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MEMORANDUM:

To: File
From: Stephen Price
Date: December 13, 1988
Subject: NAT HAND SPECIMENS AND THIN SECTIONS

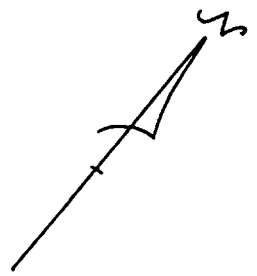
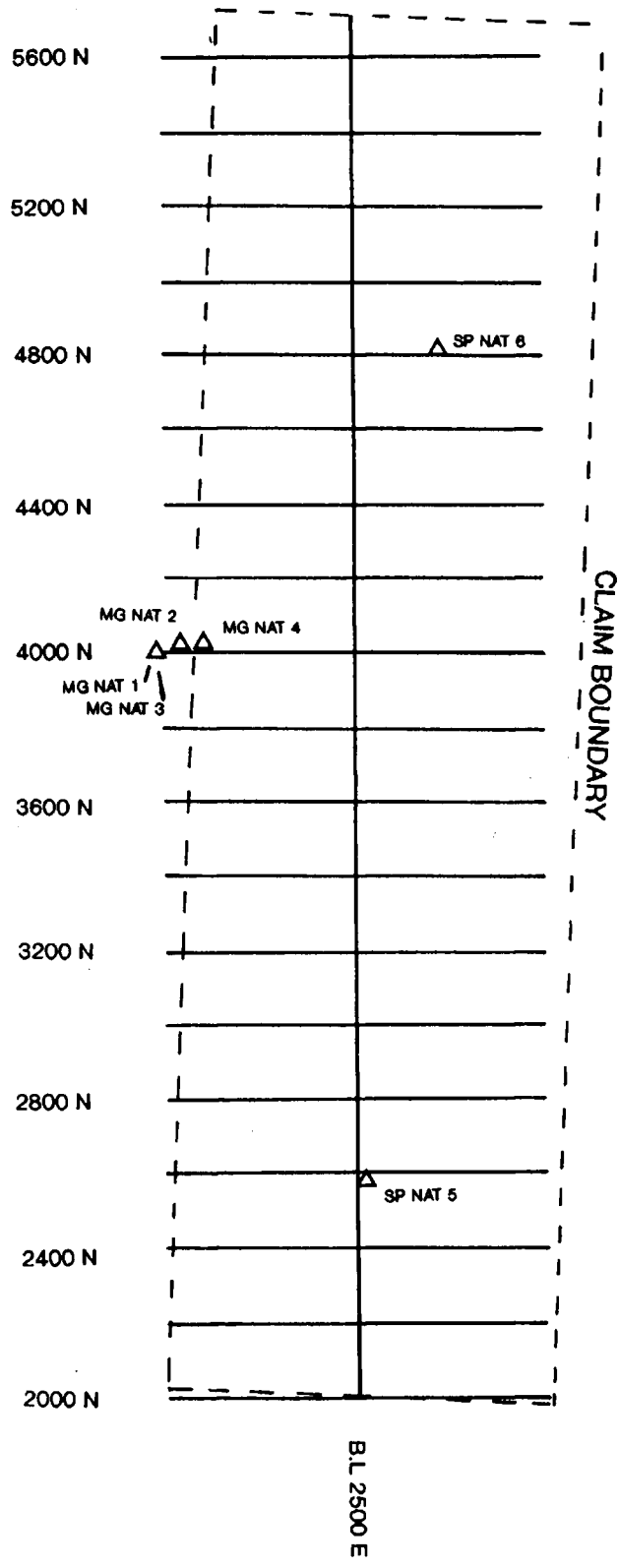
Introduction

During the ~~work~~ 1988 work programme on the Nat property, hand specimens were taken for further petrological studies. Six thin sections were made from the specimens and were examined to determine mineral assemblages, alterations and possible rock types or protoliths. The specimens are as follows:

MG NAT 1
MG NAT 2 (33329, 33330)
MG NAT 3 (33331)
MG NAT 4
SP NAT 5
SP NAT 6 (33308)

Specimen locations are shown on the attached map.

