Appendix 6

Description and photographs of polished sections of ore

Sample collected from the surface: SH-7	
Macroscopic Observation	Oxidized rock. Cavities are filled with fine network of goethite and partly with malachite and chrysocola.
Microscopic Observation	Pale grey parts suggest that the original rock was a silicified basalt, because a felsic texture consisting of lath-shaped gangue minerals filed with quartz grains is observed in these parts. Reddish brown parts represent oxidized silicified basalt disseminated densely with fine network of goethite (Photo 1). An irregular band of malachite and chrysocola occurs between the pale grey and reddish brown parts (Photo 2). Small patches of malachite with chrysocola and goethite are also observed in these two parts.

Sample collected from the surface: SH-11	
Macroscopic Observation	Oxidized rock. Cavities are filled with goethite of mammillary texture. No sulphides are observed.
Microscopic Observation	Thin goethite veinlets and small square cavities rimmed with thin films of mammillary goethite occurring in goethite disseminated silicified rock (Photo 3). Square cavities are probably the relicts of pyrite crystals leached during oxidation. Goethite consists of not only crystals that show smooth pale grey white polished surface, but also powder that is seen as rugged pale brownish grey with yellowish brown internal reflection.

Sample collected from the surface: SH-12	
Macroscopic Observation	Oxidized rock. Cavities are partly filled with patches of goethite.
Microscopic Observation	Oxidized silicified rock consists of two parts, i.e., one reddish brown smooth polished surface and another one, grey brown rugged surface densely disseminated with goethite. The reddish brown part represents a highly silicified rock with goethite veinlets of botryoidal texture occurring along cracks and grain boundaries of quartz. Some portions of the grey brown part still keep the original texture of basalt represented by the felsitic texture of laths with interstitial voids and fine-grained flakes of goethite. These portions also comprise complicated networks of goethite and quartz, and small patches of goethite aggregates (Photo 4).

Sample collected from the surface: MQ-6	
Macroscopic Observation	Massive pyrite ore. Fine-grained pyrite forming colloform texture.
Microscopic Observation	A mass of fine-grained pyrite comprises aggregates of colloform texture, concentric texture(Photo 5) or relicts of felsitic texture. Crystals of marcasite, the size of which is from 3 μ m to 100 μ m, occur in several places of pyrite aggregates along cracks and small cavities. Except for iron sulphides, no other sulphide minerals are observed.

Sample collected from the surface: MQ-8	
Macroscopic Observation	Magnetite-bearing dark color layered rock without sulphides.
Microscopic Observation	No significant differences are observed in constituent minerals, textures and sized throughout the polished surface. The constituent minerals are mainly hematite, magnetite and quartz. Hematite is generally less than 3 μ m in size, but magnetite is from 5 μ m to a maximum of 30 μ m. Grain size of quartz, which forms mosaic aggregates, ranges from 5 μ m to 20 μ m. Dark color bands comprise a great number of fine irregular grains of hematite densely distributed in mosaic aggregates of quartz with a few marmatized magnetite, occupying a quarter to one third of the polished area. Reddish brown bands, as same as the dark color bands, consist of hematite and quartz, but with less number of bands and grain size.

Sample collected from the surface: MQ-10	
Macroscopic Observation	Magnetite-bearing reddish brown layered rock without sulphides.
Microscopic Observation	Although the constituent minerals and texture are similar to those of MQ-8, but with smaller grain in size and less number of grains. Hematite replaces the majority of opaque minerals. Magnetite relicts are observed in some larger hematite grains, which are completely intact or slightly oxidized to hematite along small cracks in crystals. A small amount of minute pyrite inclusions are recognized in magnetite grains.

Sample collected from the surface: SE-2	
Macroscopic Observation	Silicified rock with slender goethite veinlets and some small cavities filled with pyrite.
Microscopic Observation	Several thin goethite veinlets penetrate the silicified rock. A few square aggregates of goethite which are possibly pseudomorph after pyrite, occur in quartz aggregates (Photo 6). Some euhedral crystals of pyrite (size between 60 to 100 μ m and fairly porous) occur is quartz. Goethite in veinlets and cavities comprises botryoidal texture or concentric texture with pale grey white fibrous crystals and pale brownish white porous powder portions.

Sample collected from drill cores: G18-254.70	
Macroscopic Observation	Massive sulphide ore with patches of pyrite (1～2mm in diameter). The matrix consists of fine-grained pyrite and some amounts of chalcopyrite.
Microscopic Observation	Pyrite occurs predominantly with some amounts of chalcopyrite. Euhedral crystals of pyrite range in size from 50 μ m to 1mm. On the other hand, minute anhedral grains of pyrite are roundish and with a size of less than 10 μ m. Chalcopyrite occurs filling the interstices of pyrite grains or wrapping small pyrite grains (Photos 7). Larger crystals are often intensively brecciated (Photo 8) and some parts of these cracks are filled with chalcopyrite.

Sample collected from drill cores: G18-256.80	
Macroscopic Observation	Banded ore with fine-grained pyrite bands and dark reddish brown siliceous bands. Pyrite occupies three quarters of the polished surface. Weakly magnetic
Microscopic Observation	Anhedral round grains and colloform-textured aggregates of pyrite, small patchy aggregates of minute magnetite grains and a small amount of chalcopyrite constitute thin bands. The relative abundance of these minerals differs from band to band, however, the size of the grain of pyrite and magnetite is distributed in a certain range dependent on the band, being the pyrite range much larger than magnetite. Pyrite is distributed in size from less than 10 μ m to 400 μ m, being most abundant in the range from 50～150 μ m. Some aggregates of minute pyrite grains represent ring-shaped colloform texture. Aggregates of minute magnetite grains fill up the center of some colloform-textured pyrite aggregates. Larger grains of pyrite are often porous. Chalcopyrite occurs in quartz forming small patches and filling the interstices of pyrite and magnetite grains.

Sample collected from drill cores: G18-259.30	
Macroscopic Observation	Banded ore with intermediate or fine-grained pyrite and fine-grained magnetite and reddish brown siliceous bands. Pyrite and magnetite bands occupy four fifths of the polished surface. Strongly magnetic.
Microscopic Observation	Although the structure and texture are similar to those of the sample G18-256.80, magnetite occurs abundantly, especially in patches of 300～500 μ m in size (Photo 9). The patches which consist of fine granular grains of 1～15 μ m in size, are porous and containing many pyrite grains and also rarely minute grains (1～25 μ m in diameter) of hematite. In quartz enclosing these magnetite patches are recognized many minute hematite flakes of less than a few micrometers. Pyrite crystals are also porous. Very fine pyrite grains occur sporadically in quartz. Relative amount of pyrite and magnetite is almost same. A small amount of chalcopyrite occurs in the interstices of pyrite, magnetite and quartz grains.

Sample collected from drill cores: G22-98.40	
Macroscopic Observation	Compact massive sulphide ore comprises sulphide ore. It comprises pyrite of various grain sizes, predominating the larger grains. Chalcopyrite occurs either in the interstices of large grains of pyrite or with fine-grained pyrite of colloform texture.
Microscopic Observation	Massive sulphide ore comprises pyrite grains of large and intermediate size and chalcopyrite (Photo 10). Pyrite grains larger than 1mm are remarkable brecciated and the cracks are filled up with chalcopyrite forming an irregular network. Some pyrite crystals of intermediate or small size are subhedral or euhedral. A breccia veinlet which has a great amount of small breccias of pyrite and chalcopyrite cuts through the massive aggregate of pyrite and chalcopyrite (Photo 11).

Sample collected from drill cores: G22-103.60	
Macroscopic Observation	Compact massive sulphide ore consists of pyrite of various grain sizes and patches as well as veinlets of chalcopyrite. Large grains of pyrite are generally brecciated and rounded. Fine-grained pyrite forms porous colloform texture. Weakly magnetic.
Microscopic Observation	Compared to G22-98.40, this sample is more abundant in colloform-texture pyrite than in crystal. Patchy aggregates of minute magnetite grains accompany the pyrite aggregates. The magnetite aggregates comprise very fine granular grains of 1～10 μ m. Small pyrite rings of colloform texture link to form irregular networks with small subhedral grains of pyrite, being the interstices filled with chalcopyrite (Photo 12).

Sample collected from drill cores: G26-82.00	
Macroscopic Observation	Massive ore mixture of magnetite, pyrite and chalcopyrite. Round grains of pyrite distribute in magnetite-quartz base. Pyrite grains are generally round and distribute in a fairly limited range of size. Magnetite forms radial or parallel aggregates of flaky crystals and includes small grains of pyrite. Chalcopyrite occurs in irregular forms of various sizes filling the interstices of the grains of other minerals. Strongly magnetic.
Microscopic Observation	Pyrite occurs in quartz aggregates as round anhedral grains in the size range of 10～600 μ m, but mainly between 50～150 μ m. Some of them are brecciated. Enclosing these pyrite grains, magnetite aggregates occur as radial or parallel bundles of long flaky crystals. Small bunches of magnetite crystals occur in chalcopyrite (Photo 13). Small flakes of hematite (10～300 μ m in length) and small grains of pyrite (5～150 μ m in diameter) are included in some places. Chalcopyrite fills up the interstices of crystals and bundles of these two minerals.

Sample collected from drill cores: G26-85.80	
Macroscopic Observation	Massive magnetite ore with some dissemination of small pyrite grains. Strongly magnetic.
Microscopic Observation	Mode of occurrence of minerals is similar to that of G26-82.00, but it lacks chalcopyrite. Long flaky crystals of magnetite are much larger than those of G26-82.00. Hematite crystals are also larger (100～600 μ m in length) and occur more abundantly (Photo 14). In some places, magnetite flakes make a rossete-like arrangement. Pyrite is much less abundant.

Sample collected from drill cores: G30-121.80	
Macroscopic Observation	Copper-rich massive ore. Chalcopyrite occupies about one third of the polished surface. Large crystals of pyrite show a smooth surface, however, the surface of the aggregates of pyrite is somewhat rough.
Microscopic Observation	Large subhedral or rounded crystals of pyrite range in size between 50～500 μ m, and occur in gangue with chalcopyrite. A breccia veinlet cuts through the assemblage of chalcopyrite, pyrite and gangue. Besides these crystals, nodule-like aggregates of pyrite (maximum diameter of several hundred μ m) are observed in some parts. Crystal of pyrite are about 100～300 μ m in the periphery of the nodule, but become as small as 10 μ m in the inner side. Small nodule-like aggregates of minute pyrite grains (10～30 μ m in diameter) distribute in the chalcopyrite matrix (Photo 15). Chalcopyrite also fills the interstice of pyrite grains forming a complicated network (Photo 16). Larger modules contain many small blebs of chalcopyrite. Textures of pyrite aggregates suggest that the aggregates have recrystallized from chalcopyrite-bearing pyrite colloids.

Sample collected from drill cores: G30-125.10	
Macroscopic Observation	Copper-rich massive ore. Chalcopyrite occupies more than half of the polished surface. Pyrite crystals are generally large and partly fractured. Some central parts of pyrite aggregates show colloform texture but in small amounts.
Microscopic Observation	The general texture is similar to that of the sample G30-121.80. Some large pyrite crystals are euhedral and as large as 800 μ m in size. Many large pyrite crystals are irregularly fractured and filled with chalcopyrite forming complicated networks in pyrite (Photo 17). In some parts, pyrite forms links of small modules, indicating the relict of colloform texture.

Sample collected from drill cores: G30-187.70	
Macroscopic Observation	Copper-poor massive pyrite ore. Anhedral pyrite crystals cover more than half of the polished surface and the result is occupied by aggregates of fine pyrite grains with some minute pyrite grains forming fine mesh-like texture in quartz. The sample shows a vague sub-parallel banded structure made by zones of coarse pyrite crystals, zones of porous fine pyrite grains and zones of pyrite and gangue. Chalcopyrite is hardly identified by the naked eyes.
Microscopic Observation	Mosaic aggregates of coarse pyrite crystals partly accompany extended zones of porous aggregates of fine pyrite grains. The transition of these zones is gradual. Linked arrays of very fine pyrite grains (2~8 μ m in diameter) in quartz or small concentric nodules of fine pyrite grains indicate the colloidal origin. Chalcopyrite occurs not only in porous pyrite aggregates as small blebs of irregular shapes, but also in the interstices of pyrite crystals.

Sample collected from drill cores: G33-241.40	
Macroscopic Observation	Large module-like aggregates (up to about 2mm in diameter) consisting of pyrite crystals of varied sizes occupy the major part of the polished surface. Pyrite aggregates of rough polished surface, occur in nodules giving a concentric appearance. Chalcopyrite can hardly be observed by the naked eye.
Microscopic Observation	The periphery of a module comprises coarse subhedral pyrite crystals, the size of which is from 0.5 mm to 4mm, but mostly in the range of 1 to 2 mm. The inner parts have porous zones consisting of aggregates of fine pyrite grains and chalcopyrite inclusions of irregular shapes and gangue. Large pyrite crystals contain many small blebs of chalcopyrite and sphalerite with exsolved chalcopyrite (Photos 18).

