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COGEMA CANADA LIMITED
BURNTBUSH RIVER PROJECT

FINAL REPORT OF ACTIVITIES 1986
VOLUME 1 of 2

Part I: Geological Mapping and Lithogeochemistry Results, Summer Field Program

(APPENDICES IN VOLUME 2)

Ref. No. 86-CND-47-02
(Document #0032U)

By: J. Learn
December 1986

TABLE OF CONTENTS

VOLUME 1 of 2

LIST OF APPENDICES

VOLUME 2 of 2

LIST OF TABLES

LIST OF MAPS

NOTE:

This report constitutes Part I of the 1986 exploration program. Part II will describe the results of the outcrop stripping and mapping program, while Part III will give results of the airborne geophysical survey flown by Dighem.

1. INTRODUCTION

The Burntbush River project is a joint venture gold exploration program between COGEMA Canada Limited and AMERITEX RESOURCES Limited. The property comprises 312 contiguous mining claims situated in northeastern Ontario.

The joint venture agreement was signed in May 1986, and names COGEMA Canada Ltd as operator. Prior to this, the only work performed by Ameritex Resources Ltd was an airborne magnetometer and VLF survey flown in November 1984 by Aerodat Ltd.

At the time of the joint venture agreement, the property consisted of 300 claims (L789211 to L789508 and L789561, L789562, originally staked in January 1984), but a small block of 12 claims (L892946 to L892957) was added in May 1986.

Two field programs were undertaken by COGEMA Canada Ltd during 1986. The first program consisted of a systematic ground traverse coverage of the entire property in order to identify, map and sample all (if possible) outcrops on the property. This program was completed between late June and mid-August using a crew of 6 field personnel with helicopter support. The second program comprised stripping, cleaning, mapping and sampling of most of the larger outcrops in order to clarify geological relationships, and further sample the rock types. Stripping was contracted to Northland Exploration Ltd and was performed between mid-September and mid-October. Northland contributed 4 men while mapping and sampling was performed by 2 COGEMA personnel.

Since assessment requirements for this year will be fulfilled by the first field program, chemistry results and detailed maps from the second program will be presented in a separate report, i.e. assessment credits for this second program will be applied for next year. However, where new results substantially clarify or change the geologic interpretation made based on the first mapping, these may be mentioned.

2. LOCATION AND ACCESS

The project area is located in northeastern Ontario: at 150 km northeast of Timmins, at 150 km north of Kirkland Lake, at 90 km northwest of La Sarre, Que. and at 20 km west of the Ontario-Quebec border (49°30'N, 79°50'W, see Map 1). The claims block covers approximately 70 km^2 within the townships of Hoblitzell and Noseworthy.

Furthermore, the Detour Lake mine is only at 60 km to the north, and the recent Golden Pond and Golden Hope discoveries are located at 35 km and 65 km, respectively, to the east.

During the summer field program, a base camp was erected on the south shore of Chabbie Lake. This lake is the nearest large lake suitable for float planes and is situated only 6 km to the north. Access to the property from this camp was gained by use of a Bell 206B helicopter. This is no doubt the easiest way to access the property since many natural landing sites are present, and many areas of muskeg required very little tree cutting to make room for such a small helicopter.

Access to the property by land vehicle is somewhat more difficult. The nearest all weather gravel road is Tomlinson Road, the end of which is located at 8 km to the south. From this point, Newmont Exploration of Canada Ltd, who holds mining claims adjoining the Burntbush property to the south, has constructed winter roads which just touch our southern property boundary at two places. No winter roads or other suitable trails exist on the property.

An additional complication to land access is the Burntbush River, which divides the property into eastern and western parts. For heavy machinery, an ice bridge could be built (as Newmont has done) to access the eastern side. For lighter machinery, a summer crossing is possible: during the fall field program, a barge was constructed by Northland Exploration, which successfully transported a 7 ton backhoe for stripping operations on the eastern side.

3. REGIONAL GEOLOGIC SETTING

The Burntbush River property is located in the northern part of the Archean Abitibi greenstone belt of the Superior Province of the Canadian Shield. Voluminous publications, dealing with regional and local studies within the Abitibi belt, are available for reference and continue to be issued on a regular basis. However, the area underlain by our claims has, up until now, received very little attention, primarily due to poor bedrock exposure and the lack of producing mines.

Thomson (1936) was the first to publish a geological map which includes the claim group. His map is useful in some respects, but his interpretation is not comprehensive and is outdated.

More recently, Johns (1982) has published a geological map at a scale of 1 to 100 000 of the Burntbush-Detour Lakes Area. Most of the following summary is taken from his work.

The claim group lies on the northern limb, but close to the nose, of a folded sequence of supracrustal rocks, which extends west from the main volcano-sedimentary sequence in Quebec. These rocks have undergone regional and contact metamorphism ranging from upper greenschist to almandine amphibolite facies. Intrusion of the supracrustal sequence by the quartz monzonitic to granodioritic rocks of the Mistawak Batholith and other smaller intrusions has resulted in their broad anticlinal nature.

In general, the base of the sequence consists of mafic to intermediate metavolcanics interlayered with and grading upwards into intermediate to felsic metavolcanics. Many of the volcanics are pyroclastic in nature and may show various degrees of reworking resulting in a variety of volcaniclastic sediments. Conformably overlying the metavolcanics on the south limb are the Scapa Metasediments which also contain iron-rich chemical metasediments and which are interpreted to also occur on the north limb.

Bedding of the supracrustals strike approximately east-west and isoclinal folding has resulted in subvertical dips. A major structural feature has recently been postulated, known as the Casa Berardi Break which transects the area from east to west and has been interpreted primarily on the basis of aeromagnetic surveys and the discovery of important gold mineralization to the east in the province of Quebec.

Table 3-1 is the stratigraphic column proposed by Johns.

Table 3-1 : BEDROCK STRATIGRAPHY
(G.W. Johns, 1982)

PRECAMBRIAN

- Late Precambrian (Proterozoic)

    - Massive intrusive rocks (quartz diabase)

---------- INTRUSIVE CONTACT ----------

- Early Precambrian (Archean)

    - Mafic to intermediate intrusive rocks (diorite)
    - Felsic to intermediate intrusive rocks (quartz monzonite, granodiorite, granite, porphyry gneiss)

---------- INTRUSIVE CONTACT ----------

- Metamorphosed mafic to ultramafic intrusive rocks (gabbro, amphibolite, porphyritic gabbro, ultramafic rocks)

---------- INTRUSIVE CONTACT ----------

Metasediments

- chemical (ironstone, chert)
- clastic (wacke, arenite, arkose, calcsilicate, grit, graphitic metasediments, tuffs, schists)

Metavolcanics

- felsic to intermediate metavolcanics
  (flow, tuff, lapilli tuff, pyroclastic breccia, tuff breccia, porphyritic flow)

- mafic to intermediate metavolcanics
  (flow, tuff, lapilli breccia, pyroclastic breccia, amphibolite, pillowed and porphyritic flows pillow breccia)

4. PREVIOUS EXPLORATION WORK

The first mention of exploration work in this part of Ontario is found in Thomson (1936). A small amount of trenching and stripping was performed for the Cyril Knight Prospecting Co. in 1931, 1932 and 1933. One assay result apparently gave 2.1 g/t Au, but the location given appears to be south of the project area on ground held by Newmont.

Within the project area, the first work reported was performed by Conwest Exploration Co. Ltd in 1958. Seven diamond drill holes were cored in the south-central part of the property (one of which failed to reach bedrock after three attempts) as a follow-up to a ground geophysics program.

The drill logs indicate that the predominant rock types encountered were garnetiferous amphibole gneisses along with some tuffs and argillite. The descriptions suggest similarity to outcrops GC-1, GC-2, GC-11 and AM-15 mapped by us this summer (see later). No assay results were reported from this drilling. Also, note that these drill sites could not be found on the ground during the summer program, while all of the more recent sites are easily visible.

Conwest proceeded with further drilling to the south of the present property boundary in 1959, but after this, the area apparently remained unexamined until 1976 when Noranda Exploration Ltd and Geophysical Engineering Ltd reported ground geophysical and diamond drilling results.

Noranda drilled one hole in the extreme western part of the property. This hole intersected andesitic tuffs followed by metasediments (argillite, greywacke, minor graphitic slate). The upper portion of this drill hole was examined at the Kirkland Lake core library and we will report some chemistry and thin section results in a later section. No assay results are given in the assessment files.

Geophysical Engineering drilled one hole in the western part of the property at ≈3 km east of the Noranda hole, and one hole on the extreme eastern part of the property. The western hole intersected predominantly metasediments (mostly quartzites and psammites). Four assay results are given, with one value of 0.342 g/t Au over 0.6 m in a thin sulfide rich section. The eastern hole also intersected metasediments, but with a 20 m section of volcanics with significant sulfide mineralization. Although the volcanics are logged as felsic (dacite), an SiO_2 analysis (57.62%) suggests they are andesites. There may be, therefore, some similarity to outcrop GC-7 (see later). Seven assay results were reported but none returned Au values.

More recently, in 1982, Dome Exploration (Canada) Ltd drilled two holes in the northern part of the property, one hole on either side of the Burntbush River. The eastern hole intersected sediments and volcanics in approximately equal proportions. Significantly, there is mention of fault gouge and slips on graphitic planes in this drill hole. Fifteen assay results are reported, one of which returned 0.343 g/t Au over 0.3 m in a zone of quartz-carbonate veining with disseminated pyrite. On the west side of the Burntbush River, predominantly metasediments were intersected. Again, there was some faulting and graphite observed. Eighteen assay results are reported, two of which yield 0.686 g/t Au: a 0.3 m section of garnetiferous metasediments with thin quartz veins and a 0.5 m section of late quartz porphyry.

Finally, from 1984, we have the airborne surveys of Ameritex (which covers the entire property) and Golden Shield Resources Ltd (which covers some of the western part of the property). The Ameritex survey comprised magnetometer and VLF readings at 100 m line spacing. The main results of these data indicate that the property can be subdivided into a southern high magnetic area and a northern low magnetic area. Also, the VLF data suggest thicker overburden cover on the east side. The Golden Shield survey comprised EM and magnetometer readings at 400 m line spacing. The main results of these data are the identification of probably east-west trending EM targets on the west side, both in the southern part of the property and close to the north boundary.

5. DESCRIPTION OF FIELD WORK

The objective of the summer field program was to traverse the property on foot at close enough spacing to be able to map most, if not all, of the outcrop exposures. Based on minimum spacing requirements to gain special provisions credits for a geological survey, a nominal spacing of 100 m was chosen. On the western side of the property, however, average spacing of traverses is closer to 80 m, due to the fact that thinner overburden cover was anticipated (see airborne VLF results from Ameritex, 1984).

Since the outcrop exposure was anticipated to be low (eg Johns, 1982), grubhoes were carried at all times by all workers. Workers were encouraged to dig frequently in search of hidden outcrop and significant float boulders. Additionally, notes were taken concerning vegetation and surficial cover in order to qualify for special provisions credits. Finally, claim posts were tied into the mapping, but not all claim posts were found in the field (see Map 2).

Traversing was performed mostly in groups of two (one geologist, and one junior geologist or geological technician), and mostly in a north-south direction. Occasional traversing was performed by a single person, or by more than two persons and a few lines were walked in an east-west direction (eg to flag the north boundary as a stopping line, and in the south central part, where dense forest made difficult the use of the south boundary as a stopping line). In most cases, two workers traversed separate lines at ≈50 to 100 m spacing and these lines are drawn separately on Map 3. Where the geologist and technician walked closer than 50 m apart, only a single line is drawn.

6. RESULTS OF FIELD WORK

6.1 Vegetation and Surficial Deposits

The main vegetation types are shown at 1:5000 scale on Maps 4 (west sheet) and 5 (east sheet). These maps were constructed using aerial photos and notes taken during traverses. The legend was worked out in the field base camp after we had traversed the property for about 3 weeks. In this manner, all of the geologists contributed in discussions directed at defining the best means of mapping the vegetation on the claim group.

The claim group is predominantly covered by black spruce forest and black spruce muskeg. Black spruce forest contains trees mostly >10 cm in diameter with lesser amounts of Canada balsam fir or tamarack. Black spruce muskeg contains a much lower density of trees whose diameter rarely exceeds 10 cm. Minor quantities of small tamarack are not uncommon here.

From these two most common subdivisions, additional mappable units are described based on an increase in the amount of standing water, or an improvement in the drainage.

Spruce tamarack muskeg contains significant tamarack, and less abundant and generally smaller black spruce. The ground is wetter. These areas may be locally quite open. Areas called swamps contain no trees, while areas of alder generally occur where there is running water.

Mixed forest is generally reasonably well drained. Here, black spruce is usually the main tree variety, but abundant Canada balsam fir, white birch and poplar also occur. In some cases the mixed forest is described as overmature, indicating the presence of much windfall and/or deadfall and a dense underbrush.

In some cases, the vegetation type may be rather transitional between the major subdivisions discussed above. For example, an area of spruce muskeg may contain significant tamarack, but the ground may be too dry to be grouped with other areas called spruce tamarack forest. In this case, the presence of tamarack is noted in brackets.

Finally, the presence of jack pine has been noted, but not described as a major subdivision because it is an uncommon tree type. Also, beaver dams and beaver huts have been shown, but all are apparently no longer active, since the ponds are more or less drained out.

The main surficial cover noted during traverses is black mud (organics, muskeg type soils) and brown or grey glaciolacustrine clays. Locally, small sand deposits (eskers, outwash, very small sand and boulder kames) were observed. These are also shown on the vegetation maps.

Coarse grained granitic boulders and cobbles are the most common types of float. These are numerous and can be found almost anywhere when the grubhoe is used diligently. A few boulders interpreted to be of local provenance were sampled and analyzed and are indicated on the vegetation map.

6.2 Bedrock Geology

As expected, very limited outcrop is exposed on the property. However, several new, previously undocumented outcrops were found and mapped. These are shown on Maps 6 (west sheet) and 7 (east sheet) at 1:5000 scale, along with the diamond drill hole locations discussed in Chapter 4. The outcrop areas will be described in detail based on field descriptions (see Appendices I and II), thin section descriptions (see Appendix III), and the results of chemical analyses (see Appendix IV).

The descriptions will start at the north side of the property, west of the Burntbush River and continue south. Outcrops east of the Burntbush River will be described approximately along a west to east line. Note that the outcrop outlines for those outcrops which were stripped and mapped during the fall program are drawn to show the approximate surface stripped during the fall program.

OUTCROP JL-1

This outcrop was found on the first day of traversing and is located at the northern boundary of the property at ≈2.3 km west of the Burntbush River. It is a small exposure with little surface relief.

It was mapped as a biotite ± amphibole schist (metasediment) intruded by minor thin felsic to intermediate dykes and lesser quartz veins with one small mafic dyke. Two samples were collected, one metasediment and one felsic to intermediate dyke.

In thin section, the metasedimentary rock is observed to be composed of mostly fine grained (0.1-0.2 mm) hornblende set within a groundmass of quartz and plagioclase of similar grain size. Minor sphene and opaques occur. The amphiboles are strongly lineated and also show a weak planar orientation. The planar orientation is a grain size variation and is also evident optically (using hornblende pleochroism).

Based on the thin section description, this rock may be in fact a mafic rock at amphibolite grade. The foliation may be a metamorphic banding or may be compositional, but the latter seems unlikely. This outcrop should be revisited and resampled, and should be analyzed for major elements.

The coarse grained dyke rock (JL-8-2) is composed primarily of plagioclase and quartz with minor biotite and opaques. Chlorite veinlets also occur and the plagioclase is weakly sericitized. It is interpreted as a late quartz diorite dyke.

Neither of these samples is anomalous in its trace element compositions.

In outcrop, the amphibole lineation was not recognized. The foliation was very apparent and trends 075/80N at the southeast end and 140/55NE at the west end. Numerous thin discontinuous quartz veins within the foliation are crenulated. Late fractures trending at 055 to 070 have locally folded the foliation.

OUTCROPS JB-7 and JB-8

These outcrops are very small and show no relief at the surface. They were found by diligence (with the grubhoe) and by luck. They are situated at ≈0.8 km and ≈0.2 km south of outcrop JL-1, respectively.

These exposures were mapped as biotite ± amphibole schist with quartz veins and other dyke rocks. The presence of these resistant veins are surely responsible for the preservation of these outcrops. Five samples were collected from these exposures, three of which were sent for thin section.

Two of the thin sections (JB-7-A, JB-8-B) are very similar and represent metasediments. They are rich in quartz with lesser feldspar and significant biotite which is fairly well oriented. Both samples contain minor garnet poikiloblasts and one contains cordierite. These rocks could easily represent greywackes metamorphosed to amphibolite grade.

The third section is composed mostly of hornblende set in a finer grained groundmass of predominantly feldspar and lesser biotite. There is no preferred orientation. The rock is interpreted to be a lamprophyre dike.

Five samples were sent for chemical analysis, one (JB-7-A) was analyzed for major elements. The trace element results are not anomalous (Au <2 ppb), but do support the interpretation that sample JB-8-A (interpreted as a lamprophyre from thin section) is different. Note the high Ni and Cr results.

The major element analysis on sample JB-7-A supports the suggestion that this may be a metamorphosed greywacke. When the results are plotted on the diagrams of de la Roche (1974), the data fall very close to the greywacke field, but between the greywacke and shale fields. Thus, there is some pelitic (argillaceous) component, which is, of course, supported by the presence of garnet and cordierite.

In outcrop, foliation measurements were difficult due to the low rounded nature of the exposure, i.e. once cleaned by the grubhoe, the outcrop surface was very dirty with mud and one could not see clearly the relations. Foliation measures at 105/55N, 100/60N, 080/75N and 100/? were taken. One fold axis was measured on a quartz boudin at 50° at 035. Quartz veins were measured at 080/S, 060/SE, 100/60N and 130/NE.

OUTCROP OF THOMSON (1936)

Thomson (1936) describes outcrop submerged at rapids in the Burntbush River. When we visited this location, the water level was high, and the water fast-flowing, so no sampling was attempted.

Given the description by Thomson (1936), and our observations of float along the shore of the Burntbush River, we interpret this outcrop to be similar to JB-7 and JB-8.

OUTCROPS JL-10 and AM-8

This outcrop is one of the larger exposures on the property. It is located at ≈0.7 km east-southeast of outcrop JL-1 and ≈1.4 km west of the Burntbush River. It is clearly visible from the air, and on the airphotos, but was tricky to find due to the local abundance of sand deposits, which from the air are difficult to distinguish from moss covered outcrop.

This outcrop was the first to be stripped during the fall program, and the stripping helped substantially in the interpretation of rock types. In the central and northern parts occurs a coarse to medium grained lineated amphibolite which represents either a massive (pillowed ?) flow or gabbro sill. To the north of this "gabbro" occurs a pillowed flow with well defined pillows and garnet bearing selvages. To the south of the "gabbro" a different pillow lava with less well defined selvages is present.

Shearing is common in the outcrop area, ranging from thin discrete zones (<1 m) to larger, less regular areas (maximum ≈12 m apparent thickness). These sheared rocks were misidentified as tuffs during the summer program.

Late quartz veins and porphyry dikes intrude all of the rock types. The stripping also revealed several generations of mafic dykes and allowed the determination of most of the cross-cutting relationships.

A total of eighteen samples were taken. One was analyzed for major elements; thirteen thin sections were taken.

Lineated amphibolite

Three samples were taken, two undeformed (JL-10-5, JL-10-12) and one sheared (JL-10-6). JL-10-5 was analyzed for major elements.

In thin section, the undeformed samples are very similar and show that amphibole (hornblende) and plagioclase (andesine) together comprise more than 90% of the rock. The deformed sample shows strong grain size reduction and the development of a weak planar fabric, but with the same mineralogy.

The trace element geochemistry of the three samples is similar and not anomalous. The major element geochemistry of JL-10-5 gives 51.40% SiO_2 which is close to an average basalt.

In outcrop, the amphibole lineation was measured once, plunging 55° towards the north. The shearing direction close to sample JL-10-6 is 130/60N. A fracture cleavage was measured in two places as 130/30S and 140/25S.

Pillow lava (north)

This outcrop was mapped as tuff. However, after stripping, it became clear that in fact, this was a pillow lava. One sample was taken (JL-10-8) and this sample represents a pillow. No pillow selvage is present in the hand specimen. As was already mentioned, the pillow selvages here are well defined (≈1 cm thickness) and are garnetiferous.

In thin section, this rock strongly resembles sample JL-10-6, i.e. it is an amphibolite (plagioclase + hornblende >90%) which is fine grained and strongly lineated, but also shows a weak planar fabric. The reduced grain size (relative to unsheared massive "gabbro") is likely primary, but the planar fabric would be caused by deformation.

The trace element geochemistry is not anomalous, and is, in fact, very similar to those samples taken from the massive "gabbro".

The strong amphibole lineation was not recognized in outcrop; a foliation was measured at 120/75NE.

Pillow lava (south)

During the summer mapping, most of this unit was mapped as tuff, with pillows locally recognized. During a return visit to this outcrop, pillows were recognized to be more abundant, but still, much of the outcrop area was mapped as tuff. During the fall program, these tuffs were re-interpreted to be sheared pillow lavas. Thus, the southernmost unit in the outcrop is composed completely of pillow lavas (pillows <1 m), with local very strong shearing (maximum ≈12 m apparent thickness).

Nine samples were taken; six were sent for thin section (JL-10-2, 3, 4, 13, AM-8-1, 3) and eight were sent for trace element analysis (JL-10-2, 3, 4, 11, JL-25-9, 10, AM-8-1, 3).

In thin section, hornblende and plagioclase are again the dominant minerals, generally comprising >90% of the rock. All are lineated; in some sections there is no apparent planar fabric, in others this may be weakly developed. One sample which displays such a fabric (JL-10-2) has been further deformed since this mineral alignment undulates. Grain size is somewhat variable from section to section and is not really dependant on the presence or absence of a planar fabric. Although I believe that shearing in this unit is locally very strong, the intensity of shearing in these slides is not particularly evident, i.e. the fine grained nature of sample AM-8-3 may be primary since there is no apparent planar fabric.

The trace element geochemistry in this unit yields no anomalous result. There is one small point worth noting. Sample JL-10-11, believed to have been taken in a thin shear zone, has very low Fe and Se, and high Ni compared to other samples from this unit. Mapping during the fall campaign interprets this "thin shear" as a mafic to intermediate sheared dyke.

In outcrop, the pillows are stretched, or stretched and flattened. Flattening is parallel to the foliation plane, stretching is parallel to the amphibole lineation. This deformation made it impossible to confidently determine the facing direction of the pillows. Foliation measures taken on the west side (JL-10) are 140/55N, 130/vert and 120/70N. On the east side (AM-8), we measured 120/70N and 090/50N. A fracture cleavage was measured in three places as striking southeast and dipping gently southwest.

Late_dykes_and_veins

Three felsic to intermediate dykes were sampled and sent for thin section and trace element analyses (JL-10-1, JL-10-10, AM-8-2). Two samples of quartz vein (JL-10-7, JL-10-9) were sent for trace element analyses.

All of the dyke rocks are porphyritic, with both quartz and feldspar phenocrysts. Two of the dikes are lineated, i.e. the phenocrysts have been stretched. This is well displayed by sample JL-10-10 which was thin sectioned twice: the two slides are oriented perpendicular to each other.

Trace element results for the three samples yield no anomalous values.

In outcrop, the dyke from which sample JL-10-1 was taken lies perfectly concordant within the foliation. The granite dyke just north of here appears concordant but locally crosscuts the foliation. Most other dykes are irregular. The maximum thickness of any one dyke is <1 m.

Two samples of quartz vein were taken. One sample gives elevated Fe, CaO and CO_2 values, but no associated Au anomaly. Note that, in outcrop, these veins weather in due to a thin zone of wall rock alteration. They are oriented approximately east-west and dip north.

OUTCROP JL-17

This outcrop area encompasses several relatively small exposures. Most of these fall on an east-west line at ≈1 km south of JL-10 and at ≈1.2 km west of the Burntbush River. Additional small exposures at ≈200 m southeast of here represent the same rock unit and are considered a part of the outcrop JL-17.

The rock type is a well lineated amphibolite. It is medium to coarse grained and is interpreted to be a metagabbro. Thin irregular veins, mostly porphyritic, crosscut the rock, but it appears very fresh and unaltered in most exposures. Ten samples in total were taken from this outcrop area.

In thin section, the lineated amphibolite is composed predominantly of hornblende and plagioclase (>90% of the rock). One section (JL-17-1B) contains ≈85% hornblende. The plagioclase composition is about An_{40} (andesine; Michel-Levy method). A few sections show parallel alignment of hornblende grains. One sample taken adjacent to a feldspar porphyry dike carries ≈25% epidote (JL-26-1).

The trace element analyses give no anomalous results with the following minor exceptions: samples JL-17-1 and JL-17-2 give elevated Cr and Ni values, while samples JL-17-2 and JL-25-7 give elevated Mo values.

The amphibole lineation was measured in five places in the exposures as 55° at 050, 55° at 010, 55° at 010, 40° at 020, 40° at 010.

Two of the samples taken represent late felsic to intermediate porphyritic dykes, and a third porphyritic dyke rock is now interpreted as a xenolith in the metagabbro. In thin section, the contact zone in the latter sample is, in fact, gradational.

Trace element analyses of the dyke rocks give no anomalous results.

OUTCROPS JL-13, 14, 24

This outcrop area represents the largest area of significant exposure on the property. Although the outcrop area is extensive, there is very little surface relief, so in fact we exposed only a small portion of the area during the summer season. Later, during the fall program, we exposed a very large surface area of bedrock.

The outcrop is located at ≈0.2 km southeast of the southeast part of JL-17 and at ≈1.0 km west of the Burntbush River.

The main rock type exposed is a well foliated fine grained grey rock with a green weathered surface. It was originally interpreted to be a chloritic mafic tuff or sheared basalt. The fall mapping however, revealed less deformed areas where the rock appeared to be a chloritized lineated amphibolite. The well foliated rock is now interpreted to be a sheared amphibolite (metagabbro) i.e. the strongly deformed equivalent of outcrop JL-17.

There is much free quartz in the outcrop, mostly discontinuous and folded boudins. Only very minor sulfide was found with the quartz - in general it is clear, white quartz, albeit strongly deformed. Feldspar porphyry dikes were not observed until after the mechanical stripping, and their abundance is much decreased relative to the outcrops previously described.

A total of seventeen samples were taken, eleven thin sections were studied.

The interpretation that this outcrop represents a sheared lineated amphibolite (metagabbro) is supported by the thin sections. Amphibole and plagioclase again comprise generally >90% of the rock. The amphibole is described as actinolite, but optically distinguishing hornblende and actinolite is difficult. On the other hand, the greenish colour of the rock may be due to actinolite, since the thin sections show that chlorite is only a minor constituent.

These sections are sheared to varying degrees based on the grain size and planar fabrics observed. However, at this time no undeformed representative is available for grain size comparisons. Note that sample JL-14-6 which may represent a felsic dyke, is also sheared.

One thin section (JL-14-7) has granoblastic texture and high quartz content. This is probably due to metasomatism close to the quartz vein contact.

Finally, in sample JL-25-4, a quartz-carbonate stockwork veining/fracturation in the rock has produced a strong alteration of amphibole to sphene. This veining is very closely spaced and generally at a high angle to the planar (shear) fabric.

Trace element geochemistry results from this outcrop show some anomalous Au values, as well as a few other interesting features. Table 6-1 shows some of these results.

Table 6-1 : Selected Geochemistry Results from Outcrops JL-13, 14, 24.

Sample #	Au ppb	Cr	Co	Ni	La	Fe	Comment
JL-13-1	20	300	41	50	2	8.6	clearly sheared
JL-14-1	<2	290	40	110	3	9.0	
JL-14-2	4	260	37	47	3	7.4	slip planes
JL-14-3	5	180	33	65	2	8.8	adj. to quartz vein
JL-14-4	<3	230	36	45	5	12.0	
JL-14-5	<3	170	35	40	3	8.6	W
JL-14-7	<2	160	16	54	16	4.1	adj. to quartz vein, CaO
JL-24-1	2	370	40	74	3	8.1	
JL-25-1	<2	310	38	110	2	8.4	
JL-25-2	5	180	40	40	2	8.7	py
JL-25-3	<2	320	27	48	2	7.3	
JL-25-4	<2	180	34	37	3	7.7	stockwork, CO_2
JL-25-6	110	330	58	45	3	9.1	rusty, py, Se
JL-14-6	<2	22	5	<20	25	3.0	altered dyke ?
JL-24-2	<2	23	<5	<20	<2	0.3	quartz vein
JL-25-5	<2	23	19	<20	10	6.2	dyke ?

Sample JL-13-1 gives 20 ppb Au; sample JL-25-6 gives 110 ppb Au. These results have yet to be confirmed (by reanalysis) but give us our first Au anomalies. Sample JL-13-1 was a composite grab sample of representative rock from the east side of the outcrop area; sample JL-25-6 was taken from a fairly restricted zone of rusty weathering (pyrite) and moderate silicification. Note that the 110 ppb value is accompanied by a value of 6 ppm for Se; all other Se results are <5 ppm i.e. below the detection limit for the analytical method used. Additional samples in the vicinity of these anomalies were taken later in the year (fall program).

Also note that Cr, Co, Ni, La and Fe are able to distinguish sheared amphibolite from other rock types. For example, JL-25-5 was thought to be a sample from rusty weathered host rock, but the fall mapping suggests that this is a late dyke (better exposure).

In outcrop, the foliation (shear fabric) changes somewhat due to minor folding. Measures taken were 100/70N, 120/60NE, 135/70NE (JL-13); 100/40N, 120/40N, 090/65N, 070/65N, 070/60N, 060/70N, 070/80N (JL-14); 090/70N, 050/75NW, 050/65NW, 050/vert, 050/70NW, 095/65N, 085/50N (JL-24). A few minor fold axes were measured: 55° at 070 (JL-13), 15° at 065, 15° at 265, 60° at 275, 45° at 085, 55° at 275, 50° at 045 (JL-24). A fracture cleavage similar to that observed at JL-10/AM-8 was also measured: 135/35SW, (JL-13); 130/45SW, 120/45SW, 140/20SW, 150/15SW, 130/25SW, 140/35SW (JL-24). Finally, a thrust plane (low angle reverse fault) with orientation 120/30°NE was observed.

OUTCROP AM-15

This outcrop is located at ≈3.2 km southeast of outcrops JL-13, 14, 24 and only about 0.4 km west of the Burntbush River. It is of intermediate size relative to the large and small outcrops described up to now.

Two rock types were mapped at this exposure: a metagabbro and a thinly bedded tuff of probably intermediate composition containing locally metric size clasts and/or magnetite and/or garnet. Four samples were collected, two from each unit.

In thin section, the texture of the metagabbro is somewhat surprising in that the amphiboles are clearly coarser grained than the plagioclase groundmass (porphyritic or porphyroblastic texture ?).

The tuff is very fine grained, with the exception of large garnet porphyroblasts. The bedding (?) and/or foliation plane is defined by grain size variations and oriented micas. It is not clear whether the grain size variations are primary (metamorphic ?) or due to shearing but strong evidence for shearing is not present.

Trace element geochemistry on the samples gives one very weakly anomalous result of 6 ppb Au on altered gabbro. (Note the corresponding high CO_2). Major element geochemistry results suggest the gabbro is a gabbro (SiO_2: 50.80%) and that the tuff is intermediate or felsic (SiO_2: 66.40%, one analysis).

In outcrop, the metagabbro was observed to be weakly lineated; no measure was taken. The foliation/bedding of the tuffs was measured at 080/40N at the southeast side, but further west the beds were close to horizontal with numerous cm scale minor folds plunging at ≈25° at 075.

OUTCROPS GC-11, 12, 13

These very small exposures are located along a north-south line over a distance of about 100 m at ≈0.8 km east of outcrop AM-15 and on the east side of the Burntbush River. They are only ≈0.6 km north of the southern property boundary.

The field mapping suggested that these outcrops were composed of mafic flows mixed with intermediate lapilli and crystal tuffs. In total, seven samples were taken, two of which were analyzed for major elements.

The northernmost exposure is GC-12, from which three samples were taken. One was called an intermediate lapilli tuff, a second was called a mafic metavolcanic. The third sample was analyzed only for trace elements and consists of quartz-tourmaline vein material.

In thin section, both samples are fine grained and plagioclase rich. It is difficult to say whether the fine grained nature is due to recrystallization or shearing. The mafic sample displays an interesting texture whereby biotite has recrystallized in the hinge zones of minor folds. These biotites are oriented parallel to the axial planes of the folds.

Results from trace element data support to some degree the field interpretation that sample GC-038 is more mafic than sample GC-034 (higher Cr, Co, Ni). The mafic sample yields 5 ppb Au. The analysis of the quartz-tourmaline vein material gives very low results for all elements tested.

In outcrop, the foliation trend is dominantly 080/subvertical, but significant variations due to minor folding occur. A fold axis measure of 45° at 050 was taken.

Just south of here, outcrop GC-13 was mapped as probable pillow lavas. In thin section, we observe again a very fine grained plagioclase rich rock. The fine grained nature may be due to recrystallization or shearing.

The trace element data from the sample taken here are not anomalous; the Cr, Co and Ni results might suggest that this rock is less mafic than sample GC-038 (from outcrop GC-12). SiO_2 content is 57.90% which would indicate an intermediate composition.

In outcrop, a weak foliation was measured at 130/15NE and a minor fold axis was measured at ≈10° at 070.

Further south, outcrop GC-11 was mapped as intermediate crystal tuff, possibly reworked to some degree. One sample (GC-059) was identified as a mafic metavolcanic, but the presence of magnetite bands and garnet porphyroblasts in the sample, together with the presence of crystal tuffs, suggests perhaps some analogy to outcrop AM-15.

In thin section, the tuff samples are very similar, quartz and plagioclase are predominant (total ≈75%) with fairly high biotite content (≈15%). They are fine grained, and again it is difficult to determine whether this is due to shearing or recrystallization. The garnet bearing sample is mineralogically and texturally similar to the tuffs; the garnets, however, have been somewhat stretched and broken parallel to the foliation. This would support a shearing origin for the fine grained nature of all of the previously described samples from this area.

The trace element data yield no anomalous result. The Cr, Co, Ni values are low, which suggests no mafic metavolcanic rock occurs. SiO_2 content of a tuff sample is 61.50% which indicates intermediate composition.

In outcrop, the foliation was measured at 080/35N. One fold axis was measured at ≈10° at 065.

In summary, these outcrops would appear to be composed mostly of intermediate tuffs which may contain clasts and/or garnets and/or magnetite. Both lithological observations and structural measures suggest comparing these exposures to outcrop AM-15. There is, however, one sample which may be more mafic than all of the rest. Also, there is more of a possibility that the rocks have been mildly sheared.

OUTCROPS GC-8, 9, 10

These outcrops form a north-south line of about 70 m length and are directly south of outcrop GC-11. These exposures were originally grouped together with outcrops GC-11, 12, 13 but are described as mafic metavolcanics (pillow lavas ?) and are therefore treated separately in this report. One sample was taken from each outcrop.

In thin section, all of the samples are similar in their mineralogy (assuming altered plagioclase in GC-022), but are texturally dissimilar. One sample displays a probable primary porphyritic texture, another suggests that phenocrysts have recrystallized into finer grained masses. No evidence for shearing was observed.

The textural dissimilarities are somewhat surprising since in hand specimen, all three samples appear to resemble each other. The foliation is also more pronounced in hand specimen, and has been folded at mm to cm scale.

An anomalous result of 15 ppb Au occurs at outcrop GC-9. This sample (GC-022) is the most strongly altered of the three. Relatively high Cr and Ni values for all three samples might be suggestive of a mafic rock.

In outcrop, foliations were measured at (from north to south) 080/55N, 080/?. Minor fold axes were measured at 60° at 050, 65° at 055 and 25° at 040.

OUTCROP JB-15

This small outcrop was found on the last day of traversing and is located at ≈300 m south of outcrop GC-8, only ≈50 m north of the southern property boundary.

The outcrop was mapped as a mafic to intermediate volcanic rock. Most samples (three of four) are well foliated suggesting a tuff or sheared flow. Comparison of hand specimens JB-15-A, B and C suggests an increase in shearing intensity with A being the least sheared and C being the most sheared.

In thin section, plagioclase is the dominant mineral observed. JB-15-A displays a good porphyritic texture, but the plagioclases are too altered to estimate their composition. JB-15-B is very similar but there is further alteration/destruction of plagioclase phenocrysts. In JB-15-C there are no relict phenocrysts - shearing is moderately strong. The rock is probably of intermediate composition since there is little or no quartz, but the only ferromagnesian minerals are biotite/chlorite.

Trace element geochemistry yields no anomalous Au values. Cr and Ni are low in JB-15-D but this sample was diluted with quartz vein material. SiO_2 content from the major element analysis on JB-15-A is 54.70% which indicates an intermediate composition.

In outcrop, the foliation was measured at 090/subvertical and 100/subvertical.

OUTCROP GC-15

This small outcrop area is located at ≈0.5 km east-northeast of outcrop JB-15 and at ≈200 m north of the southern property boundary.

The outcrop was mapped as an intermediate to mafic metavolcanic, probably of pyroclastic origin. Two samples of host rock were taken (a third sample of vein material was also taken), and these samples are striking in their similarity to samples from outcrop JB-15. There appears to be an increase in shear intensity from sample GC-054 (similar to JB-15-A) towards sample GC-056 (similar to JB-15-C). Sample GC-056 is, however, either porphyritic, porphyroblastic, or blastomylonitic.

In thin section, the comparison with JB-15 is confirmed. Mineralogy and textures are very similar. The two outcrops represent the same lithological unit, and both show a range of shearing intensity from very weak to moderately strong.

Trace elements results give a 5 ppb Au value for GC-054. Cr and Ni contents are similar to results from outcrop JB-15.

In outcrop, the dominant foliation was measured at 110/subvertical.

OUTCROP GC-7

This intermediate sized outcrop is located at ≈150 m south of outcrop GC-15. At the south end it just touches the property boundary. A vertical face at the west end rises some 10 m above the forest floor. This outcrop was the fourth area (after AM-15) to be stripped and remapped during the fall program.

The outcrop is composed of a single unit of vesicular pillow lavas (pillows about metric scale). One thin dyke (or thin massive flow ?) is present at the north end. The pillows are locally porphyritic (feldspar), generally contain tiny euhedral magnetite crystals and appear to be more or less undeformed. The vesicles are mostly quartz filled but may be weathered in suggesting the presence of carbonate.

In thin section, plagioclase is the dominant mineral and forms both phenocrysts and most of the groundmass. There is little or no quartz and the only ferromagnesian minerals are biotite/chlorite. One sample (GC-018) appears to be weakly to moderately sheared based on grain size reduction and the development of a planar fabric relative to the other two samples taken.

Trace element data are not anomalous. The Cr and Ni values may indicate that these are pillowed andesites.

In outcrop, a foliation/bedding measurement was taken at 090/85S.

OUTCROPS GC-6 and GC-14

These two very small exposures were found on the southern property boundary at ≈150 m east of GC-7.

Outcrop GC-14 was mapped as a mafic flow, while GC-6 was mapped as an intermediate to mafic metavolcanic possibly of pyroclastic origin. Two samples were taken from each outcrop; in both cases one of the samples comprises vein material which was not sent for thin section.

In thin section, the sample from outcrop GC-14 consists of predominantly plagioclase with significant biotite/chlorite (≈20%) as the only ferromagnesian. At outcrop GC-6 the ferromagnesian minerals represent less than 5% of the sample studied. In all other respects, the samples are similar. Shearing would be somewhat more intense at outcrop GC-6.

Trace element results are low, even for Cr, Co and Ni, indicating perhaps that the original rock was less mafic than supposed.

In outcrop, the foliation measured at both outcrops was 080/subvertical.

OUTCROPS GC-3, 4

These two exposures are again very small. They are located at ≈0.4 km east of outcrop GC-14 at ≈50 m north of the southern property boundary.

Both were mapped as intermediate ashfall crystal tuffs.

In thin section, samples from the two exposures are very similar. Both are very fine grained but it is difficult to decide whether this is primary or due to shearing (eg a well developed planar fabric is not present in thin section). Also, both samples contain late epidote and/or calcite which is coarser grained and which masks to some degree any relict textures which may have remained.

Trace element results give low values.

In outcrop, foliation measures of 080/subvertical were taken.

OUTCROPS GC-1, 2 and 5

These outcrops occur just north of outcrops GC-3 and 4. Outcrop GC-5 is very small, but outcrops GC-1 and 2 are of substantial size. These two outcrops were the last to be stripped during the fall program. They were not mapped in detail due to inclement weather but will be revisited next summer for this purpose.

The summer mapping here indicated three major rock types are present: at outcrop GC-1 the major rock type is an intermediate ashfall crystal tuff; at GC-2 there is a more chloritic tuff along with the intermediate tuff; and finally, a diabase dyke is exposed on the east side of both GC-1 and GC-2 and is the only rock type at GC-5. The diabase dyke was neither analyzed nor thin sectioned.

Note that the intermediate tuff at GC-1 is locally garnetiferous and may correlate with outcrop AM-15.

In thin section, the intermediate ashfall crystal tuffs appear to be somewhat heterogeneous. Three samples were studied; plagioclase may be predominant over quartz or they may be approximately equal, garnets were observed in one sample. Although all samples are fine grained, one sample shows a very well developed mylonitic texture.

The more chloritic "tuff" is also clearly mylonitic in thin section. This sample is surprising in that quartz is very abundant, but this quartz may have been introduced late along the shear zone.

Trace element results give two weakly anomalous Au values of 11 and 7 ppb from outcrop GC-1. All other results are low.

In outcrop, foliation measures of 080/subvertical were measured in several places. A minor fold axis was measured at 40° at 080 (outcrop GC-2). The diabase dyke trends approximately north-south but only one contact was observed so there is no thickness estimate.

NORANDA DRILL HOLE H76-1

This drill hole was drilled in 1976 and is located at ≈1.2 km northeast of the far southwest corner of the property (see chapter 4). The total depth of the hole was 102.4 m and the first 53.3 m (excluding 3.7 m of overburden) are stored at the Kirkland Lake core library. Two samples of split core (size AW) were taken (top of samples at 10.7 and 33.5 m, length of samples 1.5 m). Note that no outcrop was found within ≈2.5 km of this drill hole.

The drill log for this interval describes this rock as an andesite tuff and my observations would corroborate this. It is a fine grained grey but somewhat chloritic rock with abundant cm size clasts. The two samples were taken where pyrite content was somewhat higher than average but still <1% pyrite.

In thin section, the rock is composed mostly of hornblende and plagioclase. Texturally, it appears sheared based on grain size variations and the lenticular "planar" fabric.

Trace element analyses give results of 6 and 3 ppb Au. SiO_2 content and Cr, Co, Ni results suggest intermediate composition.

FLOAT OCCURRENCES

Five samples of float were analyzed and sent for thin section, based on the interpretation that they had not been too far removed from the bedrock source.

AM-13-1 and Am-14-1

These samples were taken from the west shore of the Burntbush River, in the central part of the property. Both boulders were large, and angular. They were mapped as biotite schist (metasediment).

Thin section studies confirm the field identifications, which supports to some extent the mapping of Thomson (1936) to the north.

Trace element geochemistry yields no anomaly.

JL-18-1

This single large boulder (≈1 m x 1 m x >0.5 m) was uncovered at ≈0.8 km southeast of the northwest corner of the property and at ≈1.6 km north of the Noranda drill hole H76-1. It is described as subangular to subrounded and is interpreted to be fairly locally derived due to its size, angularity and preservation (since this rock type should be easily mechanically weathered).

It was mapped in the field as a sulfide-rich graphitic metasediment. In thin section, the rock appears to be metasedimentary, but no graphite is recognized.

Trace element geochemistry is not anomalous except for high As content.

JL-20-1 and JL-20-2

This occurrence was originally mapped as float. When revisited, it was suggested that it could be frost heaved outcrop based on the observation that dyke material and metasediments were both present (analogy to JB-7, JB-8). However, the sample of supposed metasediment turned out to be intrusive, therefore it is again interpreted to be a locally derived boulder. This area will be revisited and further excavated.

In thin section the dike rocks are coarse grained and weakly porphyritic, the plagioclase being slightly more coarse than the amphibole.

The trace element geochemistry is not anomalous.

7. DISCUSSION

Using the aeromagnetic results from Ameritex (1984), the property is easily subdivided into a northern low magnetic terrane and a southern high magnetic terrane. The approximate boundary is drawn on the 1:5000 geological maps (Maps 6 and 7).

North of this boundary, three principal rock types have been found in outcrop:

i) quartz-feldspar-biotite-garnet schist which is a metasedimentary rock;
ii) plagioclase-hornblende pillow lavas;
iii) plagioclase-hornblende metagabbros.

The discovery of pillow lavas and the presence of tuffs or flow rocks in drill hole H76-1 suggest that the simple interpretation given by Johns (1982), who suggests that the north part of the property is underlain by a broad metasedimentary belt, must be modified.

In the southern part of the property, flow rocks and tuffs appear to be of mostly intermediate composition. As well, a small (?) gabbro intrusive body was mapped. Overall, the outcrop mapping suggests fairly strong heterogeneity over the southern part, the common denominator being the almost ubiquitous presence of magnetite. Just the same, a few of the outcrops appear to have preserved the same stratigraphic horizon eg outcrops AM-15, GC-11, GC-1 or outcrops JB-15, GC-15.

Using all of the presently available information, it would be difficult to present a meaningful geological interpretation map. Not enough is known concerning the regional structure to be able to extrapolate rock units, given the sparse number of data points. We hope to improve the present situation over the next few field programs using techniques such as outcrop stripping (some of which has already been performed), overburden drilling (which should sample the first 1 or 2 m of bedrock as well as sample the tills) and finally, diamond drilling.

The metamorphic grade of the outcrops found on the property appears to be close to the boundary between greenschist and amphibolite facies. To the north, the presence of well crystallized garnets and hornblende, along with one positive identification of cordierite clearly suggests amphibolite facies metamorphism. Elsewhere, epidote, actinolite and chlorite have been observed. Thus, it is possible that one or more metamorphic isograds could be mapped within the property boundary. Once again, however, the paucity of data points suggests that it would be wise to postpone detailed studies and interpretations until more bedrock samples (from drill holes) become available.

From the point of view of gold exploration, the most encouraging results received to date include the presence of a few localized lithogeochemical anomalies (eg 110 ppb at outcrop JL-24 and 686 ppb in drill hole 165E2), and perhaps more significantly, the recognition of shearing in several of the outcrops mapped.

8. REFERENCES

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COGEMA CANADA LIMITED
BURNTBUSH RIVER PROJECT
FINAL REPORT OF ACTIVITIES 1986

VOLUME 2 of 2
APPENDICES
Part I: Geological Mapping and Lithogeochemistry Results, Summer Field Program

Ref. No. 86-CND-47-02
(Document #0032U)

By: J. Learn
December 1986

TABLE OF CONTENTS

VOLUME 2

APPENDIX I

Sample Statistics

Samples are listed in the following table in the order in which they are discussed in the text. Samples are described in this same order in all other appendices as well.

SAMPLE STATISTICS

Outcrop #	Sample #	Chemistry Opt. A	Chemistry Opt. B	Thin section
JL-1	JL-1-1	X		X
	JL-8-2	X		X
JB-8	JB-7-A		X	X
	JB-7-B	X		
	JB-7-D/E	X		
JB-8	JB-8-A	X		X
	JB-8-B	X		X
JL-10	JL-10-1	X		X
and AM-8	JL-10-2	X		X
	JL-10-3	X		X
	JL-10-4	X		X
	JL-10-5		X	X
	JL-10-6	X		X
	JL-10-7	X		
	JL-10-8	X		X
	JL-10-9	X		
	JL-10-10	X		X (2)
	JL-10-11	X		
	JL-10-12	X		X
	JL-10-13			X
	AM-8-1	X		X
	AM-8-2	X		X
	AM-8-3	X		X
	JL-25-9	X		
	JL-25-10	X		

Opt. A = trace elements + CaO, K_2O, CO_2
Opt. B = trace elements plus major elements

SAMPLE STATISTICS
(cont'd)

Outcrop #	Sample #	Chemistry Opt. A	Chemistry Opt. B	Thin section
JL-17	JL-17-1A	X		X
	JL-17-1B	X		X
	JL-17-2	X		
	JL-17-3	X		X
	JL-17-4	X		X
	JL-17-5	X		X
	JL-25-7	X		X
	JL-25-8		X	X
	JL-26-1	X		X
	JL-26-2			X
JL-13,	JL-13--1	X		X
JL-14	JL-14-1	X		X
and JL-24	JL-14-2	X		X
	JL-14-3	X		
	JL-14-4	X		X
	JL-14-4A			X
	JL-14-5	X		X (2)
	JL-14-6	X		X
	JL-14-7	X		X
	JL-24-1	X		X
	JL-24-2	X		
	JL-25-1	X		
	JL-25-2	X		
	JL-25-3	X		
	JL-25-4	X		X
	JL-25-5	X		
	JL-25-6	X		
AM-15	AM-15-1		X	X
	AM-15-2		X	X
	AM-15-3	X		
	AM-15-4	X		

SAMPLE STATISTICS
(cont'd)

Outcrop #	Sample #	Chemistry Opt. A	Chemistry Opt. B	Thin section
GC-12	GC-034	X		X
	GC-038	X		X
	GC-058	X		
GC-13	GC-037		X	X
GC-11	GC-036		X	X
	GC-059	X		X
	GC-060			X
GC-10	GC-035	X		X
GC-9	GC-022	X		X
GC-8	GC-021	X		X
JB-15	JB-15-A		X	X
	JB-15-B	X		X
	JB-15-C	X		X
	JB-15-D	X		
GC-15	GC-054	X		X
	GC-055	X		
	GC-056	X		X
GC-7	GC-018	X		X
	GC-019	X		X
	GC-020	X		X
GC-6	GC-016	X		X
	GC-017	X		
GC-14	GC-052	X		X (2)
	GC-053	X		
GC-3	GC-009	X		X
	GC-010			
GC-4	GC-012	X		X
GC-5	GC-057			
GC-2	GC-006	X		X
	GC-007	X		
	GC-008	X		

SAMPLE STATISTICS
(cont'd)

Outcrop #	Sample #	Chemistry Opt. A	Chemistry Opt. B	Thin section
GC-1	GC-001			
	GC-002	X		X
	GC-003	X		
	GC-004	X		X
	GC-005	X		X
	GC-011	X		
H76-1	H76-1/10.7		X	X (2)
	H76-1/33.5		X	X (2)

ANALYSES OF FLOAT OCCURRENCES

JL-18-1	X		X
JL-20-1	X		X
JL-20-2	X		X
AM-13-1	X		X
AM-14-1	X		X

TOTALS

outcrops	78	8	67
drill hole		2	4
float	5		5
TOTAL	83	10	76

APPENDIX II

Outcrop Descriptions

Outcrop descriptions and sketches are given in this appendix. The purpose of the standard sheet is to promote systematic description by the different field geologists. These are field documents and have not been excessively tampered with in the office, therefore any reinterpretation based on thin section studies will probably not appear on these sheets.