Stephen M. Price



SCALE 1:20000

**NAT PROPERTY
SPECIMEN LOCATION MAP**

Sample Descriptions

MG NAT 1 - Carbonate-silica altered ultramafic

Hand specimen:

- fairly coarse grained (> 5 mm) calcite grains surrounded by brownish Fe-CB. Small blebs of secondary quartz occur interstitial to the calcite. Hematite forms grey-black irregular clots with red streak. Modes: 50 % calcite, 20 % Fe-CB, 20 % quartz, 5 % hematite.

Thin section:

- calcite is subhedral with well developed calcite twinning. Quartz is anhedral and poikiloblastic, with wavy extinction - seems to be primary or pregenetic to calcite formation. Talc forms irregular, scaly aggregates interstitial to the calcite and quartz grains. Mode: 70 % calcite, 20 % quartz, 5 % talc, 5 % opaques.

MG NAT 2 (33329, 33330) - ultramafic

Hand specimen:

- medium green, weakly layered antigorite with small (< 3 mm) clots of light tan Fe-CB. Minor goethite and limonite in small fractures. Magnetite occurs as fine grained disseminations. Mode: 80 % antigorite, 15 % Fe-CB, 5 % limonite, 1 % magnetite.

Thin section:

- antigorite occurs as scaly, fibrous fine grained crystals. Calcite occurs as fine microveins and blebs. Opaques form fine layers.

MG NAT 3 (33331) - carbonate-silica altered ultramafic

Hand specimen:

- strongly altered; Fe-CB as irregular aggregates, mariposite as fine green needles (books?). Silica flooded. Hematite occurs as irregular blebs, as does trace pyrite. Listwaenite. Strong limonite staining occurs on the weathered surfaces. Mode: 50 % Fe-CB, 40 % quartz, 5 % hematite, 3 % mariposite, 2 % limonite, trace pyrite.

Thin section:

- carbonate as anhedral to subhedral crystals. Quartz occurs as fine anhedral crystals within veinlets and locally interstitial. Mode: 70 % carbonate (calcite), 25 % quartz, 5 % opaques. Mariposite was not recognized in thin section.

MG NAT 4 - argillite

Hand specimen:

- medium grey carbonaceous, silicified argillite. Fine wisps of carbonaceous material form layers.

Others less learned will read this, don't abbrev.

characterized by a

(Listwaenite) specular!

Carbonate

carbonate

SECONDARY OR POST GENETIC?

what inclusions?

intrusive layering?

sp? carbonate

carbonate

describe texture

contradicts hand specimen Fe-carbonate.

did not occur in the

siliceous or silicified (implies altered) what textures support this

Thin section:

- quartz as fine anhedral crystals throughout. Opaques form layers. Muscovite is concordant with the opaque layering as fine laths (book edges?). Mode: 70 % quartz, 25 % opaques, 5 % muscovite.

SP NAT 5 - carbonate-silica altered ultramafic (Listwaenite)?

Hand specimen:

- completely altered rock. Silicified Fe-~~CB~~. Hematite as irregular blebs, replacing pyrite in cubes. On one fracture, calcite occurs as sparry crystals together with long, radiating crystals. Mode: 50 % quartz, 40 % Fe-~~CB~~, 8 % hematite, 2 % pyrite. % calcite.

carbonate (limonite stained?)

Thin section:

- calcite occurs as medium grained anhedral, poikiloblastic crystals. Quartz occurs as fine grained interstitial crystals and microveins. Mode: 60 % calcite, 40 % quartz, 2 % opaques.

SP NAT 6 (33308) - argillite

contradictory w/ hand specimen

Hand specimen:

