CHAPTER - II

GEOLOGICAL SETTING

2.1 REGIONAL GEOLOGICAL SETTING

The Assam-Meghalaya plateau represents a detached part of the Indian Peninsular Shield (Pascoe, 1950). The plateau is separated from the Indian Peninsula by the Indo-Gangetic trough and stands out as isolated Assam-Meghalaya massif and Mikir Hill massif. The rocks of this plateau show wide lithological variations and evidences of complex polymetamorphic and polytectonic history.

The rocks of the "Shillong Group" are developed typically around Shillong in the Khasi Hills and were deposited unconformably over the basement gneissic complex. This group includes metasedimentary rocks that are pelitic (phyllite and schists) at the base and quartzitic at the top. At places rocks of this group are separated by a conglomerate bed from the basement gneisses and migmatites. The major structural trends of these rocks are mostly NE-SW and rarely E-W.

The Shillong Group of rocks were intruded by a group of acid and basic rocks belonging to the Precambrian age. The first intrusives were of basic in composition, called the 'Greenstone' by Oldham (1858) and were later renamed as the 'Khasi Greenstone'
by Medlicott in 1869. These basic rocks were emplaced either in the form of dykes or sills into the Shillong Group.

This was followed by the intrusion of a coarse grained porphyritic granite known as the Mylliem Granite. Similar types of porphyritic granite occur in different parts of the plateau, such as the Umrai pluton, the south Khasi plutons the Nongpoh pluton and others. Most of the Palaeozoic and Lower Mesozoic rocks are missing in the plateau. The southern fringe of the plateau shows the occurrence of the Sylhet traps of the Jurassic (?) age, which is overlapped by the sedimentary rocks of the Cretaceous age. These sedimentary rocks of the Cretaceous age are followed without an appreciable break by the sedimentary formations of the Tertiary age.

The general stratigraphy of the Meghalaya plateau is given below:

<table>
<thead>
<tr>
<th>GEOLOGICAL AGE</th>
<th>GROUP NAME</th>
<th>FORMATION</th>
<th>LITHOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oligocene</td>
<td>Garo</td>
<td>Chengpara</td>
<td>Sandstone, siltstone, clay and marl.</td>
</tr>
<tr>
<td>Miocene</td>
<td></td>
<td>Baghmara, Kopili, Kopili/Rewak</td>
<td>Feldspathic sandstone conglomerate and clay</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shale, Sandstone and marl.</td>
</tr>
<tr>
<td>Eocene</td>
<td>Jaintia</td>
<td>Shella</td>
<td>Alternation of sandstone and limestone</td>
</tr>
<tr>
<td>Paleocene</td>
<td>Langpar</td>
<td></td>
<td>Calcareous shale, sandstone and impure limestone</td>
</tr>
</tbody>
</table>
2.2 GEOLOGICAL SETTING OF THE AREA UNDER STUDY

The area is in the eastern part of the "Shillong Plateau" where Sung Valley pluton is supposed to have been emplaced along the junction of major lineaments trending NNW-SSE and E-W.

Preliminary geological studies in this area reveal that...
the NE-SW trending Shillong Group of rocks have been subjected to a clearly defined profused intrusion of Sung Valley alkaline-ultramafic carbonatite complex.

In the study area, Shillong Group is mainly composed of quartzites interbedded with thin layers of phyllites. The rocks are of Precambrian age and suffered low-grade metamorphism under green schist facies condition (Turner, 1960).

Sung Valley rocks bear good field evidences of intrusion such as development of narrow zone of fenite along the contact between the intrusive and the quartzite of the Shillong Group near Maskut; brecciation and shearing of country rocks along the border zone; occurrence of quartzites as inclusions within the complex in the valley near Sungnala and in between pyroxenite and fenites in the south-eastern part of the study area along the Maskut road; emplacement of pyroxenite (presently altered) along NW-SE trending joints in quartzites and phyllites, and the presence of typical cumulate structure in pyroxenite.

The different rock types that constitute the alkaline complex are serpentinite, pyroxenite and its altered and compositional variations, uncomphgrite, ijolite, melteigite, syenite, carbonatite, apatite-magnetite rock, fenite and veins of serpentine, feldspar, calcite, epidote and quartz.

Isolated outliers of horizontal pebbly sandstone occur unconformably on the steeply inclined Shillong Group of rocks at
and around Mookyadur (Plate - 17b).

