## (8) BENACADIE

U.T.M.G. - N-508900
E-67248

N.T.S. - 11F/15C (1:50,000)

The barite is found along the shore of the Bras d'Or Lake, west of Benacadie, approximately 2.6 miles south-southeast of Highway 223 at Grand Narrows, and 1,300 feet east of the gravel road (Fig. 19).

No exploration work for barite has been reported to have been carried out in this area.

The barite occurs in very insignificant amounts lining the fracture plane on a boulder in a poorly sorted, red-brown conglomerate. The conglomerate is interbedded with brick red, fine-grained sandstone and forms part of the Grantmire Formation of the Windsor Group in this area. No replacement of the wallrock by barite was noted. No other rock types are evident in the immediate area.

The barite is pink-cream in colour and is coarsely crystalline in texture with a bladed habit. The pink colouration is attributed to the presence of minor quantities of hematite.

No samples were taken for chemical analyses.

This occurrence is of a minor nature and can be considered of academic interest only.

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(9) DERBY POINT

U.T.M.G. - N-508915
E-67071

N.T.S. - 11F/15C (1:50000)

The barite is found in situ along the shore on the Bras d'Or Lake at Derby Point, 1.55 miles south of Highway 223 at Grand Narrows (Fig. 19).

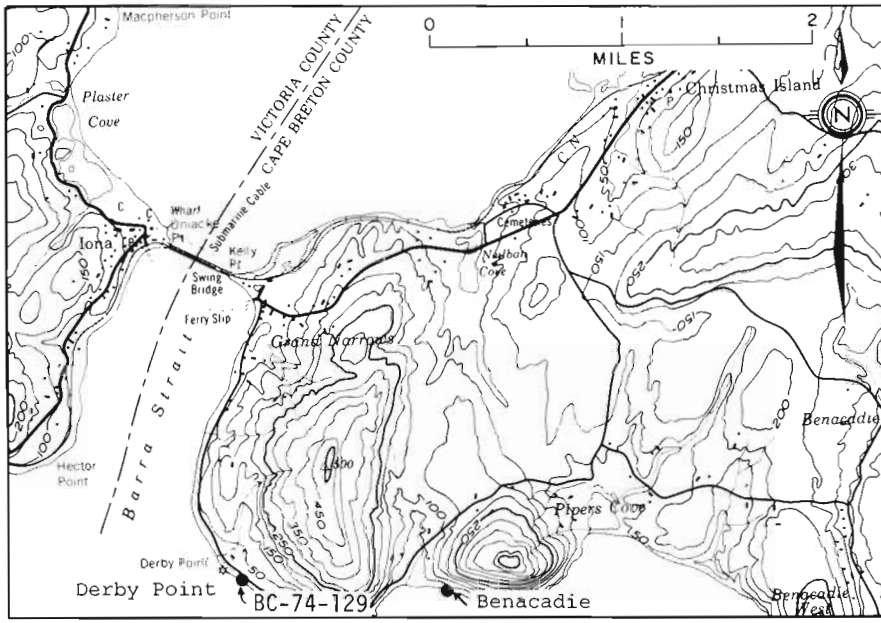



Figure 19

No reported exploratory work has been carried out in this area.

Barite is found in very small quantities forming a portion of the cement in a poorly sorted, boulder conglomerate of the Grantmire Formation of the Windsor Group. Minor replacement of the predominantly calcareous cement by barite may have taken place. No other rock types are found to crop out in the immediate area.

The barite is pink in colour and has a medium-grained, crystalline texture. Minerals closely associated with the barite are calcite and hematite. The hematite appears to be responsible for the pink colour.

A grab sample from the baritiferous zone was submitted for chemical analysis. The results are found below and in appendix III. The location sampled is shown on Figure 19.

| Rock Type | Sample No. | Per cent | | | ppm | | |
|---|---|---|---|---|---|---|---|
| | | $BaSO_4$ | $SrSO_4$ | F | Cu | Pb | Zn |
| Baritiferous conglomerate | BC-74-129 | 6.01 | .12 | .04 | 60 | 60 | 70 |

Although the barite occurs only in minor amounts, this area warrants further investigation. The nature of the occurrence lends to the possibility of additional barite being found, as the primary controlling feature appears to be the favourable lithology of the host.

(10) FRENCHVALE BROOK

U.T.M.G. - N-511238
E-70584

N.T.S. - 11K/1C (1:50,00)

The celestite is found in situ in Frenchvale Brook, 1.8 miles southwest of Highway 125 at Ball Creek, and 980 feet south of the gravel road connecting Frenchvale and Ball Creek. The showing occurs in the deepest part of the brook directly opposite D.D.H. 1, appearing as a conspicuous white outcrop that stands out from the surrounding brown-grey and grey sandstone, and the dark coloured fluviatile sediments (Fig. 20 and 21).

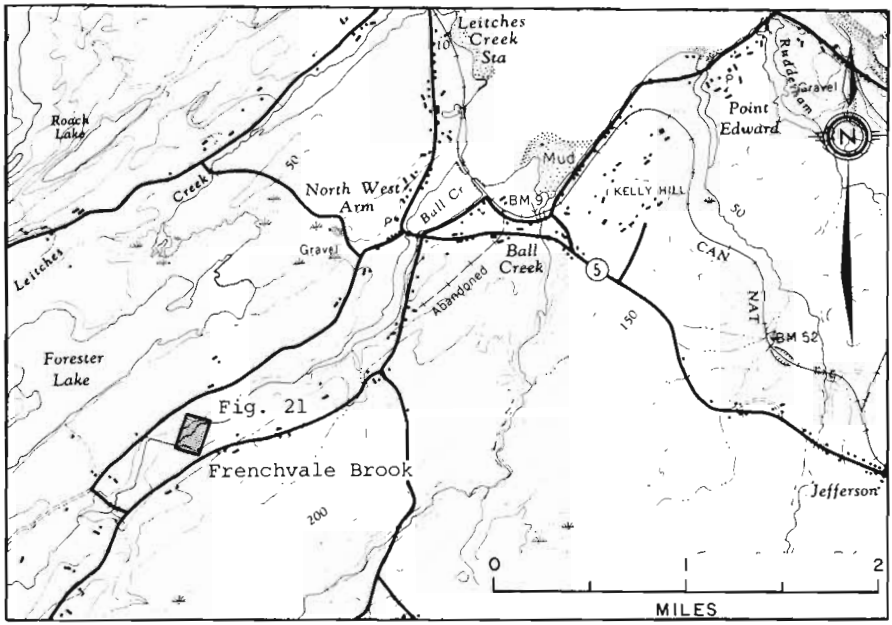
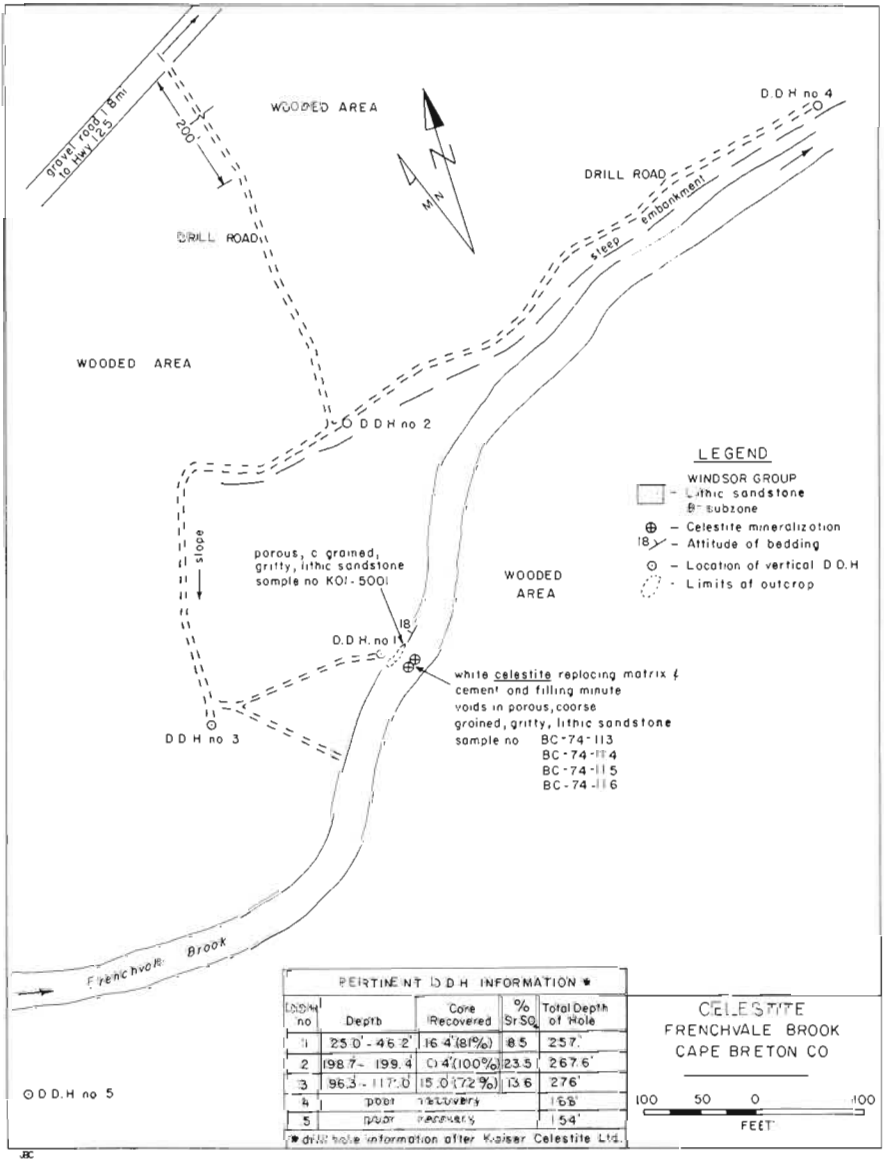



Figure 20

This showing was discovered by Kaiser Celestite Mining Ltd. in 1972 (Forgeron, 1974) during the course of geological investigations in the area. The following year the same company initiated an exploratory program in the




PERTINENT D.D.H INFORMATION *

| D.D.H no | Depth | Core Recovered | % Sr SO4 | Total Depth of Hole |
|---|---|---|---|---|
| 1 | 230' - 462' | 16.4' (81%) | 8.5 | 257' |
| 2 | 198.7' - 199.4' | 0.4' (100%) | 23.5 | 267.6' |
| 3 | 96.3' - 117.0' | 15.0' (72%) | 13.6 | 276' |
| 4 | poor recovery | | | 168' |
| 5 | poor recovery | | | 154' |

* drill hole information after Kaiser Celestite Ltd.

