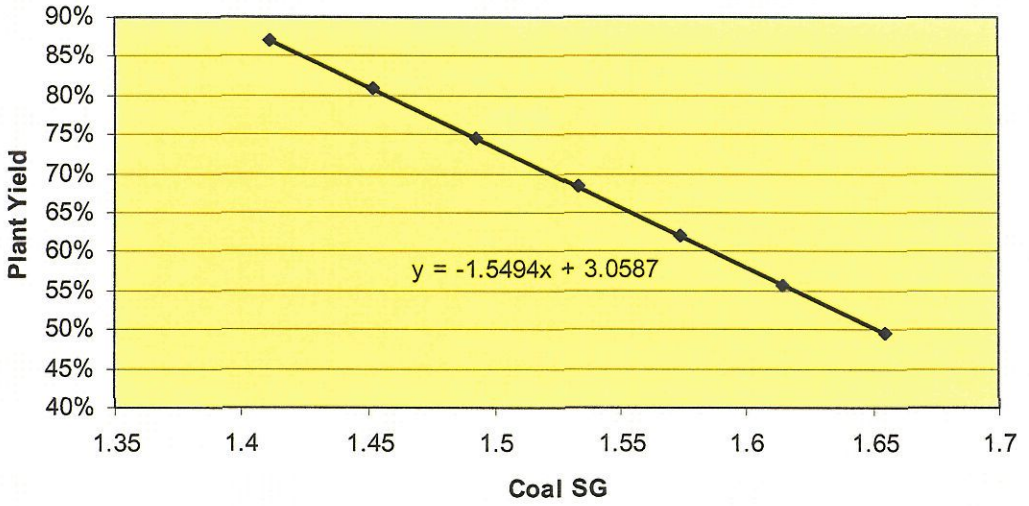
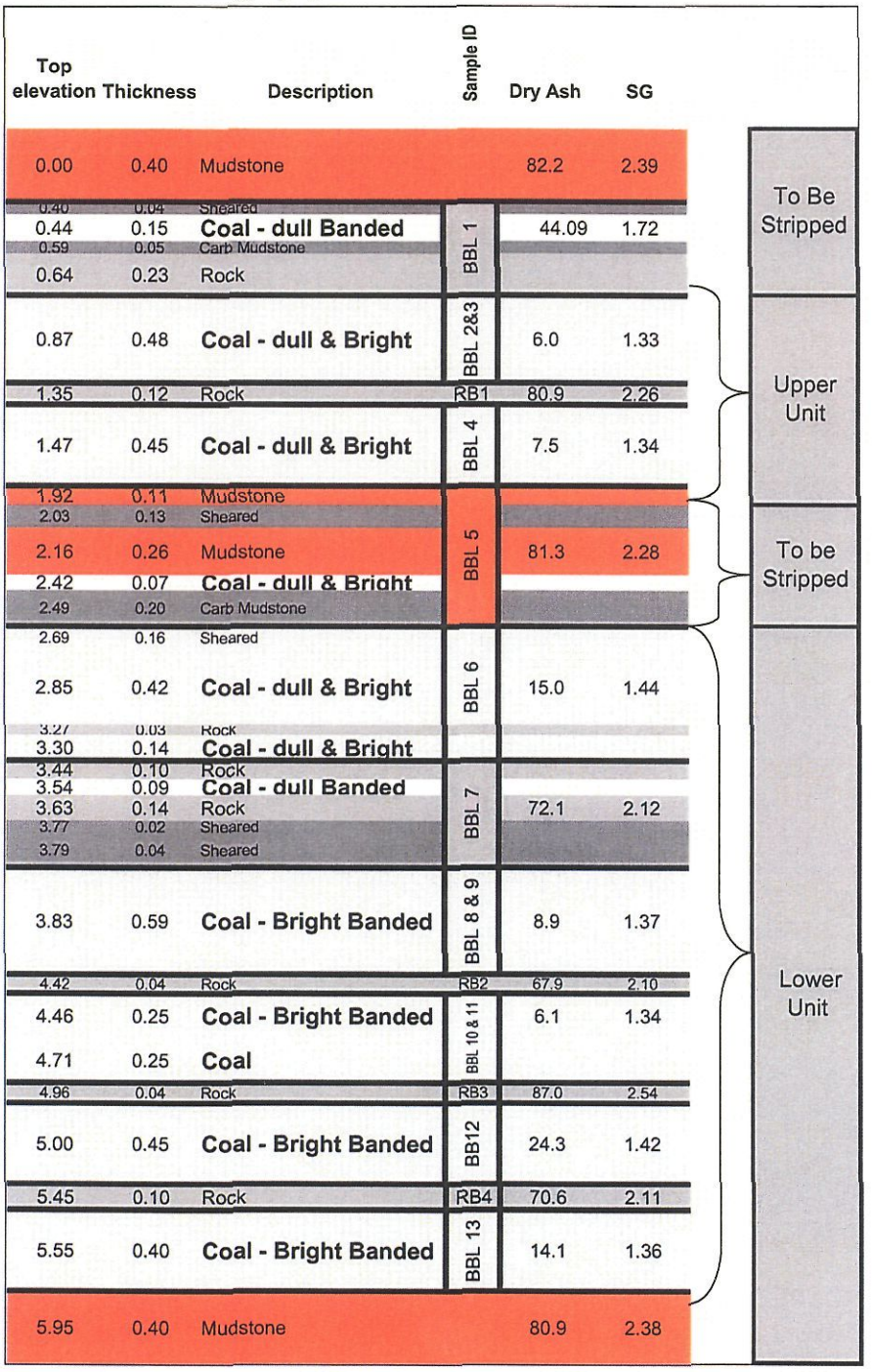


FIGURE 3-1 Stratigraphy of Lossan Seam 1



LOSSAN COAL PROJECT
FEASIBILITY STUDY
VOLUME 4

OPERATING AND CAPITAL COSTS/ PROJECT ECONOMICS/ CONCLUSIONS AND RECOMMENDATIONS

Submitted to:
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1 OPERATING AND CAPITAL COSTS

This section describes the basis for estimation of operating and capital costs covering all areas from mining and processing to rail loadout.

Costs have been drawn from a variety of sources including:

- Norwest's internal cost database;
- Independent qualified third party estimates and cost data; and
- Confidential cost data provided by Cline Mining.

Capital and operating cost estimates have been prepared for the major cost items and activities of this feasibility level mine design.

1.1 OPERATING COSTS

Table 1.1 and Figure 1-1 summarize site costs on a year by year basis. Total site operating costs vary from $48.89/cmt to $64.05/cmt and averages about $60.00/cmt over the production period.

Operating costs for the Lossan Property have been based on various sources including:

- Manufacturer/supplier cost estimates;
- Independent cost databases and publications;
- Norwest's internal cost database; and
- Quotes or estimates provided by Cline Mining.

Hourly wage rates and salaried personnel costs typical of a surface mine in the Rocky Mountains of Western Canada were utilized based on published data (Western Mine Engineering, 2005). Payroll burden and benefit cost were calculated based on the current mandated government rates for employers and estimates for the costs of typical employer sponsored fringe benefits.

TABLE 1.1
SITE OPERATING COST SUMMARY

Lossan Project - Cline Mining Corporation Operating Costs																	
Project Year	Year-1	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10	Year11	Year12	Year13	Year14	Year15	
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total/Avg
Waste Pit Production (BCM 000's)	1,200	7,593	9,127	10,298	10,583	10,377	11,451	11,451	11,451	11,451	11,451	8,934	8,934	8,934	8,332		141,569
ROM Coal Production (tonnes 000's)	0	1,280	1,278	1,283	1,417	1,505	1,376	1,376	1,376	1,376	1,376	1,394	1,394	1,394	1,300		19,126
Met Clean Coal Production at 8% moisture(tonnes 000's)	**0**	**722**	**623**	**558**	**561**	**576**	**536**	**536**	**536**	**536**	**536**	**669**	**669**	**669**	**624**		**8,349**
PCI Clean Coal Production at 8% moisture(tonnes 000's)	**0**	**298**	**397**	**462**	**459**	**445**	**485**	**485**	**485**	**485**	**485**	**352**	**352**	**352**	**328**		**5,871**
Yield at 6% Moisture		78%	78%	78%	71%	66%	73%	73%	73%	73%	73%	72%	72%	72%	72%		73%
Met Clean Coal Production at 6% moisture(tonnes 000's)	0	708	611	547	550	564	525	525	525	525	525	655	655	655	611		8,181
PCI Clean Coal Production at 6% moisture(tonnes 000's)	0	292	389	453	450	436	475	475	475	475	475	345	345	345	321		5,752
Strip Ratio (BCM/tClean) at 6% Moisture)		7.59	9.13	10.30	10.58	10.38	11.45	11.45	11.45	11.45	11.45	8.93	8.93	8.93	8.93		10.16
Site Costs ($000's)																	
Contract Mining	7,563	43,515	47,756	50,809	57,790	58,991	57,943	57,943	57,943	57,943	57,943	50,226	50,226	50,226	47,475	11,362	765,655
Processing	0	3,921	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,921	3,921	3,921	3,771	0	54,734
Loadout		200	200	200	200	200	200	200	200	200	200	200	200	200	200		2,800
Admin	1,130	2,260	2,260	2,260	2,260	2,260	2,262	2,258	2,258	2,258	2,258	2,258	2,258	2,258	2,258		32,754
Total Site	**8,693**	**49,895**	**54,136**	**57,189**	**64,170**	**65,371**	**64,325**	**64,321**	**64,321**	**64,321**	**64,321**	**56,604**	**56,604**	**56,604**	**53,704**	**11,362**	**855,943**
Site Costs $/t clean 8% Moisture																	
Contract Mining		42.64	46.79	49.78	56.62	57.80	56.77	56.77	56.77	56.77	56.77	49.21	49.21	49.21	49.88		53.84
Processing		3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.96		3.85
Loadout		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21		0.20
Admin		2.21	2.21	2.21	2.21	2.21	2.22	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.37		2.30
Total Site		48.89	53.04	56.03	62.87	64.05	63.03	63.02	63.02	63.02	63.02	55.46	55.46	55.46	56.42		60.19

TABLE 1.2
SUMMARY OF HOURLY AND STAFF BASE LABOUR RATES

Job Description	Job Level	Rate $/Hr or Salary
Shovel Operators,Senior Process Operators	H1	$28.15
Senior Equipment Operators, Senior Loader Operators, Senior Service Operators	H2	$27.80
Drillers, Senior Drivers, Loader Operators,Intermediate Process Operators	H3	$27.20
Equipment Operators, Blaster, Truck Driver, Drill Helper	H4	$26.50
Jr. Process Operator	H5	$25.50
General Labour	H6	$21.00
Journeyman Trades	M1	$29.50
Warehouseman	M2	$28.15
Senior Service Operator	M3	$27.80
Tireman, Pit Serviceman	M4	$25.50
General Shop Labour	M5	$20.00
General Manager		$166,300
Mill Manager		$118,600
Mine Superintendent		$102,400
Mech/Elect Superintendent		$94,500
Mine Foreman		$83,200
Mtce Foreman		$83,200
Mill Foreman		$79,100
Contract Administrator		$73,100
Accountant		$73,100
Planning Engineer		$70,100
Surveyors		$53,500
Technician/Grade Control		$53,500
Environmentalist Tech		$44,000
First Aid/Security		$43,000
Mtce Clerk		$43,200
Administrative Assistant		$38,600
Accounting Clerks AP,AR,Payroll		$37,500

TABLE 1.3
SUMMARY OF PAYROLL BURDEN AND BENEFIT RATES

Item	Rate
Canada Pension Plan	4.95% of wages (Maximum $$37,600)
Employment Insurance	2.73 % of wages (Maximum $39,000)
Medical Services Plan	$108/mo/employee
Workman's Compensation	3.26% of wages (Maximum $61,300)
Health, Life, Disability etc	$4,500/year/employee
Retirement-Money Purchase	4% of wages

Operating costs were developed based on assuming operating conditions representative of Western Canadian Mountain coal mines and the following commodity price assumptions:

- Diesel Fuel $0.75/litre
- Lubricants $ 2.20/litre
- AECO Natural Gas $5.75/GJ
    - ANFO $42.00 per 100kg
    - Emulsion $60 per 100kg

1.1.1 Equipment Costs

Equipment costs per Net Operating Hour (NOH) were used in conjunction with the waste and coal mining schedule to develop unit costs for these activities. Haul cycle simulations were generated for selected periods of mining to provide representative estimates of waste and coal haul truck productivity for use in costing. Table 1.4 lists the cost per net operating hour used to develop the mining unit costs for the major pieces of equipment. This table includes the ownership costs but not contractor profit which is dealt with separately. Ownership costs are based on the expected economic lives of the equipment in hours. Equipment costs for support equipment are also determined on an hourly basis and an estimate of annual hourly usage. Ownership costs for the support equipment are based on the equipment life in years, from 4 to 10 years or life of the project. The maintenance shop ownership cost is based on the project life. The support equipment operating cost is approximately $2.1 million annually, while the ownership cost of this equipment and the shop is calculated at $0.8 million per year.

TABLE 1.4
EQUIPMENT COST PER NET OPERATING HOUR

Equipment Type	M&S	Mtce Labour	Operator Labour	Ownership	Total
EX2500 Front Shovel	$329.79	$51.21	$44.78	$68.33	$494.11
Cat 345 Excavator	$71.45	$14.76	$44.78	$16.33	$147.32
Cat 992G Loader	$145.64	$21.73	$44.78	$34.53	$246.69
Cat 777D Haul Truck	$116.62	$10.39	$41.48	$20.29	$188.77
D75KS 250mm Drill	$140.34	$28.64	$42.91	$25.42	$237.31
Cat 14 H Grader	$43.26	$11.59	$43.92	$17.71	$116.48
Cat 16H Grader	$57.88	$14.06	$43.92	$23.71	$139.58
D10T Dozer	$123.70	$17.80	$42.91	$38.09	$222.50
D9T Dozer	$87.93	$14.19	$42.91	$33.14	$178.18

TABLE 1.5
UNIT COSTS FOR CONTRACT MINING OVER PROJECT LIFE

Activity	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Total/ Average
Total Contract Waste Cost	$/BCM	$3.32	$3.00	$2.91	$2.78	$3.04	$3.10	$2.97	$2.97	$2.97	$2.97	$2.97	$2.96	$2.96	$2.96	$2.98	$0.00	$2.97
Total Contract Coal Cost	$/RMT	$0.00	$9.15	$9.47	$9.92	$10.97	$11.13	$10.18	$10.18	$10.18	$10.18	$10.18	$10.18	$10.18	$10.18	$10.18	$0.00	$10.18
Total Contract Reclamation Cost	$/HA	$0	$0	$0	$18,073	$17,985	$17,978	$18,076	$18,076	$18,076	$18,076	$18,076	$17,986	$17,986	$17,986	$18,115	$18,105	$18,090
Total Contract Reject Haul Cost	$/t Reject	$0.00	$2.77	$2.79	$2.74	$2.06	$1.80	$2.21	$2.21	$2.21	$2.21	$2.21	$2.14	$2.14	$2.14	$2.14	$0.00	$2.23
Other Costs, Support Costs, Supervision,Overheads	$/Month	$149,104	$689,892	$692,822	$703,984	$743,092	$742,949	$738,477	$738,477	$738,477	$738,477	$738,477	$706,539	$706,539	$706,539	$696,368	$130,501	$720,079

1.1.2 Mining Costs

Key mining operation unit costs are summarized in the table below as developed by Norwest from first principles. The mine pre-stripping and waste fleet costs are for the CAT 777 class haul truck and the Hitachi EX2500 hydraulic shovel.

A focus on selective mining practices will be implemented to ensure recovery of the coal reserves. To reflect the cost of such a program, additional dozer hours in conjunction with the small hydraulic backhoes utilized to selectively clean the seams have been assumed for the project. Manpower requirements to monitor and conduct regular periodic reconciliations of coal recovery have also been included. This is an owner cost reported in administration and overhead.

For a detailed breakdown of equipment hours and productivities used see Volume 3, Section 2. Table 1.5 provides a summary of the mining unit costs over the project life.

Contractor profit is estimated at a flat 20% of operating and ownership costs and is included in the numbers that appear in Tables 1.1 and 1.5.

1.1.3 Coal Process and Handling

Table 1.6 summarizes the coal processing, handling and loading costs for the Lossan Property as developed by Norwest. Since train loading would be every 3 or 4 days on average, full time workers at the load-out would be limited. Preparation plant personnel would be made available to assist with the task.

TABLE 1.6
AVERAGE COAL PROCESS AND HANDLING COSTS

Processing and Handling - Full Plant ($/cmt 6% moisture)	$3.93
Rail Load-out Costs ($/cmt 6% moisture)	$0.20

1.1.4 Personnel Costs

Cline Mining has proposed to utilize contractors for mine operations and maintenance at the Lossan Property operation. Process plant operations, train loading, technical and administrative roles would be handled by Cline Mining employees.

The requirements for staff and hourly personnel for each area of the mine are discussed in more detail in the following sections.

Salary Personnel

The contract operator is expected to provide all on site salaried personnel related to mining and maintenance. Norwest estimates that Cline Mining would need 11 administrative and technical personnel and three staff in the preparation plant during Lossan Property operations. The number of salary personnel at full production levels is estimated to be 14 for Cline Mining and 13 for the mining contractor. In addition 50% of an accountant's time has been provided for in the contactor's totals. Table 1.7 provides a breakdown of the positions, numbers and total salary for Cline Mining while Table 1.8 details the contractor's staff.

The shift schedule of the salary personnel is dependent upon their position. Mine operations foreman would work with the production crew they are responsible for on a 12 hour, 4 days on/4 days off shift. Cline Mining's staff would work an 8 hour shift, 5 days per week.

Salary costs were based on salary levels for mining personnel in a British Columbia mountain coal mine provided in the 2005 "Canadian Mines Salaries/Wages/Benefits" (Western Mine Engineering, 2005). Contractor profit is not included in salary costs in Table 1.8.

TABLE 1.7
CLINE MINING STAFF PERSONNEL REQUIREMENTS AND COST

	Number	Salary	Overtime	Total Burden	Burden as % of Salary Net of Vacation, Stats	Total Staff Labour Cost
			4%			
Admin Staff						
General Manager	1	$166,300		$17,372	23%	$183,672
Administrative Assistant	1	$38,600		$11,390	44%	$49,990
Accounting Clerks AP,AR,Payroll	1	$37,500		$11,225	44%	$48,725
Contract Administrator	1	$73,100		$13,644	32%	$86,744
Total Admin	**4**				**30%**	**$369,131**
Technical						
Planning Engineer	1	$70,100		$13,524	33%	$83,624
Surveyors	1	$53,500	$2,140	$12,692	36%	$68,332
Technician/Grade Control	4	$53,500	$2,140	$12,692	36%	$273,326
Environmentalist Tech	1	$44,000	$1,760	$11,987	40%	$57,747
Total Technical Services	**7**				**33%**	**$483,029**
Total Admin Labour Cost	**11**					**$852,160**
Mill A&G						
Mill Coal Professional	1	$118,600		$15,464	26%	$134,064
Foreman	2	$79,100		$13,884	31%	$185,969
Total Mill	**3**				**30%**	**$320,033**

TABLE 1.8
MINING CONTRACTOR STAFF PERSONNEL REQUIREMENTS AND COST

	Number	Salary	Overtime	Total Burden	Burden as % of Salary Net of Vacation, Stats	Total Staff Labour Cost
Mine A&G						
Mine Operations						
Mine Superintendent	1	$102,400		$14,816	27%	$117,216
Foreman	4	$83,200		$14,048	30%	$388,993
Total Mine Operations	**5**				**28%**	**$506,209**
Mine Maintenance						
Mech/Elect Superintendent	1	$94,500		$14,500	28%	$109,000
Foreman	2	$83,200		$14,048	30%	$194,497
Accountant	0.5	$73,100		$13,644	32%	$43,372
First Aid/Security	4	$43,000		$11,844	42%	$219,375
Clerk	1	$43,200		$11,858	42%	$55,058
Total Mine Maintenance	**8.5**				**32%**	**$621,302**
Total Mine A&G Labour Cost	**13.5**					**$1,127,511**

Hourly Personnel

The mining contractor (or his sub-contractor) is responsible for providing hourly personnel for mining and reclamation activities. Personnel levels increase from development to peak production but a gradual reduction in personnel levels will occur as waste production decreases towards the end of the mine life. It is expected that some personnel will remain on-site following the cessation of production to carry out reclamation activities. Hourly personnel will work 12 hour shifts, 4 days on/4 days off. Hourly personnel costs are included in the site unit costs.

Cline Mining will operate the preparation plant with an hourly workforce of 19. These workers will work 8 hour shifts, 5 days per week.

Table 1.9 below summarizes the total annual personnel requirements.

TABLE 1.9
ANNUAL PERSONNEL REQUIREMENTS AND LABOUR COST

Lossan Project - Cline Mining Corporation Labour Summary																	
Project Year		Year-1	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10	Year11	Year12	Year13	Year14	Year15
Year	Units	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Labour Cost																	
Contract Mining	k$	2,263	8,733	9,425	9,987	11,090	11,134	11,371	11,371	11,371	11,371	11,371	9,647	9,647	9,647	9,300	2,167
Processing	k$	-	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	-
Loadout	k$		85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Contract Truck Haul to Plant	k$	-	1,936	2,004	2,118	2,608	2,813	2,336	2,336	2,336	2,336	2,336	2,367	2,367	2,367	2,207	-
Admin	k$	426	852	852	852	852	852	852	852	852	852	852	852	852	852	852	-
Total	**k$**	**2,689**	**13,302**	**14,063**	**14,739**	**16,331**	**16,581**	**16,341**	**16,341**	**16,341**	**16,341**	**16,341**	**14,647**	**14,647**	**14,647**	**14,141**	**2,167**
Total Workforce																	
Contract Mining Coal and Waste	no.	55	105	113	119	133	133	136	136	136	136	136	115	115	115	111	26
Contract Truck Haul to Plant	no.	0	23	24	26	31	34	28	28	28	28	28	29	29	29	27	0
Total Contract Mining	no.	55	128	137	145	164	167	164	164	164	164	164	144	144	144	138	26
Processing	no.		22	22	22	22	22	22	22	22	22	22	22	22	22	22	
Loadout	no.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Admin	no.	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
Total	**no.**	**66**	**162**	**171**	**179**	**198**	**201**	**198**	**198**	**198**	**198**	**198**	**178**	**178**	**178**	**172**	**26**
Staff/Hourly																	
Contactor Staff	no.	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	1
Cline Staff	no.	11	14	14	14	14	14	14	14	14	14	14	14	14	14	14	
Cline Hourly	no.		20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Contractor Hourly	no.	42	115	124	132	151	154	151	151	151	151	151	131	131	131	125	25

1.1.5 General Administration and Overhead Costs

General administration and overhead costs were based on typical requirements needed to service a mine of this size utilizing a mining contractor. Table 1.10 details the general administration and site overhead costs by year.

Items include the following:

- Property taxes have been estimated using published rates for the district of Chetwynd in the current taxation year. The mill rate is 63.885 per $1,000 of assessed property value. Norwest has estimated the assessment value based on the capital estimates for the structures.
- Insurance costs include coverage for general liability, property and business interruption. General liability insurance for $3 to $5 million coverage is estimated at $35,000. Property insurance is estimated at 1% of the capital value and business interruption insurance is 1.5% of the value of two weeks of lost revenue.
- Power demand cost is estimated based on expected base power demand range for the site using British Columbia hydro rates.
- Office supplies and outside services include miscellaneous items and services such as temporary office support, janitorial services and office consumables.

TABLE 1.10
GENERAL ADMINISTRATION AND OVERHEAD COSTS

Period		Year-1	Year 1-14	
Year		2007	2008-21	Total
Property Tax	$	392,268	784,536	11,375,775
Communications	$	3,300	6,600	95,700
Heating	$	1,750	3,500	50,750
Power	$	88,000	176,000	2,552,000
Building Maintenance, Janitorial	$	15,000	30,000	421,000
External Services	$	50,000	100,000	1,450,000
Office Supplies	$	10,000	20,000	290,000
Workers Compensation Insurance	$	-	-	-
General Liability Insurance	$	17,500	35,000	507,500
Property Insurance	$	61,402	122,803	1,780,651
Business interruption Insurance	$	32,842	65,685	952,428
Director & Officers Insurance	$	-	-	-
Travel	$	11,000	22,000	319,000
Coal Licences and Leases	$	20,800	41,600	603,200
Total A&G Non-Labour	$	703,862	1,407,724	20,398,004
Labour	$	426,080	852,160	12,356,326
Total Admin A&G	**$**	**1,129,942**	**2,259,885**	**32,754,329**

1.1.6 Reclamation

The current mine plan allows for progressive reclamation during mine operations. Approximately 705 hectares can be reclaimed during active operations. Because all of the external waste dumps are to be constructed in lifts that are set back to the long term slope requirements of the reclamation plan, the amount of dozer work to recontour the slopes will be minimal. Reclamation costs for these areas have been estimated at an average of $18,100 per hectare. This cost per hectare includes resloping, soil replacement, seeding and revegetation and is typical of costs incurred during reclamation of foothills coal mines. Approximately $250,000 per year is spent on progressive reclamation during mine operations. Most of the work will be completed after mining ceases. Reclamation costs are included in contract mining costs.

Following the completion of mining at the end of Year 14, approximately 541ha will remain to be reclaimed including the plantsite and tailings pond areas. A total cost of approximately $14.0M has been estimated. Of that amount, $11.0M would be spent in Year 15 representing post-closure reclamation, demolition and monitoring costs.

1.2 CAPITAL COST PROFILE

Figure 1-2 illustrates the annual and cumulative capital requirements (including working capital and reclamation bond) to bring the Lossan project into production and to maintain production through the project life. In the order of $57 million will be required over the life of the Lossan Property project. Initial capital of $49 million is required in 2006 and 2007, followed by $8 million in 2008, primarily for working capital. The working capital and the reclamation bond are assumed to be recovered in Year 15 and would fund final reclamation work.

Major capital cost items for the Lossan Property are incurred for construction of the coal process circuit and materials handling system, the shared coal load-out facility and rail loop, new site structures, roads and water management structures (ponds, ditches etc).

Development of the capital schedule is based on developing the mine as quickly as is practical. However options for deferring capital expenditures, by phasing mine expansion stages or other mechanisms should be evaluated in more detail during the detailed design and planning stages. Table 1.11 provides the capital expenditures schedule for the Lossan Property.