Fission track dating has indicated that the alkaline complex belongs to the Cretaceous age (Chattopadhyay and Hashimi, 1981; U. Ghosh et al. 1968).

A tentative geological succession of the area, based on field evidences is given in Table - 2.

**TABLE - 2**

<table>
<thead>
<tr>
<th>Alluvium</th>
<th>Both trasported and in-situ deposits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tertiary/Upper Cretaceous</td>
<td>Jaintia Group/ Khasi Group</td>
</tr>
<tr>
<td>Sung Valley Complex</td>
<td>Pebbly sandstone</td>
</tr>
<tr>
<td>Unconformity</td>
<td></td>
</tr>
<tr>
<td>Cretaceous</td>
<td>Serpentinite, pyroxenite, uncompaniedite, ijolite series, syenites, carbonatite, fenite, apatite-magnetite and different veins</td>
</tr>
<tr>
<td>Intrusive contact</td>
<td></td>
</tr>
<tr>
<td>Precambrian Intrusive Khasi Greenstone</td>
<td></td>
</tr>
<tr>
<td>Shillong Group Quartzite and phyllites, with conglomerate</td>
<td></td>
</tr>
<tr>
<td>Precambrian Gneissic Complex</td>
<td></td>
</tr>
<tr>
<td>Unconformity</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

*1 = Exposed near Mookyadur
*2 = Exposed near Puriang
*3 = Not exposed in the area.

### 2.3 NOMENCLATURE

*Khasi Greenstone:* It is an intrusive igneous rock
occurring in the Shillong Group of rocks. Because of typical green colour of the rock in unweathered condition and the occurrence of it first reported from Khasi Hill, it is known as the Khasi Greenstone (Medlicott, 1869).

Planar surfaces

$S_1$: Foliation marked by the parallel arrangement of very fine grained micas in a phyllite with planar fissility (Hyndman 1985, p. 255).

$S_2$: Crenulation and Strain-slip foliation developed cutting across $S_1$. This is also called fracture cleavage.

$S_3$: Kink plane marked by fractures.

Folds

$F_1$: This fold is formed by folding of $S_0$.

$F_2$: This fold is formed due to deformation of $S_1$.

$F_3$: This fold deformed the axial surfaces of the $F_2$ folds.

Lineations

$L_1$: $L_1$ is the intersection lineation between $S_0$ and $S_1$. 
L_2 : L_2 is the intersection-lineation of S_1 and S_2.

L_3 : intersection lineation of S_1 and S_3.

**Ultramafic rocks :** The ultramafic igneous rocks are hypervolcanic composed essentially of dark coloured ferromagnesian or mafic minerals. The definition of ultramafic rocks as given by Williams et al. (1958) is that the rocks of the ultramafic clan are those with colour index more than 70% that is, rock containing more than 70 per cent of mafic constituents.

**Mica Peridotite :** Mica peridotite of Sung Valley is composed mainly of phlogopite, serpentine-pseudomorphosed after olivine, pervoskite, apatite, magnetite and calcite (Wyllie, 1967; P. 313).

**Serpentinite :** A rock formed by hydration of a peridotite and generally containing a little talc, tremolite or chlorite. Most are green to dark green colour but they may weather to orange brown, (Hyndman, 1985, P. 445).

**Pyroxenite :** Pyroxenites are ultramafic rocks. They contain orthopyroxene and clinopyroxene together.

Alkali pyroxenites are associated with alkaline rocks and have titan-augite, diopside-hedenbergite or aegirine-augite as their pyroxene with or without an alkali amphibole (Nockolds et al. 1978 P. 149).
Alkali rocks: The alkali rocks are with alkali-feldspar (only feldspar in acid rocks; often together with plagioclase in silica poor rocks); feldspathoid, pyroxenes and amphiboles often sodic, no rhombic pyroxene; accessories are melanite, apatite, iron oxides and Pervoskite.

Nepheline Syenite: Nepheline syenites are coarse to medium grained igneous rocks consisting essentially of alkali feldspar and nepheline with ferromagnesium minerals (Nockold, 1956).

Ijolite: Johannsen (1974) introduced the name "ijolite series" which is composed of urtite when nepheline exceeds 70%; ijolite when nepheline is 70-50%; and meltigite when nepheline is less than 50%. The principal constituents of ijolite series are nepheline and pyroxenes with various amount of melanite-garnet and accessory amount of pervoskite, titanium apatite, phlogopite and iron-titanium oxides. Secondary minerals include concorinite, zeolite, calcite may be primary or secondary and the rocks may grade towards carbonatites e.g. pyroxene sovites. (Eckermann, 1948).

