

Coal Mining

▲ Telkwa Coal Project

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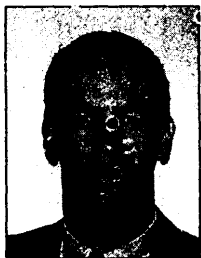
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ABSTRACT

As the next century draws near, new mine properties must be brought into production to replace existing operations that are approaching their economic life. This paper presents some of the critical technical issues being addressed by Manalta Coal Ltd. as they strive to bring the Telkwa Coal Project near Smithers, BC into production during the year 2000. The mine is planned to produce between 1.0 to 1.5 million tonnes per year of medium volatile coal for export to overseas thermal and PCI markets.

Introduction

Manalta Coal Ltd. (Manalta) is proposing the development and operation of a surface coal mine and associated infrastructure approximately six kilometres southwest of the village of Telkwa, British Columbia (Fig. 1). The infra-



Allan R. Flemming graduated from the University of Alberta in 1979 with a Bachelor of Science degree in mining engineering. After a period of operational experience in Canada and overseas he received a Master of Business Administration degree from Deakin University (Melbourne) in 1992. From 1979 to 1981 he held a number of junior and intermediate positions with coal mining and consulting companies before moving to Australia and taking on both engineering and production related positions with Capricorn Coal Management Ltd. at German Creek Mine. He also spent time with ICI Australia in the development and optimization of blasting products and services in the Australian mining industry. He joined Manalta Coal Ltd. in 1990 at the Line Creek Mine and held various positions in the engineering and operations departments. In his current role as chief engineer he is responsible for providing support to the Manalta mines and corporate office personnel by managing the engineering department in Calgary. He is also the project manager for the proposed Telkwa Coal Project. Mr. Flemming is a member of CIM, the Association of Professional Engineers, Geologists and Geophysicists of Alberta, and the Australasian Institute of Mining and Metallurgy.

structure consists of a coal washing facility, tailings disposal area, clean coal haul road, access road and rail loadout facility. Over a 25-year period, the mine is expected to produce between 25 and 37 million clean tonnes of coal primarily for the export market.

To achieve public and governmental approval for the development, the project will be reviewed under British Columbia's Environmental Assessment Act. Manalta entered the formal Assessment process in February 1, 1997 with the submission of an Application for a Project Approval Certificate for the Telkwa Coal Project.

Telkwa Coal Project History

The Telkwa Coal Project was initially investigated by Crows Nest Resources Ltd. (CNRL), a subsidiary of Shell Canada Ltd. CNRL purchased coal licenses for the property in 1978 and then, in 1985, CNRL submitted a development application for the Pit 3 coal reserves south of the Telkwa River.

CNRL obtained a Stage II Approval-in-principle (currently a Project Approval Certificate) in November, 1986 but the project was placed on hold due to depressed world coal markets. Coal exploration, however, continued in the proposed mine area. The addition of coal reserves north of the Telkwa River (Pits 7 and 8) improved the economics of the project enough to justify the development of a conceptual mine plan. In March 1990, CNRL submitted an application for a Stage II Approval under the Mine Development Review Process covering an expanded project plan, which included Pits 3, 7 and 8 reserves.

This process was interrupted, in May 1992, when Manalta Coal Ltd. purchased the Telkwa coal property. Since 1992, Manalta has held ongoing discussions with the review agencies that focussed on developing an acceptable acid rock drainage (ARD) material handling plan and reclamation planning issues.

In January 1997, Manalta withdrew its application under the old assessment process and in February 1997, re-entered the Environmental Assessment process with an application

for a Project Approval Certificate in support of the Telkwa Coal Project. In part, this was due to the inclusion of a new pit area in the nearby Tenas Creek area, which had been proved up by Manalta's exploration programs.

Geology

Although bedding orientations within the Telkwa Coal Property resource areas tend to be fault block controlled, each with independent orientations, dips normally range from 10 to 30 degrees.