Photo. 1
Sample no.: SH-7

Silicified basalt lava

Go: Goethite

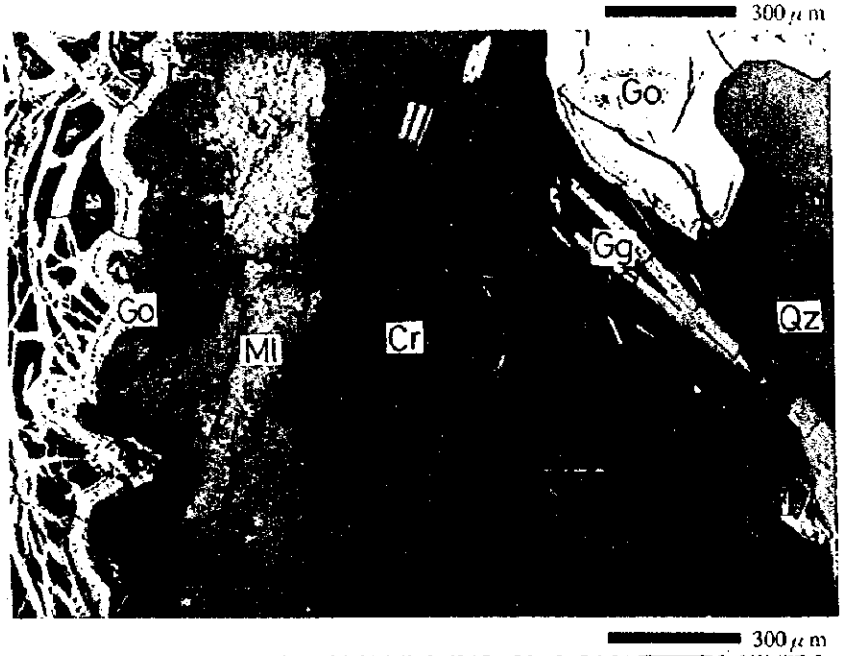


Photo. 2
Sample no.: SH-7

Silicified basalt lava

Go: Goethite
Ml: Malachite
Cr: Chrysocola
Gg: Gangue
Qz: Quartz

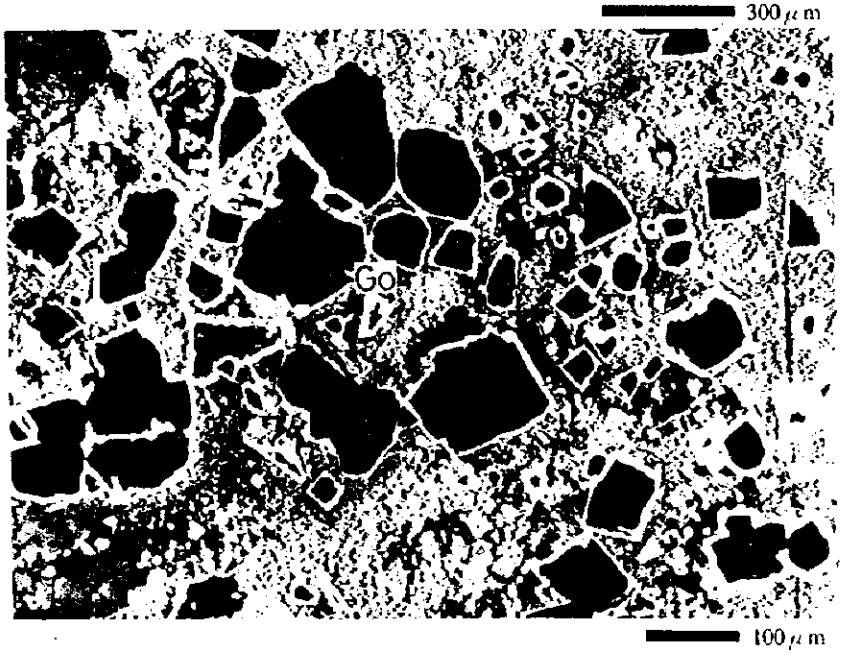


Photo. 3
Sample no.: SH-11

Gossanized rock with limonite vein

Go: Goethite

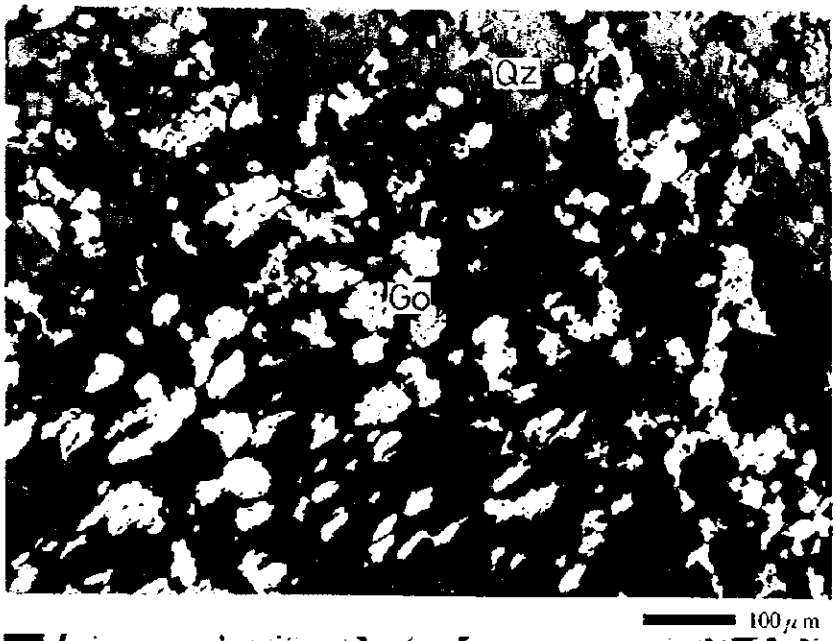


Photo. 4

Sample no.: SH-12

Gossanized metalliferous sediments

Go: Goethite
Qz: Quartz

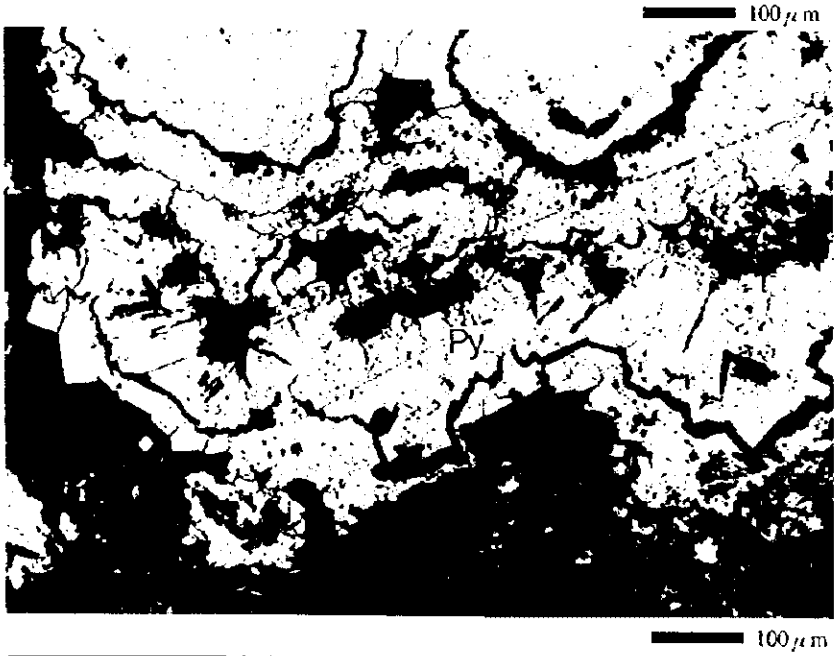


Photo. 5

Sample no.: MQ-6

Massive pyrite ore

Py: Pyrite

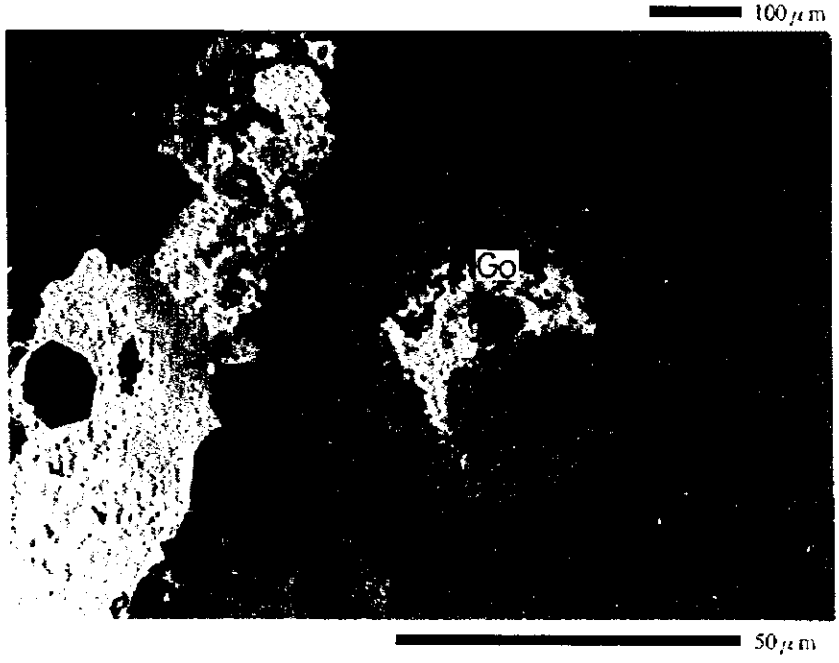


Photo. 6

Sample no.: SE-2

Silicified rock with quartz veinlets

Go: Goethite

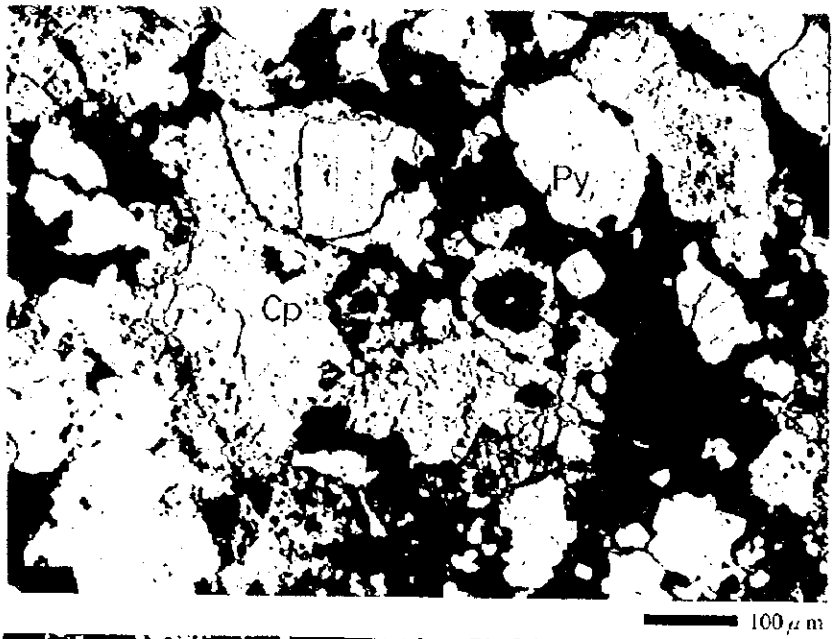


Photo. 7
Bore hole no.: G18
Depth: 254.70m
Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

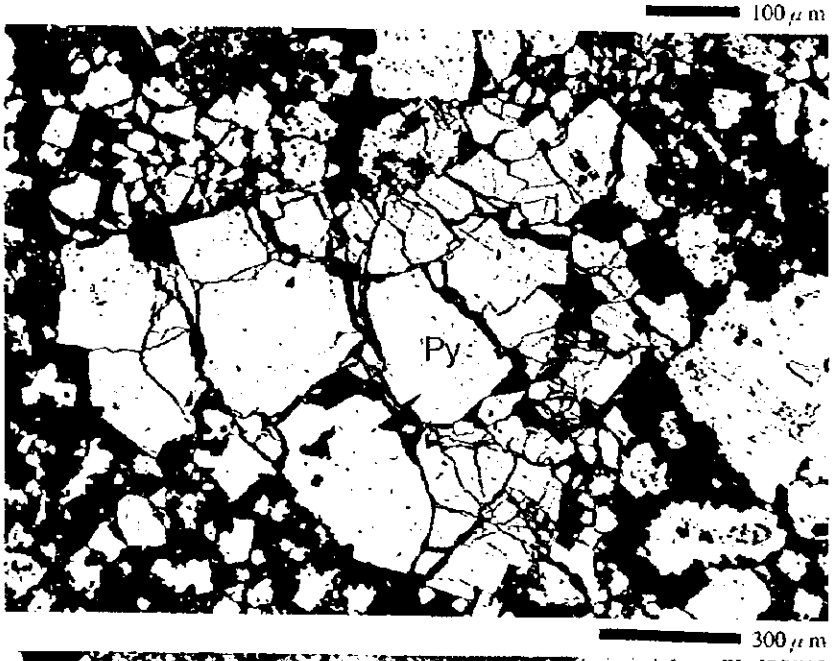


Photo. 8
Bore hole no.: G18
Depth: 254.70m
Massive sulphide ore

Py: Pyrite

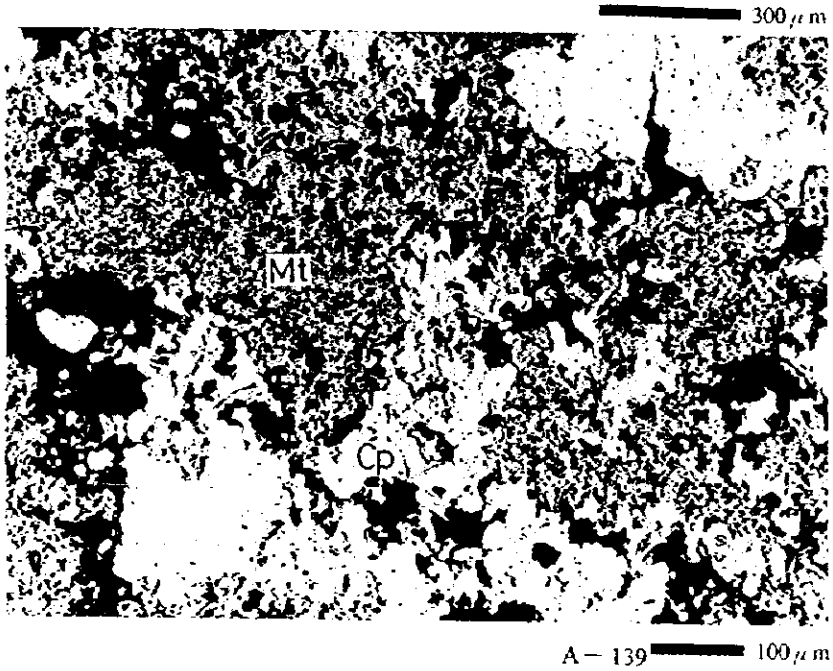


Photo. 9
Bore hole no.: G18
Depth: 259.30m
Massive sulphide ore

Cp: Chalcopyrite
Mt: Magnetite

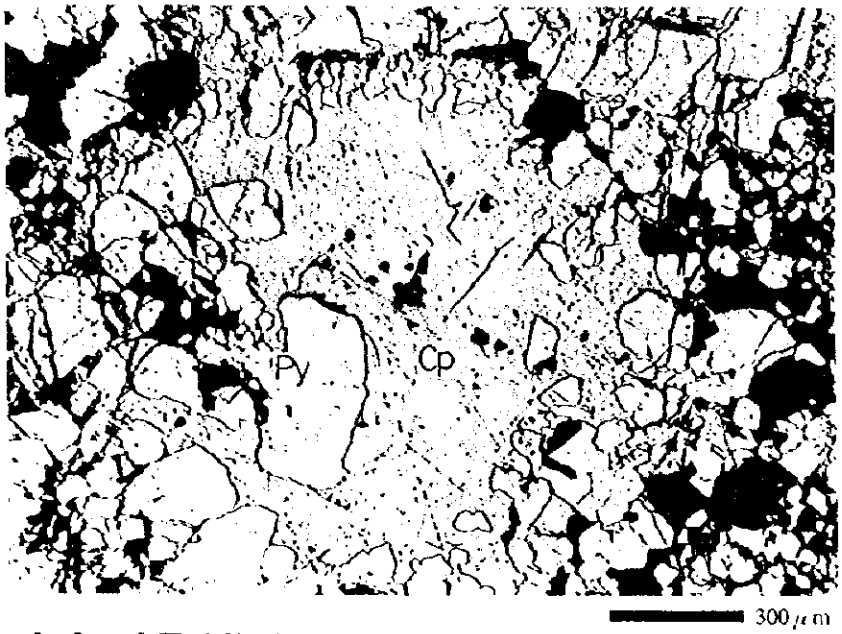


Photo. 10
Bore hole no.: G22
Depth: 98.40m
Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