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-1
Photo No.:

Approximate dimensions and shape (sketch diagram over): ≃20 m long x ≃1-2m wide sloping face, steeper face at southeast end

% Exposure: 100% all of it was stripped →minimum ≃10 cm of moss one could easily have walked over this one

Rock Type(s & %): biotite schist, felsic dykes, quartz vein, very thin mm veins 97% 2% <1% <1% mafic dyke <1%

Contact Zones and Relationships: both concordant and discordant dykes largest felsic dyke contains xenolith of schist

Structures: So, S1, S2, S3 may have So not parallel to S1 in one place, S1 well developed, thin veins commonly crenulated (concordant veins only)

Cleavages

Folds minor folding due to late fractures, also S1 changes from 140/55NE at N end to 075/80N at S end

Fracturation, Faulting, Veining-Density: numerous thin mm filled fractures, some cause folding of schist, quartz vein ≃5 cm thick in felsic dyke immediately reduced to ≃1 cm when it enters schist

Jointing:

Alterations:

Weathering: felsic dyke weathers whitish <1 cm rind schist medium to dark gray

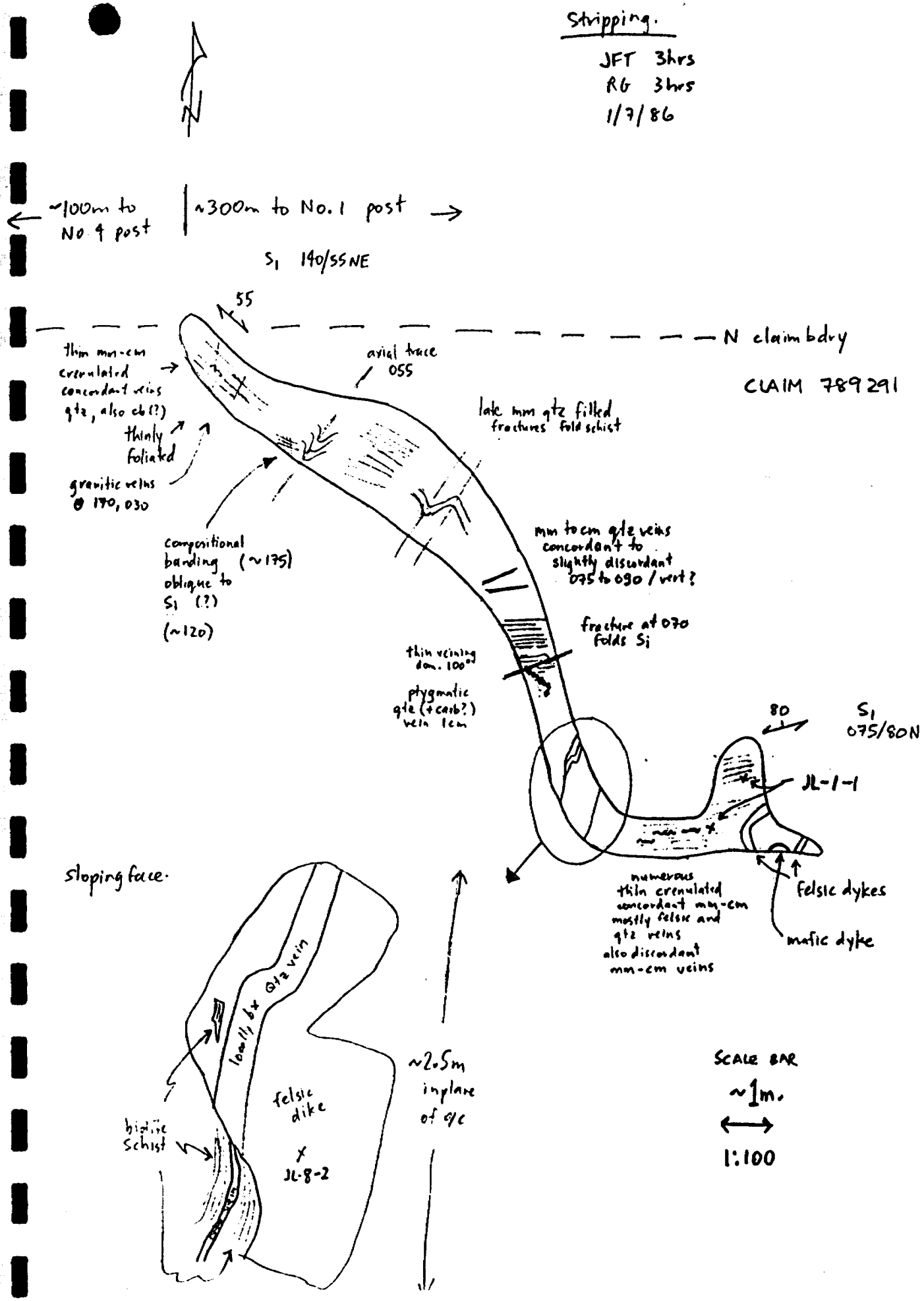
Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-1-1, JL-8-2 schist felsic dyke

(Doc. #0030U - 13.11.86)

Stripping.

JFT 3hrs
RG 3hrs
1/7/86



CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JB-7

Photo No.:

Approximate dimensions and shape (sketch diagram over): 6 small pits (max. 2m x 1m) over ≈50m x ≈20m area

% Exposure: These outcrops found, by digging with grubhoe and by luck, no real evidence of outcrop here - ≈1% exposed after stripping

Rock Type(s & %): biotite amphibole schist ≈70%
quartz veins ≈30%

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 not clear on outcrop - strong weathering low, rounded exposures

Cleavages

Folds

Fracturation, Faulting, Veining-Density: quartz veining is the reason this outcrop occurs

Jointing:

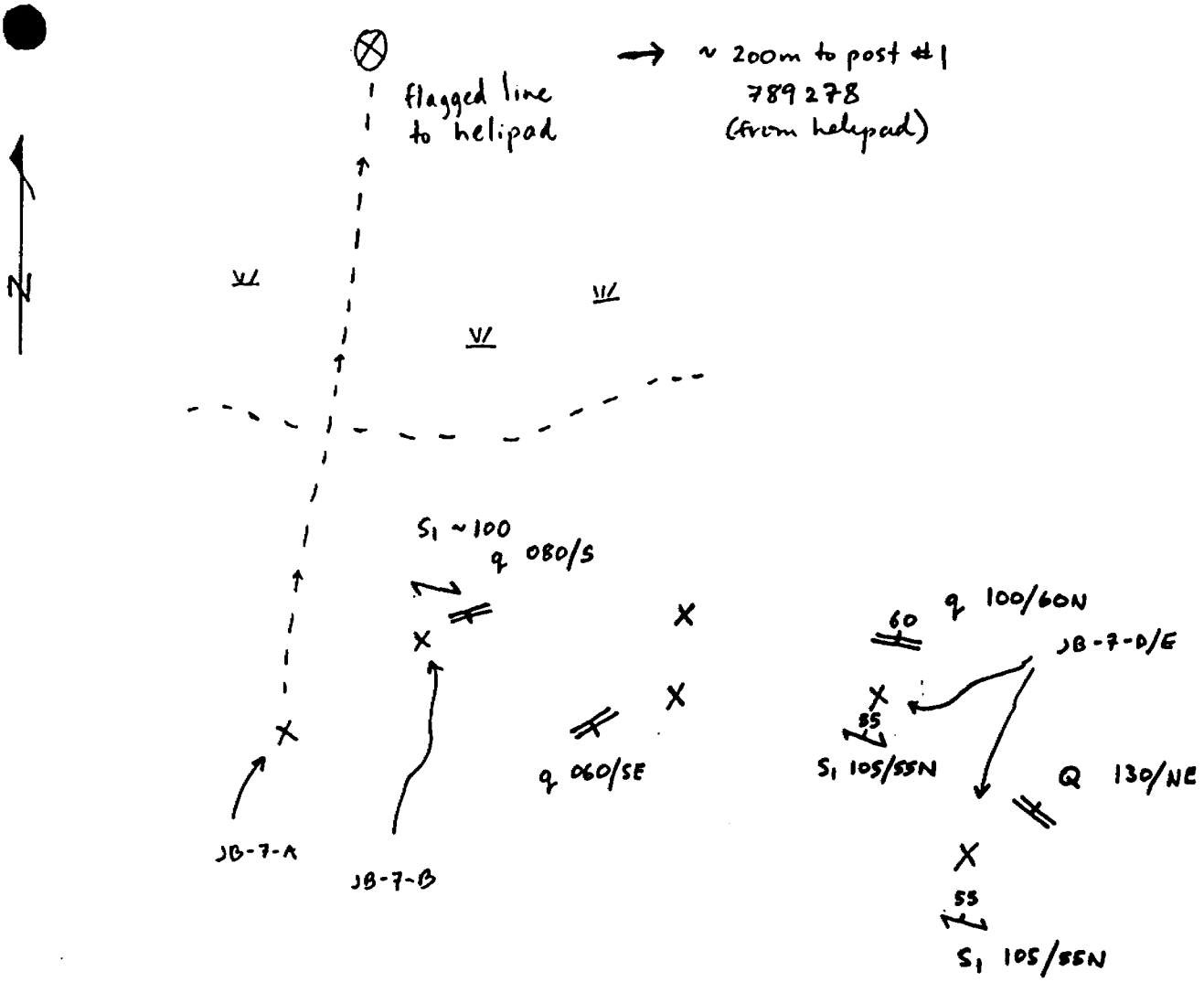
Alterations:

Weathering: strongly weathered causing light coloured rind in hand specimens

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JB-7A, JB-7B, JB/7D/E

(Doc. #0013U - 18.09.86)



~10m

1:500

COMMENT:

The biotite-amphibole schist is strongly weathered and not resistant. These rocks outcrop due to qtz veins within them

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JB-8

Photo No.:

Approximate dimensions and shape (sketch diagram over): 2 small pits (max. 2m x 1m) about 20m apart

% Exposure: these outcrops found, by digging with grubhoe and by luck, no real evidence of outcrop here

Rock Type(s & %): A: 60% biotite amphibole schist (metasediment)
40% dike rock (diabase at 090°??)
minor folded quartz boudin
B: biotite-muscovite schist (metasediment)

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 not clear on outcrop - low, rounded exposures

Cleavages

Folds quartz boudins (cm scale) folded

Fracturation, Faulting, Veining-Density:

Jointing:

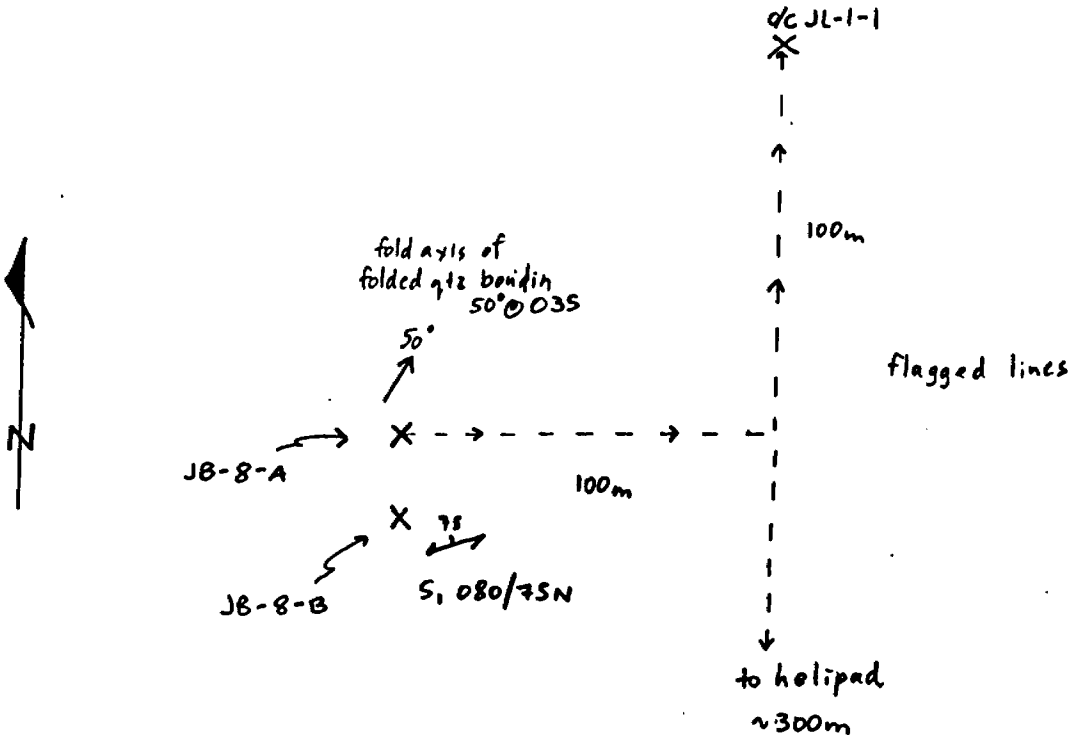
Alterations:

Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JB-8A, JB-8B

(Doc. #0013U - 18.09.86)



~25m

1:2000

CLAIM NO. 789291
(tied to o/c JL-1)

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-10
Photo No.:

Approximate dimensions and shape (sketch diagram over): ≃100 m x 100 m (see also AM-8)

% Exposure: ≃20% after stripping

Rock Type(s & %): mafic pillow lava ≃60%
mafic to intermediate tuffs ≃ 15%
lineated amphibolite ≃20%
sheared felsic crystal tuff ≃2% (remapped as granite dyke)
porphyry dykes, quartz veins ≃2%

Contact Zones and Relationships: porphyry dyke at south concordant, no wall rock alteration; sheared crystal tuff contact with pillow lavas sharp; contact of lineated amphibolite with pillow lavas to south, tuffs to north not observed

Structures: So, S1, S2, S3 So//S1 (crystal tuff-pillow lava contact), S1 well developed in tuffs and pillow lava, S1≃120/55 to 75°NE

Cleavages good development of south dipping subhorizontal fracture cleavage

Folds minor crenulations locally present, also quartz rods in tuffs

Fracturation, Faulting, Veining-Density: everywhere weakly fractured, with thin quartz veins and minor felsic dykes mostly //S1, local strong mm veining and quartz rods, boudins etc. in tuffs, prominent 25 cm feldspar porphyry dyke at south end, thin shear in pillow lavas north of sheared crystal tuff

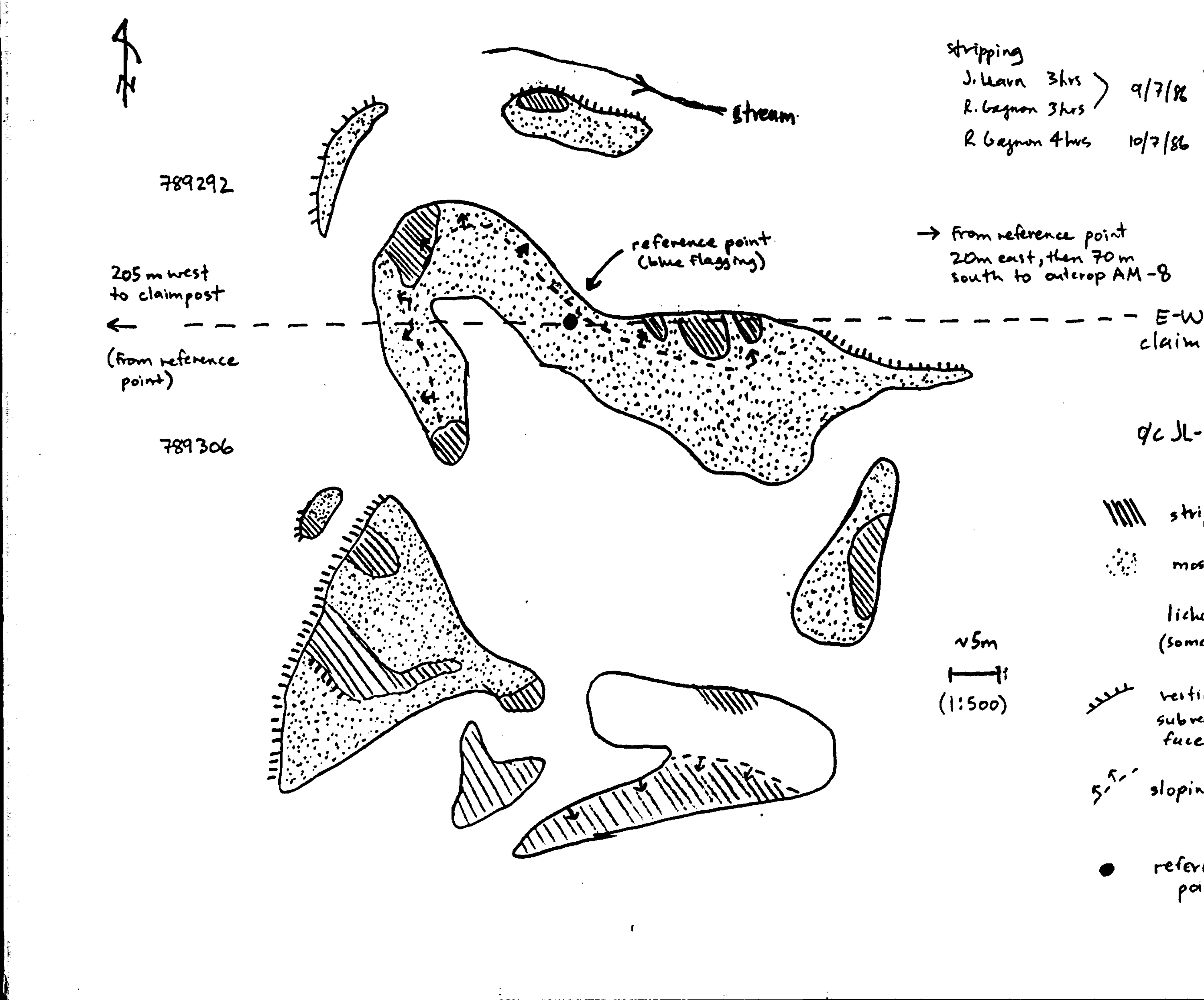
Jointing:

Alterations: Fe carbonate, minor sulfide in pillow lavas (south end), decrease in amphibolite grain size adjacent to felsic veins, bleaching of amphibolite adjacent to quartz vein

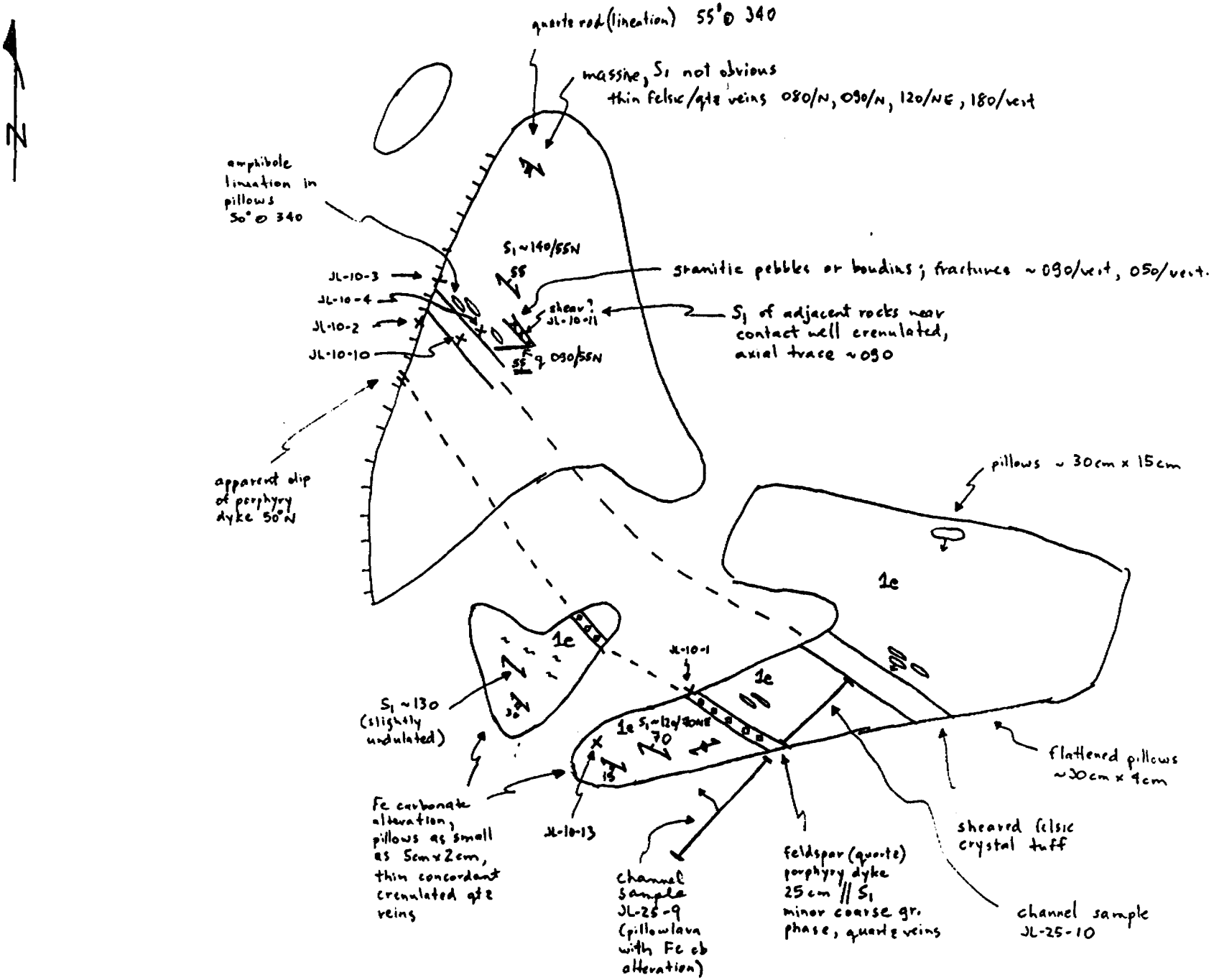
Weathering: pillow lavas became evident only after outcrop was exposed for ≃2 weeks, felsic rocks weather pink, whereas fresh surface greyish

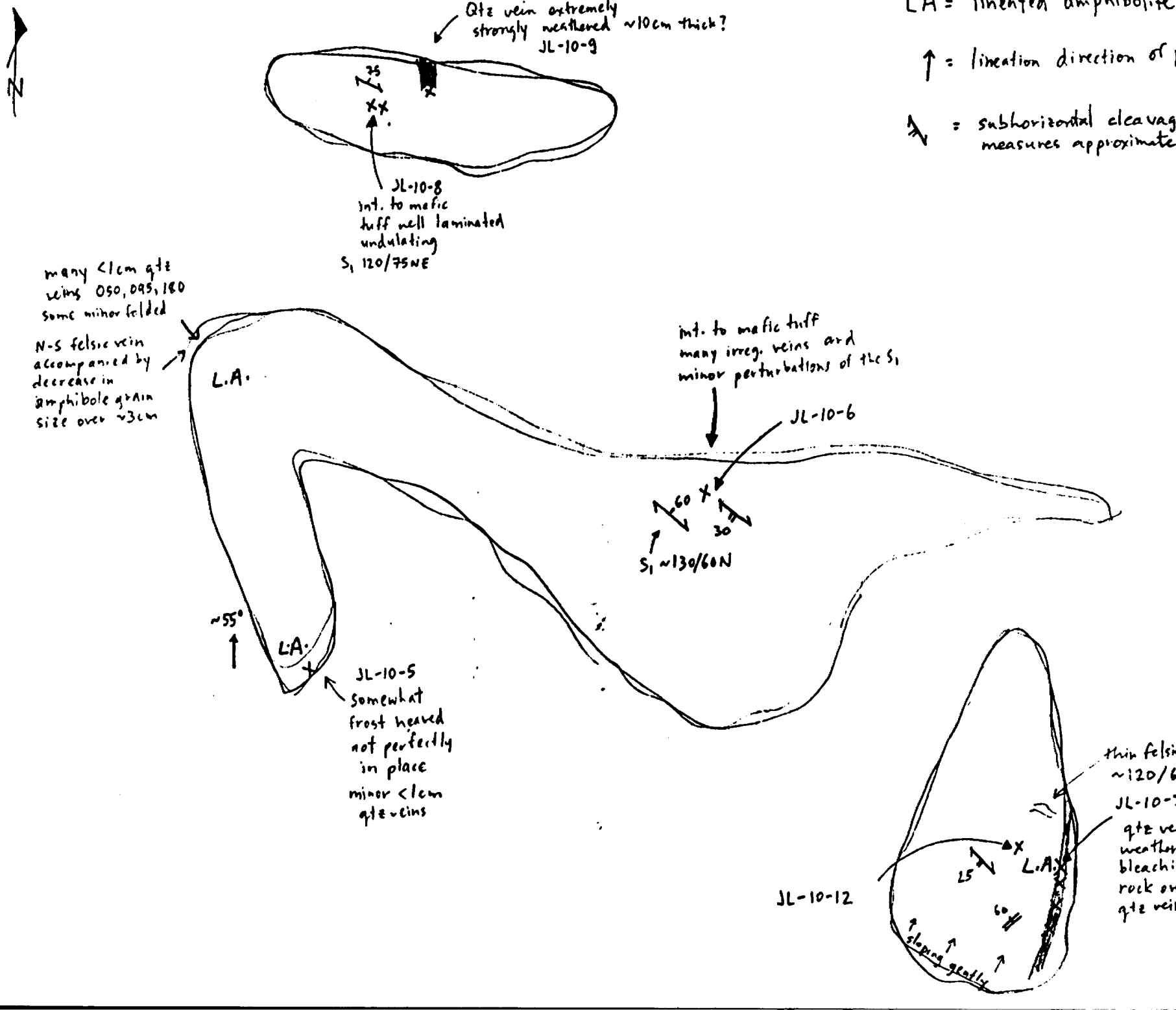
Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-10-1 through JL-10-13 also JL-25-9, JL-25-10



N
stream
stripping
J. Learn 3hrs
R. Gagnon 3hrs
9/7/86
R Gagnon 4hrs
10/7/86
789292
→ from reference point
20m east, then 70m
south to outcrop AM-8
reference point
(blue flagging)
205 m west
to claimpost
(from reference
point)
E-W
claim
789306
o/c JL-
~5m
(1:500)


N
quartz rod (lineation) 55° @ 340
massive, S1 not obvious
thin felsic/qtz veins 080/N, 090/N, 120/NE, 180/vert
amphibole lineation in pillows 50° @ 340
S1 ~140/55N
55
JL-10-3
JL-10-4
JL-10-2
JL-10-10
granitic pebbles or boudins; fractures ~090/vert, 050/vert.
shear? JL-10-11
S1 of adjacent rocks near contact well crenulated, axial trace ~090
55 q 090/55N
apparent dip of porphyry dyke 50°N
pillows ~ 30cm x 15cm
1e
JL-10-1
S1 ~130 (slightly undulated)
1e S1~120/80NE
70
15
flattened pillows ~30cm x 4cm
Fe carbonate alteration, pillows as small as 5cm x 2cm, thin concordant crenulated qtz veins
JL-10-13
channel sample JL-25-9 (pillow lava with Fe carb alteration)
feldspar (quartz) porphyry dyke 25cm // S1 minor coarse gr. phase, quartz veins
sheared felsic crystal tuff
channel sample JL-25-10


LA = lineated amphibolite
↑ = lineation direction of
= subhorizontal cleavag
measures approximate
N
Qtz vein extremely strongly weathered ~10cm thick?
JL-10-9
75
JL-10-8
int. to mafic tuff well laminated undulating
S1 120/75NE
many <1cm qtz veins 050, 095, 180 some minor folded
N-S felsic vein accompanied by decrease in amphibole grain size over ~3cm
L.A.
int. to mafic tuff many irreg. veins and minor perturbations of the S1
JL-10-6
60
30
S1 ~130/60N
~55°
L.A.
JL-10-5
somewhat frost heaved not perfectly in place
minor <1cm qtz veins
JL-10-12
thin felsi
~120/6
JL-10-
qtz ve
weather
bleachi
rock ov
qtz vei
25
L.A.
60
sloping gently

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: AM-8
Photo No.:

Approximate dimensions and shape (sketch diagram over): forme ovale 15m x 40m, axe long orienté E-W

% Exposure: 20-30% une fois décapé
(au départ 5% de la surface était affleurante)

Rock Type(s & %): tuf intermédiaire 98% ou métasédiment:. riche en biotite
. présence de clast (?)
dyke granite 1%
veine de quartz <1%, avec pyrite et chalcopyrite

Contact Zones and Relationships: veine de quartz concordante, dyke de granite discordant

Structures: So, S1, S2, S3 S1 visible sur certaines faces: 120/70°N
090/50°N

Cleavages cleavage visible par endroits, pendage vers le sud sub-horizontal(?), direction non mesurée

Folds plusieurs petits plis orientés dans diverses directions, petites veines

Fracturation, Faulting, Veining-Density: plusieurs veinules cm de quartz + "quartz sweat" parallèle à la schistosité. Veinule de quartz N000°,N240°, N260° (subhorizontal). Veinule de feldspath avec plissement.

Jointing: Aucun visible

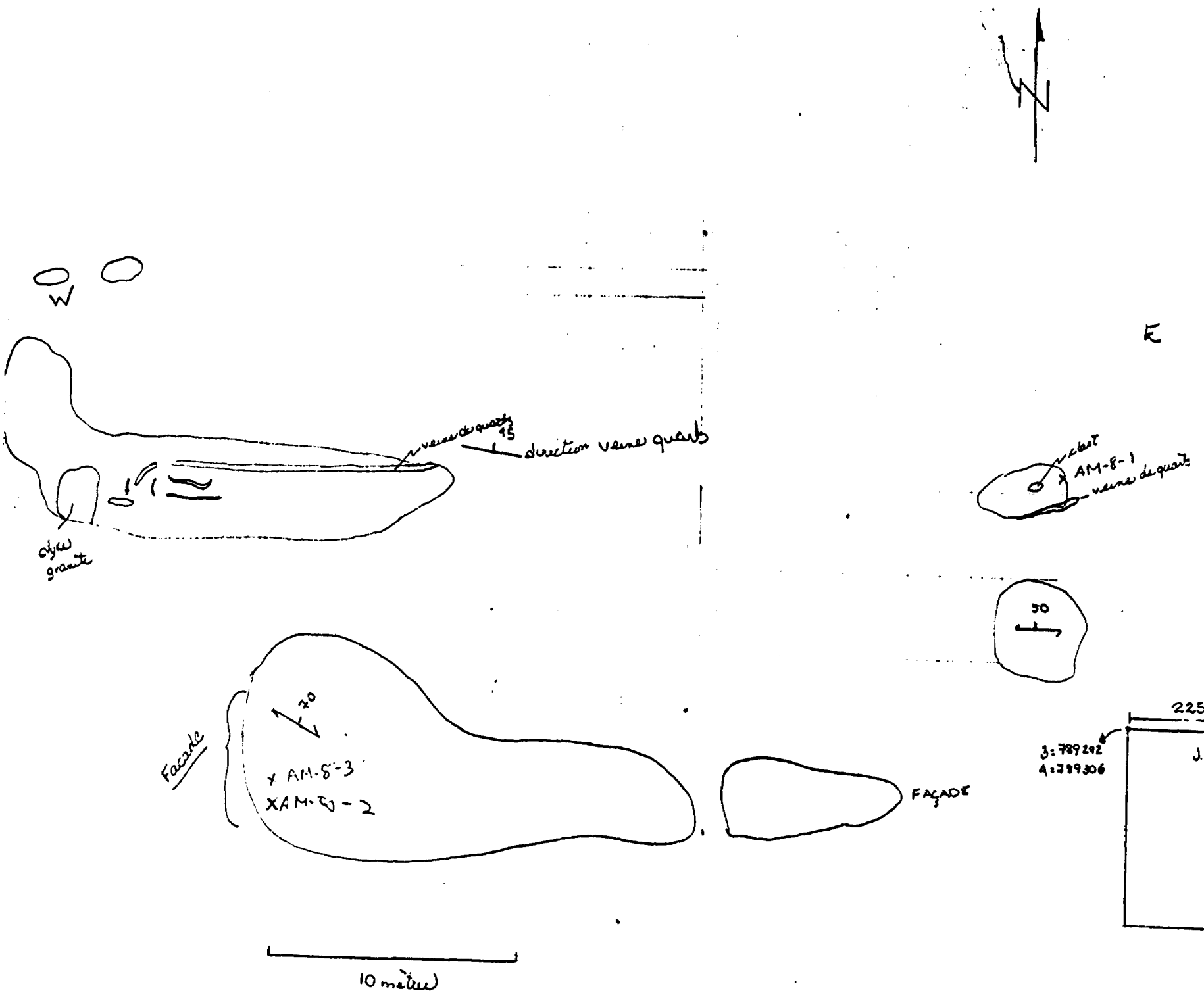
Alterations: Chloritisation par endroit

Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: AM-8-1, AM-8-2, AM-8-3

(Doc. #0013U - 18.09.86)


W
E
veine de quartz
15
direction veine quartz
dyke granite
AM-8-1
veine de quartz
50
Façade
20
AM-8-3
XAM-8-2
FAÇADE
225
3: 789292
4: 789306
J.
10 mètres

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-17

Photo No.:

Approximate dimensions and shape (sketch diagram over): one E-W line of ≃150 m of good exposures plus smaller area ≃150 m to the southeast

% Exposure:

Rock Type(s & %): lineated amphibolite 100% with minor felsic dykes e.g. feldspar porphyry and very minor quartz vein

Contact Zones and Relationships: see sketch stn 17-2

Structures: So, S1, S2, S3 amphibole lineation

Cleavages

Folds minor folding of quartz veins stn 16-1

Fracturation, Faulting, Veining-Density: generally weakly to moderately fractured and veined except at stn 2 where strong

Jointing:

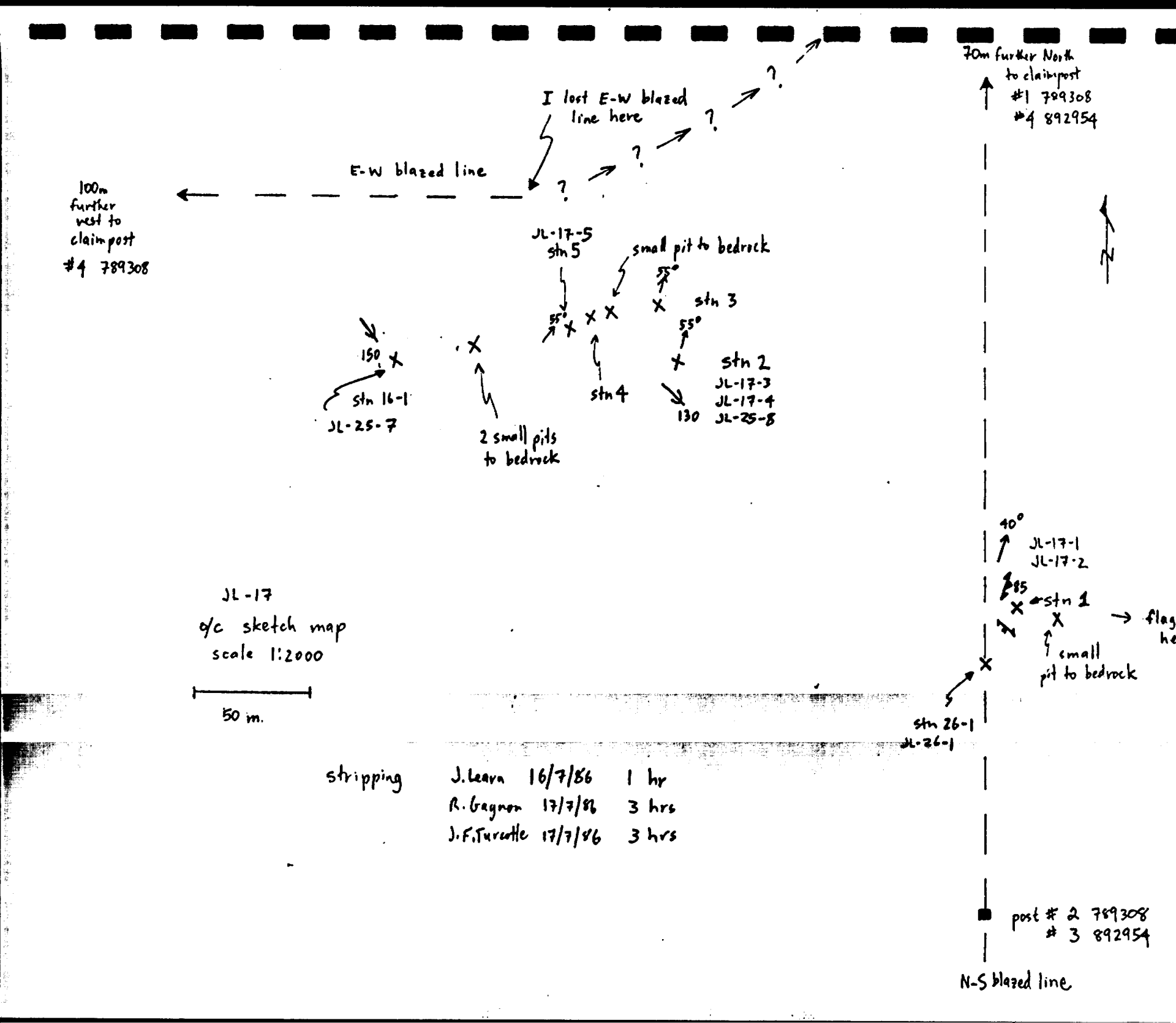
Alterations: stn 16-1 chocolate brown (Fe carbonate?) alteration
stn 26-1 rusty weakly pyritic zone adjacent to feldspar porphyry dyke

Weathering:

Glacial Striae: at 130 stn 2, at 150 stn 16-1

Sample No(s). if hand specimen(s) taken: JL-17-1A, JL-17-1B, 17-2, 17-3, 17-4, 17-5, 25-7, 25-8, 26-1, 26-2

(Doc. #0030U - 13.11.86)


70m further North
to claimpost
#1 789308
#4 892954
I lost E-W blazed
line here
E-W blazed line
100m
further
west to
claimpost
#4 789308
JL-17-5
stn 5
small pit to bedrock
55°
stn 3
55°
55°
stn 2
JL-17-3
JL-17-4
JL-25-8
130
150
stn 16-1
JL-25-7
stn 4
2 small pits
to bedrock
40°
JL-17-1
JL-17-2
85
stn 1
small
pit to bedrock
stn 26-1
JL-26-1
JL-17
o/c sketch map
scale 1:2000
50 m.
stripping J.Leavn 16/7/86 1 hr
R.Gagnon 17/7/86 3 hrs
J.F.Turcotte 17/7/86 3 hrs
post # 2 789308
3 892954
N-S blazed line

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-17
Stn No.: JL-16-1

Approximate dimensions and shape (sketch diagram over): 1 m x 1 m

% Exposure: stripped; was completely concealed by moss

Rock Type(s & %): lineated amphibolite, very minor thin quartz vein

Contact Zones and Relationships:

Structures: So, S1, S2, S3 foliation seems to be developed here due to quartz veins, brown alteration

Cleavages

Folds quartz veins folded, axial sfc //S1 (?)

Fracturation, Faulting, Veining-Density:

Jointing:

Alterations: chocolate brown alteration (Fe carbonate?) irregular but mostly //S1 (?); also ≈4 cm band //S1 (?) weathers in

Weathering:

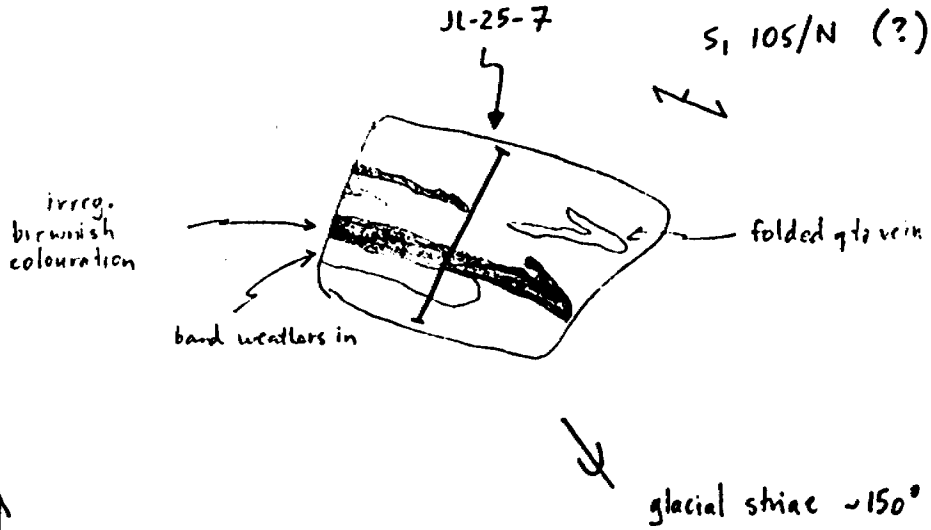
Glacial Striae: at ≈150°

Sample No(s). if hand specimen(s) taken: JL-25-7

(Doc. #0030U - 13.11.86)

SKETCH

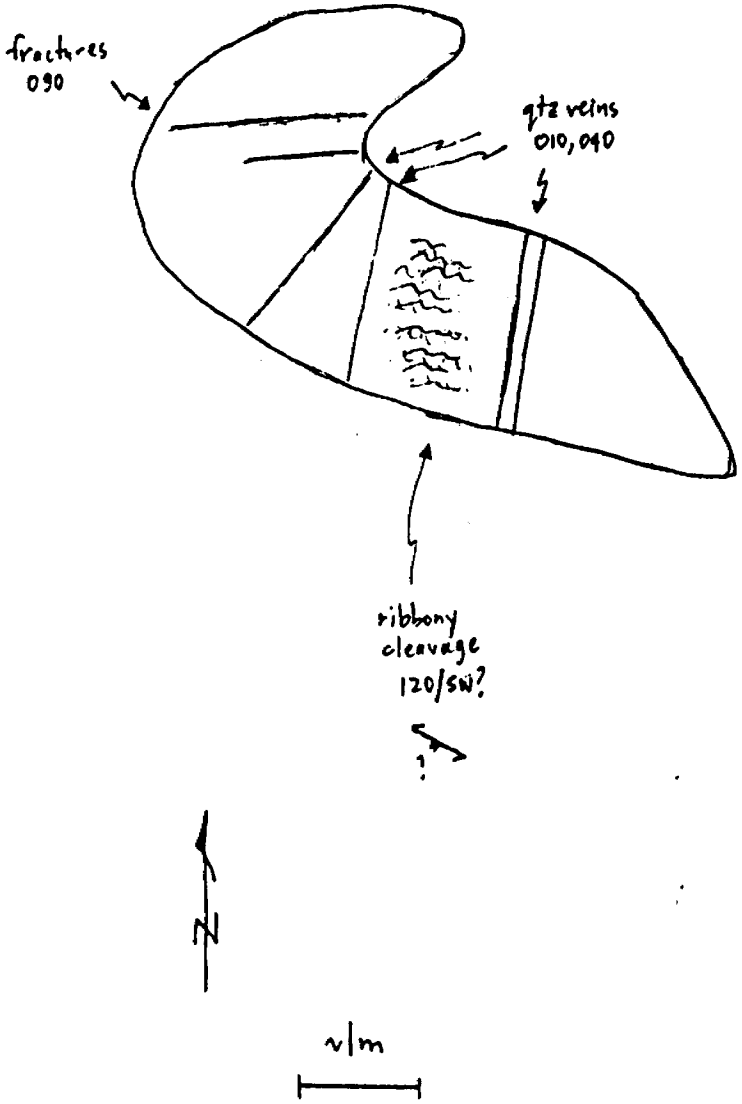
O/C JL-17
stn JL-16-1

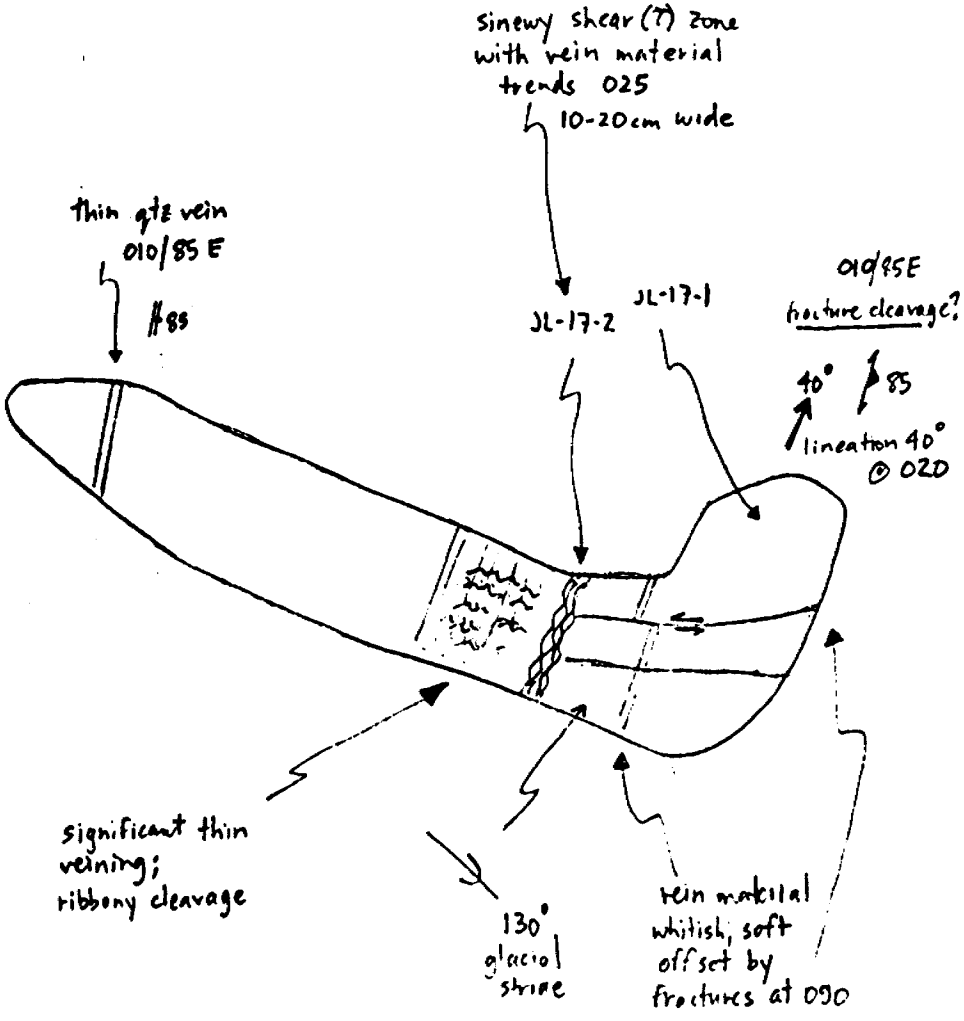


~0.5m

1:20

o/c JL-17 sth


fractures
090
qtz veins
010, 040
ribbony
cleavage
120/SW?
?
N
v/m


sinewy shear (?) zone
with vein material
trends 025
10-20cm wide
thin qtz vein
010/85 E
// 85
JL-17-2
JL-17-1
010/85E
fracture cleavage?
40°
85
lineation 40°
@ 020
significant thin
veining;
ribbony cleavage
130°
glacial
striae
vein material
whitish, soft
offset by
fractures at 090

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-17-2

Photo No.:

Approximate dimensions and shape (sketch diagram over): 9 m x 3 m

% Exposure: stripped, was completely covered by moss, labrador tea, smooth rounded outcrop

Rock Type(s & %): A) granite dyke med. gr. (quartz-feldspar ≃1-2 mm); B) sinewy quartz veining, ribbon veining ≃3-5 cm; C) feldspar 1-3 mm porphyry vein >80% feldspar (pink); D) irregular granite dyke; E) soft, medium green, fine grained rock with ≃1-3 mm feldsparphenocrysts; H) lineated amphibole-plagioclase-quartz rock, massive crystalline allure, fairly soft to the knife but hard on the chisel

Contact Zones and Relationships: C) crosscuts D); small rafts of H) within C); D) discordant within H); A) concordant within H); D) finer grained (might be weakly porphyritic) than A); E) diffuse boundary with H) (xenolith)

Structures: So, S1, S2, S3 lineations, fracturations, veining

Cleavages

Folds

Fracturation, Faulting, Veining-Density: C) bordered on E side by quartz vein (1-2 cm); many thin quartz veins // and ⊥ to vein walls of D); H) strongly veined mm-cm i) on east side by 030, E-W, NW-SE trends giving blocky fracture pattern, ii) on west side more irregular orientations

Jointing:

Alterations: light greenish alteration (perhaps generally oriented subhorizontally - ≃1 mm-1 cm scale) in H). Some of this in 17-3(H) should analyze separately