Figure 21

vicinity of the celestite showing which consisted of trenching and six diamond-drill holes totalling 1,122 feet (Fig. 21).

The host rock was difficult to examine due to the large quantity of water flowing over the showing, however it appears to be similar to the rock cropping out on the northwest bank of the brook. This outcrop is composed of coarse grained and fine grained, porous, brown-grey, lithic sandstone which has an attitude of 045°/18° northwest and is stratigraphically above the celestite zone. No evidence of mineralization was observed in this outcrop. These rocks, including that hosting the celestite, are part of the B-subzone of the Windsor Group. Stratigraphically, these rocks are approximately 100 feet above the basal limestone-Grantmire conglomerate contact.

The showing is stratigraphically controlled, occurring as a bed ranging in thickness from four inches to two feet, and can be traced along strike for approximately 25 feet. The contacts between the celestite and the host rock appear gradational. Examination of hand specimens of the mineralized rock under the microscope reveals the celestite to have filled voids and replaced the matrix and cement in a porous, coarse grained, gritty, grey, lithic sandstone.

The celestite is pale white to cream in colour and has a fine to medium-grained crystalline texture. However, it is quite friable due to: (a) the presence of clastic material which accounts for at least twenty per cent of the rock in even the best mineralized section, and (b) the porous nature of the rock. Thus, the celestite is very gritty, and is easily crumbled when rubbed with the hand (Figure 22). Although not observed in the hand specimens, chemical analysis showed the celestite to have an unusually high barite content, relative to that of the other celestite showings.

Grab samples of the celestite bearing rock and one taken from the sandstone outcrop on the northwest bank of the stream were chemically analysed. The results are listed below and in appendix III. The sample locations are indicated on Figure 21.

| Rock Type | Sample No. | Per cent $BaSO_4$ | Per cent $SrSO_4$ | Per cent F | ppm Cu | ppm Pb | ppm Zn |
|---|---|---|---|---|---|---|---|
| Baritiferous celestite | BC-74-113 | 11.90 | 66.50 | .03 | 20 | 50 | 40 |
| Baritiferous celestite | BC-74-114 | 9.52 | 59.95 | .03 | 20 | 50 | 40 |
| Baritiferous celestite | BC-74-115 | 11.10 | 65.00 | .03 | 25 | 40 | 40 |
| Baritiferous celestite | BC-74-116 | 9.83 | 47.90 | .03 | 40 | 40 | 30 |
| Lithic sandstone | K01-5001 | .08 | .07 | .05 | 35 | 25 | 35 |

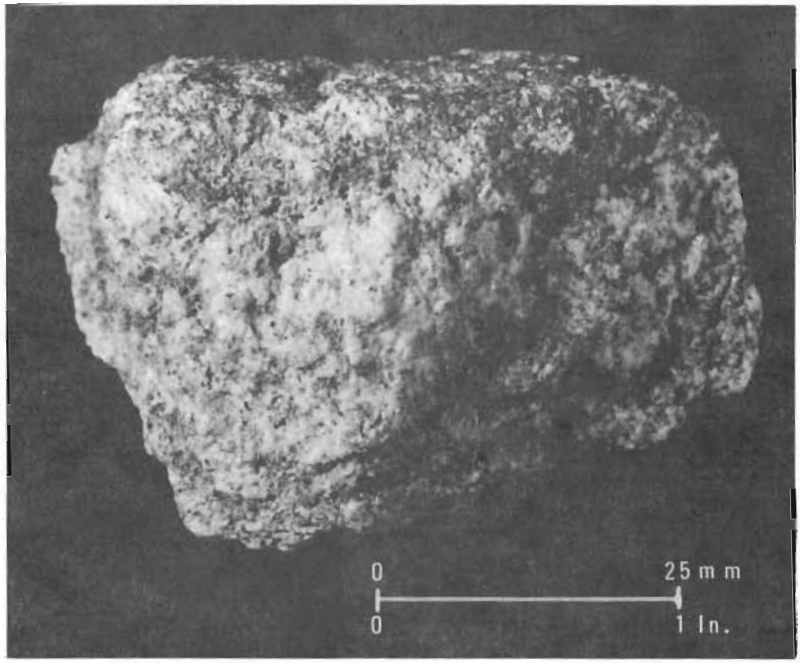



Figure 22 - Frenchvale Brook. Hand specimen of celestite. The relict sandstone (dark grey) is evenly distributed throughout the celestite giving the rock a peppery appearance.

Exploratory work conducted on this prospect to date has produced rather discouraging results; the celestite zone pinching out fairly rapidly along strike as well as at depth. However, it is interesting to note that this is the only reported stratiform deposit of celestite hosted by the clastic sedimentary rocks, other than the Kaiser deposit at Lake Enon, and raises the possibility of similar occurrences

at or near the same stratigraphic horizon at other localities. A noteworthy feature of this occurrence is the anomalously high Ba/Sr ratio as compared to that of other celestite showings.

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## (139) LOCH LOMOND*

Kaiser Celestite Mine

N.T.S. - 11F/15A (1:50,000)

The Kaiser Celestite Mine is located in the small hamlet of Enon which is situated adjacent to Lake Enon on the northeast side of the Loch Lomond Valley (Figures 23 and 24).

The celestite deposit was discovered by Lura Corporation during the course of exploratory activities in the Loch Lomond area in 1962. Diamond drilling by the same company in subsequent years proved the deposit to be of considerable size although of low grade (average $SrSO_4$ content 50-55 per cent). Evaluation of the deposit by Lura Corp. continued until 1969 when Kaiser Minerals purchased the property. Following this change in hands, the new owners initiated development procedures which included a comprehensive diamond drilling program, construction of a concentrator and construction of a chemical plant at Point Edward approximately 35 miles northeast of the mine site. Production began in early 1970 with the first shipment of concentrates made to the chemical plant in 1971, where the $SrSO_4$ was converted to $SrCO_3$, $Sr(NO_3)_2$, and $Na_2SO_4$ was produced as a by-product. Operations continued until mid-year 1976 when market setbacks forced the closure of the mine. The amount of celestite produced up until this time is indicated on Figure 2, and a summary of the tonnages left behind in the various ore bodies which comprise the deposit are indicated in Table 5.

Upon cessation of mine operations, S. Forgeron (former geologist with Kaiser Celestite Mining) was contracted by the Nova Scotia Department of Mines to compile a report on the mining operations to insure that all the necessary information will be available to future owners who may be interested in reopening the mine. This report

* The Loch Lommond deposit was not included in the list of showings and deposits to be investigated, however a brief visit to the mine site was made during the 1974 field season. The following description is essentially a summary of reports and studies undertaken at this site by various other individuals - primarily S. Forgeron, former geologist and mine manager of Kaiser Celestite Mining.

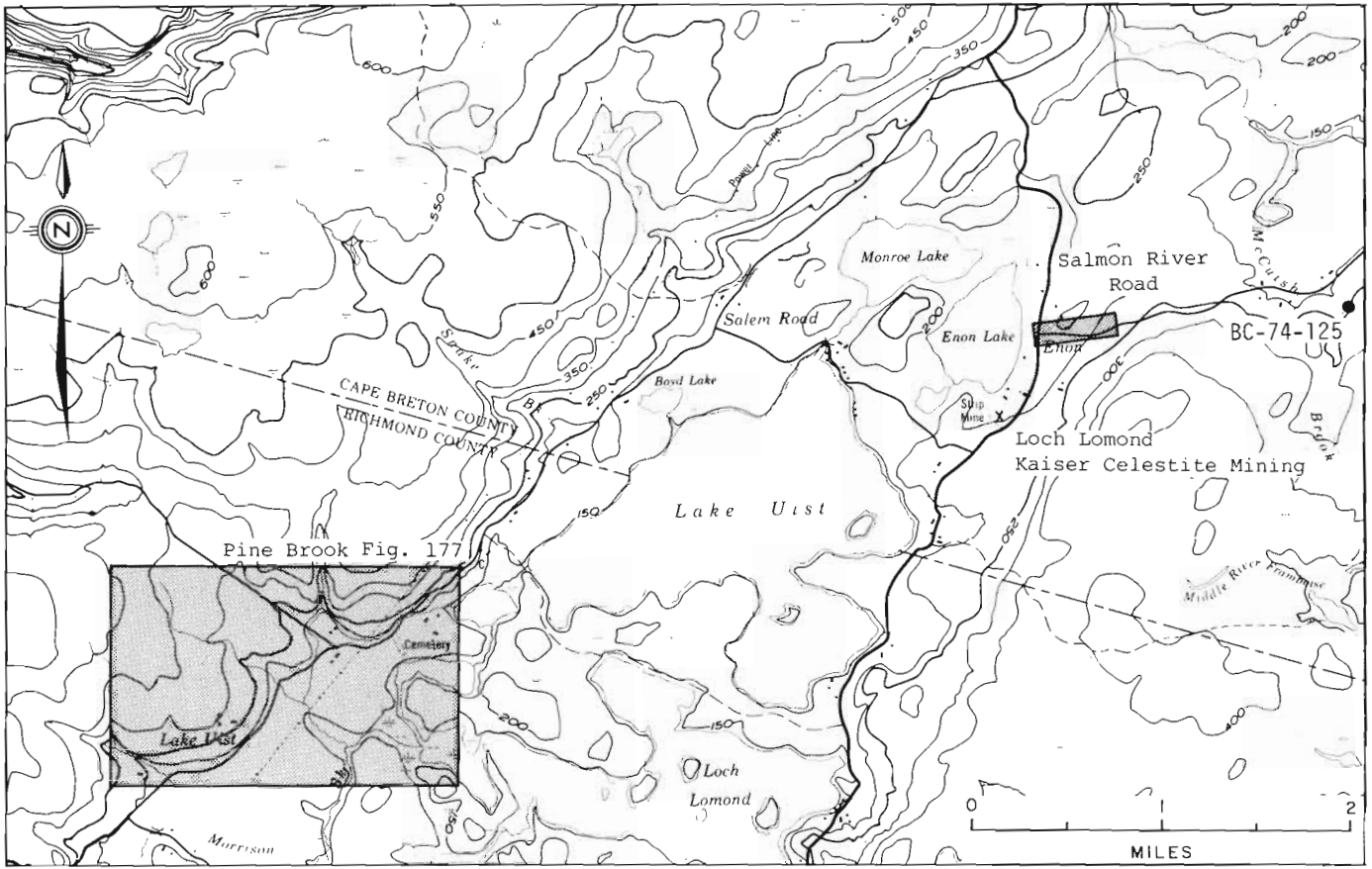
Salmon River Road
BC-74-125
Monroe Lake
Salem Road
Enon Lake
Enon
Bowd Lake
Ship Mine
Loch Lomond
Kaiser Celestite Mining
CAPE BRETON COUNTY
RICHMOND COUNTY
Lake Uist
Pine Brook Fig. 177
Cemetery
Lake Uist
Loch Lomond
Morrison
Middle River Frontmine
MILES
0
1
2