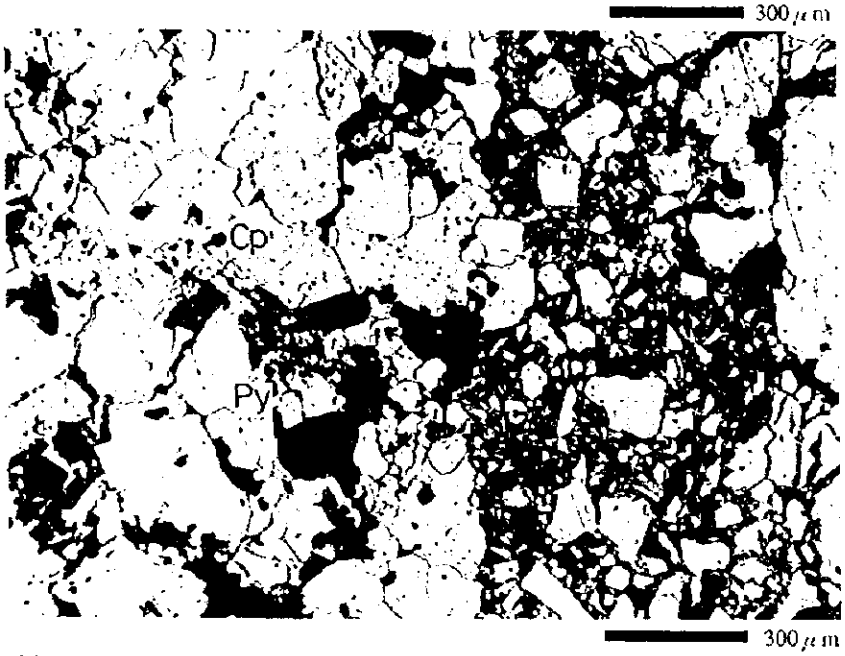


Photo. 11
Bore hole no.: G22
Depth: 98.40m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

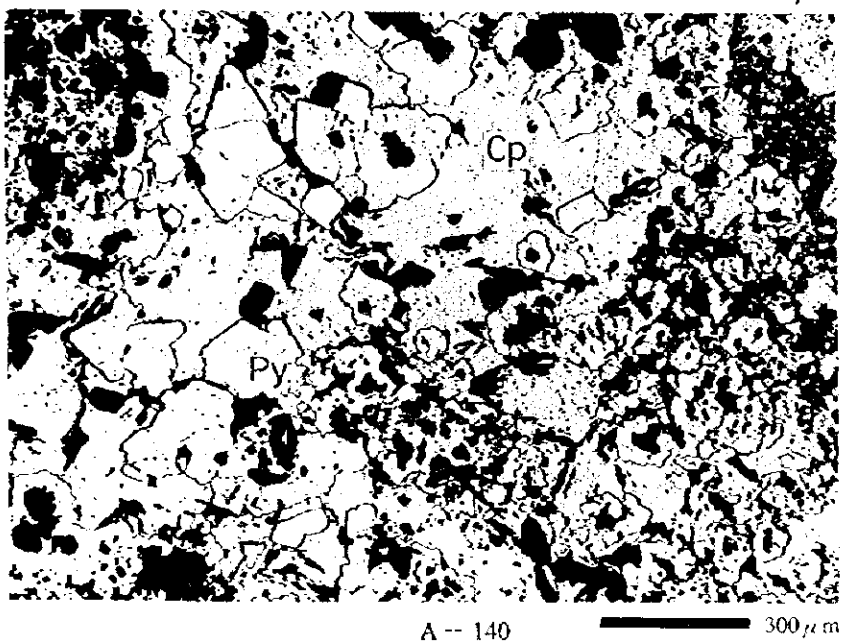


Photo. 12
Bore hole no.: G22
Depth: 103.60m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

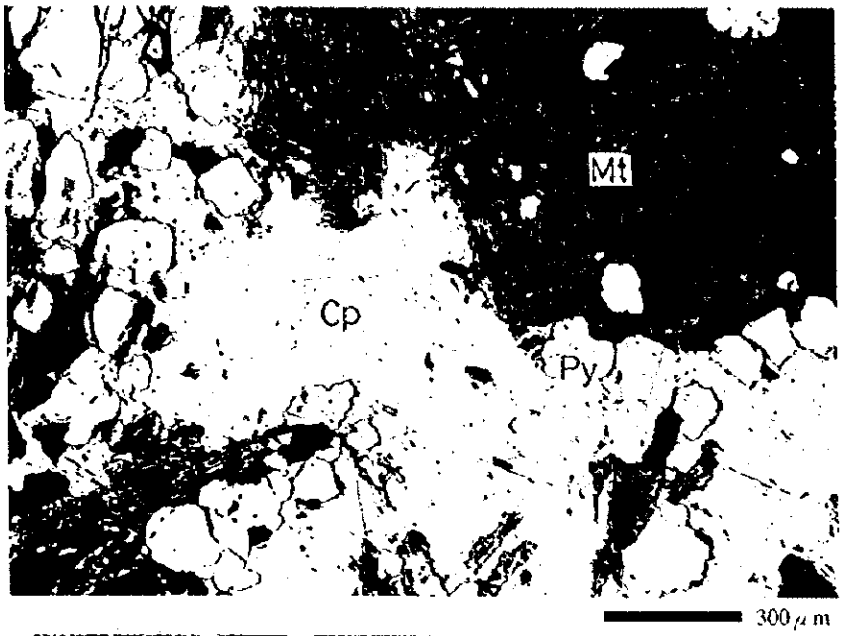


Photo. 13

Bore hole no.: G26
Depth: 82.00m

Massive magnetite ore

Py: Pyrite
Cp: Chalcopyrite
Mt: Magnetite

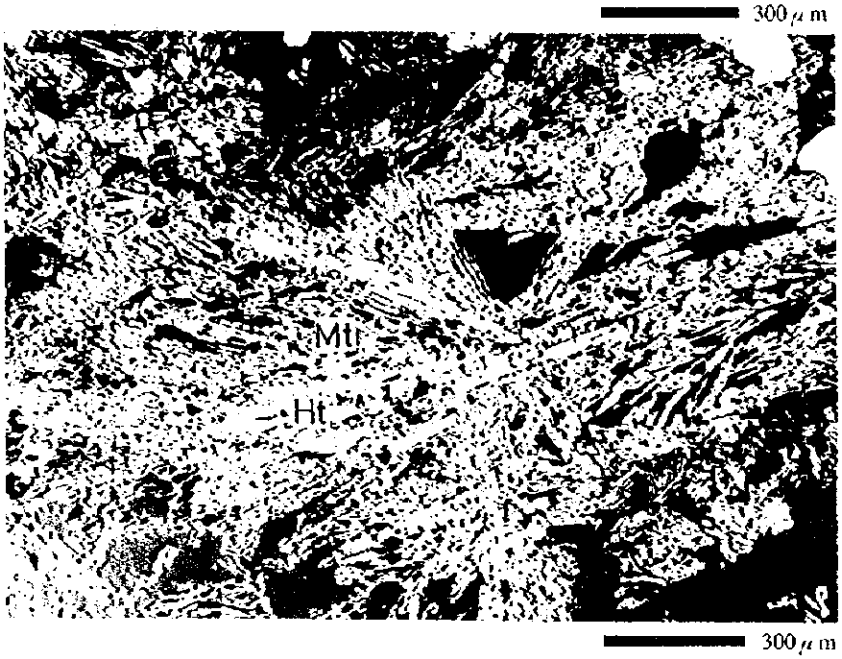


Photo. 14

Bore hole no.: G26
Depth: 85.00m

Massive magnetie ore

Mt: Magnetite
Ht: Hematite

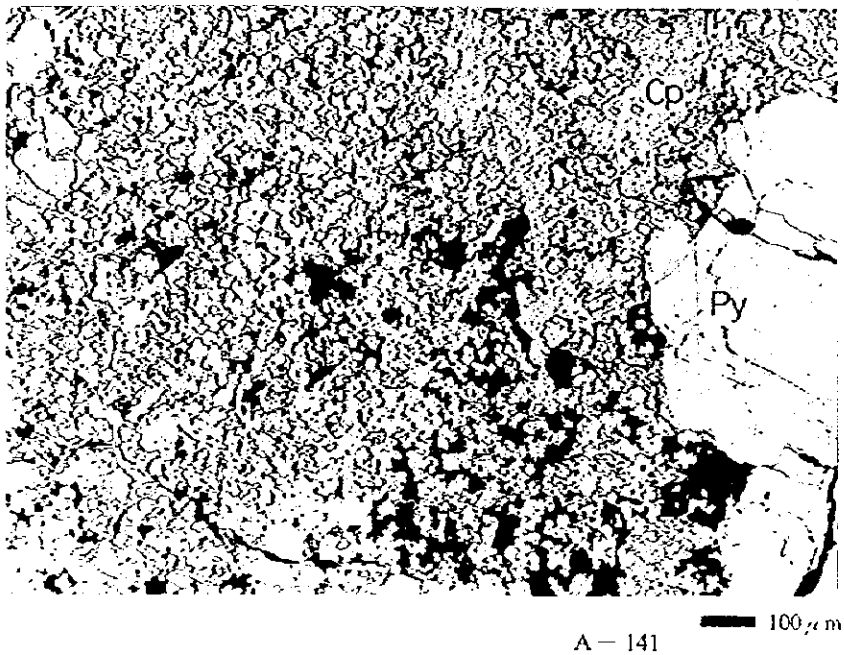


Photo.15

Bore hole no.: G30
Depth: 121.80m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

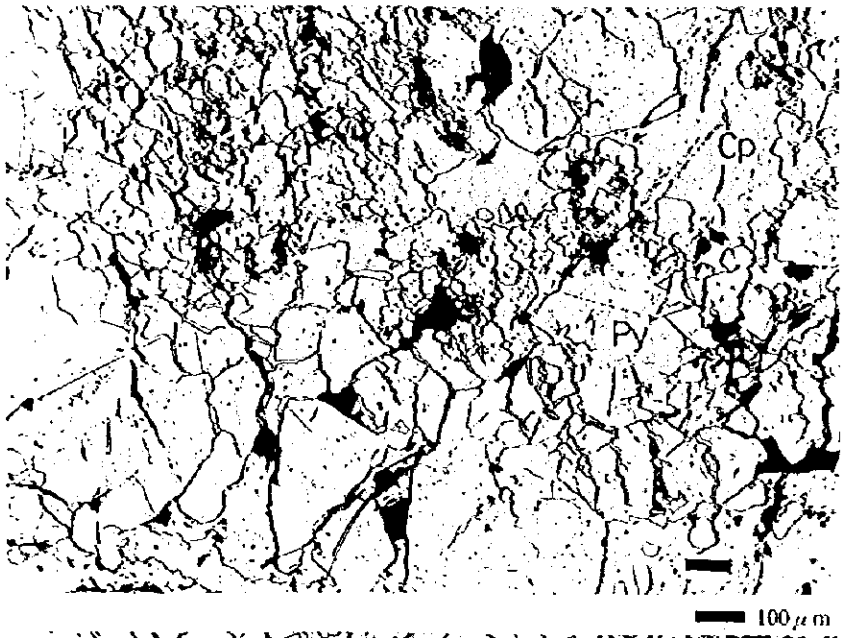


Photo.16
Bore hole no.: G30
Depth: 121.80m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

