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13 Oct 1977

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Recommended Citation

Martin, Philip S., "The Current Status of the Canadian Coal Industry" (1977). *UMR-MEC Conference on Energy / UMR-DNR Conference on Energy*. 308.

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THE CURRENT STATUS OF THE CANADIAN COAL INDUSTRY

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1. INTRODUCTION

Mineable reserves of coal are known to exist right across Canada and some 30 mines are currently operating in five provinces, plus one small mine in the Yukon. Total production in 1977 will amount to some 30 million short tons with a value of approximately \$700 million, which will be a new record tonnage.

This level of production is small in comparison to the United States which produced some 665 million short tons in 1976, and will in all likelihood, achieve a similar level in 1977. However, Canadian coal is a relatively important segment of the North American energy mosaic, and I would like to talk about some of the more salient factors which have a bearing on the production of coal in Canada.

It has taken the world four years to recover from the 1973 Arab oil embargo and come to terms with the end of a way of life built on the expectation of seemingly limitless supplies of cheap oil. Having faced up to this reality, there has been a re-emergence of coal as an important energy source, both in Canada and the U.S. Indeed, 1977 may go down as the watershed year for energy policy in general and coal in particular.

Today coal is back in fashion as an energy source, new mines are being planned, and coal production now seems likely to show steady growth for many years ahead.

This does not mean a return to coal fires at home

or steam engines on the railways. While coal is a versatile mineral which can be used to make a wide variety of products, the current rise in demand for Canadian coal stems mainly from increased use of coal in the generation of electricity and growing exports of coking coal for use in steel production. In future, however, a major use of coal may be a source of synthetic gas and oil.

Indeed it should be emphasized that coal's principal uses in Canada and the U.S. are:-

- (i) the generation of electricity, and
- (ii) as a raw material for making steel.

Electricity and steel are two of the cornerstones of our economy. The proposed use of coal as a chemical feedstock will be an additional important consumer of coal, and the changeover of oil and gas-fired generators to coal-fired units will also increase demand. The domestic production of coal is therefore likely to increase significantly over the next decade.

2. CANADIAN PRODUCTION AND DISPOSITION

2.1 BACKGROUND

In Canada, the production of coal has risen steadily from a little over 10 million tons per annum in 1969 to the anticipated level of 30 million tons per annum in 1977.

Coal occurs principally in Western Canada, namely Alberta, British Columbia and Saskatchewan and

together with a limited supply from the eastern provinces of Nova Scotia and New Brunswick, these provinces provide all the Canadian production.

With the bulk of Canada coal resources being in the eastern and western provinces, the coal is distant from the industrial centre of the country, Ontario and Quebec. Canada is therefore in the paradoxical situation of currently being able to import coal into Ontario at a lower cost than it can deliver its own coal to these coal consumers. By virtue of its vast land mass, Canada is both a major importer and exporter of coal.

The U.S. exports approximately 9% of its domestic coal production i.e. 60 million tons and of this total, Canadian Utilities and steelmakers buy 17 million tons, or 28%. These imports are principally from the eastern U.S. coalfields into Ontario. In turn, Canada itself exports 13 million tons of high grade coal from its domestic production to overseas customers (mainly Japanese steelmakers).

These international movements of coal are important, since of the several billion tons of coal produced each year around the world, only some 210 million tons are sold for consumption outside their country of origin.

On the export side, the U.S. is the major supplier, followed by Poland, Australia, the Soviet Union, West Germany and Canada. These six countries account for about 98% of all overseas coal exports. On the import side, the spread is far wider, but Japan dominates the buyers with about 28% or 67 million tons, France with 20 million tons and Canada is the next largest importer. It is Canada's importance in international coal movements that makes it a significant factor in coal at the present time.

2.2 COKING COAL

The extraordinarily rapid expansion of Canada's coal mining industry since 1969 has resulted mainly from increased demand for coking coals used in steel production, particularly by export customers in Japan. This demand has been so

strong that in 1976 the value of coal exports from Canada exceeded the value of coal imports for the first time. Although the rate of increase in the Japanese steel industry's demand for coal is expected to moderate, it will still be significant and Canada's share of the Japanese market for imported metallurgical coal is expected to rise from 18% at present to about 23% in 1990. In addition, one Canadian coal company has been successful in diversifying its export markets by securing long-term metallurgical coal contracts with steel mills in South Korea, Mexico, and Pakistan. Trial cargoes of metallurgical coal have also been sent to steel mills in Brazil, Argentina and Italy. Other companies hope to follow suit.