Figure 23

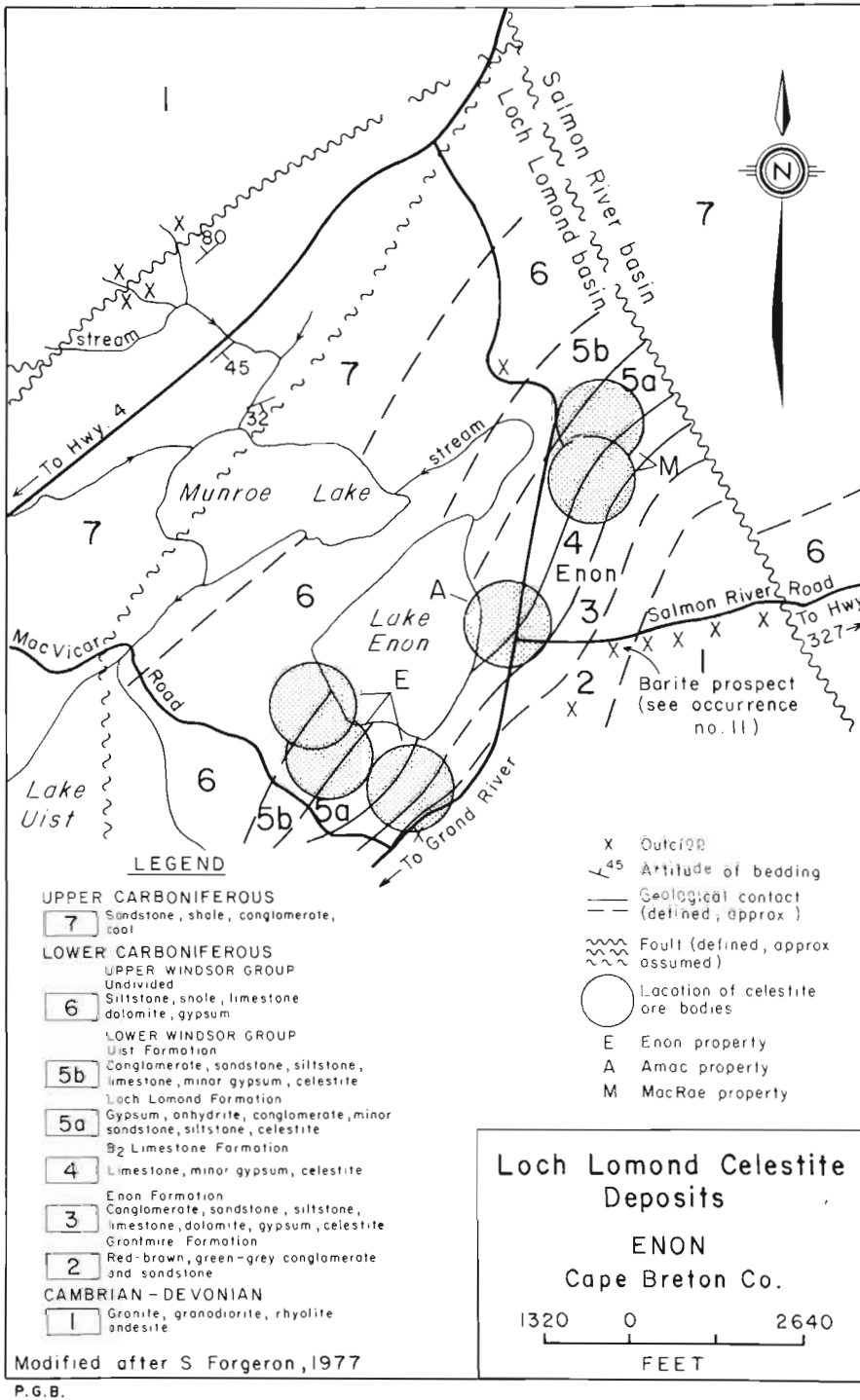
Salmon River basin
Loch Lomond basin
N
stream
To Hwy. 4
Munroe Lake
stream
MacVicar Road
Lake Uist
Lake Enon
Enon
Salmon River Road
To Hwy 327
Barite prospect (see occurrence no. 11)
To Grand River
LEGEND
UPPER CARBONIFEROUS
7 Sandstone, shale, conglomerate, coal
LOWER CARBONIFEROUS
UPPER WINDSOR GROUP
Undivided
6 Siltstone, shale, limestone dolomite, gypsum
LOWER WINDSOR GROUP
Uist Formation
5b Conglomerate, sandstone, siltstone, limestone, minor gypsum, celestite
Loch Lomond Formation
5a Gypsum, anhydrite, conglomerate, minor sandstone, siltstone, celestite
B2 Limestone Formation
4 Limestone, minor gypsum, celestite
Enon Formation
3 Conglomerate, sandstone, siltstone, limestone, dolomite, gypsum, celestite
Grantmire Formation
2 Red-brown, green-grey conglomerate and sandstone
CAMBRIAN - DEVONIAN
1 Granite, granodiorite, rhyolite andesite
Modified after S Forgeron, 1977
X Outcrop
45 Attitude of bedding
Geological contact (defined, approx.)
Fault (defined, approx assumed)
Location of celestite ore bodies
E Enon property
A Amac property
M MacRae property
Loch Lomond Celestite Deposits
ENON
Cape Breton Co.
1320 0 2640
FEET
P.G.B.

Figure 24

TABLE 5 (SUMMARY)†

LOCH LOMOND CELESTITE RESERVES

| Category | Ore bodies | | | | | Total | | |
|---|---|---|---|---|---|---|---|---|
| Measured (Short Tons) | 15 | Enon 54-54W | 75-125 | Amac | MacRae | Recoverable | In Place | Doubtful |
| 1. Recoverable | 110,461 | - | - | - | - | 110,461 | - | - |
| 2. In Place | - | - | - | - | 638,094* | - | 638,094 | - |
| 3. Doubtful | 29,373 | - | - | - | - | - | - | 29,373 |
| Subtotals | 139,834 | - | - | - | 638,094 | | | |
| | | | | | | Total Measured: | | 777,928 |

| Category | Ore bodies | | | | | Total | | |
|---|---|---|---|---|---|---|---|---|
| Indicated (Short Tons) | 15 | Enon 54-54W | 75-125 | Amac | MacRae | Recoverable | In Place | Doubtful |
| 1. Recoverable | 73,544 | 391,950 | 252,529 | 105,630 | - | 823,653 | - | - |
| 2. In Place | - | - | - | - | 220,369 | - | 220,369 | - |
| 3. Doubtful | - | 12,440 | 95,204 | - | - | - | - | 107,644 |
| Subtotals | 73,544 | 404,390 | 347,733 | 105,630 | 220,369 | | | |
| | | | | | | Total Measured: | | 1,151,666 |
| | | | | | | GRAND TOTAL | | 1,929,594 |

* This Tonnage includes 93,000 tons mined during 1975 of which 40,000 tons remain in stockpile.

† after S. Forgeron, Kaiser Celestite Mining Ltd., 1977.

includes a detailed description of the geology, the problems encountered during mining operations and how they were solved, ore reserves, celestite exploration techinques and a documentation of all the mineral showings in the former Kaiser Celestite Mining property holdings in the Loch Lomond area. The written report is supplemented by 100 maps which range in scale from 1 inch to 50 feet, to 1 inch to 2640 feet. The entire report is embodied in the Nova Scotia Department of Mines Open File Report 328.

The regional geological setting is highly significant with regard to the distribution of the celestite ore bodies (Figure 24). All of the ore bodies are situated in a northeast trending band of Carboniferous age sedimentary rocks which are underlain and flanked by pre-Carboniferous igneous and metamorphic rocks. The northwest contact between the pre-Carboniferous and Carboniferous rocks is for the most part a fault contact, whereas the southeast contact is an unconformable onlap.

The belt of sedimentary rocks is cut by major north and northwest trending faults, two of which form boundaries to three areas within the belt each exhibiting a different geological setting. These three areas are (informally termed): 1) the Loch Lomond basin, which is essentially comprised of Early Carboniferous age Windsor Group rocks with minor Late Carboniferous age rocks and is host to the ore bodies, 2) the Salmon River basin, which is composed primarily of Late Carboniferous age rocks and is located approximately one mile northeast of Lake Enon and, 3) the L'Ardoise thrust block which is for the most part comprised of Early Carboniferous age Horton Group rocks and is located five miles southwest of Lake Enon. The faulting which affects both the pre-Carboniferous and Carboniferous age rocks is attributed to the Maritime Disturbance of late Carboniferous and early Permian age.