TABLE 1.11
CAPITAL COST SUMMARY

Project Year Year	Units	Year-2 2006	Year-1 2007	Year1 2008	Year2 2009	Year3 2010	Year4 2011	Year5 2012	Year6 2013	Year7 2014	Year8 2015	Year9 2016	Year10 2017	Year11 2018	Year12 2019	Year13 2020	Year14 2021	Total
Management L.V.	k$	-	40	-	-	-	-	40	-	-	-	-	40	-	-	-	-	120
Operations L.V.	k$	-	132	-	-	-	132	-	-	-	132	-	-	-	132	-	-	528
Total Minor Equipment	**k$**	**-**	**172**	**-**	**-**	**-**	**132**	**40**	**-**	**-**	**132**	**-**	**40**	**-**	**132**	**-**	**-**	**648**
Preparation Plant	k$	-	26,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26,000
Loadout	k$	-	5,849	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,849
Rail Siding	k$	-	1,875	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,875
Shop,Office, Dry, Warehouse, EMS	k$	-	1,068	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,068
Main Power Line & Substation	k$	-	351	-	-	-	-	-	-	-	-	-	-	-	-	-	-	351
Water Supply and Sewage Treatment	k$	-	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	145
Plant Site Access Road	k$	-	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
Office Furniture	k$	-	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	96
Computer	k$	-	134	-	-	-	-	-	-	-	-	-	134	-	-	-	-	267
Exploration Drilling	k$	500	500	500	500	500	500	-	-	-	-	-	-	-	-	-	-	3,000
Geotechnical Studies	k$	-	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	375
Engineering, Design, Permiting	k$	250	1,375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,625
Water Management(ponds, ditches, culverts)	k$	-	250	250	100	100	100	100	100	-	-	-	-	-	-	-	-	1,000
Initial Pit Access Road Construction	k$	-	3,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,000
Pit Development	k$	-	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
Beaudette Creek Bridge	k$	-	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
Creek &Forestry Rd Diversion	k$	-	-	-	-	-	2,907	-	-	-	-	-	-	-	-	-	-	2,907
Pipeline Relocation	k$	-	-	-	2,743	-	-	-	-	-	-	-	-	-	-	-	-	2,743
Total Other Equipment	**k$**	**750**	**42,118**	**750**	**3,343**	**600**	**3,507**	**100**	**100**	**-**	**-**	**-**	**134**	**-**	**-**	**-**	**-**	**51,401**
All Capital	**k$**	**750**	**42,290**	**750**	**3,343**	**600**	**3,639**	**140**	**100**	**-**	**132**	**-**	**174**	**-**	**132**	**-**	**-**	**52,049**
Contingency @ 10%	**k$**	**75**	**4,229**	**75**	**334**	**60**	**364**	**14**	**10**	**-**	**13**	**-**	**17**	**-**	**13**	**-**	**-**	**5,205**
Total Capital	**k$**	**825**	**46,519**	**825**	**3,677**	**660**	**4,003**	**154**	**110**	**-**	**145**	**-**	**191**	**-**	**145**	**-**	**-**	**57,254**

1.2.1 Plant and Materials Handling System

This capital cost estimate is for the coal processing plant and materials handling system described in Volume 3, Section 3.

TABLE 1.12
PREPARATION PLANT CAPITAL ESTIMATE

ESTIMATE DETAIL SHEET TOTALS	Conveyor Cost $	Total kW	Total Equip Cost $	Total Wt. Equipt. Kg	Total Fab. Plate Wt. Kg	Total Fab. Wt. Struct. Kg	Concrete m^3	Excavation m^3	Fill m^3
Preparation Plant Detail Total	0	1,100	6,252,576	55,202	22,226	18,144	430	2,188	1,340
TOTALS	0	1,100	6,252,576	55,202	22,226	18,144	430	2,188	1,340

COST AREA		UNIT COST	QUANTITY	TOTAL COST $
CIVIL				
EXCAVATION		$10 /$m^3$	2,188 /m^3	$20,934
FILL		$12 /$m^3$	1,340 /m^3	$16,028
CONCRETE		$780 /$m^3$	430 /m^3	$335,196
STEEL & PLATE				
HEAVY STRUCT. STEEL	- SUPPLY	$ 3.86 /kg	18,144 /kg	$70,000
	- INSTALL	$ 1.12 /kg	18,144 /kg	$20,400
FABRICATED PLATEWORK	- SUPPLY	$ 7.58 /kg	22,226 /kg	$168,560
	- INSTALL	$ 4.23 /kg	22,226 /kg	$94,080
EQUIPMENT				
EQUIPMENT	- SUPPLY		from above	$6,252,576
	- SHIP/FRT	$99 /100 kg	55,202 /kg	$54,650
	- INSTALL	$ 2.76 /kg	55,202 /kg	$152,125
CONVEYORS				
SUPPLY & INSTALLATION				$0
PIPING				
PIPING	- SUPPLY			
VALVES	- SUPPLY			
PIPING/VALVES	- Supply and INSTALL	40% equipt	$4,252,576	$1,701,030
ELECTRICAL				
ELECTRICAL	- SUPPLY & INSTALL	$268 /kW	1,099.9 kW	$412,000
CONTROL SYSTEM				$200,000
SUB-STATION/TRANSF.	- SUPPLY & INSTALL			$110,625
			SUB TOTAL	$9,608,204
ESTIMATE COMPLETION FACTOR *		10% sub total		$960,820
TOTAL DIRECT CAPITAL COST				$10,570,000
FEES				
DETAILED ENGINEERING, SUPERVISION DESIGN & PURCHASING		7% direct cost less engineering complete items		$739,900
CONSTRUCTION MANAGEMENT		10% direct cost		$1,057,000
CONTRACTOR OVERHEAD & FEES		8% direct cost		$845,600
ESTIMATED TOTAL PROJECT COST w/o contingency				CDN$13,210,000

TABLE 1.13
MATERIALS HANDLING SYSTEM CAPITAL ESTIMATE

ESTIMATE DETAIL SHEET TOTALS	Conveyor Cost $	Total kW	Total Equip Cost $	Total Wt. Equipt. Kg	Heavy Plate Total Wt. Kg	Total Fab. Plate Wt. Kg	Total Fab. Wt. Struct. Kg	Concrete m^3	Excavation m^3	Fill m^3
Raw Coal Handling Systems	311,000	382	638,739	49,215	54,431	5,897	43,998	94	280	174
Refuse Handling Systems	298,000	60	61,595	6,804	16,783	18,144	36,528	62	552	1,786
Product Handling Systems	2,795,000	654	1,138,530	136,531	0	4,082	13,154	199	98	31
TOTALS	3,404,000	1,095	1,838,865	192,549	71,214	28,123	93,680	354	930	1,991

COST AREA		UNIT COST	QUANTITY	TOTAL COST $
CIVIL				
EXCAVATION		$10 /$m^3$	930 /m^3	8,896
FILL		$12 /$m^3$	1,991 /m^3	23,810
CONCRETE		$900 /$m^3$	354 /m^3	318,715
STEEL & PLATE				
HEAVY STRUCT. STEEL	- SUPPLY	$ 3.86 /kg	93,680 /kg	361,428
	- INSTALL	$ 1.12 /kg	93,680 /kg	105,330
HVY PLATEWORK	- SUPPLY	$ 3.97 /kg	71,214 /kg	282,600
	- INSTALL	$ 3.31 /kg	71,214 /kg	235,500
FABRICATED PLATEWORK	- SUPPLY	$ 7.58 /kg	28,123 /kg	213,280
	- INSTALL	$ 4.23 /kg	28,123 /kg	119,040
EQUIPMENT				
EQUIPMENT	- SUPPLY		from above	1,838,865
	- SHIP/FRT	$99 /100 kg	192,549 /kg	190,623
	- INSTALL	$ 2.76 /kg	192,549 /kg	530,625
CONVEYORS				
SUPPLY & INSTALLATION				3,404,000
PIPING				
PIPING	- SUPPLY			
VALVES	- SUPPLY			
PIPING/VALVES	- Supply and INSTALL	2% equipt	$1,838,865	36,777
ELECTRICAL				
ELECTRICAL	- SUPPLY & INSTALL	$805 /kW	1,095 kW	881,400
CONTROL SYSTEM				
SUB-STATION/TRANSF.	- SUPPLY & INSTALL	$107	1,095 kW	117,520
			SUB TOTAL	8,668,409
ESTIMATE COMPLETION FACTOR *		20% sub total		1,733,682
TOTAL DIRECT CAPITAL COST			$10,400,000	
FEES				
DETAILED ENGINEERING, SUPERVISION DESIGN & PURCHASING		5% direct cost less engineering complete items		520,000
CONSTRUCTION MANAGEMENT		10% direct cost		1,040,000
CONTRACTOR OVERHEAD & FEES		8% direct cost		832,000
ESTIMATED TOTAL PROJECT COST w/o contingency			CDN$12,790,000	

Rail Load-Out Facility

The cost estimate includes all of the facilities for the load-out for the Lossan Property. These include an automated truck dump, new coal stockpiling system, below grade reclaim feeders and a batch weigh load-out structure in addition to earthworks and structures. The costs for this facility are to be shared with Western Canadian Coal Corporation and have been estimated by Westmar Consultants Inc. in their July 2005 report entitled "Coal Transshipment Facility – Falling Creek Flats". Expenditures for items not required for rail loading by Lossan were excluded from the Westmar estimate. This remaining capital estimate was allocated 50% to Lossan.

TABLE 1.14
LOSSAN PROPERTY RAIL LOAD-OUT COST ESTIMATE

	$ M
LOAD-OUT	5.8
RAIL LOOP	1.9

1.2.2 Site Structures

A warehouse and maintenance shop is assumed to be built by the mining contractor and situated in the north end of the mining area is described in Volume 3, Section 4. The administration office located at the plant site will be Cline Mining's cost and is estimated at $1.1 million. The cost includes an electrical generator for the remote shop and warehouse but no equipment or furnishings which are included under mine equipment and facilities.

1.2.3 Water Management

A total of $1.0 million has been estimated for site water management. This amount is spread out over seven years to construct ditches, culverts and ponds. It also includes the engineering required to build these structures. This figure has been based on Norwest's estimate for ditching, culverts and sedimentation ponds for similar projects. An additional allowance has been made for riprap.

1.2.4 Road and Access

A new clean coal haul road from the Lossan Property plant to the plant site at Falling Creek Flats is estimated to cost of $3.0 million and is based on an engineering design report by Allnorth Consultants Limited.

A crossing over Beaudette Creek is planned to allow access from the plant site to the rejects disposal area. The cost of this structure is estimated at $0.3 million.

1.2.5 Water Supply and Sewage Treatment

This cost item at $0.15 million has been added to cover the additional water supply and waste treatment requirements for the administrative office. Costs for water supply to the plant facilities have been included in the process plant capital costs. The sewage treatment costs assume that a common treatment facility is used for both plant and surface facility sewage streams. As well, it assumed that water used for washing of equipment is not directed to the sewage treatment system.

1.2.6 Engineering, Design and Investigation

The cost estimates for this item are intended to cover costs incurred for on-going engineering, geotechnical and environmental work related to permitting and detailed design for the mine. Permits required include the environmental assessment, mine permit, water licenses and effluent discharge. This cost is estimated at $2.0 million.

1.2.7 Exploration Drilling

This cost estimate is for additional drilling on the property and is estimated at $3.0 million.

1.2.8 Power Line Extension

The development of the Lossan Property would include the extension of a 25kV power line from Pine Valley's Willow Creek mine site to the rail load-out at Falling Creek Flats and then a short distance to the preparation plant, shops and offices. Approximately 14.2km of line would be constructed adjacent to the existing rail line and access road right-of-way to the rail load-out and a further 1.5km to the Lossan property. The cost is estimated at $0.35 million for Lossan. Norwest has assumed that 50% of the cost up to the rail load-out will be shared with Western Canadian Coal Corporation.

1.2.9 Miscellaneous Equipment

This cost item is for light vehicles required by Cline Mining site personnel.

1.3 Summary of Capital and Operating Costs

The cost summary tables (see Tables 1.1 and 1.11) summarize all production and costs for the life of mine. It can be seen that the total production over the life of the mine is 19.1Mt of ROM coal which is estimated to produce 14.2Mt of hard coking and PCI product coal at the port (8% moisture). Elsewhere in this report total product coal has been reported at 13.9Mt, which is the tonnage delivered to the rail at 6% moisture. The difference between the reported product tonnage is the moisture gain that will occur at the port. In addition to the product coal, a total of 141.6Mbcm of waste rock and soil are moved.

The total mine operating and overhead cost at site averages about $50 to $65 million annually at full production, which is equivalent to an average over the project life of about $45.00/ROMt or $60.00/product tonne. The total mine capital costs are estimated at $52 million prior to the addition of a contingency and excluding working capital and bonding requirements. This is equivalent to $2.72/ROMt or $3.66/product tonne. A contingency of 10% on capital costs brings the total to $57 million.

Figure 1-1
Site Operating Costs

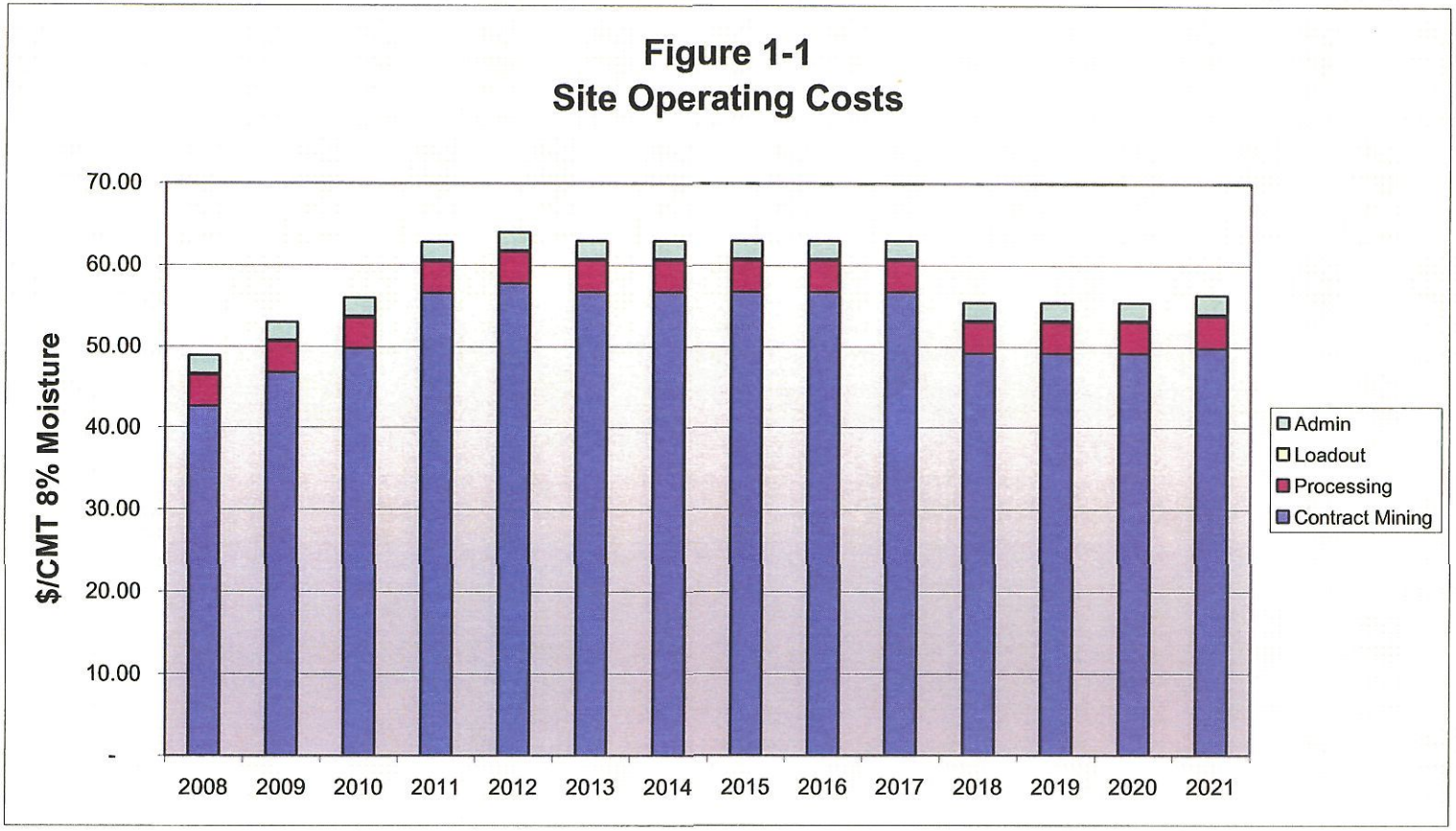
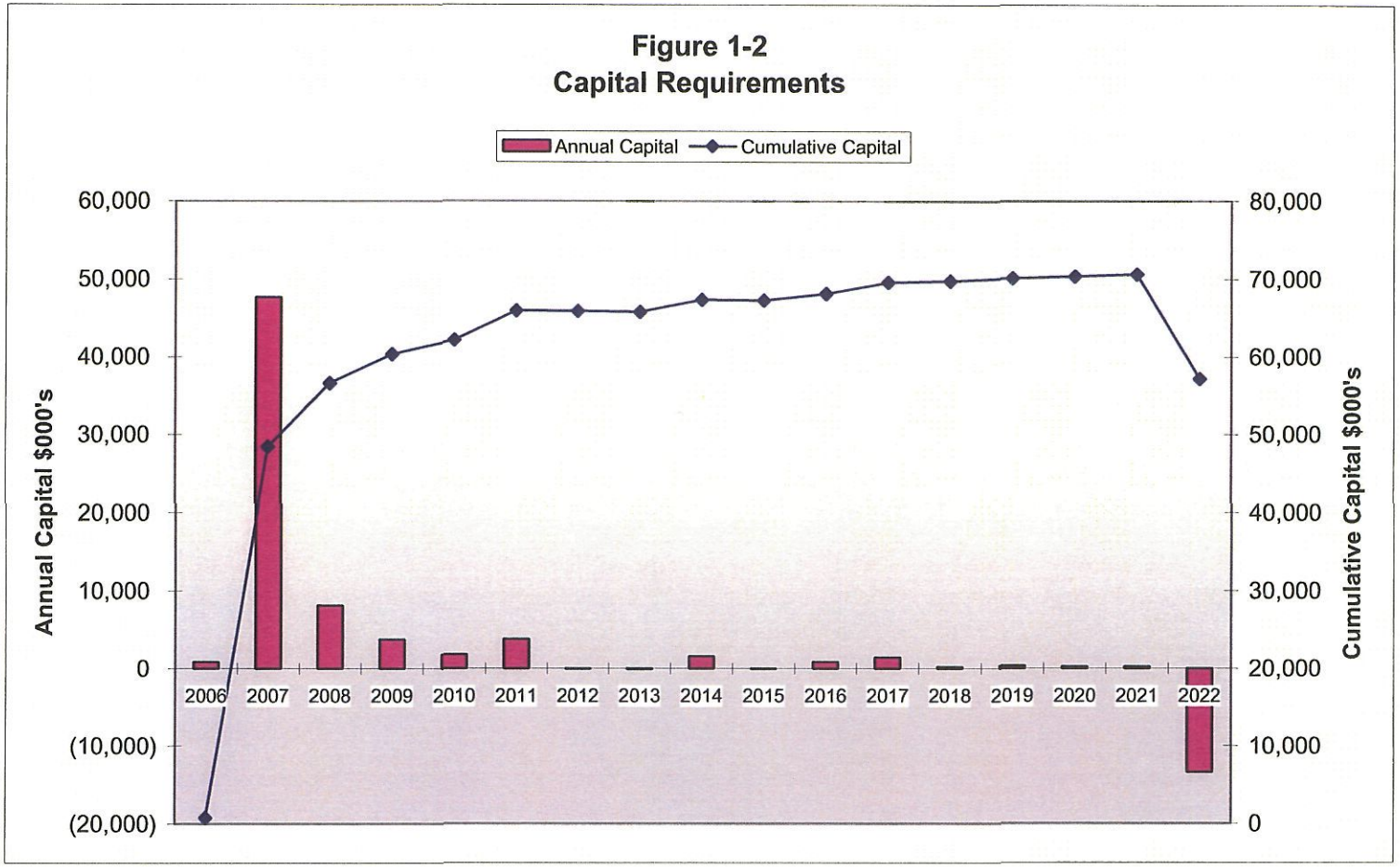


Figure 1-2
Capital Requirements



2 PROJECT ECONOMICS

2.1 FINANCIAL ASSUMPTIONS

The net present value and internal rate of return of the Lossan Property project are calculated for evaluation purposes.

2.1.1 Projections

All revenues and costs are in 2005, constant Canadian dollars. Cash flows are discounted at a rate of 10% to January 1, 2007 (Year-1), which is the starting year of mine development.

2.1.2 Coal Price and Exchange Rate

Project cash flows have been determined using a PCI and hard coking coal price forecast, FOB tidewater, from Khan & Associates Inc. Khan & Associates is an independent consulting company with expertise in coal quality and coal price forecasting. Table 2.1 lists the projected sales values by product as provided by Khan & Associates.

TABLE 2.1
KHAN & ASSOCIATES INC.
PROJECTED PCI AND HARD COKING COAL PRICES (US $)

Year (2006 – 2008)	Price (US $)
PCI Coal	70 – 80
Hard Coking Coal	85 - 95

The first year of production for the Lossan Property is scheduled for 2008, the last year of the price forecast provided by Khan & Associates. The pricing used for the remaining years of the mine life was provided by Cline Mining. The sales revenue values utilized in this evaluation were kept constant over the life of the 14 year project, as summarized in Table 2.2.

TABLE 2.2
LOSSAN PROPERTY CASHFLOW PRODUCT REVENUE VALUES
PCI AND HARD COKING COAL PRICES (US $)

Years 1 through 14	Price (US $)
PCI Coal	80
Hard Coking Coal	90

As indicated in Table 2.2, the coking coal price value utilized in the analysis was the mid-range value provided by Khan & Associates, while the PCI value utilized in the evaluation is at the top end of the forecast for this type of coal. Sensitivities to coal pricing were assessed as part of the project economics and are discussed in Section 2.3.

The US dollar coal price is converted to Canadian dollars at an exchange rate of US $0.83: Cdn $1.00. This exchange rate is based on recent published forecasts for medium and long-term exchange rates from the Province of British Columbia Ministry of Finance (September, 2005).

2.1.3 Off-Site Costs

The product will be transported by rail to Ridley Terminals in Prince Rupert for shipping. Rail and port costs were provided to Norwest by Cline Mining for use in the feasibility study. Rail and port costs are estimated at $24.07/cmt (8% moisture). These costs also include an estimate for superintendence costs at the port. A contingency is not applied to these estimates.

An additional cost based on 3% of sales revenue, as provided by Cline Mining, is included to cover commissions, rail demurrage (this assumes Ridley pays demurrage but also earns despatch for its own account) and other miscellaneous charges. An allocation of $0.50/cmt is estimated by Norwest for head office allocations related to Lossan. This is included in project cash flows.

2.1.4 Site Costs and Contingency

Summary tables of operating and capital costs are appended to the end of this section. Capital costs have a 10% contingency applied throughout the project period to account for presently unforeseen expenses. Unit operating rates for material movement are based on first principle calculations, which were then compared to budgetary quotes from an independent contractor. Consequently, no contingency has been applied to the operating forecast although the impact in operating cost variance was evaluated as part of the sensitivity analyses.

2.1.5 Mineral Tax, Royalty

Production from the Lossan Property is from Crown land and is therefore subject to the British Columbia Mineral Tax.

The Tax provides for the Crown's financial share of mineral production in two ways. The primary form is to receive 13% of the producer's profit that is in excess of a normal return on investment over the life of the mine. This is the Net Revenue Tax. To minimize any disincentive to investment, the province does not receive this share of the tax until the investment in the mine and a reasonable return has been recovered.

The second share from mineral production is to receive 2% of operating cash flow from production each year. This is referred to as the Net Current Proceeds Tax. It is intended to

provide compensation to the province for depletion of the resource when production yields less than a reasonable profit for the producer. So that only one or the other share is paid, Net Current Proceed Tax can be deducted from Net Revenue Tax.

Coal sales from the property are also subject to a private royalty. A cost of $1.50/cmt covers a privately held royalty.

2.1.6 Income Taxes

For the purposes of this report, the project economics have been calculated on a pre-tax basis.

2.1.7 Working Capital

Working capital is included in the cash flow analysis since wages, power, consumables and supply inventory expenditures will be incurred for a brief period before revenues may be realized.

It is assumed that clean coal inventory of 30,000 tonnes each of hard coking coal and PCI coal (approximately a panamax load) will be built up at the port in the first year of coal production. In addition one month of cash costs at the mine will have to be covered in Year 1 until receivables are converted to cash. Working capital is maintained through the project life. Working capital, including the coal inventory is recovered in the final two years. It is assumed that 100% of the working capital is recovered.

2.1.8 Salvage Value and Reclamation

The evaluation assumes there is no net salvage value for the buildings and equipment at the end of the mine life. In reality, some salvage may be realized so as to offset post-mining dismantling and reclamation costs.

The base case assumes that a reclamation bond is posted with the government. The bond value is calculated as the present value (discounted at 3.5%) of the reclamation liabilities looking forward five years at a time. Cline Mining may have the financial ability to issue an irrevocable letter of credit, which would reduce the cost. It is assumed that the bond is converted to cash in the year after production ceases and is therefore treated as a cash inflow item at that time.

2.2 PROJECT ECONOMICS

Under these assumptions the project economics are as follows:

TABLE 2.3
LOSSAN PROPERTY PROJECT ECONOMIC SUMMARY
(PRE-TAX BASIS)

	Lossan NPV $M	Lossan IRR %
Project Economics	29.1	19.8

Figure 2-1 illustrates the annual net cash flow of the Lossan Property. Figure 2-2 shows the cumulative net cash flow of the Lossan Property. The graph indicates that the project would achieve payback by the end of 2012, some five years after the start of the coal production start up date. Figure 2-3 shows the cash cost components in relation to the average price of the PCI and hard coking coal products. This graph indicates there is an average cash margin (above operating and capital costs) of about $8.00/cmt available to cover income taxes and return on capital.

Table 2.4 shows the yearly cash flow for the Lossan Property.

