

**Saskatchewan's Long History
of
Coal Mining**

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The farmer those days barely made a living and without the coal mine would have barely existed. Would the train have come to this area? I doubt it. Would the Power Plant that feeds electricity to that area exist? No. I could go on and on. We owe a huge debt to Coal and the Miners who worked with it. (Gent 1998)

1. Introduction

Dating back to 1857, coal mining is one of the earliest resources to be mined in the province. For more than 50 years coal provided a cheap domestic and commercial fuel. Today it is much more widely used. About 90% goes to the production of electricity to provide light and power to farms, towns and villages, cities around the province and beyond.

What was begun by enterprising settlers grubbing out coal for their own use evolved into a huge industry in which desperately poor miners slaved in dangerous underground mines. Today, the southern coalfields prosper and miners work for excellent wages and in relative safety.

What is Coal?

Coal is about 100 million years old, formed from buried swamp plants at the edges of ancient seas. The plant matter has been converted into a fuel by pressure and heat. Because plants differ and they are buried at varying depths which have been under varying amounts of pressure and heat, there are differences between coal deposits from place to place.

Coal classification by "rank" is based on how much of the original plant matter has transformed into carbon. These ranks are, from least to most carbonaceous, lignite (25-35% carbon; 4,000 - 8,300 BTUs/lb), sub-bituminous (35-45% carbon; 8,300 - 13,000 BTUs/lb), bituminous (45-86% carbon; 10,500 - 15,500 BTUs/lb) and hard anthracite (86-98% carbon; 15,000 BTUs/lb). When carbon is burned, energy is released. Coal also contains hydrogen, oxygen, nitrogen and varying amounts of sulphur. Coals high in carbon, such as anthracite, are high in heat value, but low in hydrogen and oxygen. Low-rank coals have less carbon, but more hydrogen and oxygen. Metallurgical coals are used to make coke for the steel industry. Thermal coal is used to generate electricity.

What Type Do We Mine?

Saskatchewan produces mostly lignite coal and accounts for most of this production in Canada at present. Lignite is a soft, brown or black coal found across the southern prairie provinces. In 1997, 11.6 million tonnes of lignite coal were produced in Saskatchewan. Most of this is used to generate 69 per cent of Saskatchewan's electricity. Saskatchewan lignite has a low sulphur content (0.3 to 0.9%) and high moisture and volatile matter content of 37.5 to 41%.

Where Is It Mined?

The majority of the coal mined in Saskatchewan comes from the Lower Estevan zone which averages 3.5 metres in thickness. The Ravenscrag Formation, containing the lignite deposits of

current economic interest, is an extension of lignite bearing beds distributed through North and South Dakota, Montana and Wyoming. The surface-mineable deposits are located in three coal basins: Estevan, Willow Bunch/Wood Mountain and Shaunavon.

2. Early Coal Mine History

As early as 1857, Capt John Palliser reported finding coal in southeastern Saskatchewan, but it was to be another 30 years before commercial mining began. The first prairie coal expedition, from Winnipeg to Roche Percee, happened about 1882. Coal mined from a 70 foot tunnel was loaded onto barges down the Souris River, but the procedure was too costly to be continued.

Many farmers had coal on their own lands, exposed in ravines and gravel pits, and pits and “gopher hole” mines spotted the landscape across the southern prairies.¹

When the local homesteader needed coal he simply took a wheelbarrow, which, combined with a pick and shovel and the sweat of his brow, provided him with all the coal he could use for the digging. (Overgard, p.21)

One homesteader, Robert J. Hassard, discovered a large seam in a narrow ravine near his house east of Roche Percee. This may have been the first serious extraction of coal in the province. In 1887 he began to sell coal to others farmers in his area. By 1891 the eight foot thick seam had been mined out into a wide levelly-floored corridor cut straight into the bank. The coal could be pulled out by horse, instead of having to lift it out, they way they had to from pit mines. Wooden rafters were put in place to keep the cut from collapsing. Settlers came from all over the southern part of the province to get their winter supply at a dollar per wagon load.