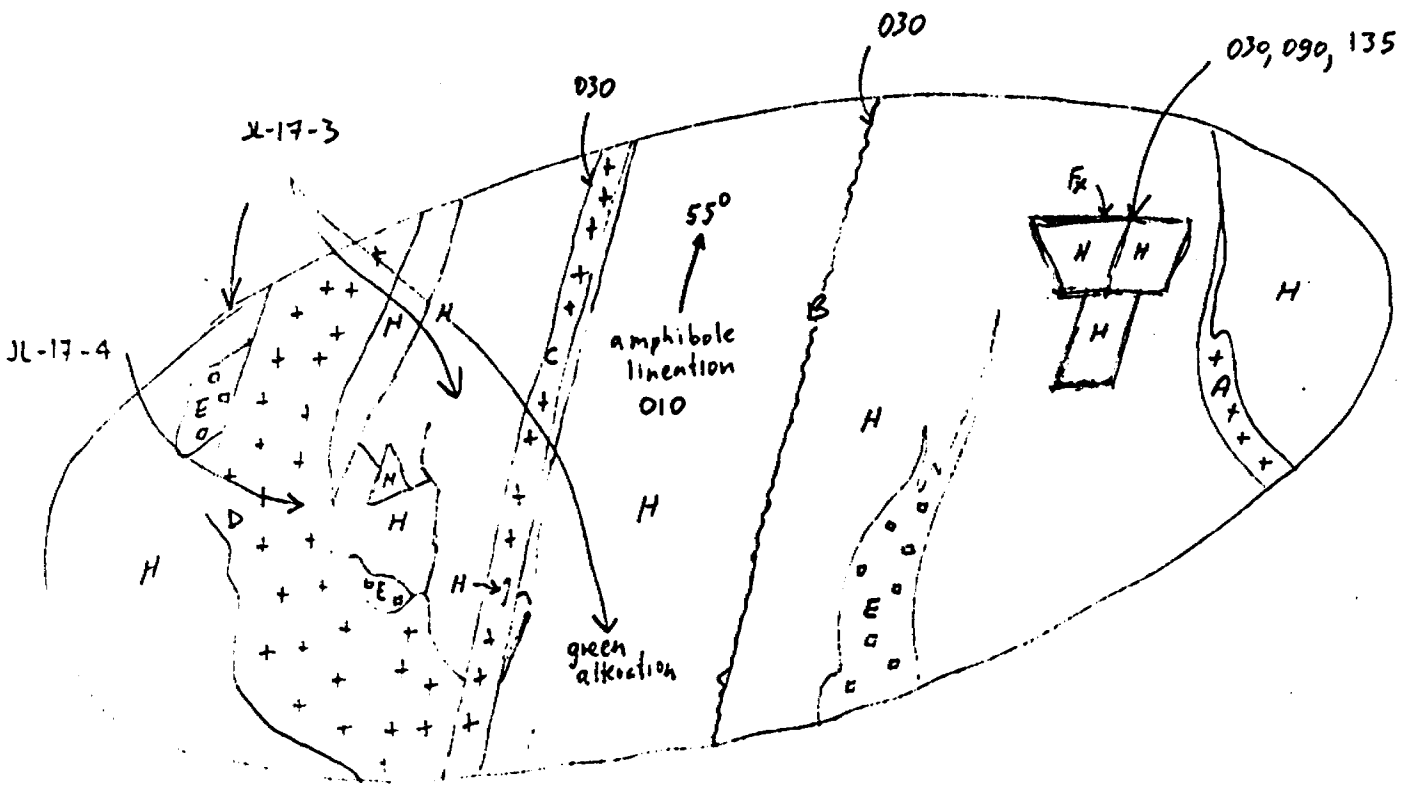
Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-17-3(H), JL-17-4(D), JL-25-8(E)

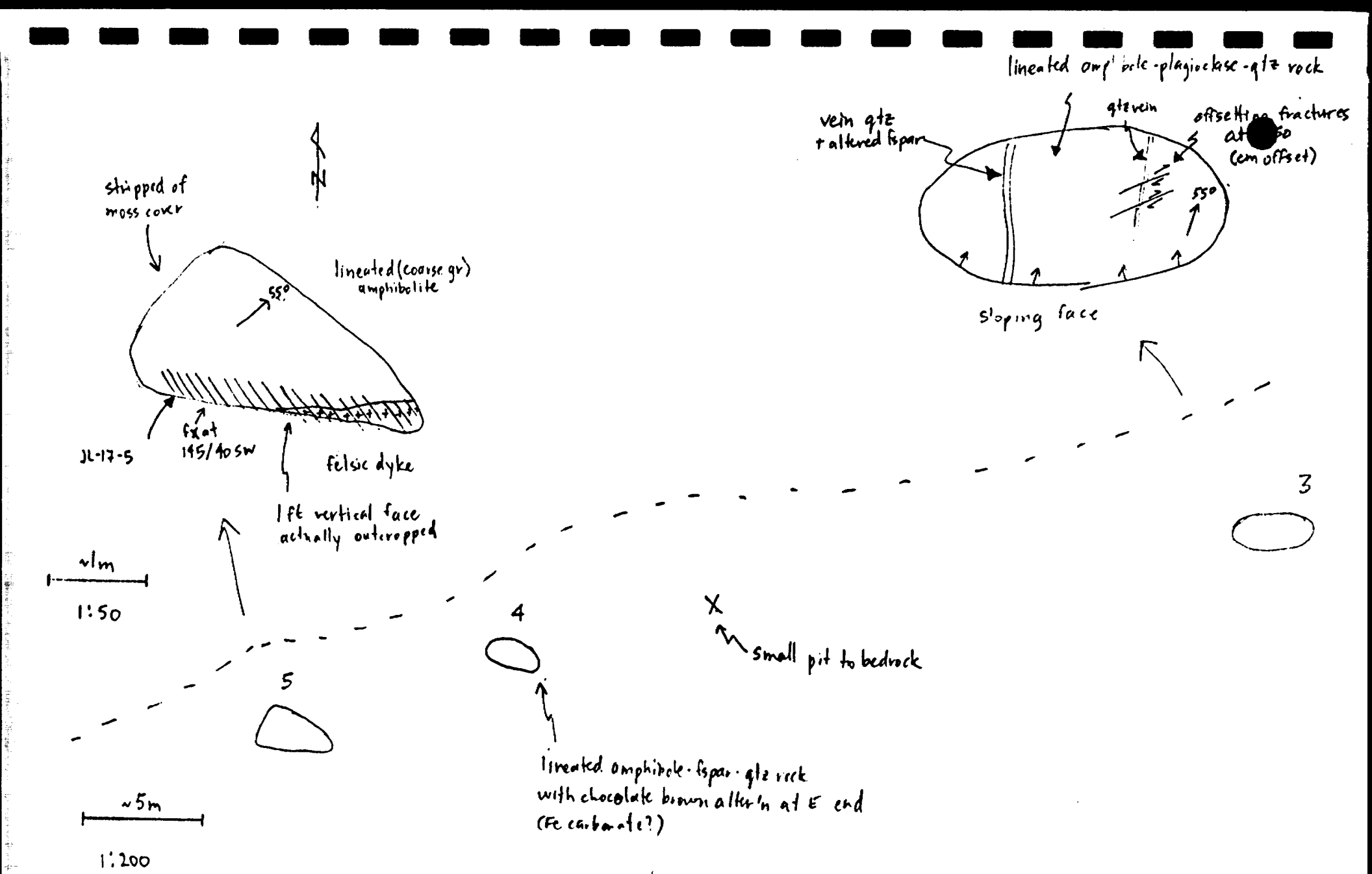
(Doc. #0030U - 13.11.86)

Stn. 17-2



~10m

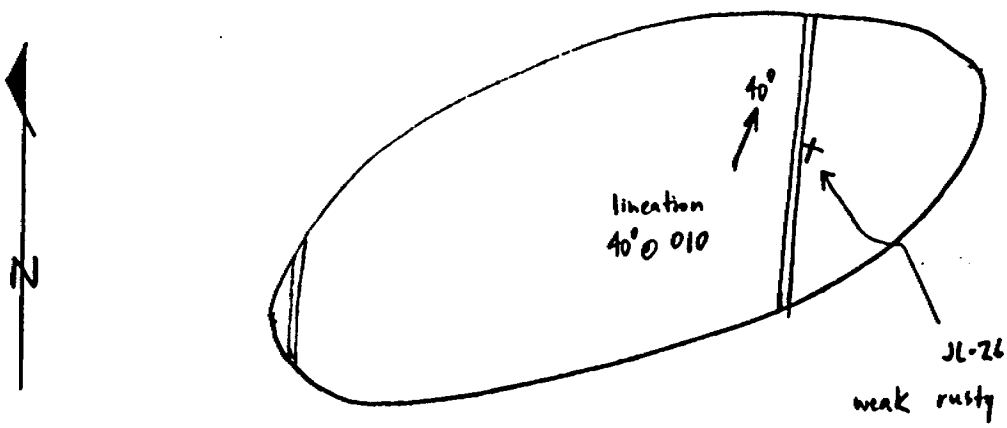
1:500


lineated amphibole-plagioclase-qtz rock
vein qtz
+ altered fspar
qtz vein
offsetting fractures
at 50
(cm offset)
55°
sloping face
stripped of
moss cover
N
lineated (coarse gr)
amphibolite
55°
JL-17-5
fx at
145/40 SW
felsic dyke
1 ft vertical face
actually outcropped
3
~1m
1:50
4
X
small pit to bedrock
5
lineated amphibole · fspar · qtz rock
with chocolate brown altern at E end
(Fe carbonate?)
~5m
1:200

SKETCH | o/c JL-17 | stn 26-1

feldspar porphyry dikes 005/85E

#85



~10 cm

1:10

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-13

Photo No.:

Approximate dimensions and shape (sketch diagram over): a few small exposures over ≈30 m x 15 m triangle

% Exposure: all exposure revealed by stripping - was completely concealed by moss and forest debris

Rock Type(s & %): strongly chloritic mafic tuffs 99%
quartz veins <1%

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 well developed, changes from E-W at north end to NW-SE at south end

Cleavages

Folds minor folding of quartz veins

Fracturation, Faulting, Veining-Density: minor dextral movement on a few fractures oriented 060/NW, some thin discontinuous quartz veins

Jointing:

Alterations: strongly chloritic rock, thin light orange colouration adjacent to some fractures, cm thick brownish colouration (Fe carbonate?) locally

Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-13-1 is a composite sample from parts 1, 2, 4 (see over)

(Doc. #0030U - 13.11.86)

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-13

Photo No.:

Approximate dimensions and shape (sketch diagram over): a few small exposures over ≈30 m x 15 m triangle

% Exposure: all exposure revealed by stripping - was completely concealed by moss and forest debris

Rock Type(s & %): strongly chloritic mafic tuffs 99%
quartz veins <1%

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 well developed, changes from E-W at north end to NW-SE at south end

Cleavages

Folds minor folding of quartz veins

Fracturation, Faulting, Veining-Density: minor dextral movement on a few fractures oriented 060/NW, some thin discontinuous quartz veins

Jointing:

Alterations: strongly chloritic rock, thin light orange colouration adjacent to some fractures, cm thick brownish colouration (Fe carbonate?) locally

Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-13-1 is a composite sample from parts 1, 2, 4 (see over)

(Doc. #0030U - 13.11.86)

stripping R. Gagnon 2 hrs
J. Learn 1 hrs
} 13/7/86

CLAIM NO.
789305

from stn 1, 50m to #1 post 789305

S_1 100/70N

~1m (1:200)

0 1 2 3 4 5

subhorizontal fracture cleavage

S_1 090/70N

55° minor fold plunges 55° @ 070
Z fold - dextral sense

fractures at 045, 110, 170
fractures at 170 have mm wide light orange alteration

S_1 135/70NE

S_1 120/60NE

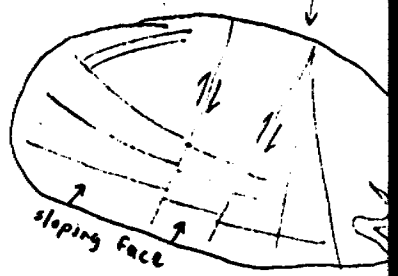
Small pits with outcrop at ~50 cm depth

50m @ 240° to reference point o/c JL-14 (from stn 4 SW corner)

blazed line N-S

minor de... movement ... fractures

060/N...



this station more massive allure, S_1 locally well pronounced

fractures 020/80W ~170/?

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-14

Photo No.:

Approximate dimensions and shape (sketch diagram over): good exposure over ≈100 m (E-W) x 70 m (N-S) see also o/cs JL-13, JL-24

% Exposure: ≈1% before stripping (stations 4, 7 outcropped with only lichen cover)

Rock Type(s & %): chloritic mafic tuffs (sheared flow??) ≈90%
S1 well defined, generally dark green but showing occasional white banding (feldspar rich areas)

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 well defined, erratic readings at east side, locally undulose; S1 truncated by shear at stn 2
S1 strongly contorted where veining density greatest (stn 8)

Folds

Fracturation, Faulting, Veining-Density: fracturation and veining (mm scale) weak to intense; blocky fracturation at stn 5

Jointing:

Alterations: Fe carbonate (brown bands) and calcite, commonly over this area, but not everywhere, rock effervesces with HCl; strongly chloritic; possible sericitization at stn 7

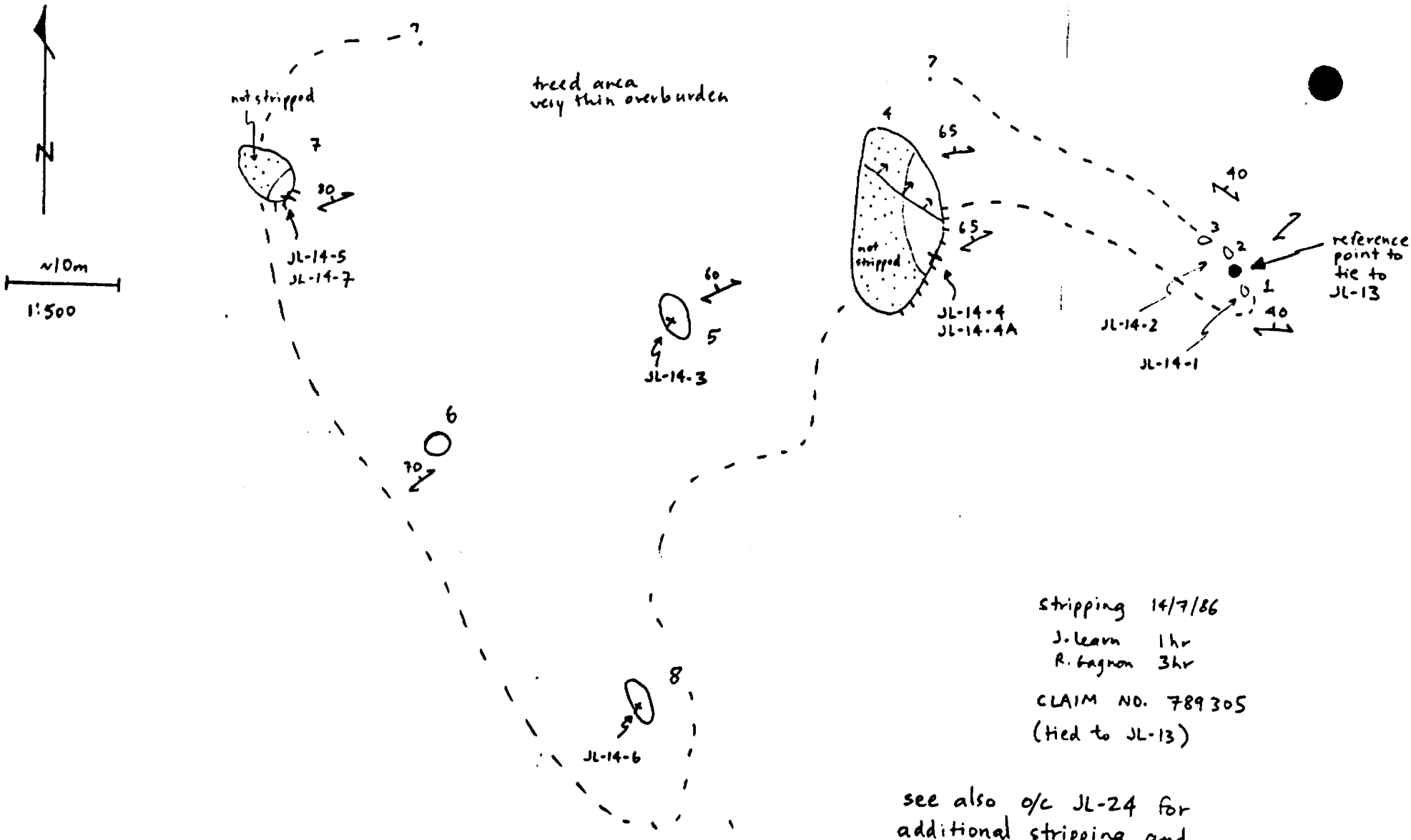
Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-14-1, JL-14-2, JL-14-3, JL-14-4, JL-14-4A, JL-14-5, JL-14-6, JL-14-7

(Doc. #0030U - 13.11.86)

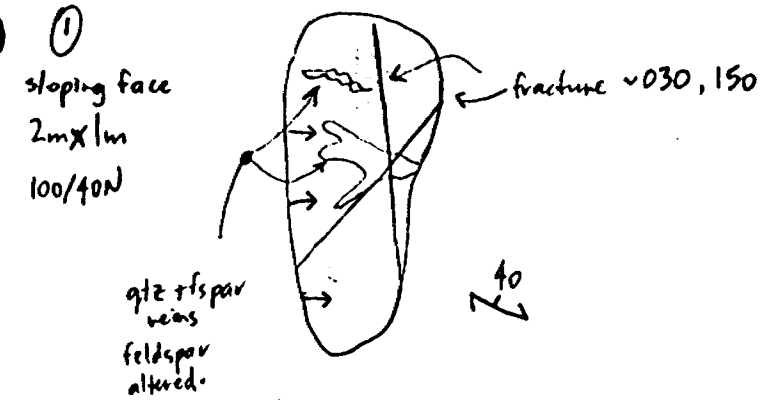
JL-14

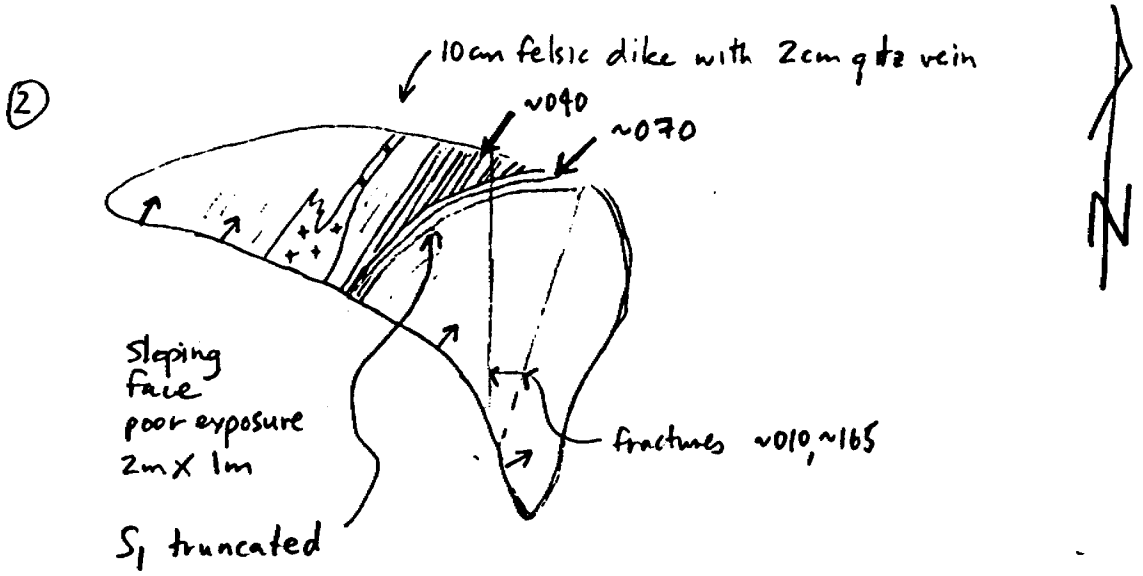


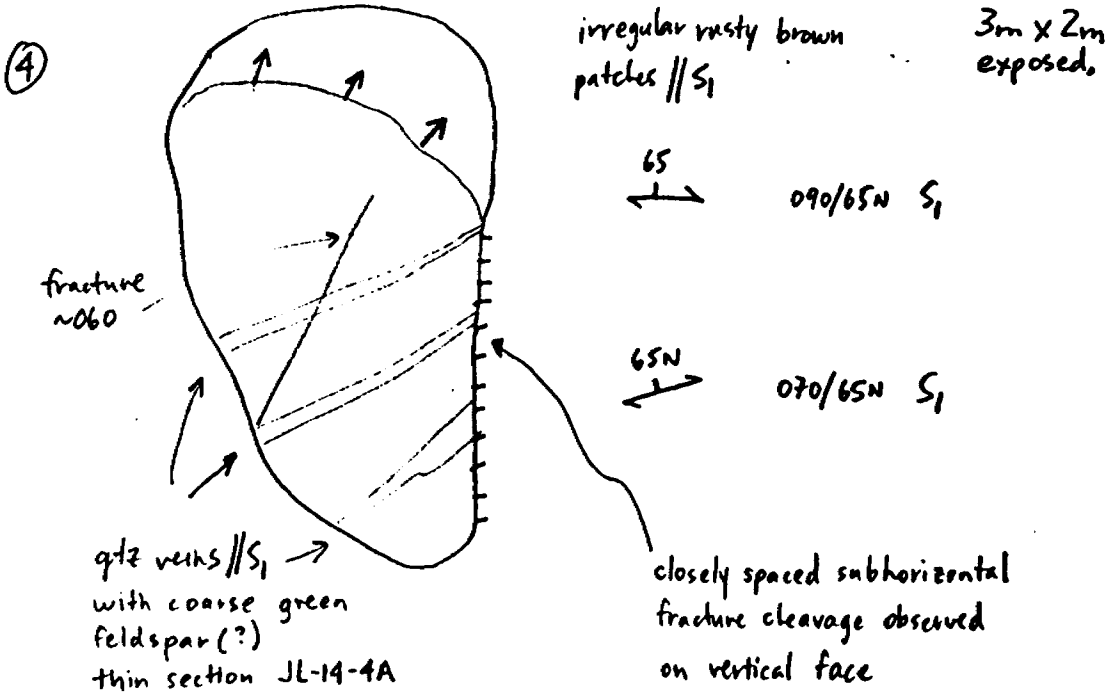
stripping 14/7/86
J. Learn 1 hr
R. Tagnon 3 hr

CLAIM NO. 789305
(tied to JL-13)

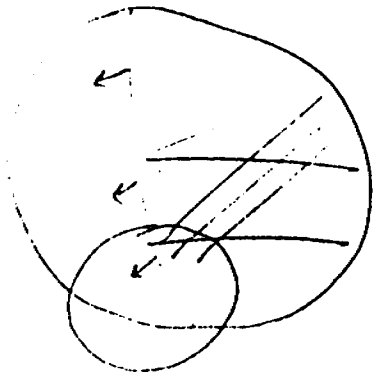
see also o/c JL-24 for additional stripping and mapping of stations 6, 7.


① sloping face 2m x 1m 100/40N
fracture ~030, 150
qtz ± fspar veins
feldspar altered.
40


② 10cm felsic dike with 2cm qtz vein
~040
~070
Sloping face poor exposure 2m x 1m
S_1 truncated
fractures ~010, ~165
N


④
irregular rusty brown patches // S_1
3m x 2m exposed.
65
090/65N S_1
65N
070/65N S_1
fracture ~060
qtz veins // S_1 with coarse green feldspar (?) thin section JL-14-4A
closely spaced subhorizontal fracture cleavage observed on vertical face

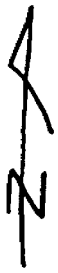
⑤ 2m x 2m



60

070/60N S_1

fractures 050, 090

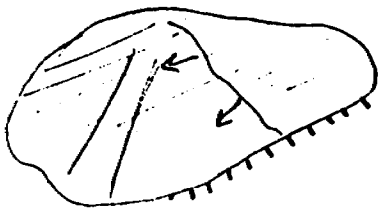


looking

good blocky fractures separating vein material

⑦ 1.5m x 1m

80 070/80N S_1

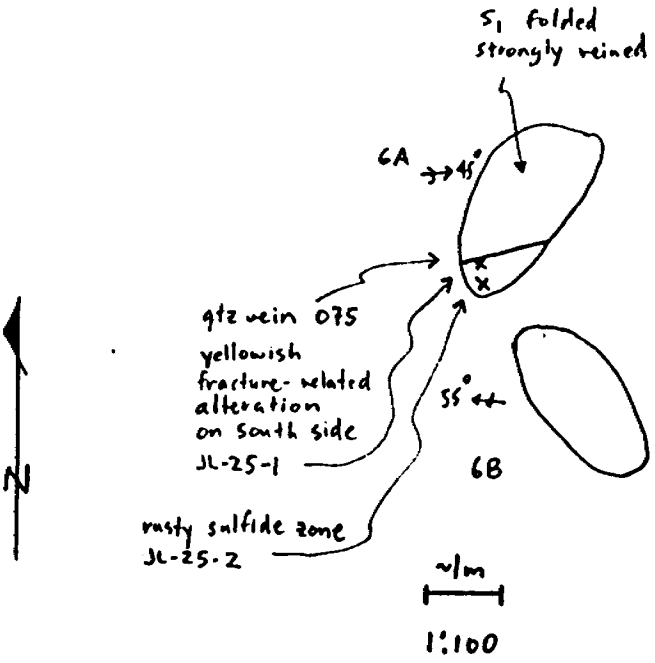


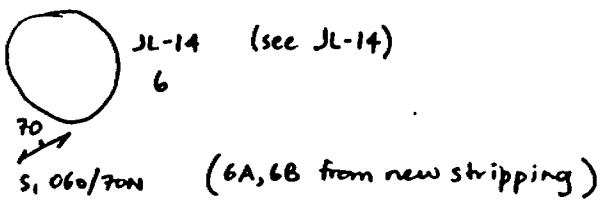
exposure shows knotty weathered surface
- carbonate alteration?
rock is micaceous, fissile → biotite (less mafic than other exposures)
S_1 undulates

⑧ very significant qtz vein and sericitic alteration or dyke rock.
contorted S_1 not useful to measure
weathering has left indentations as if
nodules had weathered out (carbonate alteration?)
~2m x 1m

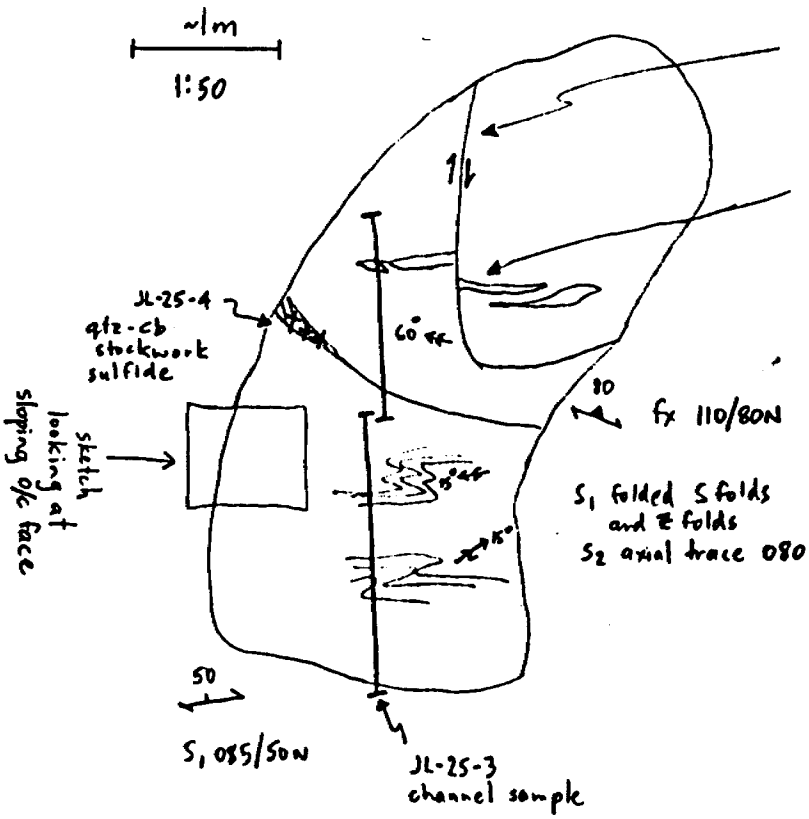
These outcrops stripped further during mapping JL-24.

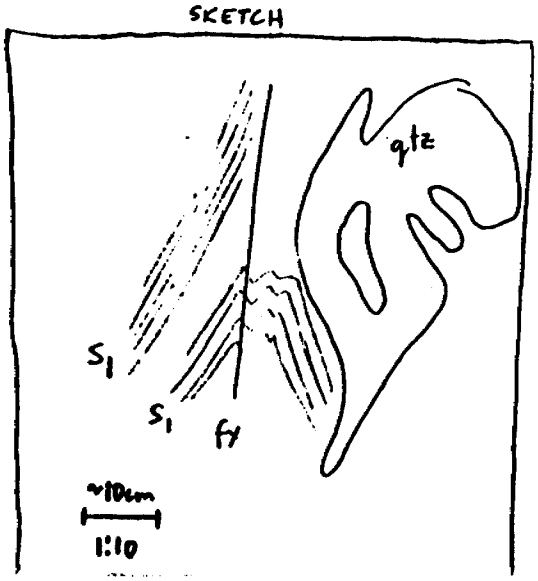
JL-14-6 (continued from JL-14)





JL-24-8 (formerly JL-14-7)





COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JL-24

Photo No.:

Approximate dimensions and shape (sketch diagram over): 100 m x 50 m semi-circular area (northern hemisphere)

% Exposure: ≃5% after stripping (see also JL-13, JL-14)

Rock Type(s & %): mafic to intermediate tuff 99% (or sheared mafic lava) usually thinly laminated, v.f.gr., chloritic

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 may be misinterpreted S2-thinly laminated

Cleavages southeast striking, gently southwest dipping, this mirror surface fracture cleavage is not a mineral alignment

Folds local strong distortion of S1, some folding of S1 and quartz veins (max. ≃30 cm scale)

Fracturation, Faulting, Veining-Density: fracturation locally strong, always present, veining moderate to strong (quartz)

Jointing:

Alterations: chlorite (strong), calcite (locally strong), Fe carbonate (local), pyrite (local), pyrrhotite (rare), sericite (local, adjacent to quartz veins and along fractures), silicification (rare)

Weathering:

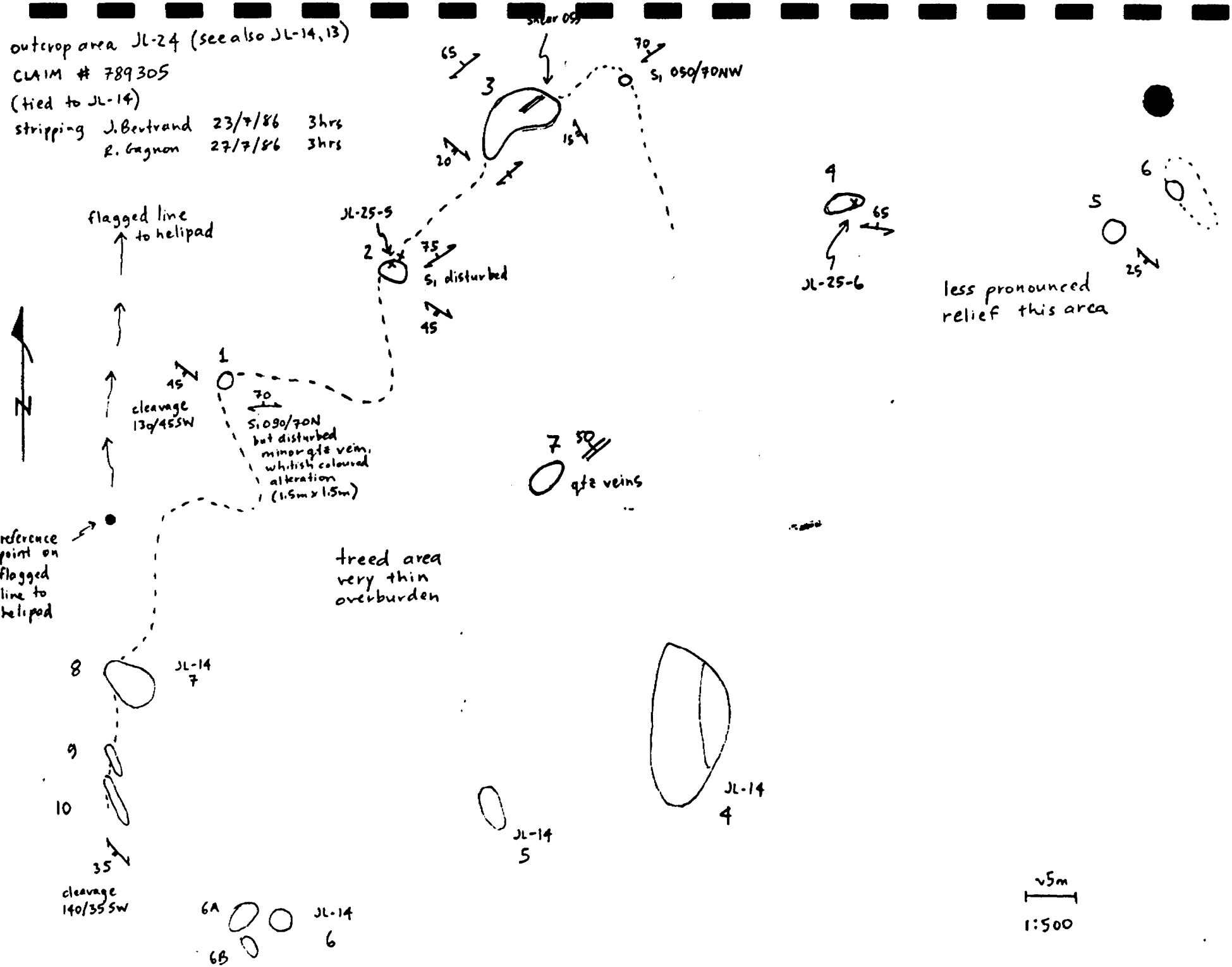
Glacial Striae:

Sample No(s). if hand specimen(s) taken: JL-24-1, JL-24-2, JL-25-1 through JL-25-6

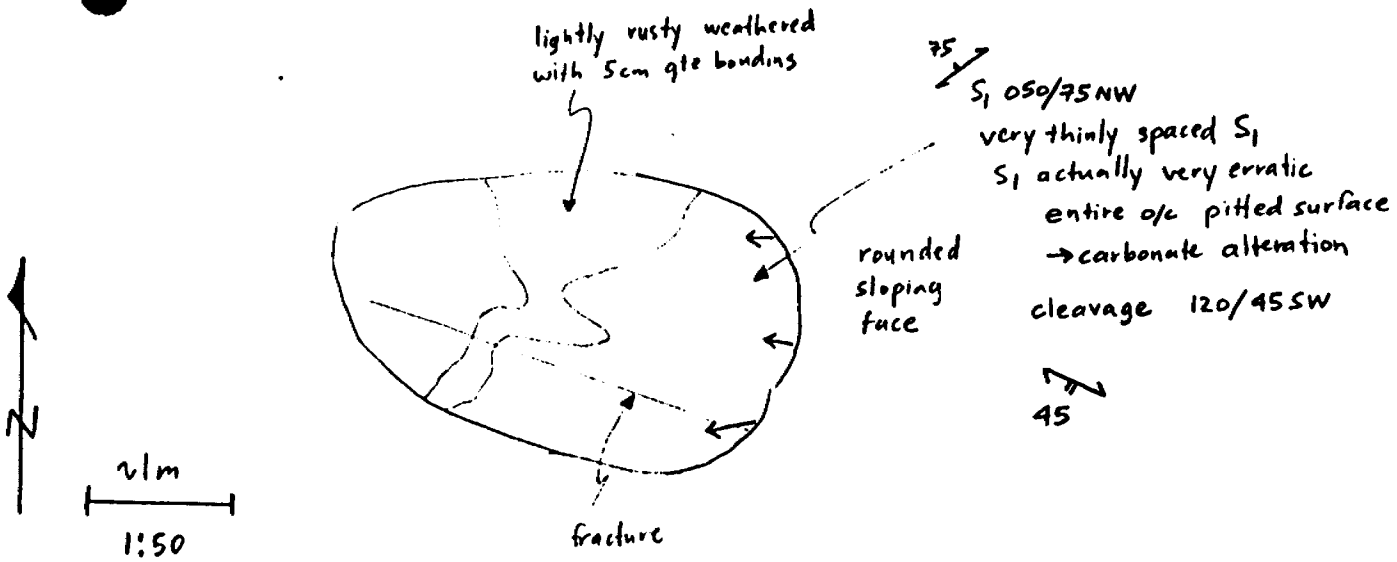
(Doc. #0030U - 13.11.86)

outcrop area JL-24 (see also JL-14, 13)
CLAIM # 789305
(tied to JL-14)

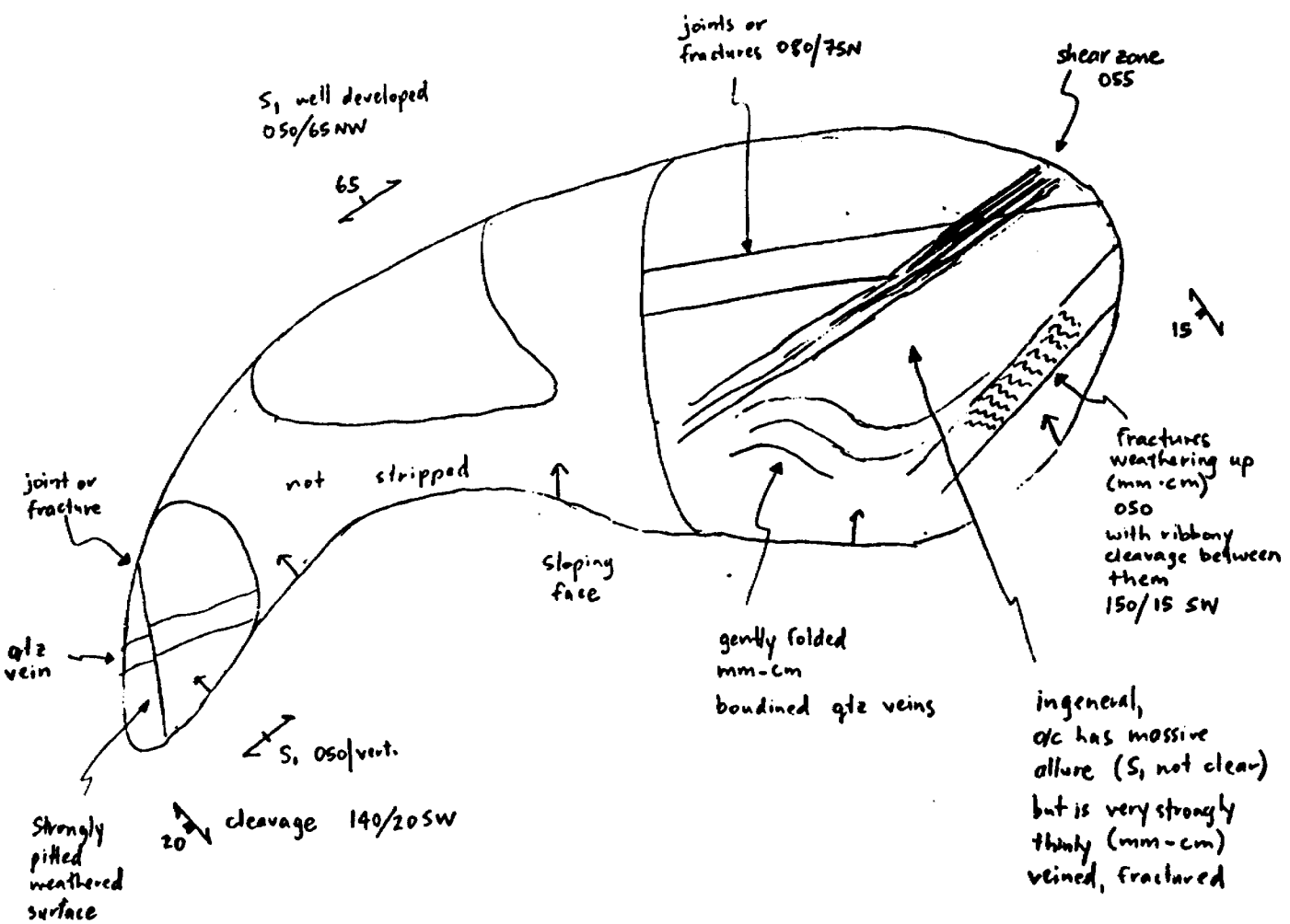
stripping J. Bertrand 23/7/86 3hrs
R. Gagnon 27/7/86 3hrs



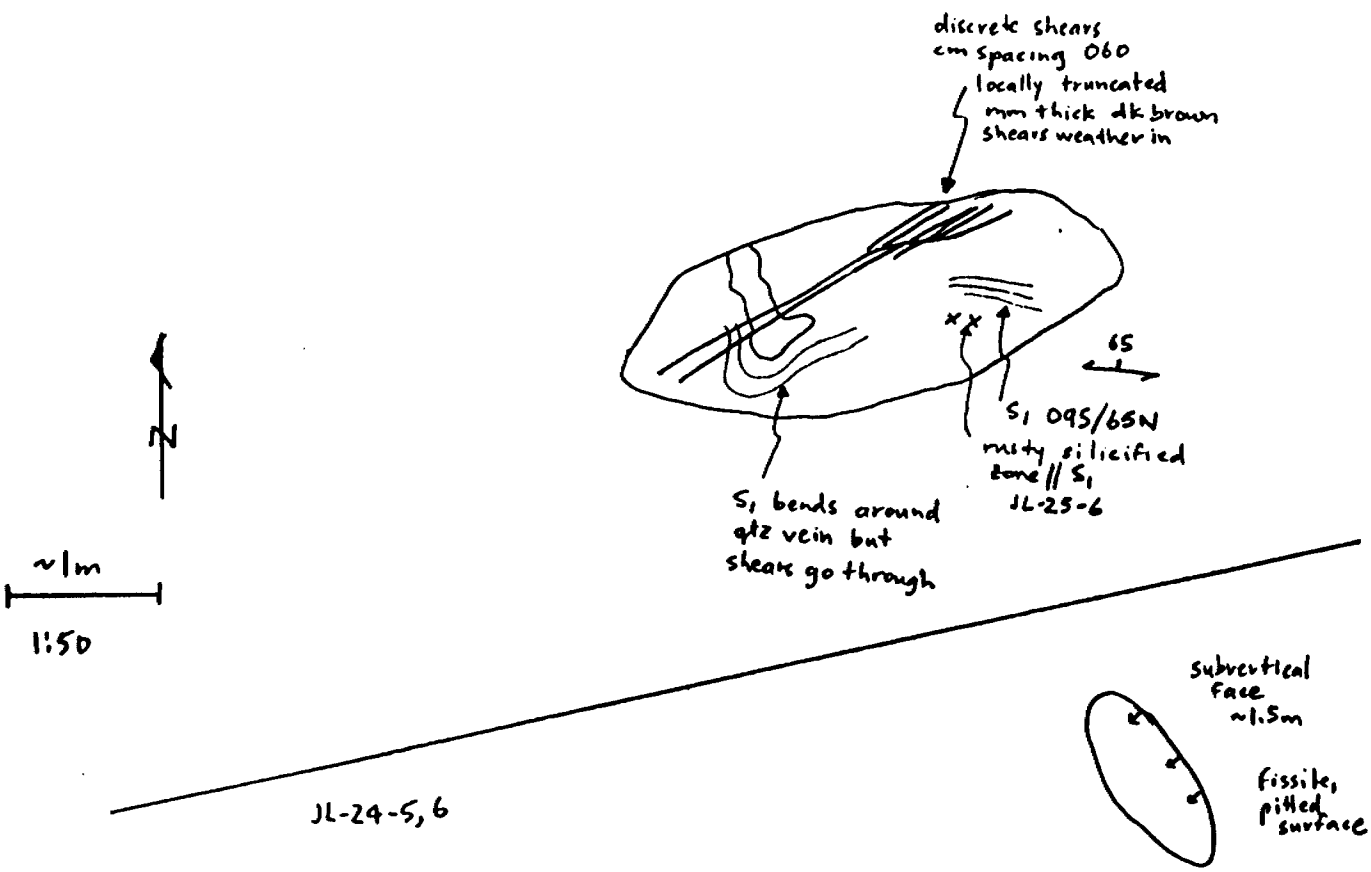
JL-24-2

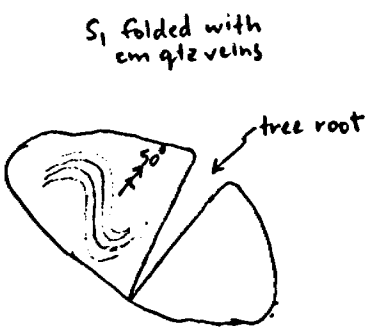

lightly rusty weathered with 5cm qtz boudins
75
S1 050/75NW
very thinly spaced S1
S1 actually very erratic
entire o/c pitted surface
→carbonate alteration
rounded sloping face
cleavage 120/45SW
45
N
1m
1:50
fracture

JL-24-3


joints or fractures 080/75N
shear zone 055
S1 well developed 050/65NW
65
15
joint or fracture
not stripped
sloping face
Fractures weathering up (mm-cm) 050 with ribbony cleavage between them 150/15 SW
qtz vein
gently folded mm-cm boudined qtz veins
S1 050/vert.
20
cleavage 140/20SW
Strongly pitted weathered surface
ingeneral, o/c has massive allure (S1 not clear) but is very strongly thinly (mm-cm) veined, fractured

JL-24-4





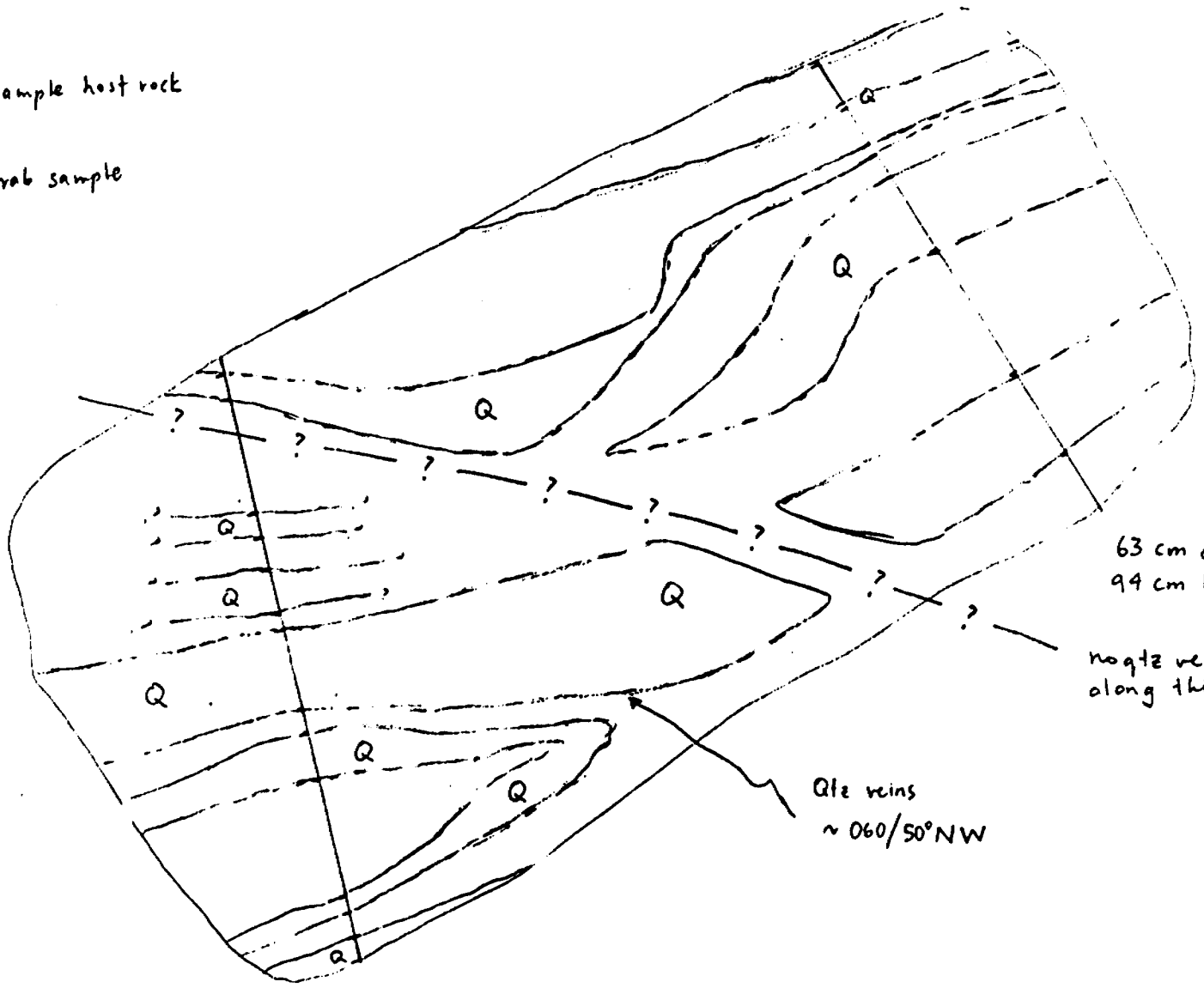
cleavage 130/25 SW

field sketch aided by
two measured sections

JL-24-7

sample JL-24-1
composite sample host rock

sample JL-24-2
composite grab sample
qtz vein



N

~0.5 m

1:20

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: AM-15

Photo No.:

Approximate dimensions and shape (sketch diagram over):

50m x 100m (dimension minimale)

% Exposure: ≃10-15% une fois décapé

au départ, tout était recouvert de mousse

Rock Type(s & %): tuf mafique à intermédiaire 70% avec grenat et magnétite

métagabbro (intrusif) 30% (amphibole+feldspath)

Contact Zones and Relationships: Contact non visible. L'affleurement de tuf localisé le plus près du métagabbro présente une foliation presque subhorizontale.