TABLE 2.4
LOSSAN PROPERTY CASH FLOW

Lossan Project - Cline Mining Corporation
Cash Flow Forecast

Project Year	Year-2	Year-1	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10	Year11	Year12	Year13	Year14	Year15	
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total/Avg
Waste Pit Production (BCM 000's)		1,200	7,593	9,127	10,298	10,583	10,377	11,451	11,451	11,451	11,451	11,451	8,934	8,934	8,934	8,332		141,569
ROM Coal Production (tonnes 000's)		0	1,280	1,278	1,283	1,417	1,505	1,376	1,376	1,376	1,376	1,376	1,394	1,394	1,394	1,300		19,126
Met Clean Coal Production at 8% moisture(tonnes 000's)		**0**	**722**	**623**	**558**	**561**	**576**	**536**	**536**	**536**	**536**	**536**	**669**	**669**	**669**	**624**		**8,349**
PCI Clean Coal Production at 8% moisture(tonnes 000's)		**0**	**298**	**397**	**462**	**459**	**445**	**485**	**485**	**485**	**485**	**485**	**352**	**352**	**352**	**328**		**5,871**
Yield at 6% Moisture			78%	78%	78%	71%	66%	73%	73%	73%	73%	73%	72%	72%	72%	72%		73%
Met Clean Coal Production at 6% moisture(tonnes 000's)		0	708	611	547	550	564	525	525	525	525	525	655	655	655	611		8,181
PCI Clean Coal Production at 6% moisture(tonnes 000's)		0	292	389	453	450	436	475	475	475	475	475	345	345	345	321		5,752
Strip Ratio (BCM/tClean) at 6% Moisture)			7.59	9.13	10.30	10.58	10.38	11.45	11.45	11.45	11.45	11.45	8.93	8.93	8.93	8.93		10.16
Sales (tonnes 000's)		**0**	**961**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,021**	**1,012**		**14,220**
Sales Revenue ($000's)		**0**	**100,928**	**105,879**	**105,096**	**105,134**	**105,310**	**104,823**	**104,823**	**104,823**	**104,823**	**104,823**	**106,430**	**106,430**	**106,430**	**105,407**		**1,471,161**
Site Costs ($000's)																		
Contract Mining		7,563	43,515	47,756	50,809	57,790	58,991	57,943	57,943	57,943	57,943	57,943	50,226	50,226	50,226	47,475	11,362	765,655
Processing		0	3,921	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,920	3,921	3,921	3,921	3,771	0	54,734
Loadout			200	200	200	200	200	200	200	200	200	200	200	200	200	200		2,800
Admin		1,130	2,260	2,260	2,260	2,260	2,260	2,262	2,258	2,258	2,258	2,258	2,258	2,258	2,258	2,258		32,754
Total Site		**8,693**	**49,895**	**54,136**	**57,189**	**64,170**	**65,371**	**64,325**	**64,321**	**64,321**	**64,321**	**64,321**	**56,604**	**56,604**	**56,604**	**53,704**	**11,362**	**855,943**
Down Stream Costs ($000's)																		
Total Ex-Mine		0	24,235	24,562	24,562	24,562	24,562	24,562	24,562	24,562	24,562	24,562	24,562	24,562	24,562	23,235		245,296
Private Royalty, Commissions		0	4,469	4,707	4,684	4,685	4,690	4,676	4,676	4,676	4,676	4,676	4,724	4,724	4,724	4,680	0	65,464
Corporate Admin		0	480	510	510	510	510	510	510	510	510	510	510	510	510	506	0	7,110
Operating Cash Flow Before Capital & Taxes		**(8,693)**	**21,849**	**21,963**	**18,150**	**11,207**	**10,177**	**10,750**	**10,754**	**10,754**	**10,754**	**10,754**	**20,029**	**20,029**	**20,029**	**23,282**	**(11,362)**	**200,427**
Capital	750	42,290	750	3,343	600	3,639	140	100	0	132	0	174	0	132	0	0	0	52,049
Capital Contingency	75	4,229	75	334	60	364	14	10	0	13	0	17	0	13	0	0	0	5,205
Working Capital			6,590														(6,590)	0
Reclamation Security Increase/(Decrease)		1,158	899	60	1,135	(208)	(208)	(208)	1,574	(207)	836	1,243	213	220	228	236	(6,969)	0
Coal Royalty	0	0	555	564	487	348	1,388	2,190	2,205	2,186	2,205	2,180	3,417	3,398	3,417	3,832	0	28,373
Net Cash Flow Before Income Taxes	**(825)**	**(56,369)**	**12,979**	**17,662**	**15,868**	**7,064**	**8,843**	**8,658**	**6,975**	**8,630**	**7,713**	**7,140**	**16,400**	**16,266**	**16,385**	**19,214**	**2,198**	**114,800**
Pre-Tax Present Value																		
Discount Rate	10%																	
Net Present Value @ Jan 1, Year-1	**$29,130**																	
IRR Pre-tax	**19.79%**																	

2.3 FINANCIAL SENSITIVITIES

Sensitivity analyses were carried out on the Lossan Property:

- coal price;
- exchange rate;
- capital costs; and
- operating costs.

2.3.1 Coal Price

The coal price sensitivity considers the price forecast as suggested by Khan and Associates. The sensitivity covers the high end, which adds US $5/cmt to the hard coking coal price. To test the low end, hard coking coal is reduced US $5/cmt to US $85/cmt while PCI is reduced US $10/cmt to US $70/cmt. The financial results of the coal price sensitivity are shown in Table 2.5.

TABLE 2.5
SENSITIVITY TO COAL PRICE

Price Forecast	Before Tax NPV ($M)	Before Tax IRR(%)
Hard Coking Coal Plus US $5	49.4	26.4
Base Case	29.1	19.8
PCI Minus US$10, Hard Coking Coal Minus US $5	-20.0	2.8

As indicated in the analysis, the lower prices would not support developing the Lossan Property. With an increased price forecast, the economics would be extremely robust. Assuming the US $15/cmt differential between hard coking coal and PCI, the project would require a hard coking coal price of US $87.86/cmt and a PCI price of US $72.86/cmt to break even on an net present value basis at 10% and an exchange rate of US $0.83: Cdn $1.00.

2.3.2 Exchange Rate

The Lossan Property would provide economic returns up to around $0.875 after which the net present value would be negative. Each $.01 change impacts the net present value by about $7.0 million.

TABLE 2.6
SENSITIVITY TO EXCHANGE RATE

Exchange Rate US $:Cdn $	Before Tax NPV $M	Before Tax IRR %
$0.80	50.5	26.6
$0.83 Base Case	29.1	19.8
$0.86	9.2	13.2

2.3.3 Capital Cost

Capital estimates may be subject to both increases and decreases.

TABLE 2.7
SENSITIVITY TO CAPITAL COST ESTIMATES

Capital Cost	Before Tax NPV $M	Before Tax IRR %
-10%	33.7	22.4
Base	29.1	19.8
+10%	24.4	17.6

The project is relatively insensitive to a change in capital costs. Within this sensitivity range, the Lossan Property economics remain favourable. The capital would have to increase 59% before the project becomes uneconomic.

2.3.4 Operating Cost (Site and Off Site)

Unit rates for material movement are based on first principle calculations, which were compared to budgetary quotes from an independent contractor. Costs are estimated from equipment productivities, labour rates, materials and supplies costs assumed for the Lossan Property project. These assumptions are discussed in previous sections of the report and may vary from conditions that might actually take place.

For example, if equipment cycle times are better (or worse), operating costs will be affected. Natural gas prices may be higher or lower than $5.75/Gj, which affects blasting costs. The price of diesel fuel at a long term average of $0.75/litre may also be subject to uncertainty. The range in Table 2.8 is provided to cover these possibilities.

TABLE 2.8
SENSITIVITY TO OPERATING COST ESTIMATES

	Before Tax NPV $M	Before Tax IRR %
-10%	79.5	35.7
Base Case	29.1	19.8
+10%	-21.7	2.3

The project is very sensitive to changes in the operating cost, since the cash operating margin (after royalties and head office allocation) is only about $12.00/cmt or 13% of the cash cost FOBT. A 10% increase in the cash operating cost reduces this margin by 50%. The operating costs may increase about 5.8% before the economics for the project become unfavourable.

Figure 2-1
Net Cash Flow Before Income Taxes

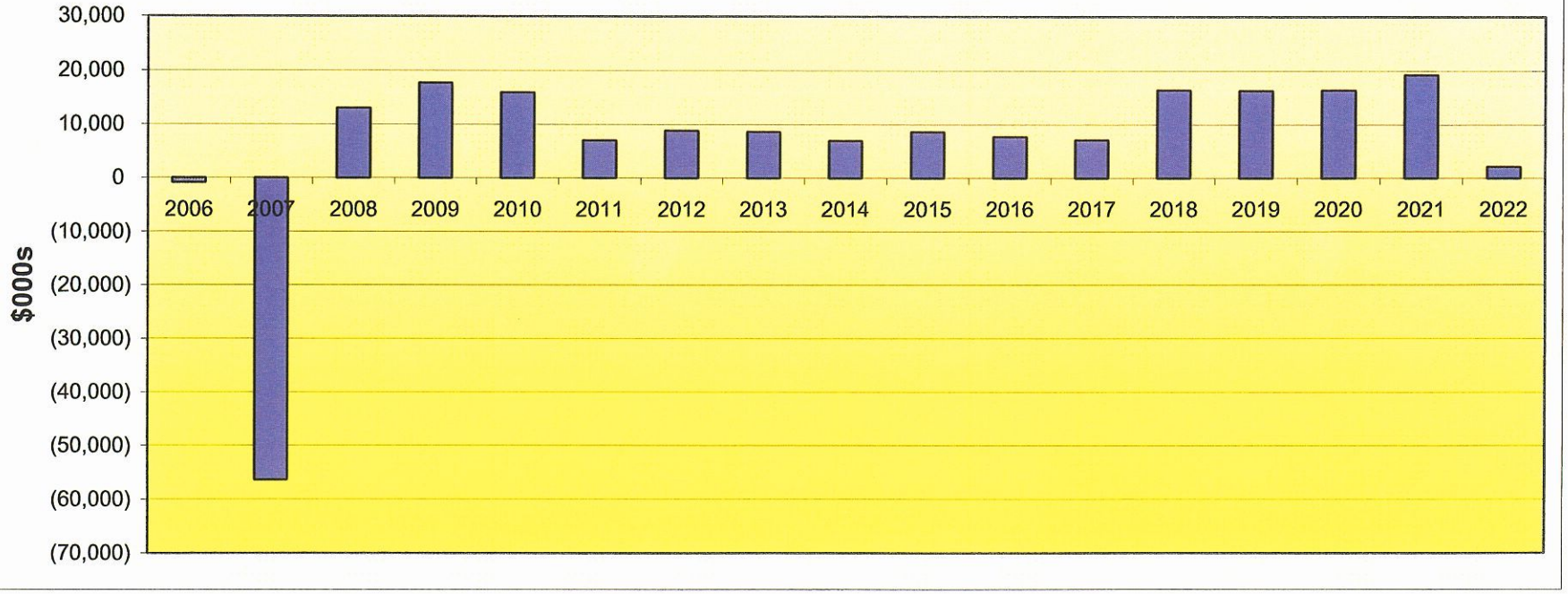


Figure 2-2
Cumulative Net Cashflow Before Tax

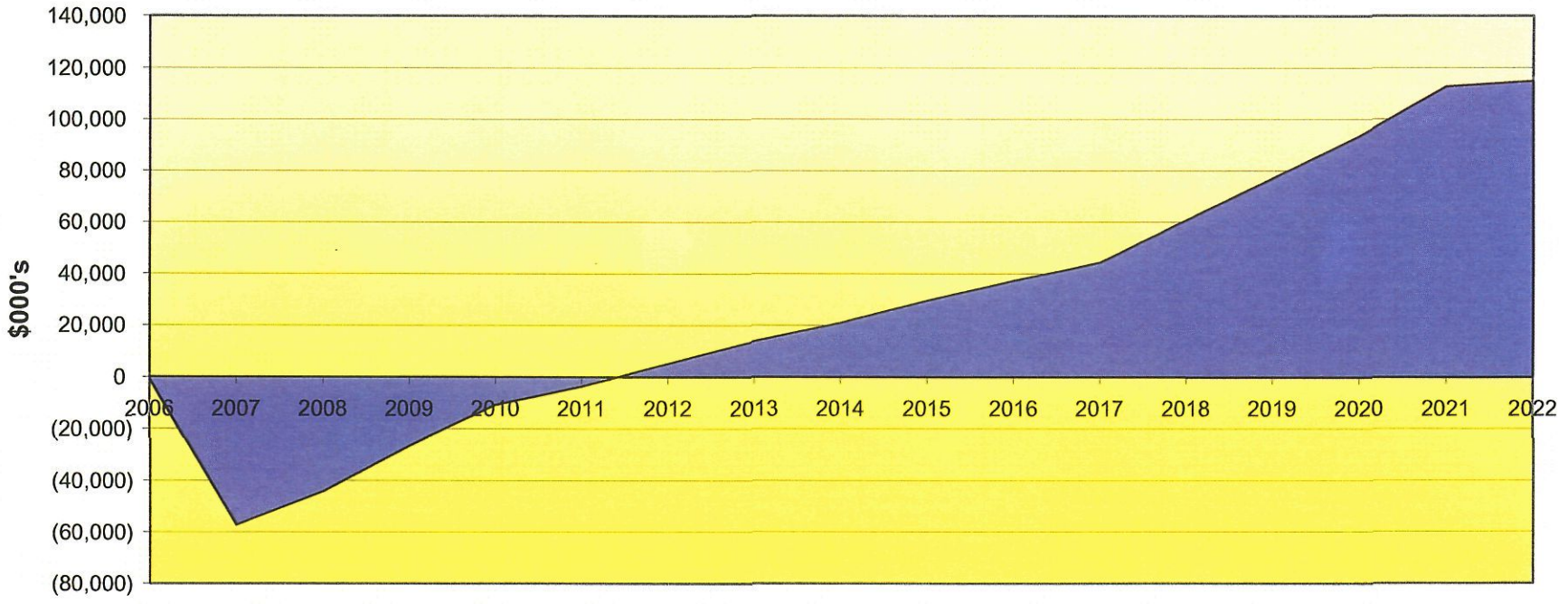
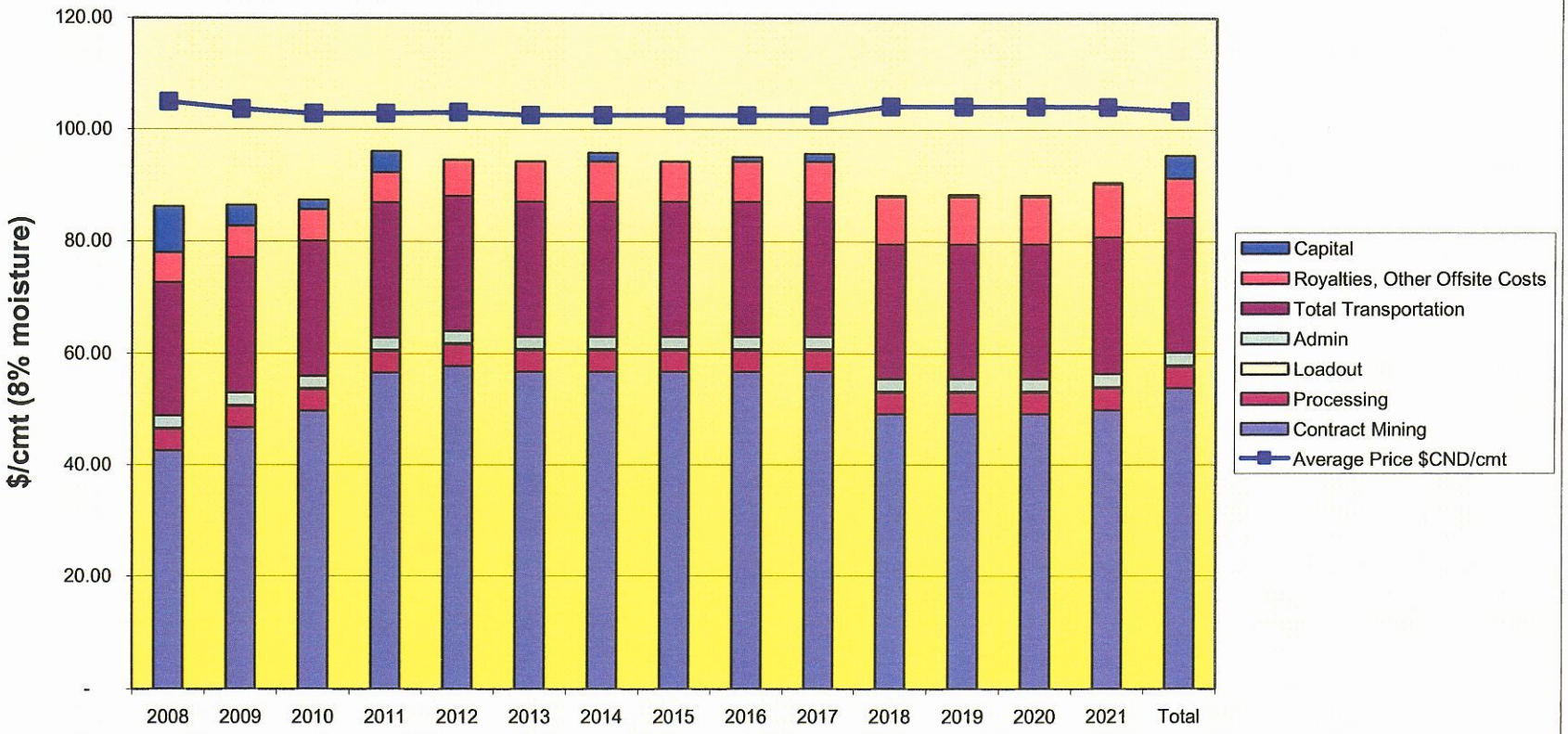


Figure 2-3
Unit Cost and Coal Price



3 CONCLUSIONS AND RECOMMENDATIONS

The Lossan Property is designed to develop mine production and coal processing capabilities of a medium sized coal mining operation in order to produce a PCI and hard coking coal product with 7-8% ash and 8% moisture. The project, as designed, has recoverable (ROM) and saleable (coking coal product) reserves of 19.1 million and 13.9 million tonnes, respectively. The product tonnage is comprised of 59% hard coking coal product (8.3 million cmt) and 41% PCI coal (5.9 million cmt).

The Lossan Property will produce an average of 1.0 million tonnes of PCI and hard coking coal per annum over a 14 year production period.

3.1 PROJECT COST SUMMARY

Total site operating costs vary from $48.89/cmt to $64.05/cmt and averages about $60.00/cmt over the production period.

Operating costs for the Lossan Property have been based on various sources including:

- Manufacturer/supplier cost estimates;
- Independent cost databases and publications;
- Norwest's internal cost database; and
- Quotes or estimates provided by Cline Mining.

In the order of $57 million will be required over the life of the Lossan Property project to bring it into production and to maintain production through the project life. Initial capital of $49 million is required in 2006 and 2007, followed by $8 million in 2008, primarily for working capital. The working capital and the reclamation bond are assumed to be recovered in Year 15 and would fund final reclamation work.

Major capital cost items for the Lossan Property are incurred for construction of the coal process circuit and materials handling system, the shared coal load-out facility and rail loop, new site structures, roads and water management structures (ponds, ditches etc).

Development of the capital schedule is based on developing the mine as quickly as is practical. However options for deferring capital expenditures, by phasing mine expansion stages or other mechanisms should be evaluated in more detail during the detailed design and planning stages.

The total mine operating and overhead cost at site averages about $50 to $65 million annually at full production, which is equivalent to an average over the project life of about $45.00/ROMt or $60.00/product tonne. The total mine capital costs are estimated

at $52 million prior to the addition of a contingency and excluding working capital and bonding requirements. This is equivalent to $2.72/ROMt or $3.66/product tonne. A contingency of 10% on capital costs brings the total to $57 million.

3.2 PROJECT ECONOMIC SUMMARY

Norwest has completed an evaluation for the coal resources/reserves as well as the mine and process engineering requirements for the Lossan Property. This work has provided the basis for a cost estimate which indicates that the Lossan Property will require a total capital investment of $49 million in 2007 and $8 million in 2008, which includes a 10% contingency. The average operating cost for the Lossan Property is $91.36/cmt (8% moisture) of saleable coal delivered to port and loaded on vessels in Prince Rupert, BC. This operating cost includes an allowance of $24.07/cmt (8% moisture) for rail and port charges; these charges were provided to Norwest by Cline Mining. Also included are the private royalty, commissions, head office allocation and BC Mineral tax.

Norwest has also completed a financial evaluation for the project based on the mine plan production and operating/capital cost profiles. Third party PCI and coking coal price forecasts were used to project cash flows and then to calculate potential investment returns in terms of net present value (NPV) and internal rate of return (IRR). The financial analysis was carried out using a base case exchange rate of US $0.83 = Cdn $1.00.

Table 3.1 provides a summary of the base case projected returns for the Lossan Property. Before tax, the Lossan Property provides a net present value of $29.1 million and a 19.8% internal rate of return.

TABLE 3.1
PROJECT ECONOMIC SUMMARY

Before Tax $NPV_{10\%}$ $M (Cdn)	Before Tax IRR %
29.1	19.8

The Lossan Property produces operating cash flow of $200 million and total net cash flow (after mineral tax and capital) of $115 million over the life of the project. The analysis shows that the project would achieve payback by the end of Year 2012, some five years after the coal production startup.

Sensitivity analyses shows that the project is most sensitive to operating costs, coal price and the US to Canadian dollar exchange rate. It is noted that under conditions of lower export resource prices the Canadian dollar has in the past fallen below current levels. Therefore the sensitivity of the project to exchange rate alone is somewhat misleading as it seems likely that lower coal prices would be at least somewhat offset by a lower exchange rate.

3.3 PROJECT OPPORTUNITIES

Cline Mining and the Lossan Property will benefit from the joint development with Western Canadian Coal of a rail line extension, a new rail loop and load-out. This provides the opportunity to take advantage of cost benefits for the construction and operation of these facilities by both parties.

Additional drilling of the Lossan Property may identify lower ratio reserves that may be developed during the initial stages of mining to improve overall project economics. The present drill spacing in not adequate to delineate the subcrop of the fold plunge axes that occur at the site, which will likely contain lower ratio reserves. Should the presence of these structures be proven, the potential to direct ship coal during the initial years of operation should be re-evaluated.

Further exploration and coal quality work may identify additional coal reserves that are capable of providing feed for a hard coking coal product. Owing to a lack of coal quality information at this time, only the lower portion of Seam 1 has been assigned as a hard coking coal feed material. Other seams, specifically Seam 3, may have potential to produce a hard coking coal product, however, due to the absence of such information have been assumed to be PCI coal for the purposes of this work.

3.4 PROJECT RISKS

Norwest has carried out this evaluation of the Lossan Property based on the current information base and Norwest's experience with Western Canadian coal mining projects. There are inherent risks to mining projects and the sensitivity analyses presented as part of the financial analyses for the project provides an indication of these risks based on a reasonable range of cost and revenue uncertainties for the project. Notwithstanding these uncertainties there are other project financial risks that have not been explicitly taken into account that need to be mentioned:

- The Lossan Property has not received Environmental Assessment (EA) approval. Significant approval delays (several months or more) and/or regulatory concerns that change the mine plan could negatively impact the project.

- Record level growth in the Western Canadian coal and oil sands mining sectors have placed very large demands on labour and mining equipment. These shortages translate to higher costs and potential for project delays. Operating cost contingencies for the project have not been factored.

- Cline Mining has not received tenure and right of access for the proposed dedicated coal haul road which provides a much more efficient coal haulage route than the existing Brazion Creek access.

- Additional exploration and coal quality work are required to further delineate the resource base prior to final mine design and development. Complications in the interpreted geological structure in the form of faulting or folding could significantly impact project economics.

- Geotechnical engineering evaluations has not been addressed at a level sufficient for final mine design. These analyses and/or subsequent unanticipated geotechnical stability problems could affect the mine plan. Norwest is not aware of any particular geotechnical problems that could significantly impact the project.

3.5 RECOMMENDATIONS

Based on the engineering and design work completed to date for this study and the results of the economic evaluation of the Lossan Property, the following recommendations are presented:

- Additional coal exploration and quality testing should be conducted to further delineate the Lossan Property resource. Prior to detailed engineering and design work the section spacing of drill hole lines should be reduced to 125 m or less.
- Detailed engineering and design work should be undertaken to support the on-going development of the project with a focus on receipt of a provincial mine permit and Environmental Assessment approval.
- Additional analyses should be completed to optimize development of the Lossan Property with specific focus on scheduling of initial project development phases and capital expenditures.