It was pretty hot working in these drifts in the fall. We used to wait until it froze up and then go. We got our coal from there from 1883 until the railroad came in. Eventually Hazard had a boarding-house, and we could stop there when we went for coal. He would charge us about \$1.00 a load for coal, and for this you could load your wagon with as much coal as your team could carry. We had to help mine it. As we got in further we would support the roofs with balks of timber. We would back the wagon into the drift by hand. It was less trouble to go to the Hazard Mine for coal than it was to go to the Souris river for wood. We would travel 65 or 75 miles by the trail to get coal, and we used to call it a four days' trip.
(Hutchinson, in Saskatchewan and Its People)

A number of mines were in operation by 1892 with an annual output of 5,400 tons. Witnesses recall as many as 62 ox trains on the old Moose Mountain trail, forming a long convoy bound for the coal fields. As many as 135 wagons might be at the mines in any one winter day.

¹Gopher hole mining resurged again in the Depression of the 1930s. While there were few crops harvested in southern Saskatchewan during the drought, many farmers dug coal and sold it to support their families. Unfortunately, the price was low: less than \$2 a ton.

As the railway was 100 miles north, early coal mining was essentially a local activity. Then, in 1892, the Soo Line spur was built to connect the coalfields with the main line across Canada. A large shipment of coal mined over the winter at the Hassard Mine was the first to be shovelled into cars and be sent out by rail. Three years later, in 1895, Saskatchewan's first coal mining company was formed: Hassard Mine changed its name to the Souris Valley Coal Mining Company. In 1905 it was sold to the Taylor family of Winnipeg and renamed the Western Dominion Collieries Ltd. Its mining campsite was called Taylorton and the old Coalfields post office name was changed to Taylorton. Soon, several new companies were formed by the amalgamation and purchase of smaller outfits and new mines and new spurs, stores and stone warehouses were built.

Deep Seam Mining

The method of mining at this time was deep seam mining. There are many famous deep seam mining company names from this period, such as Roche Percee Collieries, Big Lump Coal Company, Old Mac Coal Mine, Bienfait Mine, the Hudson Bay Mining Company², Shand Mining Company, Eastern Collieries, Hannah. They operated mostly in the winter, when fuel was needed. Drift, slope or vertical shaft tunnels were cut into the earth with pick and shovel and the coal blasted out of its seams. Drift mines were opened by driving horizontally into the coal seam on the side of a hill. Slope mines tunnelled into a hillside at an angle. Shaft mines were cut straight down through an overburden as deep as 90 feet and timbered to protect against cave-ins. The coal was cut off "the solid" in long galleries extending up to 1 ½ miles off the main shaft. In the Saskatchewan fields, seams were often between five to ten feet thick. Air passages were cut for ventilation.

To break the coal out of the seam, the coal face was undercut or sheared vertically by the coal cutter. Holes drilled into the face by hand auger were charged with explosive powder and fired by fuses. After the blast, the coal collapsed, creating a "room" about 20-30 feet wide by 7-8 ft high. The "entry driver" would then timber his X room to prevent cave-ins or clay-fall. The loose coal was shovelled by the "digger" into a mine car and pulled out by a pit horse or hauler. With a keg of black powder costing a miner \$3.60, those with experience in using it effectively made the most money. While a beginner might get out 10 tons of coal or less with his keg of powder, an experienced man could harvest about 20 to 25 tons with one keg. The dust made the work very difficult and dangerous to the miners' health.

You could load so much and then you would have to go to the main entry where the air was going straight, and stay there a few minutes, and then go back again, because—you don't load, you don't get nothing. (Miner, in Cochrane, ed., p.5)

Each man loaded his own "cars", small coal carriers which were pulled out by pit horses along a small scale rail line to the "tipple", where the coal was tipped out and screened over a set of bars and sorted for size. Each car had a tag identifying it as belonging to a particular miner. Sometimes a miner's assigned cars might be stolen by someone who would then get credit for

²The Hudson Bay Mining Company, begun in 1906 at Bienfait, later became the Manitoba and Saskatchewan Coal mining Company.

that load.

Well, I lost that car, that's all. What can I do? Oh, buggers, they was stealing to beat hell. (Miner, in Cochrane, ed., p.5)

The rails connecting the rooms to the main entry were laid and maintained by the miners themselves.

