MONTEM TENT MOUNTAIN COAL PRODUCT QUALITY AND PROJECT ECONOMIC VIABILITY

Tent Mountain Mine Redevelopment Project

Submission to The Impact Assessment Agency of Canada

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TENT MOUNTAIN PROJECT ECONOMIC VIABILITY - INTRODUCTION AND EXECTIVE SUMMARY

The international integrated steel industry utilizes Coking Coal to manufacture Coke in large industrial Coke Ovens. Coking Coal charged into these coke ovens is a blend typically containing eight coking coals to cost effectively meet the Blast Furnace's coke quality requirements for the reduction of Iron Ore to liquid Iron. Tent Mountain's Coking Coal product would have to compete on the international Seaborne Coking Coal Market.

Alberta's Metallurgical Coking Coal Mines east of the BC border in the Crowsnest Pass area, from Bellevue to Coleman, were shutting down in the 1970's, Tent Mountain the last to officially shut down in 1983. The mines shut down due to inadequate quality and low market value of their Metallurgical Coal product, combined with increasing quality requirements for the modernizing steel industry. The Vicary Creek Mine closed down in 1979. One of their last customers was the cement industry, which has lower quality requirements compared to Cokemaking, not requiring Coking Coal's purity and coking capabilities.

The Japanese Steel Industry were key customers and often partners in the Crowsnest Pass area mines. Their rejection of the coal and withdrawal was the main trigger for the shutdowns. As the shutdowns were taking place, the Elk Valley coal Resources in BC became technically and economically viable, utilizing improved mining technology and equipment, producing superior quality and higher Market Value Metallurgical Coal.

Tent Mountain Mine started intermitted mining from 1948. From 1982 onwards Tent Mountain Mine was acquired by Norcen, Manalta, Luscar, Sherritt, the Ontario Teacher's Pension Fund and Westmoreland. Finally, MONTEM Resources Alberta Operations Ltd. made an agreement to purchase Tent Mountain Mine in 2016. None of the companies and investors managed to re-start a viable mine in competition with the four Elk Valley Prime Hard Coking Coal Mines North of Sparwood, during the period 1982 till 2016, even during periods of favourable market conditions utilizing modern more productive and cost efficient mining equipment.

The significant uncertainties facing the economic viability of Tent Mountain Mine project are:

- CSR is an important indicator of Coke Strength in the Blast Furnace process. Small pilot oven Tent Mt coal carbonization results gave a Coke CSR of 51 – 55, indicative of a Semi-Soft coking coal. Modelling using an Australian model calculated CSR 60 – 65, potentially classified it as a Semi-Hard to Hard Coking Coal. However, statistical modelling results can be misleading, the result often dependent on the Seam population used to develop this model; large scale pilot oven tests using representative balk samples from Tent Mountain are required for verification.

- Assuming Tent Mountain's product at CSR 55 to 60, Ash 9.8% and Coke Button FSI 5.5, Elk Valley's Premium Hard Coking Coal of similar Rank is superior with CSR 71, Ash 8.8% and FSI 7.5. This implies that Tent Mt's coal product would sell at a significant discount to Premium Hard Coking Coal.

- The mine would produce 1.1mlnTonnes/year over a period of 14 years. Tent Mountain has a very limited Measured Resources of 3.7mlnTonnes. The additional Indicated and Inferred Reserves have a low confidence level with regard to Tonnage and Quality and the seam's quality variability and ultimately the product's market value. Indicated and Inferred reserves require additional exploration sampling and testing to upgrade to Measured Resources at a higher confidence level.

- The customer base would be the International Steel Industry. Seaborne Coking Coal market pricing is highly variable, dependent on swings in the world's economy and international supply.

- Due to Ironmaking process' efficiency improvements, development and commissioning of alternate Ironmaking Technology plus increased scrap metal use, the Seaborne Coking Coal market tonnage is projected to decline during the projects' life, increasing competition for the most desirable customers, putting prices under pressure.

Tent Mountain Mines' Footprint: For every 100 Hectares of the mine's pit, an estimate of 80 Hectares waste rock will be spoiled along the slopes of Tent Mountain. The ultimate footprint would be approx. 427 Hectares. Tent Mountain's runoff ultimately drains into the Oldman River (Alberta) and Lake Kookanusa (BC/USA), potentially contaminating them with Selenium, Nitrates, creek bed Calcium accretions and other detrimental elements. Water treatment to reduce its Selenium content and immobilization of Selenium is very costly, as demonstrated by Teck Coal's measures in the Elk Valley amounting to $1.2billion and counting. There is still significant uncertainty on the efficacy of long-term Selenium management and bio-accumulation. Selenium monitoring and remedial action as required needs to be continued decades after mine closure.

Concluding:

- Tent Mountain Project faces significant uncertainties challenging its economic viability.
- Given Tent Mountain Project's lower coal quality and market value relative to the Elk Valley products, the likelihood of ending up with a "stranded asset" is high, leaving the remediation costs for Alberta and BC.
- The mine's impact on watersheds, such as release of Selenium and other contaminants, would affect the watersheds of Alberta, Saskatchewan, Manitoba and BC down into Montana USA).
- A Federal Review is highly desirable.

C. J. Kolijn, MSc. in Mining Engineering (TU Delft, The Netherlands) December 9, 2021

Professional Experience C. J. Kolijn

Cornelis Kolijn graduated from the TU Delft (The Netherlands) with a M.Sc. in Mining Engineering in 1983, retiring as Manager Technical Marketing Teck Coal in March 2019. He was hired by Fording Coal (now Teck Coal) in 2001 until his retirement in 2019 he was responsible for product development coal & coke quality, working with the Mines and international Customers, including applied R&D. Throughout his career he worked as Mining Engineer and Process Engineer Coal, Coke and Ironmaking in Australia, Asia, Europe, the Americas, India and Africa, initially employed by the Dutch Steel Industry in Mining, the Integrated Steel Plant and as an international consultant Coke and Ironmaking. At present he is an independent consultant.

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Globe & Mail:

Market Perspective Coal Mines Closing - 23 March 1978.

Era ends in Crowsnest Alberta coal valley closes last mine - 01 November 1983.