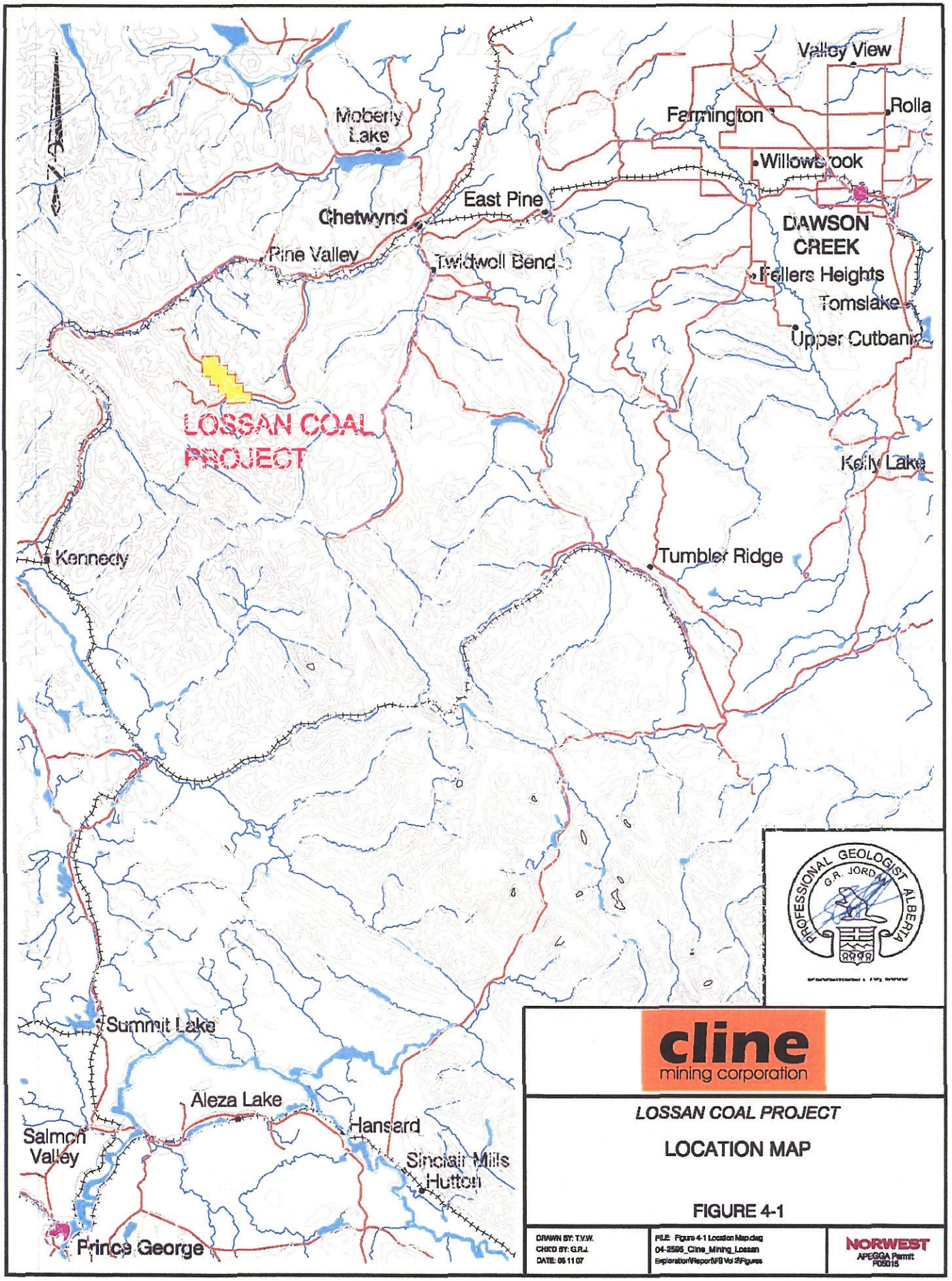
- Should a direct ship product be proven to be economic based on additional geological exploration and coal quality work, the development of a small mine operation will provide Cline Mining with valuable information related to mining and coal quality parameters. Parameters of particular interest to the Lossan Property include: actual dilution and coal recovery parameters, ROM coal particle size distribution, blasting parameters and geotechnical performance of pit walls and waste dumps.
- It is recommended that Cline Mining consider mining the Lossan Property themselves as opposed to retaining a contractor to conduct mine operations and maintenance. The project economics have proven to be sensitive to variance in operating costs and the assumed 20% contractor profit has a significant impact. If preferred, any equipment capital expenditures could be handled through leasing.

26 ILLUSTRATIONS

TECHNICAL REPORT LIST OF FIGURES

TECHNICAL REPORT LIST OF MAPS

SECTION 25 – LIST OF FIGURES


Valley View
Rolla
Farmington
Willowbrook
Moberly Lake
East Pine
Chetwynd
DAWSON CREEK
Pine Valley
Twidwell Bend
Fellers Heights
Tomslake
Upper Cutbank
LOSSAN COAL PROJECT
Kelly Lake
Kennedy
Tumbler Ridge
Summit Lake
Aleza Lake
Hansard
Salmon Valley
Sinclair Mills
Hutton
Prince George
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G.R. JORDAN
cline
mining corporation
LOSSAN COAL PROJECT
LOCATION MAP
FIGURE 4-1
DRAWN BY: T.V.W.
CHKD BY: G.R.J.
DATE: 05 11 07
FILE: Figure 4-1 Location Map.dwg
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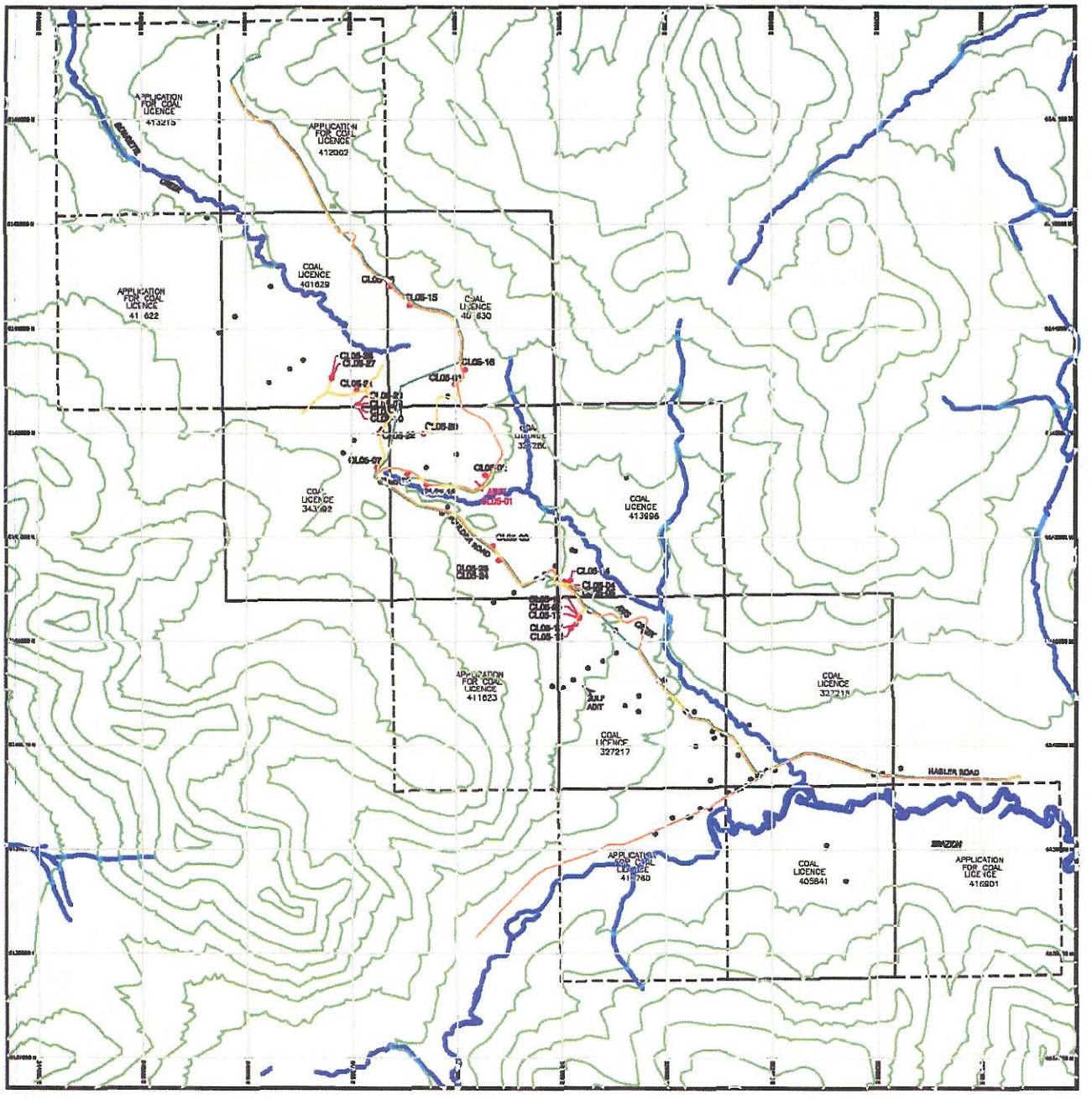
NORWEST
APEGGA Permit
P05015



LEGEND:

- Cline 2005 ADIT
- Gulf 1982 ADIT
- CL05-01 Cline 2005 Drill Hole
- Gulf Drill Hole
- Access Road
- 2005 Access Trail
- Scur Gas Pipeline (Location Approximate)
- Gas Compression Station

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LOSSAN COAL PROJECT

COAL LICENCE & APPLICATION LOCATION MAP

FIGURE 6-1

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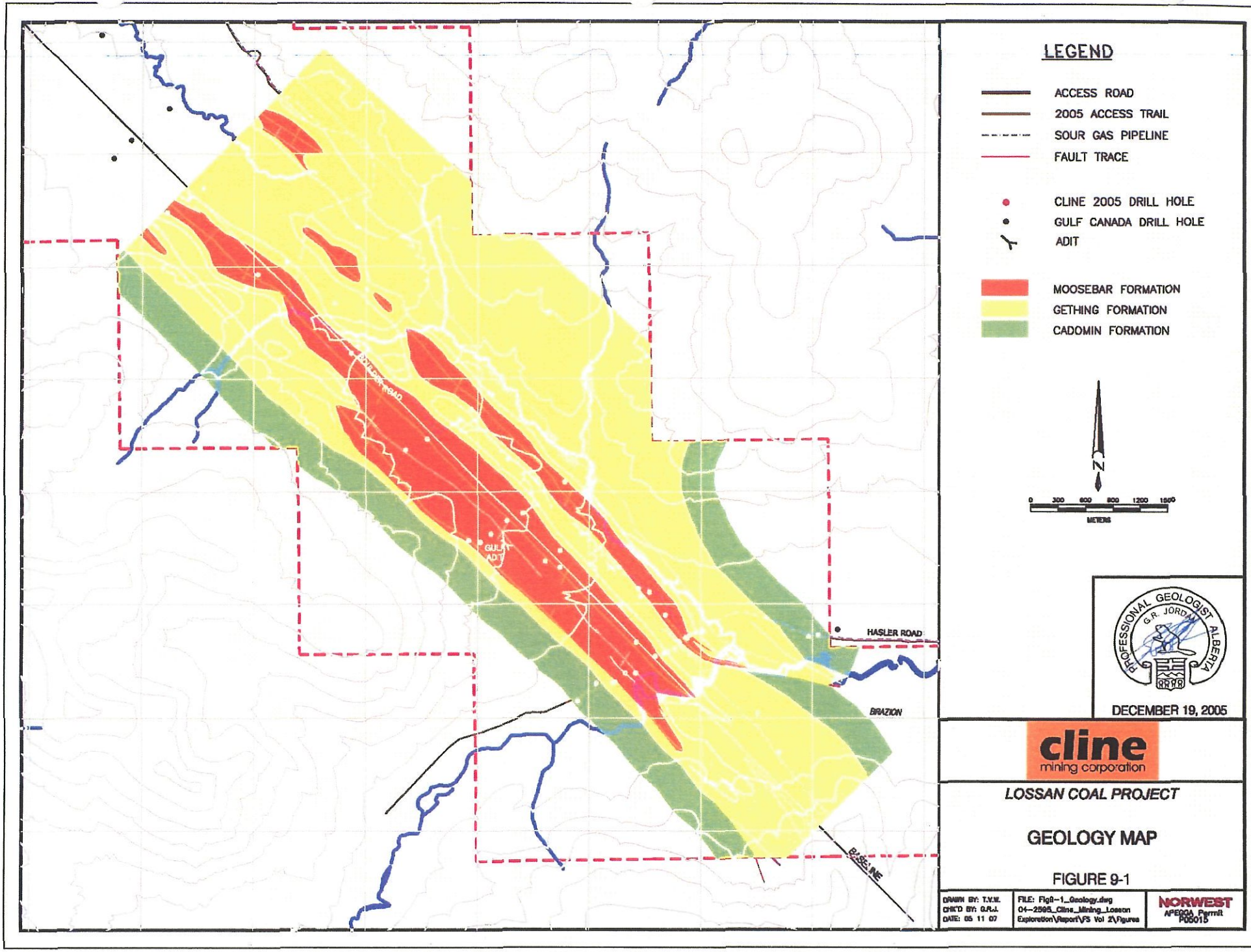
LEGEND
ACCESS ROAD
2005 ACCESS TRAIL
SOUR GAS PIPELINE
FAULT TRACE
CLINE 2005 DRILL HOLE
GULF CANADA DRILL HOLE
ADIT
MOOSEBAR FORMATION
GETHING FORMATION
CADOMIN FORMATION
N
0 300 600 900 1200 1500
METERS
HASLER ROAD
BRAZION
BASELINE
GULF ADIT
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G.R. JORDAN
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LOSSAN COAL PROJECT
GEOLOGY MAP
FIGURE 9-1
DRAWN BY: T.V.W.
CHK'D BY: G.R.J.
DATE: 05 11 07
FILE: Fig9-1_Geology.dwg
04-2565_Cline_Mining_Lossan Exploration\Report\FS Vol 2\Figures
NORWEST
APEGGA Permit P05015

SERIES	GROUP	FORMATION	APPROX. THICKNESS (m)	LITHOLOGY
Lower Cretaceous Transitional	Fort St. John	Moosebar	150 - 250	Dark grey marine mudstone, minor siltstone. Thin bed of conglomeratic sandstone and mudstone, usually glauconitic, at base (Bluesky Member).
	Bullhead	Gething	450 - 475	**Mudstone, siltstone, sandstone, carbonaceous mudstone; coalified plant debris, minor bentonite, minor conglomerate, occasional thin tuffs in upper part; COAL; coal seams are well deve[illegible] in Pine River area.**
		Cadomin	175 - 200	Medium to very coarse sandstones, grits and conglomerate; discontinuous coal seams.
	Minnes	Bickford	300 - 500	Lithic sandstone, siltstone, mudstone, carbonaceous mudstone, minor coal.
		Monach	150 - 225	Marine lithic & quartzose sandstone, with minor siltstone and conglomerate.
		Beattie Peaks	175 - 225	Sandstone, thinly bedded mudstone, silt stone, minor ironstone bands.
		Monteith	Incomplete section	Sandstone, quartzite, minor mudstone, siltstone, and thin conglomerate.

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LOSSAN COAL PROJECT

TABLE of FORMATIONS

FIGURE 9-2

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CHK'D BY: G.R.J.
DATE: 04 05 26

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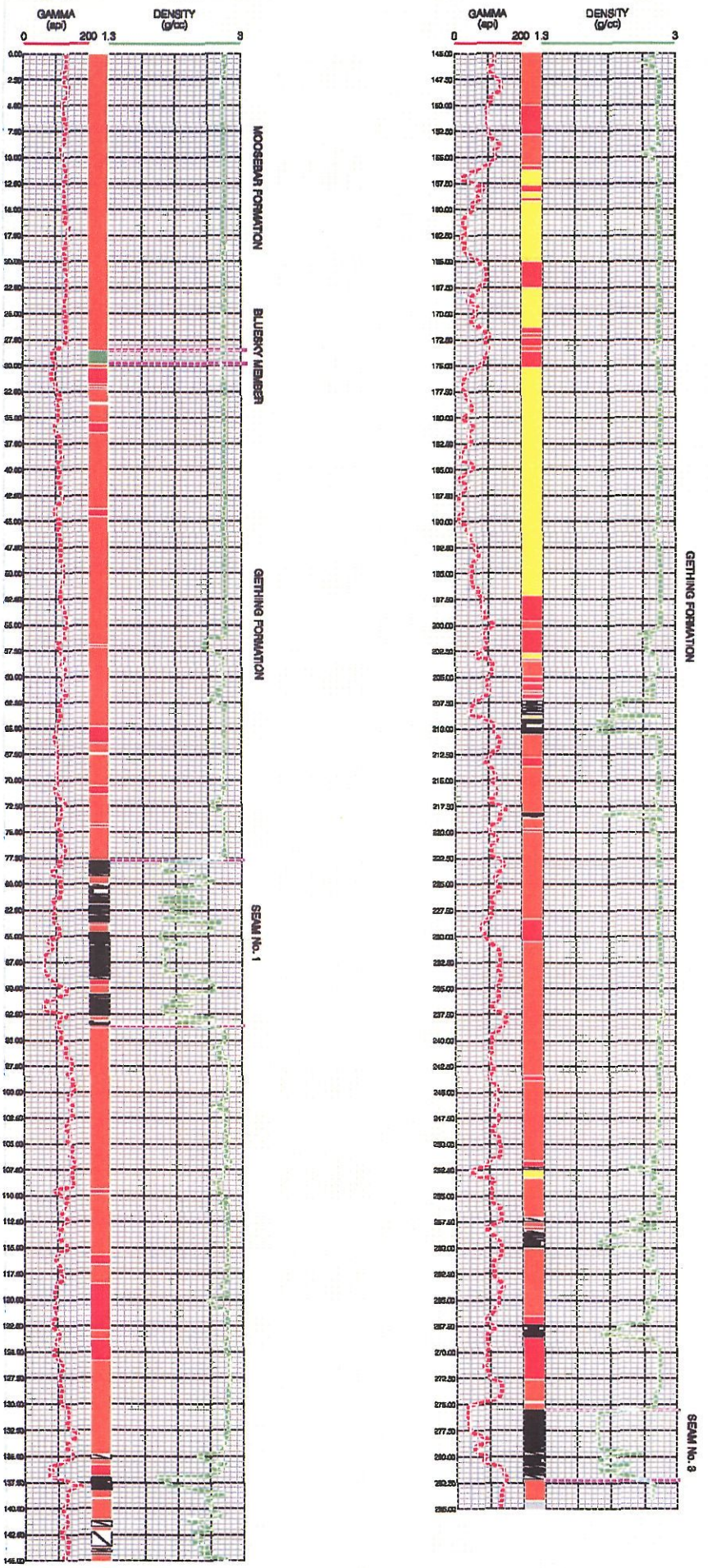
APEGGA Permit P05015



LEGEND:

- COAL BRIGHT
- COAL-BRIGHT BANDED
- COAL-DULL BRIGHT
- COAL-DULL BANDED
- COAL-DULL
- COAL-STONEY/BONEY
- CARBONACEOU MUDSTONE
- SHEARED
- CORE LOSS
- UNDEFINED ROCK
- CAVE
- CONGLOMERATE
- COARSE SANDSTONE
- MEDIUM SANDSTONE
- FINE SANDSTONE
- SILTSTONE
- MUDSTONE
- LIMESTONE
- TUFF
- OVERBURDEN

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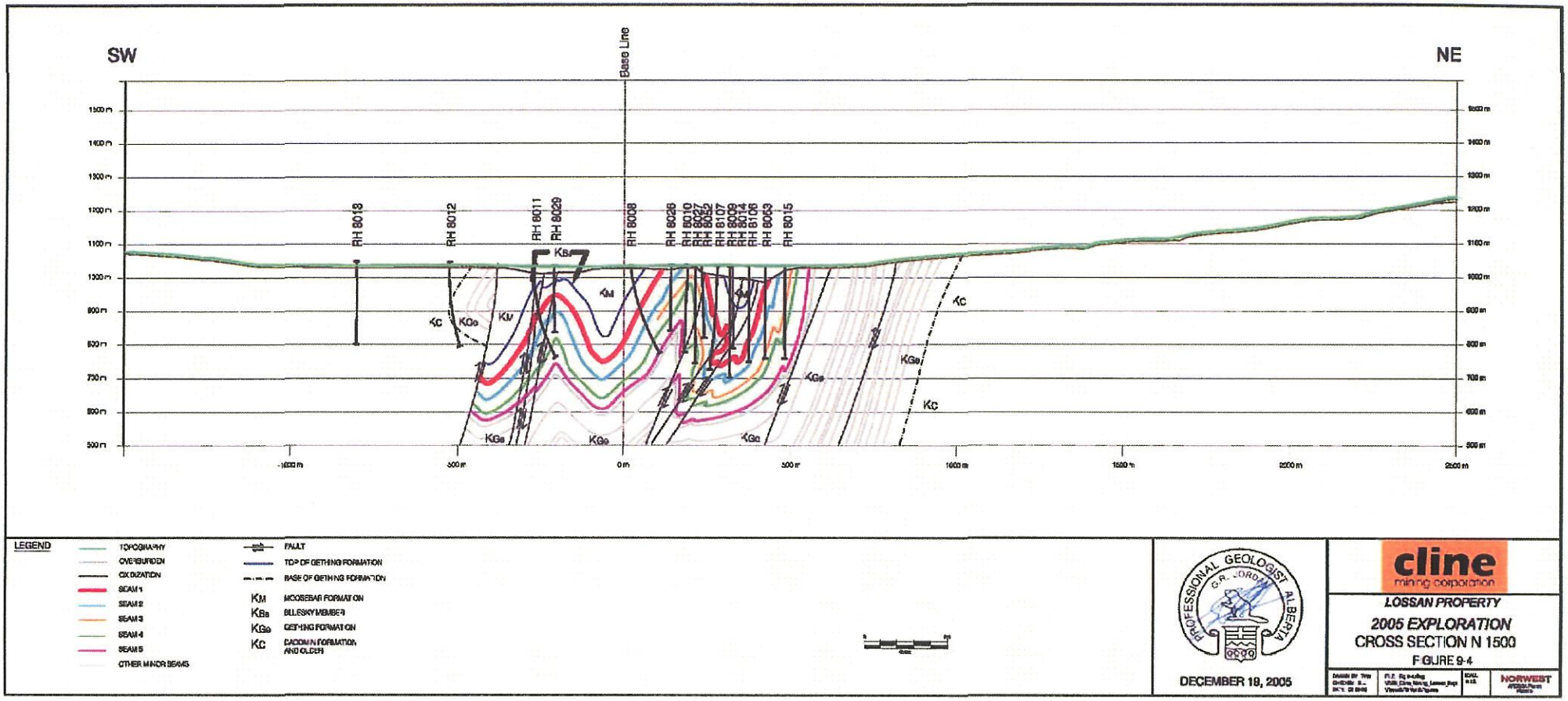
LOSSAN COAL PROJECT

GENERAL SEAM STRATIGRAPHY

FIGURE 9-3

DRAWN BY: T.V.W. CHKD BY: G.R.J. DATE: 05 11 14	FILE: Figure 11-1_strat column.dwg 04-Sask_Cline_Mining_Lossan Exploration\Report\R3 Vol II\Figures	NORWEST APEGGA Permit P05015



LEGEND

- TOPOGRAPHY
- OVERBURDEN
- OUTCROPPING
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5
- OTHER MINOR SEAMS
- FAULT
- TOP OF GETHING FORMATION
- BASE OF GETHING FORMATION
- KM MOOSEBAR FORMATION
- KBs BULLESKY MEMBER
- KGs GETHING FORMATION
- KC CADOMIN FORMATION AND OLDER

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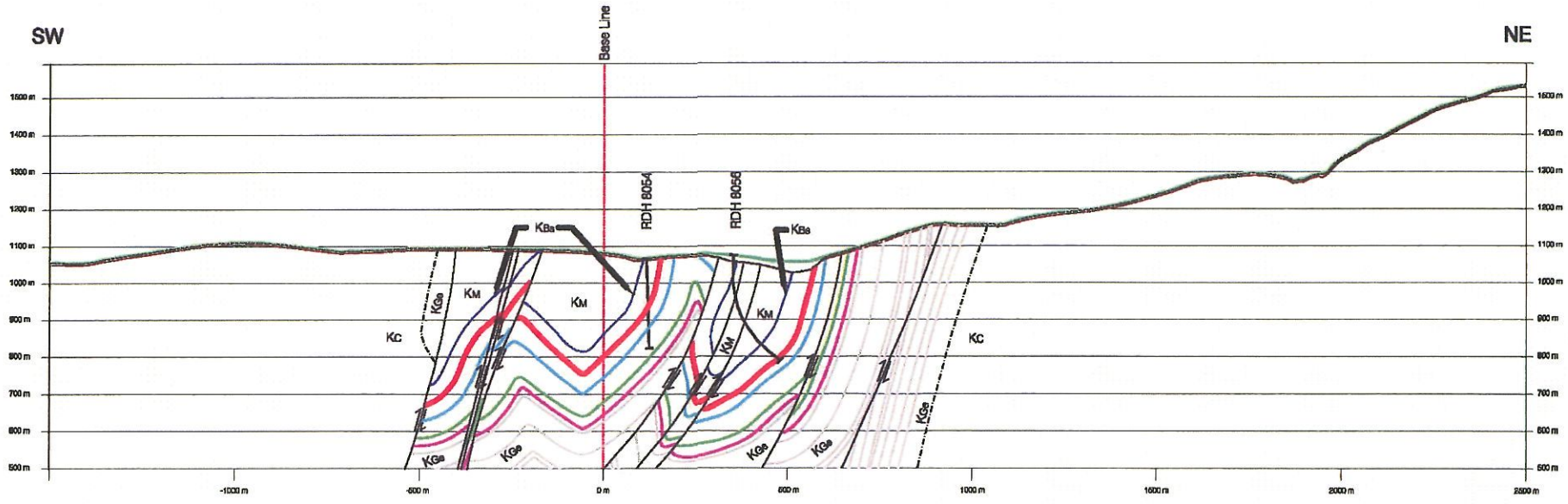
LOSSAN PROPERTY

2005 EXPLORATION

CROSS SECTION N 1500

FIGURE 9-4

NORWEST



LEGEND

- TOPOGRAPHY
- OVERBURDEN
- OXIDIZATION
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5
- OTHER MINOR SEAMS
- FAULT
- TOP OF GETHING FORMATION
- BASE OF GETHING FORMATION
- KM MOOSEBAR FORMATION
- KBs BLUESKY MEMBER
- KGe GETHING FORMATION
- KC CADOMIN FORMATION AND OLDER

