

# Mineral Exploration Monitoring

*P. D. McCulloch*

## Introduction

Monitoring of mineral exploration activity in Nova Scotia is coordinated through the Geoscience Information Services Section of the Mineral and Energy Resources Division by the author, who works out of the regional office in Stellarton, Pictou County. Regional Geologists of the Regional Services branch offices in Coxheath (Don MacNeil), Truro (Melanie Haggart) and Bridgewater (Gordon Adams) assist in the field monitoring of mineral exploration activity in their respective regions.

The monitoring process covers exploration activities throughout the province and consists of visits to company offices and exploration sites, liaison with industry personnel, and the review of current assessment reports and other material submitted by industry. Liaison with industry allows the department to maintain an awareness of current exploration activities. Assistance or advice is provided as necessary, and any drill core generated by mineral exploration activity in the province is recorded as part of the monitoring process. This core may be recovered for archiving in the Drill Core Library in Stellarton when no longer required by the companies.

The Exploration Monitoring geologist is also responsible for auditing confidential assessment reports that are submitted to support the renewal of exploration licences. In 1997, 137 assessment reports were audited for compliance with the Mineral Resources Regulations.

## Mineral Exploration Activity in 1997

Mineral exploration in Nova Scotia continued to strengthen during 1997 with a modest increase in the level of activity over 1996. Field expenditures are estimated at \$6.7 million compared with \$5.7 million in 1996 and \$2.8 million in 1995 (Table 1). Exploration was carried out for gold, base metals, industrial minerals and coal in a variety of geological environments throughout the province and was highlighted by the continuation of increased interest in the exploration and development of industrial minerals including limestone, gypsum, kaolin and silica sand. The lower Paleozoic Meguma Group of southern mainland Nova Scotia continued to be a focus for gold exploration

and exploration for coal was undertaken in the Carboniferous rocks of northern mainland Nova Scotia.

Preliminary figures for the total number of general claims staked in 1997 show a decrease of 34.4% from the previous year to 21,877 (Table 1, Fig. 1). A total of 22,691 claims for all commodities were in effect at the end of 1997 represented by 890 exploration, coal, tailings and special licences covering an area of 367 321 ha or 3673 km<sup>2</sup>, approximately 6.7% of the total area of the province. The amount of exploration drilling increased significantly in 1997 with a preliminary estimate of 21 800 m compared with a total of 15 600 m in 1996.

Approximately 294 companies and individuals held exploration interests (licenses or options) in Nova Scotia in 1997 including 17 major, 43 junior and 49 private companies (Tables 2 and 3). In addition, several mining lease holders carried out exploration on their leases or on unclaimed ground where these commodities did not require licenses (e.g. limestone, gypsum). Organizations actively engaged in exploration during 1997 included 9 major, 15 junior and 10 private companies, as well as a number of individuals (Fig. 2 and Table 4).

## Exploration Activities

### Gold

Gold exploration demonstrated a marked increase in 1997 with the number of active projects up significantly over 1996. As in previous years, the majority of work took place in the Cambro-Ordovician metasedimentary rocks of the Meguma Group in central mainland Nova Scotia. Gold exploration was carried out by junior mining companies and private interests (Table 4).

Tangier Limited Partnership continued development work on the former Coxheath Gold Holdings property at Tangier to determine the feasibility of re-opening the mine. The company completed underground bulk sampling on the property in late 1996 and proceeded with milling and metallurgical tests during 1997.

Moose River Resources Incorporated completed a diamond-drilling program at Moose River, Halifax County, early in 1997 to evaluate the potential for