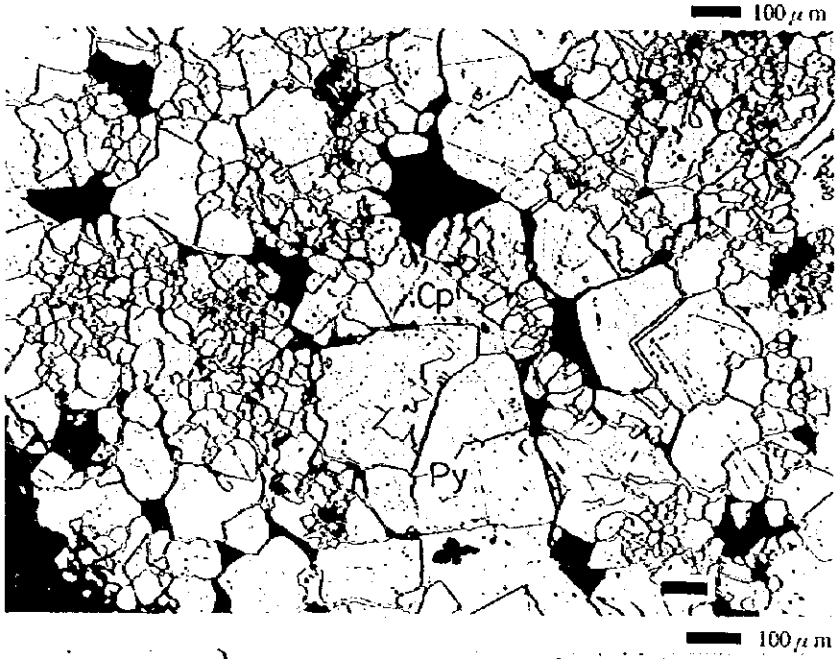


Photo.17
Bore hole no.: G30
Depth: 125.10m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite

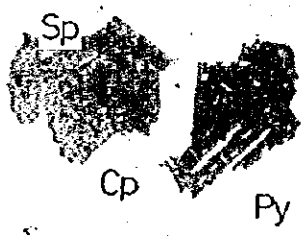


Photo.18
Bore hole no.: G33
Depth: 241.40m

Massive sulphide ore

Py: Pyrite
Cp: Chalcopyrite
Sp: Sphalerite

50 μm

E4645 E4650 E4655

N26600 N26595

Fault

HK-2 (M,X) yel. bw.~red. bw. Limonitic gossan

HK-3 (M,X) gy.~gy. wh. Altered limestone with gn. copper

HARA KILAB

Mb1

Mylonite

HK-1 (M) dk. bw.~red. bw. Hematitic gossan with highly silicified parts

HK-5 (M) dk. bw.~pale gn. Basaltic lava slightly oxidized & silicified (V1-2)

HK-6 (M) dk. bw. Hematitic gossan

HK-4 (M) dk. bw.~red. bw. Basaltic lava highly oxidized & silicified (V1-1)

HK-7 (M) rd. bw. Metalliferous sediment with gn. copper

Q.V.

SD

V1-2

V1-1

A B

N

0 100 200m

LEGEND

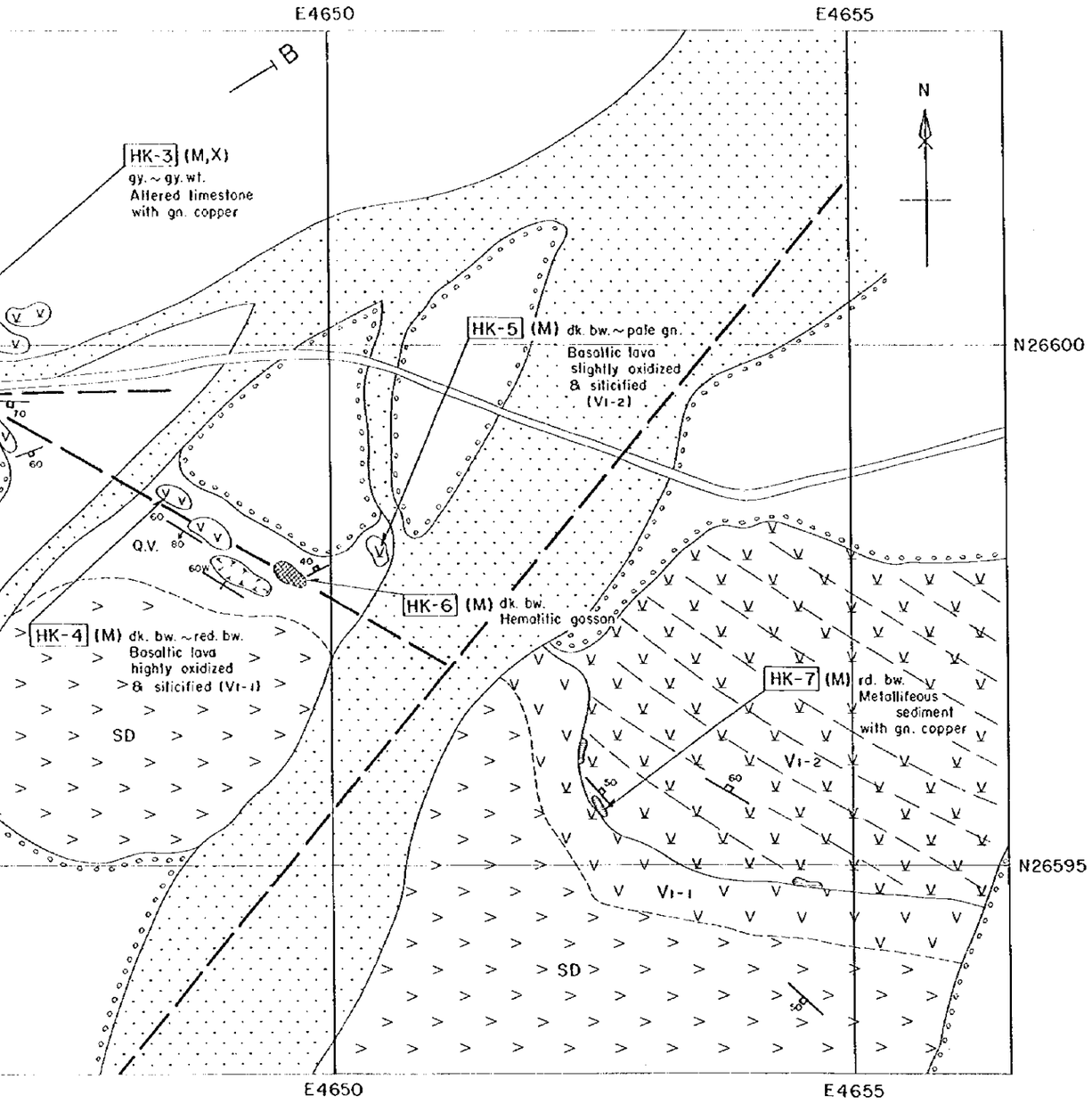
- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 Olistolith derived from the M
  - Si1 Chert and silicified micritic
- SAMAIL VOLCANIC ROCKS
  - V2 Middle extrusives; basaltic to lava and massive lava with
  - V2C Volcanic conglomerate or br rockes composed of SD, V1-
  - U1 Umber or metalliferous sed with radiolarian chert
  - V1-2 Lower extrusives 2; basaltic with small pillow lava and
  - V1-1 Lower extrusives 1; basaltic composed of big size pillow
  - SD Sheeted dyke; doleritic or
- INTRUSIVES
  - CG Cumulate gabbro
  - Td' Trondhjemite or quartz dio
  - Gu' Gabbro
- Stag

ECONOMIC GEOLOGY SYMBOLS

A B

(m) 300 200

(m) 300 200



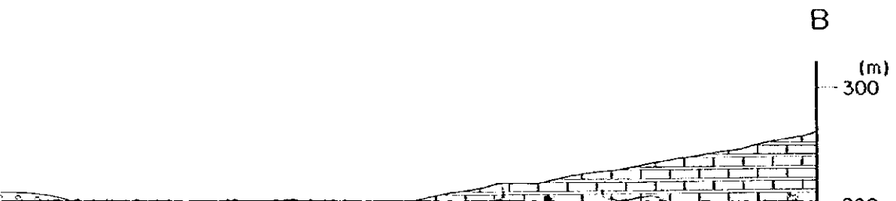


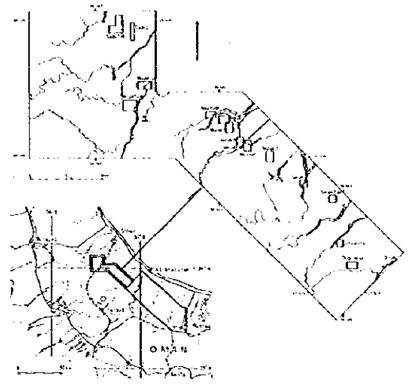
Plate II 1-1

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF HARA KILAB

(Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

- Wadi
- Alluvial fans and alluvium

BATINAH OLISTOSTROME
- Mb1 — Olistolith derived from the Matbat Formation
- Si 1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rockes composed of SD, VI-1, VI-2 and so on
- U1 — Umber or metalliferous sediments with radiolorian chert
- VI-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- VI-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gobbro

- Slag

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed

N26600

N26595

E4645

E4650

E4655

Mylonite

HK-1 (M) dk. bw. ~red. bw. Hematitic gossan with highly silicified parts

HK-4 (M) dk. bw. ~red. bw. Basaltic lava highly oxidized & silicified (VI-1)

HK-5 (M) dk. bw. ~ pale gn. Basaltic lava slightly oxidized & silicified (VI-2)

HK-6 (M) dk. bw. Hematitic gossan

HK-7 (M) rd. bw. Metalliferous sediment with gn. copper

O.V.

SD

VI-1

VI-2

0 100 200m

A

B

(m)

300

200

100

Si I

Mb I

LEGEND

BATINAH OLISTOSTROME

- Wadi
- Alluvial fans and alluvium
- Mb I — Olistolith derived from the M
- Si I — Chert and silicified micritic

SAMAIL VOLCANIC ROCKS

- V2 — Middle extrusives; basaltic to lava and massive lava with
- V2C — Volcanic conglomerate or br rockes composed of SD, VI-
- U I — Umber or metalliferous sed with radiolarian chert
- VI-2 — Lower extrusives 2; basaltic with small pillow lava and
- VI-1 — Lower extrusives 1; basaltic composed of big size pillow

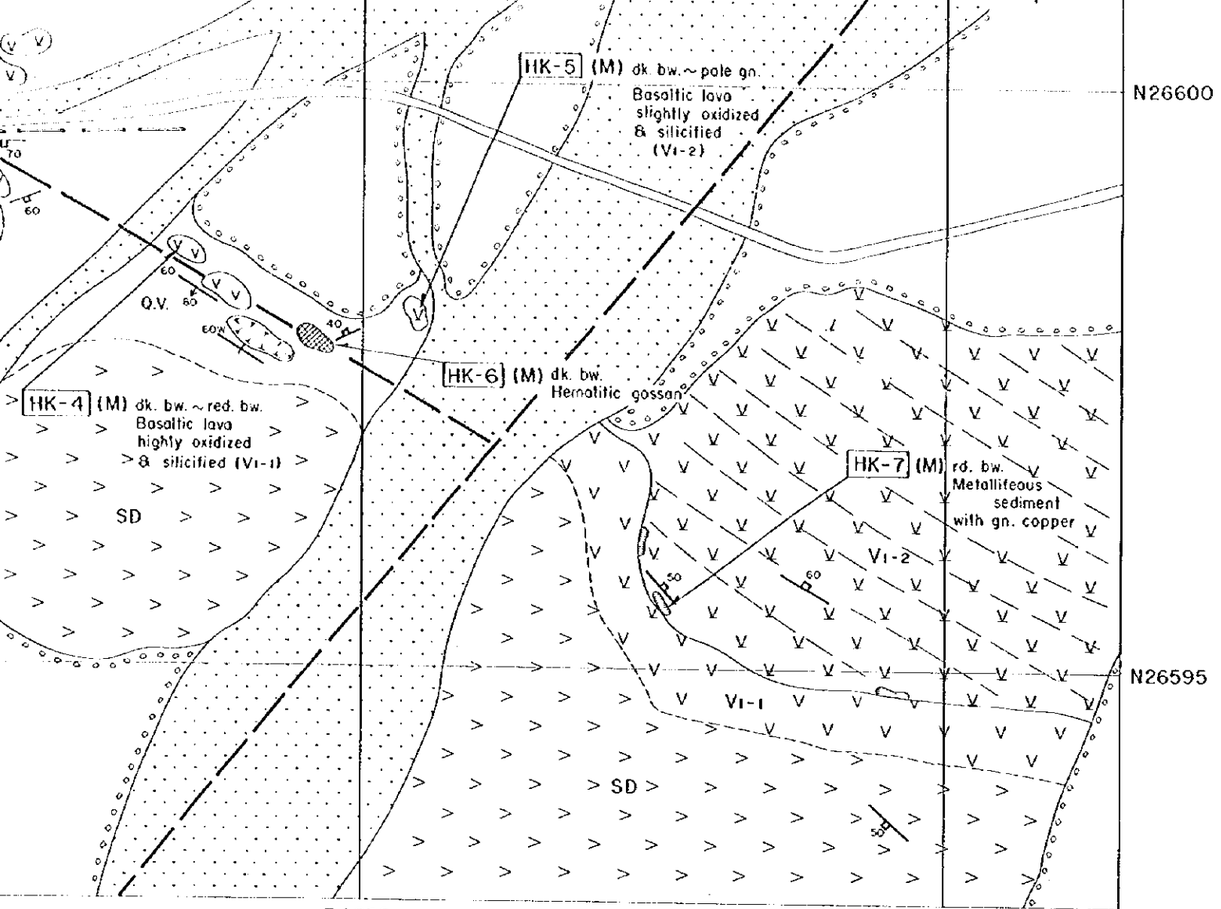
INTRUSIVES

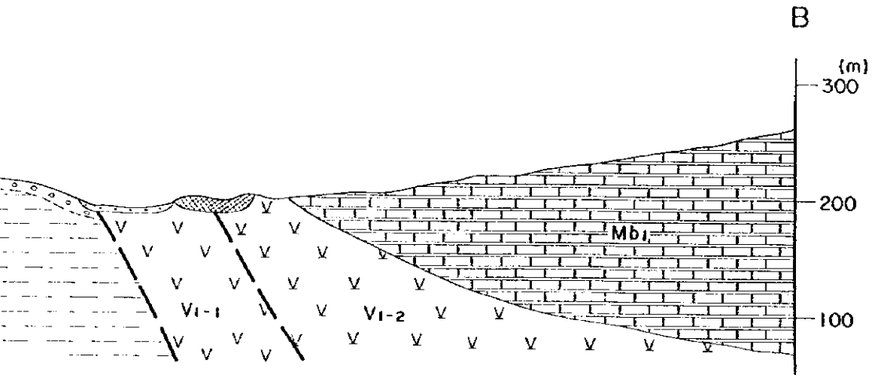
- SD — Sheeted dyke; doleritic or
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz dio
- Gu' — Gabbro

Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral s and name of mineral showi
- Quartz vein and network





LEGEND

- Wadi
- Alluvial fans and alluvium

BATINAH OLISTOSTROME

- Mb1 — Olistolith derived from the Matbat Formation
- Si1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS

- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rockes composed of SD, VI-1, VI-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- VI-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- VI-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava

INTRUSIVES

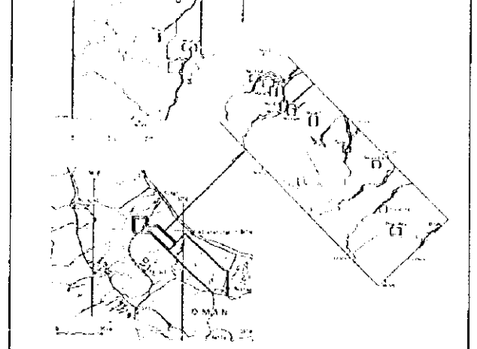
- SD — Sheeted dyke; doleritic and basaltic dyke
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis



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METAL MINING AGENCY OF JAPAN
MARCH, 1998

E4660 E4665 E4670 E4675

N26595 N26595

N26590 N26590

MAHAB-6

MAHAB-5

MB-1 (M) gy. ~ dk. bw.
Silicified rock
with Ep (V1-1)

MB-2 (M)
yel. bw. ~ pale gn. gy.
Altered basaltic lava (V1-2)

MB-3 (M) yel. bw. ~ bw.
Silicifid basaltic lava
N55W 70S frac. develop

MB-4 dk. bw ~ red. bw.
Silicified basaltic lava
(V1-1) N30W frac.