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LOSSAN PROPERTY

2005 EXPLORATION

CROSS SECTION N 2250

FIGURE 9-5

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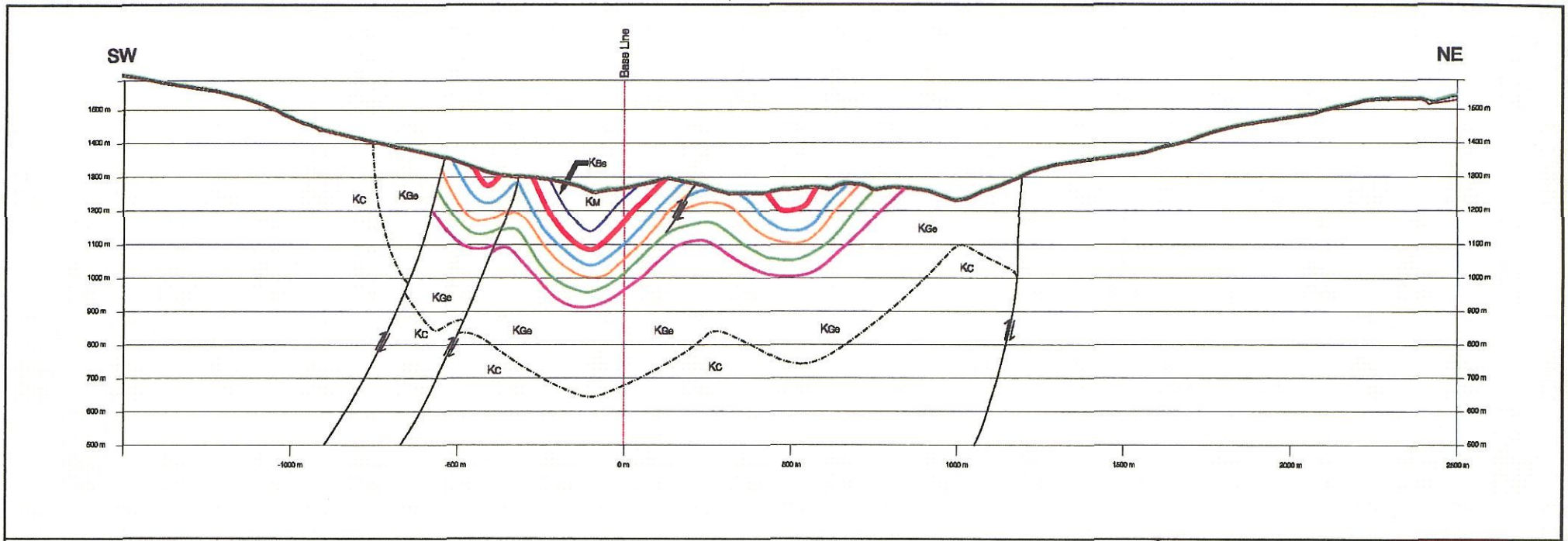

LEGEND

- TOPOGRAPHY
- OVERBURDEN
- OXIDIZATION
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5
- OTHER MINOR SEAMS
- FAULT
- TOP OF GETHING FORMATION
- BASE OF GETHING FORMATION
- KM MOOSEBAR FORMATION
- KBs BLUESKY MEMBER
- KGe GETHING FORMATION
- Kc CADOMIN FORMATION AND OLDER

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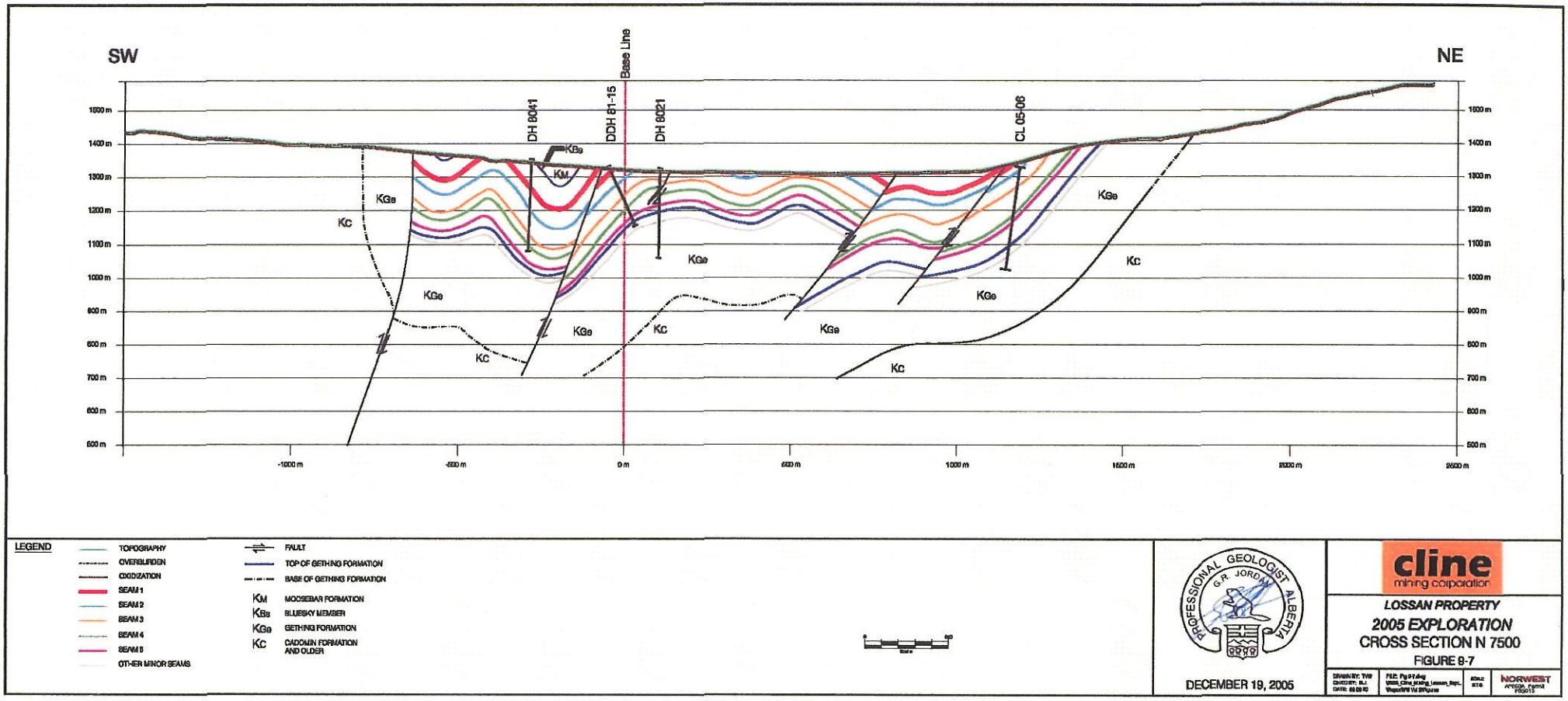
LOSSAN PROPERTY

2005 EXPLORATION

CROSS SECTION N 5250

FIGURE 9-6

NORWEST



LEGEND

- TOPOGRAPHY
- OVERBURDEN
- OXIDIZATION
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5
- OTHER MINOR SEAMS
- FAULT
- TOP OF GETHING FORMATION
- BASE OF GETHING FORMATION
- KM MOOSEBAR FORMATION
- KBs BLUESKY MEMBER
- KGe GETHING FORMATION
- Kc CADOMIN FORMATION AND OLDER

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LOSSAN PROPERTY

2005 EXPLORATION

CROSS SECTION N 7500

FIGURE 9-7

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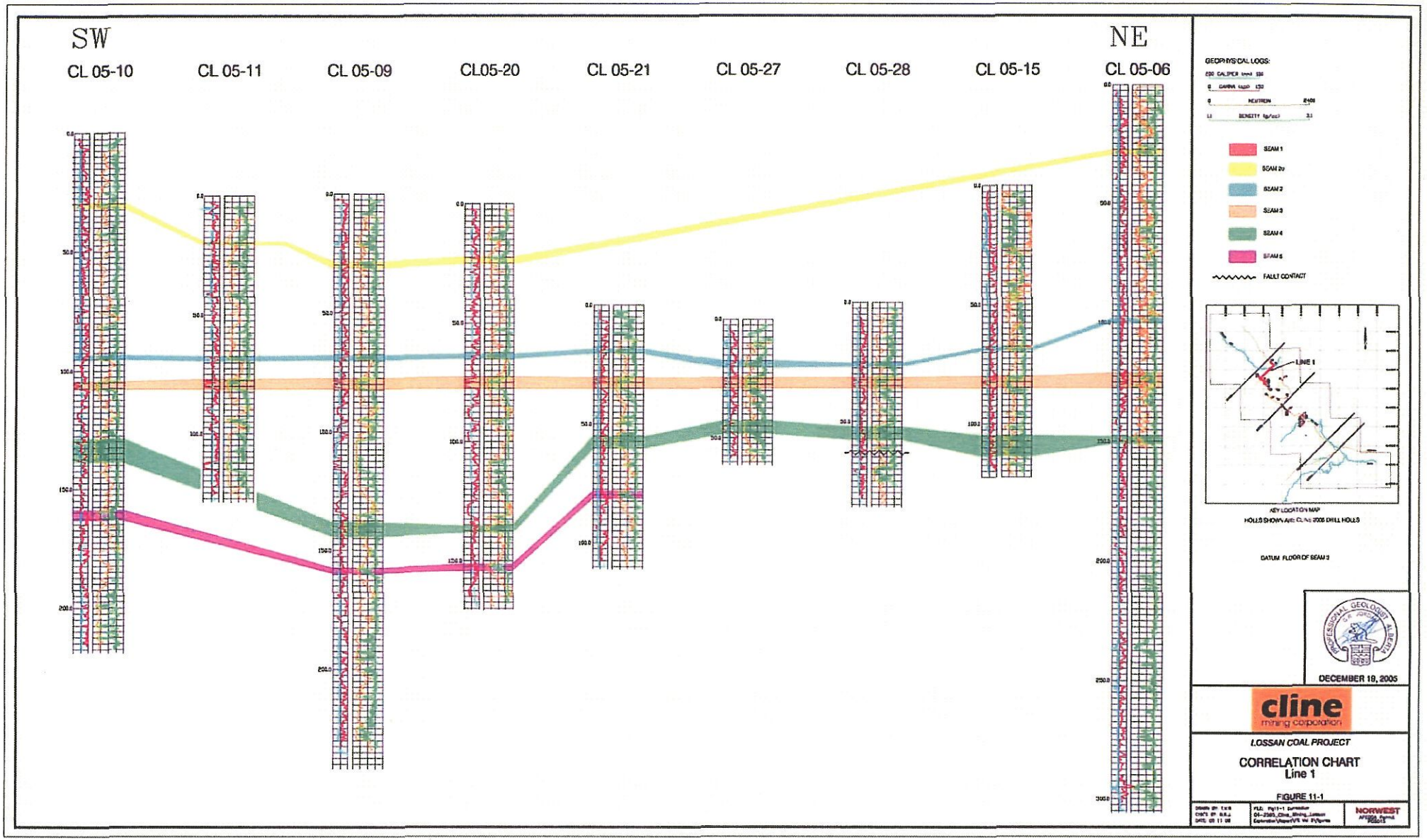
SW
NE
CL 05-10
CL 05-11
CL 05-09
CL05-20
CL 05-21
CL 05-27
CL 05-28
CL 05-15
CL 05-06
GEOPHYSICAL LOGS:
SEAM 1
SEAM 2u
SEAM 2
SEAM 3
SEAM 4
SEAM 5
FAULT CONTACT
LINE 1
KEY LOCATION MAP
DATUM: FLOOR OF SEAM 3
DECEMBER 19, 2005
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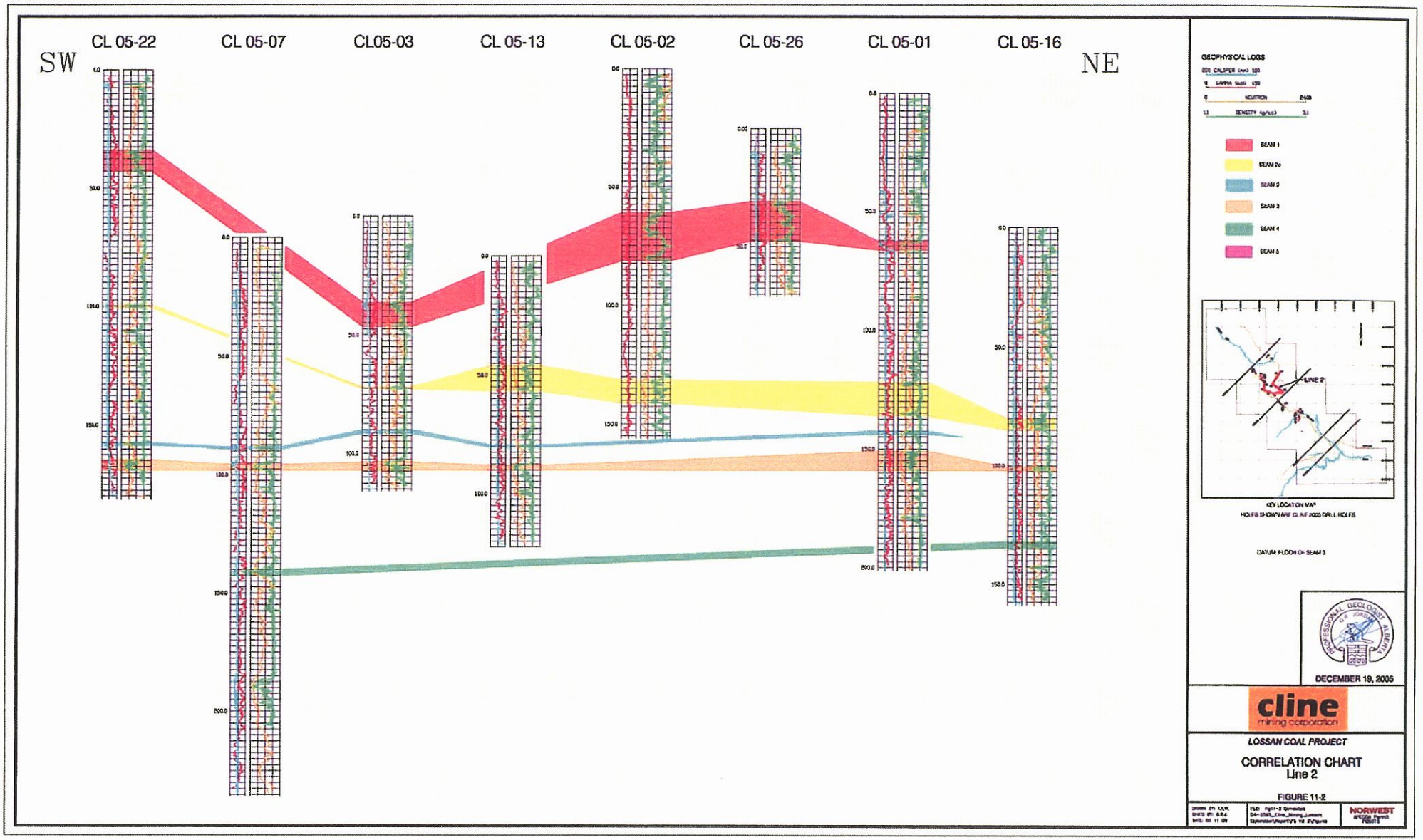
LOSSAN COAL PROJECT
CORRELATION CHART
Line 1
FIGURE 11-1
NORWEST


SW
CL 05-22
CL 05-07
CL05-03
CL 05-13
CL 05-02
CL 05-26
CL 05-01
CL 05-16
NE
GEOPHYSICAL LOGS
SEAM 1
SEAM 2b
SEAM 2
SEAM 3
SEAM 4
SEAM 5
LINE 2
KEY LOCATION MAP
HOLES SHOWN ARE CLINE 2005 DRILL HOLES
DATUM: FLOOR OF SEAM 3
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DECEMBER 19, 2005
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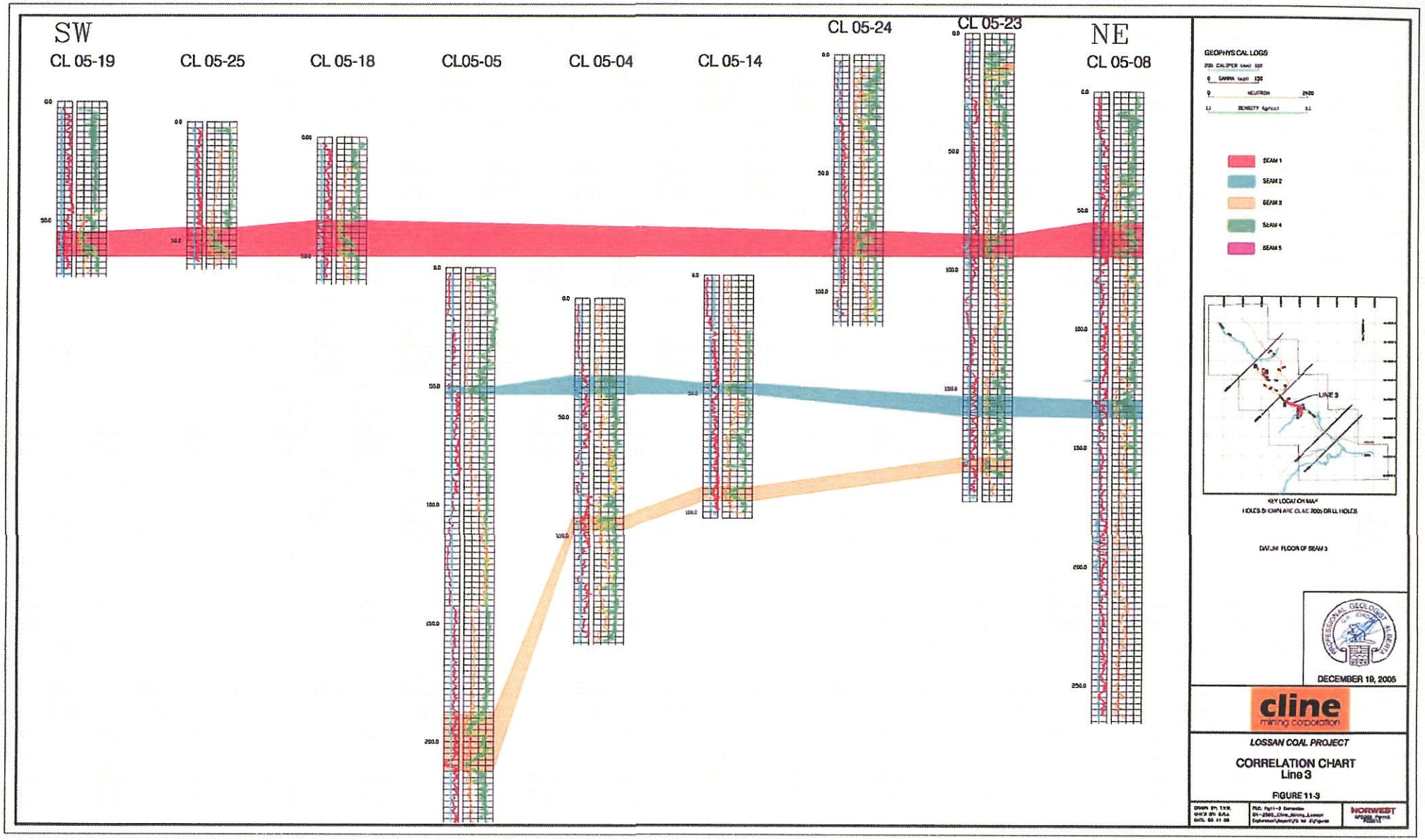
LOSSAN COAL PROJECT
CORRELATION CHART
Line 2
FIGURE 11-2
NORWEST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CL 05-18
CL05-05
CL 05-04
CL 05-14
CL 05-24
CL 05-23
NE
CL 05-08
GEOPHYSICAL LOGS
SEAM 1
SEAM 2
SEAM 3
SEAM 4
SEAM 5
LINE 3
KEY LOCATION MAP
HOLES SHOWN ARE CLINE 2005 DRILL HOLES
DATUM: FLOOR OF SEAM 3
DECEMBER 19, 2005
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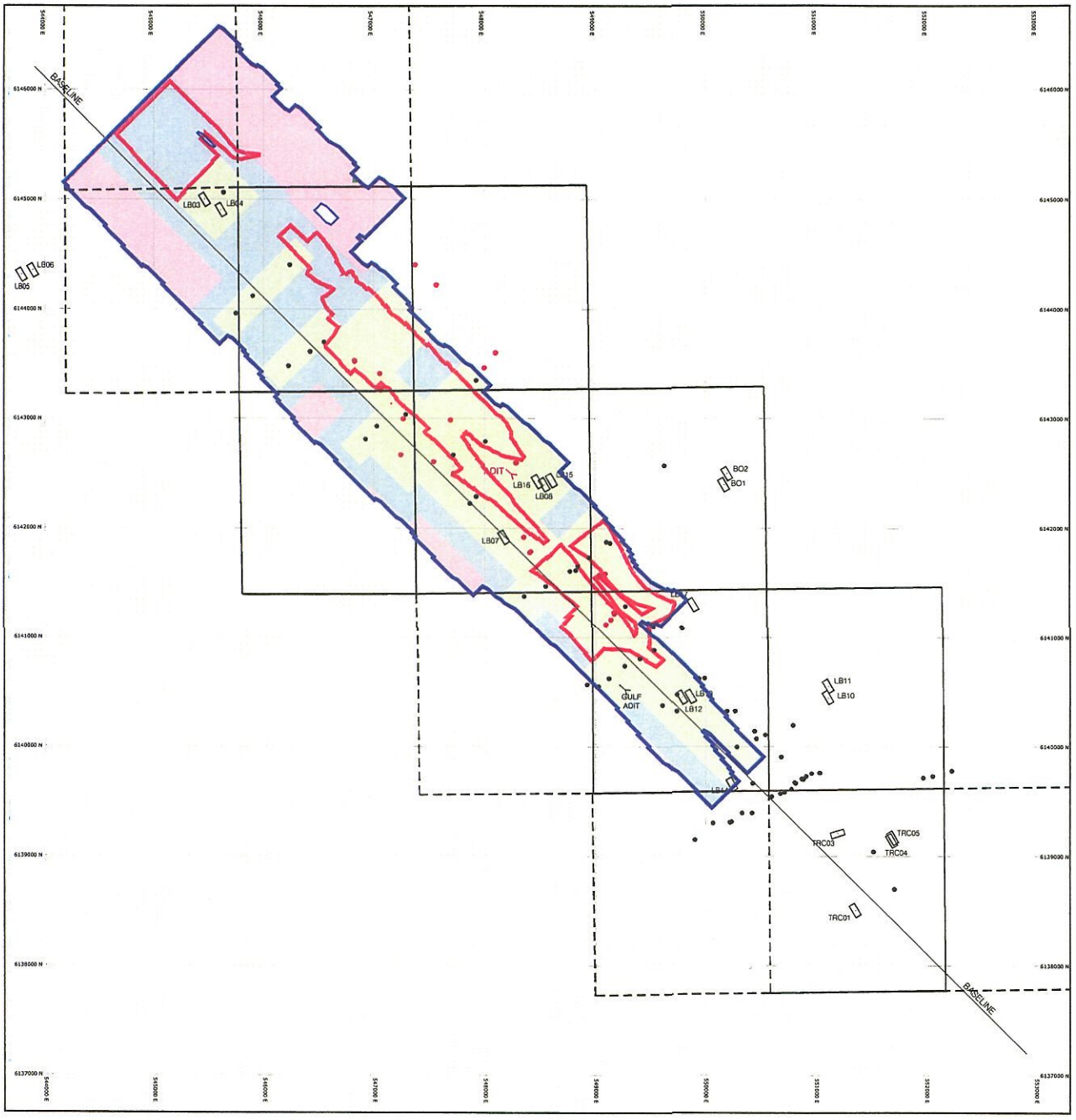
LOSSAN COAL PROJECT
CORRELATION CHART
Line 3
FIGURE 11-3
NORWEST



LEGEND:

- RESERVE LIMIT
- RESOURCE LIMIT
- MEASURED LIMIT
- INDICATED LIMIT
- INFERRED LIMIT

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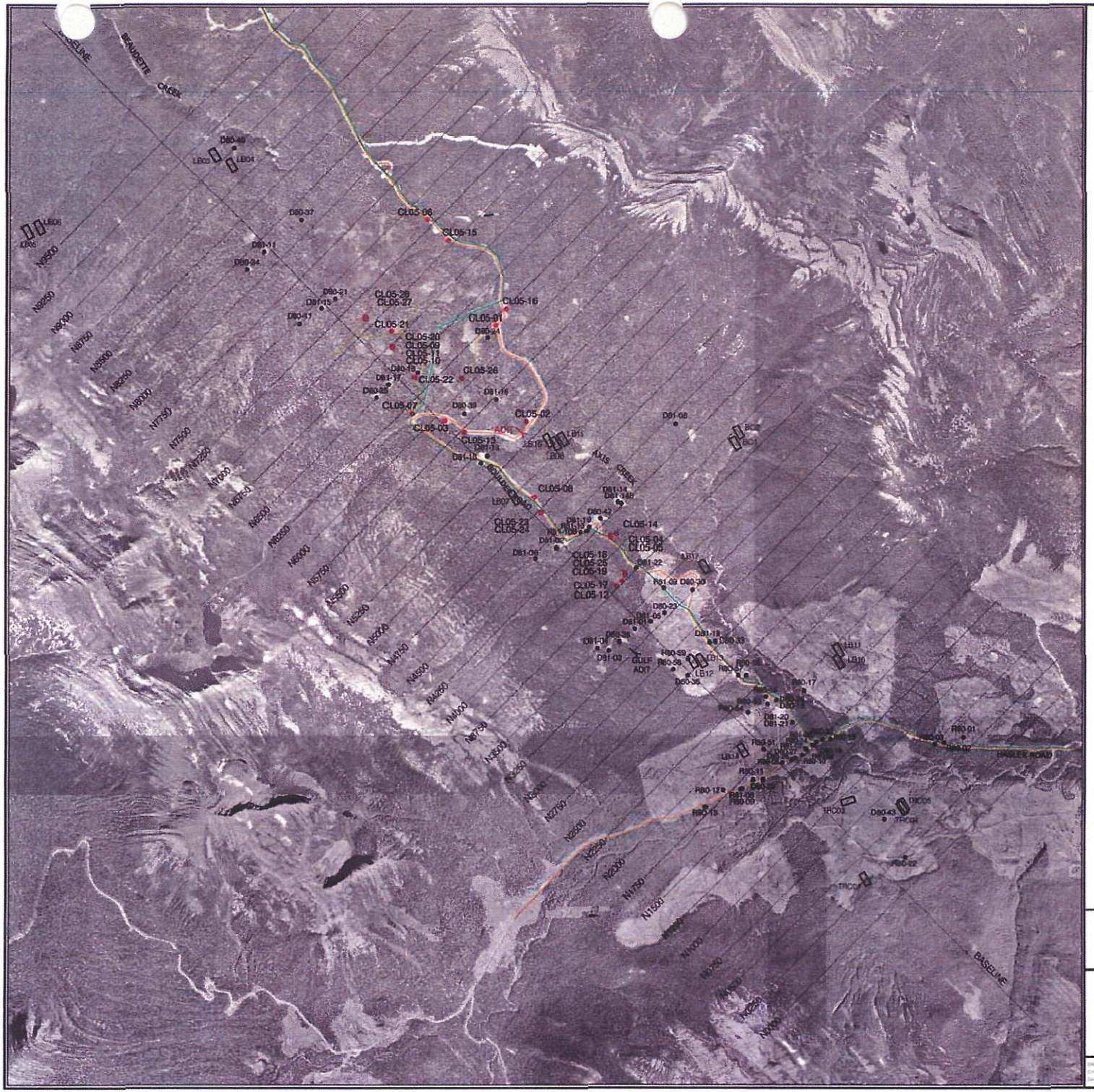
LOSSAN COAL PROJECT