Canada's own steel industry is also enjoying a favourable long-term outlook for further growth, which may lead to more demand for Canadian coal. As previously mentioned, steel plants in Ontario have traditionally imported most of their coal requirements from the United States. This is because higher mining and transport costs make the metallurgical-quality coal in British Columbia and Alberta more expensive for customers nearly 2,000 miles away in Ontario than U.S. coal from a few hundred miles away and, to a lesser degree, similar disadvantages apply to Nova Scotia coal. Those Ontario steel companies which obtain their coal from production by coal mines which they own in the United States will almost certainly try to continue using their cheaper American supplies for as long as possible before making any switch to western Canadian coal. However, Canadians are beginning to develop better transportation systems to move coal from West to East via rail and the Great Lakes, and significant inter-provincial coal movements will commence in 1979.

Research is presently going on in Canada to perfect new technologies by which the choice of the type of coal to be used in steel production could be widened. Such techniques are still a long way from commercial application, the most optimistic estimate is at least a decade away from large-scale introduction, but they may prove to be a factor in the future development of the Canadian

coal industry. For the time being, with export growth levelling off after several years of strong increases, and with no economic pressure for Ontario steel producers to shift to Canadian coal, the metallurgical coal sector of the industry should probably remain at a fairly stable level of production.

2.3 THERMAL COAL

Electricity generation appears to be the sphere in which the best prospects for growth in the use of raw coal exist. Domestic demand for coal to be used in generating electricity is projected to more than double between now and 1990, and in addition there is a chance of Canadian coal developing export markets for thermal use in Japan, South Korea, Mexico, and western Europe.

Thermal electricity generation is a field in which the user can choose from a wide range of fuels, because what is being purchased is simply heat. On the other hand, once a particular fuel has been chosen, conversion to another type may be very expensive or technically impossible. Looking ahead for the next few decades, the two leading competitors in the thermal market will be coal and nuclear fission. The major Canadian Utility, Ontario Hydro for instance intends to rely on a combination of the two, with no new oil-fired stations apart from two already planned. By 1990, about 80% of Ontario Hydro's electrical output will depend on uranium or coal. At present, Ontario Hydro has long-term coal contracts with suppliers in the United States for a total amount of about 8 million tons of coal per year but expects to be using some 3 million tons of western Canadian coal per year by 1980. Ontario has a large captive source of uranium at Elliot Lake in Northern Ontario.

When the large supplies of western coal and lignite come into use, they will be transported by unit trains, either to generating stations which will be specially designed to burn lignite, or else the coal will be transported to a terminal at Thunder Bay on Lake Superior to be taken by lake ships to southern Ontario. At the existing coal-

fired stations, the western Canadian coal will be mixed with the United States coal which these stations were originally designed to burn.

Other electricity generating utilities are planning to expand their use of coal, notably in British Columbia, Alberta and Nova Scotia.

Alberta's very extensive thermal coal reserves are being considered as a heat source to assist the recovery of in-situ heavy oils.

3. GOVERNMENT POLICIES

3.1 NATIONAL ISSUES

There are many 'ifs and buts' still remaining about Canadian coal's further development, but some experts expect the production of coal to double by the early 1980's and perhaps triple by 1990. Depending upon whose projections one reads, then Canada will achieve 100 million tons by 1990 or 2000. Either way, there will be very significant growth during the 1980's.

The most important single item affecting the Canadian industry is government policies and incentives, and 1977-78 will be a period with a great amount of activity and revision by policy makers across Canada.

Naturally, sound government policies are important to a healthy and viable coal industry, and Canada is working towards a uniform policy under the leadership of the federal and provincial governments.

Our federal government is in the midst of preparing its Coal Policy, which will form part of its overall Energy Policy. Federal government policies have been regarded as secondary to provincial policies by virtue of provincial ownership of minerals. The federal government is also actively involved in formulating a better inventory of Canada's mineable coal reserves.

3.2 ALBERTA

Alberta is Canada's main producer at 13 million tons per year, and also a major source of new coal deposits.

