

CHAPTER 2. ANTIGONISH COUNTY

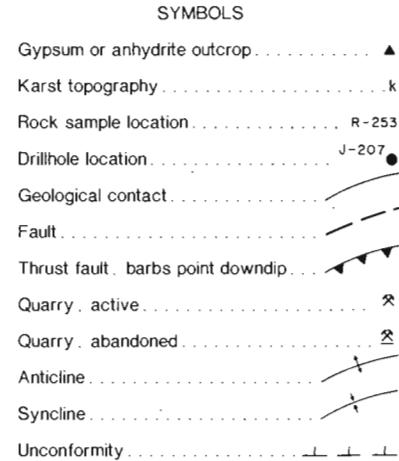
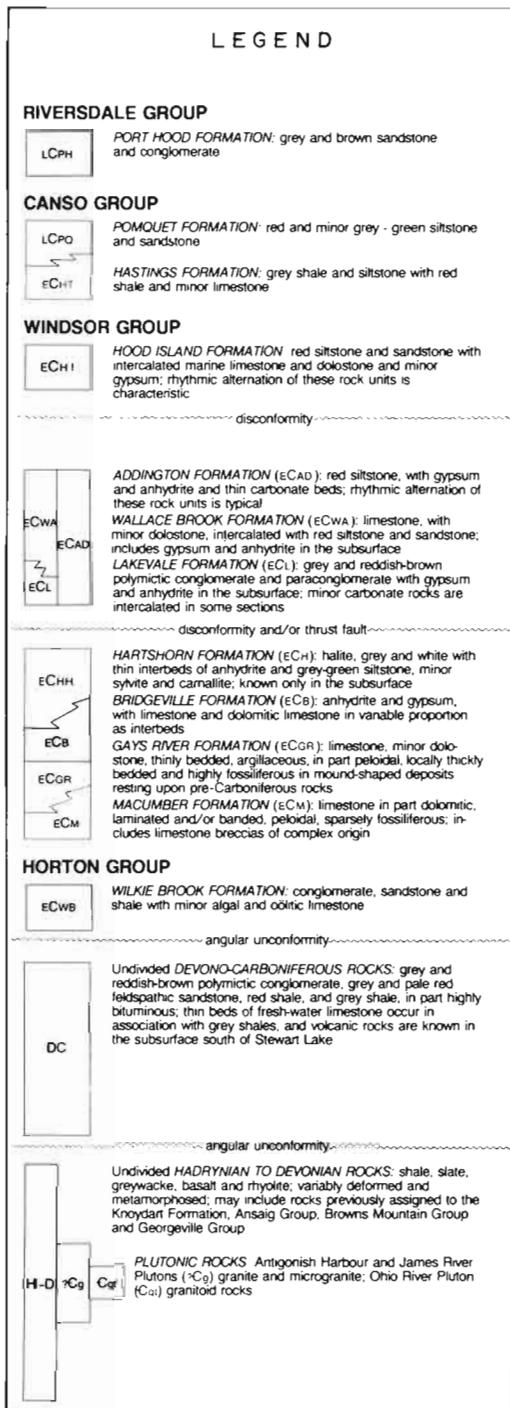


Figure 2-1. Continued.

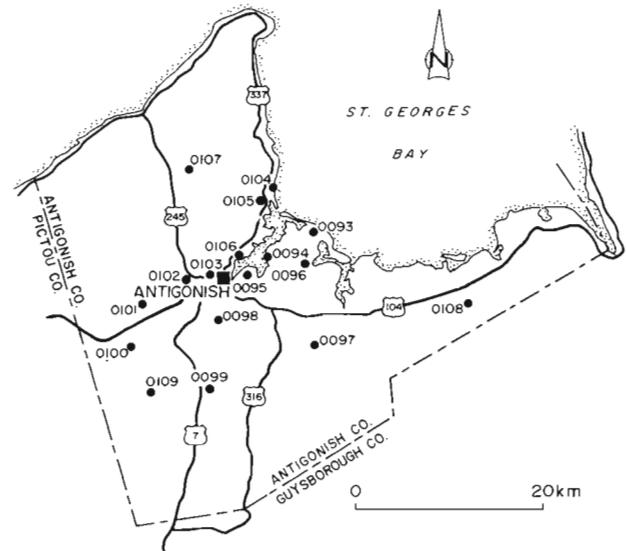


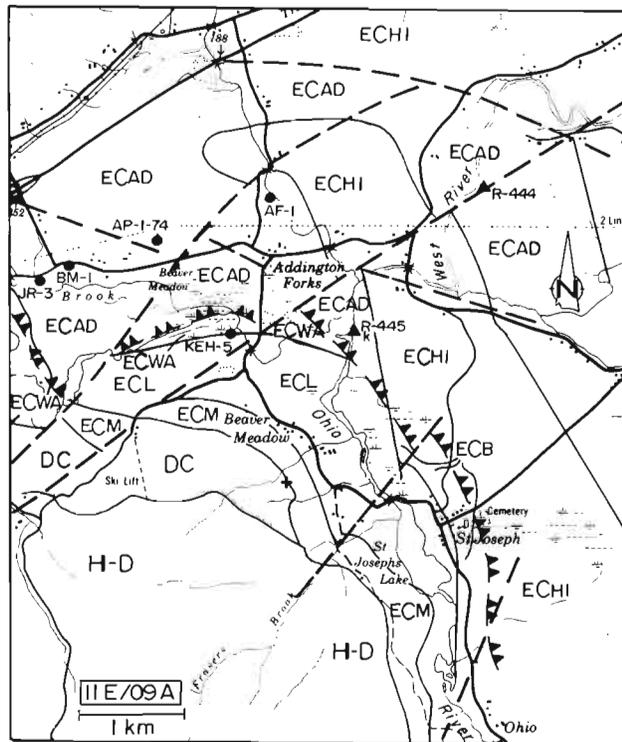
Figure 2-2. Location map for Antigonish County gypsum and anhydrite occurrences by reference number.

after Boehner and Giles, 1982

Figure 2-1. Geological legend for Antigonish County gypsum and anhydrite occurrence maps.

ADDINGTON FORKS (0100)
 NTS 11E/09A
 UTM 571100 E 5044800 N

The Addington Forks occurrence area is located 8 km southwest of the Town of Antigonish, Antigonish County (Fig. 2-3). It includes the following two separate surface outcrop areas: one found along the banks of the West River and the other at the northern end of St. Josephs Lake. Calcium sulphate units were also encountered in five diamond-drill holes.



Geology after Boehner and Giles, 1982

Figure 2-3. Location and geology of the Addington Forks occurrence area. See Figures 2-1 and 2-2 for legend and location.

Boehner (1986) included much of this area in his writeup on the James River salt deposit. A more detailed geological interpretation can be found there. The Addington Forks occurrence area is underlain by units of the Hood Island and Addington Formations on the surface and the underlying Hartshorn and Bridgeville Formations in the subsurface. The area is cut by numerous faults in various styles which complicate geological interpretation.

Regional geological mapping by Boehner and Giles (1982) placed two outcrops of gypsum/anhydrite in this area in the Addington Formation. One is found on the eastern bank of the West River 1.5 km downstream

below the Forks Road bridges. It consists of a 3-4 m thick gypsum bed which is exposed over a length of 10 m. Approximately 2 km to the southwest a second sulphate exposure can be found at the northern end of St. Josephs Lake. A large outcrop approximately 100 m in length and up to 25 m in height can be found at this point. The majority of this exposure consists of anhydrite with the upper surface consisting of high purity gypsum. The apparent thickness of this calcium sulphate section and drilling suggests that it may belong to the Bridgeville Formation rather than the Addington Formation.