Uncomphgrite: It is a melilite-bearing alkaline rock with associated ijolites (Hall, 1987, P. 439).

Apatite-Magnetite rocks: The rock containing apatite and magnetite with pyroxene associated with ultramafic alkaline complexes (Hall, 1987; Tuttle and Gittin, 1966).
Carbonatites: The carbonatites are in association with alkali ultramafic igneous rocks. They are "sovite" composed of calcite, apatite, pyroxene, phlogopite, magnetite, pervoskite, olivine pyrochlore, etc. (Nockold, 1978, p. 200; Hall, 1987, p. 440; Hest, 1986, p. 198).

Fenite: The fenite is an alkali rich metamorphic rock commonly associated with alkali-ultramafic intrusive and is composed of K-feldspar, plagioclase, aegirine, quartz, magnetite. The term fenite was first introduced by Brogger (1921) after its occurrence in the Fen Complex Norway. The process of metamorphism around alkaline intrusive is called fenitization (Sorenson, 1974, p. 564).

2.4 DISTRIBUTION AND FIELD RELATIONS OF THE ROCKS OF THE AREA

2.4.1 Shillong Group

2.4.1.1 Quartzites

Quartzites are the dominant rock type of the 'Shillong Group' which border the Sung Complex. The area occupied by the quartzites show high elevation and these are well exposed along the Shillong-Jowai road (NH 44). They are well bedded and strike NE-SW with dips 50°-80° towards NW. Near the contacts with the ultramafic igneous rocks (now altered), they become well foliated. They also occur as inclusions in the igneous rocks at Maskut village, between fenite and pyroxenite and also at the Sung Nala.
The quartzites are medium to coarse grained, highly jointed and often preserved the original primary sedimentary structures. Lithological layering, current bedding, ripple marks are some of the characteristic features observed in the quartzites (Plate- 3b) It is difficult to observed foliation by naked eye in the field but when minutely observed under high magnification, slight elongate habit of the quartz grains and rough parallelism of the minute shining flakes can be seen. The degree of development of foliation is higher nearness to the contact of the alkaline body. Shearing effect occasionally makes the quartzite flaky and feebly foliated.

Quartzites are interlayered with thinly bedded phyllites (Plate- 4b). The latter is highly foliated and crenulated. Sometimes thinly bedded quartzites and metapelites (Phyllitic) are discontinued along layering and such discontinuity may be the resultant of layer parallel extensional phenomenon. There is a variation in orientation between the lithological contact and foliation of the phyllitic rocks.

The surface of the weathered quartzites bear a reddish coating. Leaching of iron is also found along the bedding planes. Quartz veins of variable dimensions are also found both parallel or perpendicular to the bedding planes (Plate- 4a).

Two varieties of quartzites are found in this area:

(1) Micaceous quartzites (Plate - 4a)
(2) Massive quartzites (Plate - 3a)
In the micaceous quartzites, the content of mica is variable. They are highly weathered and are well jointed. These quartzites are usually coarse grained and are grey in colour.

Massive quartzites are hard and compact and are less affected by weathering. Block jointings are common. They are mostly coarse grained and are grey in colour.

Colour laminations due to impurities in quartzites are observed in Maskut village. Leaching of iron sometime changes the look of quartzite as ferruginous banded quartzite but such staining is purely surfacial. A thin conglomerate bed is observed which is purely intraformational and is seen near Lulang and Mawryngkneng. (Plate 9).

2.4.1.2 PHYLITES

Phyllites are invariably interlayered with quartzites but the thickness of the phyllites is very thin ranging from centimeter to meter scale (Plate - 5a). Irrespective of thicknesses, they show well development of foliation (Plates - 4b, 6a). The foliation is highly disturbed due to subsequent deformational impacts resulting the development of another set of foliation across the dominant type. Folding on different styles and scales are seen. Kinking is a common feature of phyllitic unit of the Shillong Group (Plate - 6a). They are either ash or reddish in colour and are brittle when fresh. They are well exposed along the National Highway No. 44. In the field they are mostly interlaminated with the quartzites, most usually
with the micaceous varities. They are characterised by perfect fissility, imparted by a single dominant set of S planes defined by strong preferred orientation of micaceous and chlorite flakes. The foliation trends NE-SW and dips 50° - 80° towards NW. The rock is highly weathered and closely jointed (Plate - 5b). The rock shows a silky shine on the surface of the cleaved planes. Veins of quartz are also found both along and across to the cleavage planes.