After several years of discussion, together with

industry and public input, Alberta presented its Coal Development Policy in June 1976. Industry almost unilaterally regards the Alberta policy as restrictive. The basic provisions of the policy were to assure that the maximum benefits accrued to the people of Alberta from any future and current coal development. Exploration and development were to be encouraged in a manner compatible with the environment and with Alberta's economy and labour force.

The policy seeks to establish a balance between environmental protection and resource development, and to ensure that coal exploration and mining activities are compatible with alternative land uses. This is particularly important in the foothills areas of the Canadian Rocky Mountains.

The policy divides the province into four categories with respect to coal exploration and development which range from:-

'No exploration or commercial development permitted'

to 'Exploration may be permitted and mining operations may be considered, subject to certain environmental and social requirements.'

Industry's reaction has been to slow down activity in Alberta and switch its attention to other provinces, particularly B.C. and Nova Scotia.

3.3 OTHER PROVINCES

B.C.'s coal policy guideline was published in June 1977 and is generally regarded as less restrictive and more encouraging to industry at large than Alberta's. The different current economic background of the two provinces is a factor in this. A very comprehensive working paper by the B.C. Task Force, "Coal in B.C. - A Technical Appraisal" went a good way in preparing for an expansionist policy. The policy sets out a framework for private enterprise to develop the industry with government providing the economic climate and facilities. B.C. is a close second to Alberta in terms of production at 9 million tons per year.

In Nova Scotia, the emphasis is on greater coal development and financing by private sector com-

panies rather than public funds. This appeal for open involvement was launched at the 1976 Canadian Coal Conference, and many companies have expressed various levels of interest; one major feasibility study is under way. The high cost of electricity generated from imported oil makes it important to Nova Scotia to expand indigenous energy sources. New Brunswick is also actively expanding its coal resource base through increased private exploration, and hopes to produce more thermal coal for electrical power generation as the projected life of its reserves increases.

In Saskatchewan the frame work for a coal policy has been built on the cornerstones of maximum upgrading within the province, better resource allocation, development under public control, and maximum returns to the people of Saskatchewan. The province is still piecing together its full policy statement, now expected in late 1977. Since only lower ranking coals are common in Saskatchewan, the thrust in the past has been the production of coals for thermal power generated and used locally, and this should not change radically in the near term.

One province without coal development, but with a policy framework, is Ontario, which is the major Canadian consumer of both thermal coal for electricity and coking coal for steel making. Ontario Hydro consumes over 8 million tons of coal currently imported from the U.S., and the major steel-makers import equally large tonnages of high quality U.S. coal.

Ontario has committed itself to retaining its current supplies (most coal is under long-term contract) but where possible to add incremental tonnages from Canadian sources, whether it be thermal coal from Alberta, or coking coal from B.C., Alberta, or Nova Scotia.

Although Canadian coal is priced higher in Ontario than U.S. coal, through higher freight rates, etc., the security of a domestic source is regarded as justification of the premium.

4. EXISTING OPERATORS

Current producers on a provincial basis are:

British Columbia. Kaiser Resources Ltd. operates the underground mine at Michel and the surface mine at Balmer, both near Sparwood in the Crows Nest Pass coalfield. Total production from Kaiser's operations should reach 6 million tons of saleable coal in 1977, which would be a new record. Kaiser, who like most western metallurgical coal producers is very dependent upon Japanese contracts, has been actively pursuing sales to other users and has secured sales to Mexico, Pakistan, India, Korea and Eastern Canada.

Fording Coal, a subsidiary of Canadian Pacific Investments and Cominco was badly affected by strike action in 1976 and saleable production dropped to just 2 m.t.p.a. but should be back at 3 m.t.p.a. in 1977.

Byron Creek Collieries, a subsidiary of the privately-owned Nassau-based Hillcrest Collieries Ltd., operates a smaller surface thermal-coal mine near Corbin, where the bulk of the 375,000 ton annual production is sent to Ontario Hydro. Byron Creek also supply Hudson Bay Mining and Smelting at Flin Flon, and Japanese customers. Production is estimated to reach 700,000 tons by 1979, and additional sales contracts are being investigated.

All these coal supplies are transported over the C.P. rail lines in southern B.C. in unit trains to either Westshore Terminals at Roberts Bank or east to Manitoba and Ontario.