The Tenas resource area lies within a closed northwest / southeast trending synform and contains coal from the Unit I zone. Orientations along the west limb are consistently northeasterly dipping, normally ranging from 9 to 22 degrees, while along the east limb dips steepen to 45 degrees in a southwesterly direction. Three seams currently identified as c-seam (1.5 m), 1-Upper seam (1.93 m), and 1-seam (3.45 m), are consistent in nature, and form the mineable component of the Tenas resource. The seams are separated by siltstone / mudstone partings that vary in thickness from 0 to 13 m.

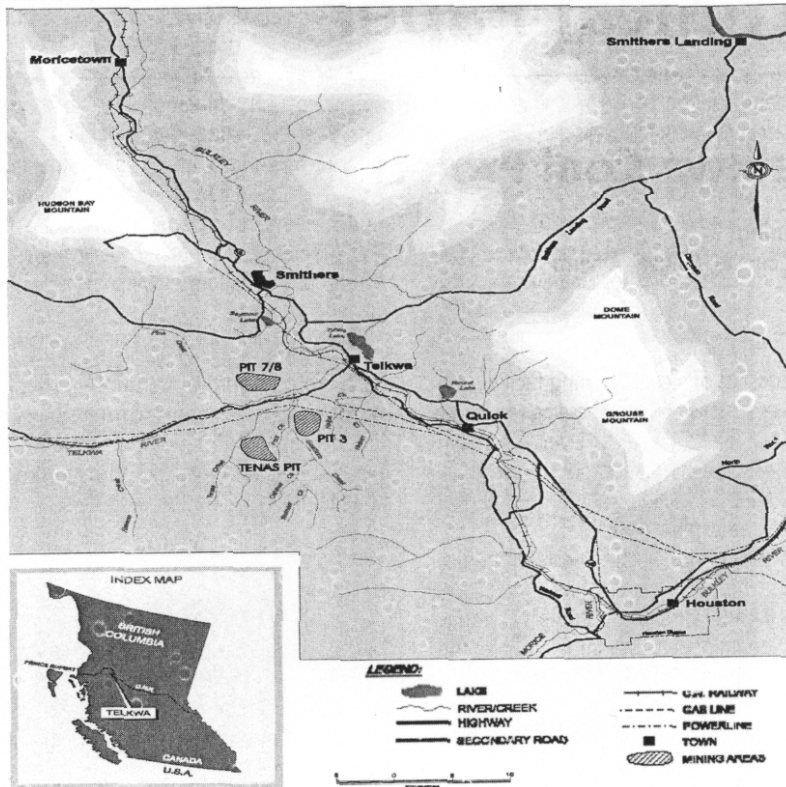
Much of Goathorn area (Pit 3 area) is characterized by an east-dipping stratigraphy, repeatedly broken by a series of north/south trending normal faults. Regional dips range from 10 to 35 degrees, averaging 20 degrees, while normal fault displacements range up to 20 m. The seams in this area are from Unit III and include seams No. 2 to 11. The economical seams vary from 1.0 m to 3.4 m and are separated by interburden of 3 m to 20 m.

The Bowser resource area (Pits 7 and 8) also contains the Unit III coal measures. The area is constrained in the north by a large Tertiary granodiorite plug and a near vertical fault on the east side. Seam and interburden thickness are similar to those in the Goathorn area.

Project Description

Coal associated with the Telkwa property is a high quality, low ash, bituminous coal

Fig. 1. Telkwa Coal project, location map.



suitable for use as a fuel for thermal power generation or in the steel making industry as a Pulverized Coal Injection (PCI) product. The coal has a very high calorific value (>7350 kcal/kg), low ash (9% ash), and low fines content (>90% passing 2.5 mm). Coal will be sequentially mined from the three major mining areas within the project area. Clean coal will be hauled from the coal preparation plant along an access road to a rail loadout on the CN mainline. Coal will then be loaded onto unit trains and transported approximately 400 km by rail to the port of Prince Rupert.