1. METALLURGICAL COAL QUALITY REQUIREMENTS, MARKETS AND COKE FOR BLAST FURNACE IRONMAKING

1a The main customer for Coking Coal is the Integrated Steel Industry, but New Technologies evolve

The international integrated steel industry utilizes Coking Coal to manufacture coke in large industrial ovens, typically heated to 1,100°C for 20 hours in the absence of oxygen. The Coking Coal charged into these coke ovens is a blend typically containing eight coking coals to cost effectively meet the Blast Furnace's coke quality requirements. The high-quality, high-priced Coking Coals are to support the cheaper, lower quality Coking Coals in the blend. Coking Coal is also referred to as Metallurgical Coal (Met-Coal). Tent Mountain's coal would be blended into an international blend with other Coking Coals available on the Seaborne Coking Coal market. The resulting Coke is charged into the Blast Furnace with the Iron Ore Charge to produce Iron.

Tent Mountain's coal product would have to compete on the international Seaborne Coking Coal markets with major suppliers from Australia, the USA and last but not least Canada's coal from the Elk Valley in British Columbia. This is a highly competitive market for coal suppliers competing for the most attractive customers with respect to pricing and reliability, being the advanced steel industry of the Japan, S-Korea, China, Europe and the Americas.

The Seaborne Met-Coal export was 307mln Tonnes in 2018, up to 310mln Tonnes in 2019, down to approx. 271mlnTonnes in 2020. Total International Met-Coal trade was 352mln Tonnes in 2018; this tonnage includes Seaborne trade plus International trade across land. International Met-Coal trade is expected to decline in 2025 to 308mlnTonnes. Seaborne trade was typically approx. 87% of total International Met-Coal trade. **This would take Seaborne Met-Coal export down to approx. 268mlnTonnes in 2025, down from 307mlnTones in 2018.** (Data Reference: IEA Coal 2020[1])

Ironmaking Technology is rapidly evolving to improve efficiency, driven by pressure to reduce the carbon footprint; the world's Steel Industry is estimated to produce up to 9% of the global greenhouse gas emissions. New technology plants mostly produce Direct Reduced Iron **(DRI)**, compacted into Hot Briquetted Iron **(HBI)**, utilizing Methane and Hydrogen. Hot Briquetted Iron can be utilized in Electric Arc Furnaces, skipping the Blast Furnace process altogether, not requiring Coke and therefore no Met-Coal. New Blast Furnace Process Technology is increasing efficiency, and more recycled Scrap Iron will be used (also in the developing economies), increasingly reducing the demand for Met-Coal and Coke.

A successful Hydrogen pilot plant producing over 100,000Tonnes/Year, HYBRIT[2] has been operational for over a year in Sweden and the mature MIDREX-technology[3] process operational for decades, utilizing Methane is adjusting to (partial) use of Hydrogen. HBI is already charged into the Blast Furnace together with Iron Ore and Coke, increasing its efficiency. New industrial scale plants, producing 2mln to 5mlnTonnes/Y Iron before the end of this decade are in the evaluation and planning phase in Europe, China and N-America, including Canada, with a number in the construction phase.

Examples close to home: The Iron Ore Company of Canada[4] (Rio Tinto) is evaluating a DRI-HBI plant utilizing Green Hydrogen generated from Hydro Electricity. ArcelorMittal Canada will upgrade its 10mlnTonne/year Port-Cartier Iron Ore Pellet Plant to produce higher quality and higher value-added Pellets[5] for the DRI process, delivering over 20% CO_2 emissions reduction. AM Dofasco[6], Hamilton, ON, plans a $1.8-billion project to reduce CO_2 emissions by transitioning from BF ironmaking utilizing Coke to Electric Arc Furnaces (EAF), which use scrap iron, electricity, natural gas and later Hydrogen. ALGOMA Steel[7] will also convert to EAFs by 2024 for $0.7-billion, utilizing scrap Iron and potentially DRI.

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[1] International Energy Agency IEA report Coal 2020 – Analysis and forecast to 2025, published December 2020, pages 104 and 114. Link: https://www.iea.org/reports/coal-2020

[2] HYBRIT SSAB Sweden: https://www.cbc.ca/news/science/fossil-free-steel-1.6146061

[3] MIDREX: https://www.midrex.com/ and https://www.midrex.com/about/midrex-plants/ Worldwide nearly 100 MIDREX shaft Furnaces in 21 Countries.

[4] Rio Tinto to try producing Low-Carbon Iron in Canada (February 2021): https://www.mining.com/rio-tinto-to-attempt-producing-low-carbon-iron-in-canada/?mc_cid=08795b5b7f&mc_eid=922027667f

[5] AM Port Cartier Pellet Plant Upgrade: https://corporate-media.arcelormittal.com/media/vvshjqqh/cop26_arcelormittal_dr-pellets-2021_final.pdf

[6] AM Dofasco Hamilton Plant EAF Investment, July 2021: https://www.cbc.ca/news/canada/hamilton/dofasco-investment-1.6123829
ARCELOR MITTAL Climate Action Report 2, July 2021: https://corporate-media.arcelormittal.com/media/ob3lpdom/car_2.pdf

[7] ALGOMA EAF transition: https://www.algoma.com/algoma-steel-selects-danieli-as-technology-provider-for-new-electric-arc-steelmaking-facility/

The trend to increased use of alternate and new Ironmaking Technologies at the expense of the Blast Furnace process not requiring Met-Coal nor coke is demonstrated in Figure 1 below.

Based on the IEA's data[8], MIDREX published Figure 1, below[9], presenting the world's annual iron production trend in Millions of Tonnes for the Sustainable Development Scenario (SDS). This includes Blast Furnace Iron production, alternate and new technologies such as Methane and Hydrogen reduction. It also includes existing COREX, FINEX and HIsarnia reduction processes not utilizing coke, mainly using less costly Non-Coking Coal (Indicated as Commercial and Innovative Smelting Reduction SR):