Structures: So, S1, S2, S3 Schistosité bien développée sur certaines façades 080/40°N mais, par endroits, semble être subhorizontale

Cleavages aucun visible

Folds petit pli - 25° à 075

Fracturation, Faulting, Veining-Density: Il y a plusieurs veinules mm de quartz discordantes N320, N000°

- boudinage de quartz
- léger déplacement cm visible localement sur veine de quartz

Jointing:

Alterations: sériciti sation ?? localement

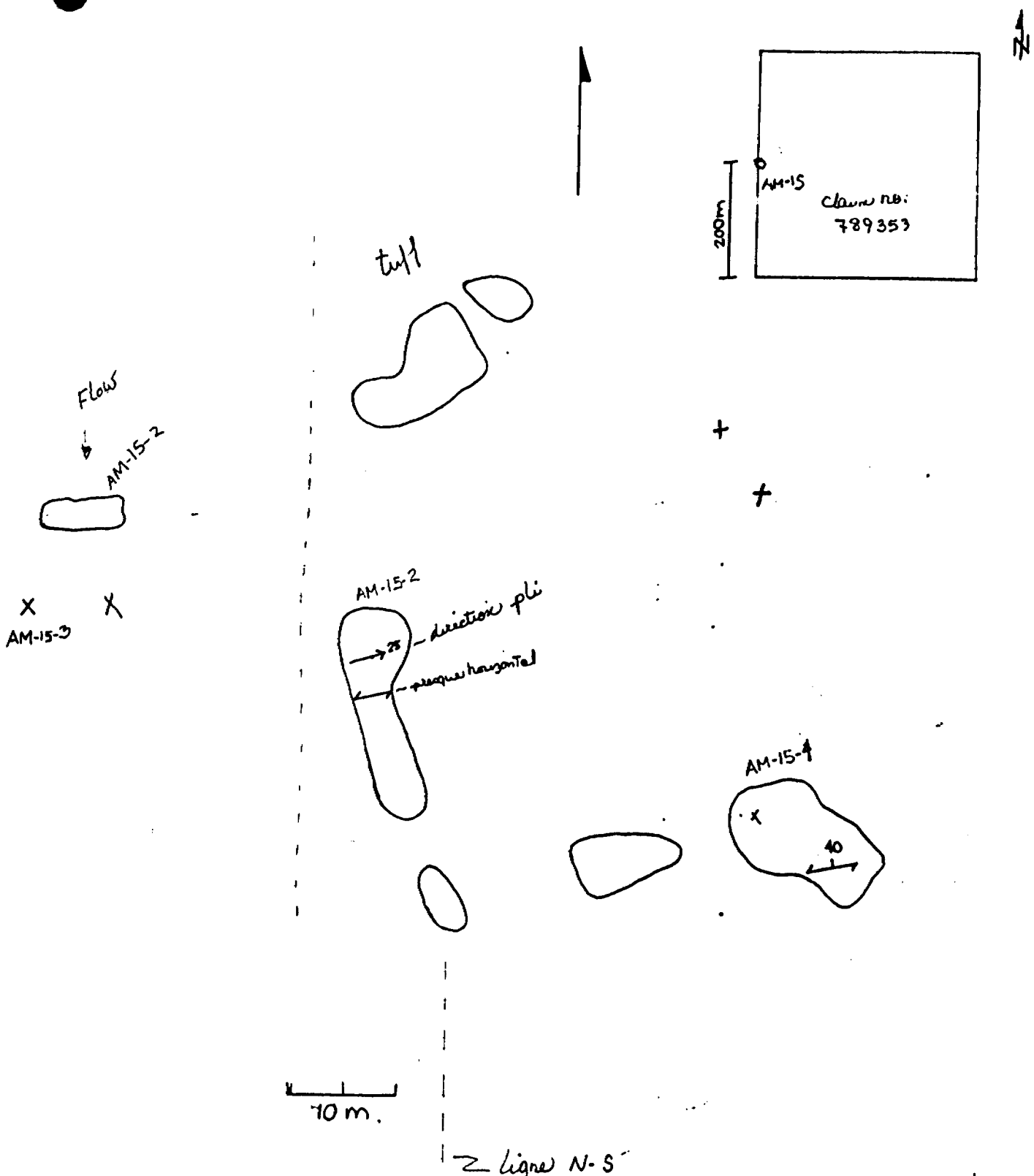
- Fe/Ca altération-réaction avec HCl-bandes brunâtres sur affleurement

Weathering: sur l'affleurement, deux couleurs: bandes brunâtres et bandes vert foncé (niveau riche en magnétite)

Glacial Striae:

Sample No(s). if hand specimen(s) taken: AM-15-1, AM-15-2, AM-15-3, AM-15-4

(Doc. #0013U - 18.09.86)



Stripping 18-07-86 J.B 1 heure
R.G 1 heure

19-07-86 J.F.T = 2 heures
A.H = 2 heures

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-8,9,10,11,
Photo No.: 12,13

Approximate dimensions and shape (sketch diagram over): small outcrops, poor exposure

% Exposure:

Rock Type(s & %):- mostly mafic metavolcanic: pillows and/or flows
- intermediate lapilli tuff
- intermediate tuff with possible graphite and somewhat reworked
- garnetiferous mafic metavolcanic with occasional magnetite bands

Contact Zones and Relationships:

Structures: So, S1, S2, S3 generally S1=So ≈80°/subvertical but significant variations do occur

Folds - area is rather strongly deformed, small scale folds are developed throughout, rocks are highly fractured and in
- places strongly veined

Fracturation, Faulting, Veining-Density:

Jointing:

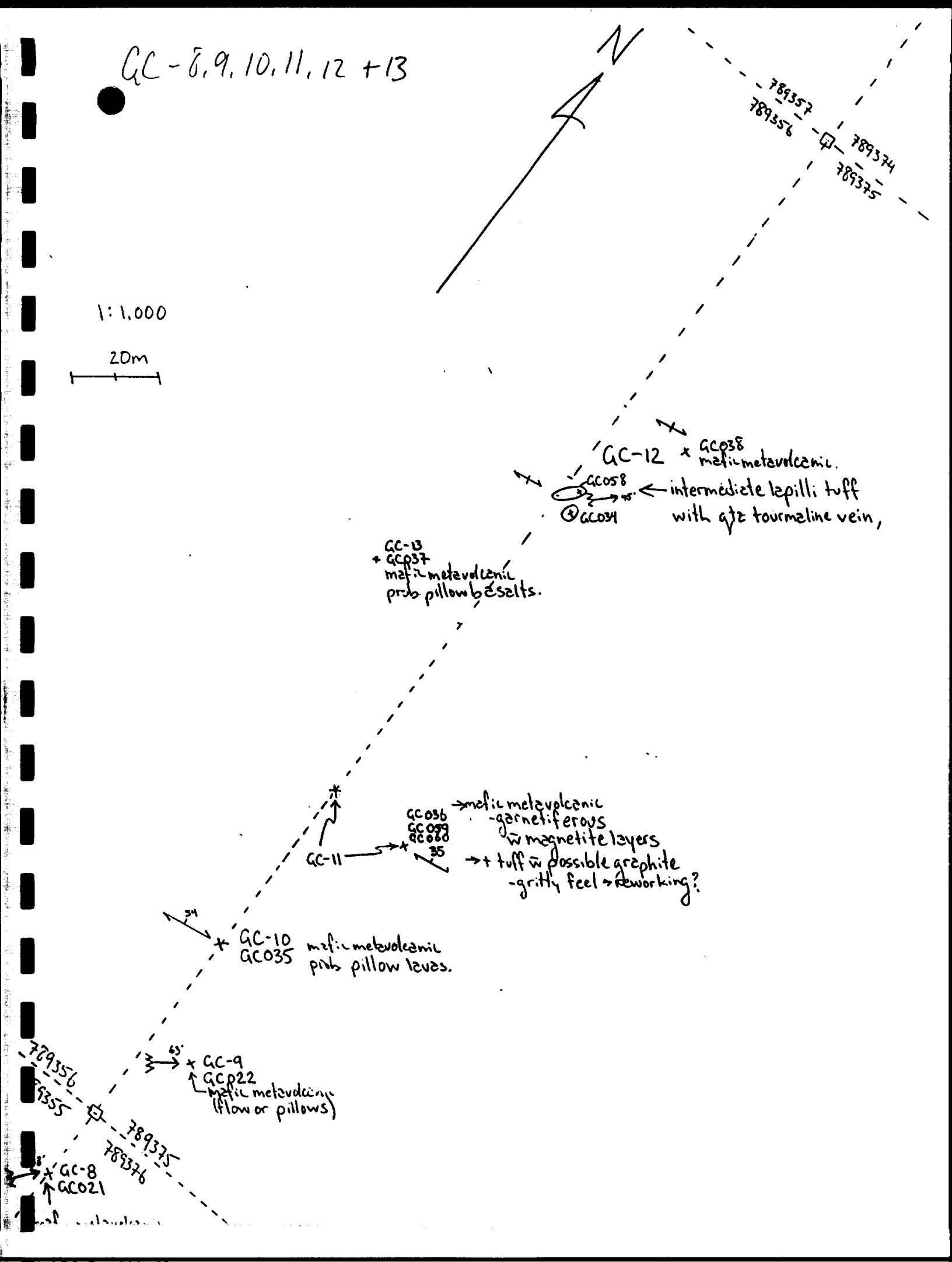
Alterations: locally carbonated

Weathering:

Glacial Striae:

Sample No(s). if hand specimen(s) taken: GC-021, 022, 034, 035, 036, 037, 038, 058, 059, 060

(Doc. #0013U - 18.09.86)


GC-8, 9, 10, 11, 12 + 13
N
789357
789356
789374
789375
1:1,000
20m
GC-12
GC038
mafic metavolcanic.
GC058
intermediate lapilli tuff
with qtz tourmaline vein,
GC034
GC-13
GC037
mafic metavolcanic
prob pillow basalts.
GC036
GC039
GC040
mafic metavolcanic
-garnetiferous
w magnetite layers
GC-11
35
+ tuff w possible graphite
-gritty feel → reworking?
34
GC-10
GC035
mafic metavolcanic
prob pillow lavas.
789356
789355
65°
GC-9
GC022
mafic metavolcanic
(flow or pillows)
789375
789376
GC-8
GC021

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: JB-15

Photo No.:

Approximate dimensions and shape (sketch diagram over):

2 petits affleurements de 1m x 1m; 1m x 4m

% Exposure: non connu

Rock Type(s & %): Roche volcanique mafique à intermédiaire (tuf ou coulée??)
avec sulfures disséminés (pyrite et chalcopyrite)
Veine de quartz mineure ou boudins??
Semble similaire à GC-54

Contact Zones and Relationships: Veine de quartz discontinue

Structures: So, S1, S2, S3 S1=090/subvertical; 100 /subvertical

Cleavages

Folds plis mineurs accentuant la schistosité

Fracturation, Faulting, Veining-Density:

Jointing:

Alterations: silicification locale?
faible chloritisation

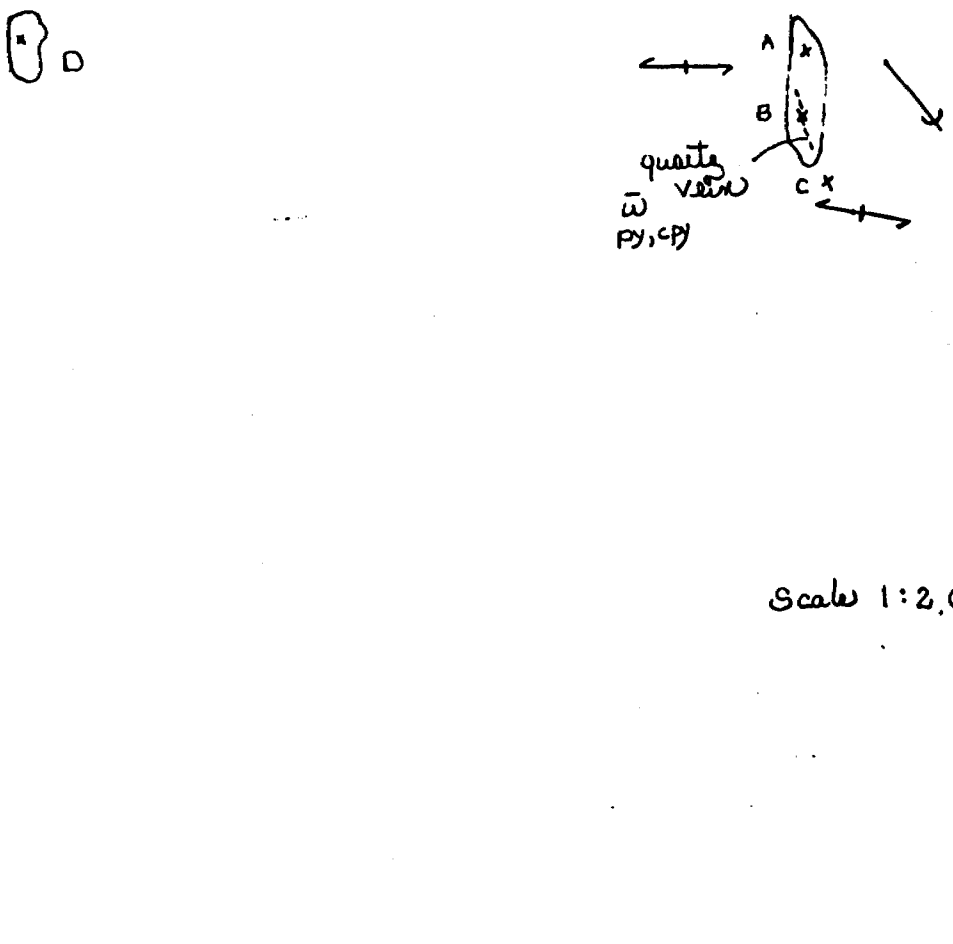
Weathering:

Glacial Striae: N140°

Sample No(s). if hand specimen(s) taken: JB-15A, JB-15B, JB-15C, JB-15D

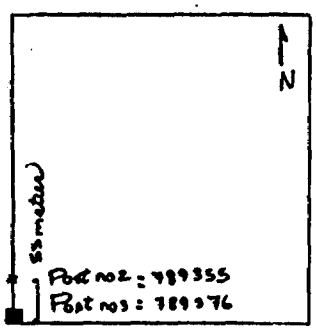
(Doc. #0013U - 18.09.86)

JB-15



Scale 1:2,000

Blazed line to Post
no2 = 789355
no3 = 789376



Scale 1:1000

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-15

Photo No.:

Approximate dimensions and shape (sketch diagram over): ≈15m x 15m

% Exposure:

Rock Type(s & %): - intermediate to mafic metavolcanic, probably of pyroclastic origin
- biotites give host rock a streaky appearance + mafic metavolcanic

Contact Zones and Relationships:

Structures: So, S1, S2, S3 weak to moderately foliated S1 110°/subvertical

Cleavages

Folds

Fracturation, Faulting, Veining-Density: - small quartz veinlets throughout
- quartz is locally abundant
- one fracture observed at 135°/subv.

Jointing:

Alterations: calcareous

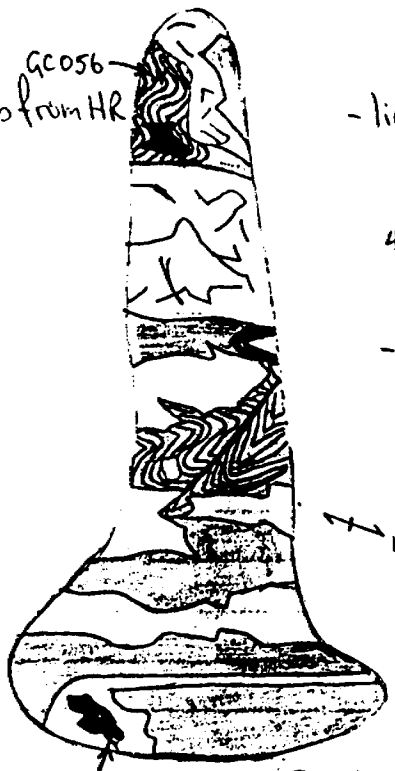
Weathering: beige to green weathering

Glacial Striae:

Sample No(s). if hand specimen(s) taken: GC-054, 055, 056

(Doc. #0003U - 12.06.86)

GC-15

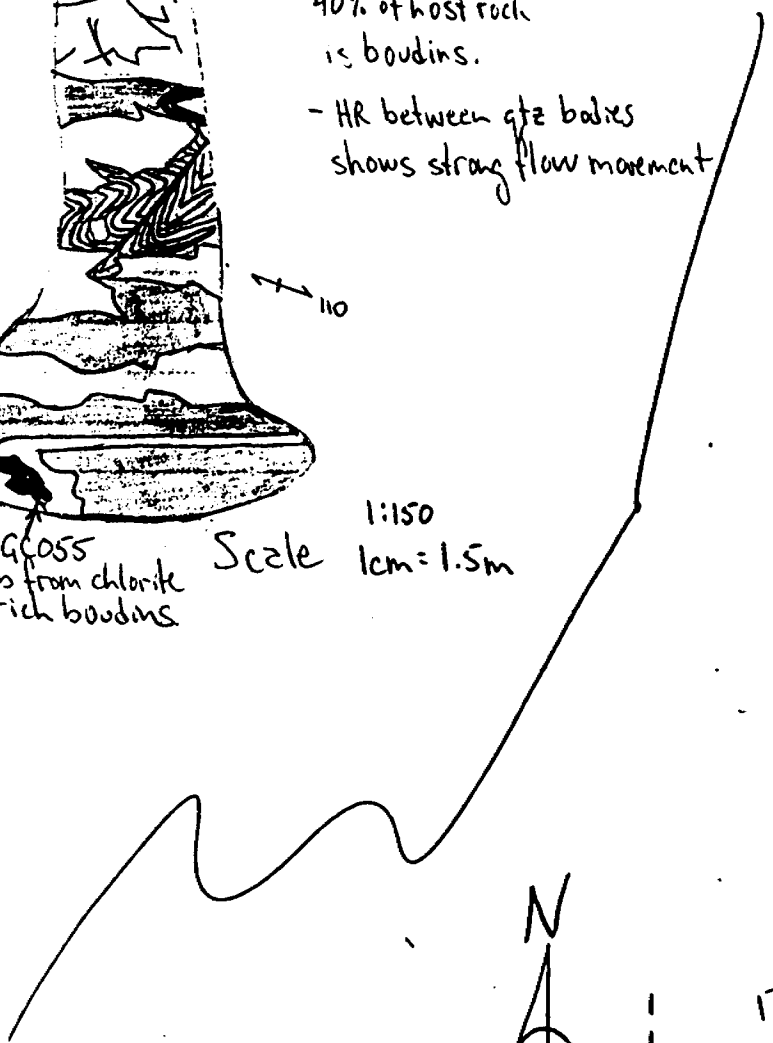


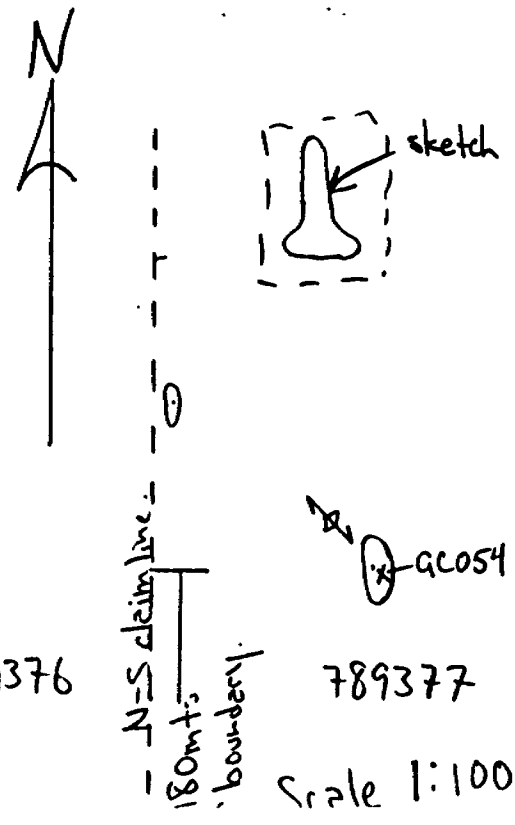
- light coloured material is quartz.

40% of host rock is boudins.

- HR between qtz bodies shows strong flow movement

Scale 1:150
1cm = 1.5m





COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-7

Photo No.:

Approximate dimensions and shape (sketch diagram over): 63m long x 25 m wide

% Exposure: 50%, the rest is moss-covered

Rock Type(s & %): - vesicular mafic pillow lavas, magnetic
- facing criterion are difficult to determine

Contact Zones and Relationships:

Structures: So, S1, S2, S3 So=S1 90-95°/≈subvertical to steeply S

Cleavages

Folds

Fracturation, Faulting, Veining-Density: quartz boudins scattered throughout

Jointing:

Alterations: chloritic (retrograde)

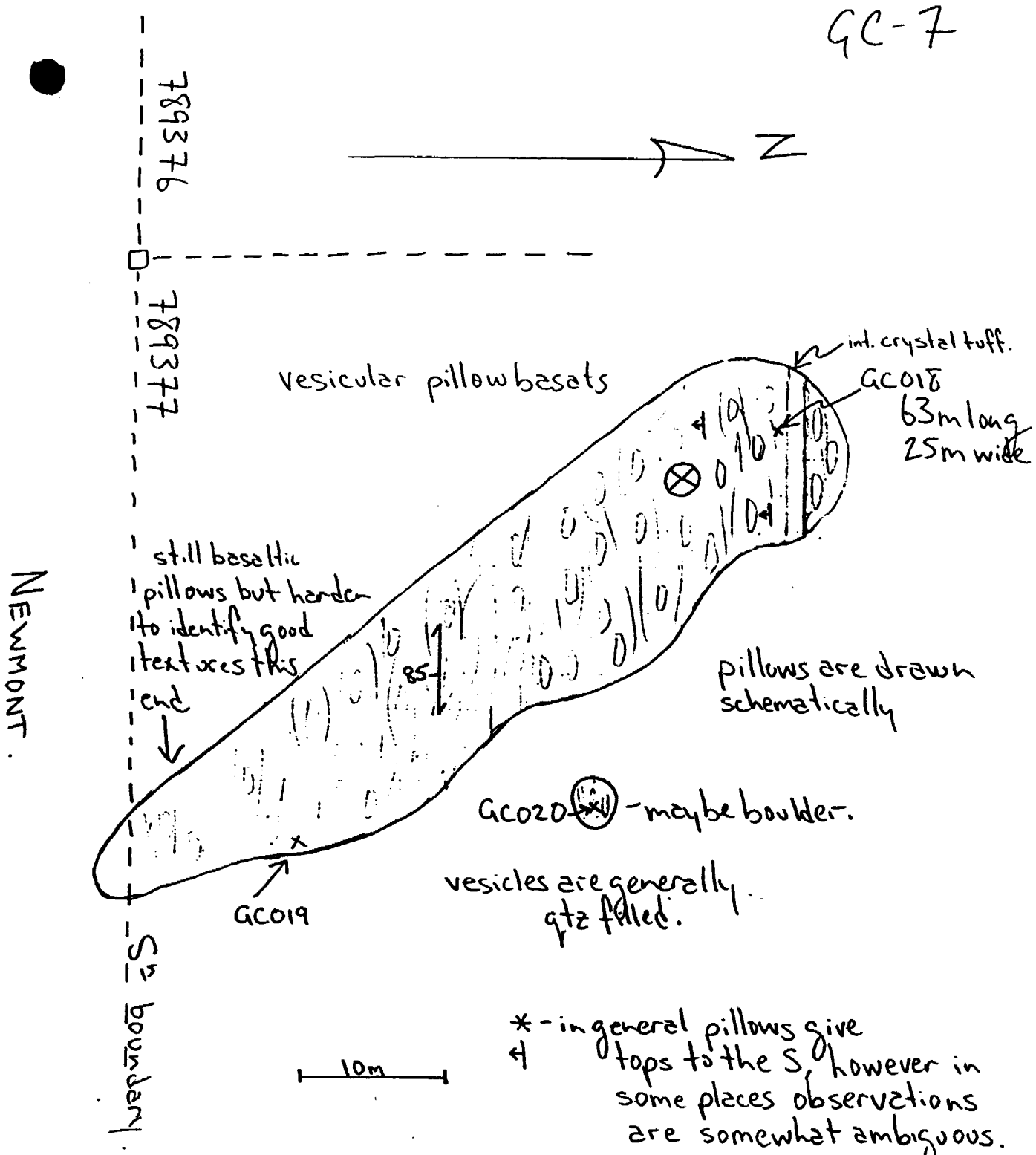
Weathering: light green to grey on weathered surface

Glacial Striae:

Sample No(s). if hand specimen(s) taken: GC-018, 019, 020

(Doc. #0003U - 12.06.86)

GC-7


7893776
7893677
N
int. crystal tuff.
Vesicular pillow basalts
GC018
63m long
25m wide
still basaltic pillows but harder to identify good textures this end
85
pillows are drawn schematically
GC020 - maybe boulder.
vesicles are generally qtz filled.
GC019
NEWMONT
S12 boundary
10m
* - in general pillows give tops to the S, however in some places observations are somewhat ambiguous.

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-6

Photo No.:

Approximate dimensions and shape (sketch diagram over):

% Exposure: Small exposure along southern claim boundary ≈4 square feet

Rock Type(s & %): intermediate metavolcanic, probably pyroclastic

Contact Zones and Relationships:

Structures: So, S1, S2, S3 So=S1 80°/subvertical

Cleavages

Folds small scale folding, ductile flow

Fracturation, Faulting, Veining-Density:

- quartz boudins, common as usual in this area
- chlorite starting to localize along boudins

Jointing:

Alterations: chloritic and sericitic

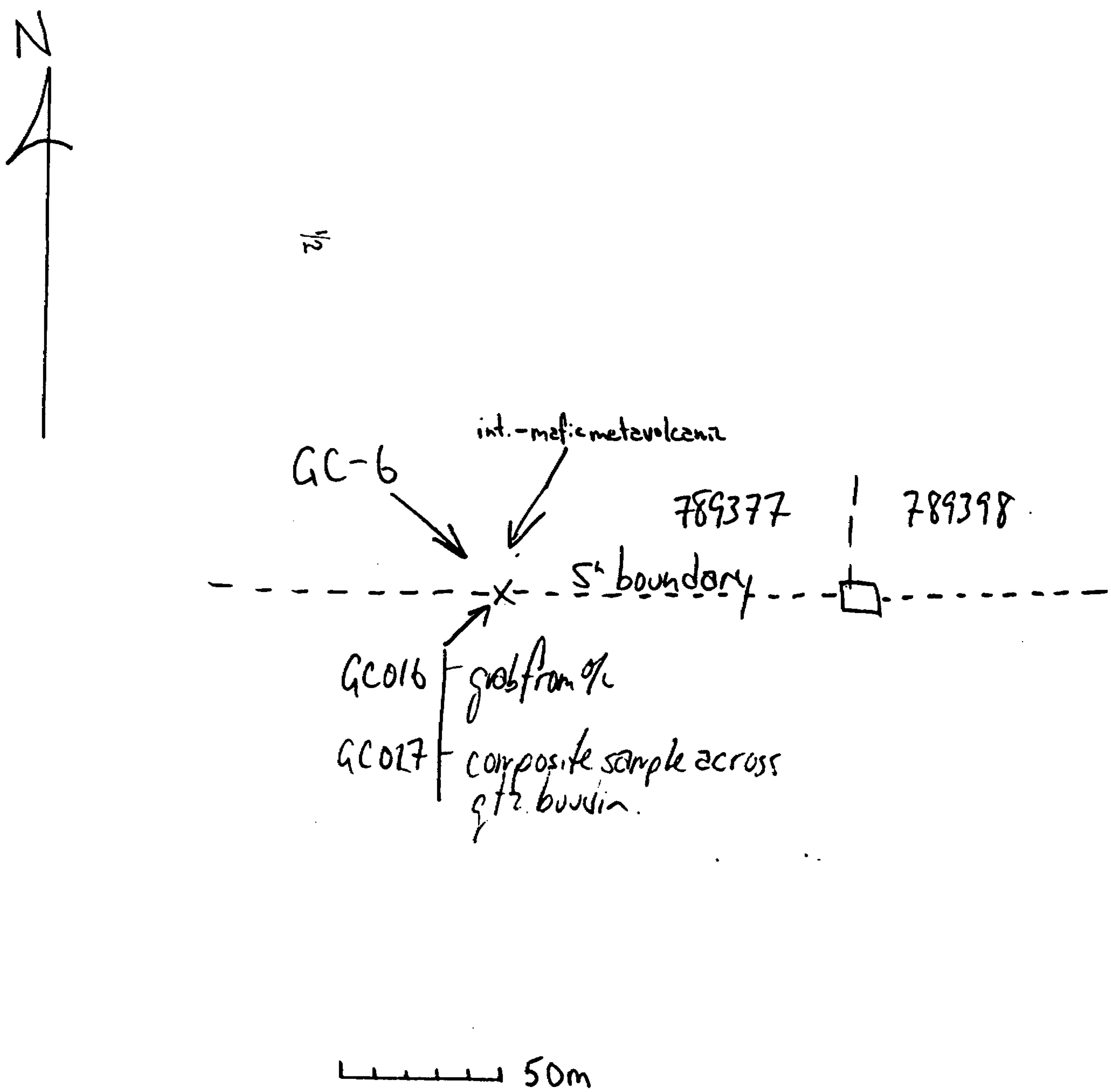
Weathering: green to grey weathering

Glacial Striae:

Sample No(s). if hand specimen(s) taken: GC-016, 017

(Doc. #0003U - 12.06.86)

GC-6


N
int.-mafic metavolcanic
GC-6
789377
789398
S^ boundary
GC016 grab from q/c
GC017 composite sample across qtz boudin.
50m

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-14

Photo No.:

Approximate dimensions and shape (sketch diagram over): ≈10m long x 1-2m wide

% Exposure: ≈50%

Rock Type(s & %):- mafic metavolcanic, resembles many previous exposures of basaltic pillow lavas, however no distinct pillow textures observed - contains trace to minor py

Contact Zones and Relationships:

Structures: So, S1, S2, S3 S1 weak to moderately developed

Cleavages

Folds ductile flow locally observed

Fracturation, Faulting, Veining-Density: boudined quartz filled fractures parallel to S1 are ubiquitous and are from 2mm to 4 cm in width - chlorite often associated with the quartz occasional fractures running 330°/45°E which offset quartz boudins

Jointing:

Alterations: Fe carbonate locally with coarse mica

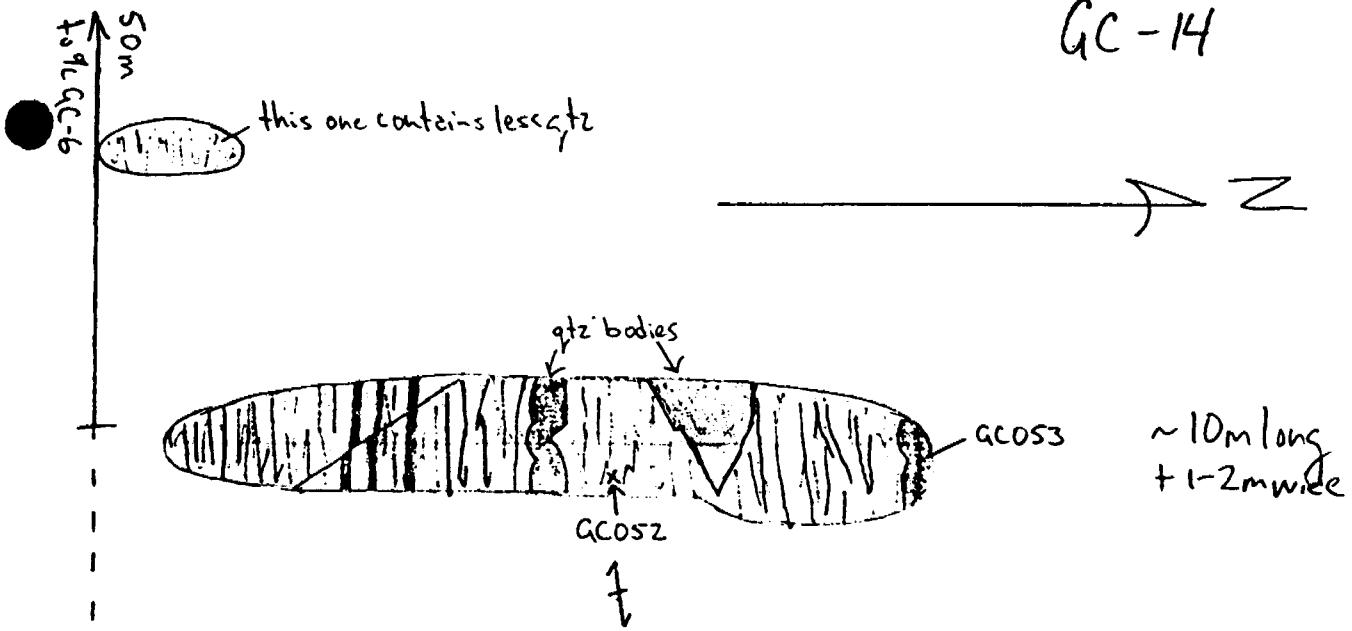
Weathering: greenish brown to beige on weathered surface

Glacial Striae:

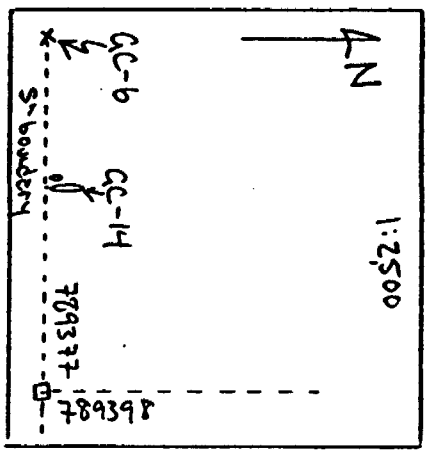
Sample No(s). if hand specimen(s) taken: GC-052 grab + GC-053 (composite grab)

(Doc. #0003U - 12.06.86)

GC-14



Scale
1:100
1cm = 1m



COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-3, 4, 5
Photo No.:

Approximate dimensions and shape (sketch diagram over):
All three are small exposures and occur in the same general vicinity

% Exposure: poorly exposed

Rock Type(s & %): - intermediate ashfall crystal tuff (GC-3, 4)
- diabase dyke (GC-5)
- well indurated (tuffs)

Contact Zones and Relationships: isolated o/c of diabase dyke but no contacts exposed

Structures: So, S1, S2, S3 So=S1: 80°subvertical
not developed in dyke

Cleavages

Folds

Fracturation, Faulting, Veining-Density:

Jointing:

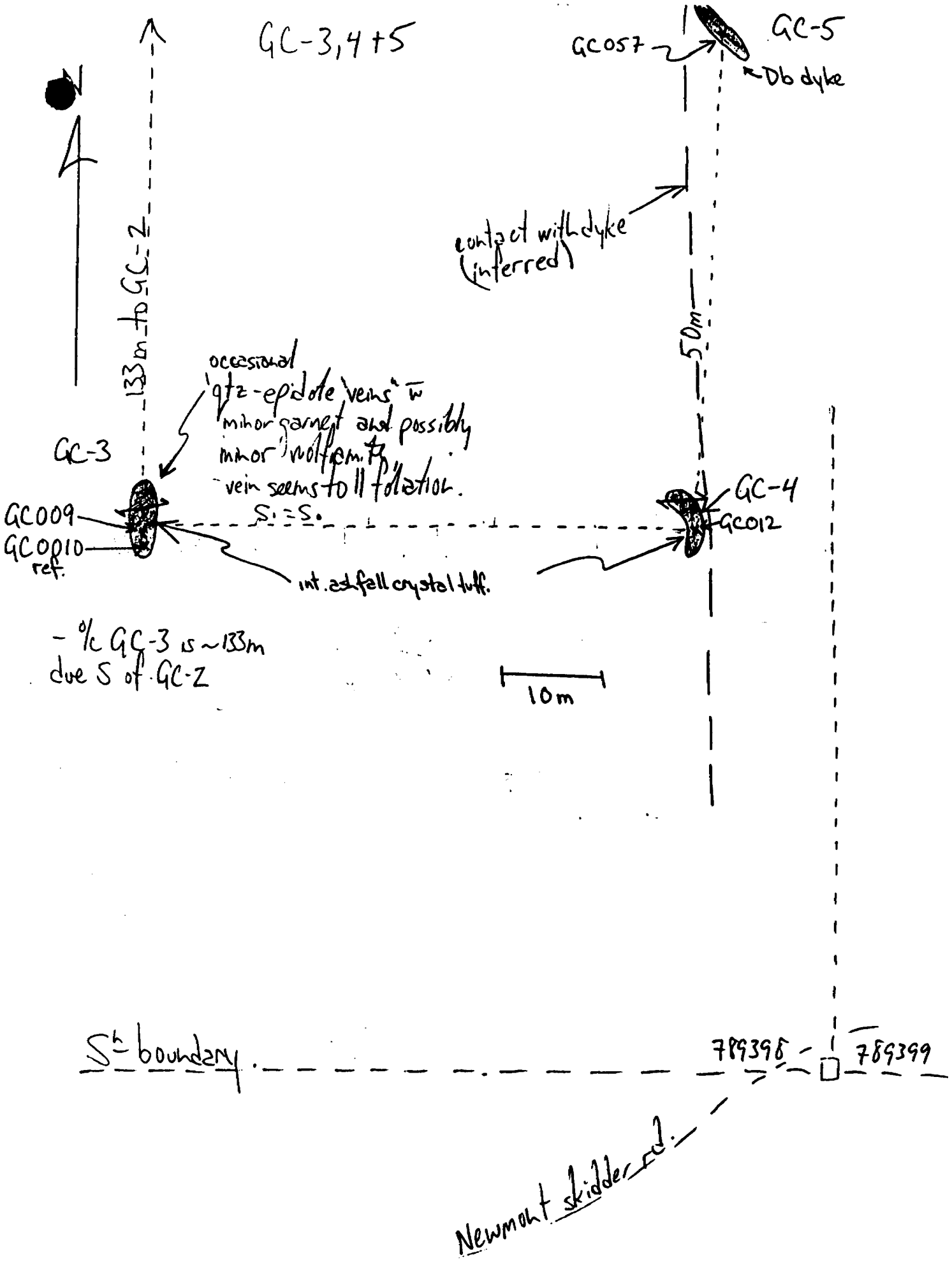
Alterations: Some quartz-epidote-garnet with possible wolframite along fracture fillings.

Weathering: Tuffs are beige to cream coloured on weathered surface
Diabase is brown

Glacial Striae:

Sample No(s). if hand specimen(s) taken: GC-009, 010, 012, 057

(Doc. #0013U - 18.09.86)


GC-3,4+5
GC057
GC-5
Db dyke
contact with dyke (inferred)
133m to GC-2
50m
occasional qtz-epidote veins w minor garnet and possibly minor wolfcm.? vein seems to ll foliation. S1 = S0
GC-3
GC009
GC0010 ref.
GC-4
GC012
int. ashfall crystal tuff.
- % GC-3 is ~133m due S of GC-2
10m
S1 boundary
789398
789399
Newmont skidder rd.

COGEMA CANADA LIMITÉE

BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-1

Photo No.:

Approximate dimensions and shape (sketch diagram over):

o/c can be seen from airphoto ≃75-80m long by 15-20m wide

% Exposure: ≃50% exposure

Rock Type(s & %): - diabase dyke, ≃5%

- intermediate ash fall crystal tuff ≃95%

- well laminated

- locally garnetiferous (metamorphic)

Contact Zones and Relationships: sequence of volcanics is conformable and dyke intrudes the sequence to the east

Structures: So, S1, S2, S3 So≃S1: 80°/subvertical

also what looks like the development of a shear direction - S3. S2 would be the axial plane of isoclinal folding

Folds Small scale folds are occasionally present, probably result of flow deformation

Fracturation, Faulting, Veining-Density:

- Quartz boudins found throughout (sweats)

- Fractures in dyke ≃80°

- Other fracture directions ≃110°/subv. 35°/subv., 140°, 165° rather all over

Jointing:

Alterations: quartz-epidote filled fractures, post-metamorphic (late)

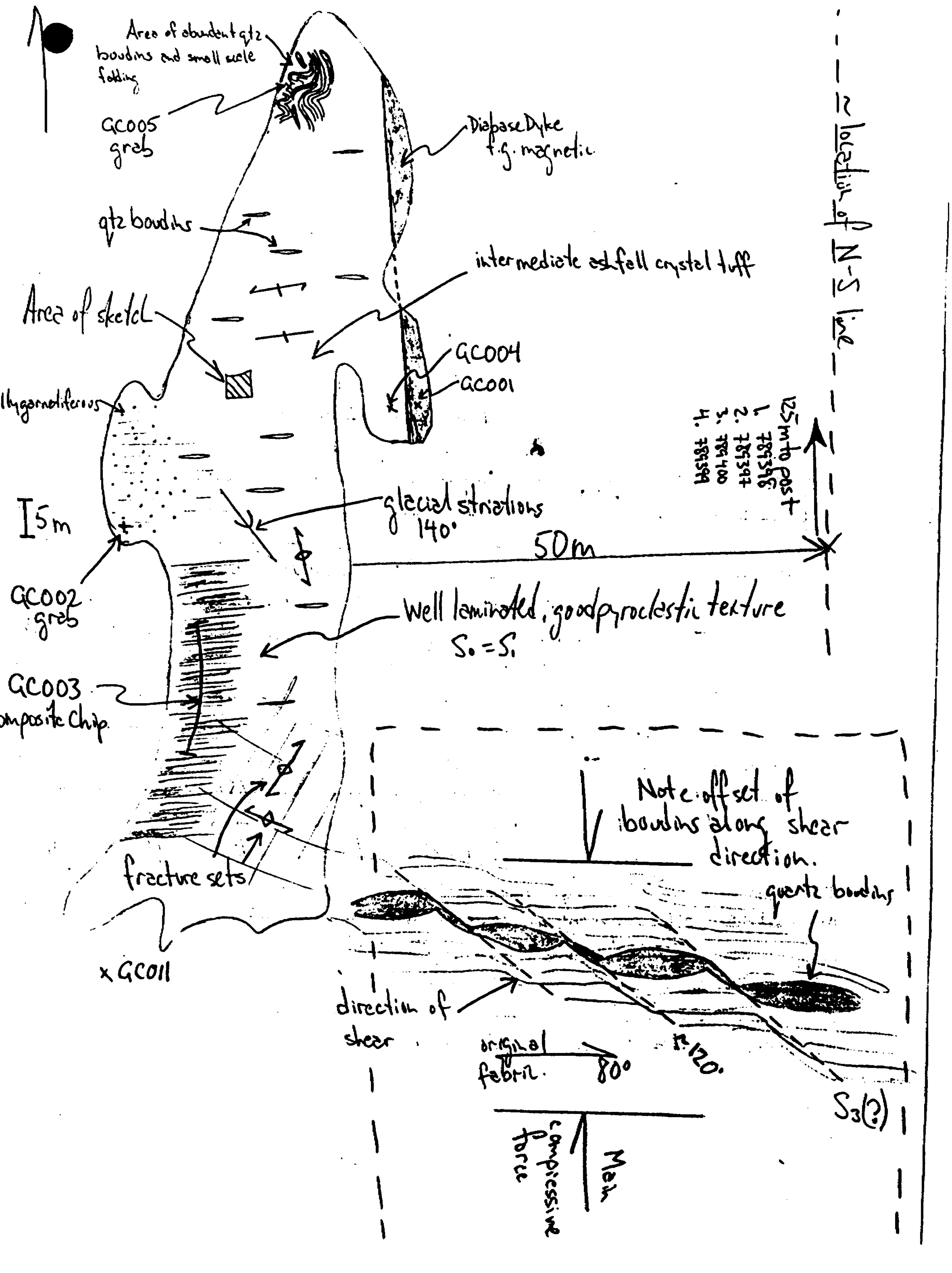
Weathering: greenish grey to cream weathering

Glacial Striae: ≃140°

Sample No(s). if hand specimen(s) taken: GC-001, 002, 003, 004, 005, 011

(Doc. #0003U - 12.06.86)

GC-1


N
Area of abundant qtz boudins and small scale folding
GC005 grab
Diabase Dyke f.g. magnetic
qtz boudins
intermediate ashfall crystal tuff
Area of sketch
GC004
GC001
weakly garnetiferous
5m
glacial striations 140°
50m
location of N-S line
125m to post
1. 785398
2. 785397
3. 785400
4. 785399
GC002 grab
Well laminated, good pyroclastic texture
$S_0 = S_1$
GC003 Composite Chip
Note offset of boudins along shear direction.
quartz boudins
fracture sets
x GC011
direction of shear
original fabric 80°
120°
S_3(?)
Main compressive force

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BURNTBUSH RIVER PROJECT

OUTCROP DESCRIPTION

Outcrop No.: GC-2
Photo No.:

Approximate dimensions and shape (sketch diagram over):
o/c can be seen on airphoto

% Exposure: ≃40% exposure

Rock Type(s & %): intermediate ash fall crystall tuff ≃92%
- may be more mafic at western end
- diabase dyke ≃8%
- occasional fragmental horizons, i.e. blocks, etc.

Contact Zones and Relationships: diabase forms intrusive contact with metavolcanics

Structures: So, S1, S2, S3 So=S1 ≃80°/subvertical

Cleavages Foliation - cleavage is moderately to well developed is better developed to the west where rocks become more biotite-rich. Again small scale folds are common and represent ductile flow.

Fracturation, Faulting, Veining-Density:
- quartz boudins common, probably derived from sweats
- these have been affected by 105° shear direction

Jointing:

Alterations: - limited to calcareous nature of matrix in some rocks to quartz epidote filled fractures which seem to parallel foliation
- minor disseminated sulfide along these

Weathering: Grey to dark green on weathered surface

Glacial Striae:

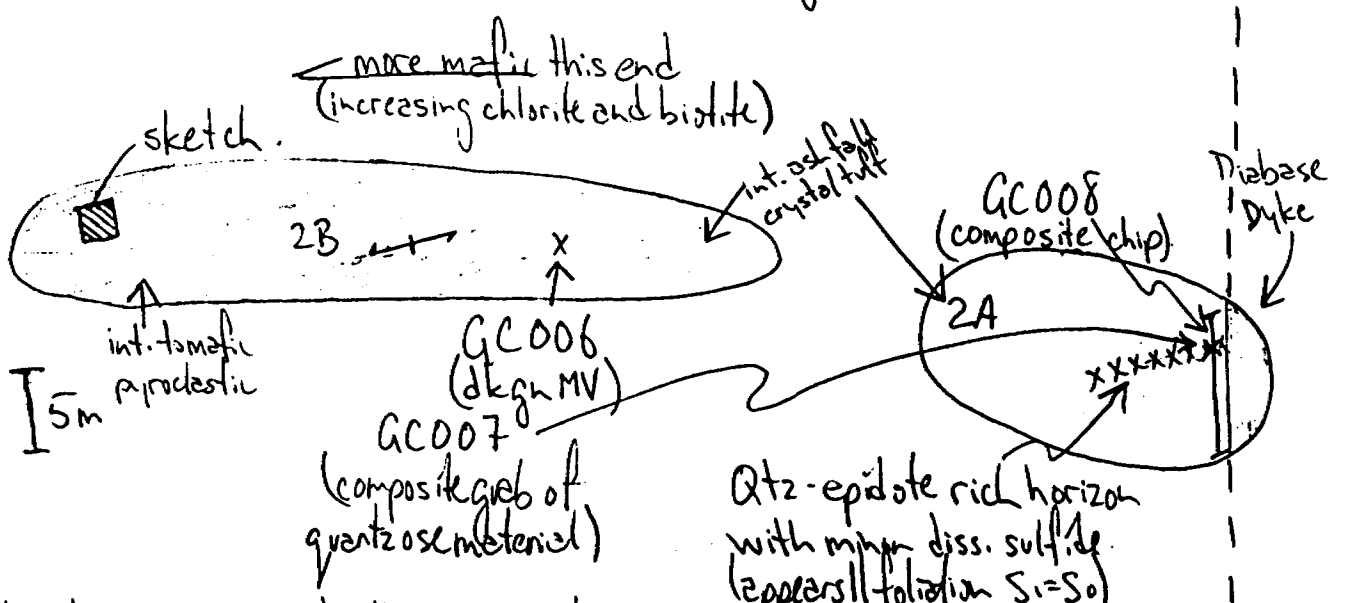
Sample No(s). if hand specimen(s) taken: GC-006, 007, 008

(Doc. #0013U - 18.09.86)

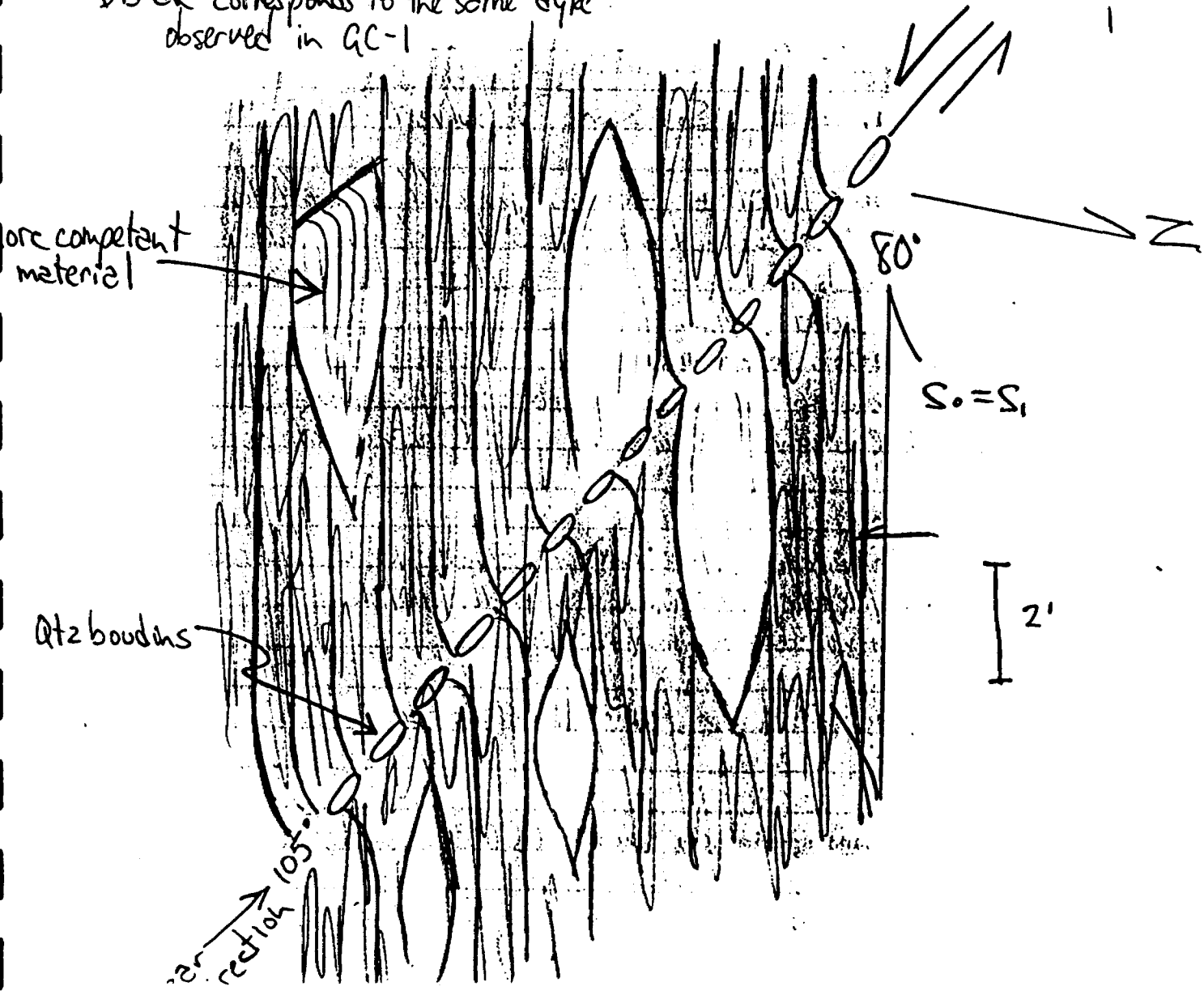
GC-2A+B

N

- one hundred meters S and slightly W of GC-1



Db dk corresponds to the same dyke observed in GC-1



APPENDIX III

Hand Specimen Descriptions

These are field documents, similar to the outcrop sheets, and were designed to promote systematic descriptions by different field geologists. They have not been excessively tampered with and mineral estimates between these documents and the (more correct) thin section sheets are commonly rather different.