2.4.1.3 QUARTZ VEINS

Innumerable, thin quartz veins are found in the quartzites and phyllites ranging thickness from a centimeter to about 0.5 meters. They are medium to coarse grained and bear both concordant and discordant relations to the foliation in the rocks. They show en-echelon pattern in quartzites (Plate - 4a).

They are displaced by small scale faults, fault planes being mostly NW-SE.

2.4.1.4 EPIDIORITES (KHASI GREENSTONE)

It is well exposed near the 44 km post on the NH-44, near Mawryngkneng. It occurs as a sill in the Shillong Group. The exposure is about 40 m thick and well exposed on the road section. It is characterised by (1) yellowish brown soil cover, (2) greenish coloured rock and (3) the typical spheroidal weathering. The boulders showing spheroidal weathering are well observed on the road section (Plate - 7a). The rocks are well jointed by longitudinal, cross and diagonal joints and horizontal
shettings. No trace of foliation is observed in the rocks. Tectonically attenuated lense like bodies (Plate - 6b) are observed in the field at 48 km post on way to Jowai.

The foliation in the country rocks on both sides of the epidiorite body is NE - SW with a dip 60° to 75° towards NW. The strike of the intrusive rock is conformable with the country rocks.

The epidiorites is medium to fine grained, dark-green to black coloured and has a considerable hardness. Unweathered exposures show prominent green colour with black amphiboles set in a colourless to grey plagioclase matrix. The hornblende can be identified in hand specimen as long needle shaped crystals. The lath-shaped feldspar are also equally prominent.

2.4.1.5 QUARTZ - MUSCOVITE - TOURMALINE SCHIST

The rock is dark in colour and grain size varies from coarse to medium. Tourmaline needles are megascopically identified. Muscovite flakes are coarse grained. The rock is interlayered with other metasedimentary rock units but relative abundance is less than the other units. The rock is hard and compact and less affected by weathering. It is observed near Lulang (Plate - 8b) towards Jowai.

2.4.1.6 CONGLOMERATE

The rock is light grey in colour and less compact than the other associated rocks. Pebbles of different sizes and shapes are
observed and they are embedded in a relatively fine-grained matrix (plate - 9, 10a). The long dimensional orientation of the pebbles in 2D lies more or less in one direction which is roughly parallel to the regional foliation of the rocks. But in 3 dimension the long orientation of the pebble makes high angle with respect to the regional foliation. Thickness of conglomerate bed varies widely but maintains concordant relationship with the country rocks as can be seen from Lulang area (Plate - 9b). The pebbles are mostly quartz. Individual pebbles when measured show maximum 6 cm long and 3 cm breadth. Shearing effect is inconspicuous but observed in a few places such as Mawrynkeng area (Plate - 9a).

2.4.2 The Sung Valley Alkaline Ultramafic Carbonatite Rock Complex

The NE-SW to E-W trending Shillong Group of rocks are transversed by a NNW-SSE trending, oval shaped (7 km long and 4-4.5 km wide) alkaline rocks. The contact between the Shillong Group and alkaline intrusives is well defined and is marked by the growth of a narrow fenite zone. This alkaline suite is absolutely free from regional metamorphism. In the area under investigation, ultramafics are the predominant rock types, while more alkaline rocks along with the carbonatites, play a subordinate role. The post magmatic rocks are not studied (Map-2).

2.4.2.1 SERPENTINITE

In the northern part of the area serpentinite occurs as stock-like mass along the Sung nala (Plates - 11b, 12a).
It is highly jointed and traversed by numerous veins of calcite, phlogopite, carbonatite and transitional carbonatites, varying in thickness from a centimeter to about 100 cm (Plate - 12b). It is surrounded by pyroxenite.

The serpentinites are massive, melanocratic, dark greyish-green coloured, medium to fine-grained rocks.

2.4.2.2 PYROXENITE

Pyroxenites are the dominant intrusive component of the area. They are coarse to medium grained, melanocratic, greenish-black in colour. Fine grained variations are also found but they are immediately associated with coarse grained types. They are massive and well jointed. The pyroxenites in places show typical cumulate structure, displaying accumulation of coarse pyroxenes within fine grained matrix.