Blasting was scheduled for early evening. Miners made most of their money in the morning, after the smoke cleared out overnight. If they could get enough cars, they could quickly fill them up. However, cave-ins covering the tracks often had to be cleared up first and that used up precious time. At first, the miners were paid 35 cents per hour for clearing cave-in debris. Then, when the mine companies began to "get tough" about 1927, miners were expected to do it for nothing. Any grumbling was dealt with by dismissal. The miners were expected to haul out any water in their rooms without pay. Sometimes the water was up to the knees. There were few pumps, so it was dumped into tanks and pulled out on the same track as the coal cars.

In the late 1920s, hundreds of miners were needed as extraction expanded and many European immigrants found work in the coalfields, driving the wages down. In general, there were two groups at the large mines. The "foreign" workers, who were given the heaviest work, were mostly Ukrainians, with Slavs and Lithuanians, and a few Russians and Scandinavians. The "bosses" and those with light duties were usually of British descent. There was a great deal of competition between mine sections, with area bosses competing to get the most work out of their miners. The bosses played off the ethnic group off against another, keeping animosities aroused.

They would give him a little promotion, just if he could keep the rest of his countrymen in line... They might pay him a little better rate or give him so much for being timber foreman in the area... just to keep the ethnic pot boiling as much as they could... (Mine cook, in Cochrane, ed., p. 13)

This manipulation is quite ironic, when the events of 1931 are considered.

Miners brought their own picks and shovels and oil wick lamps. Soon carbide lamps were available, both for lanterns and for cap lamps. Undercutting and shearing machines became available and were installed underground. By 1925, electric haulage motors were brought in, reducing the work of the pit horses.

Miners worked between nine to fifteen hours per day, with perhaps two hours for meals and rest. In 1908, the miners were paid by the hour, averaging \$1.50 a day. However, later they were paid as little as 18 cents per hour, too little for a decent living. Mining camps had rows of bunk houses for the workers and their families. Board cost about \$4 per week in the bunk houses, depending on the number of rooms taken, and the miners provided their own bedding. Nearby boarding houses provided important services for single miners and others. When farmers came in to load up their winter coal supplies, they could get meals at the boarding houses and feed was available for their teams.

By 1914, the coal fields were producing 250,000 tons a year, most of it sold in southeastern Saskatchewan until the 1920s when the Manitoba market became important. The market for Saskatchewan coal was limited by its quality, which was much lower than coal from eastern Canada, British Columbia, Alberta and the United States.

By the 1930s, the Eastern Collieries underground workings had spread to about 400 x 800 yards, an area the same as 32 football fields. At the Taylorton Crescent Collieries, when owner William Hamilton died in 1933, his daughter took over the mine operation. Crescent Collieries was the only mine in Canada operated by a woman. Jessie Hamilton received given the Coronation Medal from Queen Elizabeth for her work in the mining industry.

Company Towns

Very similar to the northern logging companies of the early 20th century, the mining companies established stores and warehouses at the mining camps, away from towns and villages. If a miner was fortunate enough to get into a company house, he paid a nominal rent and was expected to buy from the company store. Stores were stocked with food and equipment needed by the miners and their families, at prices usually well above what could be found in town. Miners had to supply much of their own equipment and supplies, without which they could not work. They were sometimes encouraged to buy on credit in the company store, something that was usually denied them in town. Because few had much cash, this often resulted in debt entrapment and resentment. Some people cheated and bought groceries more cheaply in town or from local farmers.

So the women, in their billowing skirts of that day and petticoats, they'd hang this all up around their waists with strings. They'd tie it all up underneath their skirts and walk into their camp. They'd be about thirty pounds heavier. And this was quite necessary because if anyone of the company stools... seen them bring it in, they would be reported and they would be let know about it and maybe even fired.

(Mine cook, in Cochrane, ed., p.2)

Mail orders were also controlled and, at one company, families were not allowed to buy shoes outside the company store. Often miners who had cars, and wanted to go to town, had to get permission to be let out of the camp.