Alberta. The largest mines are sub-bituminous strip mines at Whitewood and Highvale owned by Calgary Power Ltd; mined under contract by Manalta Coal and delivering coal for mine-mouth thermal power generation. Manalta, a division of Loram International of Calgary, operates four mines in Alberta and will mine the bulk of the sub-bituminous coal mined in that province in 1977.

Their other operations are at the Vesta and Roselyn plants. Luscar also mines sub-bituminous coal from its Forestburg Colliery by open-pit mining methods. Metallurgical coal producers in Alberta

include McIntyre Mines Ltd. of Toronto, a subsidiary of the Superior Oil Company of Nevada, who mine over 2 m.t. of saleable coal at their Smokey River operations near Grande Cache. Cardinal River Coals, a joint venture of Luscar Ltd., Edmonton and Consolidation Coal, subsidiary of Continental Oil, operates near Hinton in the Foothills and mines some 2 million tons of coal p.a. from several medium-size open-pits, all in the same coal measures. As a result of increased royalty payments, plans to increase production have been shelved. Coleman Collieries Ltd. a subsidiary of Norcen Energy Resources of Toronto, mines at a combined annual rate of 1 million tons from its Vicary underground mine and the Tent No. 4 open-pit operation. The Canmore Mines (a Dillingham Corporation subsidiary) currently operate a small underground mine at Canmore from which up to 200,000 tons of semi-anthracite coal is shipped to Japanese buyers annually.

Saskatchewan. Luscar and Manalta each mines approximately 2.5 million tons of lignite, used for thermal power generation in Manitoba and Saskatchewan, from the Estevan and Bienfoit areas. Saskatchewan production should be over 5.5 m.t. in 1977.

The Saskatchewan Power Corporation began production at its new Souris Valley property in late 1976 and this will eventually be a 350,000 t.p.a operation, also supplying a thermal power plant (Boundary Dam).

Saskatchewan Power Corporation has begun work on a new thermal plant and strip mine in the Willow Bunch area where 1.5 m.t.p.a. will be mined, starting in 1979.

Future advances of the Saskatchewan production levels are also indicated by the contracted delivery of 1.1 million tons p.a. to Ontario Hydro beginning in 1980 for its new lignite fired station at Thunder Bay.

New Brunswick. Coal production totals some 350,000 tons p.a. from 6 mines in the Minto/Chipman areas operated by New Brunswick Coal, a provincial government controlled body. The bulk of this

strip mined coal was sold to New Brunswick Electric Power Commission for use at their Grand Lake station. A new coal fired plant is being built at Dalhousie and is expected to consume a further 300,000 tons of coal annually, and a new drag-line operation is underway for the Salmon Harbour area. Total production should reach 600,000 t.p.a. by 1979.

Nova Scotia. The Cape Breton Development Corporation (DEVCO), a provincial government body, operates several surface and underground mines with a total annual output of some 2.5 m.t. The principal mines are the longwall operations at Lingan and No. 26, and the new room and pillar Prince Mine at Point Aconi.

DEVCO hopes to fully utilize its new washing plant during 1977. The plant, with a capacity of 3.25 m.t.p.a., cost over \$30 million, and will upgrade high sulphur coal to metallurgical grades. DEVCO has entered into a 5 year contract to supply 500,000 t.p.a. of metallurgical coal to Stelco in Hamilton.

DEVCO has recently reached agreement to supply up to 1 m.t.p.a. for a new coal fired power station at Lingan, and deliveries should begin in 1979.

5. PLANNED DEVELOPMENTS AND NEW VENTURES

Properties which may become producing facilities are being studied and developed right across Canada. However, the prospects for all the coking coal properties have been adversely affected by a slump in demand for coking coals.

British Columbia. Both Kaiser Resources and Fording are separately working on underground mines which will use Kaiser's hydraulic mining technology. Kaiser have shelved their plans to develop a new underground hydraulic mine, with a projected capacity of 2 m.t.p.a. Capital costs have been estimated at over \$150 million. Brazilian and Japanese investors had hoped to participate in the project. Reasons for the delay, are the high capital costs and poor market conditions for coking coals.

Work on Fording's proposed hydraulic underground

mine at Eagle Mountain has slowed down due to the soft world market condition. Should it achieve production, the mine would use Kaiser's hydraulic mining technology.