Different compositional varieties of pyroxenite are found, these are magnetite-pyroxenite, melilite-pyroxenite (=uncompahgrite) and so on. In the ijolite rich zone, pyroxenite grades to nepheline - pyroxenite and melteigite. Small, cross-cutting veins of syenite (Plate 16b), apatite-magnetite, ijolite and fine grained pyroxenite are found within pyroxenite. Pyroxenites are weathered to produce a greenish soil.

2.4.2.3 MELILITE PYROXENITE (=UNCOMPAHGRITE)

Uncompahgrites are well exposed in the western part of the area. It occurs as small rounded body and as small veins within
pyroxenite. Veins of ijolite often intersects the melilite-pyroxenite veins. Contact between the pyroxenite and melilite-pyroxenite veins are sharp.

They are massive, mesocratic, bluish coloured, medium-to fine-grained rock. Minerals that can be identified with naked eyes are light blue coloured melilite, greenish pyroxenes, reddish coloured flakly phlogopite and black coloured garnet.

2.4.2.4 IJOLITE

Ijolite are found to occur in the western and south-central part of the area. They occur as small lense-shaped bodies and occasionally as minor veins. They are intrusive into the pyroxenites. The contact of ijolite with pyroxenite, at places, is sharp and at places diffused.

A number of thin veins of ijolite are found in pyroxenite. The thickness of the veins usually varies from a few centimeter to about 50 centimeter. In the southern part of the complex along the Sung road, a N-S trending 30 centimeter thick ijolite vein is found within pyroxenite. Here the contact between them is diffused.

Ijolites are massive, mesocratic, brownish green coloured, coarse to medium-grained rocks. Minerals that can be distinguished in hand specimen are grey coloured nepheline, reddish coloured flaky phlogopite, greenish coloured pyroxenes and black coloured garnet.
2.4.2.5 SYENITE

Syenites of different mineralogical varieties occur widely as minor dykes and as thin veins within the host pyroxenite. A small, highly sheared dyke of nepheline syenite (Plate - 14b) is found along the Maskut road in southern part of the area. In this rock darker needles of pyroxenes can be easily differentiated from felsic mineral. In the southern part of the area, a 60 centimeter thick vein of nordmarkite, trending NE-SW, is found within the pyroxenite. The rock shows spheroidal weathering. There are also a number of occurrences or thin syenitic veins in the southern part of the complex. The syenites vary in composition from pure alkali-feldspar syenite to feldspar rich syenite.

Syenites are mostly leucocratic, medium to coarse grained, massive rocks, composed mainly of nepheline, k-feldspar, pyroxenes and apatite. Quartz occurs in nepheline free varieties. Greenish needles of sodic pyroxenes are characteristic, which sometimes are arranged in radiating pattern. Large (upto 6 centimeter) greenish needles of aegirine are also found.

2.4.2.6 CARBONATITE

Carbonatite is a light coloured leucocratic, coarse grained, hard and compact rock. It occurs as small lenses and veins. Most of the small lenses of carbonatite are found along the Maskut road in the south-eastern part of the outer complex and few lenses are found near the Sung nala in the north central part of the complex (Plate - 15a, 16a). They are essentially composed of carbonate minerals. Apatite and magnetite occurs as
accessories. Apatite occurs as fine, transparent, greyish coloured, disseminated grains. Apatite also displays characteristic spherulitic structures. Magnetite occurs as a coarse grained accessory. Banding within carbonatite is also found which is defined by layers of coarse magnetite. The bands trend N 25°E and dips vertically (Fig. 18) (Plate 16a). The carbonatite occurring near the Sung nala are foliated due to parallel alignment of magnetite crystals (Plate - 15b). Numerous small, cross-cutting veins of carbonatite are also found within serpentinites and pyroxenites (Plate - 13b). The carbonatite veins vary in thickness from a centimeter to about 20 centimeter. A transitional carbonatite vein within serpentinite is more than 100 centimeter wide in the (Plate - 13a). This veins is light grey to greenish in colour. The colour variation is caused due to the presence of layers of varying mineral composition which are usually oriented parallel to the planes of contact of the vein with the host rock. The layerings are not of uniform thickness, Bulges and constrictions occur. The greenish layers are richer in serpentine, tremolite, talc and phlogopite, while the greyish layers are composed essentially of carbonates with magnetite and apatite as minor accessories (Plate - 14a).