Five drillholes, from five separate exploration programs, have been put down in the Addington Forks area (Boehner, 1986). Using the stratigraphic information derived from these holes, Boehner (1986) determined that the Hood Island and Addington Formations had been moved over the Hartshorn and Bridgeville Formations along the Antigonish Thrust Fault in this area. The geology is further complicated by the Lakevale Formation which is believed to be an intra-Windsor (Cycle 2) solution collapse-karst infill sequence which locally may surround and overlie a highly dissolved Bridgeville Formation. Only Amax Exploration's AP-1-74 (Amax Exploration Inc., 1974a) and Cuvier's BM-1 hole (Black, 1981) actually penetrated through the salt rich Hartshorn Formation into the sulphate dominated Bridgeville Formation.

The highly faulted nature of the rocks seen in the Addington Forks area mean that hydration of thicker anhydrite units is probably enhanced. However, these units are displaced by faulting and are therefore much smaller in size. In general, the area is of much geological interest, but of little economic interest. The area at the northern end of St. Josephs Lake may warrant some additional work.

ASHDALE (0099)

NTS 11E/09A
 UTM 576600 E 5040000 N

The Ashdale occurrence is located 12 km south of the Town of Antigonish, Antigonish County, just east of Route 7 (Fig. 2-4). A second, lesser occurrence is also noted approximately 2.5 km south of the first at Glen Alpine. The primary occurrence consists of a series of minor outcrops and karst topography which trend 050° over a distance of several hundred metres. The second is only a very small <0.5 m² outcrop beside Route 7.

Regional mapping by Boehner and Giles (1982) indicated that the main Ashdale occurrence is located on the southern side of the Ashdale Anticline just north of

the northeasterly trending Pomquet Harbour Fault. The area is underlain by units of the Addington Formation which is overlain to the northeast and southwest by the clastic dominated Hood Island Formation and in fault contact to the southeast with the same Formation.

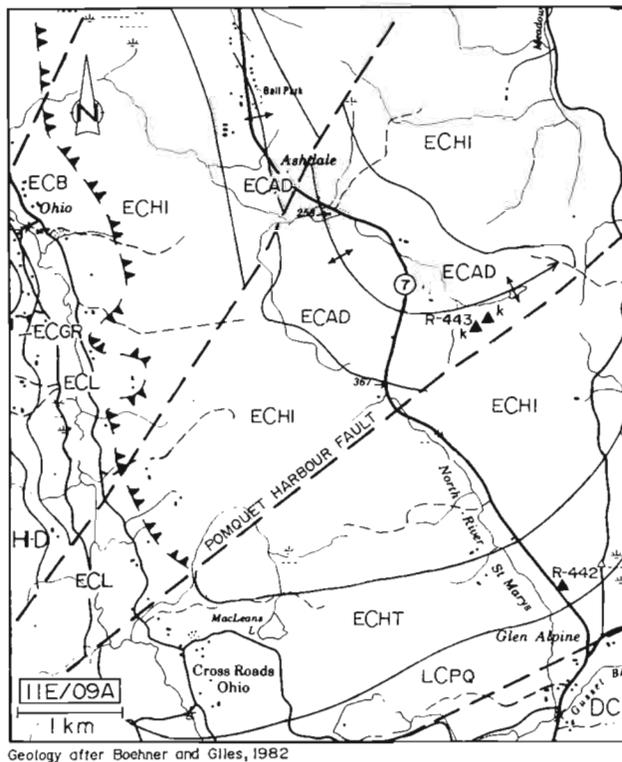


Figure 2-4. Location and geology of the Ashdale occurrence area. See Figures 2-1 and 2-2 for legend and location.

The Glen Alpine occurrence is found in units of the Canso Group Hastings Formation which is underlain to the north by Upper Windsor Hood Island Formation and overlain to the south by Upper Canso Pomquet Formation (Boehner and Giles, 1982).

The Ashdale occurrence is sufficiently interesting to warrant further investigation. Drilling could determine the thickness of the sulphate horizons present here. The small occurrence to the south at Glen Alpine is of geological interest.

BEECH HILL (0098)
NTS 11F/12B
UTM 580860 E 5048900 N

The Beech Hill occurrence is located 2-3 km southeast of the Town of Antigonish, Antigonish County (Fig. 2-5). It consists of two separate outcrops: one beside the road through Beech Hill and the other 1.2 km up a small tributary of the West River.

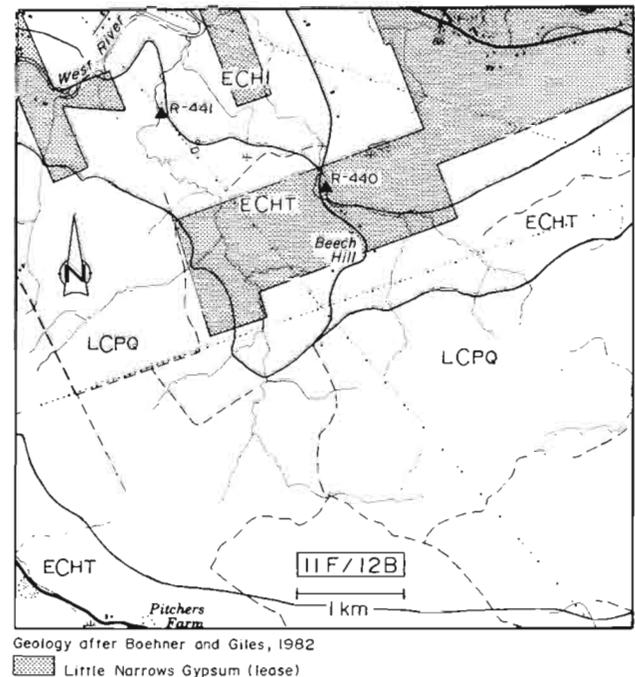


Figure 2-5. Location and geology of the Beech Hill occurrence area. See Figures 2-1 and 2-2 for legend and location.

Regional geological mapping by Boehner and Giles (1982) indicated that both these exposures lie along the contact between the Upper Windsor Hood Island Formation and the overlying Hastings Formation of the Canso Group. There are no diamond-drill holes in this area to provide further information on the local stratigraphy.

This locale is of no economic interest because the units found here do not contain sufficient sulphate thicknesses to be viable. It is, however, of geological interest.

BIG MARSH (0107)
NTS 11E/09D
UTM 577050 E 5064800 N

The Big Marsh occurrence is a subsurface occurrence located 12 km north of the Town of Antigonish, Antigonish County (Fig. 2-6). It is found in a small outlier of Windsor Group rocks which are totally surrounded by what is believed to be Horton Group clastics (Boehner and Giles, 1982).

