

# COAL PRODUCTION and UTILIZATION in NOVA SCOTIA

Nova Scotia contains an estimated coal resource of 3 billion tonnes. The major portion of the resource is found in the Sydney coalfield (2.65 billion tonnes). The next largest fields are those at Mabou (143 million tonnes), Springhill (77 million tonnes) and Pictou County (70 million tonnes). The remaining coalfields contain resources totalling approximately 16 million tonnes. It should be noted that less than 20 percent of the resource is classified as measured (proven), indicating that much is yet to be learned about the Province's coal resources. Recoverable coal (*reserves*) is estimated at one billion tonnes.

The bulk of metallurgical-grade coal is contained in the Harbour and Phalen seams in the Sydney coalfield, although a smaller resource exists in the Acadia seam in the Pictou coalfield. Metallurgical-grade coal is determined by several quality characteristics such as sulphur and ash content. Another factor in determining the grade of coal is its amenability to sulphur reduction through *beneficiation*. Since washability tests have not been completed on all coals with metallurgical-grade properties, it is not known if all reserves of metallurgical-grade coal can meet market specifications. Therefore, only rough estimates can be given for resource tonnages of metallurgical-grade coals in the Province. The current estimate is between 200 and 250 million tonnes.

There are six companies producing coal in Nova Scotia including a company involved in mine waste-bank ("dump") reclamation (Table 2).

The Cape Breton Development Corporation (CBDC) is the largest producer of coal in Nova Scotia with two operating mines in the Sydney coalfield with a yearly combined output capacity of 2.75 million tonnes of raw coal. The third CBDC mine, No. 26 colliery, ceased production in April 1984 due to an underground fire.

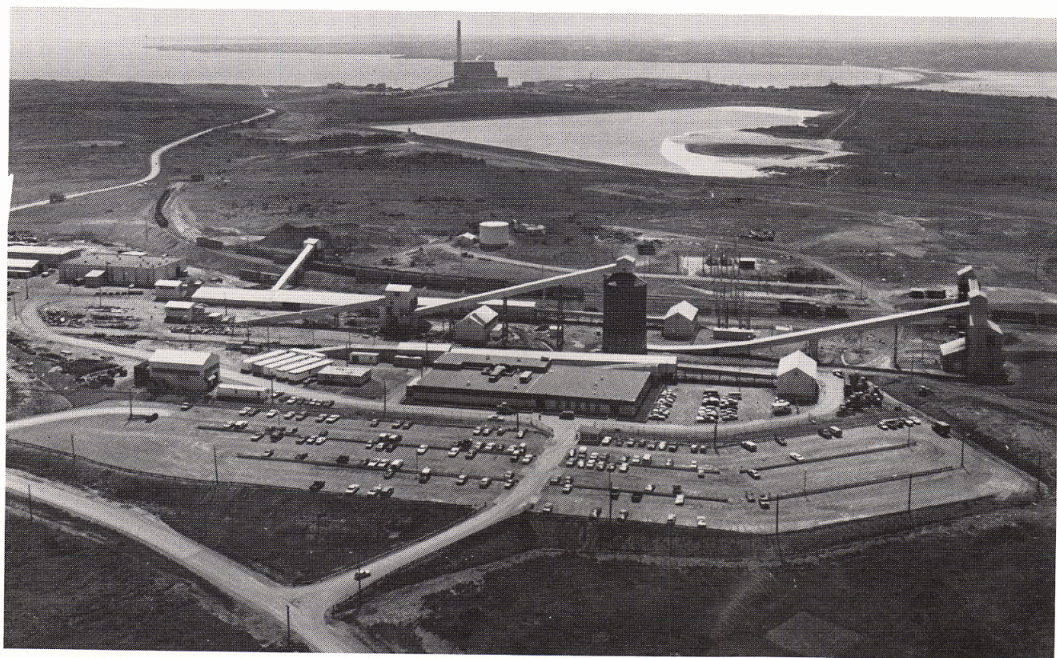


FIGURE 34. The Lingan colliery of the Cape Breton Development Corporation at New Waterford, Cape Breton. Owen Fitzgerald.