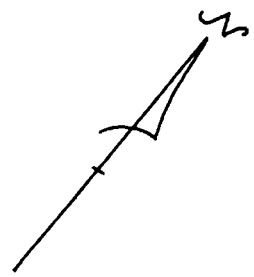
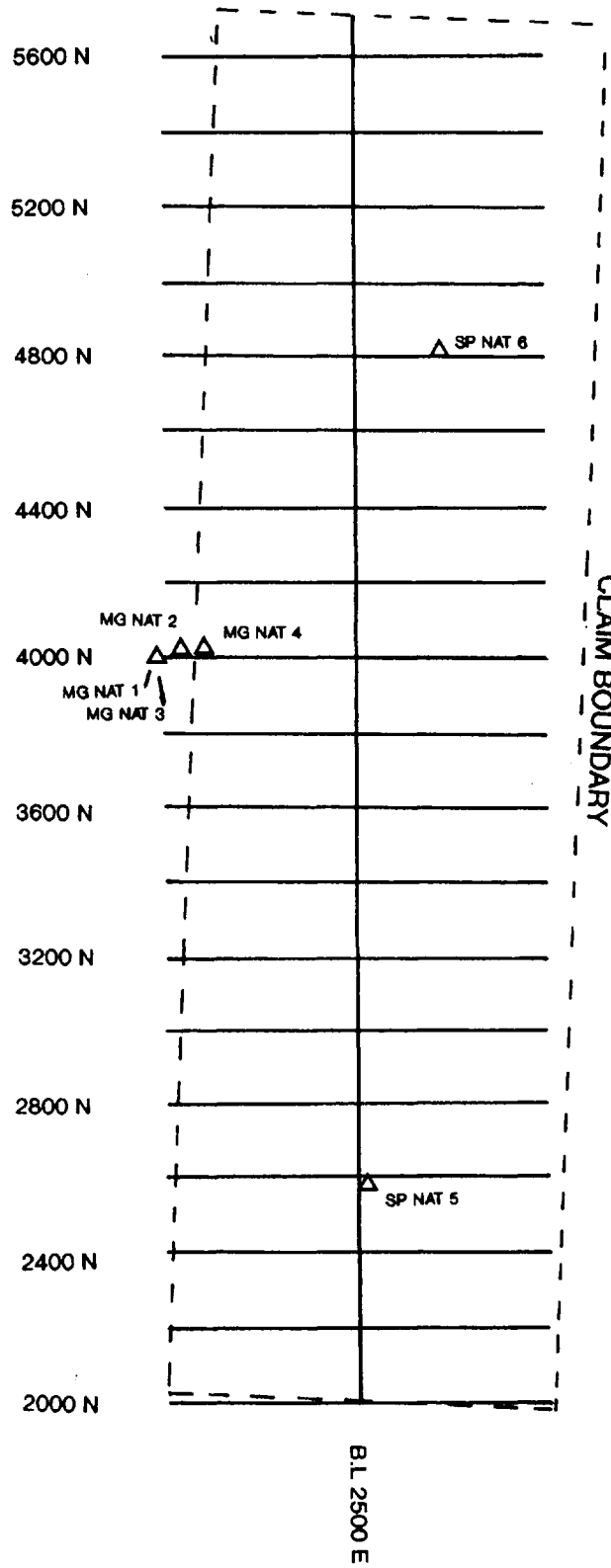
- medium grey, carbonaceous, carbonatized argillite. Carbonaceous material forms wispy layers. A 2 mm ~~Ptygmatic~~ ^{pt} ~~CB-QZ~~ microvein cuts the argillite.

carbonate-quartz

Thin section:

- quartz and carbonate (calcite) occur as fine anhedral crystals. Opaques form layering. In a small ~~CB-QZ~~ microvein, calcite shows strong calcite twinning.

Mode: ?



SCALE 1:20000

NAT PROPERTY
SPECIMEN LOCATION MAP

Serpentinite - metamorphic

Alpine type - pods & elongate sheets in
mobile geosynclinal belts
Ophiolite complexes -

↑
RADIOLARIAN CHERT
SPILITIC BASALT
SERPENTINITE

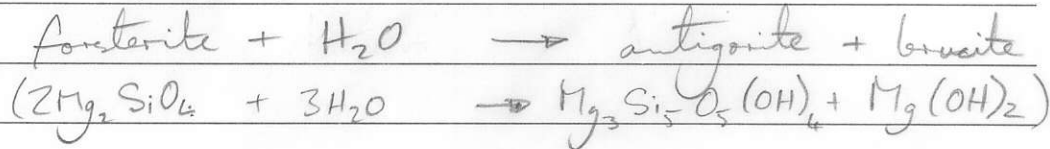
Fragments of suboceanic
crust & mantle rock

Alpine type are probably fragments of
ophiolites.

Also occurs as xenolithic fragments in alkaline
basic & ultrabasic lavas & breccia, thin cumulate
layers in diabase sills, and core components
of rare, zoned, cylindrical bodies in southern
Alaska.

Serpentinite - most are formed by hydrothermal
metasomatism of Alpine or ophiolitic
type peridotites

- < 400°C



Argillite - very finely indurated argillaceous mudstone
their formation involves some recrystallization

Peridotites - magnesian olivine, calcic plagioclase,
enstatite & diopsidic augite, hornblende,
biotite