**Table 1. Details of exploration and development activity in Nova Scotia, 1988-1997.**

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997 <sup>p</sup>
Total Exploration Expenditures (\$)	49 000 000	21 436 000	11 025 000	4 532 000	3 300 000	2 300 000	1 400 000	2 843 000	5 752 000	6 700 000
Total Licences Issued (all categories)	1 727	987	753	642	507	594	670	697	1 125	890
Claims In Good Standing (new and reissued)										
General	42 214	21 831	17 460	17 071	11 157	9 504	13 737	15 859	33 380	21 877
Special (Order in Council)										
Salt and Potash	232	232	298	264	264	66	66	-	16	16
Coal	2 805	2 440	2 440	1 566	366	433	376	376	469	398
Tailings	0	0	116	116	94	146	146	146	146	146
Other	149	255	331	448	348	452	255	130	254	254
Uranium*	(1 200)	(1 200)	(1 200)	(226)	(226)	(226)	(226)	(226)	(226)	(226)
Development	1 216	930	1 474	553	-	-	-	-	-	-
Total (excluding closures and uranium licences)	46 616	25 688	22 119	20 018	12 229	10 601	14 580	16 511	34 265	22 691
Total Area Held Under Licence ha	754 619	415 837	358 062	324 051	197 963	171 609	236 021	267 280	554 681	367 321
acres	1 864 640	1 027 520	884 760	800 720	489 160	424 040	583 200	660 440	1 370 600	907 640
Work reported for Licence Renewals (\$)	29 612 880	31 333 645	16 551 636	3 889 914	2 333 972	983 402	1 694 368	1 601 639	2 376 023	3 146 899
Number of Assessment Reports Received	406	303	176	132	75	62	84	111	114	137

<sup>p</sup> Preliminary figures for 1997

\* Parentheses around uranium claims indicate ground alienation due to the uranium moratorium

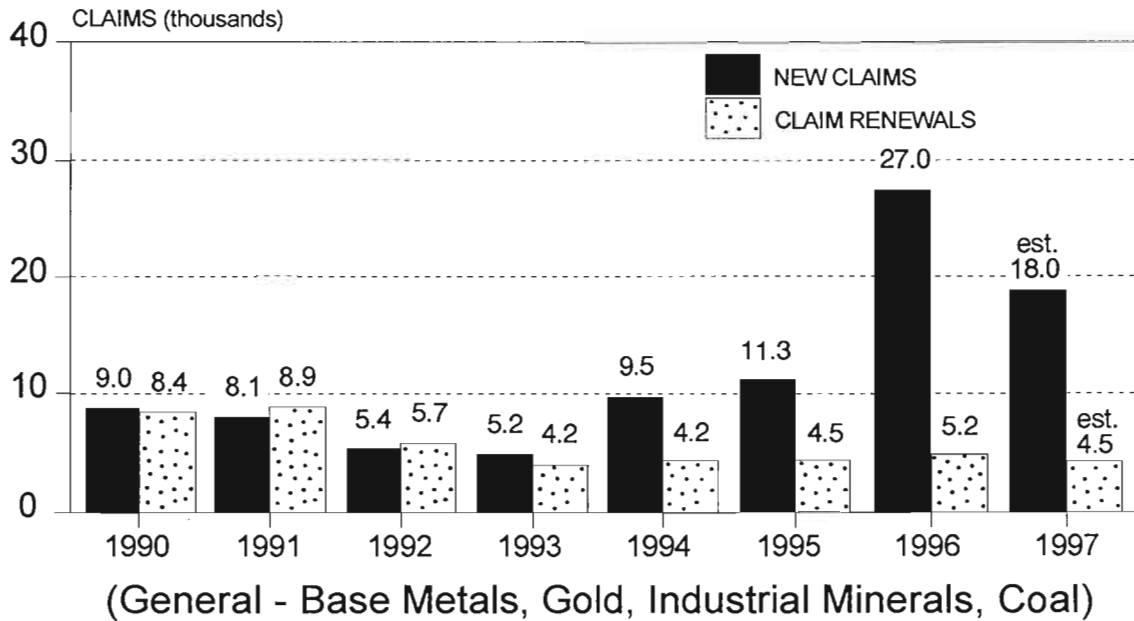


Figure 1. Expenditures for mineral exploration on new and re-issued claims in Nova Scotia, 1990-97.

expanding the known reserves of disseminated gold in the Touquoy zone and to evaluate the potential for similar large tonnage, disseminated gold in the immediate vicinity of the Moose River gold district. Ellsin Resources Incorporated ground geophysical surveys and trenching carried out on the Lake Charlotte gold property in Halifax County.