MB-5 (M,X) dk. bw.
Silicified basaltic lava
(V1-1) N20W frac.

MB-6 (M) yel. bw.
Silicified cherty rock
Calcedonic Qz. veinlet

MB-7 (M) bw. ~ wt.
ø 8m gossaniged
Altered basaltic lava

MB-8 (M,X)
yel. bw. ~ bw. wt.
Shear zone ø10cm
Boundary of V1-2 and SD

MB-9 dk. bw. ~ red. bw.
Silicified & Oxidized
basaltic lava (V1-2)

Hf rich red. bw. Metalliferous sediment

SD

V1-1

V1-2

A A'

B

N

0 100 200m

A

B

(m)
300

LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 Olistolith derived from the
  - Si1 Chert and silicified micrite
- SAMAIL VOLCANIC ROCKS
  - V2 Middle extrusives; basaltic lava and massive lava wit
  - V2C Volcanic conglomerate or b rocks composed of SD, V
  - U1 Umber or metalliferous se with radiolarian chert
  - V1-2 Lower extrusives 2; basalt with small pillow lava and
  - V1-1 Lower extrusives 1; basalt composed of big size pillo
- SD Sheeted dyke; doleritic
- INTRUSIVES
  - CG Cumulate gabbro
  - Td' Trondhjemite or quartz d
  - Gu' Gabbro
- Slag

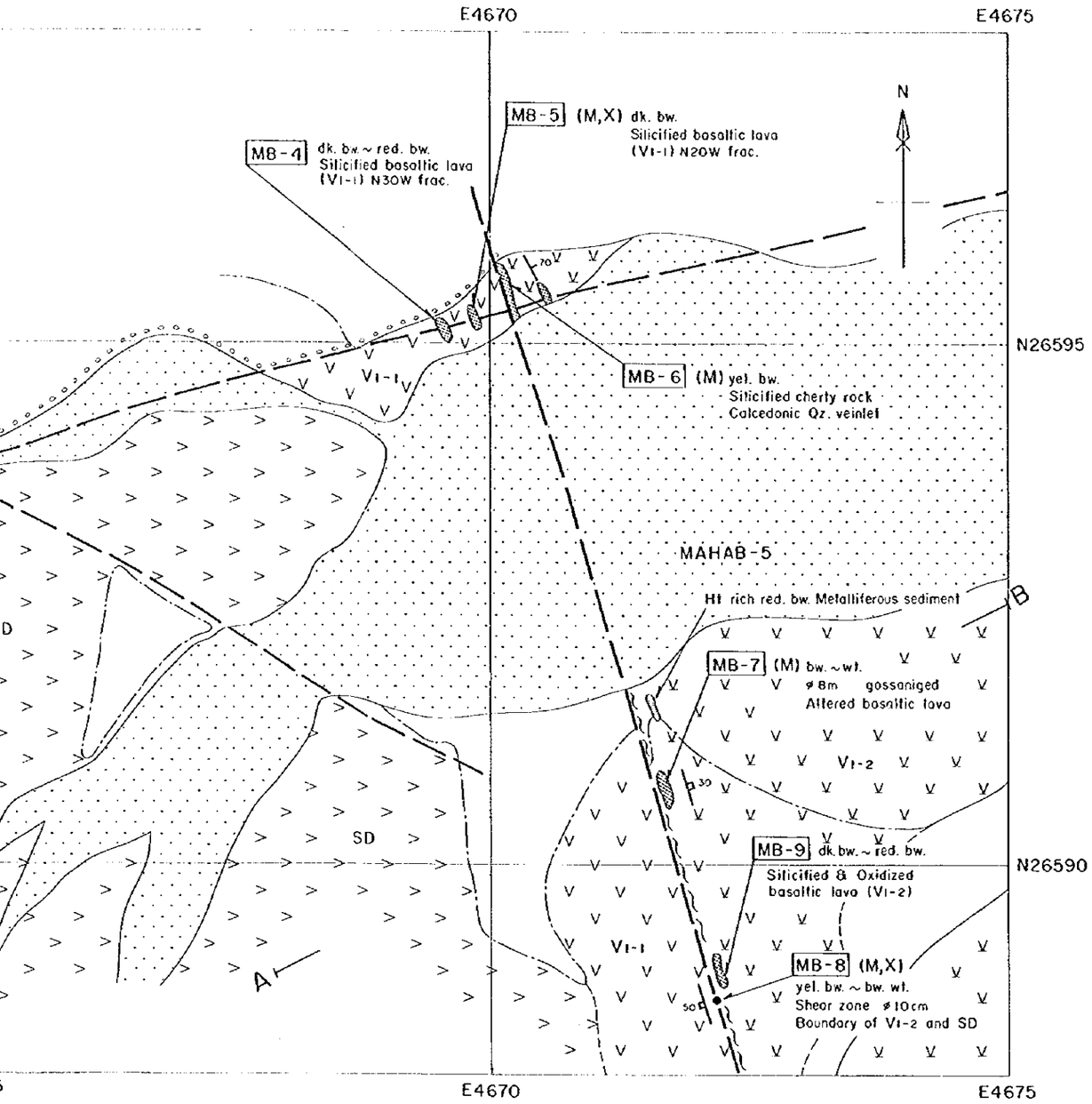


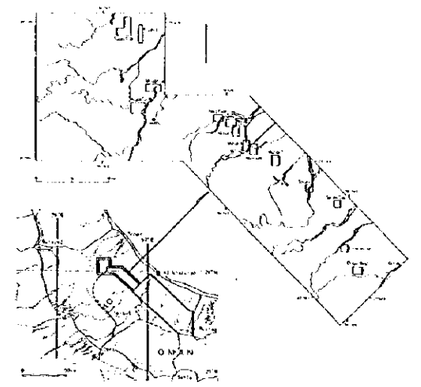
Plate II-1-2

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAHAB 5&6

(Scale 1:2,500)



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METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

- Wadi
- Alluvial fans and alluvium

BATINAH OLISTOSTROME
- Mb1 — Olistolith derived from the Matbat Formation
- Si 1 — Chert and silicified micritic limestone

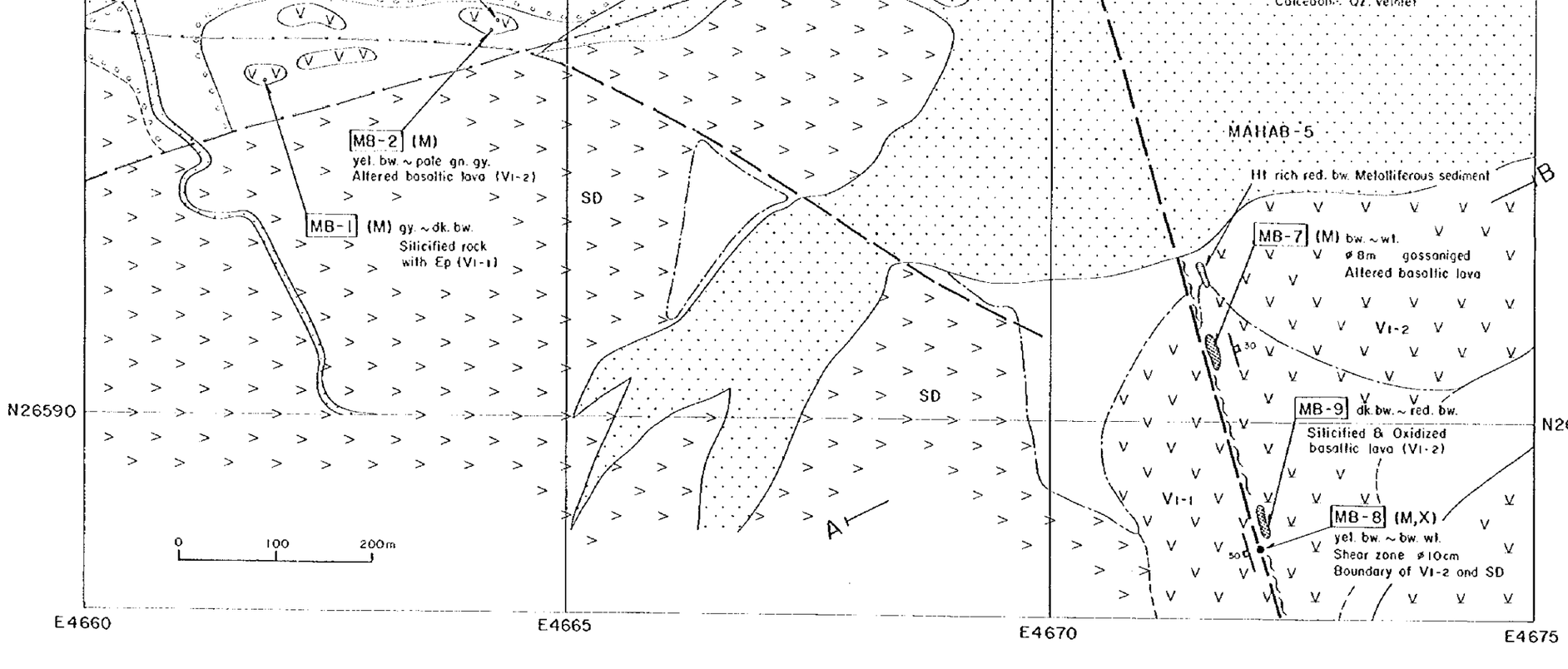
SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

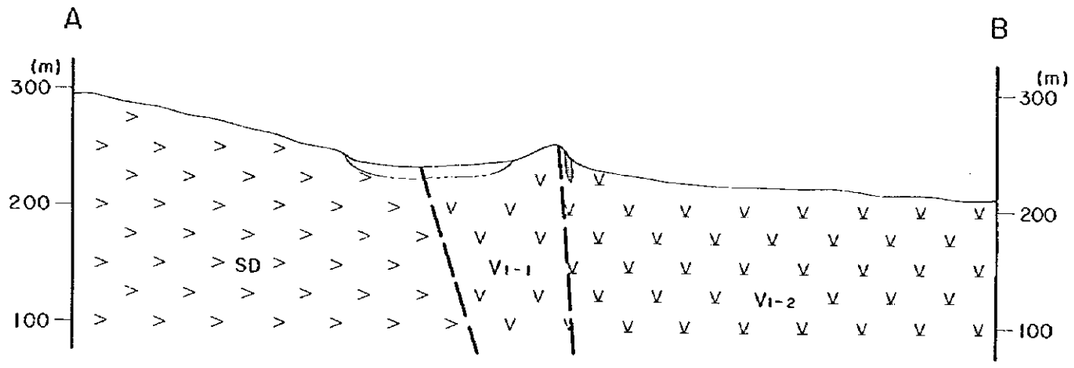
INTRUSIVES
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro

- Slag

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault, dashed where inferred or concealed