The Lingan mine (Figure 34), located in the New Waterford area, was opened by CBDC in 1967 to extract coal from the Harbour seam. This submarine colliery operates with three advance longwall systems serviced by four slopes. The resource available to this mine is 71 million tonnes, and with a rate of extraction of 60 percent, has potential reserves of 43 million tonnes. Production of raw coal in 1984 was 1,895,000 tonnes, most of which was processed at the Victoria Junction Coal Preparation Plant. Fifty to sixty percent of cleaned, saleable coal is of metallurgical grade, while the coal referred to as "the middlings" is sold in the *thermal coal* market. Over 20 percent of the raw coal feed is rejected to waste banks. The Lingan mine is expected to continue producing coal at a rate of 1.38 million tonnes of saleable coal per year.

TABLE 2. *RAW COAL PRODUCTION AND EMPLOYMENT IN COAL MINES OF NOVA SCOTIA*  
COMPANIES PRODUCING COAL IN NOVA SCOTIA

COMPANY	MINE/OPERATION	LOCATION	RAW COAL PRODUCTION	
			1983 (tonnes)	1984
Cape Breton Development Corporation	1. Lingan mine	New Waterford	1,800,000	1,895,341
	2. Prince mine	Point Aconi	777,000	966,151
	3. No. 26 <sup>1</sup>	Glace Bay	890,000	289,239
Pioneer Coal Co. (formerly Drummond)	Drummond mine <sup>2</sup>	Westville	12,600	39,468
Novaco Limited	Novaco surface mine	Point Aconi (and Springhill, 1983)	215,000	139,283
Evans Coal Co.	Evans mine	St. Rose	43,500	46,283
T. Brogan & Sons Construction	Brogan surface mine	Point Aconi	30,500	45,543
Selminco Inc.	dump reclamation	New Waterford Sydney Mines	121,200	124,934
TOTAL			3,890,400	3,546,172

<sup>1</sup> No. 26 mine ceased production in April 1984 due to an underground fire.

<sup>2</sup> The Drummond colliery (underground) ceased production in August 1984 due to an underground fire.

#### EMPLOYMENT IN NOVA SCOTIA COAL MINES (1983)

COMPANY	EMPLOYEES
Cape Breton Development Corporation	4,450 (includes staff for all coal-related activities)
Evans Coal Company	53
Pioneer Coal Co. (formerly Drummond)	40
Novaco Limited	23
Selminco Inc.	60
T. Brogan & Sons Construction	10
TOTAL	4,636



The Prince mine (Figure 35), located in the Point Aconi area, is another CBDC mine in operation in the Sydney coalfield of Cape Breton. The Prince is a submarine mine that extracts coal from the Hub seam by two retreat longwall systems, serviced by two slopes extending under the Atlantic Ocean. The resource available to the mine is 70 million tonnes. At sixty-percent extraction, the Prince mine has reserves of 42 million tonnes. Production of raw coal in 1984 was 966,000 tonnes, all of which was sold directly in the thermal coal market. Prince mine is expected to continue producing approximately 1 million tonnes of raw coal per year. The discovery of an increase in inorganic partings and a higher ash content within coal in the western region of the mine reserve has led to the planned addition of a wash plant at the mine site, and will result in a reduction of saleable coal.

Prior to an underground fire in April 1984, CBDC's oldest operating mine was No. 26 colliery in Glace Bay. In operation since 1944, No. 26 operated from the shaft of No. 1B colliery which opened in 1924. No. 26 mine produced approximately 890,000 tonnes of coal in 1983 from two advance longwall faces; however, due to the fire it produced only 289,000 tonnes in 1984.

The Evans mine is located in the St. Rose –Inverness coalfield on the western shore of Cape Breton, 16 km north of Inverness (Figure 36). This small underground mine extracts coal from the No. 5 seam of the St. Rose coal district. A conventional room-and-pillar operation serviced by two slopes, it produced approximately 46,200 tonnes of raw coal in 1984, most of which was sold in the thermal and domestic markets within the Province. Under a recent agreement with the Government of Canada, Evans agreed to undertake a capital development program at a cost of 1.5 million dollars, to increase productivity and improve safety. Production is expected to increase in future to 60,000 tonnes per year.

