3. SHALE-HOSTED DEPOSITS: GEORGEVILLE

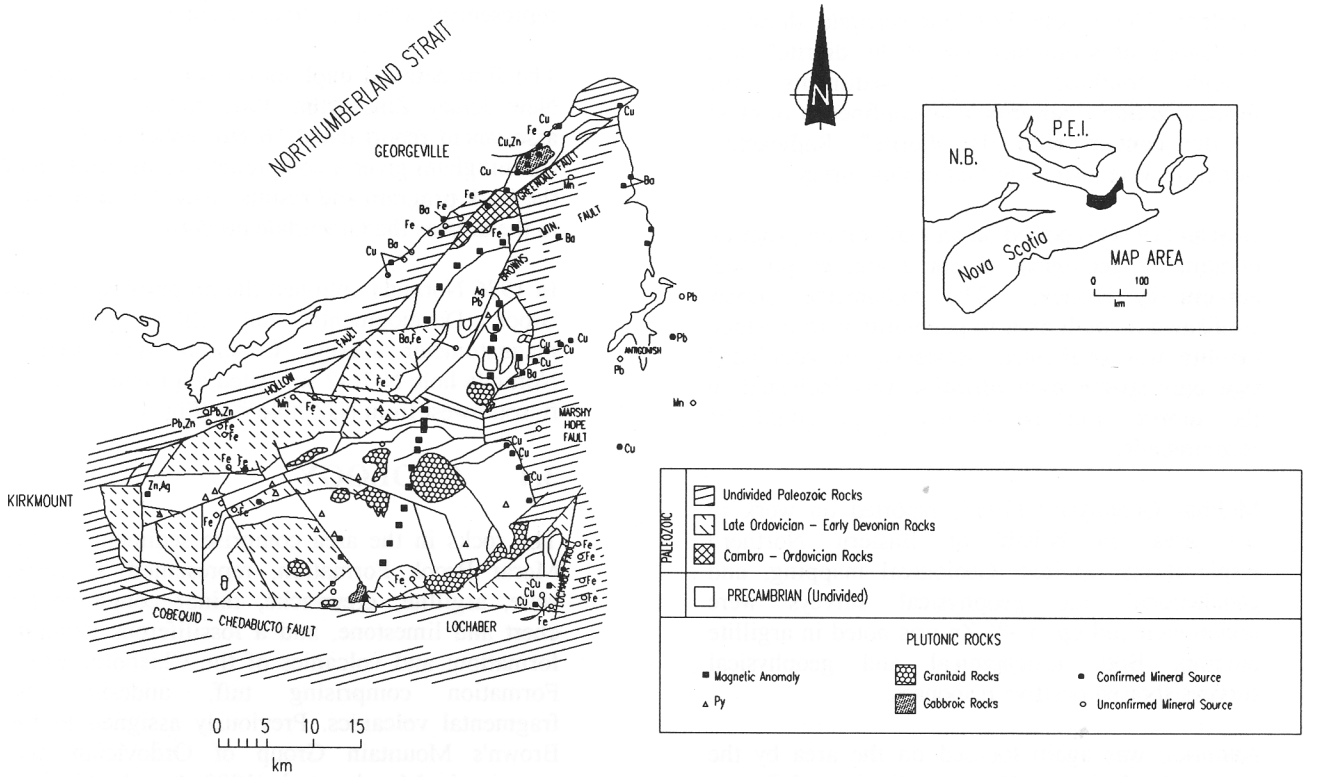

Figure 10. *Geology of Antigonish Highlands showing location of the Georgeville deposit.*

3.1 INTRODUCTION

The shale-hosted base metal sulphide deposits of the Selwyn Basin of western Canada contribute significantly to the national mineral inventory. Analogies have been drawn with similar deposits worldwide and essentially they comprise sulphide bodies hosted in carbonaceous shales or other fine-grained clastic rocks ranging in age from Proterozoic to upper Paleozoic. The Selwyn Basin deposits occur in shales ranging from lower Cambrian to upper Devonian in age and are regarded as sedimentary exhalative in origin.

Within Nova Scotia the shale-hosted mineralization in the Precambrian sedimentary rocks of the Antigonish Highlands is considered to be representative of this class of deposit and it is suggested that continued exploration of the deposits identified to date is warranted.

The type deposit for this class is the **Georgeville** property on the west side of the Cape George peninsula in the Antigonish Highlands (Fig. 10). Exploration has identified low grade (1%) zinc mineralization over intersection lengths of 17 m with greater lengths (52 m) of lower grade (0.69% Zn).