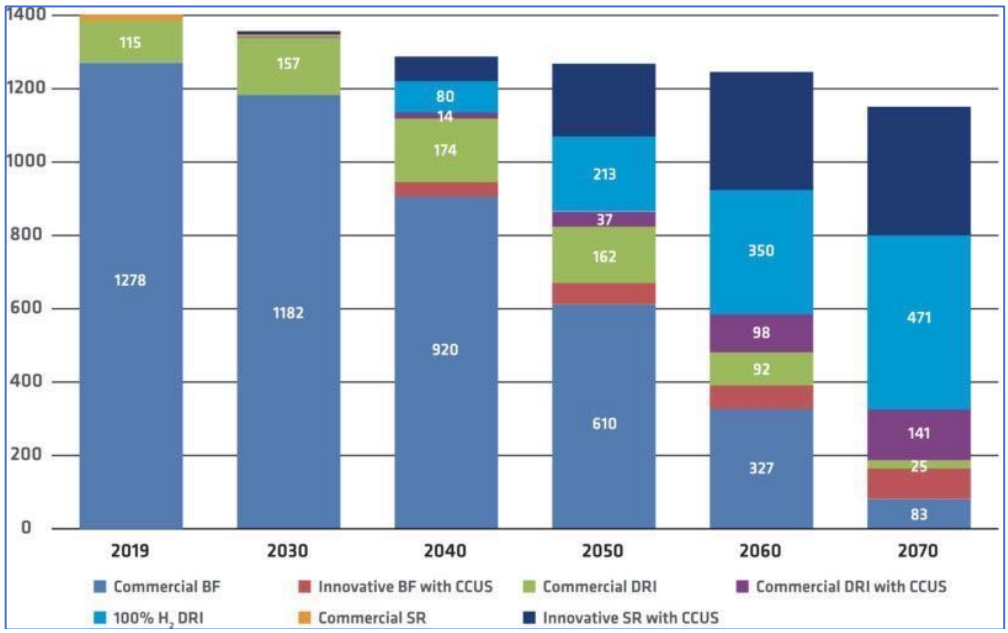

Figure 1: Iron Production by Technology in the Sustainable Development Scenario in Millions of Tonnes. (Excluding increasing use of recycled Scrap Metal in Electric Arc Furnace operations not utilizing Iron Ore)

The Figure 1 shows Blast Furnace production utilizing Coke at 1,278mlnTonnes in 2019, declining to 1,182mlnTonnes is 2030, down to 920mlnTonnes in 2040. This is a reduction of 72%. Tent Mountain has a projected production life of 14 years. **In the event Tent Mountain were to proceed in approx. 3 years' time, its productive period would be from approx. 2025 to 2039, precisely in this period of decreasing Blast Furnace iron production and therefore, Met-Coal demand. This development will trigger increased competition between suppliers and put downward pressure on market pricing.** High quality Prime Met-Coal producers can be expected to have the advantage under these market conditions. Tent Mountain's product is highly unlikely to fall into this category, as demonstrated in Paragraph 2.

Seaborne Met-Coal markets trade in a highly fluctuating market price environment. The present International Seaborne markets are destabilized due to the Australian – Chinese traded dispute, blocking Australian coals from entering China. This lead to historically high pricing, especially for coal supplied to China from alternate suppliers such as Canada. However, this situation cannot be expected to endure.

Seaborne Coking Coal pricing rose to all-time highs from November 2020 till October 2021. From 21Oct21 to 02Dec21, the Seaborne price for Prime Hard Coking Coal declined by 21% and for Hard Coking Coal by 27%, loaded free on board Dalrymple Bay Coal Terminal, Australia (fob DBCT[10]). Prime Hard Coking Coal Futures sold on the SGX[11] Singapore Exchange for October 2022 were down by 54% relative to pricing on 21Oct21 (fob DBCT).

[8] IEA Energy Technology Perspectives 2020, published February 2021, page 104 and 114.
Link: https://www.iea.org/reports/energy-technology-perspectives-2020

[9] Hot Briquetted Iron-C-FLEX Project: Addressing a Challenge to the HBI Value Chain, published September 2021, page 3.
Link: MIDEX: https://www.midrex.com/tech-article/hot-briquetted-iron-c-flex-project-addressing-a-challenge-to-the-hbi-value-chain/

[10] Fast Markets – Metal Bulletin. Link: https://www.metalbulletin.com/steel/steel-raw-materials/coking-coal.html

[11] BarChart SGX Prime Hard Coking Coal Futures. Link: https://www.barchart.com/futures/quotes/U7*0/futures-prices?timeFrame=daily&viewName=technical

1b How Coke is used to make Iron in the Blast Furnace

A larger Blast Furnace (BF) typically produces over 3mln Tonnes/y iron. Iron Ore[12] and Coke "Burden" are alternately charged into the BF top. Through the tuyeres, super-heated 1200°C oxygen-enriched Hot Blast is blown into the BF, forming CO for Iron Ore reduction. This process gas sweeps up through the Burden to the top, reducing the iron ore to liquid Iron, referred to as "hot metal".

Iron Ore melts as it reaches 1100-1400°C to be reduced to liquid Iron, which is tapped with liquid slag from the bottom of the BF at ~1500°C. Coke remains solid to the BF bottom for support.

After tapping from the BF, liquid iron (Hot Metal) and slag are separated. The liquid iron is refined into steel in the steel-shop, where Carbon and impurities (Sulfur, Phosphorous) are removed.

The Blast Furnace process requires strong coke to allow for process gas permeability and to drain the produced Hot Metal and Slag whilst supporting the burden.

The measure of coke's hot strength is the **Coke Strength After Reaction (CSR) under** BF process conditions. To achieve a high CSR the coke should not be too reactive in the process to avoid degradation of its strength. The preferred CSR typically 65, range 63 to 68, depending on the size of the BF, fuel injection rates and required productivity. The larger the BF, the higher the fuel injection rates and productivity, the higher the CSR requirement. A number of facilities take their CSR requirement up to 70.