Description of the Mine Plan

Coal will be mined exclusively from open pits using conventional truck and shovel methods. Mining is planned to start in the Tenas Pit (south of Telkwa River), followed by the Pit 3 area. The third and final mining area will include Pits 7 and 8 (north of Telkwa River). Table 1 summarizes the coal reserves and approximate pit life for each of the three mining areas.

Table 1. Mine area information

Mining area	Raw coal reserves (MT)	Years mined
Tenas Pit	20	0 — 14
Pit 3	15	14 — 20
Pits 7 and 8	11	20 +
Total	46	

The primary waste moving fleet will consist of one 33.6 m³ electric shovel loading 177-tonne haul trucks and secondary loading will

be by hydraulic excavator and front-end loader. Modern state-of-the-art mining technology (geological modeling, global positioning surveying, and equipment positioning) will be used to guide any selective mining of potentially acid generating rock material, so that the construction of waste rock dumps will achieve a balance of materials satisfying government ARD criteria. Material will be backfilled into mined out areas wherever possible to:

- minimize haulage costs;
- minimize effect on surrounding landscape due to external dumps; and
- place potentially acid generating material in a location where it can be contained and eventually water capped.

Coal Preparation Facilities

The plantsite will consist of a run-of-mine (ROM) coal handling area, a preparation plant facility, and a clean coal storage area. Clean coal will be recovered from the stockpile using front-end loaders, that will load smaller coal trucks for the short haul to the rail loadout facilities. Current planning for rail transportation is the use of 50 car sets that will cycle every two days to the port of Prince Rupert.

Waste Management Plan

As in all open pit mines, waste management plans must be developed to ensure effi-

cient and cost effective removal of waste, and that dump designs and material placement plans suit geotechnical and rock quality constraints, and compatibility with end land use policies. The Telkwa property will be developed using ARD material identification and management as a primary control factor for waste management planning.

In concept, the overall approach to management of waste rock is summarized as:

- segregation of waste rock to produce geochemically mixed waste rock dumps with an acceptable excess of acid neutralization capacity. The overall mix will be maintained on a continuous basis to produce a Neutralizing Potential Ratio (neutralizing material:acid generating material ratio) exceeding 2.0.
- disposal of segregated potentially acid generating waste rock in pits during operation to permit eventual flooding where possible;
- permanent on-land disposal in engineered encapsulated waste rock dumps of potentially acid generating waste rock released early in mining for which suitable in-pit or under water disposal locations are not available.

Major Issues and Mine Impacts

The major issues to be addressed at the Telkwa Coal Project appear to be environmental concerns and First Nation's involvement.

Environmental concerns include:

- Acid rock drainage/water quality;
- Air quality and visual impacts; and
- Land use and reclamation planning.

The project is located in an area of British Columbia that is known for its hunting, fishing and tourism opportunities. Extensive environmental baseline studies are currently in progress to enable prediction and management of impacts on the environment as a result of the project.

Manalta has also held numerous discussions with the First Nations peoples of the region over the last five years to understand and respect their different perspectives of the project lands. The Company's objective is to reach an understanding with the Wet'suwet'en people that will define what they want and expect from the Telkwa Coal Project. In turn, the Company will strive to achieve an agreement setting out mutual expectations and understandings.

The Telkwa Coal Project will have a positive contribution to the social and economic conditions in Canada, in the province, in the nearby towns and surrounding district. An estimated 170 to 200 construction jobs will be provided during a 12- to 15-month period commencing

late in 1998 or early in 1999. The manpower requirements for the project during full operation range from 120 to 210 people, depending on annual coal production. Initial capital expenditure for the project is estimated at \$90-\$110 million, depending on annual coal production. Detailed engineering studies are currently being completed to finalize the mine economics.

Project Timeline

The Project Approval process was initiated, in February 1997, with the submission of an application for a Project Approval Certificate, and the Final Project Report specifications were received in August, 1997. The approval process is estimated to take eighteen months with a Project Approval Certificate anticipated in July, 1998. Subject to favourable economic conditions at this

time, Manalta will give the go-ahead to develop the property. Applications for the required government permits will be submitted immediately following the Project Approval stage. Initial site preparation and construction activities will commence in April 1999, and continue until early the following year when commissioning of equipment and facilities will occur. The first coal production is expected in May 2000.