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-1-1
from O/C JL-1

1. Mineralogy: %, habit, grain size:
   biotite 40% probably chloritized
   quartz 40%
   feldspar 20%
   hornblende ?
   fine grained </mm

2. Rock Texture, Colour, Hardness, etc.: dark green, slightly salt and pepper granolepidoblastic, re: not quite schistose but thinly banded (or is this an amphibole lineation ?)
   moderate hardness

3. Structures: thin section might show two crosscutting cleavages (low angle)
   thinly laminated

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): biotite schist (metasediment)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-8-2
from O/C JL-1-1

1. Mineralogy: %, habit, grain size:
   quartz, feldspar 95%
   minor biotite
   medium grained

2. Rock Texture, Colour, Hardness, etc.:
   whitish greyish greenish on fresh surface
   white to light pink on weathered rind, equigranular

3. Structures: minor quartz veining

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): felsic dyke
   (minor quartz vein incorporated in chemistry sample)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-7-A
from O/C JB-7

1. Mineralogy: %, habit, grain size:

quartz	30%
feldspar	30%
amphibole	20%
biotite	20%

very fine grained disseminated sulfide <1%

2. Rock Texture, Colour, Hardness, etc.:

schistose to weakly schistose
dark grey to grey
moderate hardness

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Biotite - amphibole schist (metasediment)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-7-B
from O/C JB-7

1. Mineralogy: %, habit, grain size:
same as JB-7-A
but some quartz vein incorporated in chemistry sample

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations: strongly weathered

5. Magnetism:

6. Rock name (Field Designation): Biotite - amphibole schist (metasediment)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-7-D/E
from O/C JB-7

1. Mineralogy: %, habit, grain size:
same as JB-7-A but carrying ≈50% quartz vein
quartz vein has layered appearance due to coarse biotite
laminations in vein, also coarse biotite on vein walls

2. Rock Texture, Colour, Hardness, etc.:
quartz is white to orange-coloured

3. Structures: laminations in vein

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Biotite amphibole schist with quartz vein

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-8-A
from O/C JB-8

1. Mineralogy: %, habit, grain size:

quartz	≃30%
feldspar	≃40%
amphibole	≃20%
biotite	≃10%

2. Rock Texture, Colour, Hardness, etc.:
medium grained granolepidoblastic foliation not well pronounced - dark grey (greenish grey) - moderately hard

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Biotite - amphibole schist (metasediment)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-8-B
from O/C JB-8

1. Mineralogy: %, habit, grain size:

quartz	≈35%
feldspar	≈40%
biotite	≈10%
muscovite	≈15%

2. Rock Texture, Colour, Hardness, etc.:

medium grained mica schist (lepidoblastic)
colour light grey
moderate hardness, somewhat soft to the knife

3. Structures: might see 2 fracture cleavages intersecting at low angles in thin section

4. Alterations: more strongly weathered than JB-8-A but lighter colour and high muscovite content might be partly responsible

5. Magnetism: no

6. Rock name (Field Designation): Mica schist (metasediment)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-1
from O/C JL-10

1. Mineralogy: %, habit, grain size:

feldspar phenocrysts ≈5-10% up to 5 mm

quartz phenocrysts ≈5-10% up to ≈2 mm

feldspar groundmass 45%)

quartz groundmass 25%) fine grained

biotite 15%)

2. Rock Texture, Colour, Hardness, etc.:

- hard
- weathers orange-pink
- fresh - light grey-white,
  feldspar phenocrysts yellowish

3. Structures: trends // to schistosity of host rocks
minor coarse grained phase inside dyke

4. Alterations: no alteration of host rock

5. Magnetism: no

6. Rock name (Field Designation): Quartz feldspar phorphyry dyke - (minor coarse grained phase incorporated in chemistry sample) (no magnetic susceptibility

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-2
from O/C JL-10

1. Mineralogy: %, habit, grain size:

biotite 30% (amphibole too ?)
quartz 20%
feldspar 50%
minor pyrite
hand specimen really looks metasedimentary but in O/C can see rounded pebbles → reworked tuff ?
rock is fine-grained

2. Rock Texture, Colour, Hardness, etc.: granolepidoblastic thinly laminated but not fissile - grey-white weathers dark grey green with thin brown laminations

3. Structures: Sl clearly visible - fracture cleavage (vertical) and subhorizontal cleavage observable on outcrop

4. Alterations: thin brown laminations - Fe carbonate ?

5. Magnetism: no

6. Rock name (Field Designation): Reworked intermediate tuff or flattened pillow lava

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-3
from O/C JL-10

1. Mineralogy: %, habit, grain size:

more or less identical to JL-10-2
but taken from other side of granite dyke
along strike of pillow lava

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Pillow lava

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-4
from O/C JL-10

1. Mineralogy: %, habit, grain size:

amphibole, biotite 30%

quartz 20%

feldspar 50%

- fine grained

2. Rock Texture, Colour, Hardness, etc.: some pieces look thinly laminated. other look lineated, one looks fairly massive - dark greyish - moderately hard

3. Structures: small pillows observed in O/C

4. Alterations: thin brownish layers → Fe carbonate ?
moderately hard → silicified ?

5. Magnetism: no

6. Rock name (Field Designation): Pillow lava (silicified ?)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-5
from O/C JL-10

1. Mineralogy: %, habit, grain size:

elongate hornblende	50%	1 cm x 1 mm ?
quartz feldspar	50%	fine grained

well crystallized

2. Rock Texture, Colour, Hardness, etc.: lineated, not really schistose but appears well laminated if looking at proper face, looks equigranular

3. Structures: mineral lineation well developed

4. Alterations: no

5. Magnetism: no

6. Rock name (Field Designation): Lineated amphibolite (intrusive rock or massive flow)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-6
from O/C JL-10

1. Mineralogy: %, habit, grain size:
mineralogy very similar to JL-10-2

2. Rock Texture, Colour, Hardness, etc.: thinly laminated undulose Sl

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Intermediate tuff

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-7
from O/C JL-10

1. Mineralogy: %, habit, grain size:
   quartz 95%
   altered feldspar (?) ≈5%
   crystalline quartz vein, minor coarse white mineral

2. Rock Texture, Colour, Hardness, etc.: bluish to translucent, visible banding // vein walls

3. Structures:

4. Alterations: alters enclosing wall rock over a few cm (bleaching to light orange colour of the lineated amphibolite)
   Note due to weathering of vein walls, quartz vein weathers in (not up)

5. Magnetism:

6. Rock name (Field Designation): Quartz vein grab sample

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-8
from O/C JL-10

1. Mineralogy: %, habit, grain size:
same as JL-10-6

2. Rock Texture, Colour, Hardness, etc.: thinly laminated undulose Sl, resembles metasediment even more so than JL-10-2. Small O/C but no pebbles observed.

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Intermediate tuff

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-9
from O/C JL-10

1. Mineralogy: %, habit, grain size:

quartz 95%

altered feldspar (?) <5%

coarse mica, green mica ≃1%

2. Rock Texture, Colour, Hardness, etc.: quartz vein

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Quartz vein grab sample - some country rock incorporated

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-10
from O/C JL-10

1. Mineralogy: %, habit, grain size:

quartz 30% elongated

feldspar 60%

mica 10%

shows linear or planar fabrics

2. Rock Texture, Colour, Hardness, etc.: stretched quartz - weathers pink but fresh rock more pinkish grey

3. Structures: thin quartz veins // shear direction

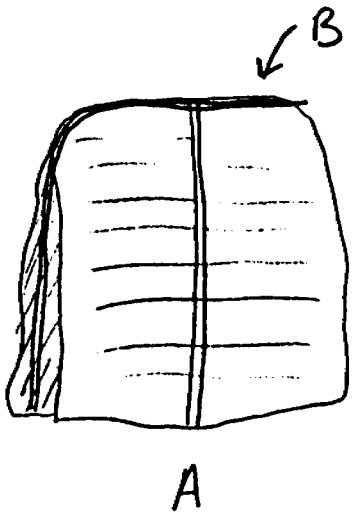
4. Alterations: sericite ?

5. Magnetism: no

6. Rock name (Field Designation): granite dyke - sheared

(Doc. #0012U - 12.09.86)

2 thin sections requested



B // elongated minerals

A across elongated minerals

Question → lineation or foliation ?

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-11
from O/C JL-10

1. Mineralogy: %, habit, grain size:
grab sample from shear (?) zone, but most of sample is vein material weathering up in softer shear (?) zone
chemistry only, no thin section, magnetic susceptibility

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-12
from O/C JL-10

1. Mineralogy: %, habit, grain size:

same as JL-10-5

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Lineated amphibolite

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-10-13
from O/C JL-10

1. Mineralogy: %, habit, grain size:

2. Rock Texture, Colour, Hardness, etc.:
   - sugary texture
   - brownish alteration in flattened pillow lava

3. Structures:

4. Alterations: Fe carbonate ?

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-8-1

1. Mineralogy: %, habit, grain size:
   quartz ≈70-75% grain fin
   biotite ≈25-30% définissant bien une foliation (schistosité)
   aucun sulfure visible
   pas de feldspath??

2. Rock Texture, Colour, Hardness, etc.:
   - roche très bien laminée (à l'échelle millimétrique)
   couleur gris foncé à noir (sur certaines surfaces: blanc & noir)
   - homogène, isogranulaire, grain fin
   - granolépidoblastique

3. Structures:

4. Alterations: biotite semble fraîche
   aucune altération détectable

5. Magnetism: aucun magnétisme

6. Rock name (Field Designation): ?? tuf ou métasédiment
   schiste à biotite

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-8-2

1. Mineralogy: %, habit, grain size:
   dyke de granite

   quartz feldspath: 95% quartz>feldspath
   biotite 5%

2. Rock Texture, Colour, Hardness, etc.:
   couleur rosée à chair
   plus résistant que la roche encaissante
   grain fin, isogranulaire

3. Structures: on croit deviner un léger alignement des biotites
   aucune évidence de cisaillement

4. Alterations: légère altération des feldspaths

5. Magnetism: aucun magnétisme

6. Rock name (Field Designation): granite (dyke)

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-8-3

1. Mineralogy: %, habit, grain size:

idem AM-8-1 mais plus riche en biotite: 30-40%

autre constituant: quartz

2. Rock Texture, Colour, Hardness, etc.:

- dureté élevée
- granolépidoblastique, grain fin, homogène
- couleur de la roche foncée

3. Structures: bonne foliation/schistosité

4. Alterations:

5. Magnetism: aucun magnétisme

6. Rock name (Field Designation): schiste à biotite

tuf ou métasédiment??

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-9
from O/C JL-10

1. Mineralogy: %, habit, grain size:
   channel sample using rock saw of pillow lava
   Fe carbonate (?) alteration

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-10
from O/C JL-10

1. Mineralogy: %, habit, grain size: channel sample across pillow lava using rock saw

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-17-1
from O/C JL-17

1. Mineralogy: %, habit, grain size:

)	hornblende	50%	) altering to actinolite/chlorite ?
sample 17-1A)	feldspar	30%	) medium grained
)	quartz	15%	)
)	biotite	5%	)

sample 17-1B) has significantly lower feldspar/quartz content
hornblende elongate (lineation)
thin white bands altered feldspar seem to give O/C
a foliation plane to measure (was this just a
fracture cleavage ?)

2. Rock Texture, Colour, Hardness, etc.:
definitely lineated, not foliated - moderate hardness -
fresh sfc blackish, but feldspar weathers white

3. Structures: lineated

4. Alterations: actinolite/chlorite alteration of hornblende

5. Magnetism: no

6. Rock name (Field Designation): Lineated amphibolite (intrusive rock ?)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-17-2
from O/C JL-17

1. Mineralogy: %, habit, grain size:
   grab chip sample from sinewy shear (stn. 1)
   some vein material

   fairly small quantity of material - chemistry only

2. Rock Texture, Colour, Hardness, etc.:
   vein material fairly hard, rest of material weathers in.

3. Structures: sinewy shear

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-17-3
from O/C JL-17

1. Mineralogy: %, habit, grain size:

hornblende ≈50% medium grained
quartz/feldspar ≈40%) fine grained
biotite ? ≈10%)

hornblende elongate

2. Rock Texture, Colour, Hardness, etc.: lineated → speckled black and white on plane | long axis of hornblende, streaky black // long axis of hornblende
moderately soft

3. Structures: lineated; hand specimen (particularly part sent for thin section) seems to show 2 cleavages intersecting at low angles

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Lineated amphibolite (intrusive rock ?)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-17-4
from O/C JL-17

1. Mineralogy: %, habit, grain size:

feldspar 60%

quartz 35% fine to medium grained

biotite 5% fine to medium grained

weakly porphyritic (feldspar ≈2-3 mm

very weak planar fabric (mica)

2. Rock Texture, Colour, Hardness, etc.: moderately hard - weathers light pink, fresh surface slightly more greyish

porphyritic in equigranular groundness

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Granite dyke (discordant)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-17-5
from O/C JL-17

1. Mineralogy: %, habit, grain size:

amphibole	90%	medium-coarse grained
quartz/feldspar (?)	10%	fine grained

amphibole elongate

2. Rock Texture, Colour, Hardness, etc.: well lineated, black, moderately hard

3. Structures: lineation

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Lineated amphibolite (intrusive rock ? → coarse grained phase)

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-7
from O/C JL-17

1. Mineralogy: %, habit, grain size:

channel sample with rock saw across JL-17 stn. 16-1
rock type is lineated amphibolite
amphibole 40%
feldspar 50%
quartz 10%
but with chocolate brown (Fe carbonate?) alteration
and quartz veins giving appearance of S1

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations: Fe carbonate (?)

5. Magnetism: no

6. Rock name (Field Designation): Lineated amphibolite

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-8
from O/C JL-17

1. Mineralogy: %, habit, grain size:
JL-17 stn. 2 - rock type E
sampled with rock saw (couldn't sample with chisel)

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Intermediate feldspar porphyry (xenolith)
thin section of contact with amphibolite

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-26-1
from O/C JL-17

1. Mineralogy: %, habit, grain size:

lineated amphibolite with weak pyritic alteration adjacent to 3 cm felsic porphyry dyke

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-26-2

1. Mineralogy: %, habit, grain size:

feldspar porphyry dyke 3 cm (felsic)
causing alteration described in JL-26-1

thin section only

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Feldspar porphyry

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-13-1
from O/C JL-13

1. Mineralogy: %, habit, grain size:
very fine grained strongly chloritic rock

2. Rock Texture, Colour, Hardness, etc.:
dark green - soft - thinly laminated

3. Structures: truncation of S1 (see over)

4. Alterations: chlorite

5. Magnetism: no

6. Rock name (Field Designation): Mafic tuff (composite sample)

(Doc. #0012U - 12.09.86)

truncated S_1
observable both
in hand specimen
and on outcrop scale.
(outcrop scale see JL-14
only 50m away).

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-1
from O/C JL-14

1. Mineralogy: %, habit, grain size:
   hornblende ≈30% probably more, fine to medium-grained
   biotite ≈10% ?
   feldspar, quartz - fine-grained
   strongly chloritic

2. Rock Texture, Colour, Hardness, etc.: schistose, granolepidoblastic
   fresh sfc medium gray, weathered sfc medium to dark green
   fresh sfc moderately soft, weathered sfc soft

3. Structures: S1 appears to be a slip plane, glossy smooth locally crenulated and crumpled

4. Alterations: strongly chloritic

5. Magnetism: no

6. Rock name (Field Designation): Mafic to intermediate tuff

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-2
from O/C JL-14

1. Mineralogy: %, habit, grain size:

hornblende	30%	medium grained
biotite	30%	medium grained
quartz feldspar	40% (?)	very fine grained

thin bands white mineral (mm scale) altered feldspar ?
moderately chloritic, sericitic (?)
(similar to JL-14-1 but with higher mica content and
mm white bands // S1)

2. Rock Texture, Colour, Hardness, etc.: Alternating amphibole/mica rich bands 1-5 cm scale, granolepidoblastic to lepidoblastic, moderately soft. Fresh dark to medium gray weathers greenish (amphibole), brownish (mica) with thin white bands not easily detected on fresh sfc.

3. Structures: S1 clearly defined by mica, white mineral, some S1, sfcs glossy suggesting slip.

4. Alterations: chloritic, sericitic (?)

5. Magnetism: no

6. Rock name (Field Designation): Intermediate to mafic tuff

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-3
from O/C JL-14

1. Mineralogy: %, habit, grain size: similar to JL-14-1 and JL-14-2 but with quartz vein incorporated into sample

2. Rock Texture, Colour, Hardness, etc.: note quartz vein may be colourless to whitish, reddish, yellowish

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Intermediate to mafic tuff with quartz vein

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-4
from O/C JL-14

1. Mineralogy: %, habit, grain size:
similar to JL-14-2 but more quartz veining
(no quartz vein in chemistry sample)

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations: brownish (Fe carbonate ?) alteration present but perhaps not strong

5. Magnetism:

6. Rock name (Field Designation): Intermediate to mafic tuff

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-4A
from O/C JL-14 stn. 4

1. Mineralogy: %, habit, grain size:

same as JL-14-4 but with quartz vein in contact with host rock -
coarse green mineral is feldspar (?)

- thin section only

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-5
from O/C JL-14

1. Mineralogy: %, habit, grain size:
similar to JL-14-2 but overall richer in mica
- appears to be altered biotite (sericitic alteration ?)

2 thin sections - one amphibole rich
- one mica rich

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Intermediate to mafic tuff
(no magnetic susceptibility sample)

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-6
from O/C JL-14

1. Mineralogy: %, habit, grain size:

quartz / feldspar	70%	fine grained
sericite	20%	fine to medium grained
biotite	10%	fine to medium grained

minor thin quartz vein

Note: is this an intrusive or strongly altered rock?
Thin section shows 2 rock types and contact

2. Rock Texture, Colour, Hardness, etc.:

weakly to moderately oriented fine grained felsic rock
moderate hardness
pinkish white

3. Structures: S1 strongly contorted here due to veining (mostly quartz)

4. Alterations: sericite

5. Magnetism: no

6. Rock name (Field Designation): Sericitic alteration of intermediate to felsic tuff or felsic dyke.

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-14-7
from O/C JL-14

1. Mineralogy: %, habit, grain size:

quartz	40%	
feldspar	40%	fine to medium grained
biotite	20%	

quartz vein removed from chemistry sample

2. Rock Texture, Colour, Hardness, etc.: very fissile at >cm scale - hand specimen shows planar orientation but not strong enough to be called schistosity → granoblastic moderately hard - fresh sfc medium to light grey, weathers greenish brown

3. Structures:

4. Alterations: sericitic alteration and silicification adjacent to quartz vein

5. Magnetism: no

6. Rock name (Field Designation): altered mafic tuff

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-24-1
from O/C JL-24 stn.7

1. Mineralogy: %, habit, grain size:

quartz-feldspar	∝40% ?
chlorite (after pyroxene, hornblende ?)	∝50% ?
biotite	∝10% ?

fine grained
strongly chloritic

2. Rock Texture, Colour, Hardness, etc.: schistosity moderately well defined but disturbed by strong nearby quartz veining - reasonably soft - dark greyish green weathers dark green

3. Structures:

4. Alterations: note brownish mica on fractures // Sl - strongly chloritic close to strong quartz veining

5. Magnetism: no

6. Rock name (Field Designation): Mafic tuff or sheared mafic flow

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-24-2
from O/C JL-24 stn.7

1. Mineralogy: %, habit, grain size:

vein quartz

<1% host rock (JL-24-1)

fairly clean quartz, no sulfide

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-1
from O/C JL-24 stn. JL-14-6A

1. Mineralogy: %, habit, grain size:

grab sample of chloritic mafic volcanic from zone of visible yellow orange alteration related to mm fractures near quartz vein

(≃10% of sample altered in this manner)

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-2

1. Mineralogy: %, habit, grain size:

grab sample of chloritic mafic volcanic from zone of pyrite enrichment (rusty weathering along fracture)

pyrite finely disseminated in host rock and weakly concentrated along fractures

total pyrite content <1%

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-3
from O/C JL-24

1. Mineralogy: %, habit, grain size:

channel sample from O/C JL-24 stn. 8

length ≈3 m across S1

(used rock saw)

chloritic mafic volcanic with minor quartz vein

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-4
from O/C JL-24

1. Mineralogy: %, habit, grain size:

thin ≈40 cm ? zone of silicification and thin quartz-carbonate (mm scale) stockwork in chloritic mafic volcanic

significant pyrite >1% fine grained but clearly visible

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations: silicification, quartz-carbonate stockwork, pyrite

5. Magnetism: one spot very weakly magnetic → pyrrhotite

6. Rock name (Field Designation):

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-5
from O/C JL-24

1. Mineralogy: %, habit, grain size:
rusty weathered zone from stn. 2
pyrite still <1% very finely disseminated through rock -
also minor thin yellowish orange alteration related to
mm fractures
grab sample; used rock saw but attempted to sample only rusty
weathered material

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Altered chloritic mafic volcanic

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-25-6
from O/C JL-24

1. Mineralogy: %, habit, grain size:

same as JL-25-5 but from stn. 4 ≈50 m to the east.

this sample weakly silicified

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-15-1

1. Mineralogy: %, habit, grain size:

amphibole)	60%	grain fin/moyen, quelquefois cristaux bien formés
biotite)		
quartz	35%	
grenat	3%	
magnétite	1-2%	

Il est difficile d'estimer le pourcentage d'amphibole versus biotite mais % amphibole < biotite

2. Rock Texture, Colour, Hardness, etc.:

Surface fraîche, couleur vert foncé, surface altérée, alternance de bandes vert foncé et buff. Roche très dure.

Roche isogranulaire (à part des grenats) avec foliation/schistosité visible sur certaines faces.

La magnétite est visible sur surfaces fraîches.

3. Structures:

4. Alterations: légère altération des amphiboles/biotite

altération brunâtre Fe/Ca

5. Magnetism: oui sur certains niveaux cm à mm. Sur surface altérée, ces niveaux sont de couleur vert bouteille. Magnétite visible ≈1-2%

6. Rock name (Field Designation): tuf intermédiaire

(Doc. #0004U - 12.06.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-15-2

1. Mineralogy: %, habit, grain size:

amphibole 60%

feldspath 30%

biotite 10% ??

équigranulaire, grain fin, les amphiboles sont parfois bien formées, il y a des doutes sur la présence de biotite

2. Rock Texture, Colour, Hardness, etc.:

Sur surface fraîche, couleur de la roche vert foncé à noir; en surface altérée, vert moyen foncé + couleur pêche. Massive avec légère linéation?? Roche dure à très dure

3. Structures:

Linéation visible

4. Alterations:

Altération des feldspath

5. Magnetism: Ne semble pas être magnétique sur échantillon mais l'affleurement peut être magnétique par endroits.

6. Rock name (Field Designation): Métagabbro (intrusif)

(Doc. #0004U - 12.06.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-15-3

1. Mineralogy: %, habit, grain size:

altered metagabbro

weakly pyritic zone

chemistry only

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0004U - 12.06.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-15-4

1. Mineralogy: %, habit, grain size:

channel sample across tuff outcrop

where tuff carries no garnet, no magnetite

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-034

1. Mineralogy: %, habit, grain size: - grab from o/c GC-12
   - very fine to fine grained, phaneritic
   - plagioclase, pyroxene, + fine grained mica

2. Rock Texture, Colour, Hardness, etc.: - beige to grey weathering
   - dark grey on fresh surface
   - pyroclastic texture, finely laminated with large lapilli fragments

3. Structures: - moderately developed foliation $S_1 = S_o$, strong flow deformation
   - cut by occasional subhorizontal fractures
   - small scale folds developed, finely laminated S_o

4. Alterations: - none, pervasive
   - fractures are calcareous
   - quartz tourmaline vein, see sample GC-058

5. Magnetism: no

6. Rock name (Field Designation): intermediate lapilli tuff

(Doc. #0004U - 12.06.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-038

1. Mineralogy: %, habit, grain size:
   - grab from o/c GC-12
   - very fine grained, phaneritic
   - biotite flakes
   - strongly chloritic

2. Rock Texture, Colour, Hardness, etc.:
   - green on weathered surface
   - green on fresh surface
   - soft poorly exposed

3. Structures: - moderately foliated - 80°/subvertical
   - biotite crystals in planar alignment

4. Alterations: - strongly chloritic

5. Magnetism: no

6. Rock name (Field Designation): mafic metavolcanic

(Doc. #0016U - 18.11.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-058

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-12
   - composite grab from quartz tourmaline vein
   - 5-10 cm thick, irregular
   - did not follow fracture but moved all over

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:**

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** quartz tourmaline vein

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-037

1. Mineralogy: %, habit, grain size: - grab from o/c GC-13
   - very fine grained, phaneritic
   - trace of minor sulfide along fractures and disseminated
   - biotite flakes

2. Rock Texture, Colour, Hardness, etc.: - dark green on weathered surface
   - light greenish brown on weathered surface
   - mottled appearance on weathered surface, i.e. almost looks like foliated vesicular basalt

3. Structures: - very weakly foliated - $S_1 = S_o \simeq 130^o/16NE$
   - fractures often carbonate filled

4. Alterations: - carbonate filled fractures - minor in abundance and very mildly calcareous matrix

5. Magnetism: yes

6. Rock name (Field Designation): metabasalt - vesicular (tentative)
   - pillowed?

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-036

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-11
   - fine grained, phaneritic
   - plagioclase
   - pyroxene, biotite

2. **Rock Texture, Colour, Hardness, etc.:** - grey weathering, grey on fresh surface
   - reworked pyroclastic texture suggestive of volcanic origin but has gritty feel and abundant biotite

3. **Structures:** Finely laminated $S_1 = S_o$
   $S_1 = S_o$ 80/35°N - weak to moderately foliated
   Small scale folds developed
   Vertical fractures at ≈136° with occasional quartz fillings

4. **Alterations:**
   - Occasional segregations (small) of quartz chlorite and unidentified brown mica

5. **Magnetism:** yes, occasional magnetite bands

6. **Rock name (Field Designation):** Intermediate crystal tuff - possibly reworked to some degree

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-059

1. Mineralogy: %, habit, grain size: - grab from o/c GC-11
   - fine medium grained
   - plagioclase
   - biotite
   - garnet porphyroblasts

2. Rock Texture, Colour, Hardness, etc.: - grey to light green weathering
   - magnetite bands may be indicative of reworking

3. Structures: - moderately developed foliation 80/35°N, might be lineated
   - small scale folds developed

4. Alterations:

5. Magnetism: yes - magnetite bands

6. Rock name (Field Designation): mafic metavolcanic

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION **Sample No.:** GC-060

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-11
   - similar to GC-036

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:**

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate crystal tuff, reworked to some degree

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-035

1. Mineralogy: %, habit, grain size: - grab from o/c GC-10
   - fine grained, phaneritic
   - plagioclase, biotite, pyroxene, chlorite, magnetite

2. Rock Texture, Colour, Hardness, etc.: - light green on weathered surface
   - green on fresh surface
   - biotites show excellent alignment with foliation

3. Structures: - weak to moderately developed foliation - biotite

4. Alterations: - very mildly calcareous

5. Magnetism: yes, magnetite

6. Rock name (Field Designation): mafic metavolcanic - probably pillow lavas

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION **Sample No.:** GC-022

1. **Mineralogy: %, habit, grain size:**
   - grab from o/c GC-9
   - fine to medium grained
   - plagioclase - phenocrysts
   - clinopyroxene
   - biotite

2. **Rock Texture, Colour, Hardness, etc.:**
   - green weathering
   - glomeroporphyritic (?) plagioclase occur in clusters and float in a matrix ~~of epidote (and biotite(?))~~
   - occasional calcite rich patches.
   - textures ambiguous
   - dark green grey on fresh surface

3. **Structures:**
   - small scale folding - ductile flow
   - occasional quartz boudins
   - weak to moderate foliation

4. **Alterations:**
   - chloritic - retrograde
   - calcareous

5. **Magnetism:** no

6. **Rock name (Field Designation):** mafic metavolcanic (flow or pillows)

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-021

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-8
   - medium grained
   - plagioclase
   - biotite
   - unidentified tan to brown coloured mica, may be hydrobiotite
   - trace sulfide

2. **Rock Texture, Colour, Hardness, etc.:** - green weathering, green on fresh surface. Intersecting fracture sets have obscured textures but they are very similar to previously described pillow basalts

3. **Structures:** - weakly developed fracture cleavage
   - actually three intersecting sets of fractures
   - very tight small scale folding

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** mafic metavolcanic - may be pillows

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-15-A

1. Mineralogy: %, habit, grain size:
   coarse grained feldspar (plagioclase) phenocrysts (2mm)
   ferromag., amph/cpx/biot.
   qtz
   very similar to GC-054 but less deformed
   GC-054 better defined S1(?) due to small scale folding

2. Rock Texture, Colour, Hardness, etc.: moderate hardness
   dark greenish black
   lineated, foliated

3. Structures: lineated, foliated

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): mafic to intermediate volcanics
   (tuff or flow)

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-15-B

1. Mineralogy: %, habit, grain size: medium grained schistose
biotitic
slightly chloritic
probably a variation on JB-15-A/GC-054
significant medium grained pyrite ≃1%
minor quartz vein ≃3%

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-15-C

1. Mineralogy: %, habit, grain size: fine grained schistose
biotitic
slightly chloritic
no feldspar phenocrysts evident as per JB-15-A,B

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JB-15-D

1. Mineralogy: %, habit, grain size: very fine grained schistose
≈20% quartz veins (with minor feldspar, carbonate, wall rock fragments)

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation):

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-054

1. **Mineralogy: %, habit, grain size:**
   - grab from o/c GC-15
   - fine to medium grained
   - plagioclase
   - biotite-chlorite (and/or amphibole)
   - trace sulfide

2. **Rock Texture, Colour, Hardness, etc.:** - beige to green weathering, green on fresh surface

3. **Structures:**
   - small quartz veinlets found throughout
   - weak to moderately developed foliation 110°/subvertical
   - weakly lineated

4. **Alterations:** - matrix is calcareous

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate to mafic metavolcanic, probably of pyroclastic origin

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-055

1. Mineralogy: %, habit, grain size: - grab of quartzose material from o/c GC-15
   - chlorite associated with quartz
   - host rock is similar to GC-054

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): quartzose material - boudins

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-056

1. Mineralogy: %, habit, grain size: - grab from o/c GC-15 - host rock
   - fine to medium grained
   - plagioclase
   - biotite

2. Rock Texture, Colour, Hardness, etc.: - beige to light green on fresh surface
   - calcite filled vesicles
   - biotites give rock a streaky appearance
   - lots of quartz boudins ≈40% of o/c, between boudins the host rock shows strong flow movement

3. Structures: - moderately foliated

4. Alterations: - pervasive carbonate

5. Magnetism: no

6. Rock name (Field Designation): mafic metavolcanic - basaltic flow or pillows

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-018

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-7
   - fine grained, phaneritic
   - plagioclase, clinopyroxene, magnetite (abundant)
   - chloritic

2. **Rock Texture, Colour, Hardness, etc.:** - light green to buff weathering
   - green on fresh surface
   - vesicular pillows
   - vesicles now filled with quartz
   - occasional quartz veinlet (barren) <1cm thickness

3. **Structures:** - moderate foliation - chlorite

4. **Alterations:** - chloritic (retrograde)

5. **Magnetism:** - strongly - magnetite

6. **Rock name (Field Designation):** vesicular basalt pillow lavas

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-019

1. **Mineralogy: %, habit, grain size:**
   - grab from o/c GC-7
   - fine grained
   - plagioclase
   - biotite abundant
   - unidentified tan coloured mica
   - trace sulfide - py

2. **Rock Texture, Colour, Hardness, etc.:**
   - green to greenish on weathered surface, weak to moderately developed foliation
   - dark greenish grey on fresh surface

3. **Structures:** - occasional calcite veins

4. **Alterations:**
   - chloritic (retrograde)
   - calcareous (pervasive)

5. **Magnetism:** no

6. **Rock name (Field Designation):** pillow basalts

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-020

1. Mineralogy: %, habit, grain size: - grab from o/c or boulder GC-7
   - fine grained, phaneritic
   - plagioclase, pyroxene, biotite

2. Rock Texture, Colour, Hardness, etc.: - greenish grey on fresh surface

3. Structures: - weak to moderate foliation

4. Alterations: - chloritic (retrograde)

5. Magnetism: no

6. Rock name (Field Designation): mafic metavolcanic

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-016

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-6
   - very fine grained, phaneritic
   - biotitic
   - plagioclase, pyroxene
   - quartz boudins

2. **Rock Texture, Colour, Hardness, etc.:** - light greenish grey on fresh surface
   - finely laminated - bedding?
   - foliated (micaceous)
   - grey on fresh surface
   - occasional lapilli size fragments?
   - chlorite is starting to localize along quartz boudins

3. **Structures:** - weakly developed crenulations along cleavage surfaces
   - occasional quartz boudins - small scale folds
   - cut by occasional quartz veinlets

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate to mafic metavolcanic, possibly pyroclastic in origin

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-017

1. **Mineralogy: %, habit, grain size:** - composite sample across quartz boudin - from o/c GC-6

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:**

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):**

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-052

1. **Mineralogy: %, habit, grain size:**
   - grab from o/c GC-14
   - fine grained
   - plagioclase
   - biotite and/or amphibole

2. **Rock Texture, Colour, Hardness, etc.:**
   - greenish brown to beige on weathered surface
   - dark grey on fresh surface
   - basaltic pillows or lavas
   - ductile flow locally observed

3. **Structures:**
   - weak to moderately developed lineation and also foliated S_1 80-85° and subvertical
   - quartz filled fractures parallel to S_1 are ubiquitous and are from 2 mm to 4 cm in width

4. **Alterations:**
   - occasional fractures running 330°/45°E

5. **Magnetism:** very weakly

6. **Rock name (Field Designation):** mafic metavolcanic (lavas or pillows)

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-053

1. Mineralogy: %, habit, grain size: - composite grab of quartzose material from GC-14
   - containing Fe-carbonate, coarse mica
   - host rock: GC-052

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): quartz veins

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-009

1. Mineralogy: %, habit, grain size: - grab from o/c GC-3
   - fine grained
   - plagioclase
   - clinopyroxene
   - minor sericite
   - tr. sulfide
   - possible wolframite along quartz epidote vein
2. Rock Texture, Colour, Hardness, etc.: - beige on weathered surface
3. Structures: - occasional quartz filled fracture (epidote - minor?)
4. Alterations:
5. Magnetism: no
6. Rock name (Field Designation): intermediate ash fall crystal tuff

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-010

1. Mineralogy: %, habit, grain size: - from o/c GC-3
   - reference sample
   - same as sample GC-009

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-012

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-4
   - similar to GC-011, GC-010 and 009
   - fine grained, phaneritic
   - plagioclase, clinopyroxene
   - minor sulfide (epidote usually associated) - pyrite

2. **Rock Texture, Colour, Hardness, etc.:** - beige to light brown weathering
   - grey on fresh surface
   - laminated on a cm scale
   - possible lithic fragments

3. **Structures:** - cm scale laminations - bedding, strike similar to other outcrops in area

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate ash fall crystal tuff

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-057

1. Mineralogy: %, habit, grain size: - grab from o/c GC-5
   - diabase dyke, no contact observed
   - sample is of coarser grained material, not a chill phase
   - sample was taken for magnetic susceptibility

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): diabase dyke

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-006

1. Mineralogy: %, habit, grain size: - grab from o/c GC-2
   - very fine grained
   - plagioclase
   - clinopyroxene
   - biotite?
   - chlorite
   - sericite

2. Rock Texture, Colour, Hardness, etc.: - dark green on weathered surface
   - dark greyish green on fresh surface
   - can be scratched with knife

3. Structures: - moderately schistose
   - possible shearing(?) but I do not think so, rather I would say ductile flow deformation

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): intermediate to mafic pyroclastic

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-007

1. Mineralogy: %, habit, grain size: - from o/c GC-2
   - composite grab of quartzose material diluted with host rock
   - unidentified red mineral only minor quantity
   - minor pyrite
   - host rock similar to GC-002
   - quartz horizon appears to be "stratigraphic" or at least follows fabric

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation):

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-008

1. **Mineralogy: %, habit, grain size:** - from o/c GC-2
   - chip sample of intermediate volcanic along contact with diabase dyke - over 15 m
   - similar to samples GC-002 and 003

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:**

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):**

(Doc. #0004U - 12.06.86)

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BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-001

1. Mineralogy: %, habit, grain size: - grab from o/c GC-1
   - plagioclase ≈ 45%
   - augite ≈ 54%
   - magnetite ≈ 1%
   - trace sulfide - po?
   - fine grained, phaneritic
   - equigranular
   - plagioclase in small acicular crystals
   - fine grained nature may be due to fact that sample was taken close to margin of dyke
   - no other material available
2. Rock Texture, Colour, Hardness, etc.:
   - dark greenish grey on fresh surface
   - brown weathering
3. Structures: - occasional quartz filled fractures with no related alteration
4. Alterations: - mild, chloritic
5. Magnetism: - magnetite ≈1%
6. Rock name (Field Designation): diabase dyke

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-002

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-1
   - fine grained, phaneritic-aphanitic
   - most of rock too fine grained to identify but plagioclase and clinopyroxene present

2. **Rock Texture, Colour, Hardness, etc.:** - beige to buff weathering
   - grey on fresh surface
   - well laminated - this may represent bedding on cm scale
   - some layers more resistant than others

3. **Structures:** - laminations - maybe bedding

4. **Alterations:** - none pervasive

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate crystal ash fall tuff

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-003

1. **Mineralogy: %, habit, grain size:**
   - from o/c GC-1
   - chip sample taken over 15 m
   - across "stratigraphy"
   - materials similar to GC-002
   - occasional quartz boudin included

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:**

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate ash fall crystal tuff

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-004

1. **Mineralogy: %, habit, grain size:**
   - grab from o/c GC-1
   - very fine grained, phaneritic
   - plagioclase crystals and groundmass
   - mica - subordinate chlorite? - sericite
   - clinopyroxene
   - too fine grained to estimate percentage

2. **Rock Texture, Colour, Hardness, etc.:**
   - very fine grained
   - granolepidoblastic
   - grey on fresh surface
   - beige to light brown weathering
   - mild foliation

3. **Structures:**
   - Weakly developed banding
   - probably bedding
   - ≈a few mm each

4. **Alterations:**
   - possibly mild sericitic and/or minor chlorite

5. **Magnetism:** no

6. **Rock name (Field Designation):** ash fall tuff with occasional plagioclase crystals intermediate in composition

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-005

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-1
   - same as sample GC-002 but sample was taken in area of abundant quartz boudins

2. **Rock Texture, Colour, Hardness, etc.:**

3. **Structures:** - flow deformation due to competancy contrast between tuff and associated quartz boudins

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** ash fall tuff

(Doc. #0004U - 12.06.86)

COGEMA Canada Ltée/Ltd.

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: GC-011

1. **Mineralogy: %, habit, grain size:** - grab from o/c GC-1
   - fine grained, phaneritic
   - plagioclase
   - pyroxene
   - minor epidote along fractures

2. **Rock Texture, Colour, Hardness, etc.:** - beige on weathered surface
   - well indurated, finely laminated
   - rusty along cleavage fracture planes, manganese oxide along cleavages
   - grey on fresh surface

3. **Structures:** - finely laminated (may be bedding)
   - mild cleavage

4. **Alterations:**

5. **Magnetism:** no

6. **Rock name (Field Designation):** intermediate ash fall crystal tuff

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

Noranda drill hole
K.L. core library
Sample No.: H76-1/10.7
(10.7 - 12.2m)

HAND SPECIMEN DESCRIPTION

1. Mineralogy: %, habit, grain size:

amphibole (actinolite)	≈20%	medium grained
quartz/feldspar	≈60%	fine grained
biotite	≈20%	fine grained

very minor quartz vein

2. Rock Texture, Colour, Hardness, etc.:

well laminated, discontinuous actinolite layers

moderately hard

greyish green

3. Structures:

4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Intermediate tuff

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

Noranda drill hole
K.L. core library

HAND SPECIMEN DESCRIPTION

Sample No.: H76-1/33.5
(33.5 - 35.0 m)

1. Mineralogy: %, habit, grain size:

same as H76-1/10.7

2. Rock Texture, Colour, Hardness, etc.:

3. Structures:

4. Alterations:

5. Magnetism:

6. Rock name (Field Designation): Intermediate tuff

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-18-1 float.

1. Mineralogy: %, habit, grain size:

quartz	≃40%	)
biotite	≃40%	) fine to medium grained
feldspar (?)	≃20%	
pyrrhotite	≃ 1%	
graphite (?)	≃ 1%	

2. Rock Texture, Colour, Hardness, etc.:

granolepidoblastic; dark grey

pyrrhotite often as laminations but also dispersed through rock

3. Structures:

4. Alterations:

5. Magnetism: yes - pyrrhotite

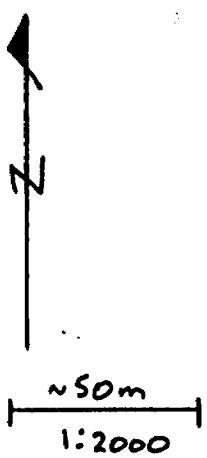
6. Rock name (Field Designation): Graphitic - pyrrhotitic - biotite quartz schist (metasediment)

(Doc. #0012U - 12.09.86)

location of float boulder JL-18-1

northern property boundary

#4 post → claim # 789231



#4 post → claim # 789230

Float occurrence

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-20-1
from O/C JL-20

1. Mineralogy: %, habit, grain size:

quartz 5-10%

feldspar 50-60%

amphibole ≈20%

biotite ≈15%

very fine grained disseminated sulfide <1%

2. Rock Texture, Colour, Hardness, etc.:

equigranular, medium grained, grey

moderate hardness

3. Structures:

4. Alterations: epidote veinlets

5. Magnetism: no

6. Rock name (Field Designation): Quartz diorite

(Doc. #0012U - 12.09.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: JL-20-2
from O/C JL-20

1. Mineralogy: %, habit, grain size:

biotite - quartz - feldspar - schist

biotite ≃20%

quartz ≃30%

feldspar ≃35%

minor amphibole ? yes ≃15%

2. Rock Texture, Colour, Hardness, etc.:

light grey, moderately well foliated

moderately hard

3. Structures:

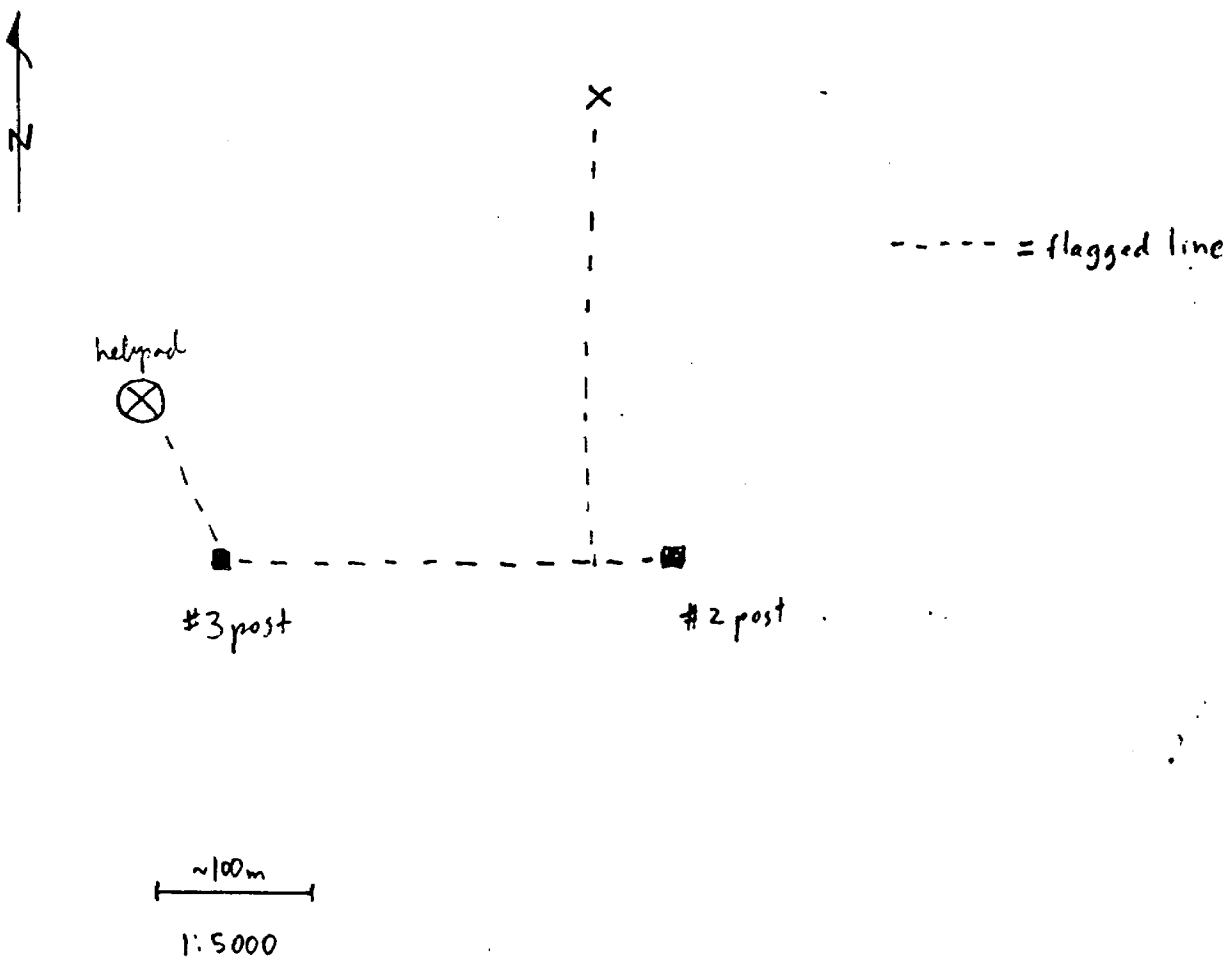
4. Alterations:

5. Magnetism: no

6. Rock name (Field Designation): Biotite schist (metasediment)

(Doc. #0012U - 12.09.86)

anomalous lead (first leaved outcrop??)
found on claim no. 789228
(JL-20-1, JL-20-2)



COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-13-1
Bloc

1. Mineralogy: %, habit, grain size:
   - isogranulaire, homogène, finement laminé
   quartz: 80%
   biotite:20%
   - petits cristaux arrondis rosés - grenats??
   - aucun sulfures visibles

   On retrouve le même type de blocs en amont de la rivière à environ 500m au tournant de celle-ci. La roche était schisteuse et de forme angulaire; le bloc ne pouvait provenir de loin.

2. Rock Texture, Colour, Hardness, etc.:
   - grain fin, de couleur gris verdâtre
   - relativement dure

3. Structures:

4. Alterations: weathering préférentiel
   altération de la biotite-sériciti sation??
   Les niveaux plus riches en quartz sont mis en relief par l'altération plus prononcée des niveaux plus riches en biotite

5. Magnetism: aucun
   5B-localisation: bloc trouvé le long de la rive ouest de la Burntbush River à 100m au nord du piquet de claim #1 789303
   #2 892956

6. Rock name (Field Designation): métasédiments (schiste à biotite)

(Doc. #0004U - 12.06.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

HAND SPECIMEN DESCRIPTION

Sample No.: AM-14-1
Bloc

1. Mineralogy: %, habit, grain size:
   - équigranulaire, grain fin
   quartz: 70-80%
   biotite: 15-20%
   - plusieurs grains de pyrite disséminée

2. Rock Texture, Colour, Hardness, etc.:
   Roche très dure, de couleur gris foncé. Sur la surface de weathering les niveaux plus riches en quartz sont légèrement en relief, les niveaux forment des bandes continues cm (ces niveaux sont plus verdâtres).

3. Structures:

4. Alterations: altération préférentielle des niveaux plus riches en biotite

5. Magnetism: aucun magnétisme

Localisation: bloc trouvé en bordure des rapides de la Burntbush River, à 220m direction N60° du poteau de claim #1 789327, #2 789324

6. Rock name (Field Designation): métasédiment

(Doc. #0004U - 12.06.86)

APPENDIX IV

Thin Section Descriptions

Thin section descriptions were performed by G. Cameron. However, during the preparation of the report, all sections were perused by the author, and comments have been added to many sheets.

On the other hand, the author has not deleted anything which was previously written which he was not in agreement with. Therefore, a few sheets contain somewhat conflicting interpretations. I feel that this is a more healthy attitude than deleting someone else's work.

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-1-1

Field Rock Name: Biotite schist (metasediment)

Major Minerals: (% - habit, grain size):

quartz) 45% predominantly
plagioclase) plagioclase
hornblende 53%
sphene 2%
oxides (trace)
grain size 0.1 - 0.2 mm - there is in fact a weak planar orientation of amphiboles

Minor Minerals:

Veins, Fractures:

Alterations:

Rock Texture: - Granoblastic in thin section - strongly lineated in hand specimen
- Finer grained than many of the other amphibolites found in the area

Rock Name: Amphibolite - lineated

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-8-2

Field Rock Name: Felsic dyke

Major Minerals: (% - habit, grain size):

quartz	94%	≃ 2/3 plagioclase
plagioclase		1/3 quartz
biotite	2%	- these abundances do not
opaques	1%	include any host rock even-
chlorite	(trace)	though there is some in
zircon	(trace) (in biotite)	the section
sericite	3%	

very coarse grained

Minor Minerals:

Veins, Fractures: Chlorite in microfractures

Alterations: Plagioclase shows light sericite dusting

Rock Texture: Granoblastic

Rock Name: Quartz diorite dyke

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JB-7-A

Field Rock Name: biotite-amphibole schist (metasediment)

Major Minerals: (% - habit, grain size):

quartz	73%	predominantly plag.
plagioclase		much of plag. has broken down
biotite	15%	to sericite
chlorite	1%	
garnet	4%	poikiloblastic
opaques	4%	
sericite	≈3%	
cordierite	≈1%	

grain size: 0.1-0.2 mm

Minor Minerals: Note: biotite laths have two preferred orientations
angle between the two ≈30°
one is much stronger than the other

Veins, Fractures:

Alterations: biotite mostly fresh but some chloritized laths

Rock Texture: granolepidoblastic

Rock Name: psammitic metasediment - with minor garnet

(Doc. #0029U - 19.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JB-8-A

Field Rock Name: ?