RJZ Mining Incorporated initiated an exploration drilling program for gold in the Beaver Dam and Otter Lake areas, Halifax County, and Gammon Lake Resources continued work on several properties including trenching and diamond-drilling at Mitchell Lake, Guysborough County, diamond-drilling at Cross Lake (Lochaber Lake gold district), Halifax County, and trenching on the Harrigan Cove property, Halifax County. The company also initiated an exploration program for gold in the Northport area, Cumberland County, during the year.

Wabana Explorations Incorporated completed additional diamond-drilling on the Lake Peter property in Lunenburg County and Altai Atlantic Mining Incorporated conducted ground geophysical surveys at Gold River, Lunenburg County. True Metallic Explorations also continued a detailed geological evaluation of the potential for gold in the Castle Frederick area, Hants County, and Little Lake Gold Mines Limited completed additional trenching at Sandy Lake, Halifax County. Burnt Point Resources Incorporated initiated an exploration program for gold in the Whycocomagh Mountain area in Inverness County. In addition, several

prospectors carried out exploration programs to evaluate the gold potential of various properties throughout the Meguma Group.

### Base Metals

Base metal exploration demonstrated a modest increase for the second year in row. Work primarily focused on mineral occurrences in the Carboniferous rocks of northern mainland Nova Scotia. Other work was undertaken in Precambrian environments in northern and southern Cape Breton Island and Devonian intrusives in southwestern Nova Scotia.

Savage Resources Canada Limited continued to evaluate the feasibility of re-opening the former Gays River Zn-Pb mine in central mainland Nova Scotia during 1997. The company completed additional diamond-drilling on the property early in the year and proceeded with plans to de-water the mine and rehabilitate the underground workings. The deposit is hosted by rocks of the Lower Carboniferous Windsor Group, with *in situ* reserves of 2.4 Mt grading 8.6% Zn and 6.3% Pb. The company also carried out exploration drilling for base metals in the immediate vicinity of the Jubilee Pb-Zn deposit in the Little Narrows area, Victoria County. Cannova Goldfields Incorporated conducted an exploration drilling program for base metals in the Far Brook area immediately south of the Gays River Zn-Pb property.

**Table 2. Major companies involved in mineral exploration in Nova Scotia, 1995-1997.**

	1995	1996	1997	Office location in 1997
BHP Minerals Canada Limited		x	-	
Caledonia Mining Corporation	x	x	x	
Canada Tungsten Incorporated (formerly Canamax Resources Incorporated)	-	-	-	
Conwest Exploration Company Limited	-	-	-	
Corner Bay Minerals Incorporated	-	-	x	
A. J. Perron Gold Corporation (formerly Deak Resources Corporation)	x	-	x	
Falconbridge Limited	-	-	-	
Fundy Gypsum Company	x	x	x	Windsor
Georgia Pacific Corporation	x	x	x	Sugar Camp
Granges Exploration Limited	-	-	-	
Lafarge Canada Incorporated	x	x	-	Brookfield
Little Narrows Gypsum Company Limited	x	x	x	Little Narrows
Inmet Mining Corporation (formerly Metall Mining Corporation)	x			
Mountain Minerals Company Limited	-			
National Gypsum (Canada) Limited	x	x	x	Milford Station
Noranda Exploration Company Limited	-	-	-	
Phelps Dodge Corporation of Canada Limited	x	x	x	
Placer Dome Canada Limited	x	x		
Savage Resources Canada Limited		x	x	
W. M. C. International Limited	-	-	-	

x indicates work performed

- company inactive

blanks indicate that the company did not hold an exploration licence in that particular year

Phelps Dodge Corporation of Canada Limited continued an exploration program for volcanogenic massive sulphides in the Stirling area along the southwest extension of the Late Precambrian Fourchu Group (Stirling Belt). The company conducted exploration drilling on the former Stirling mine property and on the McKillops Pond property approximately 5 km southwest of the Stirling property.

Regal Goldfields Limited initiated an exploration program for Cu-Ni-Co associated with mafic and ultramafic rocks in the Trout Lakes area east of Cheticamp, Inverness County, in 1996. The company continued a detailed evaluation of the property during 1997 with plans to begin an exploration drilling program pending a decision regarding the status of mineral exploration on the Jim Campbells Barren candidate protected area.