Mapped by Boehner and Giles (1982), the Big Marsh Syncline shows an area 1.8 km long by 300-500 m wide underlain by the Windsor Group. The two drill-holes put down in the middle of this Syncline passed through portions of the Wallace Brook, Lakevale and Macumber Formations of the Windsor Group before

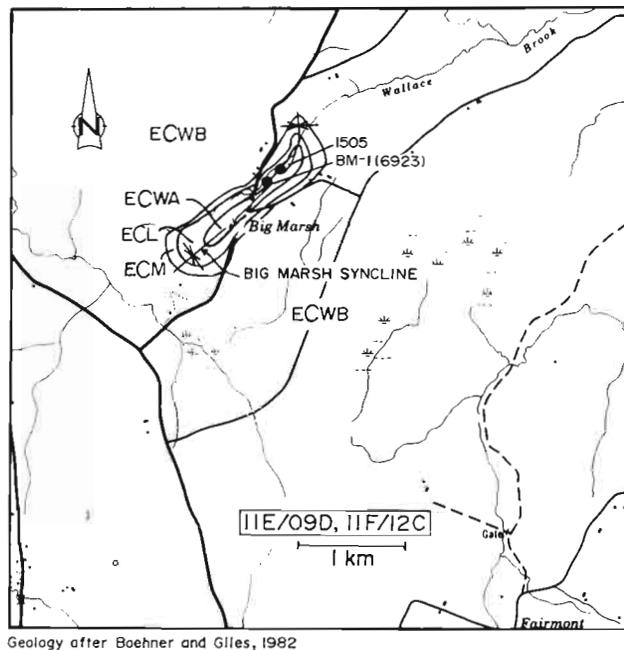


Figure 2-6. Location and geology of the Big Marsh occurrence area. See Figures 2-1 and 2-2 for legend and location.

entering the underlying Horton Group clastics. Two anhydrite beds were encountered in the subsurface, one 16 m thick at a depth of 105 m and a second 6 m thick approximately 8 m below the first. Neither bed is seen at surface or even suggested by surface topography. The Big Marsh occurrence is of geological interest and not of economic interest.

BRIERLY BROOK (0101)
NTS 11E/09A
UTM 572500 E 5050400 N

The Brierly Brook area is located 5 km southwest of the Town of Antigonish, Antigonish County (Fig. 2-7). Historical records show that some gypsum was produced in the Antigonish area between 1873 and 1979. Williams (1914) mentioned that gypsum was produced from the Brierly Brook area. Recent drilling by Nova Construction Company Ltd. led to the development of a new quarry in the area which went into intermittent production in late 1986. It presently holds the gypsum rights to a small area in the vicinity of its operations.

Regional geological mapping by Boehner and Giles (1982) placed the mine section worked at Brierly Brook in the Bridgeville Formation of the Windsor Group. It is underlain to the north and northwest by carbonates of the basal Macumber Formation and subsequently by undivided Devono-Carboniferous clastics. The sulphate dominated Bridgeville Formation is in turn overlain by

the Hood Island Formation to the south and southeast, these units having been emplaced by the Antigonish Thrust Fault. Drilling by Imperial Oil along strike near Sylvan Valley intersected >300 m of anhydrite (Ward, 1974a). The local geology is typical of the large scale solution trench valley frequently developed at the Horton/Windsor contact.

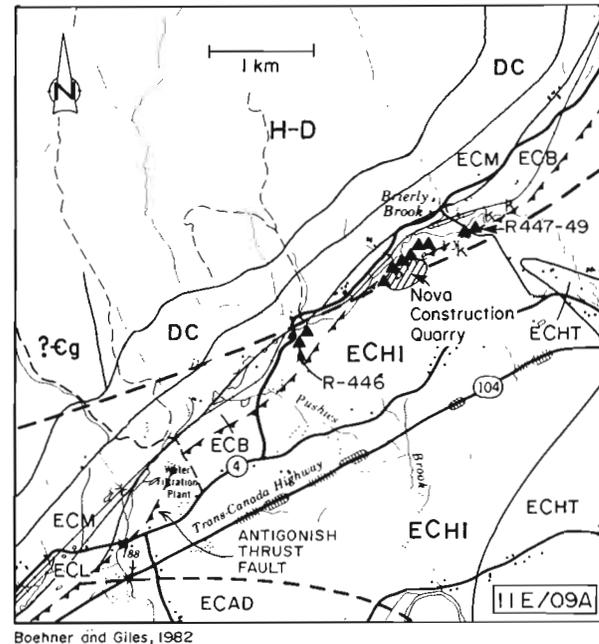


Figure 2-7. Location and geology of the Brierly Brook occurrence area. See Figures 2-1 and 2-2 for legend and location.

Recent work carried out by Nova Construction Company Limited, Inmin Resources (1986) included logs of 25 diamond-drill holes. Unfortunately none of these holes penetrated the basal carbonate making it difficult to determine the thickness of the basal sulphate at Brierly Brook. Gypsum at this location was determined to consist of a wedge-shaped body. The gypsum is thickest towards the Brook to the north and thins to 10 m within 100 m to the south of the cliff faces. It can be seen in the cliff faces where it is up to 35 m high. Further information regarding the quality of the gypsum and minor anhydrite lenses is presented in Appendix 1 of Nova Construction Company Limited, Inmin Resources' (1986) report.

A conservative estimate of the reserves available at Brierly Brook was given as 830 076 t (Nova Construction Company Limited, Inmin Resources, 1986). This includes an area 300 m in length parallel to the gypsum cliffs which apparently includes all of the Company's holdings at the present time. Further reserves would be expected to exist along strike away from the deposit area which has already been defined. However, due to the

narrow configuration of the exposure of Bridgeville Formation and the wedge-shaped hydrated portion, it is believed that the tonnages available will be limited to <10 Mt. Information gathered from this area may lead to the discovery of more extensive deposits of a similar nature elsewhere in the Antigonish Basin.

CRYSTAL CLIFFS (0104)
NTS 11F/12C
UTM 585700 E 5063700 N

The Crystal Cliffs occurrence area is located 12 km north-northeast of the Town of Antigonish, Antigonish County, on the western shores of St. Georges Bay (Fig. 2-8). At one point this was the site of the Nova Scotia Centre for Geological Sciences, a field school for geology students. Subsequently the shore section found here has been the subject of numerous studies including extensive ones by Puech (1950), Sage (1954) and more recently Bohner (1980a).

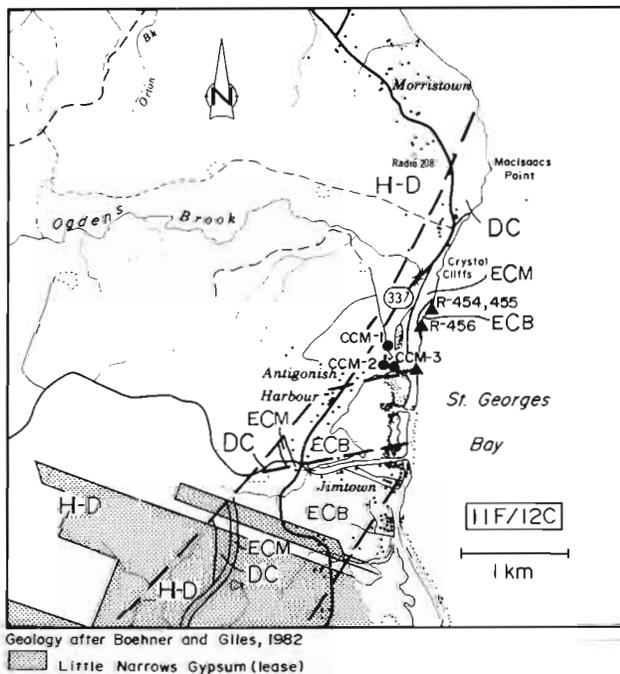


Figure 2-8. Location and geology of the Crystal Cliffs occurrence area. See Figures 2-1 and 2-2 for legend and location.