The Pre-Carboniferous rocks which form the basement to the Loch Lomond basin sediments are composed of Precambrian pyroclastics and greywackes, Ordovician granite, granodiorite, andesite and rhyolite, and Devonian granite. The Horton Group clastic sedimentary rocks (conglomerates, sandstone, shale) have not been encountered in the east side of the Loch Lomond basin, however it is suspected that they may occur in the west and south side of the basin (Forgeron, 1977, p. 13).

The younger Windsor rocks represent a change in depositional environment from terrestrial to marine. Where the Horton is absent, the Windsor Group rests unconformably on the basement rocks. The Windsor Group is divided into the Upper Windsor and Lower Windsor (Weeks, 1954) and is typically comprised of evaporites, carbonates, siltstone, shale, sandstone, and conglomerates. The conglomerates are present only in the Lower Windsor and typically form the inshore facies of various sedimentary units. It is suggested by Forgeron (1977, p. 14, 15), that the recurrence of the conglomerates throughout the Lower Windsor reflects coastal instability of the Windsor seas during that period of deposition.

All the celestite in the Loch Lomond basin is hosted by rocks of the Lower Windsor at specific stratigraphic horizons; consequently the geological work carried out by Kaiser Celestite Mining necessitated a more detailed breakdown of the group into units that could be correlated from drillhole to drillhole. This resulted in an informal nomenclature not used (with the exception of Grantmire Formation) outside the Loch Lommond basin (Fig. 25). The nomenclature adopted by Kaiser Celestite for the major distinctive sequences within the Lower Windsor, beginning with the oldest unit is; a) Grantmire Formation, b) Enon Formation, c) $B_2$ Limestone Formation, d) Loch Lomond Formation, and e) Uist Formation. Detailed descriptions of these formations are given by Forgeron, (1977, p. 18-32).

The Lower Windsor Group is conformably overlain by the Upper Windsor Group which is composed of carbonates, sulphates and fine grained clastic sediments. This group is conformably overlain by sandstone of the Canso Group, which itself is conformably overlain by Late Carboniferous age clastic sedimentary rocks. The Canso Group records a transition from a marine to terrestrial depositional environment.

The principal ore bodies that consititute the Loch Lomond deposit are;

A) Enon Property
    1) '15' Manto
    2) '54' Manto
    3) '54W' Manto
    4) '75' Manto
    5) '125' Manto

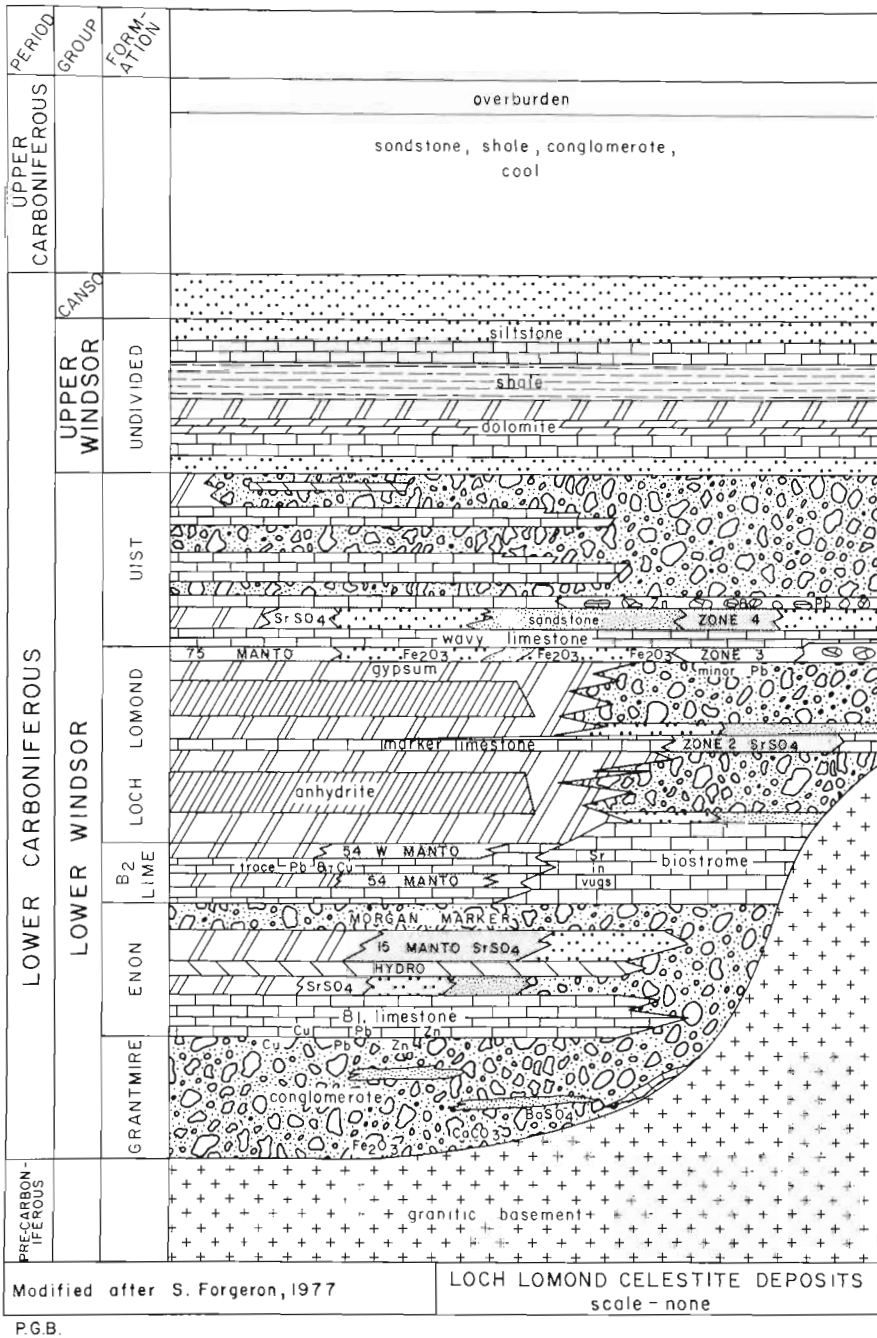


Figure 25 - Loch Lomond. Idealized section of the Loch Lomond basin indicating relationships between mineralization and geology.

Table 6 . Brief summary of geology pertaining to Loch Lomond ore bodies.

| Ore body | Thickness (ft.) Range | Thickness (ft.) Average | Host Rock Description | Formation | Mineralization Description | Associated Minerals |
|---|---|---|---|---|---|---|
| ENON PROPERTY | | | | | | |
| '15' Manto | 5-25 | 12 | -Celestite replacing red-brown, green-grey mottled, slightly calcareous siltstone<br>-Celestite grade highest near base | Enon | -Celestite is very dense, medium to coarse grained, contains few large vugs lined with well formed crystals | Hematite, trace galena |
| '75' Manto | 1.5-19.0 | 10.8 | -Celestite replacing red-brown fine grained-lithographic, fossiliferous limestone and light to medium grey 'algal mat' limestone | Loch Lomond | -Celestite is fine grained, stained red with hematite | Hematite, trace galena |
| and | | and | | | | |
| '125' Manto | 0.7-7.4 | 6.3 | | | | |
| '54' Manto | 5.0-9.6 | 7.6 | -Celestite replacing light grey-red brown, fine grained-lithographic, fossiliferous limestone and light to medium grey 'algal mat' limestone<br>-Highest grade celestite where limestone is in contact with gypsum | $B_2$ Limestone | -Celestite is white to light grey in colour, coarse grained | Traces galena and chalcopyrite |
| and | | and | | | | |
| '54w' Manto | 5.0-7.9 | 6.2 | | | | |
| AMAC PROPERTY | | | | | | |
| '75' Upper | - | 7.3 | -Celestite replacing limestone, limestone conglomerate and siltstone | Loch Lomond | -Celestite is massive, medium grained, light grey-brown and grey-brown in colour<br>-Stained red with hematite near bottom in siltstone | Minor hematite |
| '75' Intermediate | 4.6-4.8 | 4.7 | -Celestite replacing sandstone, siltstone, and matrix in pebble conglomerate | Loch Lomond | -Celestite is massive, dense, fine to medium grained, light grey-brown in colour | - |
| '75' Lower | 1.9-5.5 | 4.4 | -Celestite replacing matrix of red-brown, sandy conglomerate | Loch Lomond | -as above | |

continued ....

Table 6 continued.

| Ore body | Thickness (ft.) Range | Thickness (ft.) Average | Host Rock Description | Formation | Mineralization Description | Associated Minerals |
|---|---|---|---|---|---|---|
| '54' Zone and '54w' Zone | 1.9-5.4 and 1.0-9.7 | 4.9 and 5.7 | -Celestite replacing limestone, gypsum(?) -Limestone fossiliferous (crinoids), some stylolites | $B_2$ Limestone | -Celestite massive and as disseminations, fine to coarse grained, colour varies from light grey, grey brown, red | Minor hematite |
| MACRAE PROPERTY | | | | | | |
| Zone 1 - (equiv. to '54' Manto) | 7.8-8.7 | 8.2 | -Celestite replacing limestone -Celestite distribution irregular and spotty | $B_2$ Limestone | -Celestite massive and as disseminations, fine to coarse grained, light grey to grey-brown in colour | - |
| Zone 2 | 2-30 | 12.1 | -Celestite replacing silty limestone | Loch Lomond | -Celestite massive, very dense, brittle, light grey to brown, medium to coarse grained texture | Minor galena |
| Zone 3 - (equiv. to '75' Manto) | 2-23 | 10.3 | -Celestite replaciug silty limestone conglomerate | Loch Lomond | -Celestite medium to coarse grained texture, very vuggy -Vugs lined with excellent, well formed celestite crystals | Minor galena |
| Zone 4 | 1-5 | 1.5 | -Celestite replacing silty limestone conglomerate | Uist | -Celestite medium grained texture, light brown colour | - |