Goliath Copper Fields Limited initiated a detailed exploration program on the West Lochaber copper prospect in 1997, consisting of ground geophysics, trenching and diamond-drilling. The property is host to a low grade, disseminated copper deposit that occurs in a thick impure limestone unit of Devonian-Carboniferous age along the southwest margin of Lochaber Lake, Antigonish County.

Mispec Resources Incorporated continued an exploration drilling program for carbonate-hosted Pb-Zn in the Early Carboniferous Windsor Group in the Springville and Iron Rock areas, Pictou County. The company also completed diamond-drilling in the Meadowville area, Pictou County, to evaluate the base metal potential of Upper Carboniferous sediments of the Riversdale Group along the northeastern margin of the Cobequid Uplands.

**Table 3. Junior and private exploration companies in Nova Scotia, 1995-1997.**

	1995	1996	1997	Office location in 1997
Altai Atlantic Mining Incorporated			x	
Acadia Mineral Ventures Limited	-	-	-	
AEC West Limited			-	
Alterra Resources Incorporated		x		
Annapolis Heritage Forest Products	-			
Antigonish Ready-Mix Limited	-			
Arisaig Explorations Limited				
Ashgrove Energy Limited	-	-		
Aurora Gold Corporation			-	
Atlantic Industrial Minerals Incorporated	x	x	x	Sydney
Aurion Minerals Limited	x	x		Halifax
Beaver Exploration Incorporated			-	
Benrock Limited	-	-		Antigonish
Berichan Resources Limited	x	x	x	
Burnt Point Resources Incorporated	x	x	x	
C.A.G. Enterprises Limited		-	x	
CanNova Goldfields Incorporated		x	x	
CAN-SLO Enterprises			-	
Carbontec Industries Limited	-			Halifax
Centaur Mining Exploration Limited	-			
Champlain Goldfields Incorporated			-	
Cheni Resources Incorporated	x			
Cobequid Life Sciences Limited	-	-		
Conrad Brothers Limited			-	
Corner Bay Minerals Incorporated	-	-	-	Cold Brook Station
D & D Metal Detectors Limited			-	
Dominion Explorers Incorporated	-			
Dufferin Resources Incorporated	-	-	-	Halifax
Dundee-Palliser Resources Limited	-			
Eastcan Aggregates Limited	-			
Ellsin Resources Incorporated	x	-	x	
Exploration Orex Incorporated	x	-		
Gallant Aggregates Limited			-	
Gammon Lake Resources Incorporated	x	x	x	
Geocol Mining and Exploration	-	x		
Geosearch		x	x	
Ghost Town Gold Corporation			-	
Giant Meguma Holdings	-	-		
Globex Mining Enterprises Incorporated			-	
Gold Bank Resources Incorporated	x	x	-	
Gold 'n' Crystal Minerals	x	x	x	
Golden Aee Mineral Explorations Limited			-	
Groundstar Resources Limited			-	
Gusto Resources Limited	-	-		Halifax
Halifax Goldfields Incorporated			-	
Harrigan Ventures Limited	-			
Heartland Resources Limited	-	-	-	
Highland Range Minerals Limited	x	x	-	
James Henry & Associates	x	-		
Jasean Resources Incorporated	-	-	-	
John Logan Enterprises Limited			-	
Jubilee Minerals	-	-	-	
KoaClay Resources Incorporated		x	x	
Kelly Rock Limited	x	x	-	
Kellys Cove Offshore Incorporated	-			
Little Lake Gold Mines Limited	x	x	x	Dartmouth
Lodestone Limited	x	x	-	Halifax
Medyx Incorporated	x	x		Truro