RESERVE AND RESOURCE AREAS

FIGURE 19-1

DRAWN BY: T.V.W. CHK'D BY: G.R.J. DATE: 05 12 13	FILE: Figure 19-1 Res.dwg 04-2595_Cline_Mining_Lossan Exploration\Report\FS Vol 2\Figures	NORWEST APEGGA Permit P05015



LEGEND:

- Cline 2005 ADIT
- Gulf 1982 ADIT
- CL05-01 Cline 2005 Drill Hole
- RB0-01 Gulf Uncored Drill Hole
- D81-01 Gulf Cored Drill Hole
- Trench Location
- Access Road
- 2005 Access Trail
- Sour Gas Pipeline (Location Approximate)
- Gas Compression Station

Metres

SCALE 1:20,000

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LOSSAN COAL PROJECT

LOCATION AND INFRASTRUCTURE MAP 1

NORWEST

LEGEND:

- CONTOURS BASE OF SEAM 5
- INDEX CONTOURS
- FAULT FOOTWALL TRACE
- FAULT HANGING WALL TRACE
- SUBCROP CONTACT
- SYNCLINE
- ANTICLINE

CONTOUR INTERVAL 25 Metres

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LOSSAN COAL PROJECT

STRUCTURE CONTOUR MAP
SEAM 1 SOUTH

MAP 2

NORWEST

LEGEND:

CONTOURS BASE OF SEAM 5

INDEX CONTOURS

FAULT FOOTWALL TRACE

FAULT HANGING WALL TRACE

SUBCROP CONTACT

SYNCLINE

ANTICLINE

CONTOUR INTERVAL 25 Metres

N

500 250 0

Metres

SCALE 1:5,000

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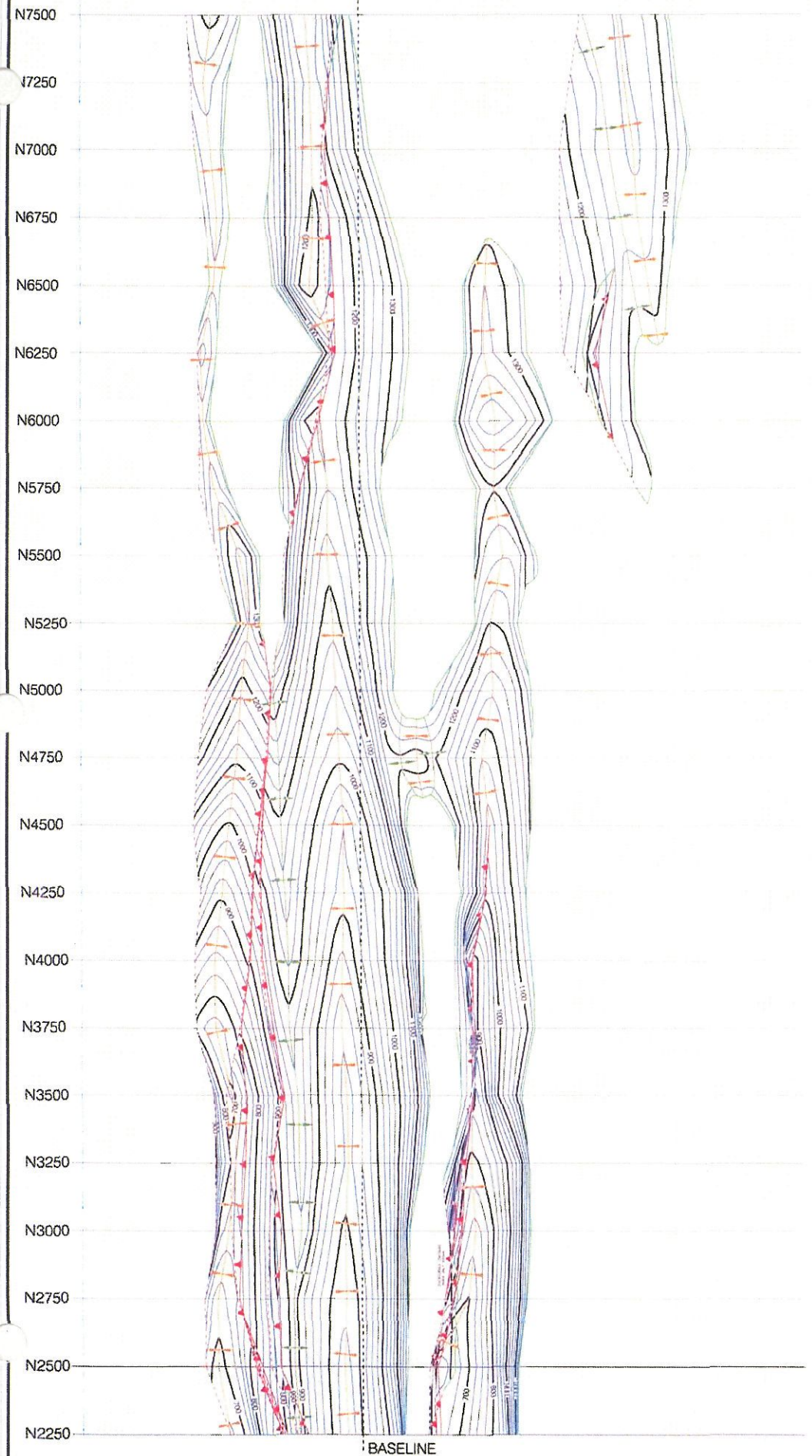
LOSSAN COAL PROJECT

STRUCTURE CONTOUR MAP
SEAM 5 SOUTH
(Gulf Nomenclature)
MAP 3

NORWEST
APEGA Permit P00015



LEGEND:

CONTOURS BASE OF SEAM 5

INDEX CONTOURS

FAULT FOOTWALL TRACE

FAULT HANGING WALL TRACE

SUBCROP CONTACT

SYNCLINE

ANTICLINE

CONTOUR INTERVAL 25 Metres

PROFESSIONAL GEOLOGIST ALBERTA

DECEMBER 19, 2005

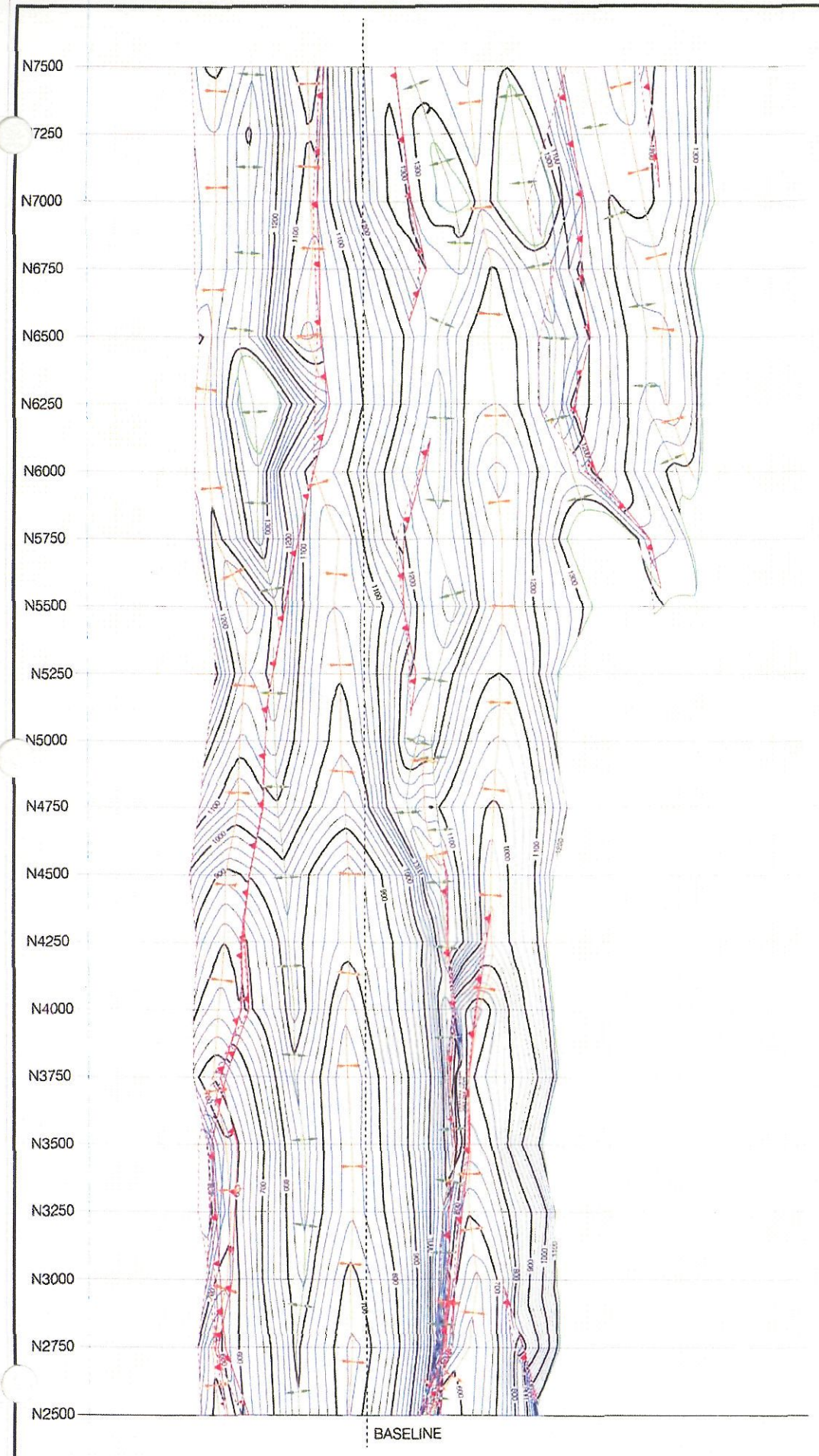
cline mining corporation

LOSSAN COAL PROJECT

STRUCTURE CONTOUR MAP
SEAM 1 NORTH

MAP 4

NORWEST



LEGEND:

- CONTOURS BASE OF SEAM 5
- INDEX CONTOURS
- FAULT FOOTWALL TRACE
- FAULT HANGING WALL TRACE
- SUBCROP CONTACT
- SYNCLINE
- ANTICLINE

CONTOUR INTERVAL 25 Metres

PROFESSIONAL GEOLOGIST ALBERTA

DECEMBER 19, 2005

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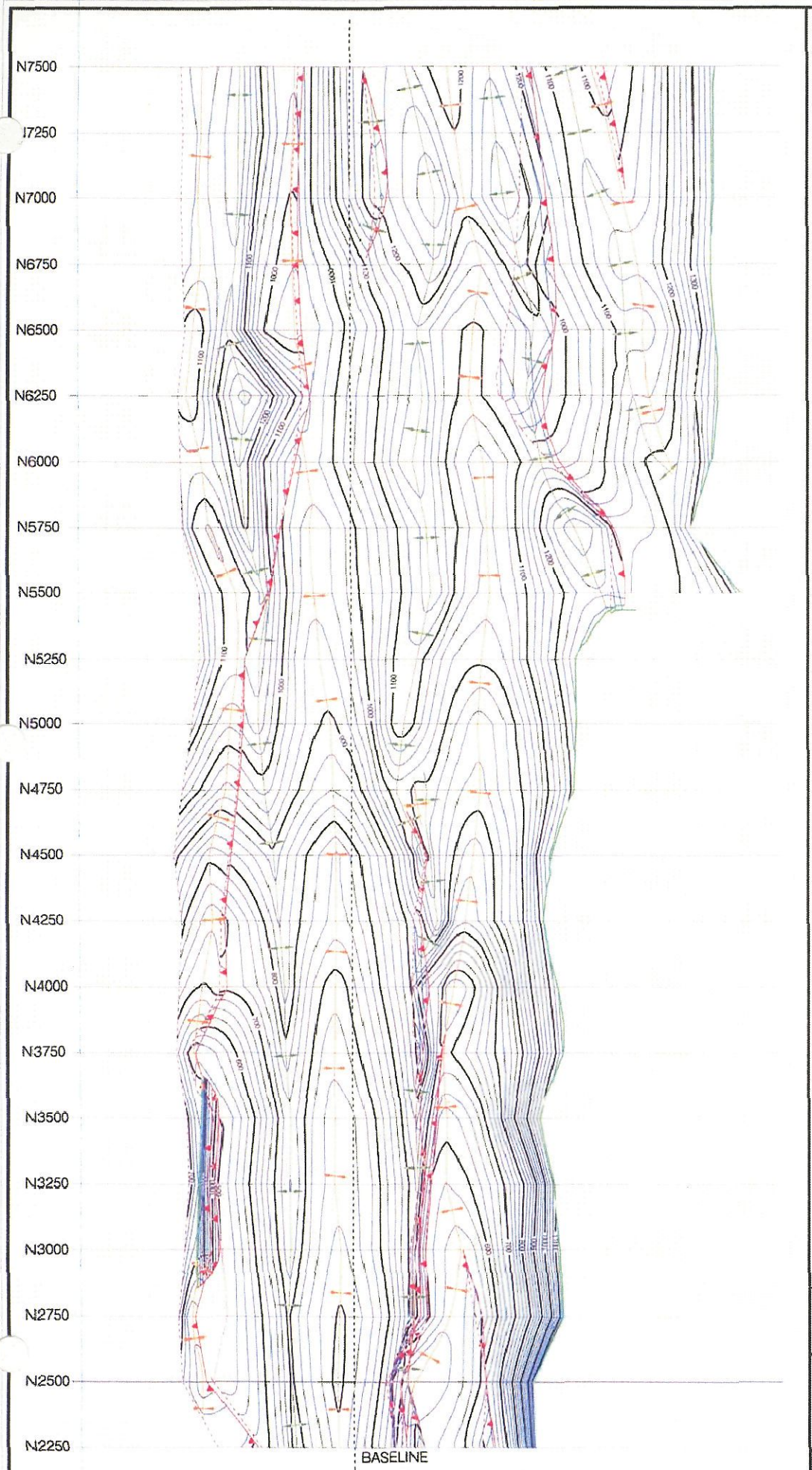
LOSSAN COAL PROJECT

STRUCTURE CONTOUR MAP
SEAM 3 NORTH

MAP 5

NORWEST



LEGEND:

- CONTOURS BASE OF SEAM 5
- INDEX CONTOURS
- FAULT FOOTWALL TRACE
- FAULT HANGING WALL TRACE
- SUBCROP CONTACT
- SYNCLINE
- ANTICLINE
- LIMIT OF DATA

CONTOUR INTERVAL 25 Metres

PROFESSIONAL GEOLOGIST G.R. JORDAN ALBERTA

DECEMBER 19, 2005

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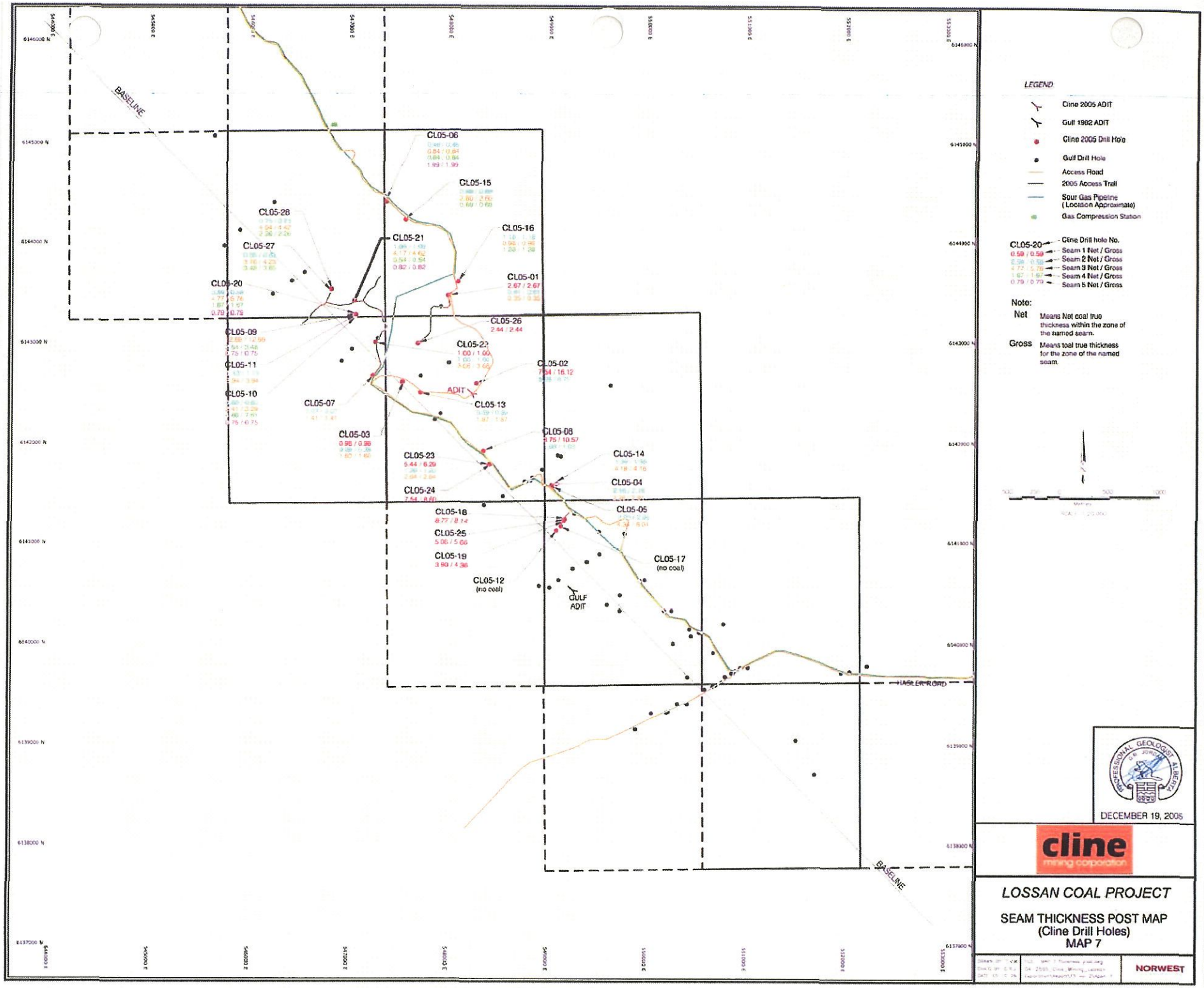
LOSSAN COAL PROJECT

STRUCTURE CONTOUR MAP SEAM 5 NORTH

MAP 6

NORWEST


BASELINE
CL05-06
CL05-15
CL05-28
CL05-16
CL05-27
CL05-21
CL05-01
CL05-20
CL05-26
CL05-09
CL05-22
CL05-11
CL05-02
CL05-10
ADIT
CL05-07
CL05-13
CL05-03
CL05-08
CL05-23
CL05-14
CL05-04
CL05-24
CL05-18
CL05-05
CL05-25
CL05-19
CL05-17
(no coal)
CL05-12
(no coal)
GULF
ADIT
BASELINE
LEGEND
Cline 2005 ADIT
Gulf 1982 ADIT
Cline 2005 Drill Hole
Gulf Drill Hole
Access Road
2005 Access Trail
Sour Gas Pipeline
(Location Approximate)
Gas Compression Station
CL05-20 Cline Drill hole No.
0.59 / 0.59 Seam 1 Net / Gross
Seam 2 Net / Gross
Seam 3 Net / Gross
Seam 4 Net / Gross
Seam 5 Net / Gross
Note:
Net Means Net coal true thickness within the zone of the named seam.
Gross Means toal true thickness for the zone of the named seam.
DECEMBER 19, 2005
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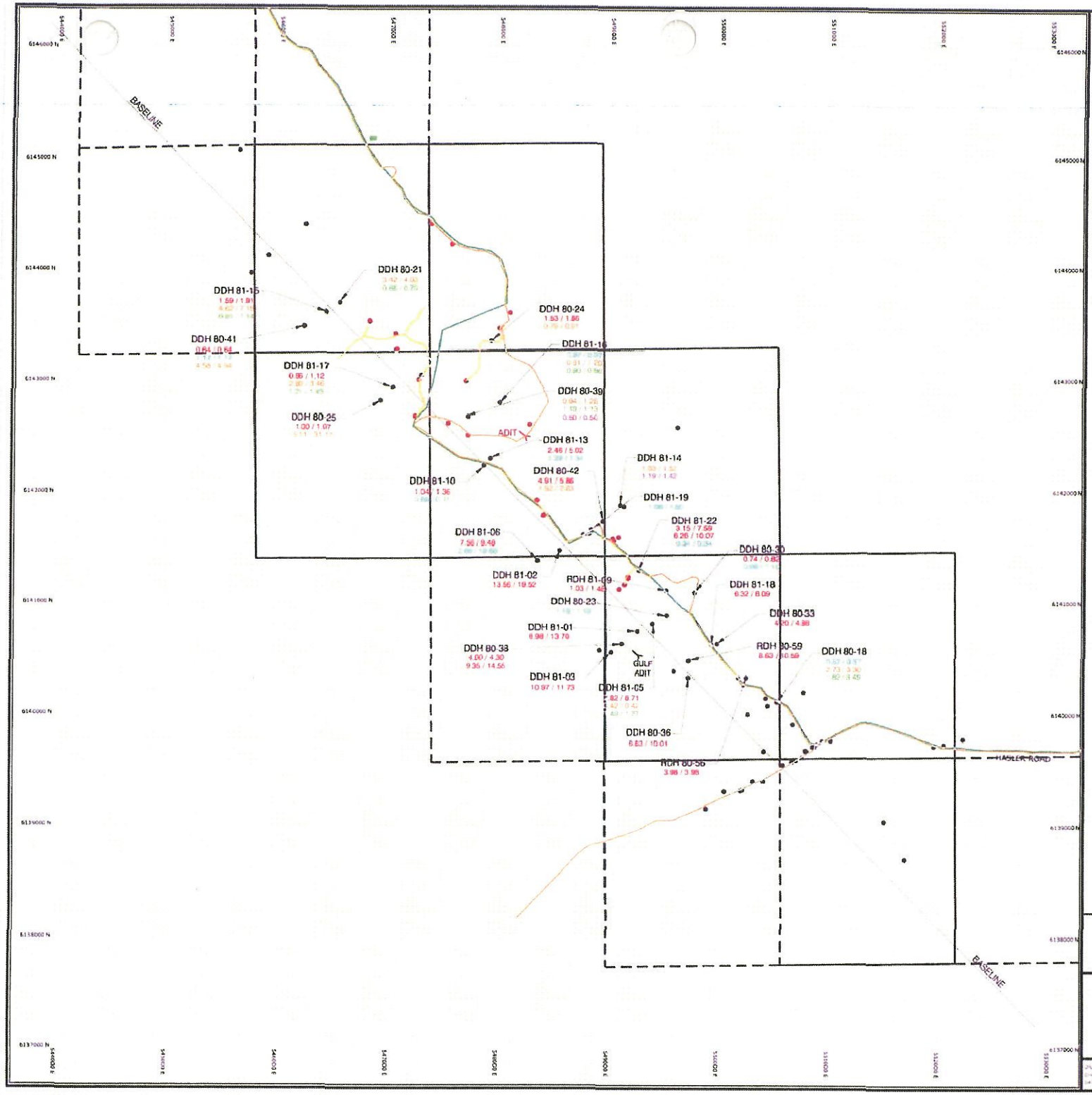
LOSSAN COAL PROJECT
SEAM THICKNESS POST MAP
(Cline Drill Holes)
MAP 7
NORWEST