Nine drillholes have tested the horizon over a strike length of 5 Km and the description of mineralization in fractures may suggest remobilization of syngenetic mineralization or introduction at a later time.

3.2 LOCATION

The Georgeville deposit is situated on the west side of the Cape George Peninsula, Antigonish County, at 61° 59' 32" W and 45° 51' N, and some 21 km north of Antigonish town. The Georgeville property, on NTS map sheets 11E-13 and 11E-16, has been the subject of exploration activity since 1953.

3.3 EXPLORATION HISTORY

Bridger (1953) described four separate showings in "bands of sediments within the diorite", and though confined to the sediments, the mineralization " appears to be confined at or close to the contact with the diorite". Radioactive minerals were also identified in this survey.

Beavan (1954) reported on an exploration program comprising geological mapping and geophysical surveys by Brinex. The radiometric survey confirmed a small area in pegmatite within which cyrolite was confirmed. However, he concluded that only sparse mineralization was indicated in the diorite and no further work could be recommended.

McPhar Geophysics (1955) reported on work in the area on behalf of Eastern Northern Explorations Limited. Geological mapping, and geochemical and geophysical surveys were undertaken and up to 3% Zn was noted in argillite outcrop. Both geochemical and geophysical surveys showed positive responses.

Attention was again focused on the area by the maps published in 1959 by the Geological Survey of Canada reporting on heavy metal stream surveys by R. H. C. Holman. Work conducted by C.G.Cheriton (1960) for Ivan C. Stairs of Bathurst, N.B., confirmed these anomalies by limited soil sampling. Ground magnetometer surveys indicated two "significant" anomalies, while a weak NE-trending anomaly was interpreted as possibly representing a fault or fracture zone.

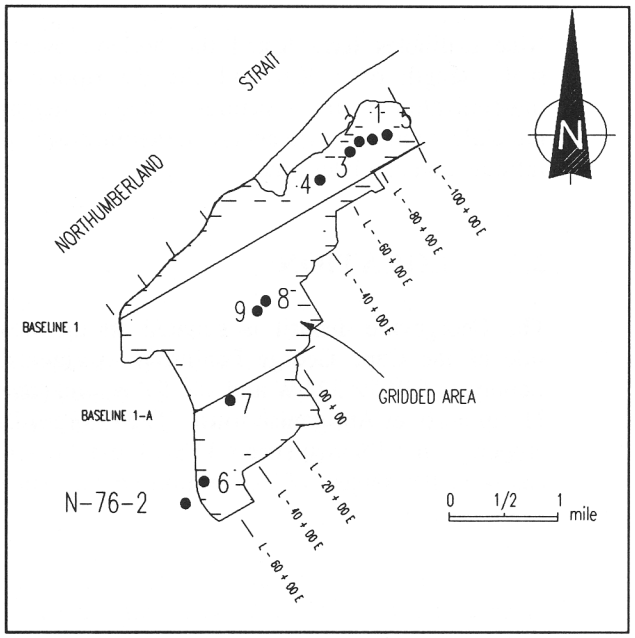

Figure 11. *Georgeville deposit showing diamond-drill hole locations (modified after New Jersey Zinc, 1970).*

The first detailed exploration was carried out by New Jersey Zinc from 1967 to 1970, and an assessment report dated 16 November 1970 by C. Cunningham gives a comprehensive description of the work program and results. New Jersey referred to the area as the Greendale property.

In 1976 Noranda optioned the property from Gold Brook Developments and utilized SP and magnetometer surveys to locate drill targets. Noranda hole N-76-2 was sited approximately 450 ft. southwest from NJZ hole # 6 (Fig. 11).

3.4 GEOLOGY

The rocks in the area comprise sediments of the Morar Brook Formation, represented by shale, slate, argillite, greywacke, minor conglomerate, chert and limestone, and a fossiliferous hematite formation; and volcanics of the Chisholm Brook Formation comprising tuff, andesite and fragmental volcanics. Previously assigned to the Brown's Mountain Group of Ordovician age, mapping by Murphy et al. (1982) has shown these rocks, both sediments and volcanics, to belong to the Georgeville Group of late Precambrian (Hadrynian) age. These are intruded by the Precambrian Greendale Complex of mafic to felsic composition. Late dykes of lower Paleozoic age also occur.

A fault, trending northeasterly, parallel to and approximately 2 km from the Hollow Fault, cuts through the prospect and may be the control to the redistribution of disseminated mineralization.

Cunningham (1970) describes the host argillite as a light to dark grey and fine-grained rock which is extremely fractured with local brecciation. Prominent anastomosing carbonate veining, with extreme distortion in the more brecciated sections, is widespread and at least two generations of veins can be identified. Interbedded light and dark colored argillites occur and siliceous and graphitic zones are abundant.