TABLE 7

CHEMICAL ANALYSES OF REPRESENTATIVE SECTIONS OF THE ORE BODIES AT LOCH LOMOND

| Ore body | Per cent | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SrO | BaO | CaO | $SiO_2$ | $Fe_2O_3$ | $Al_2O_3$ | $K_2O$ | $SO_3$ | Pb | Total |
| ENON | | | | | | | | | | |
| '15' Manto | 27.5 | 0.5 | 4.4 | 24.3 | 2.7 | 5.4 | 1.0 | 24.0 | 0.2 | 89.8 |
| '75' Manto | 27.3 | 0.3 | 5.1 | 23.0 | 8.5 | 7.9 | 1.1 | 20.5 | - | 93.7 |
| | $SrSO_4$ | $BaSO_4$ | $CaCO_3$ | $SiO_2$ | $Fe_2O_3$ | $Al_2O_3$ | $K_2O$ | - | Pb | - |
| '54' Manto | 40-50 | .5-1.9 | 30-40 | 3.0 | - | - | - | - | - | - |
| '54W' Manto | 40-50 | .9-1.2 | 30-40 | 3.0 | - | - | - | - | - | - |
| AMAC | | | | | | | | | | |
| '54' Zone | 49.0 | 1.0 | 37.0 | 5.0 | - | - | - | - | - | - |
| '54' Zone | 62.0 | 1.0 | 16.0 | 15.0 | - | - | - | - | - | - |
| '75' Upper Zone | 70.0 | 0.7 | 17.00 | 9.0 | 0.9 | - | - | - | - | - |
| '75' Inter-mediate Zone | 53.0 | 0.8 | 1.0 | 25.0 | 5.0 | - | - | - | - | - |
| '75' Lower Zone | 41.0 | 1.0 | 2.4 | 32.0 | - | - | - | - | - | - |
| MACRAE | | | | | | | | | | |
| Zone 2 | 48.1 | 1.01 | 30.06 | 16.2 | 1.38 | - | - | - | 0.47 | - |
| Zone 3 | 60.1 | 1.39 | 16.4 | 13.9 | 1.07 | - | - | - | 0.49 | - |

B) Amac Property
   1) '54' Zone
   2) '54W' Zone
   3) '75' Upper, Intermediate, and Lower Zone

C) MacRae Property
   1) Zone 1 (equiv. to '54' Manto)
   2) Zone 2
   3) Zone 3 (equiv. to '75' Manto)
   4) Zone 4

The positions the majority of these celestite bodies occupy in the stratigraphic column are shown diagrammatically in Figure 25. A detailed description of each of these bodies is given by Forgeron, (1977, p. 60-80) and will not be repeated in this discussion; however, a generalized geological description of the ore bodies is summarized in Table 6. Descriptions of the footwall, hangingwall, and facies changes associated with the ore zones are not included in Table 6; however this information is illustrated in Figure 25.

The average values of chemical analysis of a representative section of each of the most important ore zones is presented in Table 7 (after Forgeron, 1977).

The re-opening of this mine will be governed by a significant increase in demand for celestite accompanied by a higher prices and possibly a decrease in tariffs for strontium compounds produced from this mineral.

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## (11) SALMON RIVER ROAD

U.T.M.G. - N-507579
E-69188

N.T.S. - 11F/14A (1:50,000)

The barite showing is found in situ in the ditch on the south side of the Salmon River Road, 0.88 mile northwest of the Kaiser Celestite Mine at Lake Enon (Figure 23, 24 and 26).

This occurrence was discovered during exploratory work undertaken in the area by Kaiser Celestite Mining Limited and was brought to the writer's attention by S. Forgeron, Geologist for the aforementioned company.

The host rock is a poorly sorted, brick red conglomerate which forms part of the Grantmire Formation of the Windsor Group in this area. Bedding planes are not readily evident in the conglomerate; however, it appears to be striking in a northeasterly direction and dipping about 10° towards the northwest. Immediately east of the conglomerate, a rather massive feldspathic arenite also of the Grantmire Formation is found to crop out in two locations. Fractures evident in the feldspathic arenite are found to have the following attitudes: 150° /vertical, 135°/vertical, 165° /vertical and 082°/vertical. No barite was found to occur in this rock.

In outcrop, the barite is erratically distributed throughout the host rock, with no structural controls evident. The colour and texture of the barite so closely approximates that of the non-baritiferous matrix of the host rock, that its presence is difficult to detect.

In hand specimen the barite ranges in colour from dark brick red to light brick red and buff, and exhibits a cryptocrystalline, suture texture (Figure 27). Examination of the barite in thin section (No. F15-5000) shows it to be crystalline, occurring as small, equidimensional, anhedral grains with a suture or interlocking texture. The red colour is due to varying quantities of very fine grained hematite occurring both interstitially among the barite grains and as inclusions in the barite grains. In this thin section, hematite accounts for approximately 5 to 6 per cent of the

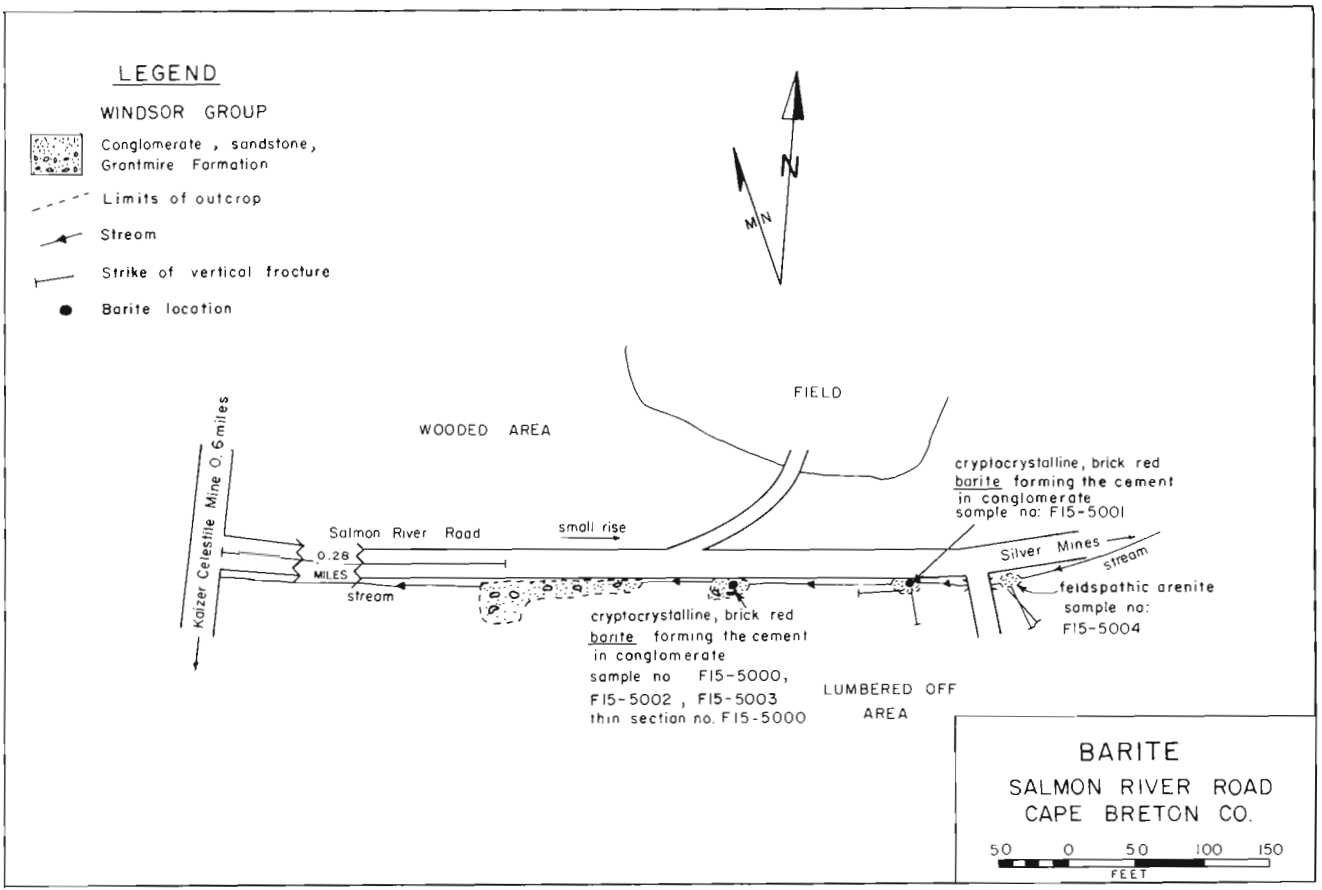
LEGEND
WINDSOR GROUP
Conglomerate , sandstone, Grantmire Formation
Limits of outcrop
Stream
Strike of vertical fracture
Barite location
N
MIN
FIELD
WOODED AREA
Kaizer Celestite Mine 0.6 miles
Salmon River Road
small rise
0.28 MILES
stream
cryptocrystalline, brick red barite forming the cement in conglomerate sample no: F15-5001
Silver Mines
stream
feldspathic arenite sample no: F15-5004
cryptocrystalline, brick red barite forming the cement in conglomerate sample no F15-5000, F15-5002 , F15-5003 thin section no. F15-5000
LUMBERED OFF AREA
BARITE
SALMON RIVER ROAD
CAPE BRETON CO.
50 0 50 100 150
FEET
P.G.B

Figure 26

rock. Barite makes up the major portion of the thin section, comprising approximately 90 per cent of the rock. The remainder (about 5 per cent) is composed of rock fragments, quartz, plagioclase and biotite clasts, all of which (other than the quartz and biotite) have been strongly sericitized. These fragments are rounded, subrounded to subangular and randomly distributed throughout the slide. Although no diagnostic evidence for a replacement mode of origin was seen, it is probable that the small clasts which are randomly distributed throughout the barite represent fragments of the original conglomerate matrix that have survived a replacement process.