Regional geology by Bohner and Giles (1982) indicated the area is underlain by moderate to steeply dipping units of the sulphate dominated Bridgeville Formation which are in turn underlain by the Windsor Group basal carbonate Macumber Formation. The Windsor Group strata unconformably overlie Devonian-Carboniferous clastics to the west. Bohner (1980a) described this section in detail.

Although impressive when seen from a distance, the sulphates found at Crystal Cliffs consist of a long exposure of a narrow ridge of anhydrite and faulted, hydrated gypsum which is narrow in width. The anhydrite is typical of the basal sulphate, light blue in colour, fine grained with minor interstitial dark grey carbonates. The gypsum zone, which is light pink to orange in colour, appears to be a faulted, disrupted and hydrated portion of the anhydrite.

The Crystal Cliffs area has no potential for gypsum or anhydrite mining, but is of interest geologically and may possibly be of interest to sample collectors or stone carvers because of colours and varieties of gypsum.

HARBOUR CENTRE (0105)
NTS 11F/12C
UTM 584000 E 5060500 N

The Harbour Centre occurrence area is located 8 km north-northeast of the Town of Antigonish, Antigonish County, along Route 337 (Fig. 2-9). The area includes a number of surface exposures as well as karst zones between North River in the south and Jimtown to the north. Gypsum rights over much of this area are held by the Little Narrows Gypsum Co. which has, in recent years, relinquished some of these rights of the cultivated portions of the area to local farmers.

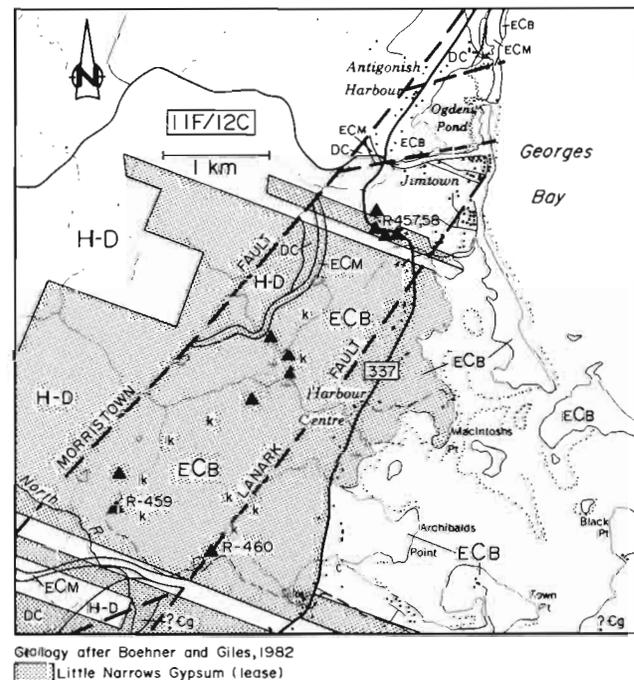


Figure 2-9. Location and geology of the Harbour Centre occurrence area. See Figures 2-1 and 2-2 for legend and location.

Regional geological mapping by Boehner and Giles (1982) showed that this area is underlain by the sulphate dominated Bridgeville Formation. This is underlain to the north and southwest by the Macumber Formation which is in turn underlain by clastics of Devonian-Carboniferous age. It is also in fault contact with older Hadrynian to Devonian basement rocks.

Extensive well developed, karst topography can be found in this area. Numerous outcrops of high purity, white, fine grained gypsum can be seen along Route 337 and at various points in the wooded terrain to the west. Unfortunately, no diamond-drill hole information is available from this area, although Little Narrows Gypsum Company Ltd. reportedly did some drilling here in the past. As a result, the depth of hydration of the thick basal sulphate is unknown.

Should there be some portions of this area over which Little Narrows Gypsum Company Ltd. does not hold the gypsum rights, they would be ideal sites for further investigations. One negative factor in the development potential of this area would be its location. Shipments of stone from the Antigonish area would probably be made via the Strait of Canso area. This would mean the shipments would have to go first through the Town of Antigonish and then a further 50 km to the Strait area.

LANARK (0106)

NTS 11F/12C

UTM 583400 E 5056800 N

The Lanark occurrence area is located 5 km north-northeast of the Town of Antigonish, Antigonish County, along Route 337 (Fig. 2-10). It is contiguous with the Harbour Centre occurrence area to the north and the Williams Point occurrence area to the south. One drillhole, SV-74-2, was completed in this area by Imperial Oil Limited as part of a regional base metal exploration program (Ward, 1974a).

Recent geological mapping by Boehner and Giles (1982) showed this area to be underlain by the sulphate dominated Bridgeville Formation of the Windsor Group. It is in fault contact with basement rocks to the west across the Lanark Fault and is overlain by the Upper Windsor Hood Island Formation in the southern part of the area.

Numerous outcrops of fine grained, white gypsum can be seen in the area both east and west of Route 337. Extensive karst can also be seen throughout portions of the area. Anhydrite is not seen in outcrops even in the 15 m high exposures which can be seen along the shore

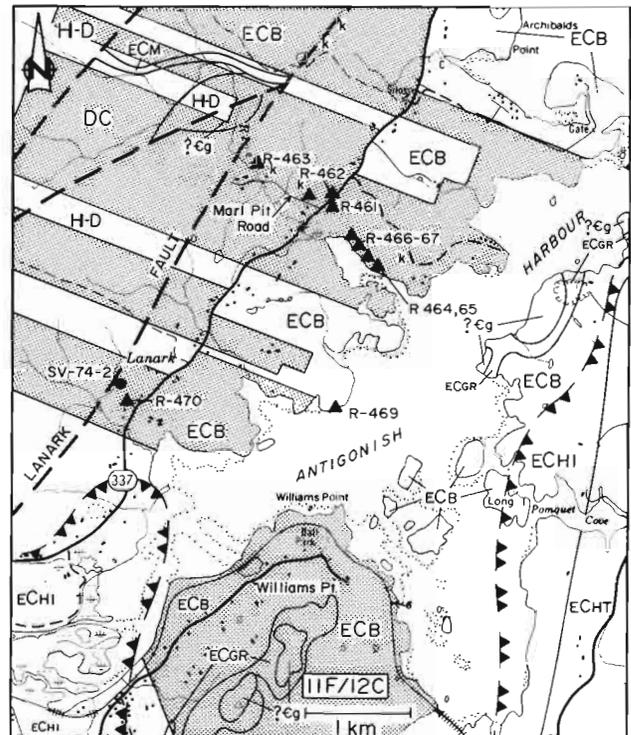


Figure 2-10. Location and geology of the Lanark occurrence area. See Figures 2-1 and 2-2 for legend and location.

of Antigonish Harbour opposite the Marl Pit Road. Information from SV-74-2, however, shows a thin hydration zone of 2 m overlying the thick basal anhydrite.

Substantial volumes of gypsum may be available in the Lanark area, but as in the Harbour Centre area, most of the gypsum rights are held by the Little Narrows Gypsum Company Ltd. This area may also have been drilled previously, however these results are not available. Further investigation of this area would be worthwhile.