**Table 3.** Continued.

	1995	1996	1997	Office Location in 1997
MEX Explorations Limited	-			Truro
Mik Vie Investments Limited			-	
Mispec Resources Limited	x	x	x	Truro
Moose River Resources Incorporated		x	x	
Mosher Limestone Company Limited	x	x	-	Upper Musquodoboit
Murray Brook Resources Incorporated			-	
North Cape Breton Resources Limited		x	-	
Nova Construction Company	x			Antigonish
NovaGold Resources Incorporated	-			Halifax
OAM Mosher Minerals Incorporated	-			
Pan East Petroleum Corporation (formerly Pan East Resources Incorporated)	-	-	-	
Phoenix Gold Resources	-			
Potter Mine (Nova Scotia) Limited	-			
Prodigy Resources Incorporated		x		
Regal Goldfields Limited		x	x	
Remosean Limited	x	x	x	
Renfrew Gold Contracting	x	x	x	
Roycefield Resources Limited	-	-		
RJZ Mining Incorporated			x	
The Shaw Group Limited (formerly L. E. Shaw Limited)	x	x	-	Lantz
Scotia Prime Resources Limited	-			
Scotia Slate Products Limited			-	
Southfield Resources Limited			-	
Springhill Coal Mines Limited	x	-		
Tangier Limited Partnership (formerly Tangier Mining Incorporated)	x	x	x	
Tanner Engineering Limited	x	x		
Tri-Explorations Limited	x	x	x	
True Metallic Explorations			x	
Tusket Mining Incorporated		x	x	
Vanoc Enterprises	x			
Victoria Mining Services Limited		-	-	
Votix Corporation Limited	-	-	x	
WTC Resources Limited		-	x	
Wabana Explorations Incorporated		x	x	

x indicates work performed

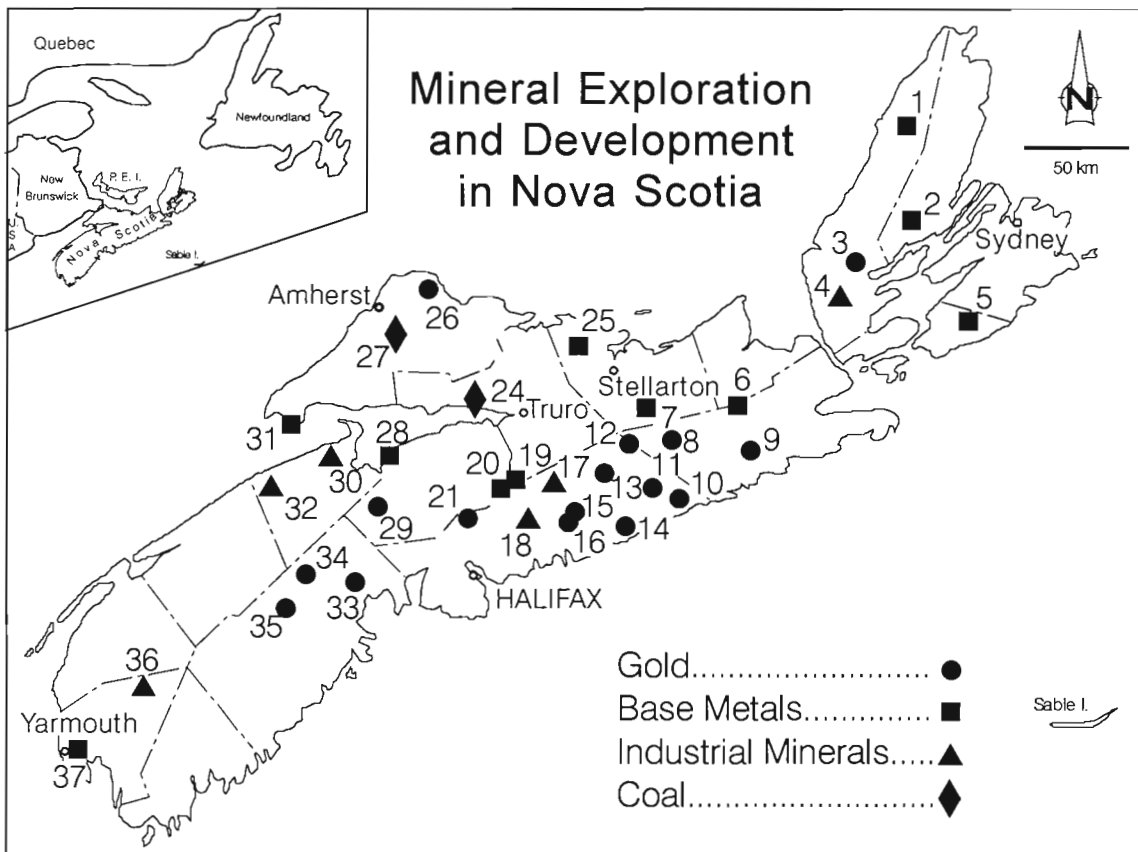
- inactive

blanks indicate that the company did not hold an exploration licence in that particular year