T. Brogan and Sons Limited operates a small surface mine in the Point Aconi area of Cape Breton. Mining operations are carried out on the Upper and Lower Bonar seams by conventional, small-scale dragline. Production in 1984 was 45,543 tonnes of raw coal, most of which was sold in the thermal and domestic markets within the Province. The total reserve is estimated at 225,000 tonnes.



FIGURE 35. The Prince mine of the Cape Breton Development Corporation at Point Aconi, Sydney coalfield. *Owen Fitzgerald.*



Pioneer Coal Company, a subsidiary of Nova Construction Company Limited of Antigonish, obtained the Drummond colliery in the Westville area of Pictou County in early 1984. Pioneer has estimated that the reserves are 453,500 tonnes of near-surface coal, 272,100 tonnes of underground coal, and a further 453,500 tonnes of coal that may be recoverable from waste banks on the property.

The old Drummond colliery mined coal from the Acadia and Scott seams continually from 1868 to 1984, when underground workings ceased. Exploration has identified a small additional underground resource available along *strike* to the southeast of the Drummond colliery.

Recovery of coal from the old mine dumps is planned by utilizing a modular coal wash-plant with a capacity of 45 tonnes per hour. The planned annual recoverable tonnage from the dumps is 45,000-50,000 tonnes per year depending upon available markets. The reclamation of the dumps will take place from 1985 to 1995, although the life of the wash plant may be extended if it can be used to upgrade coal from surface and underground operations.

Annual production of saleable coal from Pioneer's operations is estimated at 100,000 tonnes per year for a period of ten to twenty years. The coal from this operation will vary somewhat due to quality differences in (1) near-surface coal and underground reserves and (2) the Acadia and Scott seams.

Selminco Inc. operates two coal waste-bank reclamation projects in Cape Breton: one at the Summit waste bank in New Waterford and the other at the Princess waste bank in Sydney Mines. The Princess waste bank contained approximately 2.25 million tonnes of raw material prior to the commencement of operations in 1979. Recovery of thermal-grade coal from the dump ranges from 10 to 20 percent. At a processing rate of 43,350 tonnes per year, the Princess dump is expected to be exhausted by 1986. Plant life may be extended a year by trucking in dump material from nearby areas. Negotiations with the Cape Breton Development Corporation are underway regarding access to an additional waste bank.

The Summit dump in New Waterford contained about 3 million tonnes of raw material prior to the reclamation that began in 1982. Recovery rates and coal quality from the Summit dump are similar to the Sydney Mines operation, but the capacity of the New Waterford plant is greater. At a rate of 54,420 tonnes of recovered coal per year, the Summit dump is expected to be exhausted by 1987. Production from both sites in 1984 totalled 125,000 tonnes. The plant could be utilized an additional year or more by trucking raw material from other sites.



FIGURE 36. The Evans mine at St. Rose, Cape Breton. *N.S. Dept. of Education, Media Services.*



TABLE 3. *THE DISPOSITION OF NOVA SCOTIAN COAL MARKETS, 1983 and 1984.*  
(Preliminary figures in tonnes after processing)

	1983	1984
Deliveries to Nova Scotia Power Corp.	1,740,743	2,196,259
Domestic	52,626	49,267
Industrial	34,101	44,192
TOTAL DISPOSITION IN NOVA SCOTIA	1,921,643	2,289,718
To Other Provinces	51,453	26,638
TOTAL DISPOSITION IN CANADA	1,973,096	2,316,356
Exports (total)	1,109,263	499,174
Itemized:		
Argentina	19,402	—
Belgium - Luxembourg	15,386	—
Brazil	266,938	162,211
Greece	100,187	—
Italy	70,011	26,313
Japan	49,864	76,104
Netherlands	71,780	60,351
South Korea	105,865	76,466
Sweden	118,336	28,872
France	—	25,435
West Germany	291,494	43,422
TOTAL DISPOSITION	3,082,359	2,815,530



FIGURE 37. Dragline operating at the Novaco open-pit mine at Point Aconi. NSDME.