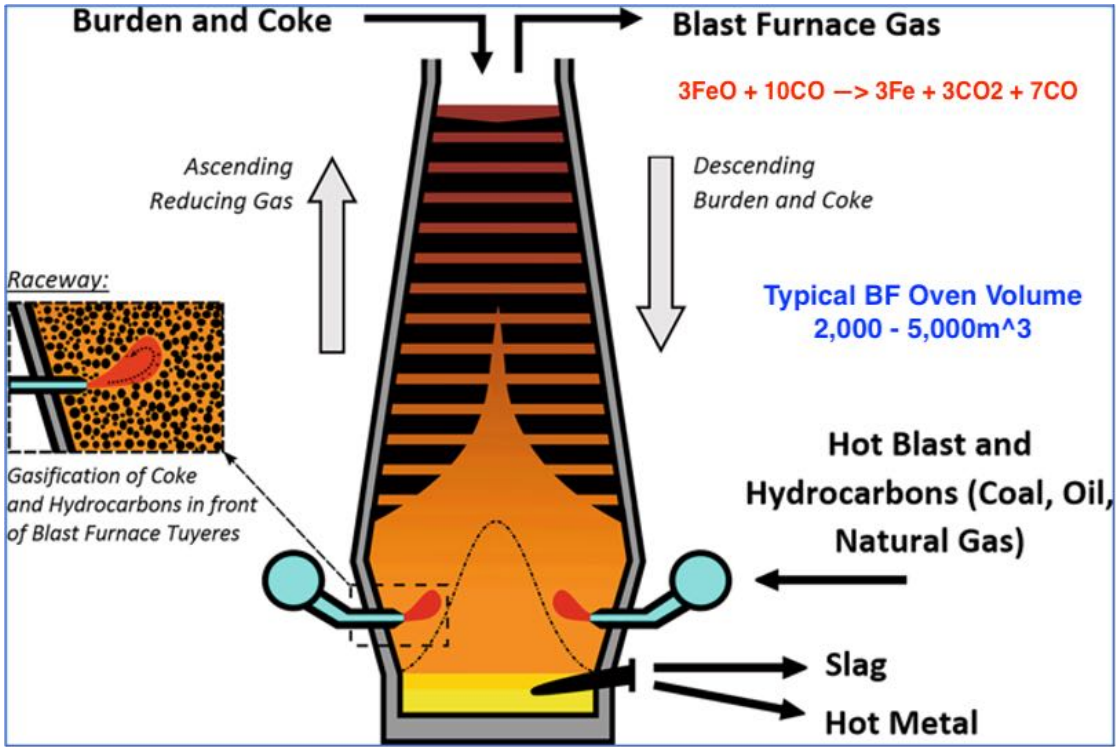

Figure2: The Blast Furnace Ironmaking Process

Another measure of Coke Strength is the **"Cold Coke Strength**", measured as Coke's size degradation in a standardized drum tumble test. This is a measure for coke degradation and abrasion as it is handled from the coke plant to the blast furnace, plus coke degradation in the upper "cold" zone of the BF reactor after charging at ambient temperature. One of the indicators of how strong a coke can be made from a certain coal, the coal's Free Swelling Index **(FSI**) is determined, were coal is pulverized and heated in an oven, where it swells, forming a "coke button". The larger the coke button the more suitable that coal is for making strong coke in an international coking coal blend. **Hard coking coals typically have an FSI from 7 to 9**. (A slightly different testing method is **CSN**, with similar results to the FSI test.)

[12] The Iron Ore charge mostly consists of Sintered and/or Pelletized Iron Ore.

1c International Metallurgical Coal Exports and Coking Coal Quality Benchmarks

Internationally traded Coking Coals are priced on a sliding scale against Benchmarks, specifying key quality parameters. Falling short will result in a price discount for that specific parameter. Conversely better performance may result in better pricing. To a certain extent, Benchmarks can be market-specific. Producer and customer negotiate the product's price based on these benchmarks.

Major Benchmarks are **IHS Markit**[13] and **S&P Global Platts**[14]. **IHS Markit**'s December 2019 Coking Coal Methodology and Specifications are summarized in Table 1 below. The correlation to **S&P Global-Platts** is obvious, the Prime Hard Coking Coals CSR 68 – 71, the Tier 2 Hard Coking Coal at CSR 62 plus a Semi-Soft Coking Coal. Table 1 shows key parameters for both Benchmarks. (Pricing is in US$, delivered free on board, Dalrymple Bay, Queensland, Australia.)

Table 1	IHS Markit Specs effective December 2019				S&P Global - Platts Spec Guide June 2020				
COAL TYPE	Low-Vol PHCC	Mid-Vol PHCC	Tier 2 HCC	Semi-Soft CC	Peak Downs HCC	Premium Low-Vol HCC	TSI Premium HCC	TSI HCC	Semi-Soft CC
CSR	71 70 Min.	68 67 Min.	62 Min. 55	--	74	71	71	62	--
Volatile Matter %ad	20 21.5 Max.	22.5 21.5-25.0	21.5 19-28	33-35	20.7	21.5	21	21.5	34
Ash %ad	10 11 Max.	9.5 11 Max.	8 10 Max.	9-10	10.5	9.3	10	8	9.25
FSI (CSN)	9	8.5	--	5 - 6	8.5	--	8	--	5.5
Abbreviations: PHCC = Prime Hard Coking Coal. HCC = Hard Coking Coal. CC = Coking Coal									

Table 1 shows the commercial coal Benchmark classifications PHCC Low & Mid-Vol, HCC and Semi-soft Coking Coal.

The highest priced coking coal is Prime Hard Coking Coal, all other types priced down from there. The price differential between PHCC and Tier 2 HCC varies depending on market conditions, but generally Tier 2 HCC sells at around 80% of PHCC.

In practice, Cokemakers and Process Engineers in Research and at the Coke Plant will refer to the following classification to design and value the coking coal coals in their blends, applied to Canadian and Australian Coking Coal based on CSR:

- **Prime Hard CC Low-Vol CSR** ≥70
- **Prime Hard CC Mid-Vol CSR** 68 – 69
- **Hard CC** 64 – 67
- **Semi-Hard CC** 55 to 63
- **Semi-Soft CC** CSR ≤54

[13] **IHS Markit** Coking Coal Methodology and Specifications December 2019
https://cdn.ihs.com/Coal-Methodology/IHS-Energy-coking-coal-methodology.pdf

[14] **S&P Global Platts** June 2020 Specifications Guide Global Metallurgical Coal
https://www.spglobal.com/platts/plattscontent/_assets/_files/en/our-methodology/methodology-specifications/global_metcoal.pdf

2. TENT MOUNTAIN MINE HISTORY, REDEVELOPMENT PROJECT AND COAL QUALITY

2a A Short History of the Crowsnest Area Coal Mines, Tent Mountain and its Coal Reserves

Alberta's Metallurgical Coking Coal Mines east of the BC border in the Crowsnest Pass area, from Bellevue to Coleman, were shutting down in the 1970's, Tent Mountain the last to officially shut down in 1983. The mines shut down due to inadequate quality and low market value of their Metallurgical Coal product, combined with increasing quality requirements for the modernizing steel industry. The Vicary Creek Mine closed down in 1979.

The Japanese Steel Industry were key customers and often partners in the Crowsnest Pass area mines. Their rejection of the coal and withdrawal was the main trigger for the shutdowns. As the shutdowns were taking place, the Elk Valley coal Resources in BC became technically and economically viable, utilizing improved mining technology and equipment, producing superior quality and higher Market Value Metallurgical Coal.