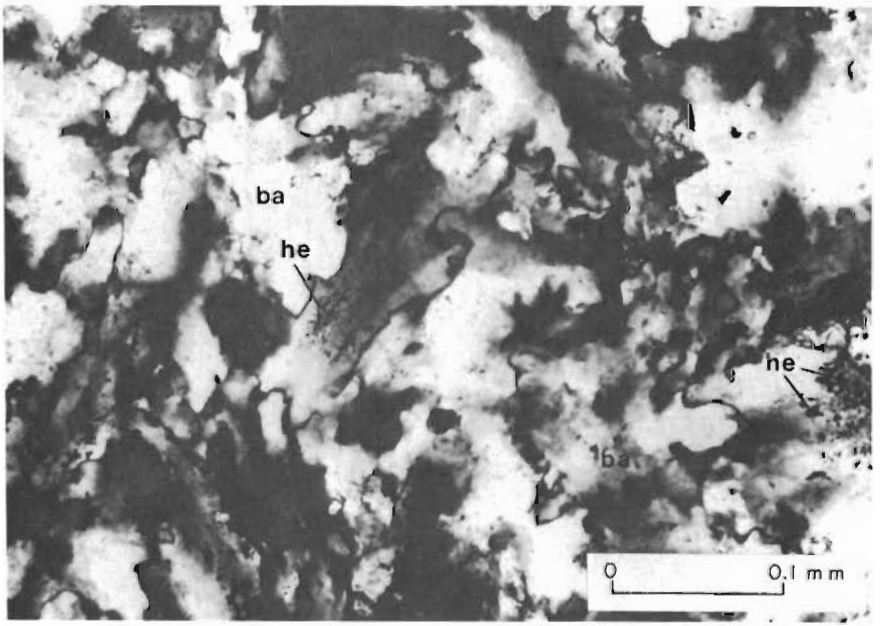


Figure 27 - Salmon River Road. Note suture of interlocking texture of cryptocrystalline barite, a record of abundant intrastratal solution. Crossed Nicols, he - hematite, ba - barite.

Grab samples of the mineralized zones, the conglomerate (which visually appeared to be barren of barite) and the feldspathic arenite were submitted for chemical analysis. Sample locations are shown in Figure 26. The results of the analyses are found below and in appendix III.

| Rock Type | Sample No. | Per cent $BaSO_4$ | Per cent $SrSO_4$ | Per cent F | ppm Cu | ppm Pb | ppm Zn |
|---|---|---|---|---|---|---|---|
| Baritiferous conglomerate | F15-5000 | 12.90 | .33 | .03 | 10 | 40 | 110 |
| Barite, conglomerate | F15-5001 | 63.10 | 3.31 | .03 | 10 | 20 | 90 |
| Barite | F15-5002 | 93.03 | 4.05 | .03 | 70 | 20 | 80 |
| Baritiferous conglomerate | F15-5003 | 21.80 | .98 | .03 | 10 | 50 | 30 |
| Feldspathic arenite | F15-5004 | .31 | .07 | .07 | 10 | 40 | 100 |

Although the barite at this showing appears to be of a minor nature, it illustrates the potential of the Grantmire Formation as a host to a replacement type of barite mineralization.

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## (12) SHENACADIE

U.T.M.G. - N-509751
E-68156

N.T.S. - 11K/2A (1:50,000)

The barite occurrence is found in the bed of a small stream approximately 4,850 feet south of Highway 223 at Shenacadie. It is best approached by walking south on an old sawmill road that begins at the rear of the John MacLean farm and intersects the stream 2,500 feet north of the showing. Upon reaching this intersection, walk upstream until a junction is reached where two small streams join the main brook on the left side of the brook. Of these two small streams, continue up the more southerly one. The barite vein is marked by a small cairn of barite rubble on the southwest bank of the stream (Fig. 28 and 29).

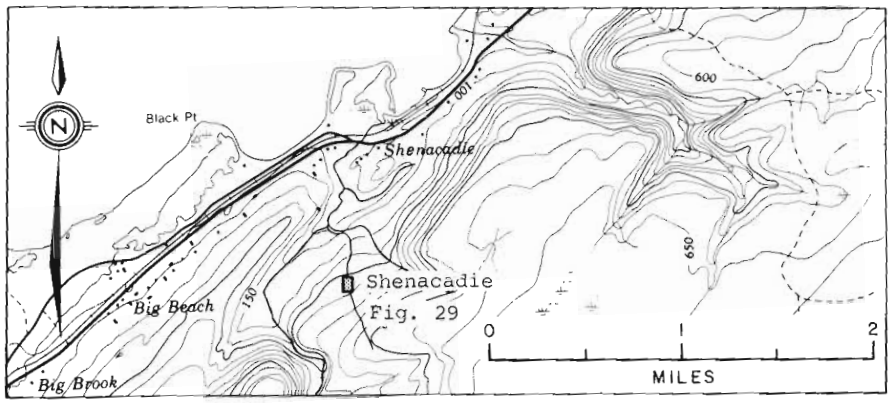


Figure 28

The barite showing was discovered in 1938 by two local inhabitants, Mr. J. A. McMullen and Mr. M. McKinnon; however, no significant follow-up work was undertaken until 1946. At this time Mr. E. J. Cole and Mr. R. Grant, Deputy Inspectors for the Nova Scotia Department of Mines, reported that several small trenches had been dug to determine the extent of the deposit.

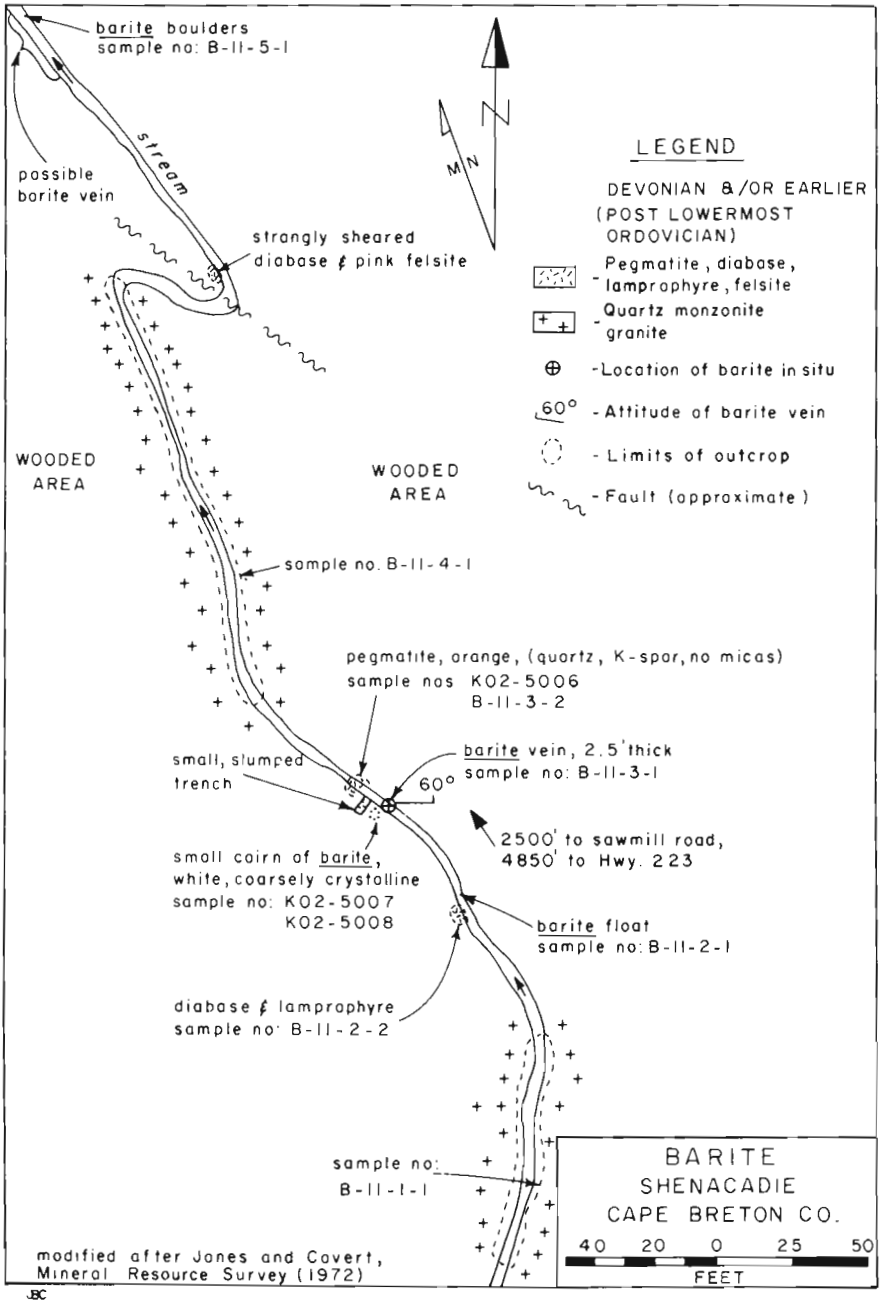
barite boulders
sample no: B-11-5-1
possible
barite vein
stream
strongly sheared
diabase & pink felsite
WOODED
AREA
WOODED
AREA
sample no. B-11-4-1
pegmatite, orange, (quartz, K-spar, no micas)
sample nos K02-5006
B-11-3-2
small, slumped
trench
barite vein, 2.5' thick
sample no: B-11-3-1
60°
2500' to sawmill road,
4850' to Hwy. 223
small cairn of barite,
white, coarsely crystalline
sample no: K02-5007
K02-5008
barite float
sample no: B-11-2-1
diabase & lamprophyre
sample no: B-11-2-2
sample no:
B-11-1-1
LEGEND
DEVONIAN &/OR EARLIER
(POST LOWERMOST
ORDOVICIAN)
Pegmatite, diabase,
lamprophyre, felsite
Quartz monzonite
granite
-Location of barite in situ
60° -Attitude of barite vein
-Limits of outcrop
-Fault (approximate)
BARITE
SHENACADIE
CAPE BRETON CO.
40 20 0 25 50
FEET
modified after Jones and Covert,
Mineral Resource Survey (1972)
JBC

Figure 29

Mr. C. O. Campbell investigated this area for barite in 1947 for Maritime Industries Ltd. Beyond noting the presence of the barite occurrence, no significant exploratory work was conducted.