Crows Nest Industries, in a joint venture with Mitsui & Co. of Japan, are working on a final feasibility program for their Line Creek property with a projected annual capacity of 1.25 m.t. (Shell Canada have recently made a takeover bid for C.N. I.). Denison Mines of Toronto are close to a production decision on their Quintette Project which could be a 3 m.t.p.a. complex with hydraulic underground mining and conventional open-pit mining. Japanese companies (Mitsui & Tokyo Boeki) hold minor interests and would be expected to take the bulk of any future metallurgical coal production, and Imperial Oil, an Exxon subsidiary, plan to take up 16 3/4% of the project's equity. At Denison's nearby Saxon property, the company is undertaking a joint venture feasibility on the metallurgical coal project with Ruhrkohle, a consortium of Ruhrkohle A.G. West Germany, Mitsui & Co., and French interests. Cinnabar Peak Mines of Edmonton is hoping to develop a 2 m.t.p.a. underground and open-pit operation at its Peace River property in North-east B.C. Production would be thermal and blending coal for coking purposes.

Rio Algom and Pan Ocean Oil are progressing with their Sage Creek Coal project. Environmental problems and sufficiency of reserves are adversely affecting the project's proposed profitability, but additional drilling continued during 1977.

B.C. Hydro has been working on plans to develop a thermal power plant at Hat Creek in Central B.C., using coal from the adjacent Hat Creek deposit, and a major lignite fired power station is a distinct possibility for the area.

Brameda Resources (a Teck Co. subsidiary) sold its interest in the Sukunka property, a highly regarded metallurgical coal deposit, to B.P. Canada, after the withdrawal of Brascan Resources from the project. Brascan still holds a small (12%) interest and B.P. plan to develop a small underground operation by the early 1980's for subse-

quent expansion to 3 m.t.p.a by the mid 1980's. The rate of development for this project is a function of the B.C. government's policy and the provision of certain key infrastructure. Other coal developers are active in the same area, including Utah Mines (now a General Electric subsidiary) at Carbon Creek, Nichimen Resources and Ranger Oil at Mt. Spieker (optioned from Brameda) and Pacific Petroleum with Canadian Superior Oils and McIntyre Mines at the latter's Monkman Pass property.

The profitable development of these projects would be tied to the further development of the rail system in Northern B.C.

Bow River Resources and Rainier Energy Resources, both of Vancouver, are hoping to develop a property in north-east B.C. and entered into an agreement with a local firm, BriCole Mining, to do further work, the result of which should be available in late 1977.

Norco Resources (formerly Northern Coal Mines) plans to develop its coal holding north of Prince George, but the project is in its early stages as yet.

The Scurry Rainbow property at Elk River in B.C. is being vigorously examined by ELCO Mining, a corporation established by seven European steel mills to hold and manage the project, should feasibility studies prove the viability of the project. The detailed and costly studies have proved to be sufficiently attractive for Stelco to join the consortium with a 25% interest. Elco holds 50%, Scurry-Rainbow 10%, and Home Oil 15%. The indicated operating level is 4 m.t.p.a. with a capital cost of \$300 million.

Weldwood of Canada, a major lumber producer, has reported extensive coal deposits on its Vancouver Island land holdings, and is hoping to develop the property for thermal power generation purposes.

Alberta. The considerable metallurgical coal activity of recent years has slowed down due to the inability of many companies to acquire new leases

and development permits. Following the new coal policy statement, Luscar Sterco's project at Coal Valley (thermal coal for Ontario Hydro) and Manalita's Gregg River Project were both given go-ahead approval.

Luscar Sterco property near Edison has proven reserves of over 200 million tons and will be a 2.5 m.t. a year operation supplying up to 2 m.t.p.a. of thermal coal to Ontario Hydro, starting in 1978. Ontario Hydro will bring in the coal via a new terminal facility at Thunder Bay on Lake Superior, for use at Southern Ontario power stations.

Alberta Energy - 50% owned by the Alberta government - has negotiated to buy a 25% share of the Luscar-Sterco property for some \$23 million. The AEC involvement is another ramification of the Alberta Coal Policy. Mine development costs are indicated at about \$100 million, but total costs, including the rail link, upgrading certain rail facilities, and the the coal terminal at Thunder Bay, may approach \$350 million.