2.4.2.7 FENITE

Fenite is well exposed in the south-eastern part of the area along the Maskut road near the occurrence of carbonatite. Nepheline-syenite dyke is also found near the occurrence of fenite. Quartzites of the Shillong Group are found as inclusions near the occurrence of fenite and carbonatite. Quartzites are sheared.
2.4.2.8 APATITE - MAGNETITE ROCK

Two lenses of apatite - magnetite rock have been found within pyroxenite in the Sung area. They are massive, coarse, black coloured and it show metallic lusture. Apatite is light greyish in colour and medium in grain. Apatite is weathered.

In the south-eastern part of the area, along the Maskut road, apatite-magnetite veins have been found. They are highly weathered. The veins trend NW-SE.

2.4.2.9 FOLIATED HORNBLENDE-AEGIRINE AND HORNBLENDE-BIOTITE ROCKS

Along the southern periphery of the area foliated hornblende biotite and hornblende - aegirine rocks have been found. These show both concordant and discordant relationship with the NE-SW trending rocks of the Shillong Groups. They are coarse to medium grained and are dark-greenish in colour. They are characterised by the development of mineral foliation defined by planar parallelism of coarse hornblende grains. The foliation is usually NE-SW and dips 40° to 70° towards SW. Trends parallel to the regional strike and dip of the country rocks are also noticed. Development of small, thin, greenish coloured epidote veins are also found. Epidote also occurs as isolated pockets within them (plate - 8a). Small irregular hard and compact quartz veins are also found in these rocks. Quartz veins are younger than the epidote veins.

Foliated hornblende-biotitic rocks near the junction of the Maskut road with NH-44 occurring as a dyke striking NE-SW
It has a mottled weathered surface where the foliation is easily distinguishable. It is again cut by a greenish limburgite dyke striking NW-SE (Plates-10b, 11a).

The hornblende rocks are well jointed and in places sheared. Near the Purunang, the rock shows exfoliation structure. The rock also shows pitted structures produced due to weathering away of the softer minerals.

2.4.2.10 LIMBURGITE

This is a fine grained, melanocratic, pale-greenish coloured rock. It occurs as a dyke within the foliated hornblende biotite rock on the NH-44 near its junction with the Maskut road. Thickness of the dyke is about 60 cm and it trends NW-SE. The contact of the dyke with the host rock is sharpened and it bears a chilled margin. Individual minerals could not be distinguished with naked eyes (Plate - 10b, 11a) (Fig. 21)

2.4.2.11 SERPENTINE VEINS

In the south central part along the Sung road occurrences of thin, bluish-green coloured serpentine veins have been found within the pyroxenite. The veins are highly weathered. The veins are mostly E - W.

2.4.2.12 PHLOGOPITE VEINS (PLATES - 12b, 13b, 14a)

Phlogopite veins occur in the serpentinites of the northern part of the area as well as along the Maskut road near the occurrence of apatite-magnetite veins. Within the serpentinites
they are associated with carbonatite, sometimes cross-cutting the carbonatite and the transitional carbonatite veins suggesting later origin for the phlogopite. In some places the veins run parallel to the carbonatite veins. Veins are weathered. The general trend of the veins is NW-SE, these are 5 to 20 cm. thick.

2.4.2.13 CALCITE VEINS

Few thin, irregular monomineralic veins of calcite have been found within the serpentinite in the northern part. They are medium grained, hard and compact, white to light green in colour. Majority of the veins are less than 10 cm thick.

2.4.2.14 K-FELDSPAR VEINS

In the south central part of the area near Maskut few narrow yellowish coloured, almost monomineralic K-feldspar veins have been found within pyroxenite near the syenite occurrence. The veins are mostly less than 30 cm thick. The veins are hard and compact, coarse grained and fractured.

2.4.2.15 EPIDOTE VEINS

In the extreme southern part of the area, small lenses and veins of epidote are seen along the foliation of the foliated hornblende-aegirite and hornblende-biotite rocks. The veins irregular, fine grained, greenish coloured. These vary in thickness from 5 to 10 cm. Intersections of epidote veins with by quartz veins are also found in these rocks. Epidote also occurs in isolated pockets.
2.4.2.16 QUARTZ VEINS

Small quartz veins, which ranges in thickness from a cm to about 0.5 m are found within the altered pyroxenites. Quartz grains in the veins are colourless to dirty white and are highly fractured. They are medium to coarse grained and do not possess crystalline shape.