Working and Living Conditions

Mining companies were not required to provide safe facilities as they are today. Working and safety conditions were poor because of the coal dust and smoke from blasting with black powder and the danger of unexpected cave-ins. Timbering in the mines was seldom adequate for real safety. Water was often up to the knees in some mines and had to be hauled out. Workers were not paid for the time it took to do this.

At the Bienfait Mines, any miner "that had water had to rush in early in the morning to get his water clear before the cars came around, otherwise it would be detrimental to his loading of coal." (Makahonuk 1980:45)

There were terrible dangers: falls of roofs or coal faces, mine car and locomotive accidents, gas and dust explosions, electrocution, timbering collapses, accidents with coal cutting machines, mining and loading machinery. There were few “safety holes” where miners run to to escape blasts, cave-ins or run-away mine cars. What safety holes there were were often filled in with refuse or equipment, due to lack of time to go to the supply room near the mine entrance. There were few first aid kits or first aid men. At one mine, there was only one first aid man for the entire mine. The reported fatal and non-fatal accidents for both surface and underground mineworkers in Saskatchewan increased almost six times between 1929 and 1939. (Makahonuk 1980:45, Table 2)

Deep seam miners’ salaries had been at \$1.20 a ton in 1927. Then, with the influx of central Europeans desperate for work in the late 1920s, wages dropped to about 25 cents a ton. Again, when the deep seam mining companies lowered salaries to compete with the strip miners in 1930-31, many families became desperate and resentment grew. The average annual wage of a Saskatchewan coal miner in 1929 was about \$950. By 1934, this had dropped to about \$620. (Makahonuk 1980:46, Table 3)

Despite the wages and condition, Saskatchewan coal miners produced the highest average number of tons of coal in one day per man employed among other western Canadian coal miners, 5.40 tons between 1930 and 1939. (Makahonuk 1980:47) The miners actually mined much more coal than they got paid for.

...a man dug out a ton and a half or a ton and three-quarters in order to get credit for a ton... (Mine cook, in Cochrane, ed., p. 1)

The company store bill was paid off the top and much of what was left went to mining supplies. The company store was a serious bur under the saddle of the working miner.

Living conditions were often deplorable. The draughty tar paper shack houses were often crowded, and frequently there was no money for coal from the company store. People used to steal what they could from spillage at the track. The workers were often in poor health and there were few medical services available to treat the sick or injured. Doctors were very scarce. “They tried to keep a doctor at the hospital in Bienfait, but this was hard to do.” In any event, workers had no money to pay them. Mothers were sometimes exhausted from childbearing and work, and childbirth mortality was high. With the children poorly nourished, many died of disease before the age of three. Families eked out a living by gathering spilled coal and grain along the railway lines, keeping a pig and some chickens, trading butter and eggs for supplies and sometimes selling home brew.

From the early 1900s to the late 1930s, the frustrations of poor living and working conditions, coupled with low wages, resulted in labour organization and the forming of a coalfields unions to represent the deep seam miners. One desperate and dramatic labour event happened in 1931, when the mine companies refused to recognize a new union and the workers struck. A riot ensued in which three miners were killed and many people, miners, police officers and bystanders alike, were injured. It was not until 1939 that Saskatchewan coal miners were able to

force mining companies to provide decent wages and safe working conditions.

3. Strip Mining

In strip or surface mining, huge crane shovels strip away the top soil overburden and scoop out the coal lying near the surface. Strip mining was introduced in 1928 by the Sunshine Mine Ltd. on a hill above the brickyard just east of Estevan. Two years later, in 1930, the New York mining company, Truax-Traer, brought in new modern equipment to replace the old pick and shovel practices and started the first big stripping operation. The 6 ton Bucyrus Erie 320 B electric shovel with its 8 yard bucket marked the beginning of the end of shaft mining³. With equipment like this, mining became much cheaper and more efficient (ignoring ecological costs), and resulted in Truax being able to undersell the other mines. By strip mining, it could produce coal at $\frac{1}{3}$ or $\frac{1}{4}$ the price of deep-seam production, which sold at that time for \$1.50 to \$1.75 a ton. Small mines were bought up and many outfits were put under by cutting the price or by taking them over.