Gregg River are currently re-evaluating the overall profitability for their metallurgical coal property, possibly with a two million ton per year facility being committed exclusively to the Japanese steel makers. Financial planning for the project appears to be the critical factor, and most likely AEC will again participate in any investment.

However, other projects have had no indication when their turn will come; these include the Cyprus Anvil Torrens Project north-west of Grande Cache, Consolidation Coal's Brazean Project near Nordegg and their Blairmore Project at Grassy Mountain, Bralorne Resource's Savanna Creek holdings, and Union Oil at their property near Hinton.

Union Oil are preparing a feasibility study on the potential of its Obed-Marsh thermal coal project which could realistically supply Ontario Hydro with upwards of 1 m.t.p.a., again through Thunder Bay. This study will be completed during late 1977.

Associated Porcupine, in a joint venture with

Granby - a Zapata subsidiary - also plans further work on their Hinton thermal coal property.

The most promising areas for development appear to be thermal coal projects or properties where in-situ gasification could be developed. The major oil companies are the developers most interested in these aspects, i.e. Shell Canada, B.P. Canada, Imperial Oil, Texaco and Pacific Petroleum (a Phillips Petroleum subsidiary). CanPac Minerals and Calgary Power had their development proposals for the Camrose-Ryley area turned down on environmental and agricultural grounds, but continue to do work on other thermal coal properties of economic interest. Pan-Canadian Petroleum (another C.P. subsidiary) are also actively assessing their significant thermal coal holdings for viable mining opportunities. One potential use of this coal is power and steam generation for the Oil Sands projects in Northern Alberta.

The most significant developments in Saskatchewan are the extension to the projects previously mentioned.

Elsewhere, coal development is continuing, particularly in New Brunswick, Nova Scotia and the North-West Territories. Lynx Canada, in joint venture with Canadian Reynolds Metals and Camflo Mines Limited, is examining in detail the potential of developing its newly discovered coal reserves in New Brunswick, where indigenous energy sources are precious.

In Nova Scotia, the provincial government's announcement for coal industry representatives to submit proposals for exploration and development is being taken up and Wimpey Canada are planning a new open-pit mine. One smaller company with an active involvement is Biron Bay Gold Mines, with an interest in the marine deposits of the old Mabou coal mine. They plan an offshore drilling program to follow earlier marketing investigations.

Only one Arctic coal mine is operating, and that provides fuel for Cyprus Anvil's lead-zinc mining operations.

The resources of the N.W.T. and the Yukon are a

good deal more difficult to develop than those further south since all access is severely limited. It may be in-situ gasification that harnesses these reserves and that is probably some way off.

In Ontario, the only known fossil fuels are the lignite deposits of Northern Ontario in the Onakawana area. Reports indicate that the provincial government is taking an active interest in the potential for economic development of these reserves.

6. SUMMATION

The Coal Industry in Canada is entering a period of sustained growth. British Columbia is likely to be the scene of the majority of this activity once on going projects in Alberta come on stream; B.C. is likely to be able to make better use of its reserves than Alberta by virtue of its easier access to the coast and its healthier development climate in terms of government support and incentives.

Coal's use in Canada as an energy fuel is increasing faster than any other fuel and in terms of reserves versus demand, known coal in Canada will last for many decades after known oil and gas reserves have been exhausted. The industry is on the brink of a decade of expansion which could see production reach 100 million tons by the early 1990's but it all depends on government policies, availability of new markets and capital costs.

7. BIOGRAPHY

Philip S. Martin. Mr. Martin joined Dames & Moore after several years of mining experience in Australia and Canada. He is currently a project engineer with the firm and has been involved in a wide variety of mining assignments for Canadian, U.S. and European companies. He has prepared open-pit mining plans and designs for a variety of minerals from asbestos to uranium as well as being active in underground mine design and economic and financial analysis of mining ventures. He is the co-ordinating editor of Dames & Moore's annual report on the "Canadian Coal Mining Industry".

Mr. Martin graduated from the Royal School of

Mines in London with a B.Sc. degree in mining. He holds an M.B.A. from the Cranfield Institute of Technology, England and is a member of the Canadian Institute of Mining and Metallurgy and the American Institute of Mining Engineers.

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