MONASTERY (0108)

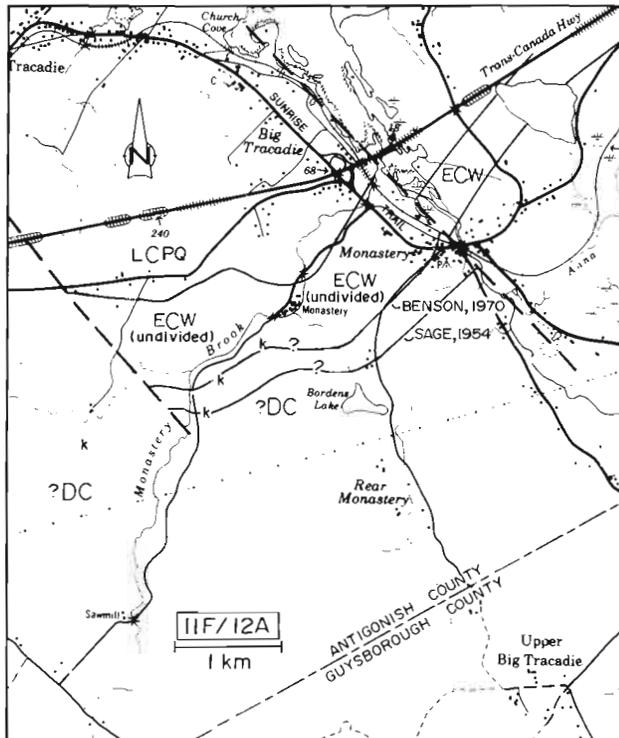
NTS 11F/12A

UTM 606500 E 5050500 N

The Monastery occurrence consists of a number of small areas of karst topography found 1-3 km southwest of the Village of Monastery, Antigonish County (Fig. 2-11). No surface exposures were located in this area and to date no diamond-drill holes have been completed in this vicinity.

Sage (1954) located a number of sinkholes south and east of Monastery Brook, but found no outcrops of gypsum or anhydrite. Schenk (1969) also mapped this

section without identifying sulphates, however Benson (1970) indicated the presence of gypsum southeast of the Monastery. None of these authors have clearly divided the Windsor Group at Monastery although Sage (1954) suggested that the A and B Subzones are present and overlie Horton Group clastics to the south and are in turn overlain by Canso Group clastics to the north.



Geology modified after Benson, 1970

Figure 2-11. Location and geology of the Monastery occurrence area. See Figures 2-1 and 2-2 for legend and location.

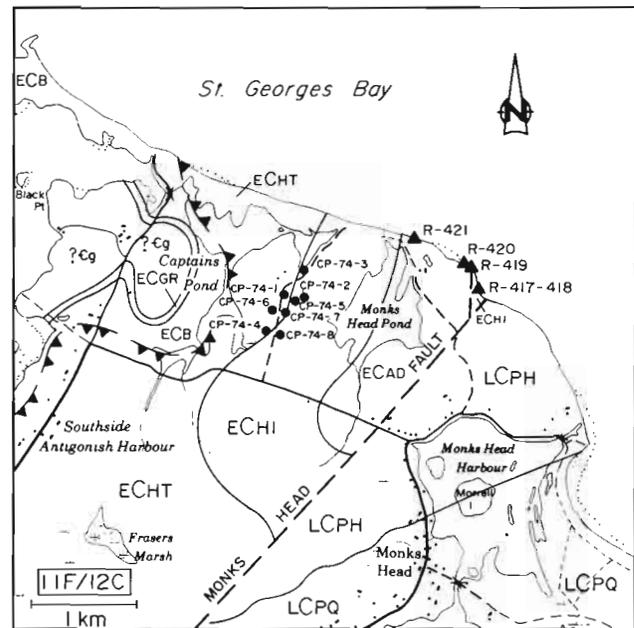
This area is of geological interest because of the presence of karst topography and possible gypsum/anhydrite in outcrop may help in determining the stratigraphy. Economic significance is only minor at this time due to the lack of areal extent of the karst. A small diamond-drill hole program in the area could help to determine the nature and extent of sulphates in the subsurface. Monastery's close proximity to the Strait of Canso, approximately 20 km to the east, would make it attractive if any volume of gypsum were found.

MONKS HEAD (0093)

NTS 11F/12C

UTM 590800 E 5058300 N

The occurrence at Monks Head is located along the shore of St. Georges Bay, 13 km northeast of the Town of Antigonish, Antigonish County (Fig. 2-12). This Windsor Group outcrop area has been the subject of



Geology after Boehner and Giles, 1982

Figure 2-12. Location and geology of the Monks Head occurrence area. See Figures 2-1 and 2-2 for legend and location.

much study and is included in works by Sage (1954) and Schenk (1969).

Recent geological mapping by Boehner and Giles (1982) determined that units of the Lower Windsor Group, Addington Formation and Upper Windsor Group Hood Island Formation are present at Monks Head. These are overlain to the west by clastics and minor carbonates of the Hastings Formation of the Canso Group and in fault contact to the east with clastics of the Port Hood Formation of the Riversdale Group (Boehner and Giles, 1982).

Sage (1954) carried out a detailed stratigraphic investigation of the Monks Head section which he described as badly faulted and "... shuffled like a pack of cards" Although numerous beds of gypsum can be seen in this section and the quality of gypsum is quite good, there is little possibility of economic exploitation.

A number of drillholes were completed to the west of this area between Captains Pond and Monks Pond by Imperial Oil Limited in 1974 as part of a regional base metal exploration program (Ward, 1974b). All of these holes were collared in the overlying Hastings or Hood Island Formations and encountered only minor gypsum or anhydrite units. None of the holes appears to have gone down into the underlying Addington Formation which contains relatively greater amounts of sulphates.

The highly faulted nature of the rocks in this area adjacent to the Monks Head Fault (Boehner and Giles, 1982) is conducive to hydration of the sulphate beds, however they do not have thickness or areal extent to permit a viable mining operation to be established here. The section is of great geological importance being one of the few good exposures of the Addington Formation readily accessible in the Antigonish Basin. This Formation is similar to those sections being exploited at Little Narrows (0087), Victoria County, and Miller Creek (0183), Hants County, and may be exploitable elsewhere in the Basin.

OHIO (0109)
NTS 11E/09A
UTM 57300 E 5040000 N

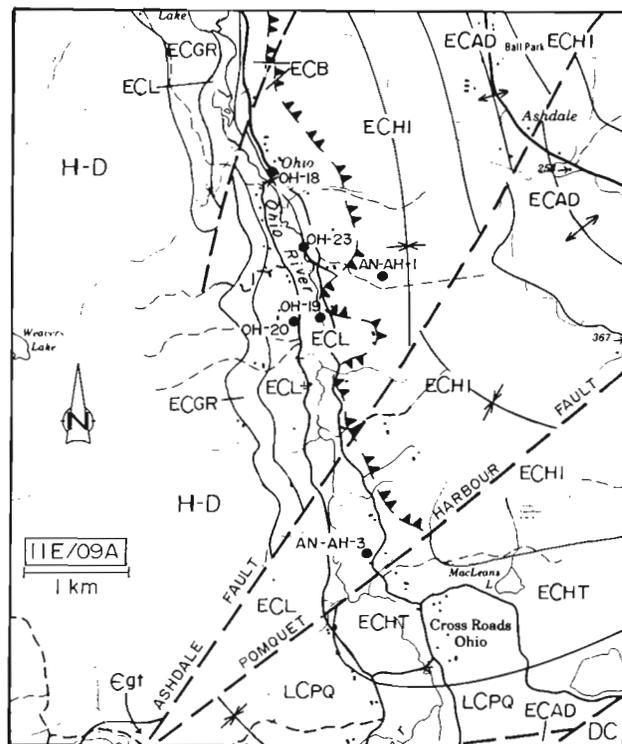
The Ohio occurrence area is located 14 km south-southwest of the Town of Antigonish, Antigonish County (Fig. 2-13). Numerous diamond-drill holes have been completed in the area by a number of companies exploring for base metals in the basal carbonates of the Windsor Group. Six of these holes encountered gypsum/anhydrite in the subsurface.