Coleman Collieries became one of the first Canadian companies to begin shipping Metallurgical Coal to the Japanese Steel Mills under long term contracts. Before shutdown in 1983, during the mid-1970's Coleman already began winding down its operations due to high operating costs and relatively poor quality coking coal, one of the last customers being a Nihon Cement Co. Ltd, Globe and Mail[15]. The cement industry has lower quality requirements compared to the Cokemakers, not requiring Coking Coal's purity, coking capabilities and quality standards.

Tent Mountain Mine started intermittent mining from 1948. From 1982 onwards Tent Mountain Mine was acquired by Norcen, Manalta, Luscar, Sherritt, the Ontario Teacher's Pension Fund and Westmoreland. Finally, MONTEM Resources Alberta Operations Ltd. made an agreement to purchase Tent Mountain Mine in 2016 (Sourced from documents published by MONTEM[16]). None of the companies and investors managed to re-start a viable mine in competition with the Elk Valley Prime Hard Coking Coal Mines North of the Teck Coal's Elkview Mine (Sparwood) during the period 1982 till 2016, even during periods of favourable market conditions utilizing modern more productive and cost efficient mining equipment.

Tent Mountain's present Resources consist of 3.7mlnTonnes Measured Resources only. In addition Tent Mountain contains 151.9mlnTonnes Indicated plus 53.7mlnTonnes Inferred Reserves, which have a low level of confidence with regard to Tonnage and quality (MONTEM's presentation April 2021[17]). Additional exploration data are required to upgrade more of the reserve's Tonnage to the Measured category with a higher level of confidence. **Given a planned mine life of 14 years, producing 1.1mlnTonnes/year, the Measured resources are very limited give the project's economic viability a significant degree of uncertainty.**

[15] Attachment 1. Globe and Mail[15]: Market Perspective Coal Mines Closing 23 March 1978 and Era ends in Crowsnest Alberta coal valley closes last mine 01 November 1983.

[16] MONTEM's submission to the AII of Canada "Tent Mountain Mine Redevelopment Initial Description" of November 2021. Dahrouge Geological Consulting Ltd.'s report "Coal resources for the Tet Mountain Mine Alberta and British Columbia , Canada".

[17] MONTEM Annual General Meeting presentation[17] April 30, 2021

2b Tent Mountain Project Coal Quality Ranking

MONTEM based the project's quality projections on historical data and analysis of recent exploration drilling samples, included in SRK's technical assessment report[18] of April 2020. This report presents Table 6.1, Section 6.4, Page 67 below:

Table 6.1 Tent Mountain Mine coal quality (indicative) - Tier 2 Hard Coking Coal

TM (% ar)	ASH (% ad)	VM (% ad)	TS (% ad)	Phos in coal (% ad)	FSI	Vitrinite RoMax	CSR
9.0	9.8	25.6	0.50	0.089	5.5	1.07	51 – 55 (small oven) 60 – 65 (calculated)

Referring to Table 1 in section 1c of this document, Tier 1 Coking Coal is the highest valued Coking Coal at CSR 71. Tier 2 CSR 62 coking coal potentially sells down to 80% of Tier 1 pricing depending on market conditions. Tier 2 Coking Coal has a "target" Benchmark of 62, minimum 55, the price reduced on a sliding scale below the 62 benchmark.

Small pilot oven results carbonizing Tent Mountain coal samples indicate Coke CSR 51 – 55, which would be a semi-hard coking coal, or even a semi-soft coking coal, given the low FSI of 5.5, depending on the coal classification used. The low FSI is due to the relatively low Vitrinite content of 52% as compared to similar Elk Valley Prime Hard Coking Coal which contain over 57% Vitrinite. Vitrinite is the key driver essential to forming strong coke.

Mylec's modelling calculates CSR 60-65. This A&B Mylec model was developed in Australia with the University of Newcastle. However, CSR modelling can be misleading, often being dependent on the Coal Basin and Seam Population used to develop this statistical model through correlation; these models generally aren't universally applicable. Therefore MONTEM requires to run a systematic carbonization program using representative Tent Mountain bulk samples in a larger pilot oven (typically 90kg – 350kg coal charge) to verify these higher CSR results. If the CSR 60 – 65 could be confirmed, this would indicate a Semi-Hard to Hard coking coal (SRK page 66) could possibly be produced, although the FSI is still very low, especially for compatibility with other coals in the Cokemaker's blend. Large representative samples (typically 150 to 450kg) need to be sent to the target customer base for testing in their international blends to provide invaluable insight into the compatibility of Tent Mountain in their operational blends and enable product development.

The very small Measured Resource of 3.7mlnTonnes make it uncertain how consistently Tent Mountain will be able to achieve the level of 62 CSR, given quality variability within the coal seams. Lower values, e.g. down to 55 would considerably lower the market value of its product and with it the project's economic viability.

A comparison of Tent Mountain's product can be made to the products of similar Rank (Volatile Matter Content VM) produced in the Elk Valley North of Sparwood, also mining the Mist Mountain formation:

- **Tent Mountain:** Vol. Matter 25.6%, assuming 55 to 60 CSR coal, 9.8% Ash and FSI 5.5 coke button.
- **Elk Valley Premium Mid-Vol Hard Coking Coal:** Vol. Matter 25.5%, with its superior CSR 71, Ash 8.8% and FSI 7.5.
- Elk Valley Premium has a considerably higher market value. It makes significantly stronger coke with 11 points higher CSR. Its Ash content is 1% lower. Its 2 points higher FSI will give good compatibility with the other coals in the customer's blend and aid in absorbing other weaker but cheaper coals into that blend.

The conclusion is that Tent Mt's product will sell at a significant discount relative to this Elk Valley Coal, finding it challenging to stay economically viable and compete in a highly competitive Seaborne Metallurgical Coal Market.

To consider for the Chinese market: Tent Mountain's Phos content is relatively high at 0.089% - In the Mist Mountain Formation, Phos content often correlates to Fluorine, higher Phos implying higher Fluorine content. China sets the limit at 200ppm, which could potentially disqualify Tent Mountain's coal from the Chinese market. MONTEM did not disclose Tent Mt's Fluorine content.

[18] SRK Consulting Inc. report "Technical Assessment Report for the Tent Mountain Mine Re-start Project, British Columbia, Canada. Published April 29, 2020.