LEGEND

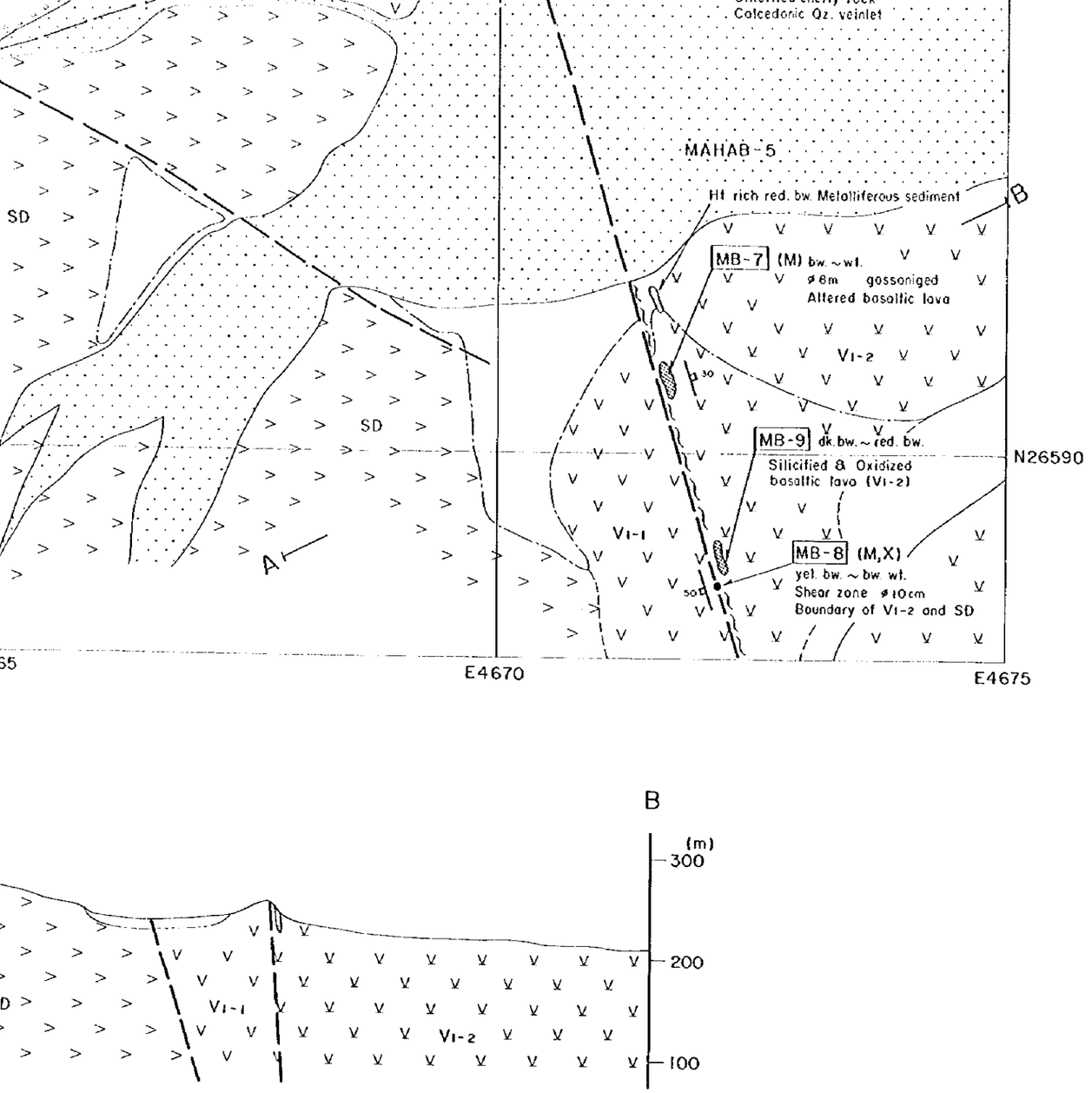
BATINAH OLISTOSTROME
- Mb1 — Olistolith derived from the Mo
- Si1 — Chert and silicified micritic li

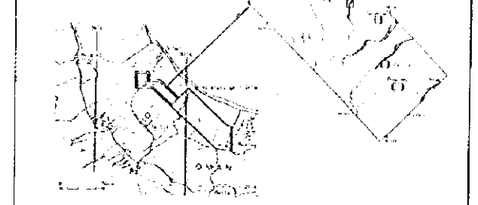
SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to lava and massive lava with t
- V2C — Volcanic conglomerate or brec rocks composed of SD, VI-1,
- U1 — Umber or metalliferous sedim with radiolarian chert
- VI-2 — Lower extrusives 2; basaltic p with small pillow lava and ma
- VI-1 — Lower extrusives 1; basaltic p composed of big size pillow l

INTRUSIVES
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diori
- Gu' — Gabbro

- Slag
- SD — Sheeted dyke; doleritic and
- Wadi
- Alluvial fans and alluvium

ECONOMIC GEOLOGY SYMBOLS
- Gossanized mineral showing
- Small gossanized mineral sho and name of mineral showing
- Quartz vein and network





LEGEND

- Wadi
- Alluvial fans and alluvium

BATINAH OLISTOSTROME
- Mb 1 — Olistolith derived from the Matbat Formation
- Si 1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
- U 1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro

Stag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

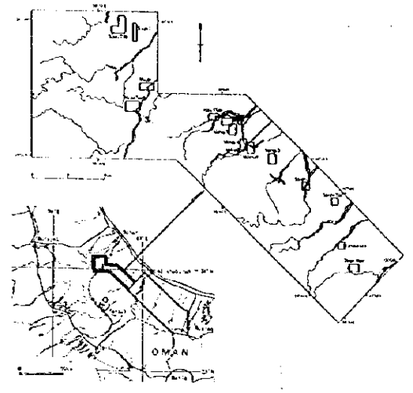
- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAHAB 3

(Scale 1:2,500)



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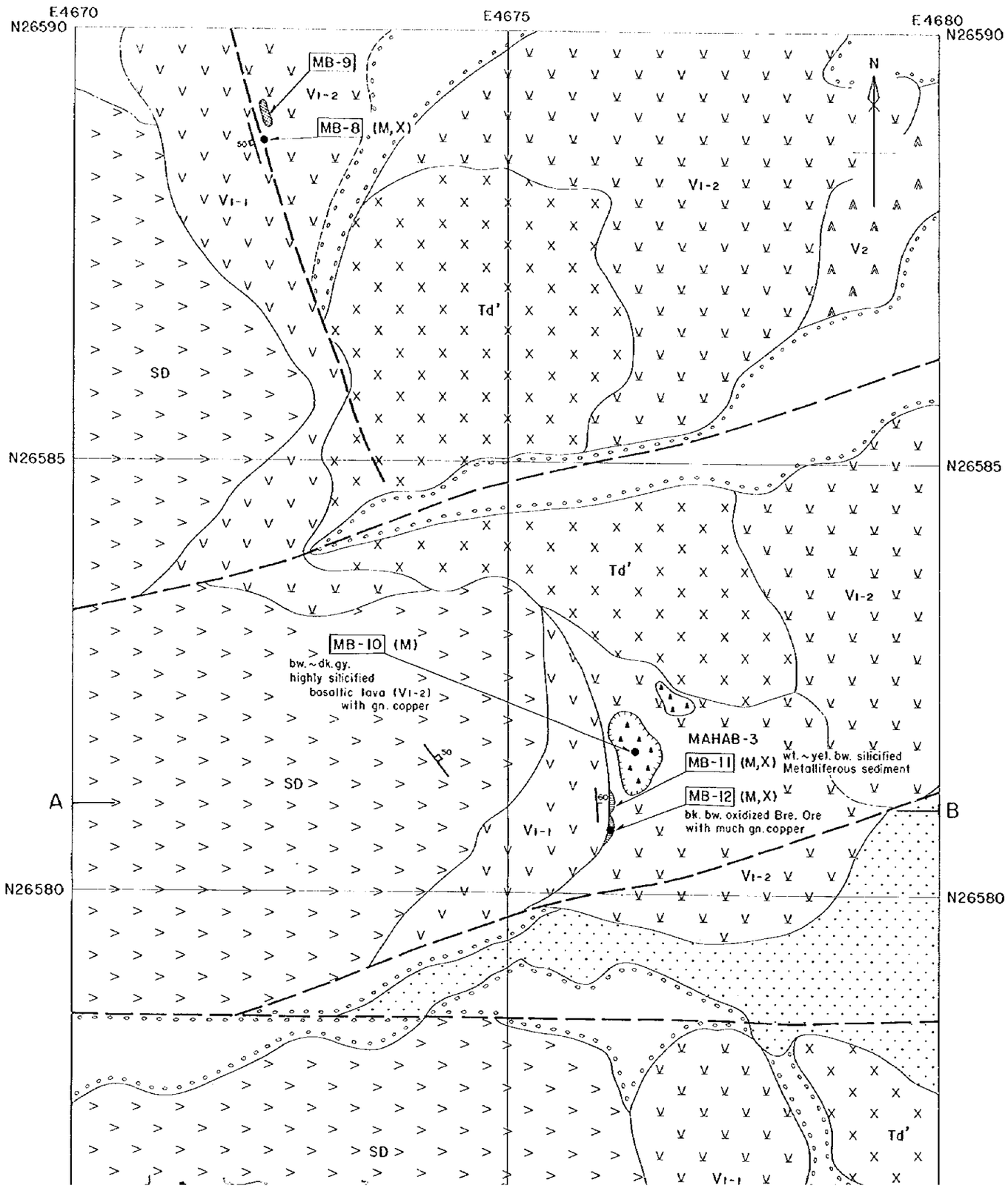
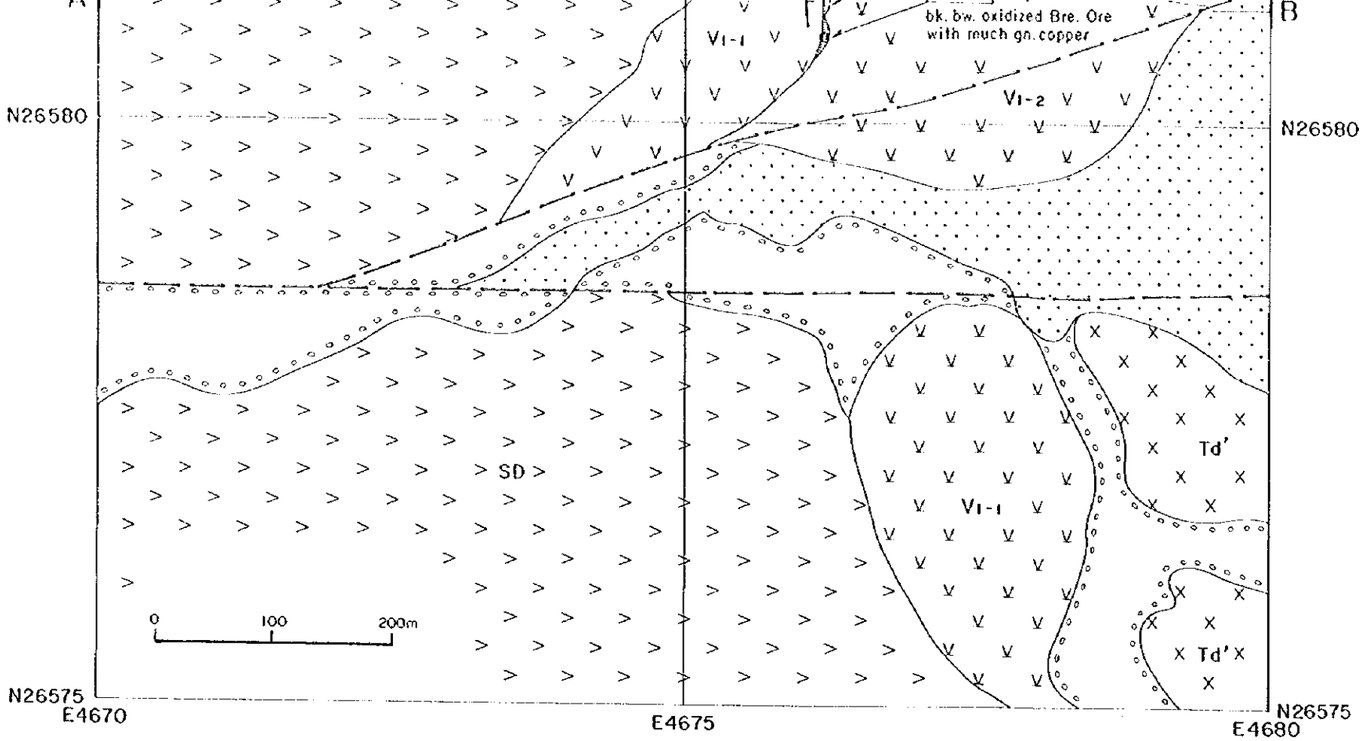
MARCH, 1998

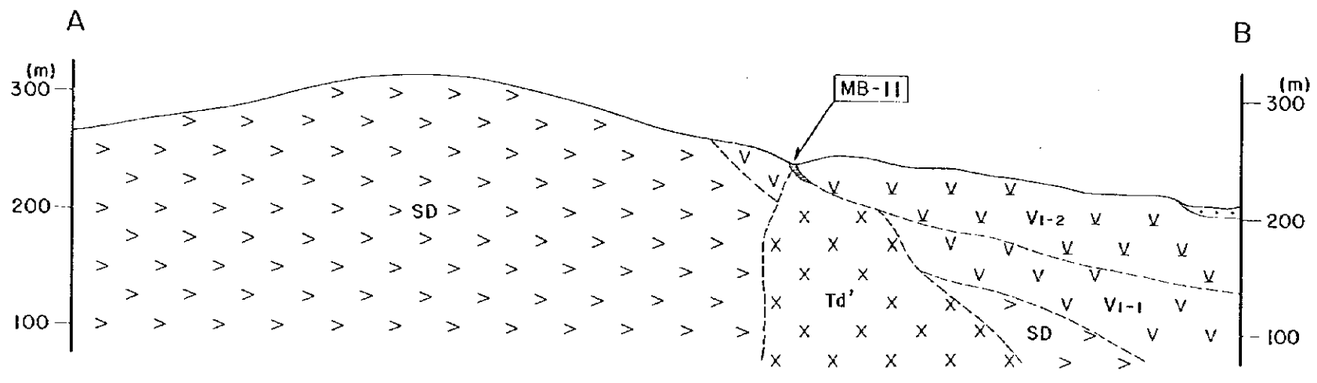


LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME — Mb1: Olistolith derived from the Malbat Formation
- BATINAH OLISTOSTROME — Si1: Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS — V2: Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- SAMAIL VOLCANIC ROCKS — V2C: Volcanic conglomerate or breccia; reworked rocks composed of SD, VI-1, VI-2 and so on
- SAMAIL VOLCANIC ROCKS — U1: Umber or metalliferous sediments with radiolarian chert
- SAMAIL VOLCANIC ROCKS — VI-2: Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- SAMAIL VOLCANIC ROCKS — VI-1: Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD: Sheeted dyke; doleritic and basaltic dyke
- INTRUSIVES — CG: Cumulate gabbro
- INTRUSIVES — Td': Trondhjemite or quartz diorite
- INTRUSIVES — Gu': Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS





SAMAIL VOLCANICS

- Ui — Umber or metalliferous sediments with radiolarian chert
- Vi-2 — Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
- Vi-1 — Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava

INTRUSIVES

- SD — Sheeted dyke ; doleritic and basaltic dyke
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault ; dashed where inferred or concealed

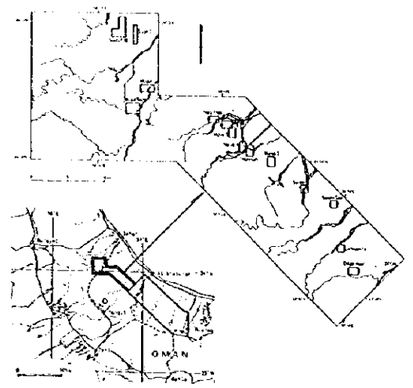
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAHAB 4

(Scale 1:2,500)



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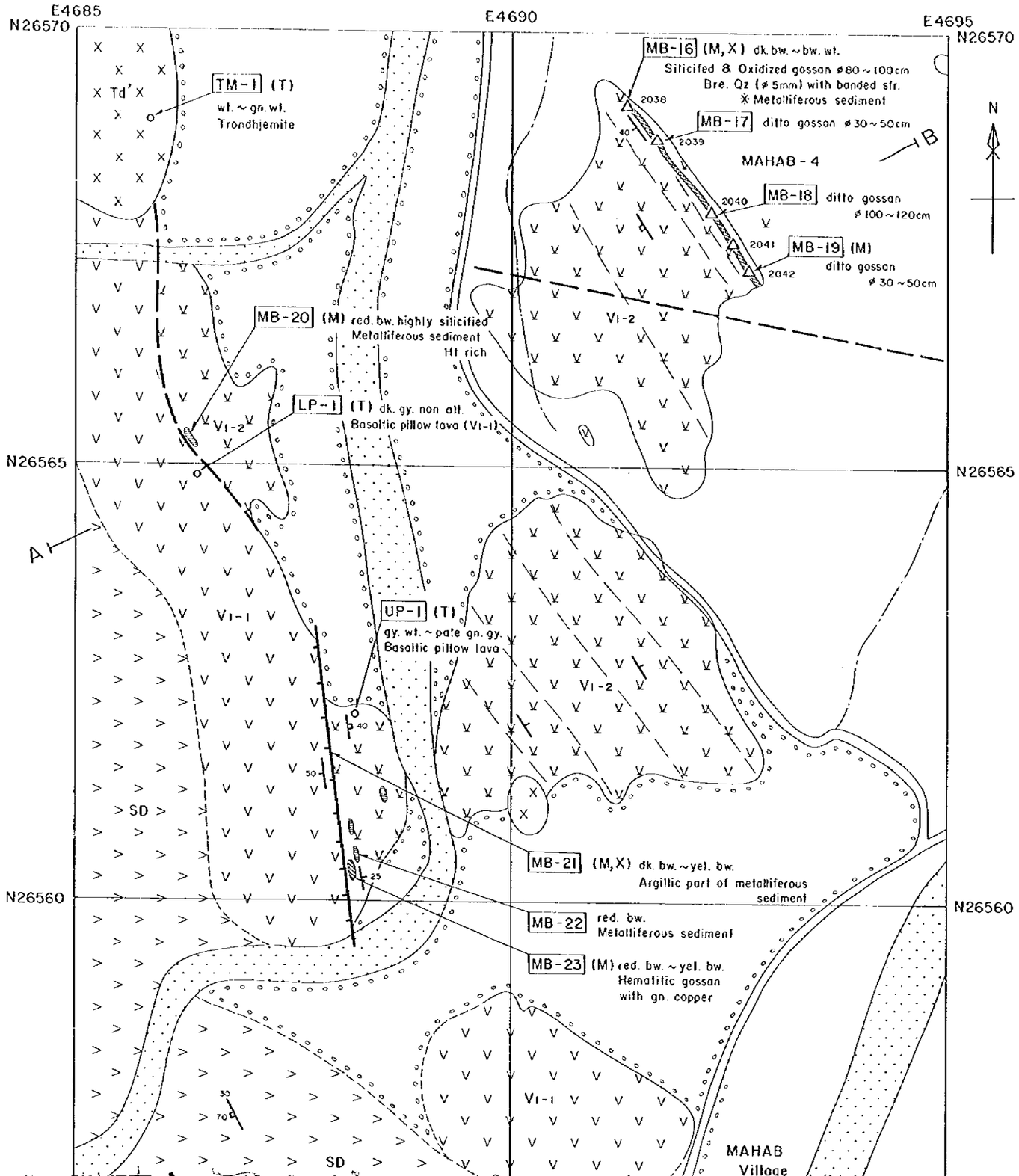
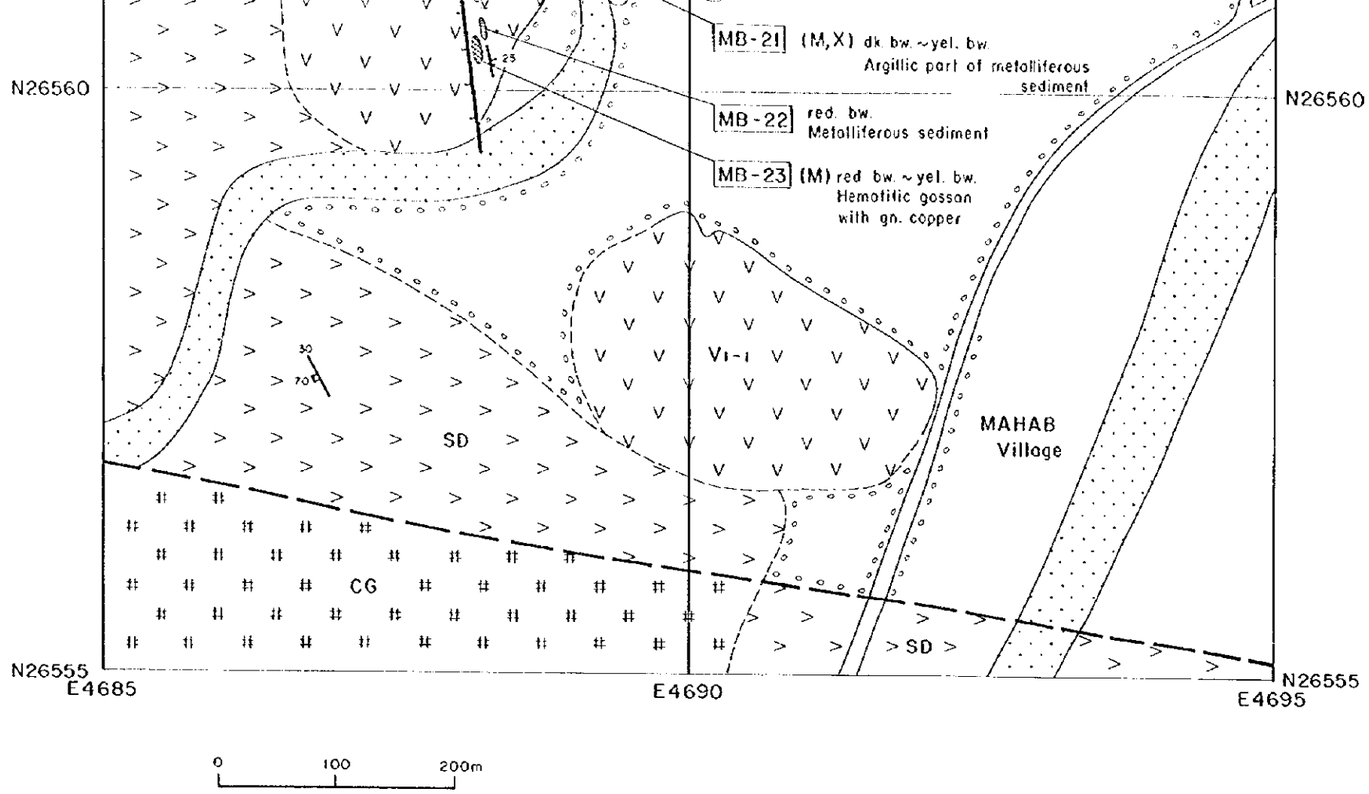
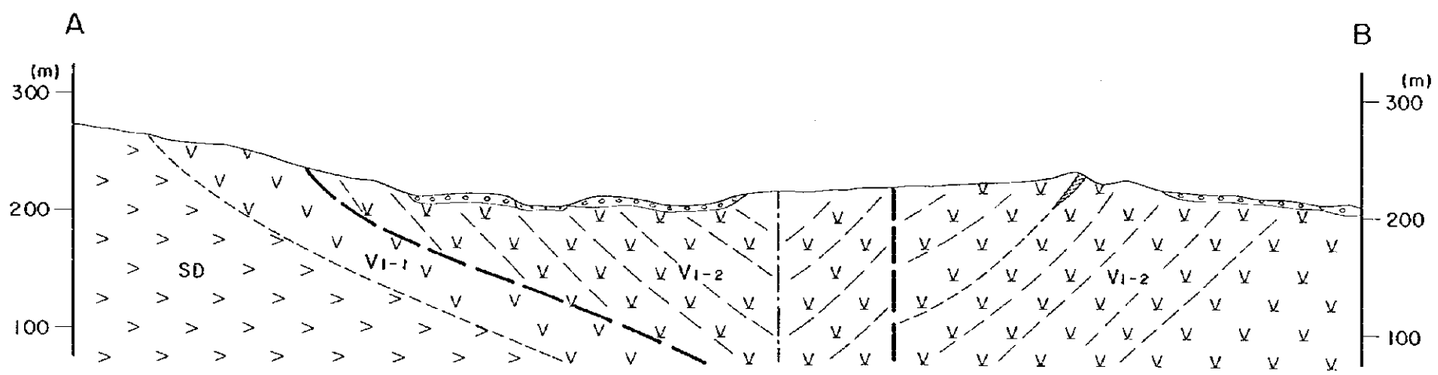


LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 — Olistolith derived from the Matbat Formation
  - Si1 — Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
  - V2C — Volcanic conglomerate or breccio; reworked rockes composed of SD, V1-1, V1-2 and so on
  - U1 — Umber or metalliferous sediments with radiolarian chert
  - V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
  - V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke
- INTRUSIVES
  - CG — Cumulate gabbro
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS





SAMAIL VOLCANICS

- Vl-2 — Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
- Vl-1 — Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke ; doleritic and basaltic dyke
- CG — Cumulate gabbro

INTRUSIVES

- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault ; dashed where inferred or concealed

- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

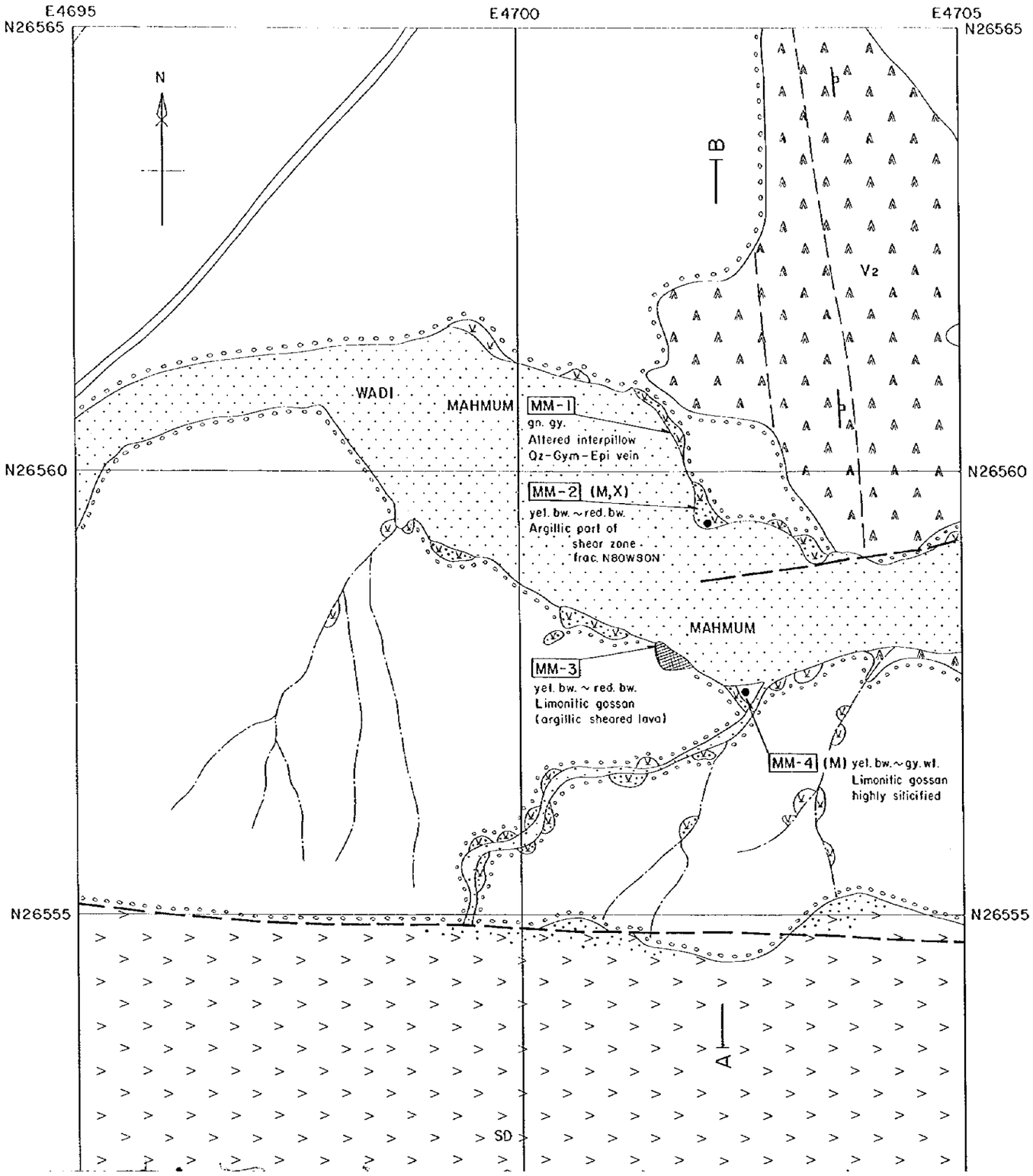


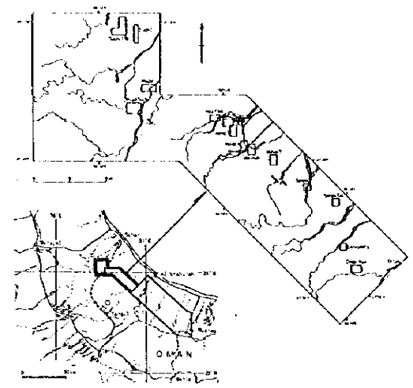
Plate II-1-5

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAHMUM

(Scale 1:2,500)