Major Minerals: (% - habit, grain size):

quartz	31% plag.+microcline subequal
microcline	very little quartz
plagioclase	
hornblende	52%
biotite	11%
epidote	3%
zircon	trace (in biotite)
sericite	2%
calcite	1%
sphene	<1%

grain size: hornblende porphyroblasts up to .25x 1.5 mm but random orientation feldspar quartz:0.1-0.4 mm

Minor Minerals:

Veins, Fractures:

Alterations: plag. has become quite unstable in places (this may be late stage saussuritization)

does not appear to be any preferred orientation or lineation in either the hand specimen or the thin section

Rock Texture:

Rock Name: amphibolite (metagabbro?)

(Doc. #0029U - 19.11.86)

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JB-8-B

Field Rock Name: micaschist (metasediment)

Major Minerals: (% - habit, grain size): quartz 61.5% ≈subequal but plagioclase predominates
plagioclase
biotite 31.5%
muscovite 4%
garnet 1% poikiloblastic
zircon trace (in biotite)
chlorite 2%
grain size: 0.1-0.3 mm

Minor Minerals:

Veins, Fractures: occasional strain lamellae in muscovite

Alterations: chlorite is retrograde after biotite (i.e. radiation halos also seen in chlorite)

Rock Texture: granolepidoblastic, weak to moderately foliated (due to // alignment of micas)

Rock Name: psammitic metasediment (quartz-feldspar-biotite schist)

(Doc. #0029U - 19.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-10-1

Field Rock Name: Quartz feldspar porphyry dyke

Major Minerals: (% - habit, grain size):

quartz)	82%	plagioclase dominant
plagioclase)		over both quartz
microcline)		and microcline
biotite	17%	
opaques	1%	- groundmass ≈0.1 mm
zircon	(trace in biotite)	- phenocrysts ≈1 to 2 mm
sericite	(trace)	
sphene	(trace)	

Minor Minerals:

Veins, Fractures:

Alterations:

Rock Texture: - Quartz and plagioclase phenocrysts in an equigranular quartz-plagioclase matrix

Rock Name: - Quartz-feldspar porphyry (dyke)

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-10-2

Field Rock Name: Reworked intermediate tuff or flattened pillow lava

Major Minerals: (% - habit, grain size):

quartz, plagioclase	44%	with plagioclase predominant over quartz
hornblende	53%	
garnet, muscovite		only along altered zone
sphene	2-3%	
zoisite, pumpellyite		only along altered zone

* mineral percentages are based on host rock material not altered horizon

opaques (trace) grain size ≈0.1 mm

Minor Minerals:

Veins, Fractures: Thin, folded quartz vein has fine grained texture - appears to be a recrystallization. There is, however, some associated coarse feldspar.

Alterations: - Small altered horizon ≈1 cm thick, looks grungy and consists of pumpellyite, zoisite and garnet.

- Note that planar fabric undulates somewhat.

Rock Texture: Strongly lineated, amphiboles only slightly elongated in this section, but they still show // alignment (section was taken at high angle to lineation).

Rock Name: Amphibolite (lineated)

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-10-3

Field Rock Name: Pillow lava

Major Minerals: (% - habit, grain size):

quartz) plagioclase)	51% plagioclase predominant
hornblende	42%
opaques	4%
zircon	(trace)
sericite	≈3%

grain size 0.1 to 0.2 mm

Minor Minerals: Note there is a weak planar fabric but very poorly developed.

Veins, Fractures:

Alterations:

Rock Texture: - Strongly lineated (hand specimen) - pillow structures seen in field - granoblastic texture in this section.

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-10-4

Field Rock Name: Pillow lava (silicified ?)

Major Minerals: (% - habit, grain size):

quartz)	47% plagioclase > quartz
plagioclase)	
hornblende	≈40%
opaques	3%
sericite	(trace)
cummingtonite	10%

- cummingtonite is found only along a small quartz-plagioclase filled fracture and appears to be an alteration of hornblende.

Minor Minerals: - Also isolated patches of cummingtonite rich amphibolite are present which appear to have no relationship to fractures.

- Occasional patches of coarser grained quartz and plagioclase.

Veins, Fractures:

Alterations:

Rock Texture: Lineated in hand specimen - no apparent planar fabric.

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION

Sample No.: JL-10-5

Field Rock Name: Lineated amphibolite (intrusive rock or massive flow)

Major Minerals: (% - habit, grain size):

quartz	≃5%	
plagioclase	50%	
hornblende	42%	
sphene	3%	in clusters
opaques	(trace)	- medium grained (i.e. coarser
zircon	(trace)	than most rocks in area)
leucoxene	(trace)	- hornblende cross-sections ≃0.2 x 0.2 mm to 0.4 x 0.4 mm

Minor Minerals:

Veins, Fractures:

Alterations:

Rock Texture: Strongly lineated in hand specimen

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-10-6

Field Rock Name: Intermediate tuff

Major Minerals: (% - habit, grain size):

quartz)	61%	plagioclase predominant over quartz -
plagioclase)		very little quartz
hornblende	35%	
sphene	4%	
opaques	<<1%	

grain size ≃0.05 mm

Minor Minerals: Compared to JL-10-5 and JL-10-12, the grain size is greatly reduced, and there is a weak planar preferred orientation (this is compositional - hornblende cross-sections are weakly to moderately aligned).

Veins, Fractures:

Alterations:

Rock Texture: Weak to moderately lineated in hand specimen.

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-10-8

Field Rock Name: Intermediate tuff

Major Minerals: (% - habit, grain size):

quartz)	58%	mostly plagioclase
plagioclase)		
hornblende	38%	
sphene	3%	
opaques	1%	

- plagioclase often shows compositional zoning

Minor Minerals: Note that in addition to the lineation there is a weak planar fabric - this is both compositional (i.e. hornblende cross-sections show weak alignment) and grain size variation finer grained bands and coarser grained bands.

Veins, Fractures: - Finer grained bands 0.05 - 0.2 mm
- Coarser grained bands 0.2 - 0.3 mm

Alterations:

Rock Texture: Lineated in hand specimen

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION

Sample No.: JL-10-10A

Field Rock Name: Sheared felsic crystal tuff

Major Minerals: (% - habit, grain size):

quartz, plagioclase	93-1/2%	plagioclase predominant
muscovite	3%	
biotite	3-1/2%	
opaques	<<1%	
chlorite	(trace)	

- clusters of quartz, plag. phenocrysts up to ≃ 2 mm
- groundmass ≃0.05 to 0.2 mm - no preferred orientation

Minor Minerals: - Much of plagioclase has recrystallized and much is still in the process of breaking down → sericite (alteration ?)

Veins, Fractures: Feldspar broken and stretched out.

Alterations:

Rock Texture: Granoblastic

Rock Name: Sheared dyke of intermediate composition, blasto-proto-mylonitic

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THIN SECTION DESCRIPTION Sample No.: JL-10-10B

Field Rock Name: Sheared felsic crystal tuff

Major Minerals: (% - habit, grain size):

quartz)
plagioclase)
biotite) same as JL-10-10A
muscovite)
opaques)

Minor Minerals: Strong preferred orientation
l:w of some phenocrysts may be 10:1
quartz extinction suggests, however, very little strain

Veins, Fractures:

Alterations: - Texture is similar to JL-10-10A except that fragments are more stretched out or sheared - i.e. this section must be closer to the plane of shearing - due to the amount of shearing (cataclasis) and recrystallization, it is difficult to get a handle on pure tectonic flattening (i.e. strain).

Rock Texture:

Rock Name: Sheared dyke of intermediate composition
- Blasto-protomylonitic

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THIN SECTION DESCRIPTION Sample No.: JL-10-12

Field Rock Name: Lineated amphibolite - very similar to JL-10-5

Major Minerals: (% - habit, grain size):

quartz	≈1-2% ?	
plagioclase	54%	
hornblende	40%	
sphene	3%	in clusters
opaques	1-2%	

medium grained

Minor Minerals: - Plagioclase crystals usually show strong compositional zoning, however where they show good albite twinning zoning is not present.

- Twinned plagioclase is probably primary where as untwinned may be metamorphic (recrystallized)

- Twinned plagioclase is at least An 47

Veins, Fractures:

Alterations: Rock is strongly altered (locally) along sides of a small epidote veinlet.

- Whereas JL-10-5 is fresh and unaltered, JL-10-12 is locally well fractured.

Rock Texture: Strongly lineated in hand sample but this is not seen in thin section.

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-10-13

Field Rock Name: Pillow lava (brownish alteration)

Major Minerals: (% - habit, grain size):

quartz 72%

amphibole 8% (actinolite ?)

clinozoisite 12%

oxides 8%

no plagioclase

- finely laminated in this section - clinozoisite rich layers and amphibole rich layers.

Minor Minerals: - Amphiboles show parallel orientation in this section.

Veins, Fractures:

Alterations: No carbonate

Rock Texture: Granoblastic texture

Rock Name: Psammitic material

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Note: I disagree fairly strongly with GC's description so I will do my own. /JL

THIN SECTION DESCRIPTION Sample No.: JL-10-13

Field Rock Name: Brownish alteration zone in pillow lava
- Sugary texture

Major Minerals: (% - habit, grain size):

1/3 of slide
domain A)
amphibole ≃40%
plag.>qtz ≃50%
sphene ≃3%
Ti oxides ≃7%
grain size: ≃0.2 mm

2/3 of slide
domain B) quartz ≃70%
amphibole ≃10%
clinozoisite ≃10%
Ti oxides ≃10%
grain size: 0.2 - 0.4 mm
pleochroism of hornblende not too strong but I wouldn't call this actinolite

Minor Minerals:

domain A) shows strong parallel orientation. I can't tell whether slide has been cut close to plane with lineation or whether this is a planar fabric. I think there is a strong planar fabric.

Veins, Fractures:

Alterations: We thought that the brownish colouration was perhaps due to Fe carbonate but in fact it must be the Ti oxides (reddish colour in plane light - leucoxene ?).

Rock Texture: Granolepidoblastic

Rock Name: A) amphibolite B) psammitic or vein material

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THIN SECTION DESCRIPTION

Sample No.: AM-8-1

Field Rock Name: Tuff or metasediment
Biotite schist

Major Minerals: (% - habit, grain size):

quartz	2%
plagioclase	43%
hornblende	50%
biotite	≃1%
opaques	4%

grain size 0.1 to 0.4 mm
no planar orientation

Minor Minerals:

Veins, Fractures: Zoning in plagioclase

Alterations:

Rock Texture: Strongly lineated (amphiboles) - only seen in hand sample

Rock Name: Amphibolite (metagabbro)

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THIN SECTION DESCRIPTION

Sample No.: AM-8-2

Field Rock Name: Granite (dyke)

Major Minerals: (% - habit, grain size):

quartz	25%
plagioclase	70%
biotite	5%
muscovite	≈1%

Minor Minerals:

Veins, Fractures:

Alterations: NOT equigranular phenocrysts very abundant - mostly plagioclase ≈1 to 1.5 mm - groundmass ≈0.1 to 0.2 mm - also lineated in hand specimen.

Rock Texture: Equigranular, polygonal boundaries

Rock Name: Granite dyke - very siliceous

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THIN SECTION DESCRIPTION

Sample No.: AM-8-3

Field Rock Name: Biotite schist, tuff or metasediment

Major Minerals: (% - habit, grain size):

quartz 10%

plagioclase 29%

hornblende 60%

epidote 1-2%

grain size <0.05 mm to ≈0.1 mm

no apparent planar fabric

Minor Minerals:

Veins, Fractures: Zoning in plagioclase

Alterations:

Rock Texture: Strongly lineated (amphiboles) - only seen in hand sample

Rock Name: Amphibolite (metagabbro)

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THIN SECTION DESCRIPTION Sample No.: JL-17-1A

Field Rock Name: Lineated amphibolite (intrusive ?)

Major Minerals: (% - habit, grain size):

quartz	19%	predominantly
plagioclase		plagioclase
hornblende	71%	
biotite	2-1/2%	
sphene	3%	
epidote	3%	
sericite	1%	chlorite <<1%
opaques	1/2%	

Minor Minerals: - sphene is formed in grungey looking aggretates

grain size: hornblende 0.1 to 1.0 mm

groundmass ≈0.1 mm

Note: local planar fabric defined by biotite does not have consistent orientation across the whole thin section.

Veins, Fractures:

Alterations: ≈ none primary; actually very fresh except for weak dusty appearance of minerals and sericitized plagioclase - retrograde

Rock Texture: - strong lineation in hand specimen but only a very weak orientation is seen in thin section (section is | to lineation).

Rock Name: Amphibolite (metagabbro ??) (lineated)

(Doc. #0031U - 02.12.86)

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THIN SECTION DESCRIPTION

Sample No.: JL-17-1B

Field Rock Name: Lineated amphibolite (intrusive rock)

Major Minerals: (% - habit, grain size):

similar to JL-17A except that 17B contains more hornblende and sericite and less quartz and plagioclase

quartz
plagioclase
hornblende ≈85%
biotite
sphene
epidote
sericite
opaques

Minor Minerals: - sphene found in grungy looking aggregates

→ grain size and retrograde alteration same as for JL-17-1A

Veins, Fractures:

Alterations:

Rock Texture: Strong lineation in hand specimen - no preferred orientation is seen in thin section (section ⊥ to lineation)

Rock Name: Amphibolite (metagabbro ??) (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-17-3

Field Rock Name: Lineated amphibolite (intrusive rock)

Major Minerals: (% - habit, grain size):

quartz	46%	≃ predominantly
plagioclase		plagioclase
hornblende	40%	
biotite	11%	
opaques	3%	

grain size 0.05 - 0.1 mm

Minor Minerals:

Veins, Fractures: quartz veinlet
→ grain size reduction and strong planar fabric
(relative to JL-17-1) due to weak shearing ?

Alterations:

Rock Texture: - granolepidoblastic, both biotite and amphibole show // alignment in thin section

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION

Sample No.: JL-17-4

Field Rock Name: Granite dyke (discordant)

Major Minerals: (% - habit, grain size):

quartz) 96% predominantly
plagioclase) plagioclase (sodic)
biotite 4%
muscovite <<1%

grain size: phenocrysts ≈0.4 to 1.0 mm
groundmass ≈0.1 to 0.2 mm

Minor Minerals:

Veins, Fractures:

Alterations: (>6.00 wt % Na2O)
some plagioclase lightly sericitized

Rock Texture: Porphyritic texture in thin section

Rock Name: Diorite dyke

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THIN SECTION DESCRIPTION

Sample No.: JL-17-5

Field Rock Name: Lineated amphibolite (intrusive rock ? → coarse grained phase)

Major Minerals: (% - habit, grain size):

quartz)	31%	
plagioclase)		
hornblende	55%	medium grained
biotite	4%	
sericite	5%	
opaques	2-1/2%	
sphene	2-1/2%	

- opaques are found in loose clusters

Minor Minerals: Coarse grained nature of rock described for this sample in hand specimen not present in thin section.
Grain size 0.1 - 0.2 mm

Veins, Fractures:

Alterations:

Rock Texture:

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-25-7

Field Rock Name: Lineated amphibolite

Major Minerals: (% - habit, grain size):

plagioclase	44%	
amphibole	37%	(hornblende ?)
biotite	11%	
opaques	3%	
chlorite	3%	
sphene	2%	

grain size: hornblende ≃0.1 x 0.4 mm

quartz-plag. ≃0.1 to 0.4 mm

Minor Minerals: Michel Levy on plagioclase gives about An 40

Veins, Fractures:

Alterations: - no carbonate

Rock Texture: - amphiboles show good alignment in thin section

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION Sample No.: JL-25-8

Field Rock Name: Intermediate feldspar porphyry (xenolith)

Major Minerals: (% - habit, grain size):

quartz	68%	predominantly plagioclase
plagioclase		≈5-10% quartz
amphibole	29%	
biotite	1%	
sphene	1%	
opaques	1%	

- sphene is found in small clusters

Minor Minerals: Grain size: groundmass (quartz, plag., hornblende) ≈0.1 mm
hornblende phenocrysts ≈0.4 mm

Note: contact with amphibolite is gradational supporting interpretation that this is a xenolith.

Veins, Fractures:

Phenocrysts are hornblende, not feldspar

Alterations:

Rock Texture: - granoblastic

Rock Name: Intermediate xenolith - of probable dioritic composition

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THIN SECTION DESCRIPTION Sample No.: JL-26-1

Field Rock Name: Lineated amphibolite with weak pyritic alteration

Major Minerals: (% - habit, grain size):

quartz	) 36%	predominantly plagioclase
plagioclase	)	
hornblende	33%	
* epidote	25%	
biotite	3%	
chlorite	<<1%	
opaques	2%	(pyrite)
sphene	1%	

Minor Minerals:

Grain size: ≈0.05 to 0.2 mm (epidote, quartz, plag.)
≈0.1 to 0.5 mm (hornblende)

Veins, Fractures: - section is cut by a small mm scale quartz filled fracture,
- an epidote rich envelope surrounds this veinlet.
Grain size here ≈2 mm

Alterations: - epidote

Rock Texture:

Rock Name: Amphibolite (lineated)

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THIN SECTION DESCRIPTION

Sample No.: JL-26-2

Field Rock Name: Feldspar porphyry

Major Minerals: (% - habit, grain size):

quartz	92%	≃ subequal in groundmass but more plag.
plagioclase		in rock due to plag. phenos.
biotite	7%	
opaques	1%	
sphene	trace	

- plagioclase phenocrysts

Minor Minerals: Grain size: groundmass ≃0.05 to 0.2 mm

phenocrysts ≃1.0 to 1.5 mm

Veins, Fractures: - fairly well pronounced grain alignment

Alterations: - light sericitization of plagioclase along twin planes

Rock Texture: - porphyritic texture, granolepidoblastic

Rock Name: Quartz diorite porphyry

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THIN SECTION DESCRIPTION Sample No.: JL-13-1

Field Rock Name: Mafic tuff (composite sample)

Major Minerals: (% - habit, grain size):

ferro-actinolite	60%	
sphene	3%	
plagioclase	33%	
opaques	1-2%	very fine grained
calcite	1%	≈0.02 to 0.1 mm
sericite	1%	
chlorite	(trace) ?	
quartz	≈ 1-2%	(very little)

Minor Minerals:

- Actinolite shows strong alignment in this section.
- A few relict non aligned amphiboles; these generally coarser grained, i.e. ≈0.4 mm

Veins, Fractures:

- Looks like foliation rather than lineation.
- Looks like shearing - grain size reduction parallel alignment.

Alterations:

Rock Texture: Amphibolite (foliated ?)

Rock Name:

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THIN SECTION DESCRIPTION Sample No.: JL-14-1

Field Rock Name: Mafic to intermediate tuff

Major Minerals: (% - habit, grain size):

actinolite	49%	
plagioclase	37%	grain size ≃.02 to .05 mm but
clinozoisite	5%	amphiboles elongate eg up to
calcite	1%	0.15 mm; a few relict (unsheared)
epidote	3%	amphiboles up to ≃0.3 mm
sericite	2%	
chlorite	trace	
quartz	≃2-3% ? maybe more	
opaques	≃1%	

Minor Minerals:

Veins, Fractures:

- Lineation can be seen in hand specimen.

Alterations: - Clinozoisite is replacing actinolite - retrograde.

- In hand specimen, the rock looks sheared but this is very difficult to see in thin section due to the amount of recrystallization that has taken place - S1 gently folded about S2.

Rock Texture: - Very strong alignment of actinolites in thin section.

Rock Name: Amphibolite - sheared precursor (lineated)

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THIN SECTION DESCRIPTION

Sample No.: JL-14-1

Field Rock Name:

Major Minerals: (% - habit, grain size):

I think the rock is clearly sheared since there are relict coarser grained amphiboles present → generally several grains in lenticular zone between sheared layers.

i.e. relative to (presumed) amphibolite precursor, grain size has been reduced, and planar fabric imparted.

Minor Minerals:

/JL

Veins, Fractures:

Alterations:

Rock Texture:

Rock Name:

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THIN SECTION DESCRIPTION

Sample No.: JL-14-2

Field Rock Name: Intermediate to mafic tuff

Major Minerals: (% - habit, grain size):

hornblende	48%		
biotite	25%		
clinozoisite	4%		
muscovite	3%	quartz	3%
chlorite	6%	sphene	2%
opaques	2%	zircon	(trace)
plagioclase	3%	calcite	4%

Minor Minerals:

- Occasional coarse grained patches of quartz, plagioclase + calcite.
- Alternating biotite rich and hornblende rich horizons.

Veins, Fractures:

→ grain size and development of planar fabric variable across section, smallest grain size where best planar fabric.

→ this rock is also sheared, but less intensity than JL-13-1, JL-14-1

Alterations:

Rock Texture: - A weak lepidoblastic foliation, may be sheared but textures are poorly developed.

Rock Name: Mafic metavolcanic, possibly pyroclastic in origin.

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THIN SECTION DESCRIPTION

Sample No.: JL-14-4

Field Rock Name: Intermediate to mafic tuff

Major Minerals: (% - habit, grain size):

hornblende	88%
clinozoisite	3%
sphene	4%
plagioclase	3%
quartz	≈2%

very fine grained ≈0.02 - 0.05 mm

Minor Minerals:

Veins, Fractures:

Alterations: - No carbonate
- Hornblende shows weak alignment in thin section
- Rock shows moderate foliation in hand specimen

Rock Texture:

Rock Name: Amphibolite - unidentified precursor

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THIN SECTION DESCRIPTION Sample No.: JL-14-4A

Field Rock Name:

Major Minerals: (% - habit, grain size):

actinolite	30%	
quartz	5%	
90° cleavage (Btve) * clinopyroxene (?)	15%	(diopside ?)
clinozoisite	25%	
calcite	20%	percentages are difficult to estimate
sphene	3%	for section as a whole due to its mineralogical
opagues	2%	heterogeneity

Minor Minerals: - Clinozoisite occasionally shows strong compositional zoning.
- Diopside and calcite are found only along vein.

Veins, Fractures: This sample comprises both host rock and vein material and therefore the mineralogy and relative abundances are not indicative of host rock composition.

Alterations:

Rock Texture:

Rock Name: Vein material with host rock

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THIN SECTION DESCRIPTION Sample No.: JL-14-5A

Field Rock Name: Intermediate to mafic tuff

Major Minerals: (% - habit, grain size):

actinolite	60%	
biotite	6%	
chlorite	10%	
quartz, plagioclase	18%	mostly plagioclase
opaques	3%	grain size 0.02 to 0.1 mm
calcite	1%	a few oriented amphiboles at 0.1 x 0.3 mm
epidote	2%	(sphene ?)

Minor Minerals:

- Both sections A and B are texturally similar.
  B has less biotite

Veins, Fractures: Minor calcite veinlet

Alterations: - A weakly developed streaky appearance → may be from shearing.
- Rock has been completely recrystallized.
- Moderately foliated in hand specimen - non penetrative i.e. foliation is better developed on biotite rich horizons.

Rock Texture: - Biotite is concentrated along discrete layers imparting a weak lamination even in thin section.

Rock Name: Amphibolite (foliated)

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THIN SECTION DESCRIPTION

Sample No.: JL-14-6

Field Rock Name: Sericitic alteration of intermediate to felsic tuff or felsic dyke.

Major Minerals: (% - habit, grain size):

quartz) plagioclase)	70%	predominantly plagioclase ≃1/4 is quartz
hornblende	6%	
biotite	18%	
opaques	3%	grain size 0.05 to 0.1 mm
epidote	2%	some relict grains 0.2 to 0.4 mm
sphene	1%	

Minor Minerals: - Occasional relict plagioclase crystal is seen.

Veins, Fractures:

Alterations: - No sericite
- Level of shearing has made interpretation of primary textures problematic

Rock Texture: - Granolepidoblastic, weak to moderately developed lepidoblastic foliation, sheared ≃ blasto-protomylonitic

Rock Name: Intermediate to felsic tuff or felsic dyke

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THIN SECTION DESCRIPTION Sample No.: JL-14-7

Field Rock Name: Altered mafic tuff

Major Minerals: (% - habit, grain size):

quartz	73%	plagioclase is
plagioclase		predominant ≈1/3 quartz
biotite	20%	
hornblende	1-1/2%	
sericite	2%	percentages are of host rock
opaques	2%	material
clinozoisite	1-1/2%	

grain size 0.1 to 0.2 mm

Minor Minerals:

Veins, Fractures: - Vein is composed entirely of quartz and subordinate plagioclase
- Grain size up to 2 mm

Alterations: - Sericitic alteration is very light

Rock Texture: - Granoblastic (weakly developed lepidoblastic foliation), gritty in hand specimen.

Rock Name: Psammitic metasediment

alteration/metasomatism from vein ?

(Doc. #0031U - 18.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: JL-24-1

Field Rock Name: Mafic tuff or sheared mafic flow

Major Minerals: (% - habit, grain size):

quartz	18%	predominantly plagioclase
plagioclase		≃ < 1/4 of quartz
hornblende	74%	
biotite	3%	
sphene	2-1/2%	
opaques	2-1/2%	

grain size 0.05 m to 0.25 mm

- no chlorite

Minor Minerals:

- Cut by small mm, scale quartz veinlets which are folded and generally parallel foliation

Veins, Fractures: (good // but grain size a bit larger)

Alterations: - Appears to be sheared but intensity of shearing is difficult to evaluate due to the amount of recrystallization.

Rock Texture: - Moderately developed foliation observed in hand sample // alignment of amphiboles and biotites was observed in thin section.

Rock Name: Amphibolite - mafic metavolcanic precursor (foliated)

(Doc. #0031U - 18.11.86)

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THIN SECTION DESCRIPTION

Sample No.: JL-25-4

Field Rock Name: Zone of silicification and thin quartz-carbonate stockwork in chloritic mafic volcanic.

Major Minerals: (% - habit, grain size):

quartz) plagioclase	36% predominantly plagioclase		
sphene	26%		
epidote	2-1/2%		
calcite	3%		
hornblende	29%	opaques	3%
chlorite	(trace)	biotite	1/2%

grain size 0.05 to 0.2 mm

Minor Minerals:

Veins, Fractures: MM scale - epidote stockwork - quartz-calcite sphene alteration of amphibole

Alterations: Epidote stockwork - late stage postmetamorphic retrograde stockwork veinlets.

Rock Texture: Amphiboles are cut by stockwork

Rock Name: Thin zone of epidote stockwork in chloritic mafic rock

(Doc. #0031U - 18.11.86)

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THIN SECTION DESCRIPTION Sample No.: AM-15-1

Field Rock Name: Intermediate tuff

Major Minerals: (% - habit, grain size):

quartz)	77%	more plagioclase than quartz		
plagioclase)				
biotite	6%			
garnet	5%			
chlorite	3%	after biotite	epidote	1%
opaques	4%	magnetite	hornblende	3%
sericite	1%		tourmaline	(trace)

Minor Minerals: - No clear evidence of shearing, could easily be metamorphosed tuff - grain size mostly 0.02 to 0.1 m
- Garnets up to 3 mm

Veins, Fractures: - Small mm size magnetite bands seen on % scale

Alterations: - May correlate with o/c GC-1 and GC-11, compare with sample GC-059

Rock Texture: - Granolepidoblastic, S1 crenulated by F2
- Appears relatively sheared on hand specimen scale but recrystallization has made this difficult to see in thin section

Rock Name: - Unidentified precursor - possible exhalative component mixture - either a sedimentary or reworked pyroclastic rock.
- Possible Fe Formation

(Doc. #0031U - 18.11.86)

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: AM-15-2

Field Rock Name: Metagabbro (intrusive)

Note: thin section cut oblique to amphibole lineation - poor orientation

Major Minerals: (% - habit, grain size):

hornblende	45%
plagioclase	47%
opaques	4%
chlorite	2%
calcite	2%

In fact, amphiboles are much coarser grained (up to 0.2 x 0.5 mm) than quartz/plagioclase (0.02 to 0.1 mm).

Amphiboles show no preferred orientation at all, in fact thin section by itself shows no evidence of lineation.

Minor Minerals:

Veins, Fractures:

Alterations: Similar to samples AM-8-1 and AM-8-3

Rock Texture: Strongly lineated (amphiboles) only seen in hand specimen.

Rock Name: Amphibolite (metagabbro)

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: GC-034

Field Rock Name: Intermediate lapilli tuff

Major Minerals: (% - habit, grain size):

quartz)	53%	predominantly
plagioclase)		plagioclase
calcite	15%	
clinozoisite	4%	
chlorite	9%	grain size 0.02 to 0.1 mm
muscovite	3%	calcite commonly more coarse eg 0.5
biotite	13%	to 1.0 mm (late mineral)
opaques	3%	

Minor Minerals:

Veins, Fractures: Cut by numerous small fractures

Alterations: Looks like cataclasis has begun; however, the fine grained size and recrystallization makes textural interpretation rather tenuous.
- could easily be recrystallized tuff - not necessarily sheared

Rock Texture: Foliation planes more difficult to see in thin section than in hand specimen

Rock Name: Intermediate metavolcanic ? - protomylonite ??

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: GC-038

Field Rock Name: Mafic metavolcanic

Major Minerals: (% - habit, grain size):

quartz)	63%	predominantly
plagioclase)		plagioclase
chlorite	10%	after biotite
epidote	12%	
calcite	5%	
biotite	8%	
opaques	2%	

Minor Minerals: Grain size 0.02 to 0.1 mm

- coarser calcite and biotite eg up to 1.0 mm in hinge zones of minor folds
- chlorite masses in hinge zones may contain newly formed biotite oriented // to axial trace of folds rather than being oriented // to foliation

Veins, Fractures:

Alterations:

Rock Texture: - Well foliated (both micaceous and tectonic), S1 well crenulated about S2 (wavy texture to S1) - shearing ??

Rock Name: Intermediate metavolcanic ?

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THIN SECTION DESCRIPTION Sample No.: GC-037

Field Rock Name: Metabasalt ?

Major Minerals: (% - habit, grain size):

quartz)	66%	predominantly
plagioclase)		plagioclase
biotite	10%	
chlorite	6%	grain size 0.01 to 0.05 mm with
calcite	14%	abundant coarse calcite eg up to
opaques	3%	0.5 mm (late mineral) and not
epidote	1%	uncommon relict (?)
		plagioclase up to 0.5 mm

Minor Minerals:

- may be cataclastic texture but also could be recrystallized crystal tuff

Veins, Fractures:

Alterations: - Occasional relict plagioclase crystals → basaltic affinity

- Biotite + chlorite show little if any preferred orientation: metasomatic origin is possible

Rock Texture: - S1 crenulated about S2

- Gritty texture in hard sample suggests sedimentary affinity

Rock Name: - Unidentified precursor

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THIN SECTION DESCRIPTION Sample No.: GC-036

Field Rock Name: Intermediate crystal tuff (possibly reworked)

Major Minerals: (% - habit, grain size):

quartz	35%	grain size 0.01 to 0.1 mm	
plagioclase	40%		
biotite	15%		
clinozoisite	2%	also epidote ≈1%	
tourmaline	2%		
sericite	1%	opaques	4%
chlorite	(trace)	calcite	1%

Minor Minerals: - In plane light, plagioclase can be easily differentiated from quartz due to the rather turbid nature of the plagioclase
- Biotite is more abundant than would be generally expected for a volcanic

Veins, Fractures: - Biotite is generally concentrated along certain planes which // foliation but within these planes it shows no preferred orientation
- Some of the areas richest in biotite + tourmaline are associated with calcite filled fractures therefore it may be possible that tourmaline and at lease some of the biotite may actually be alterations

Alterations:

Rock Texture: - Well developed foliation - appears to be mainly due to shearing (tectonic alignment) of previous grains rather than from alignment of micaceous constituents. S1 has been crenulated by F2; rock has undergone considerable shearing, i.e. mylonitic

Rock Name: Blastomylonite - precursor ??

(Doc. #0028U - 10.11.86)

GC-036

Rock may be sheared but not necessarily so.

Foliation best defined by grain size variations and biotite rich layers (biotites are oriented but not strongly).

i.e. could also be folded recrystallized tuff.

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THIN SECTION DESCRIPTION Sample No.: GC-059

Field Rock Name: Mafic metavolcanic

Major Minerals: (% - habit, grain size):

quartz)	67%	≃ subequal
plagioclase)		
biotite	16%	grain size 0.02 to 0.1 mm
garnet	7%	garnets ≃2 mm
opaques	3%	
clinozoisite	4%	
tourmaline	1%	
chlorite	2%	calcite (trace)

Minor Minerals:

Veins, Fractures: In this sample, magnetite bands were seen on o/c scale

Alterations: - Garnet poikiloblasts are slightly stretched and broken // foliation (good evidence for mild shearing)
- Si crenulated about S2

Rock Texture: - Granoblastic, gritty texture suggesting reworking
- Appeared relatively sheared on hand specimen scale but recrystallization has made this difficult to see in thin section

Rock Name: - Unidentified precursor, possible exhalative component mixed with either a sedimentary or reworked pyroclastic rock
- Possible iron formation

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: GC-060

Field Rock Name: Intermediate crystal tuff, reworked to some degree

Major Minerals: (% - habit, grain size):

quartz)	70%	≃ predominantly plagioclase, however there
plagioclase)		looks to be quite a lot of quartz
biotite	15%	
chlorite	1%	
epidote	2%	
opaques	2%	
calcite	2%	
muscovite	8%	

Minor Minerals: Grain size variations across the foliation which is folded, i.e. if grain size variations are due to shearing, a later deformation has folded the shearing planes at small scale

Veins, Fractures:

Alterations:

Rock Texture: - Textures similar to those in GC-036
- Granolepidoblastic

Rock Name: - Proto-blasto-mylonite - unidentified precursor

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THIN SECTION DESCRIPTION Sample No.: GC-035

Field Rock Name: Mafic metavolcanic - probably pillow lavas

Major Minerals: (% - habit, grain size):

quartz	≈0%	
plagioclase	81%	grain size:
calcite	3%	plagioclase and retrograded amphiboles
chlorite	10%	up to ≈0.5 mm in plagioclase rich
biotite	3%	groundmass ≈0.02 to 0.05 mm
opaques	3%	
epidote	<1%	

also an unidentified grungy looking mineral (trace amounts)

Minor Minerals: Pleochroic green to blue green - high relief, moderate birefringence ? (2nd order ?) - may be amphibole - is retrograding back to biotite and chlorite.

Yes - some of the biotite occurs in masses and appears to be retrograde after amphibole.

Veins, Fractures:

Alterations: - Primary plagioclase crystals still present
- Primary igneous texture still visible
- Weakly developed foliation (from micas)

Rock Texture: Unsheared - primary porphyritic texture ?

Rock Name: Basalt

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THIN SECTION DESCRIPTION

Sample No.: GC-022

Field Rock Name: Mafic metavolcanic (flow or pillowed)

Major Minerals: (% - habit, grain size):

quartz	0% ?	
plagioclase	10%	
chlorite	45%	
muscovite	38%	sericite alteration of plagioclase ?
oxide	4%	
zoisite	3%	

Minor Minerals:

Veins, Fractures:

Alterations: Well developed foliation - this is strongly crenulated

Rock Texture: Textures were misinterpreted - is actually variolitic

Rock Name: Variolitic basalt

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THIN SECTION DESCRIPTION

Sample No.: GC-021

Field Rock Name: Mafic metavolcanic

Major Minerals: (% - habit, grain size):

quartz	≈2% ?	
plagioclase	65%	mostly ≈0.05 mm grain size but biotite
calcite	9%	occurs in segregations, individual
biotite	6%	flakes up to 0.05 mm X 1.0 mm may be
chlorite	15%	outlining previous larger crystals,
oxides	3%	i.e. plagioclase may be completely
		recrystallized

Minor Minerals:

Veins, Fractures:

Alterations: Some relict plagioclase laths still present

Rock Texture: Well foliated and Sl is crenulated (mainly), strongly recrystellized - primary textures largely destroyed

Rock Name: Mafic metavolcanic (flow or pillows ?)

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THIN SECTION DESCRIPTION Sample No.: JB-15-A

Field Rock Name: mafic to intermediate volcanic (tuff or flow)

Major Minerals: (% - habit, grain size): plagioclase 74%
chlorite 4%
biotite 11%
calcite 8%
opaques 3%
epidote <1%
phenocrysts (plag/biotite) up to ≈0.5 mm also calcite
groundmass ≈0.02 to 0.1 mm

Minor Minerals:

Veins, Fractures:

Alterations: relict plagioclase phenos - turbid but still intact

Rock Texture: weak foliation, lepidoblastic, porphyritic

Rock Name: porphyritic andesite

(Doc. #0029U - 19.11.86)

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THIN SECTION DESCRIPTION Sample No.: JB-15-B

Field Rock Name:

Major Minerals: (% - habit, grain size):

	quartz	75% predominantly plag.
	plagioclase	
	biotite	11%
	chlorite	11% after biotite
	calcite	trace <1%
	opaques	3% (sulfide)

similar to JB-15-A but destruction of phenocrysts through recrystallization apparent

Minor Minerals:

Veins, Fractures:

Alterations: relict plagioclase crystals can be seen

Rock Texture: weak to moderately developed lepidoblastic foliation

Rock Name: metabasalt (flow or pillows), may actually have been porphyritic (see JB-15-A)

(Doc. #0029U - 19.11.86)

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THIN SECTION DESCRIPTION Sample No.: JB-15-C

Field Rock Name:

Major Minerals: (% - habit, grain size): plagioclase 73%
biotite 8%
chlorite 8% after biotite
calcite 8%
opaques 3%
grain size ≃0.02 to 0.05 mm
some biotite is coarser

Minor Minerals: sheared equivalent of JB-15-A,B
shearing is moderately strong →protomylonite

Veins, Fractures:

Alterations:

Rock Texture: granolepidoblastic - moderately to well developed lepidoblastic foliation probably sheared, intensity is difficult to evaluate

Rock Name: mafic metavolcanic, sheared (protomylonite??)

(Doc. #0029U - 19.11.86)

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THIN SECTION DESCRIPTION Sample No.: GC-054

Field Rock Name: Intermediate to mafic metavolcanic, probably of pyroclastic origin

Major Minerals: (% - habit, grain size):

plagioclase	70%	
chlorite	14%	
calcite	11%	groundmass ≈0.02 to 0.05 mm
opaques	3%	phenocrysts up to ≈0.5 mm
muscovite	2%	actually very similar to JB-15A, B phenocrysts undergoing destruction through recrystallization

Minor Minerals:

Veins, Fractures:

Alterations: - Lots of relict plagioclase crystals showing good twinning
- In slab, texture is almost suggestive of glomeroporphyritic

Rock Texture: Granolepidoblastic - porphyritic

Rock Name: Mafic metavolcanic (probably flow or pillow)

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THIN SECTION DESCRIPTION Sample No.: GC-056

Field Rock Name: Mafic metavolcanic - basaltic flow or pillows

Major Minerals: (% - habit, grain size):

quartz)	71%	predominantly
plagioclase)		plagioclase
biotite	16%	
chlorite	6%	grain size ≃0.02 to 0.05 mm
calcite	3%	some biotite is coarser
opagues	4%	
epidote	(trace)	

Minor Minerals: - sheared equivalent of GC-054
a few relict plagioclases (very few)
→ protomylonite

Veins, Fractures:

Alterations: - Occasional quartz-eyes (may represent deformed amygdules)
- Totally recrystallized - granolepidoblastic

Rock Texture: - Moderately foliated due to tectonic flattening and // alignment of biotite; rock is relatively sheared

Rock Name: Mafic metavolcanic (basaltic flow or pillow)
Blastomylonitic

(Doc. #0028U - 10.11.86)

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THIN SECTION DESCRIPTION Sample No.: GC-018

Field Rock Name: Vesicular pillow basalts

Major Minerals: (% - habit, grain size):

quartz) 65% plagioclase predominant
plagioclase)
chlorite 14%
biotite 7%
calcite 10%
zoisite (minor)
oxide 4%
most of quartz is in vesicles

Minor Minerals: Primary texture was porphyritic phenocrysts (plag) ≈0.4 mm
groundmass ≈0.01 to 0.03 mm
probably somewhat sheared

Veins, Fractures:

Alterations: Vesicles filles with quartz + calcite (coarse grained)

Rock Texture: Weak to moderately developed foliation, relict plagioclase laths occasionally observable

Rock Name: Amygdaloidal basalt

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THIN SECTION DESCRIPTION

Sample No.: GC-019

Field Rock Name: Vesicular basalt pillows

Major Minerals: (% - habit, grain size):

quartz	≃5%	mostly in amygdales
plagioclase	67%	
calcite	7%	
biotite	6%	
chlorite	9%	
oxide	6%	
epidote	(minor)	

Minor Minerals: Good porphyritic texture,
plagioclase phenocrysts very abundant (laths) up to ≃0.4 mm
groundmass (also plagioclase) ≃0.03 to 0.1 mm
practically undeformed, very fresh

Veins, Fractures:

Alterations:

Rock Texture: Plagioclase laths still visible, still has good volcanic texture - weakly developed foliation

Rock Name: Amygdaloidal basalt

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THIN SECTION DESCRIPTION

Sample No.: GC-020

Field Rock Name: Pillow basalt

Major Minerals: (% - habit, grain size):

quartz)
plagioclase)
biotite) ≈ same as GC-019
chlorite)
epidote) but with a bit more biotite
oxide)
calcite)

Minor Minerals: Identical to GC-019 but foliation better developed (at least in thin section)

Veins, Fractures:

Alterations:

Rock Texture: Weak to moderately developed foliation, relict plagioclase laths still present

Rock Name: Pillow basalt

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THIN SECTION DESCRIPTION Sample No.: GC-016

Field Rock Name: Intermediate to mafic metavolcanic, probably pyroclastic in origin

Major Minerals: (% - habit, grain size):

quartz)	80%	plagioclase predominant
plagioclase)		
sericite	16%	
chlorite	1-2%	
biotite	1-2%	
calcite	1%	

Minor Minerals: Grain size: groundmass 0.01 to 0.03 mm
phenocrysts up to 3 mm now recrystallized - i.e. there are 3 mm size patches where grain size is 0.02 to 0.1 mm
- I would call this mylonite

Veins, Fractures:

Alterations: Fragments (best seen in slab) of unsheared material in strongly sheared matrix

Rock Texture: Equigranular, fine grained, some relict fragments completely recrystallized and composed of polygonal quartz (is coarser than quartz in groundmass)

Rock Name: Protomylonite - Intermediate to mafic metavolcanic precursor

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THIN SECTION DESCRIPTION Sample No.: GC-052

Field Rock Name: Mafic metavolcanic (lavas or pillows)

Major Minerals: (% - habit, grain size):

plagioclase	74%	
biotite	16%	
chlorite	5%	grain size:
calcite	2%	groundmass 0.02 to 0.1 mm
opaques	2%	phenocrysts up to 3 mm

Minor Minerals: - relict primary porphyritic texture present
- phenocrysts are in process of recrystallization and show l:w ratio of ≈2:1 within the planar fabric i.e. there is moderate to weak shearing indicated
- note 2 thin sections were taken on ⊥ planes and show that the phenocrysts are being stretched and flattened not just one or the other

Veins, Fractures:

Alterations:

Rock Texture: - Granolepidoblastic, relict plagioclase crystals can still be recognized but have recrystallized and are starting to blend in with the finer grained groundmass - moderate foliation - mild shearing

Rock Name: Mafic metavolcanic

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THIN SECTION DESCRIPTION Sample No.: GC-009

Field Rock Name: Intermediate ashfall crystal tuff

Major Minerals: (% - habit, grain size):

quartz)	70%	plagioclase dominant
plagioclase)		
epidote (±zoisite)	12%	
chlorite	7%	grain size mostly 0.02 to 0.2 mm but
calcite	10%	very heterogeneous
sulfide	1%	calcite, epidote up to 0.8 mm
		relict plagioclase up to 0.5 mm

Minor Minerals: Occasional relict plagioclase observed with twinning but most of plagioclase has recrystallized - what is now fine grained and probably more albitic

Veins, Fractures:

Alterations: Strong epidotization, high carbonate
Strong alteration and recrystallization have masked primary textures - difficult to interpret

Rock Texture: Very weak foliation, layering is probably the result of primary compositional differences

Rock Name: Intermediate metavolcanic - moderately sheared

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THIN SECTION DESCRIPTION Sample No.: GC-012

Field Rock Name: Intermediate ashfall crystal tuff

Major Minerals: (% - habit, grain size):

quartz)	77%	predominantly
plagioclase)		plagioclase
epidote	12%	
chlorite	10%	grain size 0.01 to 0.04 mm
opaques	1%	epidote is late mineral
		up to 1 mm

Minor Minerals: This could be fine grained rock or this could be mylonite. The latter interpretation would imply that I know primary rock type (which I don't).

Veins, Fractures:

Alterations: Strong epidotization similar to GC-011

Rock Texture: Islands of unsheared material floating in matrix of strongly sheared material - I disagree - everything is fine grained except late epidote and chlorite.

Rock Name: Protomylonite - possible intermediate metavolcanic precursor

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THIN SECTION DESCRIPTION

Sample No.: GC-006

Field Rock Name: Intermediate to mafic pyroclastic

Major Minerals: (% - habit, grain size):

quartz	65%	with quartz dominant
plagioclase		over plagioclase
calcite	15%	
biotite	6%	grain size variable across foliation
chlorite	11%	from <0.01 mm to 0.05 mm and, in some
sulfide	3%	areas relict grains or neoblasts at up
		to ≃0.2 mm

Minor Minerals: clearly mylonitic texture

Veins, Fractures: Quartz is abundant but was probably introduced late along shear zone

Alterations:

Rock Texture: Strongly foliated, granolepidoblastic foliation is primarily due to tectonic flattening and shearing

Rock Name: Blastomylonite - intermediate to mafic metavolcanic precursor

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THIN SECTION DESCRIPTION

Sample No.: GC-002

Field Rock Name: Intermediate ashfall tuff

Major Minerals: (% - habit, grain size):

quartz + plagioclase subequal	≈75%
muscovite	5%
epidote	10%
lepidomelane (?) grungy	5%
opaques (minor)	
chlorite (minor)	5%

Minor Minerals: grain size 0.01 mm to 0.04 mm
well developed mylonitic texture
with tectonic foliation well developed

Veins, Fractures:

Alterations:

Rock Texture: Mildly developed flaser texture, strongly sheared → mylonitic

Rock Name: Blastomylonite - probably intermediate metavolcanic precursor

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THIN SECTION DESCRIPTION Sample No.: GC-004

Field Rock Name:

Major Minerals: (% - habit, grain size):

quartz)	70%	
plagioclase)		
garnet	10%	
epidote	10%	grain size ≈0.01 to 0.04 mm
lepidomelane	1-2%	garnets up to 1 mm
chlorite	8%	
opaques	(minor)	
sericite	(minor)	

Minor Minerals:

Very fine grained but poorly developed foliation;
could easily be fine grained tuff

Veins, Fractures:

Alterations: Garnet is retrograding to magnetite and chlorite

Rock Texture: Weakly developed foliation

Rock Name: Ashfall tuff ? ≈ intermediate in composition - locally sheared

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THIN SECTION DESCRIPTION

Sample No.: GC-005

Field Rock Name: Ashfall tuff

Major Minerals: (% - habit, grain size):

quartz	5%	
plagioclase	77%	
zoisite	5%	grain size 0.02 to 0.15 mm
muscovite	(minor)	but homogeneous
opaques	10%	
tourmaline	1%	
chlorite	2%	

Minor Minerals:

Veins, Fractures: Local coarse vein material present - quartz feldspar up to 2 mm

Alterations:

Rock Texture: Very weak foliation, fine grained, granoblastic

Rock Name: Unidentified precursor - locally difficult to say sheared (may have been intermediate pyroclastic)

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BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: H76-1-10.7A and B

Field Rock Name: Intermediate tuff

Major Minerals: (% - habit, grain size):

plagioclase >> quartz	≃55%	
hornblende	≃40%	poikiloblastic
biotite	≃ 3%	
calcite	≃ 1%	
opaques	< 1%	
epidote	< 1%	

grain size: hornblende up to 3 mm
groundmass 0.02 to 0.1 mm

Minor Minerals: Good lenticular parallel orientation i.e. groundmass wraps around elongate hornblende blasts. Biotite restricted to certain plag/quartz bands devoid of hornblende. Intensity of planar orientation is variable across the section as if there is a heterogeneous distribution of sheared and less sheared rock.

Note: Section A more strongly sheared than section B.
Section B slightly higher biotite content and local alteration of amphibole to chlorite.
Section B average grain size of hornblende smaller than section A, but maximum grain size similar.

Veins, Fractures:

Alterations:

Rock Texture: Granolepidoblastic - porphyroblastic

Rock Name: Intermediate tuff or sheared flow

(Doc. #0031U - 01.12.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: H76-1-33.5A and B

Field Rock Name: Intermediate tuff

Major Minerals: (% - habit, grain size):

plagioclase >> quartz	≈50%	
hornblende	≈45%	poikiloblastic
biotite	≈ 3%	
calcite	≈ 1%	
clinozoisite	< 1%	
chlorite	< 1%	
opaques	< 1%	

Grain size: hornblende up to 3 mm

Minor Minerals: groundmass 0.02 to 0.1 mm

Very similar to H76-1-10.5 but section A overall finer grained, section B overall coarser grained.

Section B contains a few coarse lenticular shaped plagioclase segregations, and some of the amphibole adjacent to these segregations may be cummingtonite.