3. **<u>TENT MOUNTAIN'S FOOTPRINT AND RUNOFF INTO AB AND BC WATERSHEDS</u>**

Tent Mountain's disturbed mine area from is clearly visible on satellite imaging. Scaled off Google Earth, the disturbed area is approx. 320 acres.

A large portion of the old works at the southern end has not been reclaimed, some of the reasons being the lack of top soils and significant remediation cost. In the NW-section the partly remediated waste rock spoils show instability, erosion and slumping (Figure 3; I traced the yellow line on Google Maps for it to calculate the disturbed area).

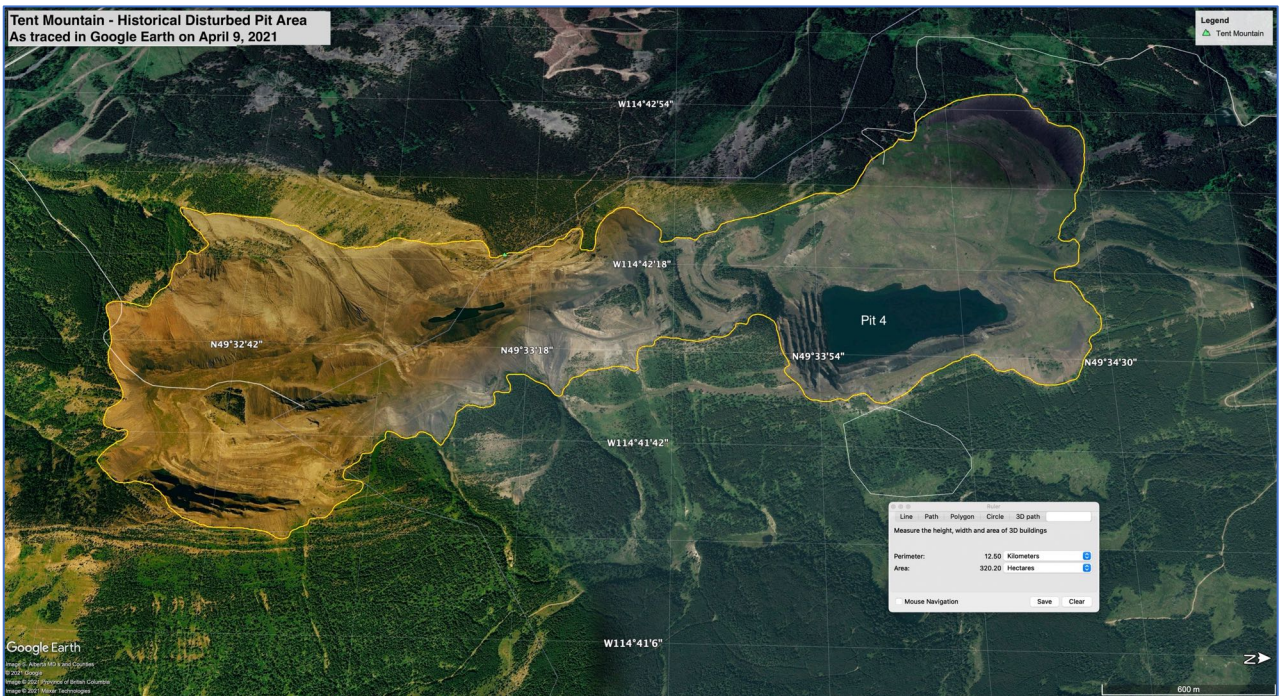

Figure 3: Tent Mountain's Historical Disturbed Area scaled from Google Earth approx. 320 Hectares (April 2021).

Figure 4: Tent Mountain NW section and Pit 4. Waste Rock spoil shows slumping and erosion.

Upon completion of mining after 14 years' production, the ultimate Pit Area (238 Hectares) and the total Footprint of Pits and Spoil Area (427 Hectares) is shown in Figure 4 (maps from SRK's April 2021 report). The Areas were scaled off these maps using a planimeter.

From this can be calculated that for each 100 Hect. of Pit, 80 Hect. of Waste Rock Spoil is deposited outside of the final Pit Area along the slopes of Tent Mountain in Alberta and BC. When breaking up solid rock, its volume increases by approx. 30%. The increased rock volume won't fit into the remaining Pits. The relatively small removed coal seam volume will not compensate sufficiently for this volume increase.