Votix Corporation carried out trenching and diamond-drilling on the Dominique tin prospect near Plymouth, Yarmouth County, during 1997. Base metals, along with tin, occur in cross-cutting shear zones in altered greywackes of the Cambro-Ordovician Meguma Group. Gold 'n' Crystal Minerals completed additional work, including ground geophysical surveys and geochemical sampling, to evaluate the gold and base metal potential at Cap d'Or, Cumberland County, and Geosearch continued an evaluation of the base metal potential of Carboniferous sediments in the Cheverie area, Hants County.

## Industrial Minerals

Exploration for industrial minerals during 1997 continued to focus on recent discoveries of high quality kaolin and silica sand of Cretaceous age in the Shubenacadie and Musquodoboit valleys. Work was also carried out to continue exploration and development activities for new gypsum reserves in mainland Nova Scotia and Cape Breton Island.



- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| 1. Regal Goldfields Ltd.             | 20. Cannova Goldfields Inc.           |
| 2. Aurora Gold Corporation           | 21. Little Lake Gold Mines Ltd.       |
| 3. Burnt Point Resources Inc.        | 22. R. Anthony                        |
| 4. Georgia Pacific Corporation       | 23. E. Horne                          |
| 5. Phelps Dodge Corp. of Canada Ltd. | 24. Berichan Resources Ltd.           |
| 6. Goliath Copper Fields Ltd.        | 25. Misphec Resources Ltd.            |
| 7. Misphec Resources Inc.            | 26. Gammon Lake Resources Inc.        |
| 8. T. MacNaughton                    | 27. Delta Coal Inc.                   |
| 9. Gammon Lake Resources Inc.        | 28. Geosearch                         |
| 10. Gammon Lake Resources Inc.       | 29. True Metallic Explorations        |
| 11. Gammon Lake Resources Inc.       | 30. WTC Resources Ltd.                |
| 12. S. Grant                         | 31. Gold 'n' Crystal Minerals         |
| 13. RJZ Mining Incorporated          | 32. WTC Resources Ltd.                |
| 14. Tangier Limited Partnership      | 33. Altai Atlantic Mining Corporation |
| 15. Moose River Resources Inc.       | 34. Wabana Explorations Inc.          |
| 16. Ellsin Resources Inc.            | 35. R. Baker                          |
| 17. KaoClay Inc.                     | 36. CAG Enterprises Ltd.              |
| 18. Tusket Mining Ltd.               | 37. Votix Corporation Ltd.            |
| 19. Savage Resources Canada Ltd.     |                                       |

Figure 2. Mineral exploration programs in Nova Scotia, 1997.

KaoClay Incorporated carried out additional diamond-drilling and bulk sampling for kaolin and silica sand on several properties in central mainland Nova Scotia during the year. Development work also continued

on a large gypsum deposit in the Murchyville-Elderbank area of Halifax County by Tusket Mining Limited. The company was issued a mining permit in early 1997 and began preliminary mining operations late in the year.