The most recent work carried out here was in 1972 by B. E. Jones for the Nova Scotia Department of Mines as part of the Cape Breton Island Mineral Resources Survey.

The contact between the barite and the host rock was not visible; however, a brown-orange pegmatite lacking in micas, is found to crop out in the immediate vicinity. The majority of the outcrops encountered are granite and quartz monzonite, and it is quite likely that these rocks host the barite. Other rock types encountered are diabase, lamprophyre, and felsite, which appear as dykes in the 'granites'.

The barite was difficult to examine in situ due to the high water in the stream bed. It appears to be structurally controlled, however; the barite occupying a fracture and attaining a maximum thickness of approximately 2.5 feet. Earlier reports indicate the vein to be striking east and dipping 60° towards the north.

The barite varies from pale pink-white, white, to bluish white in colour, and is coarsely crystalline, often occurring in small radiating sheaves. No other minerals were observed with the barite.

No barite was observed in the felsite, diabase or lamprophyre, but Jones and Covert (1972) report the following:

> "A second barite occurrence of a different nature may exist approximately 450 feet downstream from the main showing. At this locality, scattered float of barite-cemented felsite breccia are found in the stream bed. The barite is coarsely crystalline, pink to orange in colour, and comprise up to 30 per cent of the rock volume. The brecciated rock is very fine grained pale pink felsite, similar to dykes that cut the granite in several localities. This breccia is found one hundred feet upstream from an area in which the size of the barite float is somewhat larger than usually found in the brook."

The source of this float is yet to be located, suggesting the possibility of additional veins occurring in the area.

Grab samples were taken from the barite vein and the nearby pegmatite outcrop for analysis. The sample locations are shown in Figure 29 and the results of the chemical analyses are listed below and in appendix III. Also listed below are the results of analyses of samples collected by Jones and Covert, (1972).

| Rock Type | Sample No. | Per cent $BaSO_4$ | Per cent $SrSO_4$ | F | ppm Cu | ppm Pb | ppm Zn |
|---|---|---|---|---|---|---|---|
| Pegmatite | K02-5006 | .37 | .01 | .03 | 10 | 10 | 10 |
| Barite | K02-5007 | 93.86 | 3.86 | .03 | 20 | 20 | 10 |
| Barite | K02-5008 | 94.42 | 3.38 | .03 | 10 | 30 | 10 |

Chemical analysis of samples taken by Jones, B. E. and Covert, T. N., 1972.

| Rock Type | Sample No. | Ba% | Sr% | F% | Cu% | Pb% |
|---|---|---|---|---|---|---|
| Granite | B.11.1-1 | .080 | .030 | .020 | .005 | .003 |
| Granite | B.11.4-1 | .045 | .300 | .055 | .005 | .003 |
| Granite | B.11.2-2 | .090 | .030 | .020 | .003 | .003 |
| Barite | B.11.3-2 | .120 | .020 | .020 | .005 | .003 |
| Barite | B.11.2-1 | 36.800 | 1.500 | .020 | .005 | .003 |
| Barite | B.11.3-1 | 52.800 | 1.550 | .055 | .005 | .003 |
| Barite | B.11.5-1 | 53.000 | 1.550 | .020 | .005 | .003 |

Additional exploratory work is warranted at this occurrence to define the following: (a) the exact width of the vein, (b) the length of the vein along strike, and (c) the dimensions and the composition of the vein at depth.

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(13) SYDNEY RIVER

U.T.M.G. - N-510915
E-71321

N.T.S. - 11K/1A (1:50,000)

The celestite occurrence is found in situ on the southeast bank of Sydney River, approximately 700 feet northeast of the dam which is located at the end of Riverside Drive, about 0.5 mile northwest of Highway 4. The celestite appears as a low profile outcrop at the base of the river bank and the river floor, thus it is best seen at low tide (Figures 30 and 31).

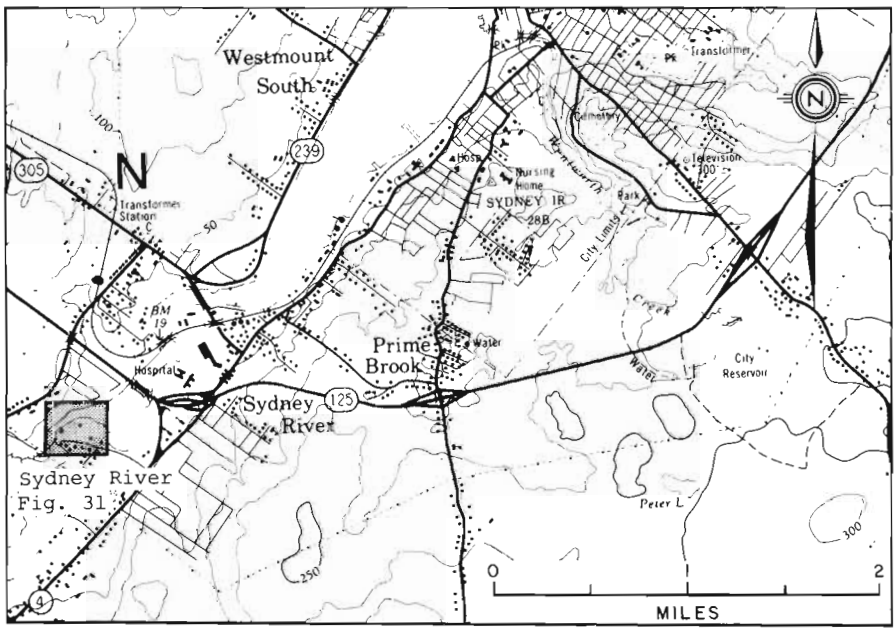


Figure 30

The celestite was first reported by H. Fletcher and C. Robb on G.S.C. Map Sheet No. 134 (1899). It is briefly referred to in reports by H. S. Poole (1907) and H. S. Spence (1922) in G.S.C. publications 953 and 570 respectively, and again in an unpublished report by W. A. Bell (1961).

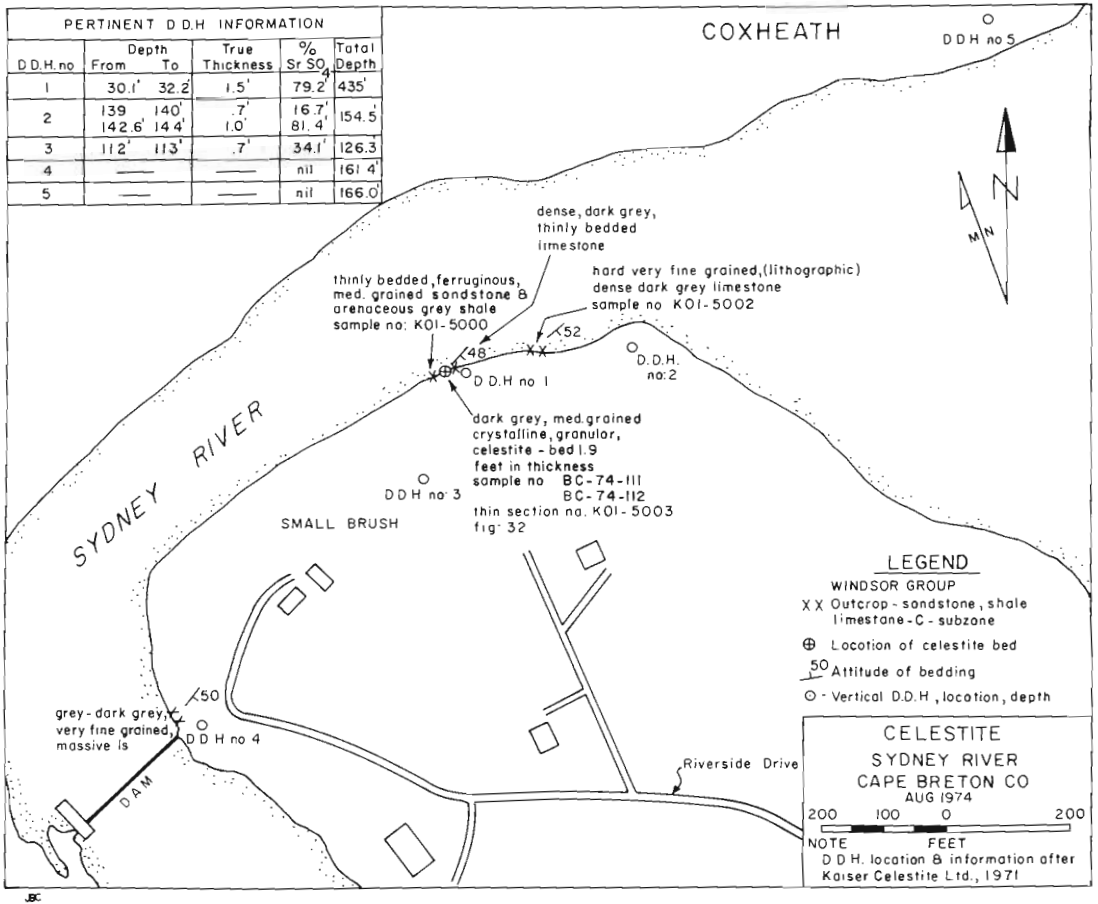
PERTINENT D.D.H INFORMATION
D.D.H. no | Depth From | Depth To | True Thickness | % $SrSO_4$ | Total Depth
1 | 30.1' | 32.2' | 1.5' | 79.2' | 435'
2 | 139' | 140' | .7' | 16.7' | 154.5'
2 | 142.6' | 144' | 1.0' | 81.4' | 154.5'
3 | 112' | 113' | .7' | 34.1' | 126.3
4 | — | — | — | nil | 161.4'
5 | — | — | — | nil | 166.0'
COXHEATH
D D H no 5
MN
dense, dark grey, thinly bedded limestone
thinly bedded, ferruginous, med. grained sandstone & arenaceous grey shale sample no: K01-5000
hard very fine grained, (lithographic) dense dark grey limestone sample no K01-5002
48
52
D D.H no 1
D.D.H. no:2
SYDNEY RIVER
dark grey, med. grained crystalline, granular, celestite - bed 1.9 feet in thickness sample no BC-74-111 BC-74-112 thin section no. K01-5003 fig: 32
D D H no 3
SMALL BRUSH
LEGEND
WINDSOR GROUP
XX Outcrop - sandstone, shale limestone - C - subzone
⊕ Location of celestite bed
50 Attitude of bedding
O - Vertical D.D.H, location, depth
50
grey - dark grey, very fine grained, massive ls
D D H no 4
DAM
Riverside Drive
CELESTITE
SYDNEY RIVER
CAPE BRETON CO
AUG 1974
200 100 0 200
FEET
NOTE
D D H. location & information after Kaiser Celestite Ltd., 1971
JBC

Figure 31

It was not until 1971 that the showing was examined as a potential prospect, when Kaiser Celestite Mining Ltd. conducted a geological survey over the area and put down five diamond-drill holes totalling 1,043 feet (Figure 31).