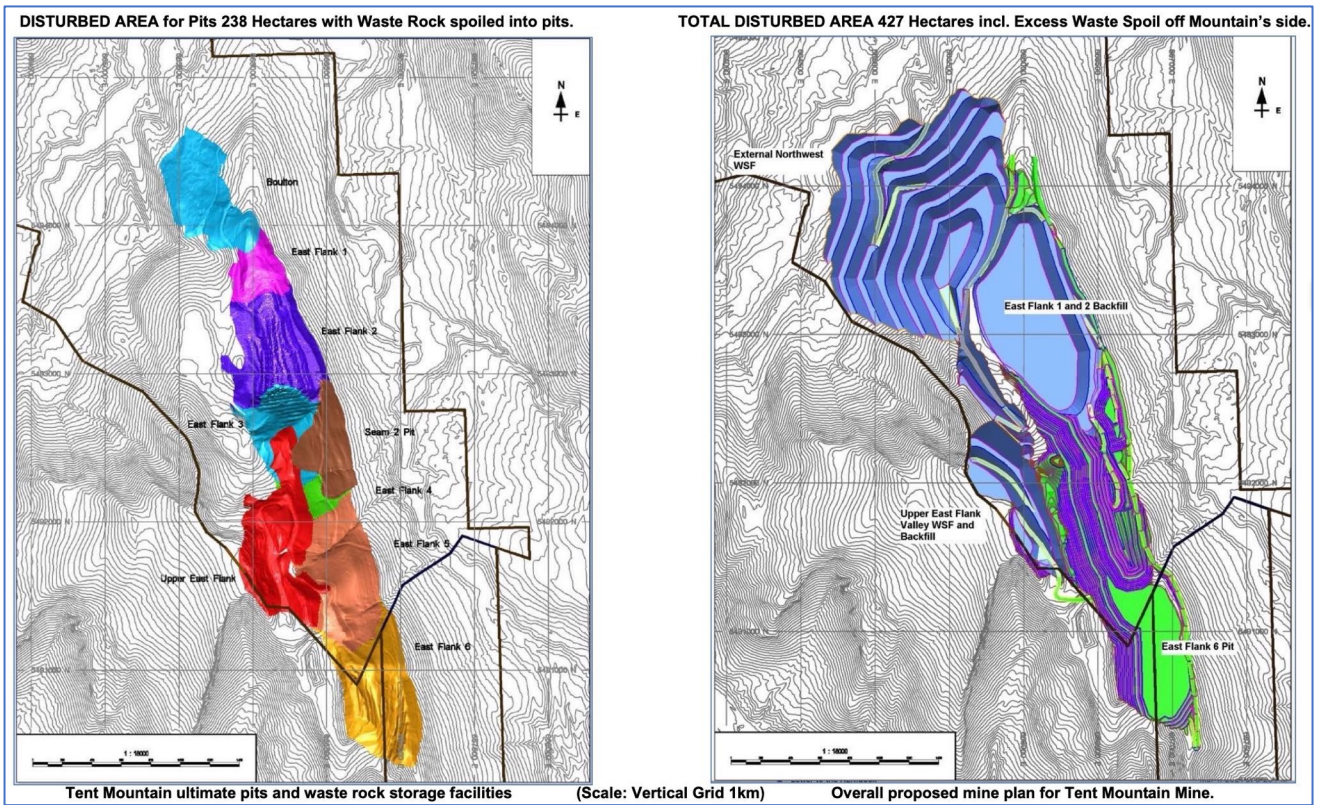

Figure 4: Ultimate Pit Area 238 Hectares and Ultimate Footprint including Spoil Area 427 Hectares.

Runoff from the disturbed mine area with its waste rock spoil along Mist Mountain's slopes will drain into the surrounding valleys and their watersheds:

- **The mine area within Alberta** drains into Crowsnest Creek into the Crowsnest River, the Oldman watershed ultimately draining into the Bow River to form the South Saskatchewan River, flowing into Saskatchewan and Manitoba.

- **The BC portion** drains from Tent Creek into Michel Creek, then Michel Creek into the Elk River, ultimately contributing to Lake Koocanusa down south into Montana, USA (MONTEM's Tent Mt Submission to the AII of Canada, November 2021).

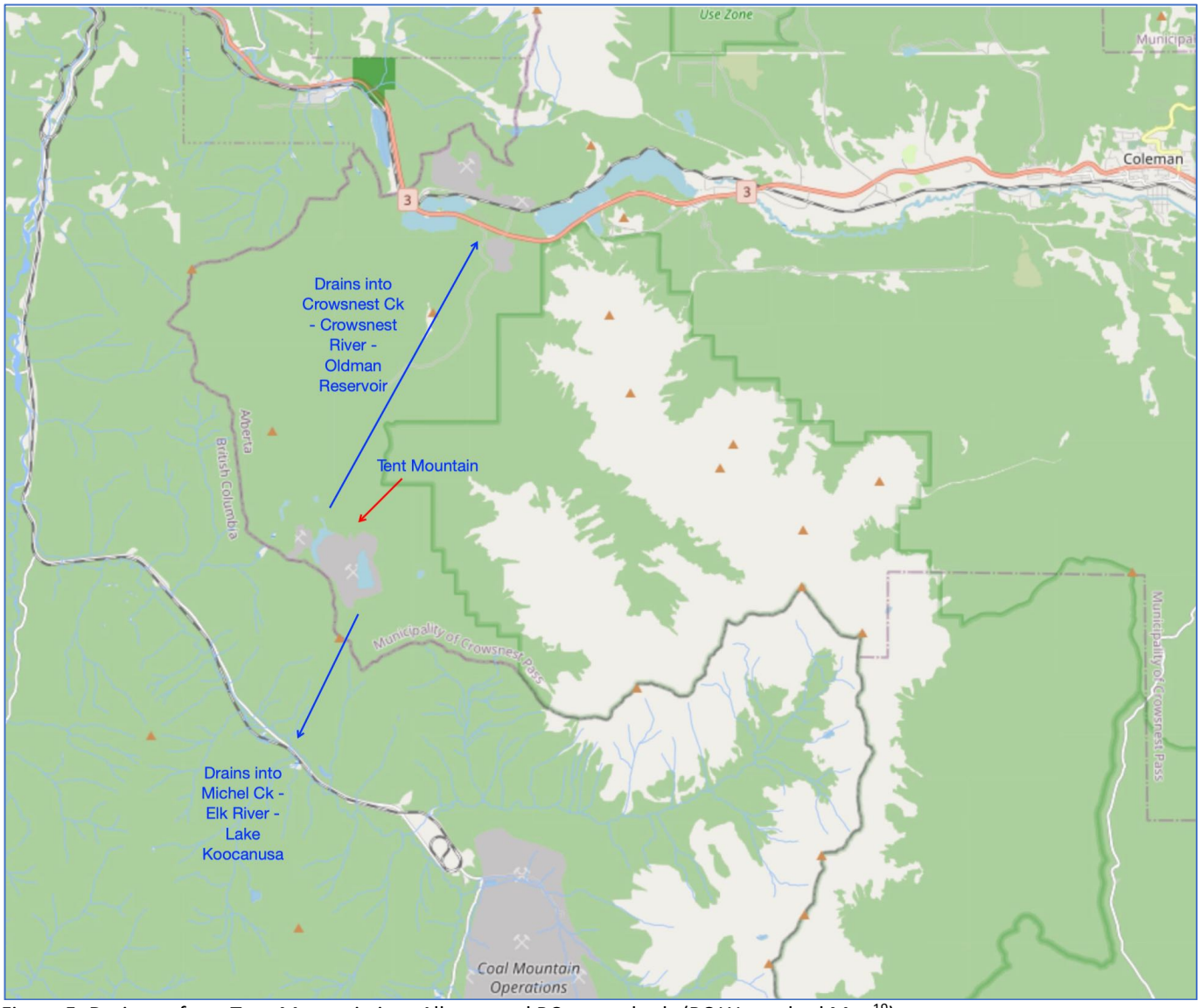

Figure 5: Drainage from Tent Mountain into Alberta and BC watersheds (BC Watershed Map[19])

Runoff from waste rock piles along Tent Mt's slopes will drain into the valleys and watersheds below, potentially contaminating them with Selenium, Nitrates, creek bed Calcium accretions and other detrimental elements. The fact that the mine would remain within its historical mining lease or expand beyond it is irrelevant to this process.

Water treatment to reduce its Selenium content and immobilization of Selenium is very costly, as demonstrated by Teck Coal's measures in the Elk Valley amounting to $1.2billion and counting. Selenium monitoring and remedial action as required needs to be continued decades after mine closure.