BASELINE
DDH 80-21
DDH 81-15
1.59 / 1.91
DDH 80-24
1.53 / 1.86
DDH 80-41
0.64 / 0.64
DDH 81-16
DDH 81-17
0.85 / 1.12
DDH 80-39
DDH 80-25
1.00 / 1.07
ADIT
DDH 81-13
2.46 / 5.02
DDH 81-14
DDH 80-42
4.91 / 5.86
DDH 81-10
DDH 81-19
DDH 81-22
3.15 / 7.59
6.26 / 10.07
DDH 81-06
7.56 / 9.49
DDH 80-30
0.74 / 0.82
DDH 81-02
13.56 / 19.52
RDH 81-09
1.03 / 1.46
DDH 81-18
6.32 / 8.09
DDH 80-23
DDH 80-33
4.90 / 4.98
DDH 81-01
6.98 / 13.70
RDH 80-59
8.63 / 10.59
DDH 80-18
DDH 80-38
4.00 / 4.30
9.35 / 14.56
GULF ADIT
DDH 81-03
10.97 / 11.73
DDH 81-05
DDH 80-36
8.83 / 10.01
RDH 80-56
3.98 / 3.98
HASLER ROAD
BASELINE
LEGEND:
Cline 2005 ADIT
Gulf 1982 ADIT
Cline 2005 Drill Hole
Gulf Drill Hole
Access Road
2005 Access Trail
Sour Gas Pipeline
(Location Approximate)
Gas Compression Station
DDH 05-20
0.59 / 0.59
Gulf Drill hole No.
Seam 1 Net / Gross
Seam 2 Net / Gross
Seam 3 Net / Gross
Seam 4 Net / Gross
Seam 5 Net / Gross
Note:
Net
Means Net coal true thickness within the zone of the named seam.
Gross
Means total true thickness for the zone of the named seam.
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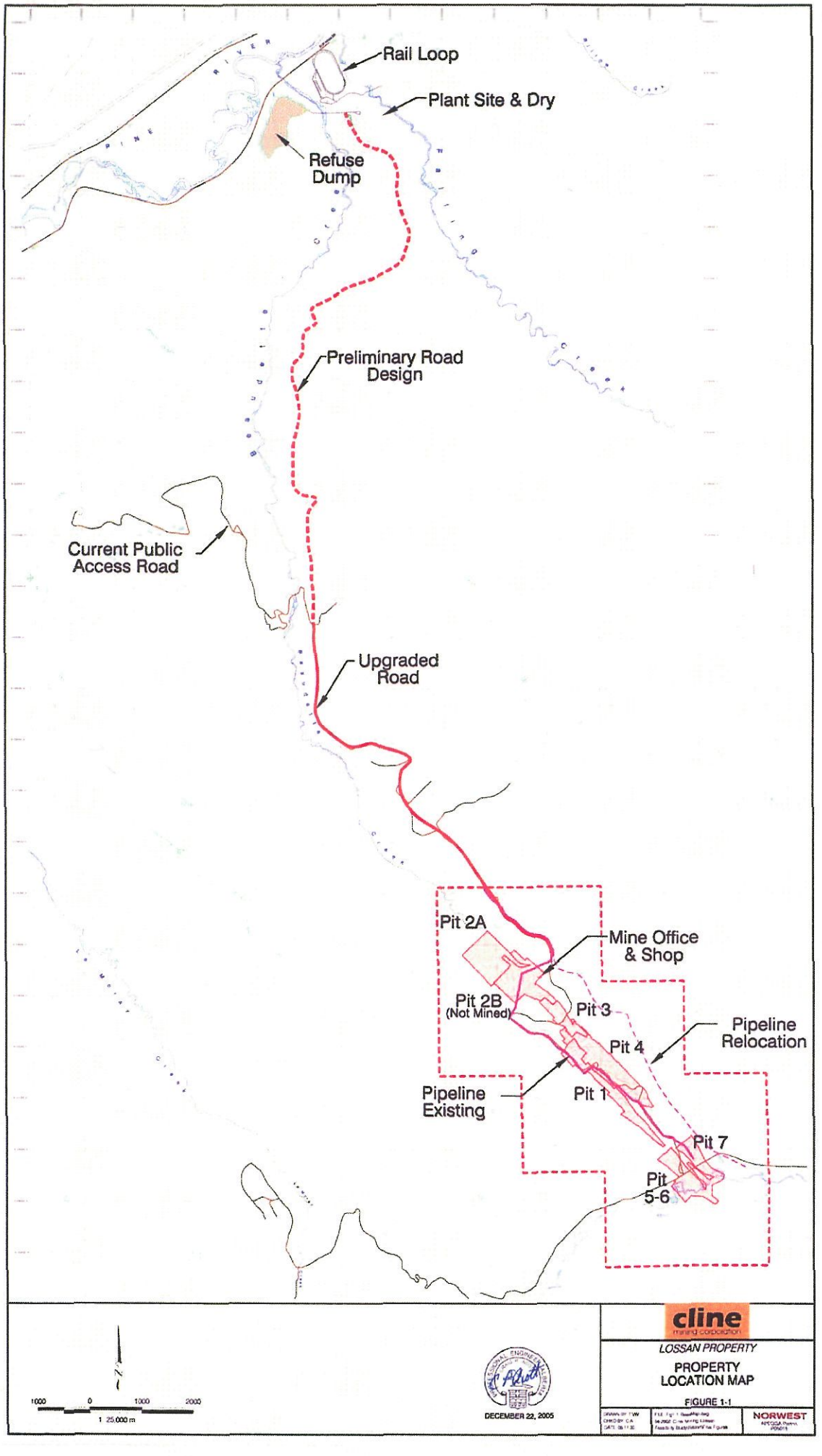
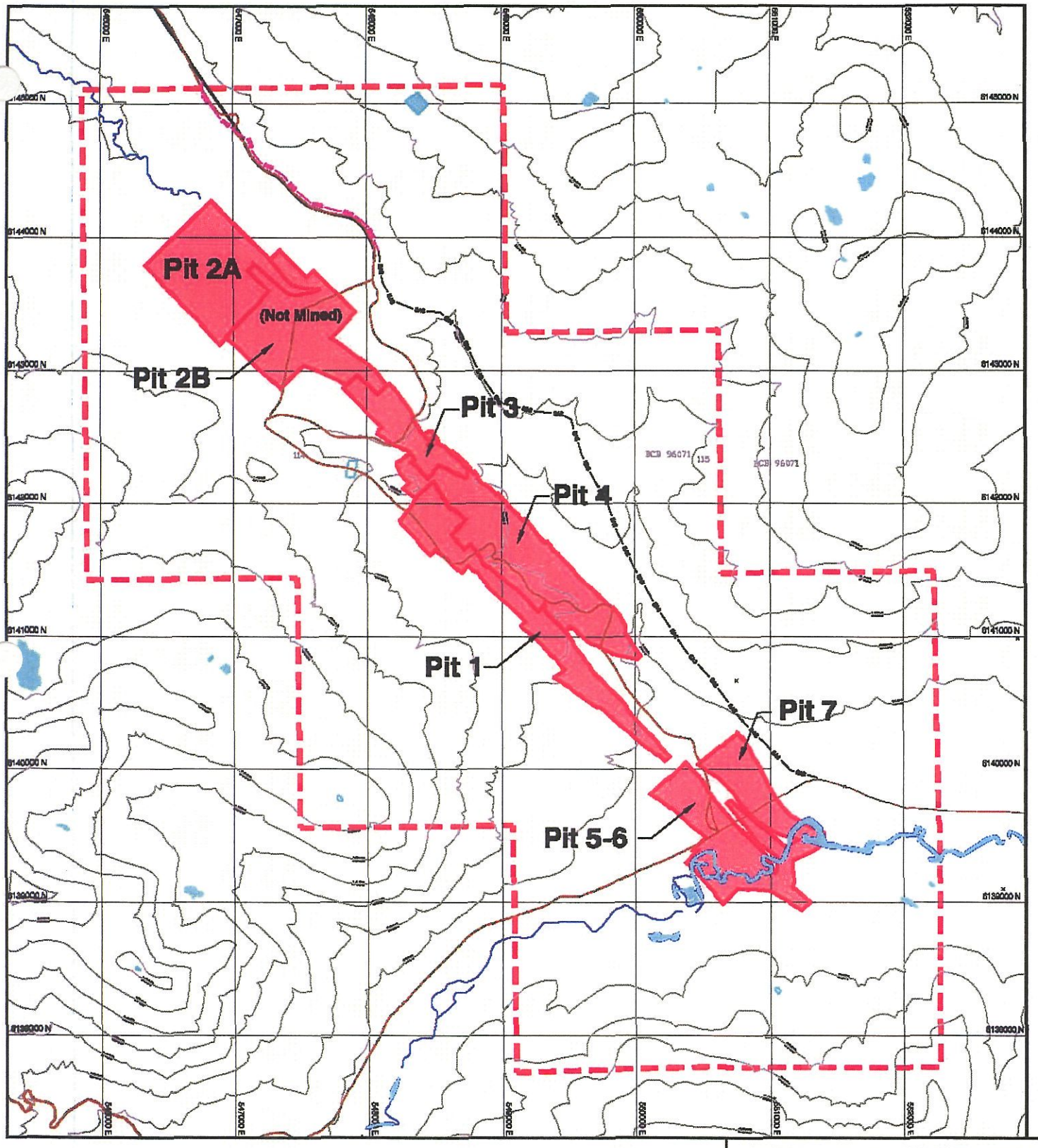
LOSSAN COAL PROJECT
SEAM THICKNESS POST MAP
(Gulf Drill Holes)
MAP 8
NORWEST


Rail Loop
Plant Site & Dry
Refuse Dump
Preliminary Road Design
Current Public Access Road
Upgraded Road
Pit 2A
Mine Office & Shop
Pit 2B (Not Mined)
Pit 3
Pipeline Relocation
Pit 4
Pipeline Existing
Pit 1
Pit 7
Pit 5-6
1000 0 1000 2000
1 : 25,000 m
DECEMBER 22, 2005
cline mining corporation
LOSSAN PROPERTY
PROPERTY LOCATION MAP
FIGURE 1-1
NORWEST



PROFESSIONAL ENGINEER ALBERTA
CRAIG P. ACOTT

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CLINE MINING CORPORATION

LOSSAN PROPERTY

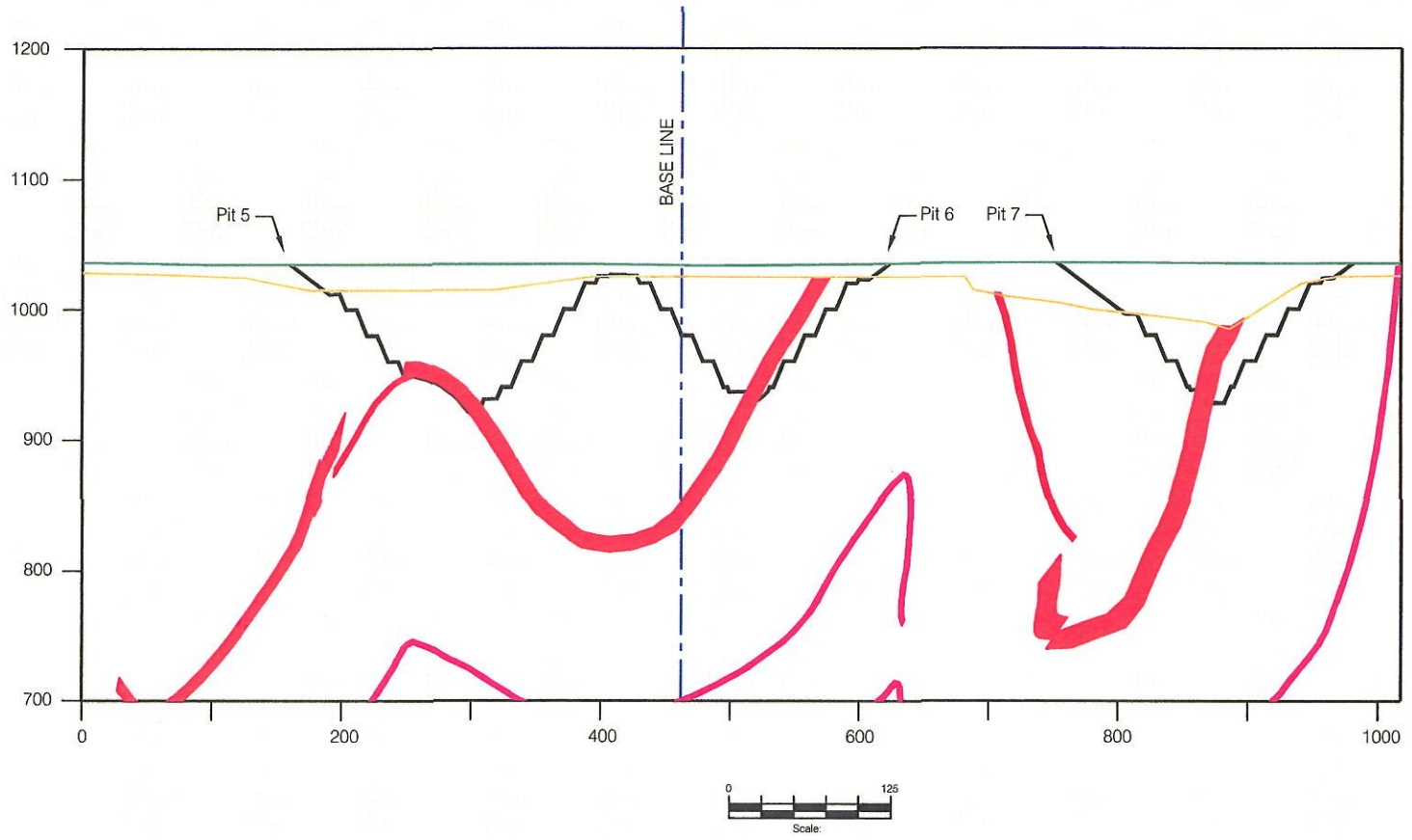
ULTIMATE PIT DESIGN

FIGURE 2-1

DRAWN BY: M.L.E. CHKD BY: C.A. DATE: 05 11 25	FILE: ULTIMATE PIT DESIGN.dwg 04-2602 Cline Mining Lossan Feasibility Study\Report\Final Figures	NORWEST APEGGA Permit P05015

W

E



LEGEND

- BASELINE
- TOPO
- TILL
- PIT OUTLINE
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5

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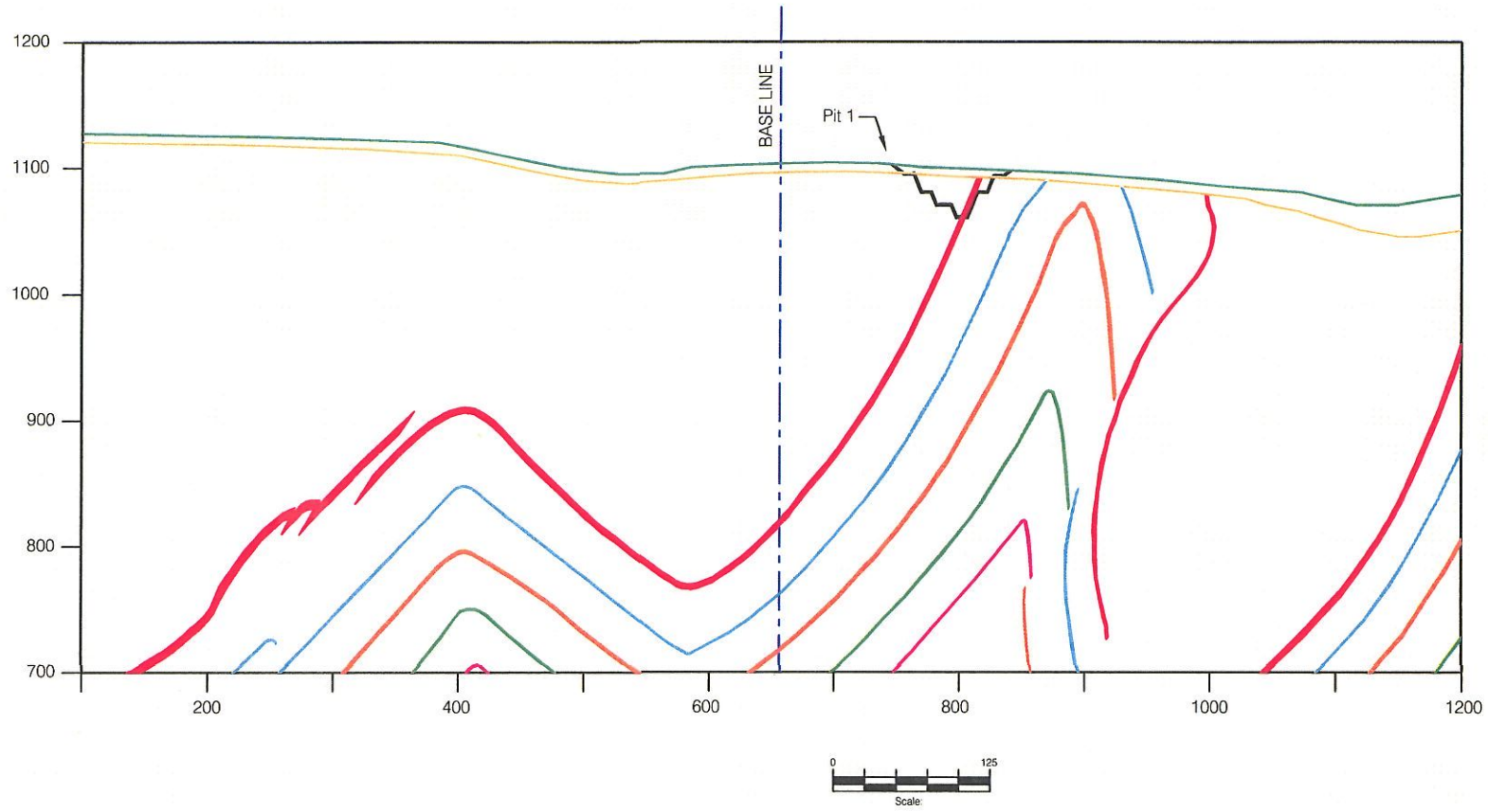
LOSSAN PROPERTY

CROSS SECTION N 1500

FIGURE 2-6

DRAWN BY: M.B. CHK'D BY: C.A. DATE: 05 11 30	FILE: Cross Section 1500N.dwg \2602_Cline_Mining_Lossan_Expl.. \Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015



LEGEND

- BASELINE
- TOPO
- TILL
- PIT OUTLINE
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5

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LOSSAN PROPERTY

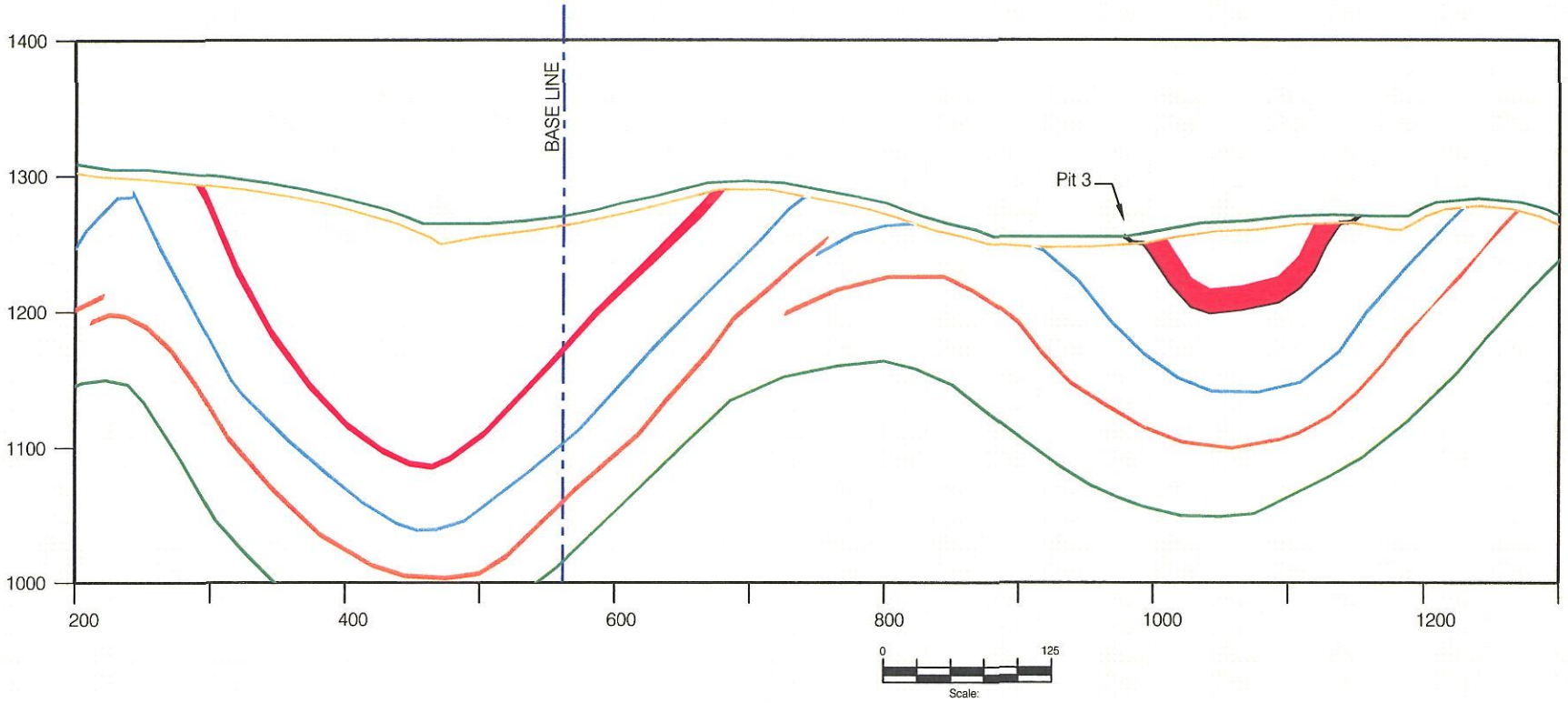
CROSS SECTION N 2500

FIGURE 2-9

DRAWN BY: M.B. CHKD BY: C.A. DATE: 05 11 30	FILE: Cross Section 2500N.dwg \2602_Cline_Mining_Lossan_Expl.. \Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015

W

E



LEGEND

- BASELINE
- TOPO
- TILL
- PIT OUTLINE
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5

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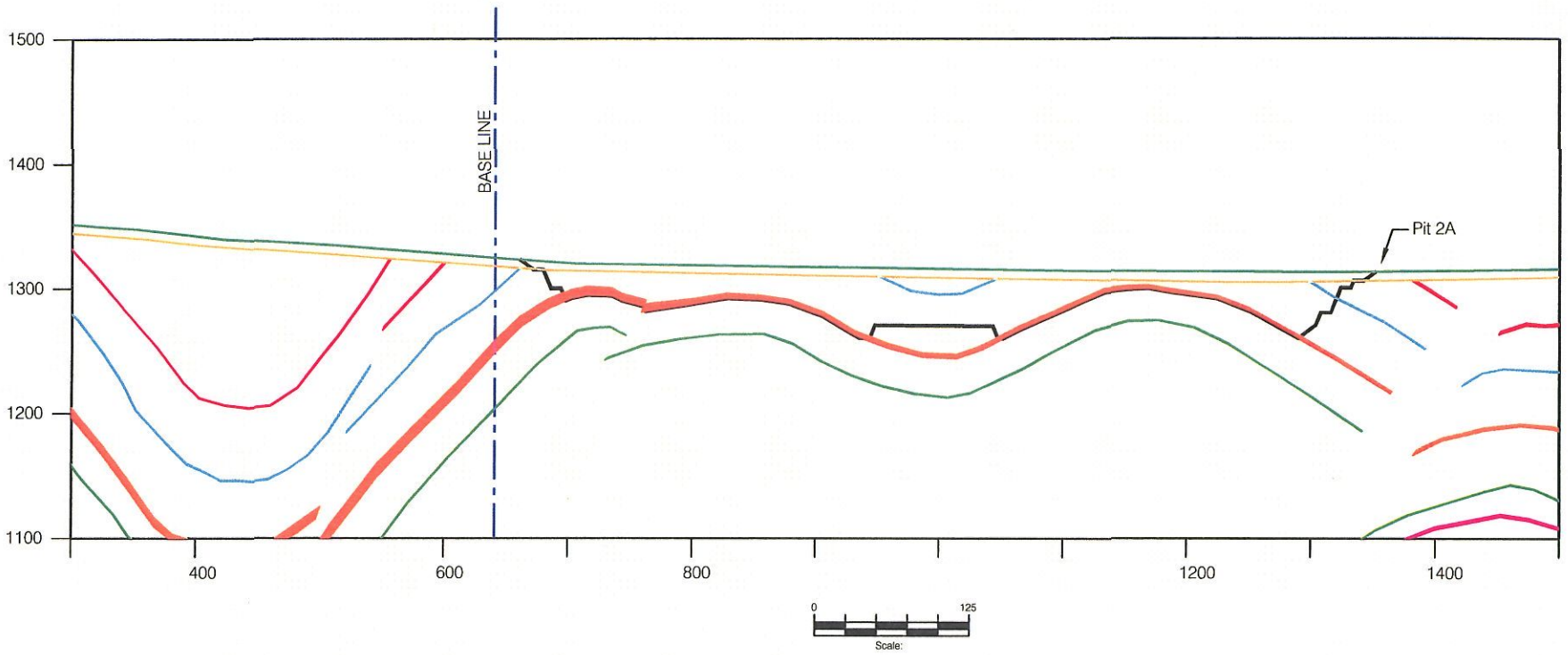
LOSSAN PROPERTY

CROSS SECTION N 5250

FIGURE 2-20

DRAWN BY: M.B. CHKD BY: C.A. DATE: 05 11 30	FILE: Cross Section 5250N.dwg \2602_Cline_Mining_Lossan_Expl.. \Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015



LEGEND

- BASELINE
- TOPO
- TILL
- PIT OUTLINE
- SEAM 1
- SEAM 2
- SEAM 3
- SEAM 4
- SEAM 5

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DECEMBER 22, 2005

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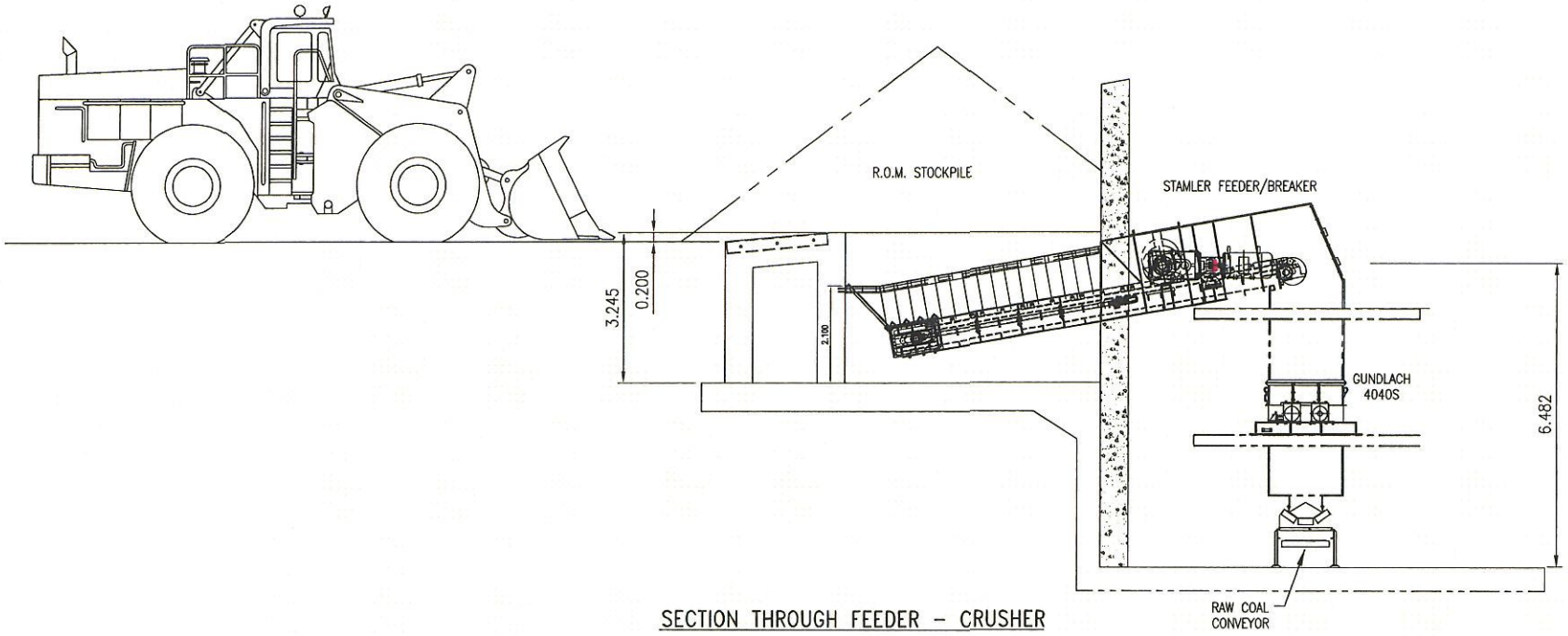
LOSSAN PROPERTY