The celestite is stratibound, occurring as a bed with a maximum thickness of 1.9 feet. It has an attitude of 044° azimuth/48° southeast, and at low tide can be traced along strike for a distance of 25 feet (Figure 32). It is directly overlain by a dense, dark grey, thinly bedded limestone and underlain by a thinly bedded, ferruginous, medium-grained sandstone and arenaceous grey shale. The contacts between the celestite bed and the wallrock on both the hangingwall and footwall are sharp. No visible celestite was observed in the wallrock on either the hangingwall or the footwall. Thus, it appears that the celestite has preferentially replaced a specific horizon in this sequence of beds. These rocks are believed to be part of the Crawley Limestone member of the C-Subzone, Upper Windsor Group.


Figure 32 - Sydney River. Celestite bed in the river bank. ce - celestite.

The following detailed stratigraphic section of the outcrops along this shore is given by W. A. Bell (1961, p. 52):

"Descending:

(a) Limestone, thinly bedded; scattered crinoid stems, Nodosinella (?), Productus semicubiculus P. lyelli, Diaphragmus tenuicostiformis, Hartinia (rare), Composita windsorensis, small turetted gastropoda (including Flemingia?) and Spirorbis 18'+

(b) Limestone, thinly bedded or calcareous shale 7'

(c) Sandstone, light grey, thinly bedded, very fine-grained, calcareous, or laminated calcareous siltstone 7.5'

(d) Sandstone, grey, medium-grained to coarse and conglomeratic 2'

(e) Mostly concealed, but chocolate red siltstone in part 15'

(f) Limestone, dense, showing bedding laminations on weathered surface 1'+

(h) Limestone, thinly bedded, dark grey, carrying crushed Productus semicubiculus, Palyelli, a small species of ostracoda, Leptodesma, Lithophagus, Mediola(?) small turetted gastropods, Spirorbis, and carbonized filiform, algal-like plant remains 4'+

(i) Sandstone thinly bedded and arenaceous, grey shale 5'+

(j) Concealed mostly, include red, finely micaceous arenaceous shale and thinly bedded sandstone, and a 1.9' bed of crystalline celestite that is overlain directly by about 2 feet dark grey, dense thinly bedded limestone 50'+"

In hand specimen the celestite is dark grey to light grey in colour and has a medium-grained, crystalline, granular texture. A weathered specimen displays a dull, pale grey colour. Other minerals evident include minor quantities (<1%) of sulphides (galena?) and calcite (slight fizz when treated with dilute HCl).

Examination of the celestite in thin section (No. K01-5003) revealed it to account for 90 per cent of the rock, with the remainder made up of calcite and minor sulphides. The celestite occurs both as anhedral and lath shaped grains randomly oriented and distributed throughout the slide.

The calcite is present as small, euhedral rhombs and as relict clumps of limestone dispersed evenly throughout the rock. A few larger calcite grains are present, however these generally display a relict texture (Fig. 33).

The least most abundant minerals (<1%) are the sulphides (galena?) which occur as very fine grained material with boundaries controlled by the celestite grain boundaries. They are generally restricted to areas of calcite and limestone which have not undergone replacement by celestite. The sulphides appear to have replaced portions of the calcite and limestone as well as very minor portions of the celestite.

Thus it would appear that the celestite and sulphides occur as a replacement deposit in a dolomitic limestone. Examination of thin section K01-5003 suggests the mineral paragenesis to be:

(1) celestite, and
(2) sulphides (galena?).

Two grab samples taken at random from the celestite bed and samples of the sandstone and limestone were submitted for chemical analysis. The location of the samples are shown in Figure 31 and the results of the analyses are listed below and in appendix III.

| Rock Type | Sample No. | Per cent | | | ppm | | |
|---|---|---|---|---|---|---|---|
| | | $BaSO_4$ | $SrSO_4$ | F | Cu | Pb | Zn |
| Celestite | BC-74-111 | 6.01 | 85.00 | .03 | 10 | 1600 | 40 |
| Celestite | BC-74-112 | 3.11 | 89.50 | .03 | 10 | 50 | 200 |
| Sandstone | K01-5000 | .53 | .03 | .04 | 10 | 50 | 40 |
| Lithographic limestone | K01-5002 | .08 | .07 | .03 | 60 | 10 | 25 |

This celestite occurrence is interesting in that it is the only stratiform occurrence known in Nova Scotia to be hosted by rocks of the Upper Windsor Group. Texturally, mineralogically and colourwise it closely resembles the celestite found at Rear Black River and Byers Creek which are hosted by rocks of the Lower Windsor Group. It does not appear to be associated with any paleotopographic highs. This occurrence further substantiates the importance of the Upper Windsor Group rocks as a potential host for mineral deposits.

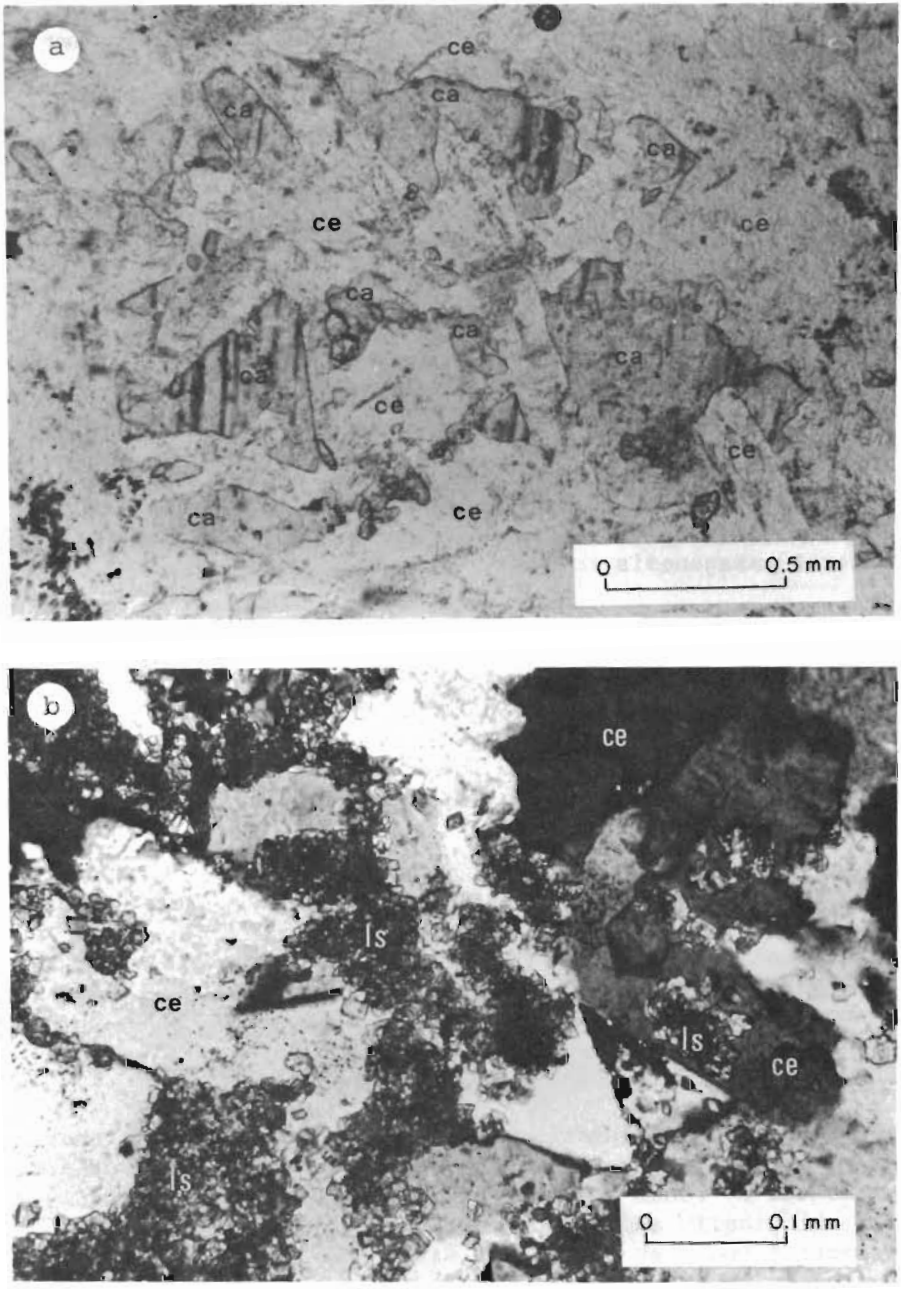


Figure 33 - (a) Sydney River. Celestite replacing calcite. Note the uniform cleavage directions in the relict calcite fragments, indicating that they were once all part of the same crystal. Plane polarized light, ca - calcite, ce - celestite. (b) Celestite replacing limestone. Note the relict clumps of limestone engulfed by celestite. Crossed Nicols, ce - celestite, ls - limestone.

It is believed that this prospect has sufficient merit to warrant further exploratory work, although the close proximity to urban areas may be a hindrance to any development plans.

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