Novaco Limited, a wholly owned subsidiary of Nova Scotia Resources Limited, became involved with surface coal mining in late 1979. Novaco generated a mine on the Sydney Main seam (or Harbour seam) in the Point Aconi area (Figure 37) whose reserves are nearly depleted. Novaco's total coal production in 1983 was 237,000 tonnes, which included approximately 15,000 tonnes from a smaller surface operation on the Rodney seam in Springhill. The Springhill operation had been directed toward obtaining information for evaluating underground mining possibilities, and after producing approximately 83,000 tonnes, was completed in August 1983. Novaco's production in 1984 was solely achieved from the Point Aconi site, where 139,000 tonnes were mined.

The major user of Nova Scotian coal is the Nova Scotia Power Corporation (Figure 38). Other consumers within the Province include the Sydney Steel plant, boilers in industrial plants, and home owners. In 1984, less than one percent of the 2,815,530 tonnes of coal sold was exported to other Canadian provinces. Seventy-eight percent of the coal was utilized in Nova Scotia, greatly aiding the effort to lessen our reliance on foreign oil imports. A breakdown of coal disposition in 1983 and 1984 is given in Table 3.

Offshore markets for Nova Scotia coal in 1983 and/or 1984 included Brazil, West Germany, South Korea, Sweden, the Netherlands, Japan, Greece, Italy, France, Argentina, Belgium and Luxembourg. The Cape Breton Development Corporation is pursuing markets in other countries such as Mexico, Taiwan, Spain, Finland, Denmark and Jamaica. The economic activity spawned by coal mining in Nova Scotia includes direct wages of approximately \$59 million and yearly sales of about \$140 million.



FIGURE 38. The Lingan power plant of the Nova Scotia Power Corporation at Lingan, near New Waterford, Cape Breton. *Owen Fitzgerald.*



## COAL PREPARATION

The Cape Breton Development Corporation operates the only complete coal-treatment facility in Nova Scotia (Figure 39) at its Victoria Junction plant at Grand Lake. This plant, commissioned in 1976, employs 43 salaried and 154 hourly employees in a 231-day year. It treats 680 t/hr in two parallel circuits, which receive coal from the Lingan mine by rail. "Fines" (coal smaller than -28 mesh) are processed by froth flotation, and the +28 mesh to 4 cm size is treated by heavy-media washing cyclones. Both circuits produce metallurgical-grade coal, thermal-grade coal and rejected material.

Given the variation in sulphur content of the coal fed from the Lingan mine, the option exists to reduce the maximum size to 2 cm to create a greater liberation of pyrite, and hence sulphur. This must be balanced against greater retained moisture on the increased surface area. At present, coal and discarded waste dewatering is completed through the use of a centrifuge. In future, fine coal recovered by flotation will be dewatered with disc filters. Additional magnetic separators will be installed to improve recovery of the magnetite utilized to provide the heavy media for washing cyclones. As well, discarded material (+28 mesh to 15 cm) handling capacity will be increased by 50 percent.

Selminco Inc. is recovering coal from waste dumps at Sydney Mines and New Waterford. Coal is separated from the waste rock in raw material, or "feed," by screening off the coarse, rejected fraction, by conditioning/breaking and by water-only cyclones. Coal recovery is approximately 10 percent of the feed material processed. The large amount of waste is returned to areas of the waste dumps which have been already removed, and the dewatered thermal-coal product is shipped by rail and/or truck to CBDC.



FIGURE 39. The Victoria Junction coal preparation plant of the Cape Breton Development Corporation. *Owen Fitzgerald.*



Coal production for the 1983 calendar year amounted to 57,000 tonnes (1.9 percent sulphur, less than 9.0 percent ash, and 7.0 percent water) from the Sydney Mines plant and 63,000 tonnes (1.5 percent sulphur, less than 9.0 percent ash, and 7.0 percent water) from the Summit mine waste-bank plant. The future improvements envisioned are early removal of coarse rejected fraction and recycling of rejected material from the cyclone. Each plant employs five salaried personnel and general contractors provide 24 operators for 5 day/week, 24 hour/day operations. A general manager oversees both operations.

Gael Tech. Inc., an operating subsidiary of Guildcraft Inc. of Toronto, is establishing a plant on the Princess Mine dump at Sydney Mines. The objective is to recover fine coal from the fine tailing of the former wash plant by employing *spherical agglomeration* and special screening techniques.



Owen Fitzgerald