Veins, Fractures:

Alterations:

Rock Texture: Granolepidoblastic - porphyroblastic

Rock Name: Intermediate tuff or sheared flow

(Doc. #0031U - 01.12.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-18-1

Field Rock Name: Graphitic - pyrrhotitic - biotite quartz schist (metasediment)

Major Minerals: (% - habit, grain size):

quartz, plagioclase	72%	predominantly plagioclase (i.e. <5% quartz)
biotite	18%	
opaques	7%	→ pyrrhotite
garnet	3%	
zircon	(trace)	

Minor Minerals:

Veins, Fractures:

Alterations:

Rock Texture: Gritty - granolepidoblastic, very weak foliation

Rock Name: Psammitic pyrrhotiferous metasediment

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-20-1

Field Rock Name: Quartz diorite

Major Minerals: (% - habit, grain size):

quartz	37%	plagioclase predominant
plagioclase		≈5% quartz
hornblende	25%	
chlorite	≈17%	
sericite	18%	
opaques	1%	
epidote	1%	
sphene	1%	

Minor Minerals:

Compositional zoning in plagioclase

Veins, Fractures:

Alterations: - Relict plagioclases still present but are saussuritized

- Amphiboles are retrograding to chlorite

Rock Texture: - No foliation - non directional - massive

Rock Name: Diorite

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: JL-20-2

Field Rock Name:

Major Minerals: (% - habit, grain size):

quartz)	55%	predominantly plagioclase
plagioclase)		quartz <4%
hornblende	15%	
biotite	20%	
epidote	2%	
sphene	3%	
opaques	1%	
sericite	4%	

Minor Minerals: - Similar to JL-20-1 but is fresher, i.e. biotite instead of chlorite and less sericite
- Compositional zoning in plagioclase

Veins, Fractures:

Alterations:

Rock Texture: - Only a very slight preferred orientation of biotite and amphibole grains

Rock Name: Diorite

(Doc. #0029U - 12.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION

Sample No.: AM-13-1

Field Rock Name: Metasediment (biotite schist)

Major Minerals: (% - habit, grain size):

plagioclase	70%	predominantly
quartz		quartz
biotite	23%	
garnet	2%	
opaques	3%	
chlorite	2%	

Minor Minerals:

Veins, Fractures:

Alterations: - Garnets show a good poikiloblastic texture

- Granolepidoblastic

Rock Texture: - Moderately foliated due to // alignment of biotite

Rock Name: - Plammitic metasediment (quartz-biotite schist) with minor garnets

(Doc. #0031U - 18.11.86)

COGEMA CANADA LIMITED

BURNTBUSH RIVER PROJECT

THIN SECTION DESCRIPTION Sample No.: AM-14-1

Field Rock Name: Metasediment

Major Minerals: (% - habit, grain size):

quartz) 69% ≈ subequal
plagioclase)
biotite 19%
hornblende 7%
epidote 3%
opaque 1-2% (sulfide)
sericite - only proximal to veinlets
chlorite - only proximal to veinlets
zircon - trace in biotite (with good halos)

Minor Minerals:

Veins, Fractures:

Alterations: - Small fractures cut rock and are surrounded by small alteration envelopes in which primarily plagioclase is breaking down

Rock Texture: - Granolepidoblastic

Rock Name: Psammitic metasediment

(Doc. #0031U - 18.11.86)

APPENDIX V

Chemistry Results

All samples were sent to Chimitec, Ltée, and up to now, no repeat analyses have been performed. These will be reported as they are done.

Sample locations are given on Map 8 and on the outcrop sketches.

Explanation of Tables

Explanation of Tables

1. -9.00 is the null value in our computer files and indicates that no analysis was done.

2. Detection limits for each element are given below. When Chimitec's analysis indicates that a given sample contains less than this amount, we enter half the detection limit into our files.

   SiO_2, TiO_2, Al_2O_3, Fe_2O_3 (total iron as Fe_2O_3), MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, CO_2, LOI: all 0.01%.

   Au : 2 ppb

   Sb : 0.1 ppm

   Sc, Th, U : 0.2 ppm

   As, Cs, Ta, Tb : 0.5 ppm

   Eu, Hf, Mo, W : 1 ppm

   La, Ag, Yb : 2 ppm

   Cd, Co, Rb, Se : 5 ppm

   Cr, Ni : 20 ppm

   Ba, Ir : 50 ppm

   Zn : 100 ppm

   Na (by n.a.) : 0.02%

   Fe (by n.a.) : 0.2%

3. Sample preparation:

total sample crushed to ≃10 mm
secondary crushing to ≃ 2 mm
separation of ≃250 g
total pulverization to -150 mesh

for major elements
FUSION-BORATE extraction
analysis by D.C. Plasma

for CO_2
H_3PO_4 extraction
analysis for gravimetry

for LOI
analysis by gravimetry

for minor elements
analysis by neutron activation
(multi-element package)

by Chimitec Ltée, Ste-Foy, Quebec

Sample no	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	CO2	LOI	TOTAL
JL-1-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	10.10	-9.00	0.72	-9.00	0.00	-9.00	-9.00
JL-8-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	1.70	-9.00	1.61	-9.00	0.00	-9.00	-9.00
JB-7A	64.00	0.54	14.50	6.34	0.11	2.71	3.87	1.93	2.11	0.03	0.43	1.45	97.59
JB-7B	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.45	-9.00	1.58	-9.00	0.22	-9.00	-9.00
JB-7D/E	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.98	-9.00	0.40	-9.00	0.45	-9.00	-9.00
JB-8A	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.32	-9.00	3.29	-9.00	0.10	-9.00	-9.00
JB-8B	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	1.49	-9.00	3.29	-9.00	0.05	-9.00	-9.00
JL-10-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.99	-9.00	1.06	-9.00	0.28	-9.00	-9.00
JL-10-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.51	-9.00	0.36	-9.00	0.00	-9.00	-9.00
JL-10-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.56	-9.00	0.53	-9.00	0.00	-9.00	-9.00
JL-10-4	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.08	-9.00	0.20	-9.00	0.03	-9.00	-9.00
JL-10-5	51.40	1.49	14.00	14.30	0.19	6.58	9.33	3.00	0.31	0.28	0.12	0.25	101.13
JL-10-6	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.30	-9.00	0.47	-9.00	0.19	-9.00	-9.00
JL-10-7	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	0.36	-9.00	0.10	-9.00	0.00	-9.00	-9.00
JL-10-8	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	10.00	-9.00	0.51	-9.00	0.00	-9.00	-9.00
JL-10-9	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.46	-9.00	1.02	-9.00	1.95	-9.00	-9.00
JL-10-10	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.03	-9.00	0.88	-9.00	0.02	-9.00	-9.00
JL-10-11	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.54	-9.00	0.57	-9.00	0.08	-9.00	-9.00
JL-10-12	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	10.50	-9.00	0.33	-9.00	0.03	-9.00	-9.00
AM-8-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.27	-9.00	0.44	-9.00	0.16	-9.00	-9.00
AM-8-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.88	-9.00	0.90	-9.00	0.04	-9.00	-9.00
AM-8-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	10.00	-9.00	0.43	-9.00	0.05	-9.00	-9.00
JL-25-9	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.26	-9.00	0.72	-9.00	0.26	-9.00	-9.00
JL-25-10	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.83	-9.00	0.86	-9.00	0.05	-9.00	-9.00
JL-17-A	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.90	-9.00	0.83	-9.00	0.05	-9.00	-9.00
JL-17-B	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.40	-9.00	1.18	-9.00	0.05	-9.00	-9.00
JL-17-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	12.40	-9.00	0.70	-9.00	0.40	-9.00	-9.00
JL-17-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.71	-9.00	0.51	-9.00	0.00	-9.00	-9.00
JL-17-4	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	1.97	-9.00	0.37	-9.00	0.04	-9.00	-9.00
JL-17-5	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.86	-9.00	1.24	-9.00	0.10	-9.00	-9.00
JL-25-7	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.02	-9.00	0.97	-9.00	0.00	-9.00	-9.00
JL-25-8	58.40	0.35	15.70	4.53	0.06	5.23	7.18	4.90	0.36	0.05	0.05	0.45	97.21
JL-26-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.58	-9.00	1.33	-9.00	0.05	-9.00	-9.00
JL-13-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.87	-9.00	0.32	-9.00	0.08	-9.00	-9.00
JL-14-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.90	-9.00	0.31	-9.00	0.13	-9.00	-9.00
JL-14-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.60	-9.00	0.26	-9.00	0.34	-9.00	-9.00
JL-14-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.00	-9.00	0.20	-9.00	0.22	-9.00	-9.00
JL-14-4	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.83	-9.00	1.23	-9.00	0.38	-9.00	-9.00
JL-14-5	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.81	-9.00	0.44	-9.00	0.62	-9.00	-9.00
JL-14-6	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.52	-9.00	0.89	-9.00	0.18	-9.00	-9.00
JL-14-7	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	51.90	-9.00	1.93	-9.00	0.13	-9.00	-9.00
JL-24-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.10	-9.00	1.13	-9.00	0.09	-9.00	-9.00
JL-24-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	0.55	-9.00	0.04	-9.00	0.14	-9.00	-9.00
JL-25-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.15	-9.00	0.42	-9.00	0.90	-9.00	-9.00
JL-25-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.74	-9.00	0.33	-9.00	0.53	-9.00	-9.00
JL-25-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	11.20	-9.00	0.26	-9.00	0.06	-9.00	-9.00
JL-25-4	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.54	-9.00	0.26	-9.00	1.89	-9.00	-9.00
JL-25-5	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.53	-9.00	0.29	-9.00	0.00	-9.00	-9.00
JL-25-6	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.75	-9.00	0.49	-9.00	0.26	-9.00	-9.00
AM-15-1	66.40	0.54	14.50	4.39	0.12	0.91	5.42	1.88	1.37	0.01	0.68	1.70	97.23
AM-15-2	50.80	0.97	15.90	9.23	0.11	4.74	8.53	3.90	0.16	0.06	0.81	2.85	97.25
AM-15-3	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	9.91	-9.00	0.49	-9.00	5.78	-9.00	-9.00
AM-15-4	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.37	-9.00	1.61	-9.00	0.06	-9.00	-9.00
GG-034	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	8.97	-9.00	2.03	-9.00	4.25	-9.00	-9.00
GC-0038	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.52	-9.00	0.68	-9.00	0.06	-9.00	-9.00
GC-0058	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	0.38	-9.00	0.10	-9.00	0.01	-9.00	-9.00

Sample no	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	CO2	LOI	TOTAL
GC-0037	57.90	1.00	18.00	6.69	0.11	2.12	4.65	4.74	1.39	0.19	0.42	1.75	98.54
GC-0036	61.50	0.60	16.10	6.90	0.16	1.98	5.43	1.29	2.13	0.19	0.40	0.95	97.23
GC-0059	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.54	-9.00	2.13	-9.00	0.11	-9.00	-9.00
GG-035	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.30	-9.00	0.37	-9.00	1.41	-9.00	-9.00
GC-022	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.99	-9.00	2.14	-9.00	2.07	-9.00	-9.00
GC-021	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.20	-9.00	0.74	-9.00	1.17	-9.00	-9.00
JB-15-A	54.70	0.60	15.80	7.46	0.11	5.25	3.92	4.37	0.45	0.19	1.86	5.25	98.10
JB-15-B	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.29	-9.00	1.37	-9.00	2.41	-9.00	-9.00
JB-15-C	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.79	-9.00	1.37	-9.00	1.73	-9.00	-9.00
JB-15-D	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.29	-9.00	0.77	-9.00	0.52	-9.00	-9.00
GC-0054	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.80	-9.00	0.96	-9.00	1.87	-9.00	-9.00
GC-0055	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	1.53	-9.00	0.07	-9.00	1.15	-9.00	-9.00
GC-0056	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.15	-9.00	1.30	-9.00	1.82	-9.00	-9.00
GC-018	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.01	-9.00	0.56	-9.00	1.68	-9.00	-9.00
GC-019	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.74	-9.00	0.63	-9.00	0.66	-9.00	-9.00
GC-020	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.52	-9.00	0.74	-9.00	1.84	-9.00	-9.00
GC-016	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.83	-9.00	1.29	-9.00	0.41	-9.00	-9.00
GC-017	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	0.52	-9.00	0.72	-9.00	0.16	-9.00	-9.00
GC-0052	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.20	-9.00	1.22	-9.00	0.21	-9.00	-9.00
GC-0053	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.06	-9.00	0.89	-9.00	0.43	-9.00	-9.00
GC-0009	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.20	-9.00	0.41	-9.00	2.19	-9.00	-9.00
GC-012	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.02	-9.00	0.47	-9.00	0.32	-9.00	-9.00
GC-006	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	5.81	-9.00	1.02	-9.00	2.94	-9.00	-9.00
GC-007	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.92	-9.00	0.34	-9.00	0.04	-9.00	-9.00
GC-008	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.94	-9.00	0.81	-9.00	0.08	-9.00	-9.00
GC-002	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	4.35	-9.00	1.80	-9.00	0.05	-9.00	-9.00
GC-003	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.60	-9.00	0.87	-9.00	0.12	-9.00	-9.00
GC-004	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.81	-9.00	1.97	-9.00	0.09	-9.00	-9.00
GC-005	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.43	-9.00	0.75	-9.00	0.12	-9.00	-9.00
GC-011	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	7.27	-9.00	0.35	-9.00	0.12	-9.00	-9.00
H76-1/10.7	55.80	0.92	15.20	9.45	0.15	3.93	6.56	2.73	0.74	0.16	0.89	1.45	97.09
H76-1/33.5	53.50	1.36	16.40	9.78	0.23	4.15	9.32	2.83	0.42	0.35	1.61	2.20	100.54
JL-18-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	2.57	-9.00	1.92	-9.00	0.05	-9.00	-9.00
JL-20-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.50	-9.00	2.52	-9.00	0.07	-9.00	-9.00
JL-20-2	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	6.22	-9.00	2.29	-9.00	0.31	-9.00	-9.00
AM-13-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.00	-9.00	1.92	-9.00	0.09	-9.00	-9.00
AM-14-1	-9.00	-9.00	-9.00	-9.00	-9.00	-9.00	3.54	-9.00	2.44	-9.00	0.23	-9.00	-9.00

Sample no	Au	Sb	As	Ba	Cd	Cs	Cr	Co	Eu	Hf	Ir	Fe	La	Mo
JL-1-1	1.00	0.05	0.25	140.00	2.50	0.60	190.00	29.00	1.00	2.00	25.00	9.30	4.00	0.50
JL-8-2	1.00	0.05	0.70	610.00	2.50	0.80	10.00	2.50	0.50	3.00	25.00	0.90	14.00	9.00
JB-7A	1.00	0.05	0.25	570.00	2.50	5.70	180.00	16.00	1.00	5.00	25.00	3.90	33.00	2.00
JB-7B	1.00	0.05	0.25	470.00	2.50	4.50	120.00	10.00	0.50	4.00	25.00	3.30	3.00	2.00
JB-7D/E	1.00	0.05	0.25	110.00	2.50	0.90	78.00	8.00	0.50	2.00	25.00	1.90	7.00	2.00
JB-8A	1.00	0.05	0.25	1300.00	2.50	3.50	360.00	30.00	2.00	5.00	25.00	5.10	57.00	1.00
JB-8B	1.00	0.05	0.25	830.00	2.50	5.90	120.00	12.00	1.00	3.00	25.00	4.20	24.00	2.00
JL-10-1	1.00	0.50	0.25	490.00	2.50	2.30	10.00	6.00	0.50	2.00	25.00	2.00	4.00	0.50
JL-10-2	1.00	0.05	0.25	89.00	2.50	0.25	180.00	23.00	0.50	3.00	25.00	8.10	5.00	2.00
JL-10-3	1.00	0.05	0.25	150.00	2.50	0.80	130.00	29.00	2.00	3.00	25.00	9.10	3.00	7.00
JL-10-4	1.00	0.05	0.25	25.00	2.50	0.25	170.00	34.00	0.50	3.00	25.00	8.40	3.00	0.50
JL-10-5	3.00	0.05	0.25	25.00	2.50	0.60	120.00	35.00	0.50	2.00	25.00	9.30	2.00	0.50
JL-10-6	1.00	0.05	0.25	110.00	2.50	0.25	220.00	34.00	0.50	2.00	25.00	8.10	7.00	0.50
JL-10-7	1.00	0.05	0.25	25.00	2.50	0.25	10.00	2.50	0.50	0.50	25.00	0.20	1.00	0.50
JL-10-8	1.00	0.05	0.25	82.00	2.50	0.60	210.00	34.00	1.00	3.00	25.00	8.20	5.00	0.50
JL-10-9	1.00	0.05	0.25	110.00	2.50	2.90	49.00	8.00	0.50	0.50	25.00	2.10	3.00	0.50
JL-10-10	1.00	0.05	0.25	300.00	2.50	0.80	10.00	2.50	0.50	2.00	25.00	0.30	1.00	0.50
JL-10-11	1.00	0.05	0.25	160.00	2.50	1.20	170.00	14.00	3.00	3.00	25.00	2.80	25.00	0.50
JL-10-12	1.00	0.05	0.25	25.00	2.50	0.25	200.00	29.00	0.50	2.00	25.00	7.50	4.00	0.50
AM-8-1	1.00	0.40	0.25	88.00	2.50	1.50	72.00	27.00	2.00	3.00	25.00	6.40	5.00	0.50
AM-8-2	1.00	0.05	0.25	610.00	2.50	1.20	27.00	2.50	0.50	2.00	25.00	0.30	5.00	0.50
AM-8-3	2.00	0.05	0.25	25.00	2.50	0.25	180.00	21.00	0.50	3.00	25.00	8.00	4.00	0.50
JL-25-9	1.00	0.05	0.25	61.00	2.50	1.00	170.00	24.00	0.50	3.00	25.00	6.80	3.00	3.00
JL-25-10	1.00	0.05	0.25	230.00	2.50	1.70	180.00	27.00	1.00	3.00	25.00	7.10	3.00	2.00
JL-17-A	1.00	0.05	0.25	110.00	2.50	1.60	1100.00	43.00	0.50	1.00	25.00	8.60	3.00	0.50
JL-17-B	1.00	0.05	0.25	160.00	2.50	1.10	950.00	42.00	0.50	1.00	25.00	7.70	4.00	0.50
JL-17-2	1.00	0.05	0.60	290.00	2.50	1.00	1200.00	33.00	0.50	0.50	25.00	8.80	5.00	19.00
JL-17-3	1.00	0.40	0.25	54.00	2.50	0.60	24.00	33.00	1.00	4.00	25.00	11.00	3.00	0.50
JL-17-4	1.00	0.05	0.25	400.00	2.50	1.10	10.00	2.50	0.50	2.00	25.00	0.50	1.00	0.50
JL-17-5	1.00	0.05	0.25	210.00	2.50	1.60	25.00	34.00	2.00	3.00	25.00	9.10	5.00	1.00
JL-25-7	3.00	0.05	0.90	160.00	2.50	2.90	45.00	26.00	0.50	3.00	25.00	8.30	4.00	27.00
JL-25-8	2.00	0.05	0.25	170.00	2.50	0.25	280.00	15.00	0.50	2.00	25.00	2.50	4.00	0.50
JL-26-1	1.00	0.05	0.25	220.00	2.50	3.30	150.00	22.00	1.00	1.00	25.00	5.50	3.00	8.00
JL-13-1	20.00	0.05	0.60	25.00	2.50	4.00	300.00	41.00	1.00	1.00	25.00	8.60	2.00	0.50
JL-14-1	1.00	0.05	0.25	61.00	2.50	2.20	290.00	40.00	1.00	2.00	25.00	9.00	3.00	0.50
JL-14-2	4.00	0.05	0.25	51.00	2.50	2.20	260.00	37.00	0.50	1.00	25.00	7.40	3.00	0.50
JL-14-3	5.00	0.10	0.50	25.00	2.50	1.30	180.00	33.00	0.50	1.00	25.00	8.80	2.00	0.50
JL-14-4	1.50	0.20	0.25	70.00	2.50	96.40	230.00	36.00	1.00	0.50	25.00	12.00	5.00	0.50
JL-14-5	1.50	0.10	0.25	93.00	2.50	7.20	170.00	35.00	0.50	2.00	25.00	8.60	3.00	0.50
JL-14-6	1.00	0.20	0.25	560.00	2.50	8.40	22.00	5.00	0.50	4.00	25.00	3.00	25.00	0.50
JL-14-7	1.00	0.05	0.25	550.00	2.50	4.30	160.00	16.00	0.50	4.00	25.00	4.10	16.00	0.50
JL-24-1	2.00	0.10	0.25	130.00	2.50	11.00	370.00	40.00	0.50	0.50	25.00	8.10	3.00	4.00
JL-24-2	1.00	0.05	0.25	25.00	2.50	0.25	23.00	2.50	0.50	0.50	25.00	0.30	1.00	2.00
JL-25-1	1.00	0.05	0.25	69.00	2.50	9.30	310.00	38.00	0.50	0.50	25.00	8.40	2.00	2.00
JL-25-2	5.00	0.05	1.60	65.00	2.50	1.50	180.00	40.00	0.50	1.00	25.00	8.70	2.00	0.50
JL-25-3	1.00	0.05	0.50	25.00	2.50	1.40	320.00	27.00	0.50	2.00	25.00	7.30	2.00	2.00
JL-25-4	1.00	0.05	0.50	65.00	2.50	4.80	180.00	34.00	1.00	2.00	25.00	7.70	3.00	1.00
JL-25-5	1.00	0.05	0.25	25.00	2.50	1.30	23.00	19.00	2.00	6.00	25.00	6.20	10.00	3.00
JL-25-6	110.00	0.05	0.25	100.00	2.50	3.50	330.00	58.00	1.00	0.50	25.00	9.10	3.00	2.00
AM-15-1	4.00	0.10	0.25	390.00	2.50	3.40	10.00	7.00	0.50	4.00	25.00	2.70	10.00	1.00
AM-15-2	1.00	0.20	0.25	86.00	2.50	0.25	160.00	33.00	2.00	4.00	25.00	6.10	10.00	1.00
AM-15-3	6.00	0.05	0.25	110.00	2.50	0.70	73.00	20.30	1.00	3.00	25.00	5.00	9.00	2.00
AM-15-4	4.00	0.05	0.25	430.00	2.50	3.50	10.00	8.00	1.00	4.00	25.00	3.00	9.00	0.50
GG-034	1.00	0.10	0.90	310.00	2.50	1.90	40.00	20.00	1.00	2.00	25.00	4.30	9.00	2.00
GC-0038	5.00	0.40	1.50	240.00	2.50	1.10	160.00	30.00	1.00	4.00	25.00	6.80	17.00	0.50
GC-0058	1.00	0.30	1.80	25.00	2.50	0.25	10.00	2.50	0.50	0.50	25.00	0.50	1.00	1.00

Sample no	Au	Sb	As	Ba	Cd	Cs	Cr	Co	Eu	Hf	Ir	Fe	La	Mo
GC-0037	3.00	0.30	3.60	250.00	2.50	3.10	71.00	25.00	0.50	3.00	25.00	4.80	12.00	0.50
GC-0036	3.00	0.30	7.00	500.00	2.50	3.10	25.00	12.00	0.50	5.00	25.00	4.20	13.00	0.50
GC-0059	1.00	0.20	0.50	510.00	2.50	3.40	32.00	21.00	0.50	5.00	25.00	7.90	14.00	0.50
GG-035	1.00	0.05	0.25	53.00	2.50	1.00	110.00	24.00	2.00	3.00	25.00	4.90	7.00	0.50
GC-022	15.00	0.05	0.25	360.00	2.50	4.30	180.00	19.00	0.50	2.00	25.00	3.90	10.00	5.00
GC-021	1.00	0.05	0.25	110.00	2.50	1.10	220.00	25.00	0.50	2.00	25.00	5.00	10.00	0.50
JB-15-A	1.00	0.30	2.50	81.00	2.50	1.40	240.00	35.00	0.50	4.00	25.00	5.90	10.00	0.50
JB-15-B	1.00	0.20	2.40	260.00	2.50	5.60	240.00	29.00	0.50	4.00	25.00	6.10	11.00	1.00
JB-15-C	1.00	0.30	1.10	300.00	2.50	2.90	230.00	28.00	0.50	4.00	25.00	5.20	10.00	0.50
JB-15-D	1.00	0.30	1.40	750.00	2.50	1.00	85.00	23.00	0.50	3.00	25.00	4.70	11.00	0.50
GC-0054	5.00	0.30	1.00	120.00	2.50	1.20	230.00	32.00	0.50	4.00	25.00	6.20	9.00	0.50
GC-0055	1.00	0.20	2.10	25.00	2.50	0.25	10.00	2.50	0.50	0.50	25.00	0.40	1.00	0.50
GC-0056	1.00	0.20	1.10	220.00	2.50	2.70	160.00	24.00	0.50	3.00	25.00	4.80	15.00	0.50
GC-018	1.00	0.10	0.25	100.00	2.50	2.30	71.00	23.00	0.50	2.00	25.00	5.20	11.00	0.50
GC-019	1.00	0.05	0.25	83.00	2.50	1.70	73.00	21.00	2.00	3.00	25.00	4.70	10.00	0.50
GC-020	1.00	0.10	0.70	230.00	2.50	4.00	64.00	26.00	1.00	3.00	25.00	4.80	10.00	0.50
GC-016	1.00	0.20	0.25	290.00	2.50	3.70	10.00	5.00	1.00	6.00	25.00	1.80	17.00	0.50
GC-017	1.00	0.05	0.25	89.00	2.50	0.80	10.00	2.50	0.50	2.00	25.00	1.00	5.00	0.50
GC-0052	1.00	0.30	1.00	300.00	2.50	3.10	44.00	18.00	0.50	7.00	25.00	4.50	16.00	1.00
GC-0053	1.00	0.40	1.10	220.00	2.50	1.30	32.00	7.00	0.50	4.00	25.00	1.80	23.00	2.00
GC-0009	1.00	0.40	2.20	510.00	2.50	0.25	27.00	13.00	0.50	7.00	25.00	4.20	19.00	0.50
GC-012	1.00	0.05	0.70	130.00	2.50	0.25	10.00	13.00	0.50	5.00	25.00	3.80	15.00	0.50
GC-006	4.00	0.05	0.25	150.00	2.50	1.30	23.00	14.00	0.50	4.00	25.00	8.10	13.00	0.50
GC-007	1.00	0.30	2.20	91.00	2.50	0.25	28.00	32.00	1.00	3.00	25.00	8.30	15.00	0.50
GC-008	1.00	0.05	0.80	250.00	2.50	0.25	40.00	16.00	1.00	3.00	25.00	3.50	10.00	0.50
GC-002	11.00	0.05	0.50	390.00	2.50	0.70	10.00	14.00	2.00	3.00	25.00	3.50	15.00	0.50
GC-003	7.00	0.10	0.80	220.00	2.50	0.70	10.00	10.00	1.00	3.00	25.00	5.20	9.00	0.50
GC-004	1.00	0.10	0.70	390.00	2.50	0.25	10.00	14.00	1.00	4.00	25.00	5.10	15.00	0.50
GC-005	1.00	0.20	0.25	150.00	2.50	0.25	10.00	8.00	1.00	4.00	25.00	3.00	13.00	0.50
GC-011	1.00	0.30	0.25	75.00	2.50	0.25	35.00	15.00	1.00	3.00	25.00	6.60	18.00	0.50
H76-1/10.7	6.00	0.05	3.30	140.00	2.50	0.90	75.00	22.00	0.50	4.00	25.00	5.90	12.00	0.50
H76-1/33.5	3.00	0.05	0.25	120.00	2.50	0.60	170.00	38.00	0.50	3.00	25.00	6.00	9.00	0.50
JL-18-1	1.00	0.40	3.90	630.00	2.50	3.20	56.00	13.00	1.00	3.00	25.00	4.70	13.00	0.50
JL-20-1	1.00	0.05	0.25	1000.00	2.50	0.90	38.00	23.00	2.00	3.00	25.00	4.90	40.00	2.00
JL-20-2	1.00	0.20	0.25	1100.00	2.50	1.80	44.00	25.00	3.00	4.00	25.00	5.20	46.00	0.50
AM-13-1	1.00	0.05	0.25	480.00	2.50	3.10	120.00	12.00	0.50	3.00	25.00	3.70	7.00	1.00
AM-14-1	3.00	0.10	0.60	610.00	2.50	3.00	100.00	13.00	0.50	3.00	25.00	3.10	16.00	3.00

Sample no	Ni	Rb	Sc	Se	Ag	Ta	Tb	Th	W	U	Yb	Zn	Na
JL-1-1	47.00	17.00	29.80	2.50	1.00	0.25	0.70	0.40	0.50	0.10	4.00	50.00	1.30
JL-8-2	10.00	36.00	1.80	2.50	1.00	0.25	0.25	4.80	0.50	0.80	1.00	50.00	3.01
JB-7A	46.00	94.00	12.00	2.50	1.00	0.50	0.25	8.60	0.50	2.20	1.00	50.00	1.50
JB-7B	29.00	55.00	11.00	2.50	1.00	0.25	0.25	5.00	0.50	1.30	1.00	50.00	2.05
JB-7D/E	29.00	10.00	6.00	2.50	1.00	0.25	0.25	2.70	0.50	0.70	1.00	50.00	1.20
JB-8A	260.00	100.00	16.00	2.50	1.00	0.60	0.90	4.40	1.00	0.90	1.00	50.00	1.00
JB-8B	35.00	84.00	15.00	2.50	1.00	0.60	0.25	7.00	0.50	1.80	1.00	50.00	1.70
JL-10-1	22.00	37.00	2.90	2.50	1.00	0.25	0.25	0.70	0.50	0.50	1.00	50.00	2.27
JL-10-2	40.00	2.50	31.90	2.50	1.00	0.25	0.70	0.30	0.50	0.20	4.00	50.00	1.40
JL-10-3	47.00	15.00	30.70	2.50	1.00	0.25	0.60	0.30	0.50	0.10	3.00	50.00	1.40
JL-10-4	48.00	9.00	29.30	2.50	1.00	0.25	0.80	0.40	0.50	0.10	3.00	50.00	2.00
JL-10-5	45.00	15.00	32.50	2.50	1.00	0.25	0.60	0.30	0.50	0.10	3.00	50.00	2.01
JL-10-6	59.00	7.00	32.70	2.50	1.00	0.25	0.90	0.40	0.50	0.10	4.00	50.00	1.00
JL-10-7	10.00	2.50	0.40	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	0.50
JL-10-8	45.00	11.00	29.90	2.50	1.00	0.25	0.80	0.40	0.50	0.10	4.00	50.00	1.60
JL-10-9	10.00	42.00	6.80	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	1.50
JL-10-10	10.00	23.00	1.20	2.50	1.00	0.25	0.25	0.30	0.50	0.20	1.00	50.00	4.10
JL-10-11	91.00	17.00	6.20	2.50	1.00	0.50	0.25	3.40	0.50	0.80	1.00	50.00	2.09
JL-10-12	39.00	3.00	30.40	2.50	1.00	0.25	0.60	0.30	0.50	0.10	3.00	50.00	2.02
AM-8-1	37.00	9.00	26.20	2.50	1.00	0.25	1.00	0.30	0.50	0.20	3.00	50.00	2.08
AM-8-2	10.00	29.00	1.50	2.50	1.00	0.25	0.25	1.00	0.50	0.50	1.00	50.00	3.40
AM-8-3	36.00	3.00	30.60	2.50	1.00	0.50	0.90	0.50	0.50	0.10	3.00	50.00	1.80
JL-25-9	36.00	21.00	28.40	2.50	1.00	0.25	0.90	0.40	0.50	0.10	3.00	50.00	1.10
JL-25-10	40.00	24.00	33.20	2.50	1.00	0.25	0.70	0.30	0.50	0.10	4.00	50.00	1.40
JL-17-A	150.00	27.00	34.70	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	1.10
JL-17-B	130.00	43.00	33.90	2.50	1.00	0.25	0.25	0.10	1.00	0.10	1.00	50.00	1.30
JL-17-2	93.00	21.00	32.90	2.50	1.00	0.25	0.60	0.20	0.50	0.30	1.00	50.00	0.85
JL-17-3	26.00	10.00	34.00	2.50	1.00	0.50	1.10	0.40	0.50	0.20	5.00	50.00	1.80
JL-17-4	10.00	12.00	1.20	2.50	1.00	0.25	0.25	0.60	0.50	0.60	1.00	50.00	4.56
JL-17-5	42.00	56.00	34.00	2.50	1.50	0.25	0.90	0.80	0.50	0.10	4.00	50.00	1.90
JL-25-7	34.00	32.00	30.60	2.50	1.00	0.25	1.00	0.40	0.50	0.40	4.00	110.00	1.60
JL-25-8	130.00	4.00	7.00	2.50	1.00	0.25	0.25	1.30	0.50	0.40	1.00	50.00	3.61
JL-26-1	31.00	59.00	25.60	2.50	1.00	0.25	0.25	0.20	0.50	1.00	3.00	50.00	1.50
JL-13-1	50.00	12.00	35.40	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	1.30
JL-14-1	110.00	8.00	34.20	2.50	1.00	0.25	0.50	0.20	31.00	0.10	2.00	50.00	1.20
JL-14-2	47.00	2.50	29.30	2.50	1.00	0.25	0.25	0.10	6.00	0.10	2.00	50.00	0.85
JL-14-3	65.00	2.50	31.70	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	1.10
JL-14-4	45.00	81.00	39.90	2.50	1.00	0.25	0.70	0.50	0.50	0.10	1.00	50.00	0.55
JL-14-5	40.00	21.00	36.30	2.50	1.00	0.25	0.25	0.10	51.00	0.10	1.00	50.00	1.50
JL-14-6	10.00	35.00	6.30	2.50	1.00	0.60	0.25	4.30	2.00	0.70	1.00	50.00	3.09
JL-14-7	54.00	71.00	11.00	2.50	1.00	0.25	0.25	7.40	0.50	1.50	1.00	50.00	2.13
JL-24-1	74.00	31.00	34.40	2.50	1.00	0.25	0.50	0.30	0.50	0.10	2.00	50.00	1.30
JL-24-2	10.00	2.50	1.10	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	0.12
JL-25-1	110.00	15.00	34.40	2.50	1.00	0.25	0.60	0.10	0.50	0.10	1.00	50.00	1.50
JL-25-2	40.00	10.00	33.80	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	110.00	1.50
JL-25-3	48.00	2.50	35.50	2.50	1.00	0.25	0.25	0.30	0.50	0.10	1.00	50.00	1.50
JL-25-4	37.00	8.00	36.00	2.50	1.00	0.25	0.25	0.10	2.00	0.10	1.00	50.00	2.00
JL-25-5	10.00	3.00	25.80	2.50	1.00	0.80	0.80	1.20	0.50	0.20	4.00	50.00	2.36
JL-25-6	45.00	14.00	37.00	6.00	1.00	0.25	0.25	0.20	1.00	0.10	1.00	50.00	1.20
AM-15-1	10.00	36.00	8.80	2.50	1.00	0.25	0.25	1.40	0.50	0.30	1.00	120.00	1.40
AM-15-2	93.00	10.00	24.10	2.50	1.00	0.25	0.60	0.70	0.50	0.10	2.00	50.00	3.03
AM-15-3	66.00	10.00	17.00	2.50	1.00	0.60	0.25	0.60	2.00	0.20	1.00	50.00	2.30
AM-15-4	10.00	43.00	8.20	2.50	1.00	0.25	0.25	1.10	0.50	0.30	1.00	50.00	1.40
GG-034	36.00	54.00	16.00	2.50	1.00	0.25	0.50	0.90	0.50	0.10	1.00	50.00	0.77
GC-0038	100.00	22.00	23.40	2.50	1.00	0.60	0.70	1.40	0.50	0.50	1.00	160.00	1.30
GC-0058	10.00	2.50	1.00	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	0.12

Sample no	Ni	Rb	Sc	Se	Ag	Ta	Tb	Th	W	U	Yb	Zn	Na
GC-0037	75.00	45.00	21.60	2.50	1.00	0.60	0.70	1.20	0.50	0.10	3.00	50.00	3.42
GC-0036	39.00	59.00	12.00	2.50	1.00	0.25	0.50	1.80	0.50	0.50	1.00	50.00	0.85
GC-0059	41.00	60.00	15.00	2.50	1.00	0.25	0.70	1.90	0.50	0.40	2.00	50.00	0.47
GG-035	75.00	3.50	18.00	2.50	1.00	0.25	0.25	0.90	0.50	0.10	1.00	50.00	3.56
GC-022	110.00	48.00	12.00	2.50	1.00	0.25	0.25	0.90	0.50	0.30	1.00	50.00	0.92
GC-021	130.00	16.00	16.00	2.50	1.00	0.25	0.25	1.00	0.50	0.10	1.00	50.00	2.10
JB-15-A	130.00	15.00	25.90	2.50	1.00	0.25	0.25	1.30	0.50	0.20	1.00	50.00	3.54
JB-15-B	110.00	52.00	25.80	2.50	1.00	0.25	0.70	1.30	0.50	0.30	2.00	50.00	2.93
JB-15-C	120.00	50.00	24.10	2.50	1.00	0.25	0.25	1.20	0.50	0.20	1.00	50.00	1.40
JB-15-D	69.00	14.00	19.00	2.50	1.00	0.60	0.60	1.20	0.50	0.20	1.00	50.00	2.77
GC-0054	130.00	25.00	25.10	2.50	1.00	0.25	0.60	1.20	0.50	0.20	2.00	50.00	2.24
GC-0055	10.00	2.50	1.10	2.50	1.00	0.25	0.25	0.10	0.50	0.10	1.00	50.00	0.10
GC-0056	100.00	48.00	19.00	2.50	1.00	0.25	0.60	1.20	0.50	0.40	1.00	50.00	2.91
GC-018	71.00	13.00	16.00	2.50	1.00	0.25	0.25	0.70	0.50	0.10	1.00	50.00	2.85
GC-019	44.00	16.00	16.00	2.50	1.00	0.50	0.25	0.70	0.50	0.10	1.00	50.00	3.54
GC-020	59.00	19.00	16.00	2.50	1.00	0.25	0.25	0.80	0.50	0.10	1.00	50.00	2.58
GC-016	10.00	41.00	10.00	2.50	1.00	0.50	0.70	2.10	0.50	0.40	3.00	50.00	1.70
GC-017	10.00	20.00	4.40	2.50	1.00	0.25	0.25	0.60	0.50	0.10	1.00	50.00	0.33
GC-0052	38.00	55.00	15.00	2.50	1.00	0.60	0.60	3.50	1.00	0.80	3.00	50.00	3.06
GC-0053	10.00	32.00	7.60	2.50	1.00	0.25	0.70	1.90	0.50	0.60	1.00	50.00	2.10
GC-0009	10.00	14.00	12.00	2.50	1.00	0.60	0.70	3.40	0.50	1.00	3.00	50.00	3.60
GC-012	10.00	8.00	9.30	2.50	1.00	0.70	0.25	2.80	0.50	0.60	2.00	50.00	3.17
GC-006	10.00	30.00	14.00	2.50	1.00	0.25	0.25	1.50	0.50	0.40	2.00	50.00	1.40
GC-007	23.00	2.50	16.00	2.50	1.00	0.25	0.25	1.70	0.50	0.40	1.00	50.00	1.40
GC-008	24.00	21.00	14.00	2.50	1.00	0.25	0.25	1.90	0.50	0.40	1.00	50.00	2.89
GC-002	10.00	32.00	10.00	2.50	1.00	0.25	0.25	1.70	1.00	0.30	1.00	50.00	2.91
GC-003	10.00	25.00	8.90	2.50	1.00	0.25	0.25	1.30	1.00	0.30	1.00	50.00	2.16
GC-004	10.00	26.00	13.00	2.50	1.00	0.60	0.60	1.40	0.50	0.30	3.00	50.00	2.22
GC-005	10.00	15.00	13.00	2.50	1.00	0.60	0.60	1.60	0.50	0.30	2.00	50.00	2.07
GC-011	24.00	3.00	15.00	2.50	1.00	0.25	0.50	1.90	0.50	0.40	1.00	50.00	2.87
H76-1/10.7	45.00	21.00	18.00	2.50	1.00	0.60	0.70	1.00	0.50	0.20	3.00	50.00	1.70
H76-1/33.5	84.00	13.00	26.30	2.50	1.00	0.25	0.90	0.70	0.50	0.10	3.00	50.00	1.70
JL-18-1	24.00	69.00	9.20	2.50	1.00	0.25	0.25	4.20	0.50	1.00	1.00	50.00	2.35
JL-20-1	37.00	64.00	13.00	2.50	1.00	0.25	0.70	3.70	0.50	0.90	1.00	50.00	2.63
JL-20-2	33.00	59.00	13.00	2.50	1.00	0.25	0.90	3.90	0.50	0.70	1.00	50.00	3.19
AM-13-1	21.00	77.00	11.00	2.50	1.00	0.25	0.25	5.00	1.00	1.50	1.00	50.00	2.34
AM-14-1	45.00	78.00	7.90	2.50	1.00	0.25	0.25	4.50	0.50	1.30	1.00	50.00	1.50

APPENDIX VI

Technical Data

TABLE OF CONTENTS

1. INTRODUCTION

The Burntbush River project refers to a block of 312 contiguous mining claims in northeastern Ontario (L789211 to L789508, L789561, L789562, L892946 to L892957; see maps 1 and 2).

During the summer of 1986, a field program was undertaken by COGEMA Canada Ltd, which is described in this report. This program qualifies for special provisions credits as described in the Mining Act and which allows for assessment credits of 20 man-days per claim.

Those claims beginning with "L789" (see above) are in their third year; the recording date was January 25. Up to now, 80 man-days have been approved, therefore 20 man-days per claim are required. Those claims beginning with "L892" are in their first year; the recording date was May 12. Therefore, 20 man-days per claim are also required for these claims.

Note, however, that the full 20 days for special provisions will likely not be granted over all of the claims applied for, due to water coverage, eg claim L789467 (see map 2). This is logical because one cannot walk on water. Therefore, the Ministry of Northern Development and Mines will probably send to us what is called a "letter of intent". This letter will indicate to us which claims are not eligible for the 20 man-days, and by how much they will be reduced.

This means, that in reality, we will not be granted enough man-days on some of our claims for us to retain them for another year, unless we file for additional assessment credits.

However we have performed sufficient work to compensate for the reductions in man-days from the special provisions credits. This work includes the following: manual work (i.e. grubhoe stripping of outcrops), geochemical analyses on rock samples (presented in this report), thin section preparation and studies (also presented in this report).

This additional work will be filed immediately after the "letter of intent" is received, and will be applied to those claims which are deficient in man-days due to water coverage.

Note that a second field program was also undertaken in the fall of 1986 which is not described in this report. This program consisted of outcrop stripping, mapping and sampling, and although no precise calculations have been made, will amount to about 30 man-days per claim over the entire property. This work will be reported as part of the assessment credits applied for during the next year.

Finally, in the winter of 1986, an airborne geophysical survey has been performed. This survey cannot be applied to those claims beginning with "L789" since the maximum credits for a geophysical survey (80 man-days) have already been awarded. However, these data can be used on those claims beginning with "L892". These will also be filed next year.

2. TECHNICAL FORMS

i) Technical Data Statement

ii) List of Mining Claims

iii) Report of Work (copy; original sent to Mining Recorder, Kirkland Lake, Ont.).

Ministry of Northern Development and Mines
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): Geological
Township or Area: Hoblitzell, Nosewothy
Claim Holder(s): COGEMA CANADA LIMITED
Prospector's Licence No.: T-4677
Address: 2000 Mansfield St., Suite 400, Montreal, Quebec H3A 2Z1
Survey Company: COGEMA CANADA LIMITED
Date of Survey (from & to): 30 Day 06 Mo. 86 Yr. | 10 Day 08 Mo. 86 Yr.
Total Miles of line Cut: none
Name and Address of Author (of Geo-Technical report): John Learn, 2000 Mansfield St., Montreal, Quebec H3A 2Z1

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	20
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.		Days per Claim
	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
[redacted]	see attached		[redacted]		
	list				

Total number of mining claims covered by this report of work: 312

Expenditures (excludes power stripping)

Type of Work Performed:
Performed on Claim(s):
Calculation of Expenditure Days Credits: Total Expenditures $ ÷ 15 = Total Days Credits
Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date | Recorded Holder or Agent (Signature)

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
	Date Approved as Recorded	Branch Director

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: John Learn, 2000 Mansfield St.,Suite 400
Montreal, Quebec H3A 2Z1
Date Certified: Jan. 6, 1987
Certified by (Signature):

1362 (85/12)

3. NAMES AND ADDRESSES OF EMPLOYEES

1. John Learn
   Project Geologist

   2000 Mansfield Street, Suite 400
   Montreal, Quebec H3A 2Z1

   2350 Melrose Ave., N.D.G.
   Montreal, Quebec H4A 2R8

   Hon. B.Sc. Brock University 1977
   M.Sc. (App) McGill University 1981
   10 years experience

2. Aline Morin
   Temporary Geologist

   841 Osborne Street
   Verdun, Quebec H4H 1X3

   B.Sc. App. Laval University 1982
   5 years experience

3. Greg Cameron
   Temporary Geologist

   26 Riverview Drive
   Brockville, Ontario K6V 2Y6

   B.Sc. (Hon.) McGill University 1983
   M.Sc. University of Toronto in progress
   5 years experience

4. Jocelyn Bertrand
   Temporary Geologist

   690, boul. du Lac
   Charlesbourg, Quebec G1H 7B1

   D.E.C. Technologie Minérale C.E.G.E.P. Thetford Mines 1981
   B.Sc. Université du Québec à Chicoutimi 1956
   5 years experience

5. Réjean Gagnon
Temporary Geological Technician

3912, rue Panet
Jonquière, Québec G7X 3V3

D.E.C. Géologie Appliquée C.E.G.E.P. Thetford Mines 1985
2 years experience

6. Jean-François Turcotte
Temporary Geological Technician

621, Laliberté
Rouyn, Quebec J9X 5R5

D.E.C. Technologie Minière,
C.E.G.E.P. Abitibi-Témiscamingue 1986
1 year experience

7. Elizabeth Giles
Cook

428 Elm Road
Toronto, Ontario M5M 3W7

8. Pierre Paré
Helicopter Pilot

9. Tom Taal
Helicopter Engineer

Both:
Helicoptères Trans-Canada
1215, Montée Pilon, C.P. 179
Les Cèdres, Québec J0P 1L0

4. BREAKDOWN OF THE TYPE OF WORK PERFORMED BY THE EMPLOYEES

John Learn: 06/05/86 → 28/06/86

planning and co-ordination of field work, compilation studies, mobilization

29/06/86 → 10/08/86

geological traversing, report writing

11/08/86 → 12/08/86

demobilization

01/11/86 → 12/12/86

report writing, checking maps etc. prepared by other geologists

Aline Morin: 28/05/86 → 28/06/86

compilation studies, mobilization

29/06/86 → 06/08/86

geological traversing, demobilization

18/08/86 → 31/10/86

preparing maps from field program, further compilation studies

Greg Cameron: 09/06/86 → 28/06/86

compilation studies, mobilization

29/06/86 → 10/08/86

geological traversing

11/08/86 → 12/08/86

demobilization

Greg Cameron: (cont'd)

21/08/86 → 04/09/86

preparing maps from field program, further compilation studies

02/10/86 → 31/10/86

preparing maps from field season, thin section studies, preliminary treatment of geochemistry data

Jocelyn Bertrand:

02/06/86 → 16/06/86

compilation studies

17/06/86 → 28/06/86

mobilization, camp construction

29/06/86 → 12/08/86

geological traversing, demobilization

Réjean Gagnon:

17/06/86 → 28/06/86

mobilization, camp construction

29/06/86 → 12/08/86

geological traversing, demobilization

Jean-François Turcotte:

28/06/86 → 12/08/86

mobilization, geological traversing, demobilization

Elizabeth Giles:

28/06/86 → 12/08/86

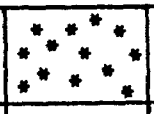
mobilization, cooking, demobilization

5. WEATHER LOG

The weather log is included for interest only. It was filled out twice daily and indicates the conditions over a period of about 2 hours, i.e. 7h-9h and 19h-21h. Where two columns are checked, the capital X indicates the predominant conditions and the lower case x indicates minor variations experienced.

COGEMA Canada Ltée/Ltd.

FICHE DE TEMPÉRATURE

1986 DATE	HEURE						MAX.	MIN.	REMARQUES
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	20 h.	X							
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	20 h.		X						
02.07	08 h.			X	x				
	20 h.		x	X	x				
03.07	08 h.	X	x						
	20 h.		x	X	X				
04.07	08 h.				X				rain day, no field work
	20 h.				X				
05.07	08 h.			X					
	20 h.		x	X	x				
06.07	08 h.			X					
	20 h.	X	x						
07.07	08 h.	X	x						
	20 h.		X		x				
08.07	08 h.	X	x						
	20 h.	x	X						
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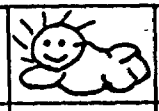
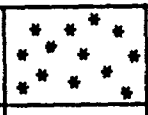
	20 h.			X					

COGEMA Canada Ltée/Ltd.

FICHE DE TEMPÉRATURE

1986 DATE	HEURE						MAX.	MIN.	REMARQUES
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	20 h.		x	X					
12.07	08 h.		X	X					
	20 h.		X						
13.07	08 h.	X	X						
	20 h.			X					
14.07	08 h.	X							
	20 h.	X	x						
15.07	08 h.	X							
	20 h.	X	x						
16.07	08 h.	X							
	20 h.	X							
17.07	08 h.	X							
	20 h.	X							
18.07	08 h.								morning fog, late start
	20 h.	X							
19.07	08 h.		X						morning fog
	20 h.		X						
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	20 h.	X							

COGEMA Canada Ltée/Ltd.

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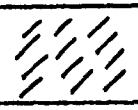
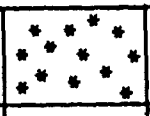
1986 DATE	HEURE						MAX.	MIN.	REMARQUES
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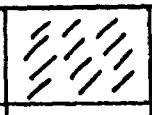
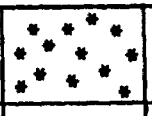
	20 h.	X	X						
24.07	08 h.		X						
	20 h.			X					
25.07	08 h.		X						day off for all personnel
	20 h.		X						
26.07	08 h.	X							
	20 h.	X							
27.07	08 h.		X						
	20 h.		X						
28.07	08 h.			X					
	20 h.		X						
29.07	08 h.			X					morning fog
	20 h.	X	X						
30.07	08 h.	X							
	20 h.	X							
31.07	08 h.	X							
	20 h.								

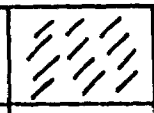
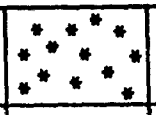
COGEMA Canada Ltée/Ltd.

FICHE DE TEMPÉRATURE

1986 DATE	HEURE						MAX.	MIN.	REMARQUES
01.08	08 h.		X	X	x				
	20 h.		X	X					
02.08	08 h.		X	X	x				helicopter grounded for mechanical
	20 h.		X		x				reasons, no field work
03.08	08 h.			X	X				morning fog
	20 h.			X	X				
04.08	08 h.	X	X						
	20 h.			X	X				
05.08	08 h.			X					morning fog
	20 h.		X	X					
06.08	08 h.			X					morning fog
	20 h.		X						
07.08	08 h.		X						
	20 h.		X						
08.08	08 h.	X							
	20 h.		X						
09.08	08 h.			X					
	20 h.		X						
10.08	08 h.	X							
	20 h.				X				
11.08	08 h.				X				
	20 h.		X	X					

COGEMA Canada Ltée/Ltd.