Regional geological mapping by Boehner and Giles (1982) indicated that the area is underlain by both the Bridgeville and Lakevale Formations of the Lower Windsor Group which strike north-south and dip to the east. The relationship between these Formations is complex and an explanation was presented by Giles (1980). Simplified, the Lakevale is believed to be comprised of material which infilled paleokarsted Bridgeville Formation, therefore most of the units encountered in the subsurface are predominantly clastics where the basal sulphate should have occurred. To the east these units are overridden by the Upper Windsor Hood Island Formation along the Antigonish Thrust Fault. The Lakevale Formation overlies the basal Gays River Formation and Hadrynian-Devonian basement rocks to the west.

Cuvier Mines Ltd. (Black, 1979) drilled a hole, AN-AH-3, to a depth of 305 m in the southern part of this area in 1978. Virtually the entire hole was drilled in a red or green siltstone breccia with gypsum or anhydrite cement. Similar holes were drilled by Esso Minerals Canada (MacLeod, 1980) in 1979. Two holes OH-18 and OH-23 penetrated less disturbed units of the Bridgeville Formation. However, where hydration to gypsum has extended downward, the overlying thickness of infill material increases as well.

This area is not of economic importance. Thick gypsum sections, where encountered, are covered by

thick infilled material. Geologically the area is of much interest because indurated material in paleokarst may give some clues to the timing of the hydration and dissolution of the basal anhydrite in the area (Giles, 1980).



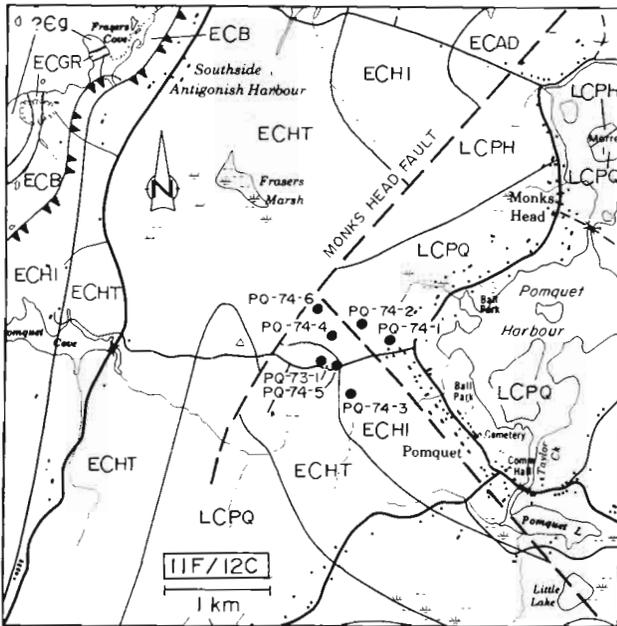
Geology after Boehner and Giles, 1982

Figure 2-13. Location and geology of the Ohio occurrence area. See Figures 2-1 and 2-2 for legend and location.

POMQUET HARBOUR (0096)
NTS 11F/12C
UTM 588500 E 5054000 N

The Pomquet Harbour occurrence is a subsurface occurrence found in drillholes located just west of Pomquet Harbour 9 km east-northeast of the Town of Antigonish, Antigonish County (Fig. 2-14). A series of seven diamond-drill holes were put down in this area in 1973-74 by Imperial Oil as part of a base metal exploration program (Ward, 1974b).

Boehner and Giles (1982), in mapping the area, used the Imperial drillhole information to determine that it is underlain by a faulted sequence of Upper Windsor Group and Canso Group sedimentary rocks. Only minor amounts of gypsum were encountered in three of the drillholes which passed through portions of the Hood Island Formation (Cycles 3-5).



Geology after Boehner and Giles, 1982

Figure 2-14. Location and geology of the Pomquet Harbour occurrence area. See Figures 2-1 and 2-2 for legend and location.

This occurrence is of no economic interest, however it serves to emphasize the structural complexity which is often encountered in the Windsor basins, particularly in their upper portions.

POMQUET RIVER (0097)
NTS 11F/12B
UTM 591600 E 5047300 N

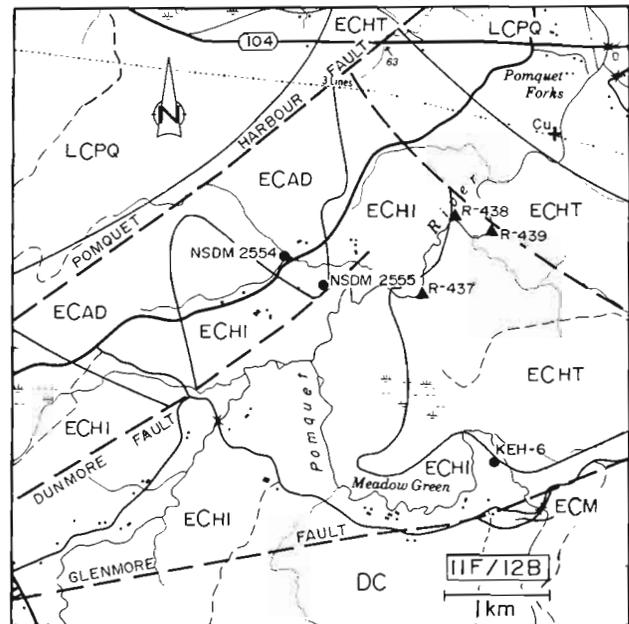
The Pomquet River occurrence area is located 12 km east-southeast of the Town of Antigonish, Antigonish County (Fig. 2-15). It consists of several small surface outcroppings of gypsum which Boehner and Giles (1982) placed in the Hastings Formation of the Canso Group and numerous sulphate horizons encountered in three drillholes (NSDM 2554, NSDM 2555 and KEH-6).

Regional geological mapping by Boehner and Giles (1982) determined this area to be structurally complex. The clastic dominated Hood Island Formation of the Upper Windsor Group and Hastings Formation of the Canso Group underlie most of the area. Some units of the Addington Formation are also seen in drillcore in the northwestern portion of the area (Province of Nova Scotia, 1959). These units are in fault contact to the northwest and northeast with younger strata and in fault contact to the south with Devonian-Carboniferous basement rocks.

Outcrops of gypsum can be found along the Pomquet River between 2 and 3.5 km south of Highway

104. They are generally small in size with the thickest bed found 1-2 m thick. Southeast of the River a drill-hole was completed in 1966 by Kennco Explorations (KEH-6) (Grace, 1966). Boehner (1980b) interpreted this hole as having "... intersected a vertical to overturned section of the E₁ Limestone and the basal Hastings Formation". Northwest of the River two holes were drilled by Lura Corporation in 1958 (NSDM 2554 and 2555) (Province of Nova Scotia, 1959). They were drilled in units of the Addington Formation and encountered slightly more abundant sulphate horizons than hole KEH-6, however in both holes these units were probably steeply dipping and deeply buried beneath overburden or clastic sedimentary rocks.