Summary

The Telkwa Coal Project is currently progressing through the British Columbia Environmental Assessment Process and is also continuing exploration on the property. There are a number of issues that must be resolved before approval for go-ahead is granted, but Manalta is optimistic that these issues can be resolved to

the satisfaction of all stakeholders. With this optimism, Manalta is on target for continued mining in British Columbia into the next century.

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NEWS IN BRIEF

THE 5 POINT SAFETY SYSTEM

It was back in 1942 that Neil George, general safety engineer at INCO Ltd. in Sudbury, first introduced his 5 Point Safety System to promote safe procedures in underground mines. George later became director of safety with the Western Quebec Mines Accident Prevention Association. His system was adopted by mines throughout Ontario, Quebec and the

world, and it remains popular as a practical approach workers and supervisors can take to safety.

Now the Ontario Natural Resources Safety Association introduces its new 5 Point Safety System Kit, developed to help trainers conduct a one-hour session about Neil George's popular system. The kit features a video which depicts two miners and their supervisor using the 5 Point Safety System to check workplace conditions and work practices. As they proceed, each step in the system is described and ana-

lyzed. The kit also includes a leader's guide, a set of colour overheads, samples of 5 Point Safety System daily checklists, and participant hand-outs.

The 5 Point Safety System Kit costs \$65 for ONRSA members, \$200 for non-members and out-of-province buyers. For more information, please call: ONRSA's Resource Centre at (705) 474-7233. To order a copy, use ONRSA's toll-free order fax: 1 (800) 850-5519. Prepayment required on all international orders. Visa and Mastercard accepted.

NEWS IN BRIEF

TECHNOLOGY FORUM INTERNATIONAL

The Düsseldorf Trade Fair Center is to host five technology trade fairs simultaneously for the first time ever. From June 9-15, 1999, GIFA, 9th International Foundry Trade Fair with CIATF Technical Forum; METEC, 5th International Exhibition for Metallurgical Technology and Equipment with Congress; THERMOPROCESS, 7th International Exhibition for Industrial Furnaces and Thermic Production Processes with Technology Forum; MINETIME, 5th World Mining Technology Exhibition with International Congress; and GEOSPECTRA, International Trade Fair for Geotechnology and Applied Earth Sciences, will be taking place concurrently for the first time.

Clearly laid out in Halls 1 to 15 and

covering a total area of 200 000 m² (gross), the Technology Forum International will encompass a vast spectrum of events and innovations that is unparalleled anywhere in the world. Two thousand exhibitors and over 100 000 visitors from every continent are expected.

Concrete preparations for the event are now gathering pace: in October 1997 exhibitor invitations to the five trade fairs were sent out worldwide. Placement meetings will also be taking place when the space allocation process gets under way on July 1, 1998. Final decisions will be taken in consultation with the exhibitors in autumn 1998.

Each individual event enjoys a leading role in its own sector. By staging the exhibitions concurrently it is possible to put on a wide-ranging presentation of inter-related industry sectors which is unique throughout the world. The overlap of subject categories between the five related exhibitions means that visitors to the

joint event benefit considerably, saving themselves both time and money.

At the accompanying congresses and forums, experts from all over the world will give practical information about the latest developments and discoveries in the five specialist fields. Practical uses and potential applications of the new technologies will be explained and discussed by the exhibitors in seminars, symposiums and special shows.

By taking part in this joint exhibition, exhibitors and participating associations guarantee a breadth of categories which reflects the event's leading international status.

For information, contact: Messe Düsseldorf, Düsseldorf Messegesellschaft mbH — NOWEA/ Postfach 10 10 06, D-40001 Düsseldorf, Stockumer Kirchstraße 61, D-40474 Düsseldorf, Germany; Tel.: +49 (0) 2 11/45 60-01; Fax: +49 (0) 2 11/45 60-6 68; Internet <http://www.tradefair.de>.