Between 1928 and 1931, the price of coal fell by twenty-five to thirty-five cents a ton. The deep-seam mines that were left had to cut their miners' salaries in order to compete. This led to trouble later. New mining companies, such as the deep seam miner Manitoba and Saskatchewan (M & S) Mines, the Bienfait Mine, the Hawkinson Mine and the Crescent Collieries, were formed. At this time twenty-five per cent of Saskatchewan coal was sold in Manitoba. Now, farmers could buy coal direct from only a few mines.

Production surged. By 1938, the M & S Mines, for example, had a daily output of about 1,600 tons, which filled 45 cars. Their yearly average was now 300,000 tons of lignite. Electric culling machines and pumps were common by now. Main entrance ways were electrically lit, although miners still used their carbide lamps. These gains in production were, at times, at the expense of the miners themselves. After the Second World War, miners were finally unionized and were able to force mine companies to pay decent wages and provide safe conditions and procedures.

Over the years, into the 1990s, mines changed their names many times and amalgamated with other mines. Out-of-province interests came in. Equipment got bigger and more sophisticated. And more and more coal was taken from the ground.

4. Coal Mining in Saskatchewan Today

Saskatchewan is the third largest producer of coal in Canada. At present there are five active coal mines in Saskatchewan which account for about 14 to 17 per cent of total Canadian coal production. In 2001, Saskatchewan produced 11,341,000 metric tons of coal, valued at

³One mine that persisted in deep seam mining at this time was the North West Coal Company Ltd., which began operations in 1932, using pit horses to pull the mine cars from a 62 ft sloped timbered shaft. North West's 15 miners produced about 3,750 tons of coal per month. By 1939, 50 miners were shipping 360 tons in eight box cars a day to Saskatchewan, Manitoba and Ontario. However, seam mining was expensive compared to strip mining and in 1947 North West converted to surface mining.

\$11,948,000. (Saskatchewan Mining Association 2001:58)

How is Mining Done Today?

Today, all coal mining in Saskatchewan is done on the surface in open pits. The deep seam method of coal mining ceased to be economical long ago. At today's strip mines draglines remove the topsoil and subsoil. A dragline is a huge machine which crawls over the surface, stripping off the upper soil layers. At Estevan there are three draglines, including a P&H 2355, used to supply coal for the Boundary Dam and Shand power plants. The gigantic P&H 9020 carries a 100 cubic yard bucket on a boom 350 ft long, and has two huge walking motors.⁴ Once the surface is stripped off, the overburden is dug up and moved away by the dragline, exposing the coal beneath. Huge shovels and loaders then load the coal into bottom dumping carriers which transport it to the preparation plant where it is crushed and screened. Then it is transported either directly to an adjacent electricity generating station, to storage silos or to railway cars. Some mines have computerized "loadout" facilities which load the coal into Canadian National or Canadian Pacific unit trains for transport.

The operations of today do not create the destruction to the environment which has characterized coal mining for generations. Provincial regulations ensure compliance with new standards in the mining industry, for both the protection of humans and the environment and for aesthetic appearance. Once the coal has been removed, the overburden, subsoil and topsoil are redeposited in the order they were removed and levelled. The reclamation of mined areas is the final step, an integral part of modern operations, and one which is carried out as other mining operations go on. Monitoring of operating and decommissioned excavations is ongoing.

It's a Good Thing: Conservation and Improvements

Mining uses only 0.01% of available land in Saskatchewan, which is less than the size of the city of Saskatoon. Today, coal mining is seen as a temporary use of the land. The first step in a new operation is to remove and save the covering soil. As pits are mined out, they are refilled according to provincial environmental standards with material from the spoil piles, recovered with overburden and levelled or recontoured. Then the cover soil is replaced and planted to minimize wind and water erosion. Native grasslands are being replanted with native species. Land is reclaimed as soon as possible to a productive state such as cereal or forage crop, pasture, wildlife habitat, recreation and commercial land uses. Water management is an important component of land reclamation, needed to minimize the impact on surface and ground water resources.