The Pomquet River occurrence area is of geological interest only. Its structural complexity and position in the middle to upper part of the Windsor Group are unfavourable for finding economically significant sulphate bodies in the area.



Geology after Boehner and Giles, 1982

Figure 2-15. Location and geology of the Pomquet River occurrence area. See Figures 2-1 and 2-2 for legend and location.

RIGHTS RIVER (0103)
NTS 11E/09D, 11F/12C
UTM 577600 E 5053500 N

The Rights River occurrence consists of two separate outcrops both of which can be found on the northern edge of the Town of Antigonish, Antigonish County (Fig. 2-16). The first is found on the southwestern side of Rights River below the golf course and appears to

belong to the Bridgeville Formation. The second outcrop is found 750 m north of the River on the east of a secondary highway which is known locally as Fairmont Road or Cloverville Road. It is believed to be a minor interbed which belongs to the Hood Island Formation (Sage, 1954).

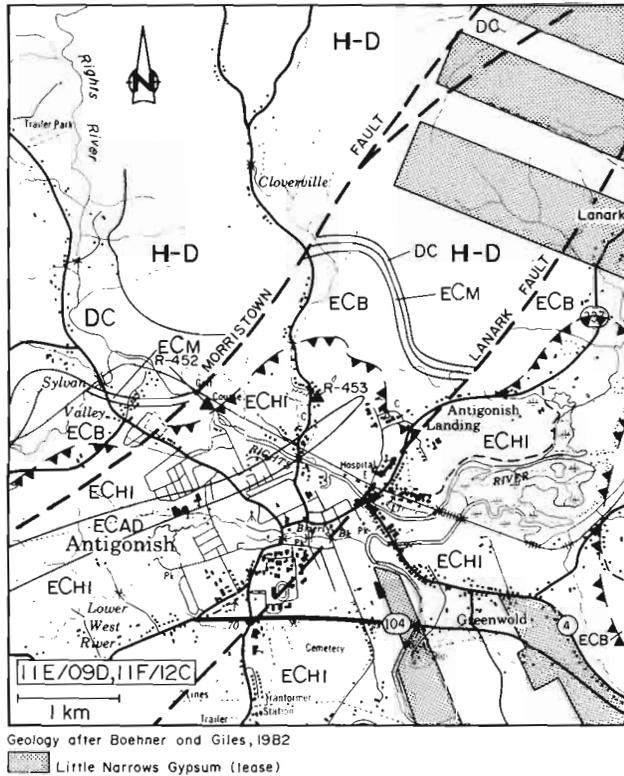


Figure 2-16. Location and geology of the Rights River occurrence area. See Figures 2-1 and 2-2 for legend and location.

Regional geological mapping by Boehner and Giles (1982) included both outcrop areas in a fault-bound block bounded to the northwest by the Morrystown Fault and to the southeast by the Lanark Fault. The outcrop of the Bridgeville Formation consists of a head up to 7 m high and 15 m long of fine grained, white gypsum with minor interstitial carbonate material.

The outcrop located 750 m north of Rights River is a 2.5 m thick selenitic gypsum interbed in a section dominated by dark red siltstones. This section was described in some detail by Sage (1954) as the Milk Plant section. In general the entire section here consists of the uppermost Hood Island Formation of the Upper Windsor Group which is thrust up over the Lower Windsor Group sulphate dominated Bridgeville Formation. This is in turn underlain by the basal Windsor Macumber Formation and Devonian-Carboniferous clastics. This section trends northwest-

ward and is cut off by the Morrystown and Lanark Faults to the west and east respectively.

The occurrences in this area are strictly of geological interest. Even if sufficient volumes of material were present south of the Rights River, its location at the edge of Antigonish would preclude any development.

SOUTHSIDE ANTIGONISH HARBOUR (0094)
 NTS 11F/12C
 UTM 585700 E 5056300 N

The Southside Antigonish Harbour occurrence is located 8 km northeast of the Town of Antigonish, Antigonish County (Fig. 2-17). Several outcrops of gypsum and anhydrite can be seen along the eastern side of Antigonish Harbour both north and south of Ridge Brokers Limited's limestone quarry. Drilling information from this area has been the subject of investigations by Sage (1954), Boehner (1986) as well as numerous undergraduate studies by geology students from St. Francis Xavier University, Antigonish.

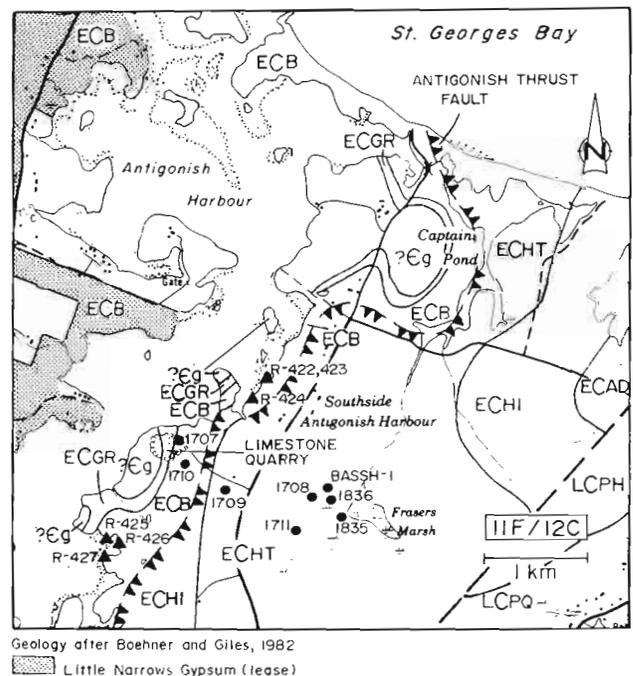


Figure 2-17. Location and geology of the Southside Antigonish Harbour occurrence area. See Figures 2-1 and 2-2 for legend and location.

Regional geological mapping by Boehner and Giles (1982) indicated that an undisturbed sequence of basal carbonate, and sulphate overlying a Carboniferous or older granitic body to the west, occurs along the eastern shore of Antigonish Harbour. However, immediately to the east, this sequence is covered by units of Hood

Island and Hastings Formations which have been thrust over top of the A Subzone Bridgeville (basal anhydrite) and Gays River Formations. A series of seven drillholes (Fig. 2-17), by the Nova Scotia Department of Mines in 1951 and 1952 as part of a salt exploration program (Nova Scotia Department of Trade and Industry, 1952), as well as one oil well drilled in 1976 by the Bras d'Or Oil Company (Farries Engineering Limited, 1976) provide stratigraphic information east of the outcrop areas.