**Table 4. Exploration programs in Nova Scotia, 1997.**

COMPANY/LOCATION	COMMODITY	PROGRAM	CURRENT STATUS (DEC/97)
Altai Atlantic Mining Corporation Gold River, Lunenburg County	Gold	Ground geophysics	na
Aurora Gold Corporation Muskrat Brook, Victoria County	Base metals	Ground geophysics	Ongoing
Berichan Resources Limited Cottam Settlement, Colchester County	Coal	Diamond-drilling, trenching	Ongoing
Burnt Point Resources Incorporated Whycoemagh Mountain, Inverness County	Gold, copper	Prospecting, geochemical sampling	Ongoing
CAG Enterprises Limited Flintstone Rock, Yarmouth County	Clay, silica sand	Diamond-drilling	na
Cannova Goldfields Incorporated Far Brook, Halifax County	Base metals	Diamond-drilling	Ongoing
Delta Coal Incorporated Chignecto, Cumberland County	Coal	Diamond-drilling, trenching	Ongoing
Ellsin Resources Incorporated Lake Charlotte	Gold	Ground geophysics, trenching	Ongoing
Gammon Lake Resources Incorporated Cross Lake, Halifax County	Gold	Geological mapping, diamond-drilling	Ongoing
Harrigan Cove, Halifax County	Gold	Trenching	Ongoing
Lawrencetown, Halifax County	Gold	Prospecting, geochemical sampling	Ongoing
Mitchell Lake, Guysborough County	Gold	Trenching, diamond-drilling	na
Northport, Cumberland County	Gold	Prospecting, geochemical sampling	na
Geosearch Cheverie, Hants County	Base metals, gold	Prospecting, geochemical sampling	Ongoing
Georgia Pacific Corporation Melford, Inverness County	Gypsum	Diamond-drilling	Ongoing
Gold 'n' Crystal Cap d'Or	Copper, gold	Prospecting, rock sampling	Ongoing
Goliath Copper Fields Limited West Loehaber, Antigonish County	Copper	Trenching, diamond-drilling	Ongoing
KaoClay Resources Limited Middle Musquodoboit, Halifax County	Clay, silica sand	Diamond-drilling, bulk sampling	Ongoing
Little Lake Gold Mines Limited Sandy Lake, Halifax County	Gold	Trenching	na

Table 4. Continued.

COMPANY/LOCATION	COMMODITY	PROGRAM	CURRENT STATUS (DEC/97)
Mispee Resources Limited Iron Rock, Pictou County	Base metals	Diamond-drilling	Ongoing
Meadowville, Pictou County	Base metals	Diamond-drilling	na
Springville, Pictou County	Base metals	Diamond-drilling	Ongoing
Moose River Resources Incorporated Moose River, Halifax County	Gold	Diamond-drilling	Ongoing
Phelps Dodge Corp. of Canada Ltd. MacKillops Pond, Richmond County	Base metals	Diamond-drilling	Ongoing
Stirling, Richmond County	Base metals	Diamond-drilling	Ongoing
RJZ Mining Incorporated Beaver Dam, Halifax County	Gold	Diamond-drilling	Ongoing
Otter Lake, Halifax County	Gold	Diamond-drilling	Ongoing
Savage Resources Canada Limited Gays River, Halifax County	Base metals	Diamond-drilling	Ongoing
Little Narrows, Victoria County	Base metals	Diamond-drilling	na
Tangier Limited Partnership Tangier, Halifax County	Gold	Underground bulk sampling	Ongoing
True Metallie Explorations Castle Frederick, Hants County	Gold	Geological mapping/analysis	
Tusket Mining Incorporated Murchyville, Halifax County	Gypsum	Mine development	Ongoing
Votix Corporation Limited Plymouth, Yarmouth County	Tin	Trenching, diamond-drilling	na
Wabana Explorations Limited Lake Peter, Lunenburg County	Gold	Diamond-drilling	Ongoing
WTC Resources Limited Arlington, Kings County	Zeolites	Geochemical sampling, diamond-drilling	Ongoing
Stronach Mountain, Annapolis County	Zeolites	Geochemical sampling, diamond-drilling	Ongoing

na = not available

Georgia Pacific Corporation carried out a detailed drilling program near Melford, Inverness County, as part of an ongoing program to develop additional gypsum resources in the Early Carboniferous Windsor Group.

## Coal

Exploration for coal resources focused on Upper Carboniferous sediments of the Pictou and Cumberland groups in northern mainland Nova Scotia. Berichan Resources Limited initiated an exploration drilling

program to evaluate known coal resources in the Cottam Settlement area east of Debert, Colchester County, in 1995. The company completed additional work on the property in 1997, consisting of trenching and diamond-drilling.

Delta Coal Incorporated began work in 1997 to evaluate coal resources in the Chignecto area, Cumberland County. The company completed trenching, diamond-drilling and bulk sampling on the property.