There is still significant uncertainty on the efficacy of long-term Selenium management and bio-accumulation. (Background Reading: Environmental hazard assessment of Benga Mining's proposed Grassy Mountain Coal Project, A. Dennis Lemley, Elsevier publication 25Mar19)

Given Tent Mountain's lower coal quality and market value relative to the Elk Valley products, the likelihood of ending up with a "stranded asset" is high, leaving the remediation costs for Alberta and BC.

[19] Aquatic Information Partnership Atlas. Link: https://cmnmaps.ca/AIP/

ATTACHMENT 1

THE GLOBE AND MAIL

SE ROB
HD MARKET PERSPECTIVE Coal mines closing
CR Canadian Press
WC 174 words
PD 23 March 1978
SN The Globe and Mail
SC GLOB
PG B6
LA English

LP CALGARY (CP) - The **Coleman Collieries** Ltd. coal mining operations in the Crowsnest Pass will likely be closed in 1980 because of high operating costs and low-quality coal reserves, Edward Battle of Norcen Energy Resources Ltd., said in an interview. Coleman, which is controlled by Norcen, has decided to close its three Crowsnest mines, which employ about 650 workers, when its long term Japanese sales contracts expire March 31, 1980.

Coal reserves at the existing underground mine and two surface mines, located about 100 miles southwest of Calgary, will also be fully depleted on that date.

TD The company has no plans to extend mining, although the economics of continuing the operations are under study.

Coleman Collieries has operated in the Crowsnest Pass area since 1911.

In 1967 it became one of the first Canadian companies to begin shipping metallurgical coal to Japanese steel mills under long term contracts.

But the profitability of the operation suffered from high operating costs and the relatively poor quality of coal.

AN Document glob000020011126da3n07lys

Search Summary

Text	coleman collieries
Date	All Dates
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Language	English
Results Found	47
Timestamp	2 April 2021 10:57 AM

THE GLOBE AND MAIL

SE News
HD Era ends in Crowsnest Alberta coal valley loses its last mine
WC 946 words
PD 1 November 1983
SN The Globe and Mail
SC GLOB
PG N8
LA English

LP COLEMAN, Alta - Glen Poulton and the boys were busy last week shovelling coal down to a conveyor belt for processing in the Coleman Collieries tipple. The boyish and good-humored give-and-take among the workers - all in their 50s or early 60s - belied the fact that it was their last day working in the mine, with little hope some of them would find any other jobs.

"We've got good, stiff upper lips," said Mr. Poulton, 60, president of Local 2633, United Mine Workers of America, "but it hurts to see our mine go down."

TD Layoffs are part of the coal-mining history of the Crowsnest Pass, but last week's closing was the end of an era for a community born and built on coal: the end of Coleman Collieries is the first time in this century that no coal has been dug on the Alberta side of the Pass.

"In the 1950s, if we were laid off, we could go get a job in another mine," said Mr. Poulton. "There was lots of work around, even up to the 1970s. But now, there's no place to go. The older guys have roots here and we don't want to move out."

Last Friday, Coleman Collieries laid off 64 employees. Another 14 workers go in December and the last six next June.

The immediate cause of the closing is the loss of a six-year contract with Nihon Cement Co. Ltd., Coleman's only contract customer. When a recession-fed world-wide coal glut led to tough competition from South Africa and Australia, Coleman could not meet Nihon's demand for lower prices in the second half of its contract.

But, long before the recession, Coleman began winding down its operations from the 700 it employed in the mid-1970s. The Racehorse Creek mine closed in 1978, followed the next year by Vicary Creek mine - the last underground mine on the Alberta side of the pass - and the **Tent Mountain** mine in 1980.

Few of the workers being laid off now have jobs to go to. They seem reluctant to plan, feeling resignation, perhaps even despair.

There are few jobs in the B.C. mines, where 800 from the Alberta side already work, and the men at Coleman are getting old.

The average age of the last 84 Coleman workers is 51. The 25 in their 50s hope for jobs in the B.C. coal fields, but the 21 workers over 60 will just take early retirement, even though each feels he has a few good years left in him.

"I'm not going to look for a job because I'm 61," says Ed Szoke, a mechanic who worked 18 years for the

company. "If I go looking for a job, they'll say 'Go home, Grandpa, and look after the kids'. There are no jobs anyway. Maybe things will be different in the spring."

Michael Verigan, a 54-year-old warehouse operator, says he planned to work for Coleman until he retired. "I'm very disappointed," he says. "Twenty-three years ago, I made a decision to stay with coal. Suddenly I'm told there's no future for me. It's not bad for the younger people who have a trade, but coal-mining isn't a trade."

Each miner will receive 200 hours of severance pay - $2,700 at the average hourly wage of $13.50.

The miners' pension plan falls far short of the $300 a month it was planned to provide. Set up in 1978, it was to be built up over 15 years, but at the shutdown, the company had paid in only 54 per cent of the planned total, so men who have worked 20 years will receive about $180 a month.

Workers feel the company, owned by Norcen Energy Resources Ltd. of Toronto, did not try hard enough to keep Coleman Collieries open. Norcen, they say, is not interested in coal.

"I think it's a mistake to let an oil company buy a coal company," one worker said. "It seems queer to close this place down with an established work force and coal in the ground when they're starting mines 20 miles west of here (in British Columbia). Byron Creek, Fording and Line Creek are relatively new mines. It's hard to understand why we can't progress and advance while other companies can."

Another worker said: "Norcen closes down companies. It's a company that doesn't care about anything but money. Under different management, I think we'd still be working, but they run us; we can't do anything about it."

In 1971, Norcen bought 82 per cent of the company, created in a 1951 merger of International Coal and Coke Co. Ltd., McGillivray Creek Coal and Coke Co. Ltd. and Hillcrest-Mohawk Collieries Ltd., and since then, as its high-quality coal reserves dwindled, so did the company's value. Coleman president Wilfrid Loucks says Norcen has lost $3-million on Coleman.

At the time of the 1951 merger, Coleman was the largest coal operation in Canada, employing more than 1,200 workers.

For this community of 7,500, the closing of Coleman Collieries means the loss of an $2-million annual payroll and $165,000 in direct corporate taxes.

"We sort of knew this was going to happen," says George Hurtak, a plant foreman and 20-year employee. "Pretty well every family in the Pass has had somebody working in the mines to make this community grow. This may be the end of the road."

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