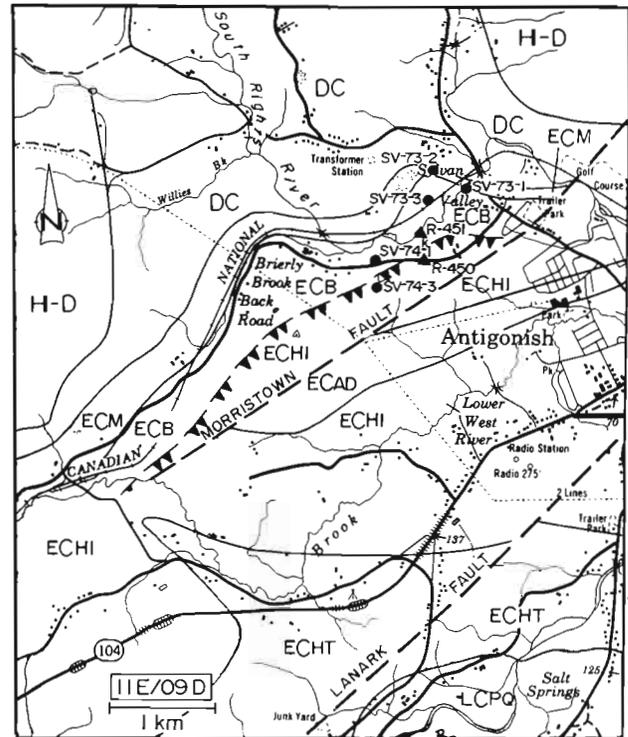
In outcrop, the sulphate units of the Bridgeville Formation are nodular to massive, high purity gypsum with minor limestone interlaminae; locally northeasterly striking and vertical joints are prominent. The few drillholes put down near these exposures indicate hydration to depths >30 m below surface. Karst topography in the area also suggests that gypsum is present below the surface in the immediate area.

The Southside Antigonish Harbour area would be a good location for a small drilling program to test the depth of hydration of the Bridgeville Formation sulphates and might possibly support a small gypsum mining operation. The limited outcrop area of these units would probably prevent any significant developments. The other negative factor in this area is the substantial distance to the nearest ocean shipping point (Strait of Canso), approximately 40 km to the east.

SYLVAN VALLEY (0102)
NTS 11E/09D
UTM 576100 E 5053100 N

The Sylvan Valley occurrence area is located 1 km northwest of the Town of Antigonish, Antigonish County (Fig. 2-18). The occurrence consists of two outcrop areas, a small area of karst topography, and sulphate horizons encountered by drillholes completed by Imperial Oil in 1973-74 as part of a regional base metal exploration program (Ward, 1974a; Burton, 1974a).

Geological mapping by Bohner and Giles (1982) indicated that this area is underlain by the sulphate dominated Lower Windsor Group Bridgeville Formation. This is underlain to the north and west by the basal Macumber Formation and in turn Devonian-Carboniferous clastics. As at Brierly Brook (0101), the Bridgeville is overlain to the south by Upper Windsor Hood Island Formation which overrides the Bridgeville along the Antigonish Thrust Fault. This section is slightly offset by another fault to the east.



Geology after Bohner and Giles, 1982

Figure 2-18. Location and geology of the Sylvan Valley occurrence area. See Figures 2-1 and 2-2 for legend and location.

Imperial Oil Limited drilled a total of five diamond-drill holes in this area in 1973 and 1974. Three of these encountered the basal sulphate and four of the five passed through the basal Macumber limestone before entering the underlying Devonian-Carboniferous conglomerates. Hole SV-74-3 is believed to have passed through 17.2 m of evaporites with minor carbonates before entering the Macumber Formation; it represents the thickest evaporite section encountered (Burton, 1974a). However, it is found beneath a section of clastics of the Hood Island Formation. In the two other holes (SV-73-2 and SV-74-1) which collared in the basal anhydrite, a maximum surface hydration of 5.4 m was seen in SV-74-1. Although some deeper hydration is inferred by karst topography found just south of the South Rights River in this area, there does not appear to be as thick a hydrated section as is seen at Brierly Brook (0101).

The Sylvan Valley area does not appear to have much economic potential. The thick gypsum section seen at Brierly Brook is not apparent in this area and the proximity of the Town of Antigonish would prohibit development even if significant gypsum were present.

WILLIAMS POINT (0095)
 NTS 11F/12C
 UTM 583900 E 5053400 N

The Williams Point occurrence area is located 4 km east of the Town of Antigonish, Antigonish County (Fig. 2-19). It encompasses all gypsum and anhydrite found at the surface and in numerous drillholes from Williams Point in the north to Highway 104 in the south, from South River in the east to West River in the west.

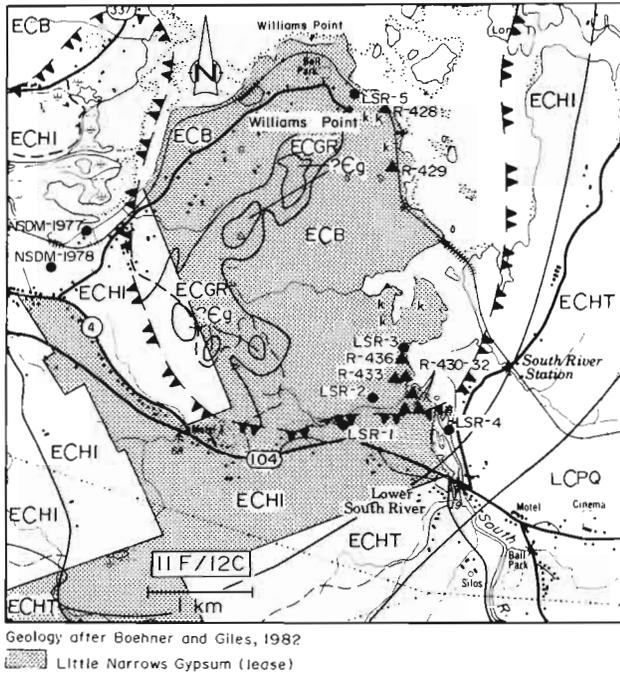


Figure 2-19. Location and geology of the Williams Point occurrence area. See Figures 2-1 and 2-2 for legend and location.

Boehner and Giles (1982) mapped this area as part of their Antigonish Basin map sheet. The Williams Point area is underlain by a north-northeasterly trending ridge of granitic rocks of undetermined age. These are overlain for the most part by carbonates identified by Sage (1954) as belonging to the Cycle 2 (B Subzone) of the Windsor Group. Boehner and Giles (1982), using

drillhole and field data and information from similar units seen in the Shubenacadie Basin, determined that these units belonged to the Gays River Formation of the Cycle 1 (A Subzone) rather than the B Subzone. The carbonate units are in turn overlain to the west, north and east by the thick sulphate units of the Cycle 1 (A Subzone) Bridgeville Formation. All of these units are overlain to the west, south and east by the clastics and interbedded carbonates of the Upper Windsor Hood Island Formation which are believed to have been thrust up over them by the Antigonish Thrust Fault (Boehner, personal communication).

Between 1976 and 1978 U.S. Borax drilled five holes in the Williams Point area as part of a base metal exploration program (Burton, 1977). Three of these holes (LSR-2, -3 and -5) were collared in the A Subzone and were stopped in the underlying basement. They are all located on the eastern side of the basement ridge and indicate a rather gentle dip of $<10^\circ$ into the Antigonish Basin in this area. Hole LSR-4 may have been collared in the Bridgeville or overthrust Hood Island Formation and encountered mainly anhydrite before entering granite at 165.8 m. LSR-1 appears to have been started in the Hood Island Formation, entered the Bridgeville Formation at 54.4 m and stopped in basement at 212.8 m. All of these holes showed some hydration of the uppermost portion of the basal sulphate and abundant heads in the area exhibit good hydration near surface.

The limited drillhole information and extensive karst topography and outcrop seen in the Williams Point area provide insufficient information to evaluate its potential gypsum/anhydrite resources. This information does suggest that this area would benefit from further investigation. Although hydration is generally thin (maximum 15.2 m in LSR-5) there is quite a large area underlain by the Bridgeville Formation. King (1985) reported that gypsum rights for this entire area are held by the Little Narrows Gypsum Company Ltd. and this fact would hinder any others from carrying out any further investigations.