The basic rocks comprise pink feldspathic porphyritic volcanics and green, more siliceous volcanics with quartz, carbonate and pyrite. Late diorite is slightly chloritized, contains quartz and an unidentified mafic mineral, and exhibits chilled margins with the enclosing argillite.

3.5 DIAMOND-DRILLING

Several diamond-drilling programs, totalling 992 m in eight holes, were undertaken by New Jersey Zinc between October 1968 and October 1970. These holes were sited (Fig. 11) to investigate coincident geochemical and geophysical (SP) anomalies located by NJZ personnel.

The 1968-69 drilling comprised 518 m in 5 holes with hole 4 returning 0.69% Zn over 52 m (Cunningham, 1969; Bartlett, 1969). The 1970 drilling program comprised 433 m in 3 holes and glacial overburden did not exceed 20 ft.

The drilling was widely spaced, with DDH 6 (12.2 m @ 0.93% Zn) approximately 5 km from DDH 4 (0.69% Zn over 52 m) and including 1% Zn over 17 m. Holes 8 and 9, approximately mid-way between the DDH 6 and DDH 4 areas, both show the mineralized argillite to be present. Hole DDH 8 assayed 0.53% Zn over 15 m, while DDH 9 returned 0.32% Zn over 62 m (Cunningham, 1970).

Noranda DDH N-76-2, which was drilled in 1976, was not completed due to drilling difficulties and did not completely cross the SP anomaly. Results were "similar to those for #6, i.e. graphite, pyrite and minor sphalerite in hornfels" (Graham, 1977).

3.6 MINERALIZATION

Mineralization is represented by pyrite in carbonate veins, while minor chalcopyrite and galena occur as flecks and smears on sheared surfaces and fractures within the argillites. Sphalerite is associated with the carbonate and also occurs as minute disseminations. Bornite occurs in fractures and also as an alteration product of chalcopyrite. In DDH 6 these copper minerals occur in an extremely sheared and altered section of very dark argillite, asssaying 0.21% Cu over 3.7 m immediately below a 30 m section of basic volcanics The Cu minerals also occur within the altered volcanics.

Sphalerite is present in all but one of the drillholes within the argillites of the late Precambrian Georgeville Group. It varies from the light yellow variety, occurring in small veinlets up to 3 mm wide in a 12 m section which asssayed 0.93% Zn in DDH 6, to a reddish-brown to black variety occurring in fractures with carbonate. These stringers of carbonate and associated pyrite and sphalerite vary from hairline to 6 mm in width and up to 8 cm in length. The anastomosing veinlets are fractured and offset in the more brecciated sections of argillite. In DDH 8 the sphalerite also occurs as minute disseminations within the argillite and parallel to bedding.

This minute disseminated sphalerite should be considered as a possible indicator of an original syngenetic mineralization which has been remobilized by subsequent tectonic events. Copper mineralization occurs within both the argillites and the volcanics but the extent and the controls of this mineralization are unknown.

3.7 EXPLORATION POTENTIAL

The mineralization outlined at Georgeville is important because a long strike length (approximately 5 km) of zinc and copper mineralization has been recognized. Grades locally attain significance and long intersections of sub-economic mineralization attest to the large body of mineralized ground. Recognition of the fracture control to the higher grade intersections point to a grade enhancement by later structures. It would appear that the fault parallel to the Hollow Fault and shown on the 1982 map of Murphy et al., may be a major control to mineralization. The wide spacing of the NJZ drillholes and the fact that a large gap between the two mineralized areas has not been tested, makes this a target worthy of further investigation.

The **Kirkmount** (Kirkmont) property in the western part of the Antigonish Highlands (Fig. 10) represents a different type of shale-hosted deposit. Here the zinc mineralization is present in silicate form and core assays averaged 1.66% Zn over 21 m in one drillhole. Shorter and higher grade sections occur but no sulphides have been noted (Sangster, 1980, 1986). Sangster (1989) identified a willemite (zinc silicate) vein at a depth of 150 m in a drillhole and suggests this as evidence of deep weathering of sulphides in an area of high uplift near the Hollow Fault.

At the **Doctors Brook** mineral occurrence, about 3km south of Georgeville, very scattered chalcopyrite mineralization occurs in widely spaced quartz veins and also disseminated in argillites of the Georgeville Group (Northcote et al., 1989). Though not in itself

economic or even marginally so, this mineralization supports the contention that the turbiditic, predominantly argillite sequences in the Georgeville Group are exploration targets worthy of further study.

Dump material at Meat Cove deposit. Adit entrance is to the right of the truck.