CROSS SECTION N 7500

FIGURE 2-28

DRAWN BY: M.B. CHKD BY: C.A. DATE: 05 11 30	FILE: Cross Section 7500N.dwg \2602_Cline_Mining_Lossan_Expl.\Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015



SECTION THROUGH FEEDER – CRUSHER

1 0 1 2
METERS

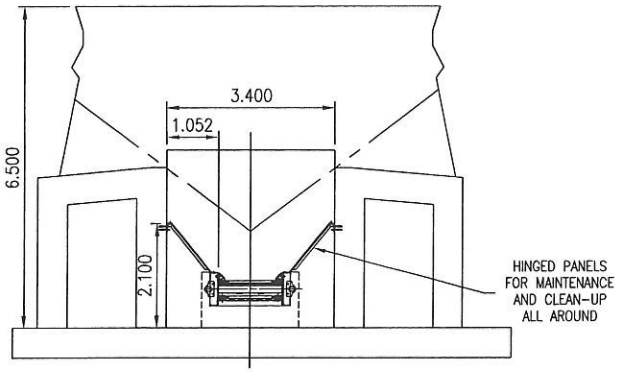
cline mining corporation

LOSSAN PROPERTY

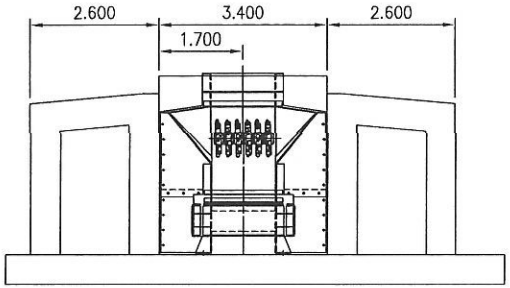
400 TPH PREP PLANT
SIDE VIEW OF PLANT RECLAIM FEEDER

FIGURE 3-15

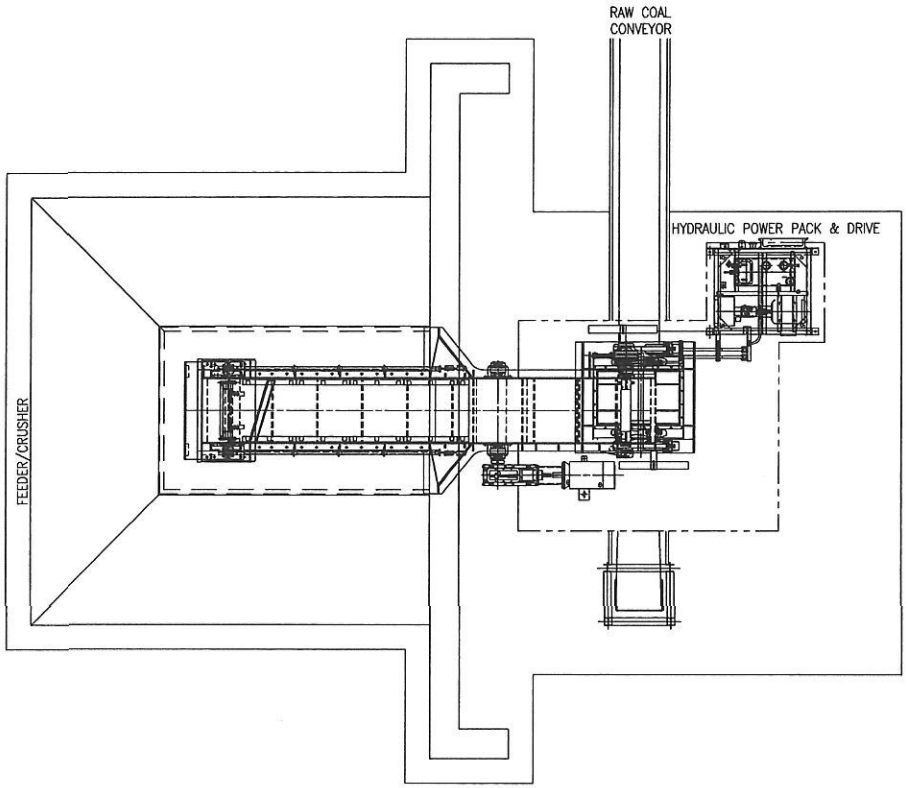
DRAWN BY: DD CHKD BY: C.A. DATE: 05 11 30	FILE:3-15to16truckdump plant.profile \2602_Cline_Mining_Lossan_Expl. \Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015



SECTION THROUGH PIT



SECTION @ CRUSHER FACE



PLAN VIEW FEEDER – CRUSHER

1 0 1 2
METERS

1 0 1 2
METERS

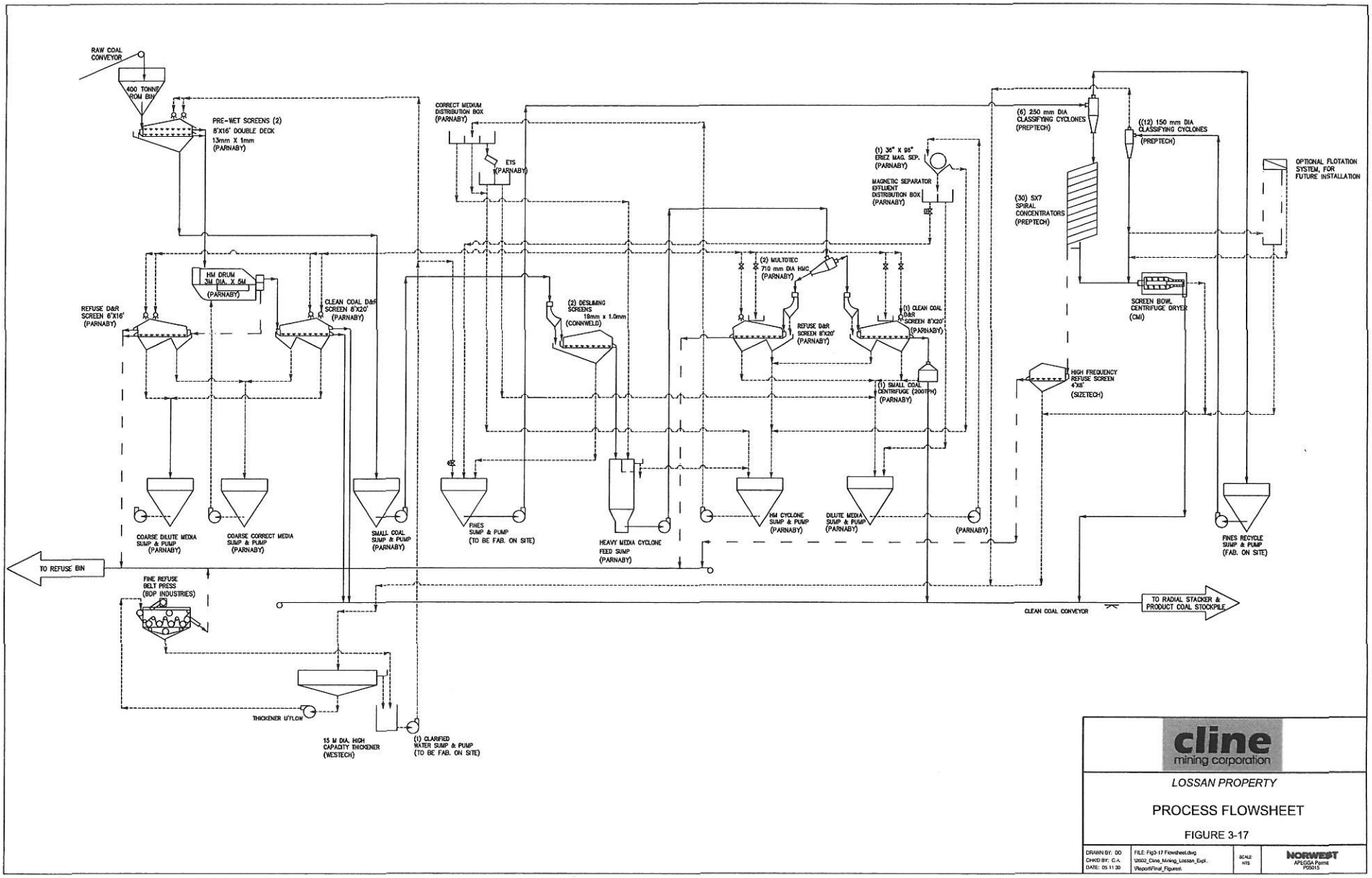
cline mining corporation

LOSSAN PROPERTY

400 TPH PREP PLANT
PLANT RECLAIM FEEDER

FIGURE 3-16

DRAWN BY: DD CHKD BY: C.A. DATE: 05 11 30	FILE:3-15to16truckdump plant profile \2602_Cline_Mining_Lossan_Expl.. \Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P05015



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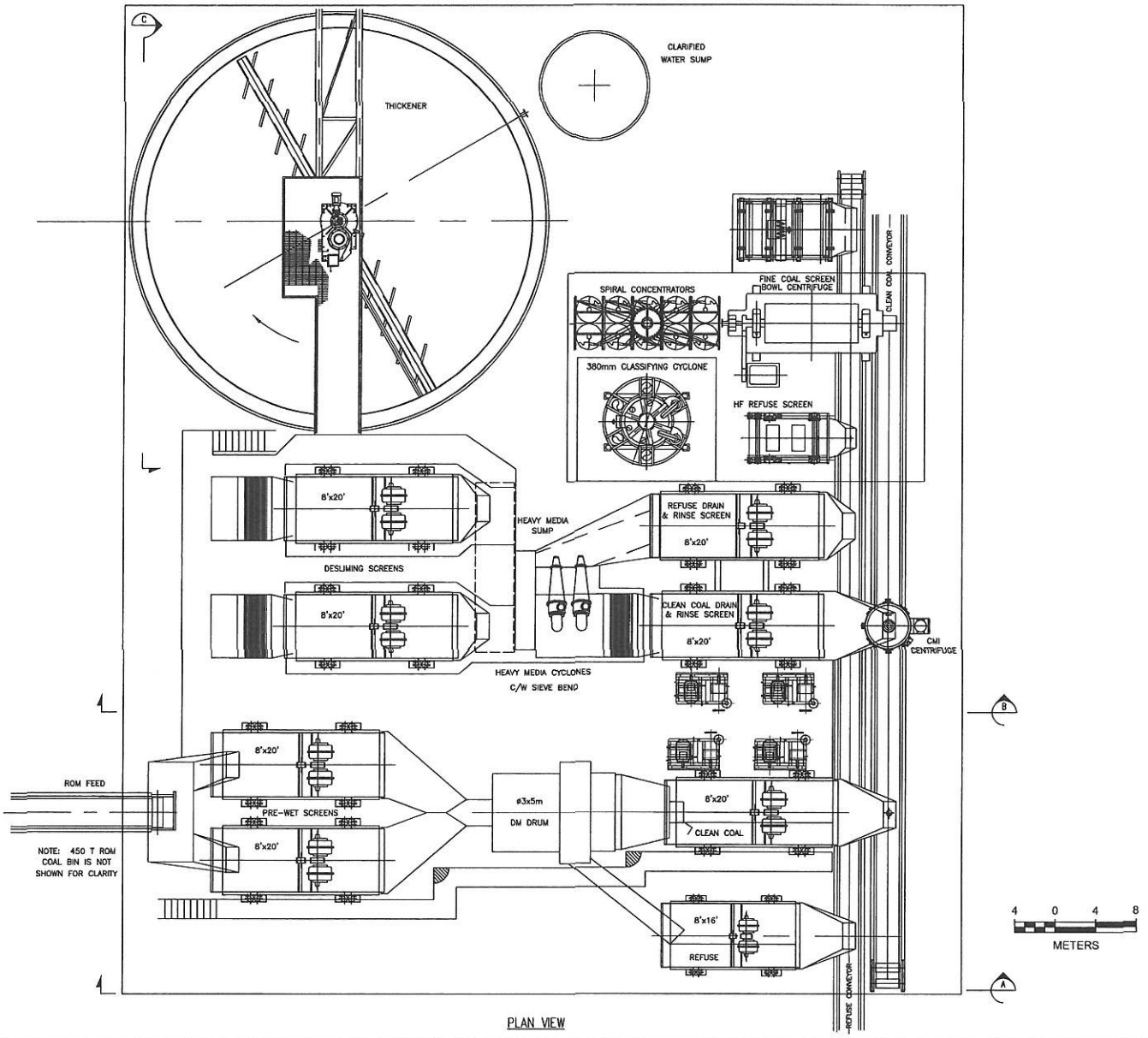
LOSSAN PROPERTY

PROCESS FLOWSHEET

FIGURE 3-17

DRAWN BY: DD CHK'D BY: C.A. DATE: 05 11 30	FILE: Fig3-17 FlowsheetLdwg \2602_Cline_Mining_Lossan_Expl.. \Report\Final_Figures\	SCALE NTS	NORWEST APEGGA Permit P05015



PLAN VIEW

cline mining corporation

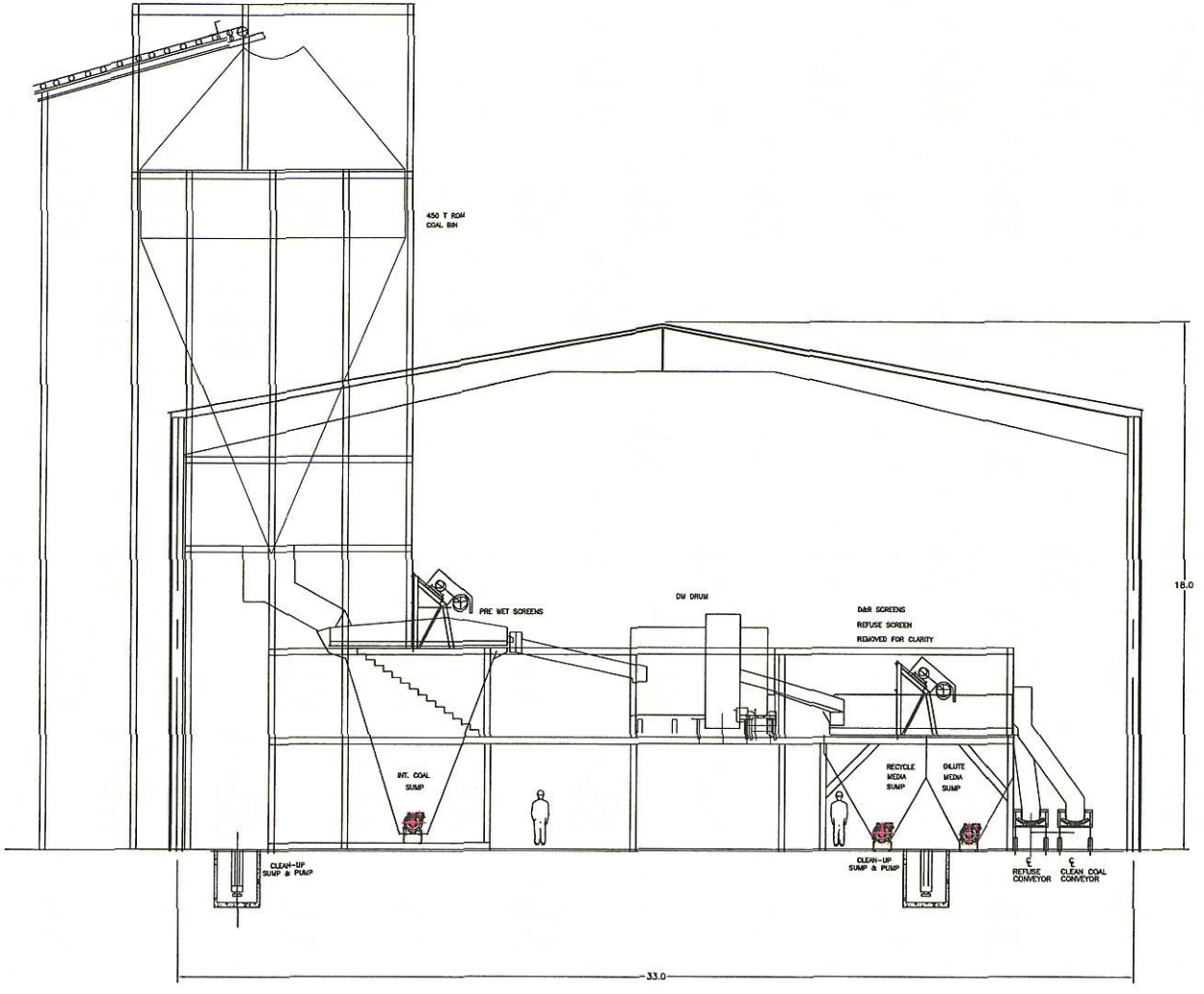
LOSSAN PROPERTY

400 TPH PREP PLANT

PLAN VIEW GENERAL ARRANGEMENT

FIGURE 3-18

DRAWN BY: DD CHKD BY: C.A. DATE: 05 11 30	FILE:3-18b20GeneralArrangement.dwg \2602_Cline_Mining_Lossan_Feasibility _Study\Report\Final_Figures\	SCALE: NTS	NORWEST APEGG Permit P05015



SECTION A

4 0 4 8

METERS

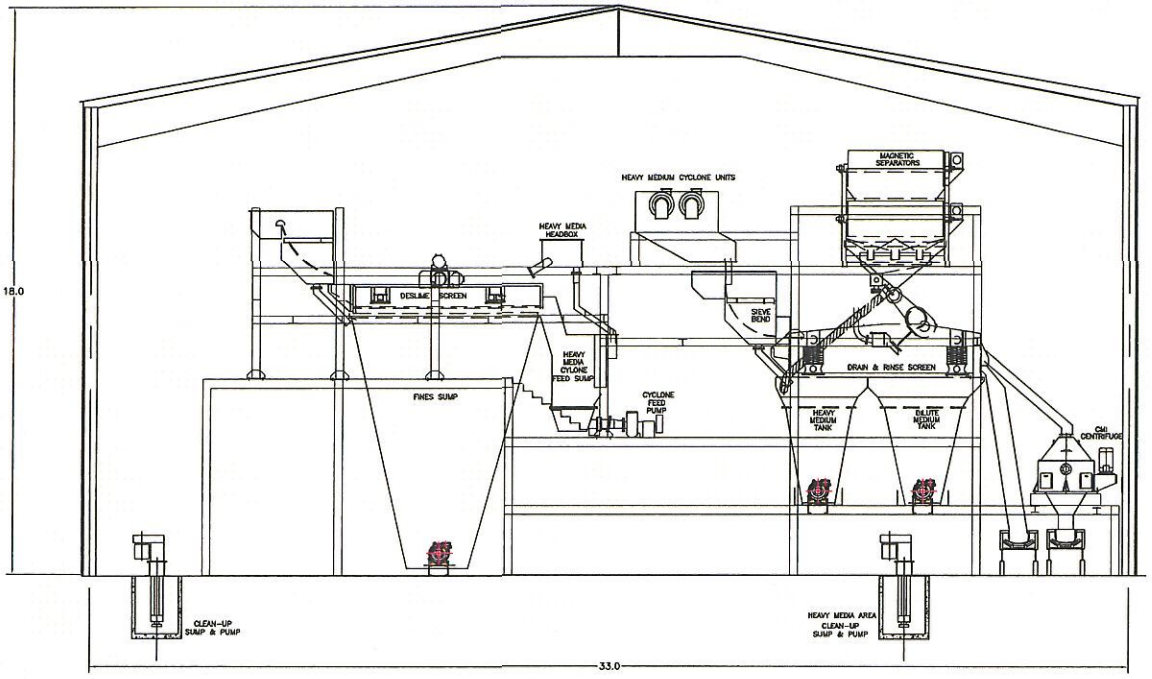
cline mining corporation

LOSSAN PROPERTY

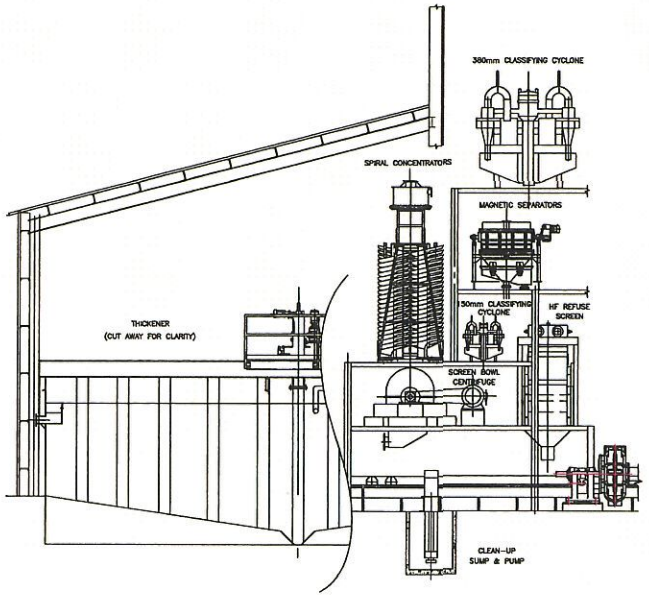
400 TPH PREP PLANT
SECTION A GENERAL ARRANGEMENT

FIGURE 3-19

DRAWN BY: DD CHK'D BY: C.A DATE: 05 11 30	FILE:3-18\c20GeneralArrangement.dwg \2602_Cline_Mining_Lossan_Feasibility _Study\Report\Final_Figures\	SCALE: NTS	NORWEST AFC090_Permit R50018



SECTION B



SECTION C

4 0 4 8

METERS

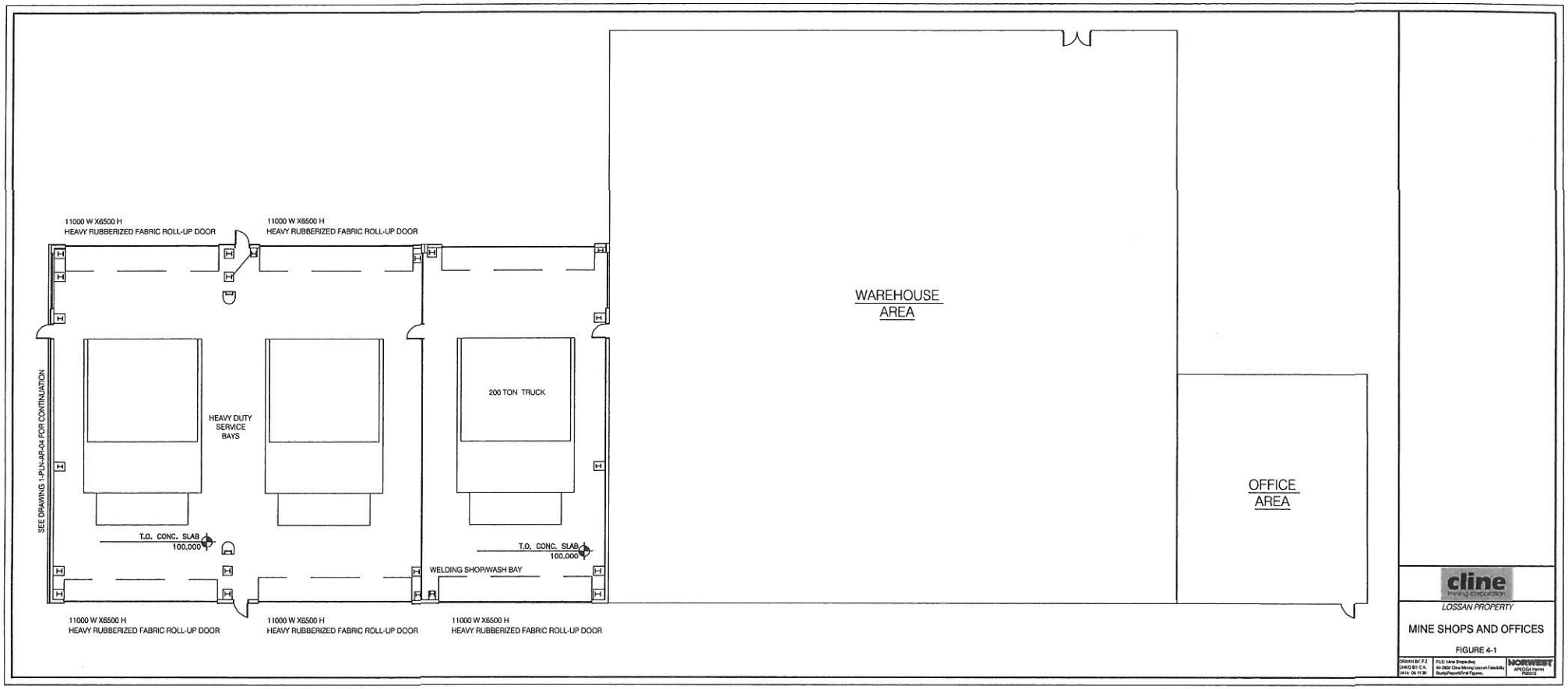
cline mining corporation

LOSSAN PROPERTY

400 TPH PREP PLANT
SECTION B & C
GENERAL ARRANGEMENT

FIGURE 3-20

DRAWN BY: DD CHKD BY: C.A. DATE: 05 11 30	File:E:\3-18to20Genrol\Arrangement.dwg \2005_Cline_Mining_Lossan_Feasibility_Study\Report\Final_Figures\	SCALE: NTS	NORWEST APEGGA Permit P06015


11000 W X6500 H
HEAVY RUBBERIZED FABRIC ROLL-UP DOOR
11000 W X6500 H
HEAVY RUBBERIZED FABRIC ROLL-UP DOOR
WAREHOUSE
AREA
OFFICE
AREA
SEE DRAWING 1-PLN-4R-04 FOR CONTINUATION
HEAVY DUTY
SERVICE
BAYS
200 TON TRUCK
T.O. CONC. SLAB
100.000
T.O. CONC. SLAB
100.000
WELDING SHOP/WASH BAY
11000 W X6500 H
HEAVY RUBBERIZED FABRIC ROLL-UP DOOR
11000 W X6500 H
HEAVY RUBBERIZED FABRIC ROLL-UP DOOR
11000 W X6500 H
HEAVY RUBBERIZED FABRIC ROLL-UP DOOR
cline
LOSSAN PROPERTY
MINE SHOPS AND OFFICES
FIGURE 4-1