The coal mining industry is an active participant in ongoing research, development and the

⁴The P&H 9020 walking dragline was the first large machine of its kind sold in North America since 1990. Ordered by Luscar Ltd. for the expansion of its Estevan Coal Corp. mine in Saskatchewan, the 6,295 ton overburden stripper was commissioned there in late 1999. It works on a 73-ft diameter high-strength patented gradial tub which is designed to handle multiple load paths in any direction. The 9020 has ultra-high horsepower to increase production rates. Six planetary swing motors, six drag motors, six hoist motors, and two walk motors provide a total 35,200 horsepower. (Coal Age 1998) Compare the 100 yard bucket of the 9020 with the contender of the 1950s, the widely known Mr. Klimax, with its 35 yard bucket. It had a boom of 225 feet, compared with the 9020's 350 foot boom.

implementation of new technologies to improve combustion efficiency, reduce greenhouse gas emissions, increase resource conservation and further reduce environmental impact.

(Saskatchewan Mining Association 2002) An example of new technologies is the first system permitted to be used in Saskatchewan for the thermal treatment of coal tar waste in Estevan, contracted to Komex International.

Where is Coal Mined in Saskatchewan?

The same coalfields are being mined today as have been harvested since the late 1880s. The surface-mineable deposits of the Ravenscrag formation are located in three coal basins: Estevan/Bienfait, Willow Bunch/Wood Mountain and Shaunavon. The primary product is lignite, although some bituminous coal is also extracted. Some of the largest and most important mines are the Boundary Dam Mine,⁵ the Bienfait Mine, and the Poplar River Mine.

Where Does Saskatchewan's Coal Go?

Most of Saskatchewan's coal, about 90 %, is used in the production of electricity right here in the province. Some coal, about 10%, is shipped by rail to Ontario and Manitoba where it is also used to generate electricity. The Boundary Dam mine, 5 km south of Estevan, began supplying coal to the Boundary Dam Generating Station in 1973 and to the Shand Generating Station in 1992. Coal from the Shand Mine also goes to the Shand plant. At the mines, front-end loaders and shovels load it into coal haulers for delivery directly to the mine-mouth generating stations. Both coal-fired plants are owned by SaskPower and supply most of the province's electricity.

Poplar River Mine, near Coronach, is the sole supplier of lignite coal to SaskPower's Poplar River power generating station. It produces about 4 million metric tons of coal per year using two draglines. It is unique in western Canada in that its coal is loaded into its own train for transport to the station, about 20 km away.

The present-day Bienfait Mine supplies lignite coal to Ontario Power Generation and other domestic markets for electricity generation. A char plant at the mine produces lignite char for barbecue briquettes and industrial applications requiring reactive carbon. The char is transported by truck and rail to various destinations in the United States and Canada.

The rail systems of Canadian National Railway and Canadian Pacific Railway are essential in the transportation of coal to distant markets. Both high capacity aluminum and conventional steel rotary dump gondola unit trains are used. Depending on the market and availability, train configurations vary with total carrying capacity capable of exceeding 13,000 tonnes. Unit trains are routinely loaded and dumped in under 11 hours. (Luscar 1999: Transportation) The coal is delivered either directly to customers or shipped to ports where it is transferred onto ships for delivery to its final destination. The distance by rail from Bienfait to the port of Thunder Bay for example, is 1,180 km.

⁵Having merged with Manalta Ltd in 1998, Luscar Limited, based in Edmonton, is now the largest coal mining operator in Canada and the seventh in North America. It produces more than 42 million metric tons of coal a year in Canada and operates several mines in Saskatchewan.

What About the Future?

Saskatchewan's total coal reserves are estimated to be about 5.1 billion tonnes, which is equivalent to 236 years of mining at current rates of production. The life of a coal mine depends on many things, but new technologies and extraction methods are prolonging the life of this abundant, but non-renewable, natural resource. Coal resources immediately available, by current open pit technology and at depths of less than 35 metres, are estimated at 1.3 billion tonnes. There is evidence that another 2.6 billion tonnes may exist, available through the same technology. Reserves more difficult, and thus more costly, to extract are estimated at more than 1.2 billion tonnes. (Downing 1998:2; Saskatchewan Department of Energy and Mines; Geological Survey of Canada 1998)

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