FICHE DE TEMPÉRATURE

1986 DATE	HEURE						MAX.	MIN.	REMARQUES
12.08	08 h.	X							
	20 h.								

Doc. #0027U

Fiche #TMP-2

900

Ministry of
Northern Developmen
and Mines

Ontario

Ministère du
Développement du Nord
et des Mines

October 23, 1987

Your File: 337/87
Our File: 2.9701

Mining Recorder
Ministry of Northern Development and Mines
4 Government Road East
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

RE: Data for Assaying submitted under Section 77(19)
of the Mining Act R.S.O. 1980 on Mining Claims L-789227
et al, in the Townships of Hoblitzell and Noseworthy

The enclosed statement of assessment work credits for Assaying has been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely,

R.M. Charnesky (Mrs.)
Acting Manager
Mining Lands Section
Mineral Development and Lands Branch
Mines and Minerals Branch

Whitney Block, Room 6610
Queen's Park
Toronto, Ontario
M7A 1W3

Telephone: (416) 965-4888

DK:pl
Enclosure

cc: Resident Geologist
Kirkland Lake, Ontario

Cogema Canada Limited
2000 Mansfield Street
Suite 400
Montreal, Quebec
H3A 2Z1

Ministry of Northern Development and Mines

Ontario

Technical Assessment Work Credits

File 2.9701

Date: October 23,1987

Mining Recorder's Report of Work No.: 337/87

Recorded Holder: Cogema Canada Limited

Township ~~XXXX~~: Hoblitzell, Noseworthy

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	$5,861.50 SPENT ON ANALYSES OF SAMPLES TAKEN FROM MINING CLAIMS:
Electromagnetic _____ days	L - 789227
Magnetometer _____ days	789278
Radiometric _____ days	789291
Induced polarization _____ days	789305-06
Other _____ days	789308
Section 77 (19) See "Mining Claims Assessed" column	789353
Geological _____ days	789374-75
Geochemical _____ days	789377
Man days ☐ Airborne ☐	789398
Special provision ☐ Ground ☐	390 ASSESSMENT WORK DAYS ARE ALLOWED WHICH MAY BE GROUPED IN ACCORDANCE WITH SECTION 76(6) OF THE MINING ACT.
☐ Credits have been reduced because of partial coverage of claims.	
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 77 (16) for the following mining claims

No credits have been allowed for the following mining claims

☐ not sufficiently covered by the survey ☐ insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

Ministry of Northern Development and Mines
Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

2.9701

#337/87

Oct. 9

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s): Rock Geochemistry, Thin Sections, Refer to file #2.9701

Township or Area: Hoblitzell and Noseworthy

Claim Holder(s): COGEMA CANADA LIMITED

Prospector's Licence No.: T-4677

Address: 2000 Mansfield Street, Suite 400, Montreal, Quebec H3A 2Z1

Survey Company: COGEMA CANADA LIMITED

Date of Survey (from & to): 29 / 06 / 86 – 10 / 08 / 86 (Day / Mo. / Yr.)

Total Miles of line Cut: none

Name and Address of Author (of Geo-Technical report): John Learn, 2350 Melrose Ave, N.D.G., Montreal, Que. H4A 2R8

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical	
	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical	
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
	see attached list				

RECEIVED
SEP 21 1987
MINING LANDS SECTION

LARDER LAKE
RECEIVED
AUG 20 1987
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

Expenditures (excludes power stripping)

Type of Work Performed (Sec 77-19): rock geochemistry, thin sections

Performed on Claim(s): see attached list

Calculation of Expenditure Days Credits

Total Expenditures				Total Days Credits
$5861.50	÷	15	=	390

Total number of mining claims covered by this report of work: 130

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date	Recorded Holder or Agent (Signature)
Aug. 17, 1987	COGEMA CANADA LTD Denis Lesage

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
390	Aug 20, 1987	[signature]
	Date Approved as Recorded	Branch Director: See work statement

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: John Learn, 2350 Melrose Ave., N.D.G., Montreal, Que. H4A 2R8

Date Certified: Aug. 17, 1987

Certified by (Signature): John Learn

1362 (85/12)

DISTRIBUTION OF CREDITS

Claim No.	Workdays Credits	Claim No.	Workdays Credits	Claim No.	Workdays Credits	Claim No.	Workdays Credits
L789216	3	L789249	3	L789282	3	L789314	3
L789217	3	L789250	3	L789283	3	L789315	3
L789218	3	L789251	3	L789284	3	L789316	3
L789219	3	L789252	3	L789285	3	L789317	3
L789220	3	L789253	3	L789286	3	L789318	3
L789221	3	L789254	3	L789287	3	L789319	3
L789222	3	L789255	3	L789288	3	L789320	3
L789223	3	L789256	3	L789289	3	L789321	3
L789224	3	L789257	3	L789290	3	L789322	3
L789225	3	L789258	3	L789291	3	L789323	3
L789226	3	L789259	3	L789292	3	L789324	3
L789227	3	L789260	3	L789293	3	L789325	3
L789228	3	L789261	3	L789294	3	L789326	3
L789229	3	L789262	3	L789295	3	L789327	3
L789230	3	L789263	3	L789296	3	L789328	3
L789231	3	L789264	3	L789297	3	L789329	3
L789232	3	L789265	3	L789298	3	L789330	3
L789233	3	L789266	3	L789299	3	L789331	3
L789234	3	L789267	3	L789300	3	L789332	3
L789235	3	L789268	3	L789301	3	L789333	3
L789236	3	L789269	3	L789302	3	L789334	3
L789237	3	L789270	3	L789303	3	L789335	3
L789238	3	L789271	3	L789304	3	L789336	3
L789239	3	L789272	3	L789305	3	L789337	3
L789240	3	L789273	3	L789306	3	L789338	3
L789241	3	L789274	3	L789307	3	L789339	3
L789242	3	L789275	3	L789308	3	L789340	3
L789243	3	L789276	3	L789309	3	L789341	3
L789244	3	L789277	3	L789310	3	L789342	3
L789245	3	L789278	3	L789311	3	L789343	3
L789246	3	L789279	3	L789312	3	L789344	3
L789247	3	L789280	3	L789313	3	L789345	3
L789248	3	L789281	3				

attached to REPORT OF WORK FORM IN COGEMA'S REPORT 86-CND-47-02A

TÉLEX: 05-25274 TÉLÉCOP: (514) 282-9462

DISTRIBUTION OF CREDITS

Claim No.	Workdays Credits	Claim No.	Workdays Credits	Claim No.	Workdays Credits	Claim No.	Workdays Credits
L789216	3	L789249	3	L789282	3	L789314	3
L789217	3	L789250	3	L789283	3	L789315	3
L789218	3	L789251	3	L789284	3	L789316	3
L789219	3	L789252	3	L789285	3	L789317	3
L789220	3	L789253	3	L789286	3	L789318	3
L789221	3	L789254	3	L789287	3	L789319	3
L789222	3	L789255	3	L789288	3	L789320	3
L789223	3	L789256	3	L789289	3	L789321	3
L789224	3	L789257	3	L789290	3	L789322	3
L789225	3	L789258	3	L789291	3	L789323	3
L789226	3	L789259	3	L789292	3	L789324	3
L789227	3	L789260	3	L789293	3	L789325	3
L789228	3	L789261	3	L789294	3	L789326	3
L789229	3	L789262	3	L789295	3	L789327	3
L789230	3	L789263	3	L789296	3	L789328	3
L789231	3	L789264	3	L789297	3	L789329	3
L789232	3	L789265	3	L789298	3	L789330	3
L789233	3	L789266	3	L789299	3	L789331	3
L789234	3	L789267	3	L789300	3	L789332	3
L789235	3	L789268	3	L789301	3	L789333	3
L789236	3	L789269	3	L789302	3	L789334	3
L789237	3	L789270	3	L789303	3	L789335	3
L789238	3	L789271	3	L789304	3	L789336	3
L789239	3	L789272	3	L789305	3	L789337	3
L789240	3	L789273	3	L789306	3	L789338	3
L789241	3	L789274	3	L789307	3	L789339	3
L789242	3	L789275	3	L789308	3	L789340	3
L789243	3	L789276	3	L789309	3	L789341	3
L789244	3	L789277	3	L789310	3	L789342	3
L789245	3	L789278	3	L789311	3	L789343	3
L789246	3	L789279	3	L789312	3	L789344	3
L789247	3	L789280	3	L789313	3	L789345	3
L789248	3	L789281	3				

attached to REPORT OF WORK FORM IN COGEMA'S REPORT 86-CND-47-02A

TÉLEX: 05-25274 TÉLÉCOP: (514) 282-9462

86-CND-47-02A

Ontario

Action Memo

Time

Date

To

From (Name and City)

I.C.N. No.	Area Code	Telephone No.	Ext.	Message Taken By

☐ Phoned ☐ On Hold	☐ Please Call ☐ Returned Your Call	☐ Will Call Back ☐ Wishes Appointment	☐ Waiting In Person ☐ Was Here	☐ Will Return

☐ File	☐ Draft Reply For My Signature	☐ Provide More Details	☐ For Your Information
☐ Type Draft	☐ For Your Approval and Signature	☑ Keep Me Informed	☐ Per Discussion
☐ Type Final	☐ Circulate, Initial and Return	☐ Take Appropriate Action	☐ Per Your Request
☐ Make Copies	☐ Return With Comments	☐ Note and See Me	☐ Returned With Thanks
☐ Please Answer	☐ Investigate and Report	☐ Note and Return	☐

Comments:

DON'T CULL BEYOND THIS POINT.

7540-1452

☐ Over

Ministry of Northern Development and Mines

Ontario

Lands Management #31/3

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

File 2.9701

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s)	Township or Area
Geological	Hoblitzell, Noseworthy

Claim Holder(s)	Prospector's Licence No.
COGEMA CANADA LIMITED	T-4677

Address: 2000 Mansfield St., Suite 400, Montreal, Quebec H3A 2Z1

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
COGEMA CANADA LIMITED	30 06 86 (Day Mo. Yr.) to 10 09 86 (Day Mo. Yr.)	none

Name and Address of Author (of Geo-Technical report): John Learn, 2000 Mansfield St., Suite 400, Montreal, Quebec H3A 2Z1

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	20
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

RECEIVED JAN 19 1987 10 a.m.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
see attached	list	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

RECEIVED FEB 17 1987 MINING LANDS SECTION

Total number of mining claims covered by this report of work: 312

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only		
Total Days Cr. Recorded: 6240	Date Recorded: JAN 19 1987	Mining Recorder:
	Date Approved as Recorded: 87.V.20	Branch Director:

Date	Recorded Holder or Agent (Signature)
Jan. 13, 1987	COGEMA CANADA LIMITED [illegible] VP ADMIN

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: John Learn, 2000 Mansfield St., Suite 400, Montreal, Quebec H3A 2Z1

Date Certified	Certified by (Signature)
Jan. 13, 1987	John Learn

2.9701

MINING CLAIMS TRAVERSED

L789211	L789243	L789275	L789307	L789339	L789371	L789403	L789435	L789467	L789499
L789212	L789244	L789276	L789308	L789340	L789372	L789404	L789436	L789468	L789500
L789213	L789245	L789277	L789309	L789341	L789373	L789405	L789437	L789469	L789501
L789214	L789246	L789278	L789310	L789342	L789374	L789406	L789438	L789470	L789502
L789215	L789247	L789279	L789311	L789343	L789375	L789407	L789439	L789471	L789503
L789216	L789248	L789280	L789312	L789344	L789376	L789408	L789440	L789472	L789504
L789217	L789249	L789281	L789313	L789345	L789377	L789409	L789441	L789473	L789505
L789218	L789250	L789282	L789314	L789346	L789378	L789410	L789442	L789474	L789506
L789219	L789251	L789283	L789315	L789347	L789379	L789411	L789443	L789475	L789507
L789220	L789252	L789284	L789316	L789348	L789380	L789412	L789444	L789476	L789508
L789221	L789253	L789285	L789317	L789349	L789381	L789413	L789445	L789477	
L789222	L789254	L789286	L789318	L789350	L789382	L789414	L789446	L789478	L789561
L789223	L789255	L789287	L789319	L789351	L789383	L789415	L789447	L789479	L789562
L789224	L789256	L789288	L789320	L789352	L789384	L789416	L789448	L789480	
L789225	L789257	L789289	L789321	L789353	L789385	L789417	L789449	L789481	L892946
L789226	L789258	L789290	L789322	L789354	L789386	L789418	L789450	L789482	L892947
L789227	L789259	L789291	L789323	L789355	L789387	L789419	L789451	L789483	L892948
L789228	L789260	L789292	L789324	L789356	L789388	L789420	L789452	L789484	L892949
L789229	L789261	L789293	L789325	L789357	L789389	L789421	L789453	L789485	L892950
L789230	L789262	L789294	L789326	L789358	L789390	L789422	L789454	L789486	L892951
L789231	L789263	L789295	L789327	L789359	L789391	L789423	L789455	L789487	L892952
L789232	L789264	L789296	L789328	L789360	L789392	L789424	L789456	L789488	L892953
L789233	L789265	L789297	L789329	L789361	L789393	L789425	L789457	L789489	L892954
L789234	L789266	L789298	L789330	L789362	L789394	L789426	L789458	L789490	L892955
L789235	L789267	L789299	L789331	L789363	L789395	L789427	L789459	L789491	L892956
L789236	L789268	L789300	L789332	L789364	L789396	L789428	L789460	L789492	L892957
L789237	L789269	L789301	L789333	L789365	L789397	L789429	L789461	L789493	
L789238	L789270	L789302	L789334	L789366	L789398	L789430	L789462	L789494	
L789239	L789271	L789303	L789335	L789367	L789399	L789431	L789463	L789495	
L789240	L789272	L789304	L789336	L789368	L789400	L789432	L789464	L789496	
L789241	L789273	L789305	L789337	L789369	L789401	L789433	L789465	L789497	
L789242	L789274	L789306	L789338	L789370	L789402	L789434	L789466	L789498	

(Doc. #0033U)

Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File _____

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geological

Township or Area Hoblitzell, Noseworthy

Claim Holder(s) COGEMA CANADA LIMITED

Survey Company COGEMA CANADA LIMITED

Author of Report John Learn

Address of Author 2000 Mansfield St., Suite 400, Mtl.

Covering Dates of Survey 30/06/86 to 10/08/86
(linecutting to office)

Total Miles of Line Cut none

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	
–Magnetometer	
–Radiometric	
–Other	
Geological	20
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Jan. 6, 1987 SIGNATURE: _____
Author of Report or Agent

Res. Geol. _____ Qualifications This file

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

see attached list
(prefix) (number)

If space insufficient, attach list

TOTAL CLAIMS 312

OFFICE USE ONLY

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

_____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken _____

Total Number of Samples _____

Type of Sample _____
(Nature of Material)

Average Sample Weight _____

Method of Collection _____

Soil Horizon Sampled _____

Horizon Development _____

Sample Depth _____

Terrain _____

Drainage Development _____

Estimated Range of Overburden Thickness _____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis _____

General _____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others _____

Field Analysis (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Commercial Laboratory (_____ tests)

Name of Laboratory _____

Extraction Method _____

Analytical Method _____

Reagents Used _____

General _____

MINING CLAIMS TRAVERSED

L789211	L789243	L789275	L789307	L789339	L789371	L789403	L789435	L789467	L789499
L789212	L789244	L789276	L789308	L789340	L789372	L789404	L789436	L789468	L789500
L789213	L789245	L789277	L789309	L789341	L789373	L789405	L789437	L789469	L789501
L789214	L789246	L789278	L789310	L789342	L789374	L789406	L789438	L789470	L789502
L789215	L789247	L789279	L789311	L789343	L789375	L789407	L789439	L789471	L789503
L789216	L789248	L789280	L789312	L789344	L789376	L789408	L789440	L789472	L789504
L789217	L789249	L789281	L789313	L789345	L789377	L789409	L789441	L789473	L789505
L789218	L789250	L789282	L789314	L789346	L789378	L789410	L789442	L789474	L789506
L789219	L789251	L789283	L789315	L789347	L789379	L789411	L789443	L789475	L789507
L789220	L789252	L789284	L789316	L789348	L789380	L789412	L789444	L789476	L789508
L789221	L789253	L789285	L789317	L789349	L789381	L789413	L789445	L789477	
L789222	L789254	L789286	L789318	L789350	L789382	L789414	L789446	L789478	L789561
L789223	L789255	L789287	L789319	L789351	L789383	L789415	L789447	L789479	L789562
L789224	L789256	L789288	L789320	L789352	L789384	L789416	L789448	L789480	
L789225	L789257	L789289	L789321	L789353	L789385	L789417	L789449	L789481	L892946
L789226	L789258	L789290	L789322	L789354	L789386	L789418	L789450	L789482	L892947
L789227	L789259	L789291	L789323	L789355	L789387	L789419	L789451	L789483	L892948
L789228	L789260	L789292	L789324	L789356	L789388	L789420	L789452	L789484	L892949
L789229	L789261	L789293	L789325	L789357	L789389	L789421	L789453	L789485	L892950
L789230	L789262	L789294	L789326	L789358	L789390	L789422	L789454	L789486	L892951
L789231	L789263	L789295	L789327	L789359	L789391	L789423	L789455	L789487	L892952
L789232	L789264	L789296	L789328	L789360	L789392	L789424	L789456	L789488	L892953
L789233	L789265	L789297	L789329	L789361	L789393	L789425	L789457	L789489	L892954
L789234	L789266	L789298	L789330	L789362	L789394	L789426	L789458	L789490	L892955
L789235	L789267	L789299	L789331	L789363	L789395	L789427	L789459	L789491	L892956
L789236	L789268	L789300	L789332	L789364	L789396	L789428	L789460	L789492	L892957
L789237	L789269	L789301	L789333	L789365	L789397	L789429	L789461	L789493	
L789238	L789270	L789302	L789334	L789366	L789398	L789430	L789462	L789494	
L789239	L789271	L789303	L789335	L789367	L789399	L789431	L789463	L789495	
L789240	L789272	L789304	L789336	L789368	L789400	L789432	L789464	L789496	
L789241	L789273	L789305	L789337	L789369	L789401	L789433	L789465	L789497	
L789242	L789274	L789306	L789338	L789370	L789402	L789434	L789466	L789498	

(Doc. #0033U)

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+ S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File

46 M 48 M 49 M 50 M 51 M 52 M 53 M 54 M

Soucie Cr
Soucie
Lake
East Soucie Lake
Creek
Soucie
Mikwam R
Burntbush
Mikwam River
Porphyry Cr
Porphyry
West Porphyry L
Porphyry L
Little Porphyry L

576269
576270
576263

BLAKELOCK TOWNSHIP
PROJECTED

NOSEWORTHY TOWNSHIP
PROJECTED

TOMLINSON TOWNSHIP
PROJECTED

200

LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	⊖
" , MINING RIGHTS ONLY	⊖
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	■
" , MINING RIGHTS ONLY	■
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	⊖
CANCELLED	⊗
SAND & GRAVEL	⊖

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

SCALE
500 Metres 0 1000 Metres
1:20 000

NOV 14 1996

TOWNSHIP
HOBLITZELL
M.N.R. ADMINISTRATIVE DISTRICT
COCHRANE
MINING DIVISION
LARDER LAKE
LAND TITLES / REGISTRY DIVISION
COCHRANE

Ontario Ministry of Natural Resources

Date OCTOBER 1986
Number G-3513

REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File

54 M 55 M 56 M 57 M 58 M 60 M 61 M 62 M 63 M

Chabbie Lake

Chabbie

HOBLITZELL TOWNSHIP LINE PROJECTED

BRADETTE TOWNSHIP LINE PROJECTED

Burntbush River

PROJECTED LINE

HURTUBISE TOWNSHIP

210

32E12SW0018 2.9701 NOSEWORTHY

LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◓
" , MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	▣
" , MINING RIGHTS ONLY	▤
LICENCE OF OCCUPATION	▼
ORDER IN COUNCIL	OC
RESERVATION	R
CANCELLED	C
SAND & GRAVEL	S

NOTE MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC. 1.

100 Metres 0 100 Metres

15 0 10 20 30 40 50 60 70 Chains

500 0 1000 2000 3000 4000 5000 Feet

OCT 31 1986

TOWNSHIP

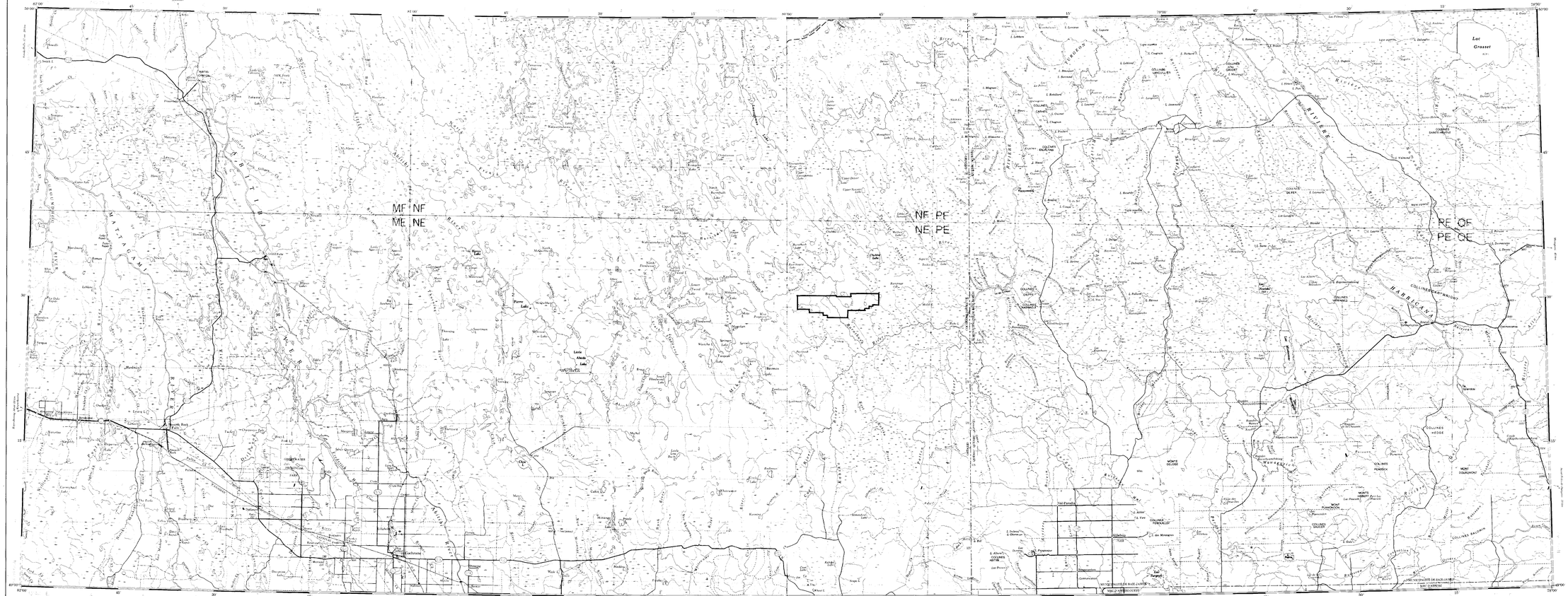
NOSEWORTHY

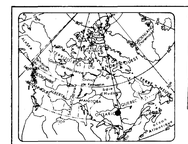
M.N.R. ADMINISTRATIVE DISTRICT
COCHRANE
MINING DIVISION
LARDER LAKE
LAND TITLES / REGISTRY DIVISION
COCHRANE

Ministry of Natural Resources — Ontario
Ministry of Northern Development and Mines

Date SEPTEMBER, 1986

Number G-3549





INDEX TO ADJOINING N.T.S. SHEETS 1/250,000

COGEMA Canada Ltée/Ltd.

Scale 1:250,000

BURNTBUSH RIVER PROJECT

29701

LOCATION MAP

	Date
Interpretation by: J. Learn	
Drafted by: R. Allie	
Base map	
Revised by:	

Report no. 86-CND-47-02
Annex no.
MAP NO. 1

220

HOBLITZELL TP

NOSEWORTHY TP

LAKE

CHABBIE LAKE

EAST SOUCIE LAKE

282±

275±

273±

RAMMAGE

BURNTBUSH RIVER

HOBLITZELL TP
TOMLINSON TP

NOSEWORTHY TP
HURTUBISE TP

LEGEND

Claim boundary

Claim post tied to mapping

Approximate position

INDEX TO ADJOINING N.T.S. SHEETS 1/50,000

42H

32 E

COGEMA Canada Ltée/Ltd.

SCALE 1:1/20,000

BURNTBUSH RIVER PROJECT

29701

CLAIMS MAP

Interpretation by: G.C., J.L., A.M.	Date
Drafted by: R. Allie	28/8/86
Base map:	Report no. 86-CND-47-02
Revise by:	Annex no.
	MAP NO. 2

230

TRAVERSES

J. Learn

G. Cameron

A. Morin

J. Bertrand, R. Gagnon and/or J. F. Turcotte

Helicopter pad, natural or cut, used in summer 1986 program

Property boundary as mapped in summer 1986 program

INDEX TO ADJOINING N.T.S. SHEETS 1/50,000

42H 32E

COGEMA Canada Ltée/Ltd.

SCALE 1:20,000

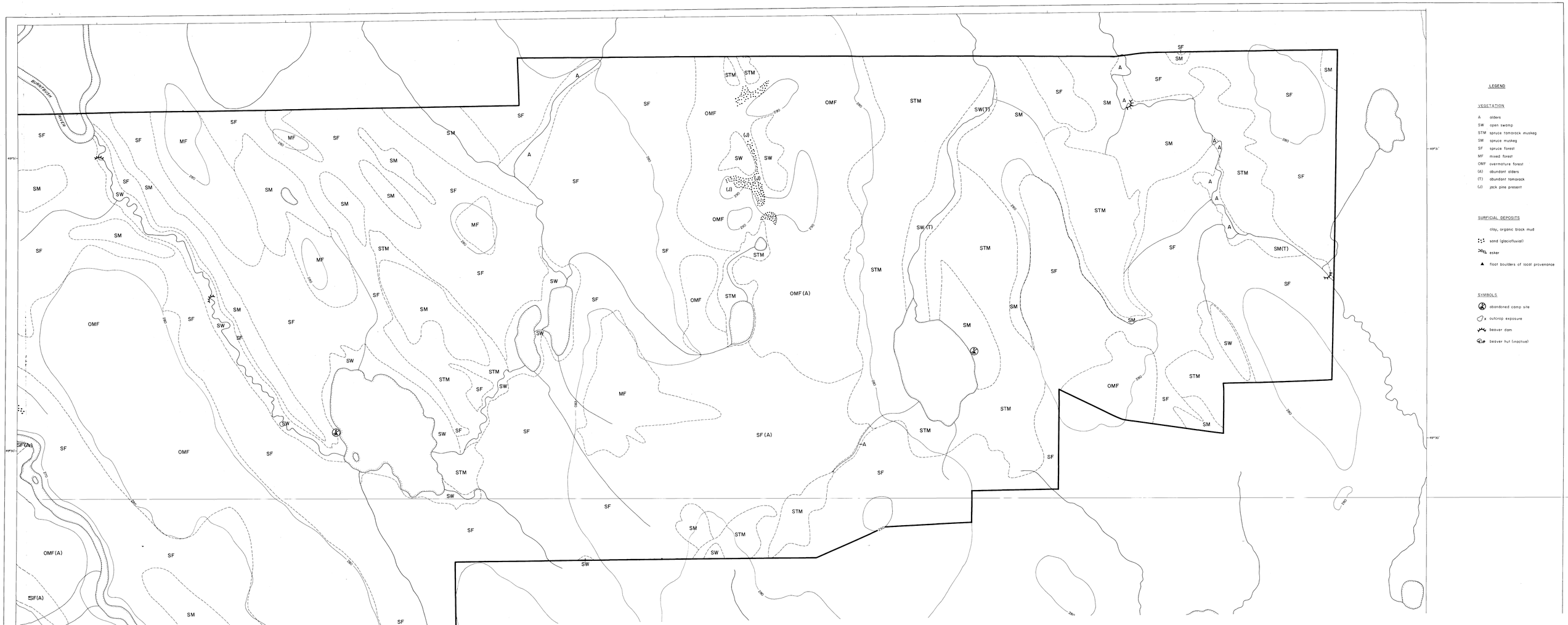
BURNTBUSH RIVER PROJECT

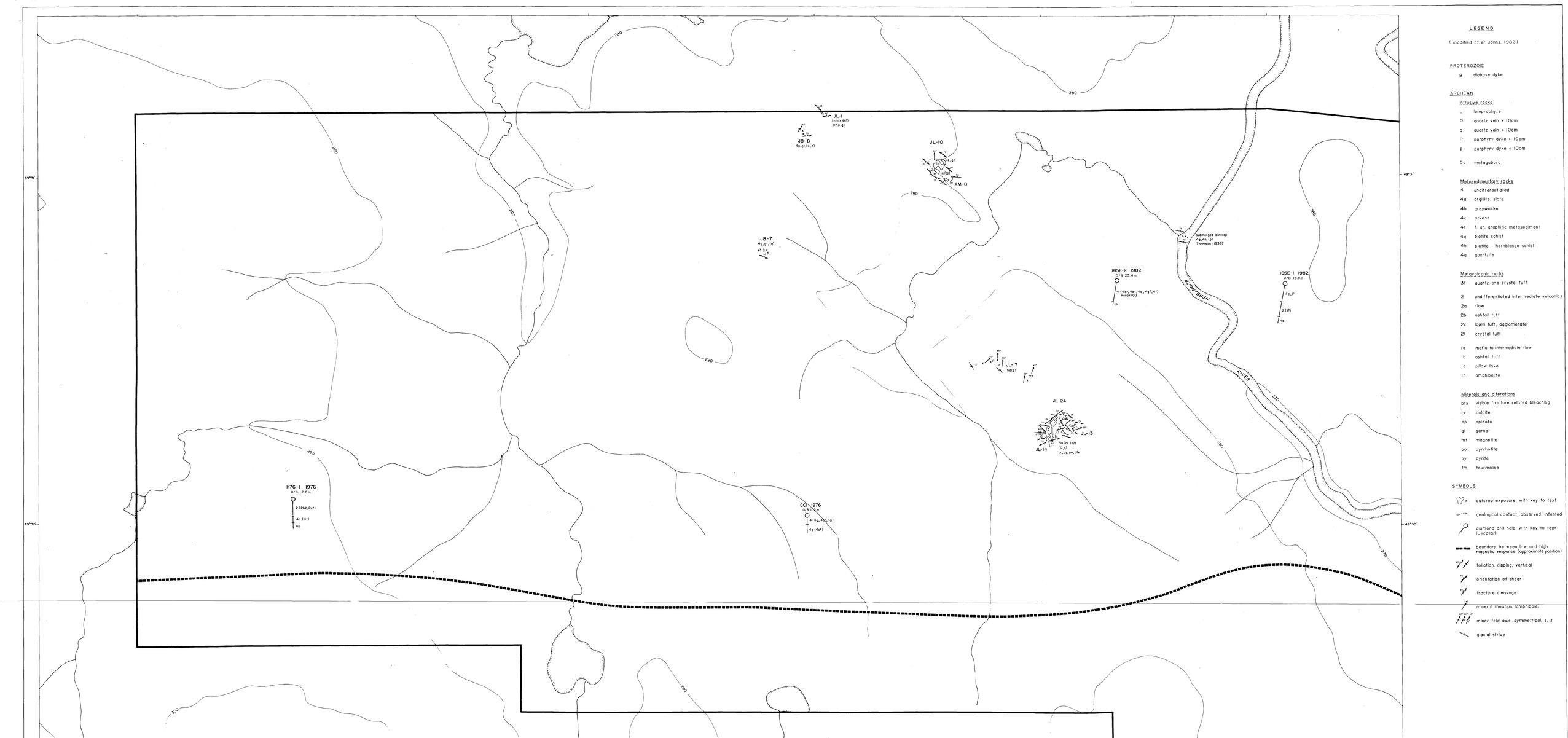
29701

TRAVERSE MAP

Interpretation by:		Date	Report no. 86-CND-47-02
Drafted by: R. Allie		1/12/86	Annex no.
Base map:		8/86	
Revise by:			MAP NO. 3


LEGEND
VEGETATION
A alders
SW open swamp
STM spruce tamarack muskeg
SM spruce muskeg
SF spruce forest
MF mixed forest
OMF overmature forest
(A) abundant alders
(T) abundant tamarack
(J) jack pine present
SURFICIAL DEPOSITS
clay, organic black mud
sand (glaciofluvial)
esker
float boulders of local provenance
SYMBOLS
abandoned camp site
x outcrop exposure
beaver dam
beaver hut (inactive)
BURNTBUSH RIVER
AM-13-1
AM-14-1
JL-18-1
JL-20-1,2
49°31'
49°30'


Burntbirch River
49°35'
49°30'
LEGEND
VEGETATION
A alders
SW open swamp
STM spruce tamarack muskeg
SM spruce muskeg
SF spruce forest
MF mixed forest
OMF overmature forest
(A) abundant alders
(T) abundant tamarack
(J) jack pine present
SURFICIAL DEPOSITS
clay, organic block mud
sand (glaciofluvial)
esker
float boulders of local provenance
SYMBOLS
abandoned camp site
outcrop exposure
beaver dam
beaver hut (inactive)



LEGEND

(modified after Johns, 1982)

PROTEROZOIC

- B diabase dyke

ARCHEAN

Intrusive rocks

- L lamprophyre
- Q quartz vein > 10cm
- q quartz vein < 10cm
- P porphyry dyke > 10cm
- p porphyry dyke < 10cm
- 5a metagabbro

Metasedimentary rocks

- 4 undifferentiated
- 4a argillite, slate
- 4b greywacke
- 4c arkose
- 4f f. gr. graphitic metasediment
- 4g biotite schist
- 4h biotite - hornblende schist
- 4q quartzite

Metavolcanic rocks

- 3f quartz-eye crystal tuff
- 2 undifferentiated intermediate volcanics
- 2a flow
- 2b ashfall tuff
- 2c lapilli tuff, agglomerate
- 2f crystal tuff
- 1a mafic to intermediate flow
- 1b ashfall tuff
- 1e pillow lava
- 1h amphibolite

Minerals and alterations

- bfx visible fracture related bleaching
- cc calcite
- ep epidote
- gt garnet
- mt magnetite
- po pyrrhotite
- py pyrite
- tm tourmaline

SYMBOLS

- outcrop exposure, with key to text
- geological contact, observed, inferred
- diamond drill hole, with key to text (0=collar)
- boundary between low and high magnetic response (approximate position)
- foliation, dipping, vertical
- orientation of shear
- fracture cleavage
- mineral lineation (amphibole)
- minor fold axis, symmetrical, s, z
- glacial striae

LEGEND

(modified after Johns, 1982)

PROTEROZOIC

- B dabase dyke

ARCHEAN

Intrusive rocks

- L lamprophyre
- Q quartz vein > 10cm
- q quartz vein < 10cm
- P porphyry dyke > 10cm
- p porphyry dyke < 10cm
- 5a metagabbro

Metasedimentary rocks

- 4 undifferentiated
- 4a argilite, slate
- 4b greywacke
- 4c arkose
- 4f f. gr. graphitic metasediment
- 4g biotite schist
- 4h biotite - hornblende schist
- 4q quartzite

Metavolcanic rocks

- 3f quartz-eye crystal tuff
- 2 undifferentiated intermediate volcanics
- 2a flow
- 2b ashfall tuff
- 2c lapilli tuff, agglomerate
- 2f crystal tuff
- 1a mafic and intermediate flow
- 1b ashfall tuff
- 1e pillow lava
- 1h amphibolite

Minerals and alterations

- bfx visible fracture related bleaching
- cc calcite
- ep epidote
- gt garnet
- mt magnetite
- po pyrrhotite
- py pyrite
- tm tourmaline

SYMBOLS

- x outcrop exposure, with key to text
- geological contact, observed, inferred
- diamond drill hole, with key to text (D=collar)
- boundary between low and high magnetic response (approximate position)
- foliation, dipping, vertical
- orientation of shear
- fracture cleavage
- mineral lineation (amphibole)
- minor fold axis, symmetrical, s, z
- glacial striae

HOBLITZELL TP

NOSEWORTHY TP

HOBLITZELL TP
TOMLINSON TP

NOSEWORTHY TP
HURTUBISE TP

BURNTBUSH RIVER

RAMMAGE

KABIKA RIVER

JL-1-1
JL-1-2

JB-8A
JB-8B

JB-7A
JB-7B
JB-7C
JB-7D
JB-7E

JL-10-1
JL-10-2
JL-10-3
JL-10-4
JL-10-5
JL-10-6
JL-10-7
JL-10-8
JL-10-9
JL-10-10
JL-10-11
JL-10-12
JL-10-13
JL-25-4
JL-25-5

AM-8-1
AM-8-2
AM-8-3

JL-17-2
JL-17-3
JL-17-4
JL-17-5
JL-25-7
JL-25-8

JL-17-1
JL-26-1
JL-26-2

JL-13-1

JL-14-1
JL-14-2
JL-14-3
JL-14-4
JL-14-5
JL-14-6
JL-14-7
JL-24-1
JL-24-2
JL-25-1
JL-25-2
JL-25-3
JL-25-4
JL-25-5
JL-25-6

H76-1-10.7
H76-1-33.5

JL-130-1

AM-15-1
AM-15-2
AM-15-3
AM-15-4

GC 037

GC 021
GC 022
GC 035
GC 036
GC 059
GC 060

GC 034
GC 038
GC 058

GC 054
GC 055
GC 056

GC 018
GC 019

GC 020

GC 016
GC 017

GC 001
GC 002
GC 003
GC 004
GC 005

GC 006
GC 007
GC 008

GC 009
GC 010
GC 057
GC 012

GC 093

JB-15A
JB-15B
JB-15C
JB-15D
JB-15E

273±

275±

LEGEND

JL-17-2 Sample number

★ Au 5-10ppb

★ Au 10ppb (maximum 110 ppb)

INDEX TO ADJOINING N.T.S. SHEETS 1/50,000

42H 32E

COGEMA Canada Ltée/Ltd.

SCALE - 1:1/20,000

Metres 0 500 1000 1500 2000 2500
Feet 0 2000 4000 6000 8000

BURNTBUSH RIVER PROJECT

29701

SAMPLES LOCATION

Interpretation by: J. Learn, A.Mori	Date	Report no. 86-CND-47-02
Drafted by: R. Allie	3/12/86	Appendix
Base map:	8/86	MAP NO. 8
Revise by:		

290

(J) jack pine present

SURFICIAL DEPOSITS

clay, organic black mud

sand (glaciofluvial)

esker

float boulders of local provenance

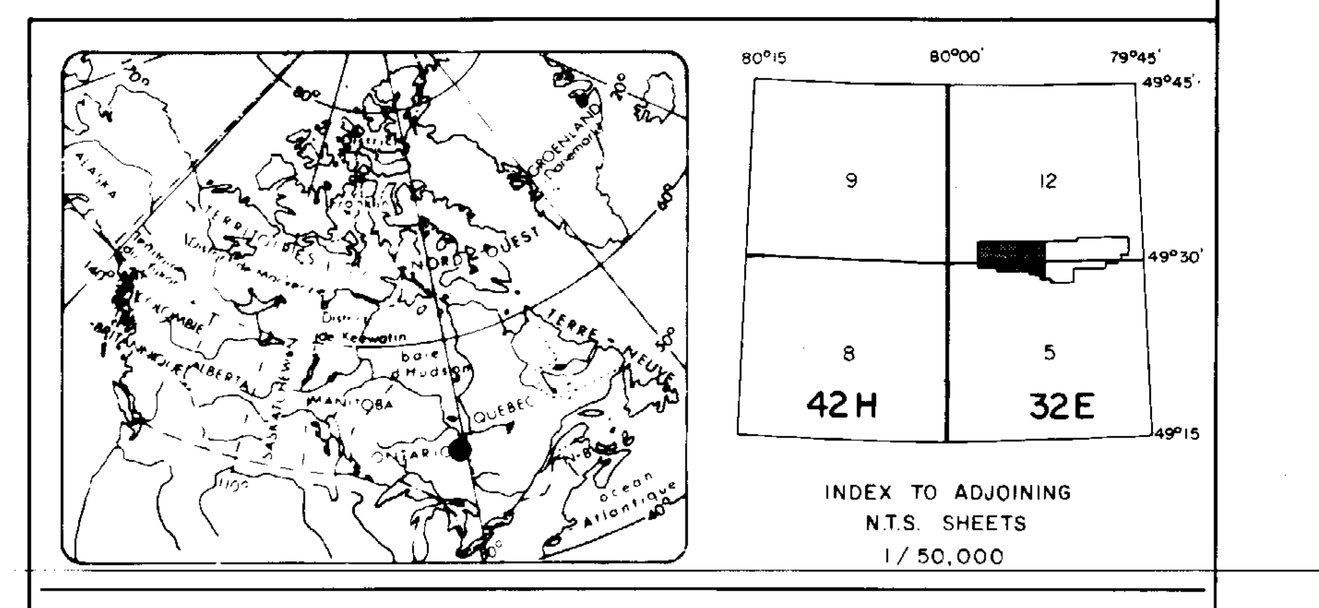
SYMBOLS

abandoned camp site

x outcrop exposure

beaver dam

beaver hut (inactive)



COGEMA Canada Ltée Ltd.

Scale 1: 5,000

Meters 0 100 200 300 400 500 600

Feet 0 500 1000 1500 2000

BURNTBUSH RIVER PROJECT

WEST SHEET 29701

VEGETATION AND SURFICIAL DEPOSITS

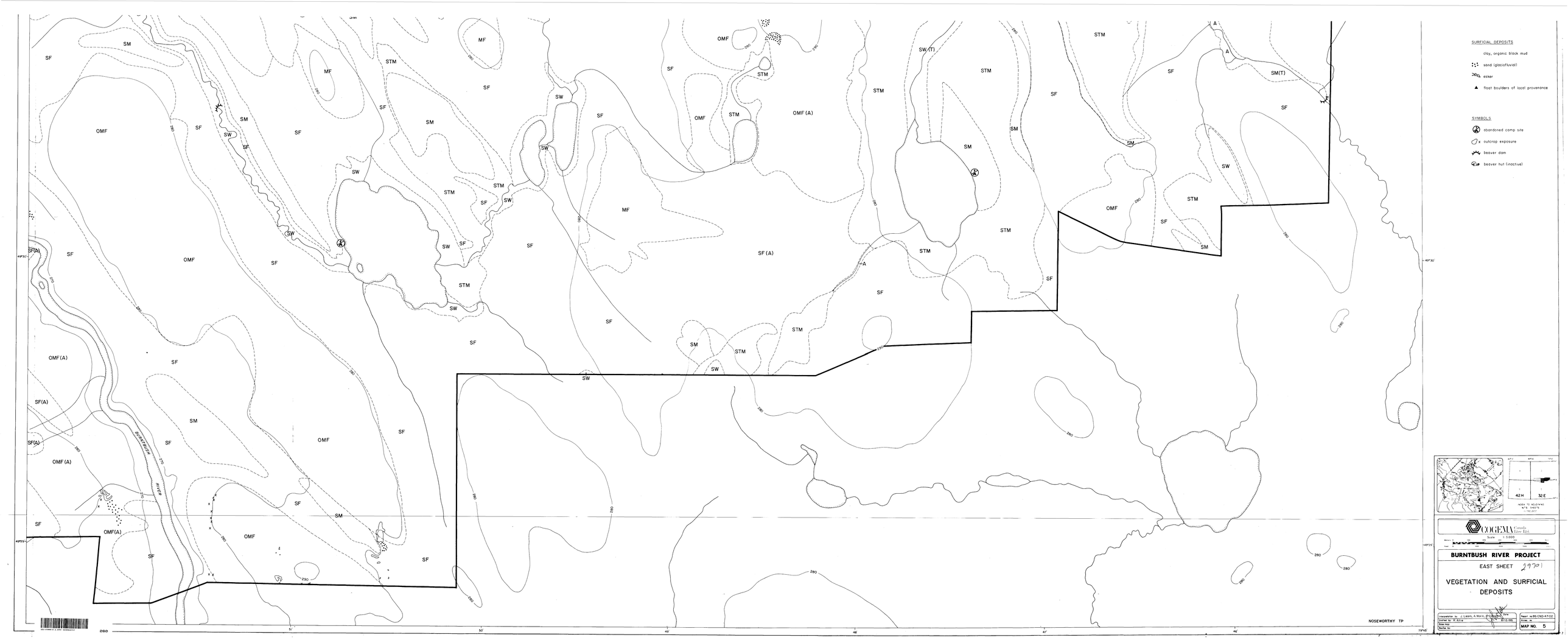
Interpretation by: J. Learn, A. Morin, G. Cameron	Date
Drafted by: R. Allie	8/12/86
Base map:	
Revise by:	

Report no. 86-CND-47-02

Annex no.

MAP NO. 4

250


SURFICIAL DEPOSITS
clay, organic black mud
sand (glaciofluvial)
esker
float boulders of local provenance
SYMBOLS
abandoned camp site
outcrop exposure
beaver dam
beaver hut (inactive)
BURNTBUSH RIVER
NOSEWORTHY TP
42 H
32 E
COGEMA Canada Inc. Ltée
Scale 1:5,000
BURNTBUSH RIVER PROJECT
EAST SHEET 29701
VEGETATION AND SURFICIAL DEPOSITS
MAP NO. 5

4a quartzite

Metavolcanic rocks

3f quartz-eye crystal tuff

2 undifferentiated intermediate volcanics

2a flow

2b ashfall tuff

2c lapilli tuff, agglomerate

2f crystal tuff

1a mafic to intermediate flow

1b ashfall tuff

1e pillow lava

1h amphibolite

Minerals and alterations

bfx visible fracture related bleaching

cc calcite

ep epidote

gt garnet

mt magnetite

po pyrrhotite

py pyrite

tm tourmaline

SYMBOLS

outcrop exposure, with key to text

geological contact, observed, inferred

diamond drill hole, with key to text (O=collar)

boundary between low and high magnetic response (approximate position)

foliation, dipping, vertical

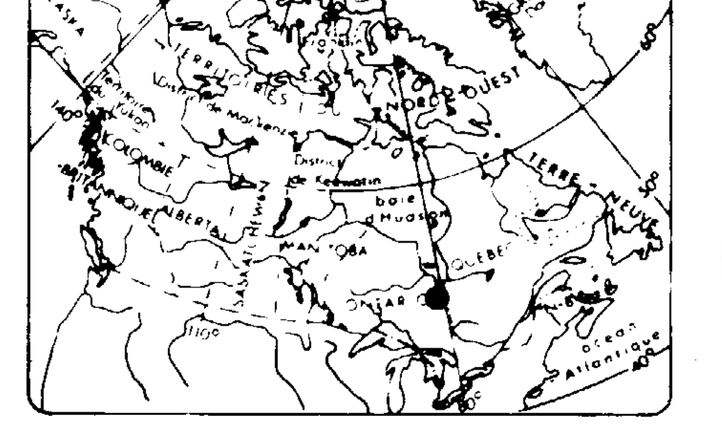
orientation of shear

fracture cleavage

mineral lineation (amphibole)

minor fold axis, symmetrical, s, z

glacial striae



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COGEMA Canada Ltee Ltd.

Scale 1:5,000

BURNTBUSH RIVER PROJECT

WEST SHEET

BEDROCK GEOLOGY

Interpretation by: J. Learn, A. Morin, G. Cameron	Date	Report no. 86-CND-47-02
Drafted by: R. Allie	8/12/86	Annex no.
Base map:		MAP NO. 6
Revise by:		

4g biotite schist
4h biotite - hornblende schist
4q quartzite

Metavolcanic rocks

3f quartz-eye crystal tuff

2 undifferentiated intermediate volcanics
2a flow
2b ashfall tuff
2c lapilli tuff, agglomerate
2f crystal tuff

1a mafic and intermediate flow
1b ashfall tuff
1e pillow lava
1h amphibolite

Minerals and alterations

bfx visible fracture related bleaching
cc calcite
ep epidote
gt garnet
mt magnetite
po pyrrhotite
py pyrite
tm tourmaline

SYMBOLS

outcrop exposure, with key to text
geological contact, observed, inferred
diamond drill hole, with key to text (O=collar)
boundary between low and high magnetic response (approximate position)
foliation, dipping, vertical
orientation of shear
fracture cleavage
mineral lineation (amphibole)
minor fold axis, symmetrical, s, z
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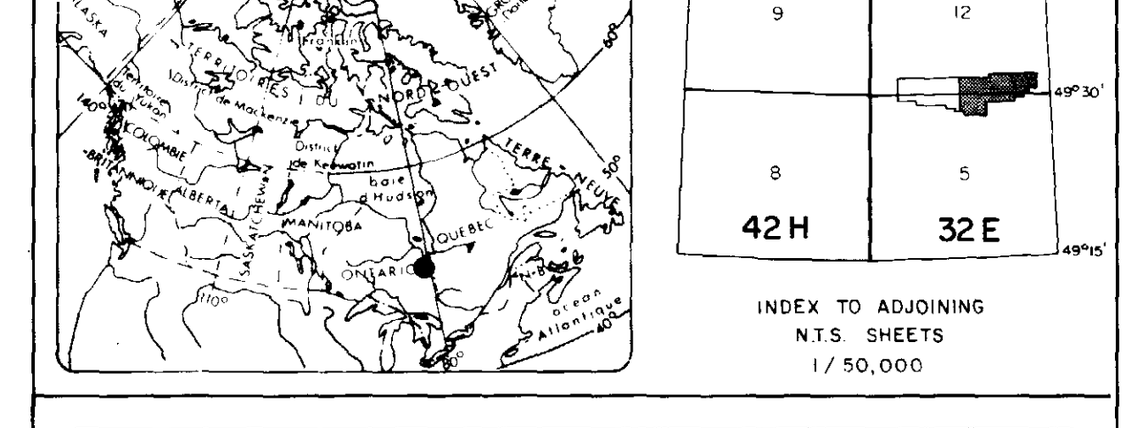

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COGEMA Canada Ltée Ltd.

Scale 1:5,000

Meters 0 100 200 300 400 500 600
Feet 0 500 1000 1500 2000

BURNTBUSH RIVER PROJECT

EAST SHEET

BEDROCK GEOLOGY

Interpretation by: J. Learn, A. Morin, G. Cameron
Drafted by: R. Allie
Date 9/12/86
Base map:
Revise by:

Report no. 86-CND-47-02
Annex no.
MAP NO. 7