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METAL MINING AGENCY OF JAPAN
MARCH, 1998

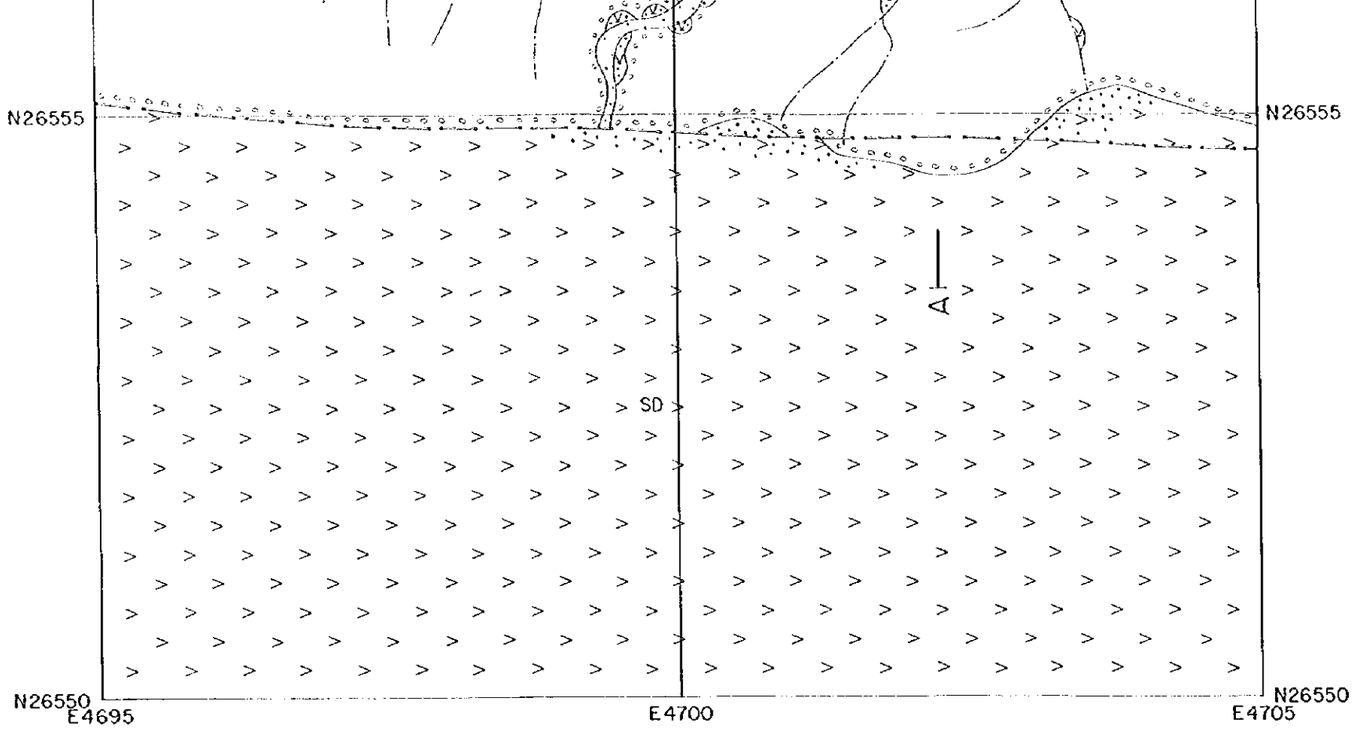
LEGEND

- Wadi
- Alluvial fans and alluvium

BATINAH OLISTOSTROME
- Mb1 — Olistolith derived from the Matbat Formation
- Si1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES
- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro
- Slag



SAMAIL VOLCANICS

- V2 : Upper extrusives ; basaltic pillow lava with radiolarian chert
- V1-2 : Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
- V1-1 : Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
- SD : Sheeted dyke ; doleritic and basaltic dyke
- CG : Cumulate gabbro

INTRUSIVES

- Td' : Trondhjemite or quartz diorite
- Gu' : Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 : Strike and dip of bedding
- 50 : Strike and dip of dykes and sills
- Fault ; dashed where inferred or concealed

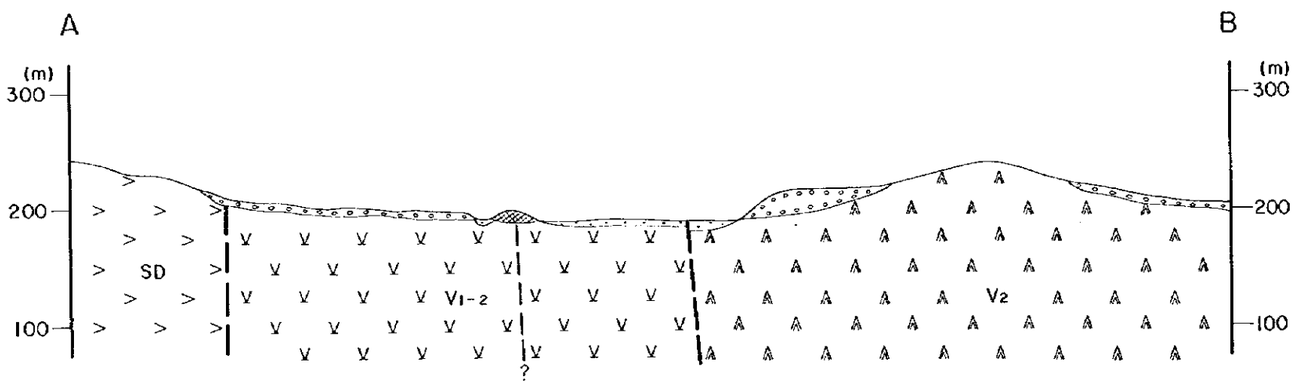
HK-1 : Sample location

T : Thin section

P : Polished section

M : Chemical analysis

X : X-ray diffraction analysis

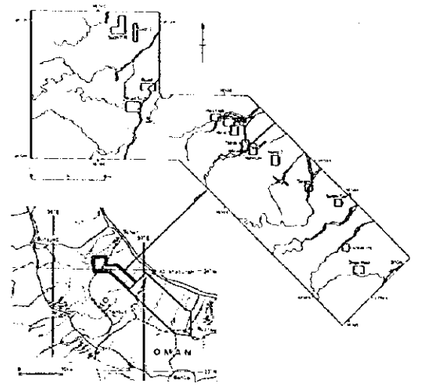


REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAHAB 2

(Scale 1:2,500)



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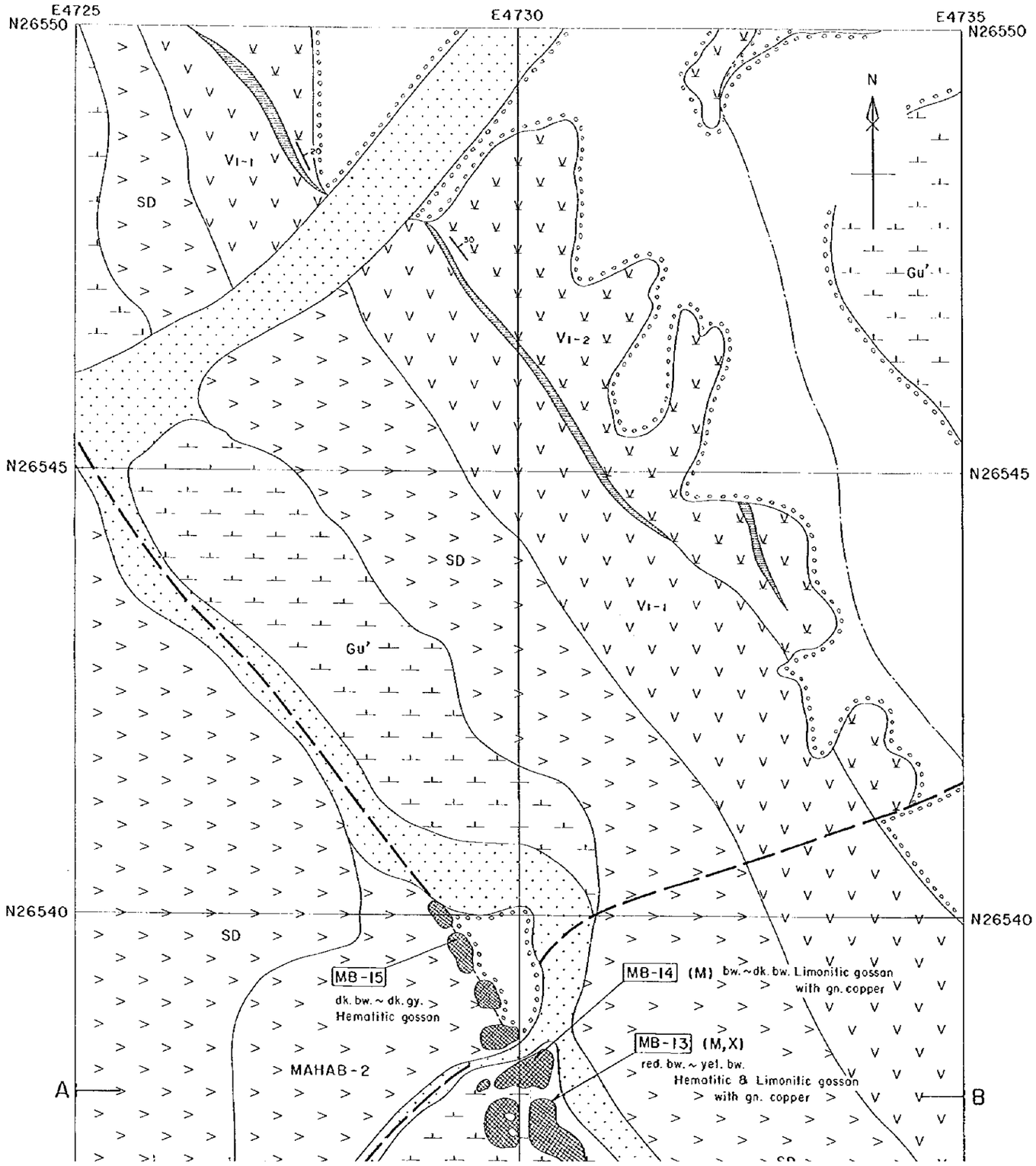
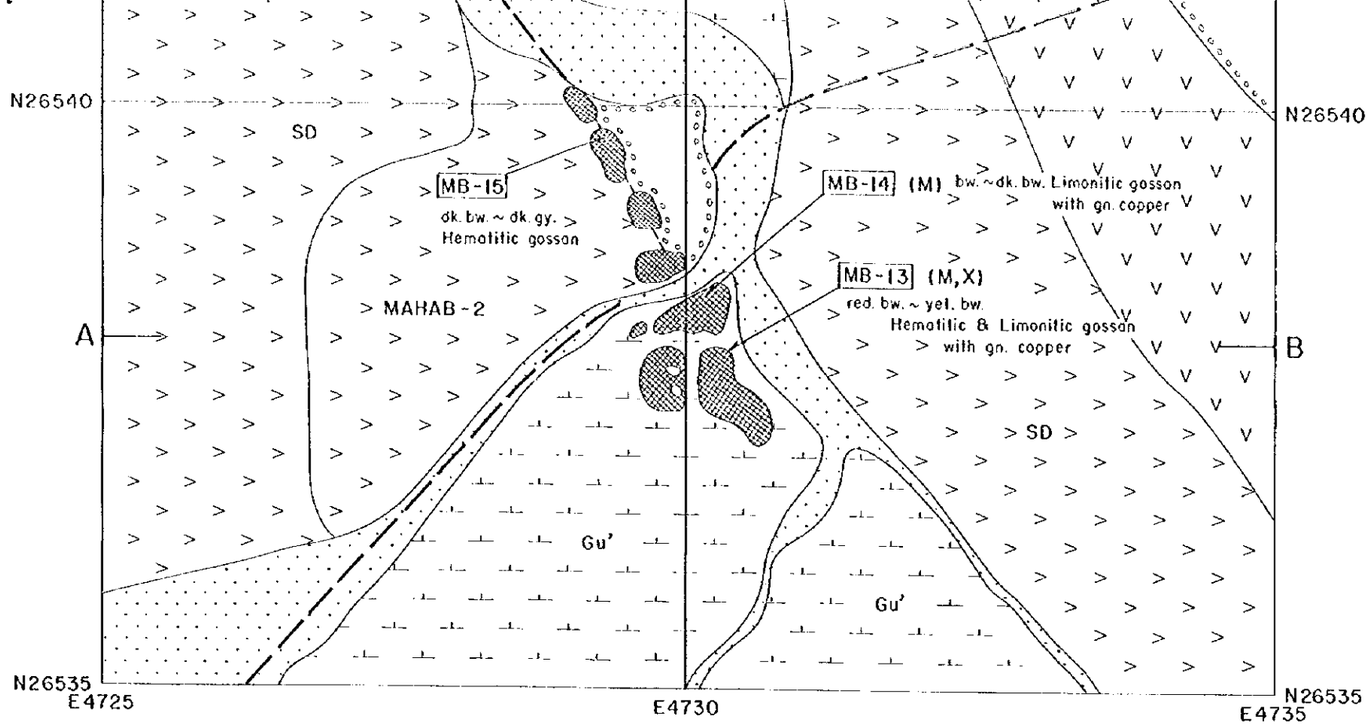
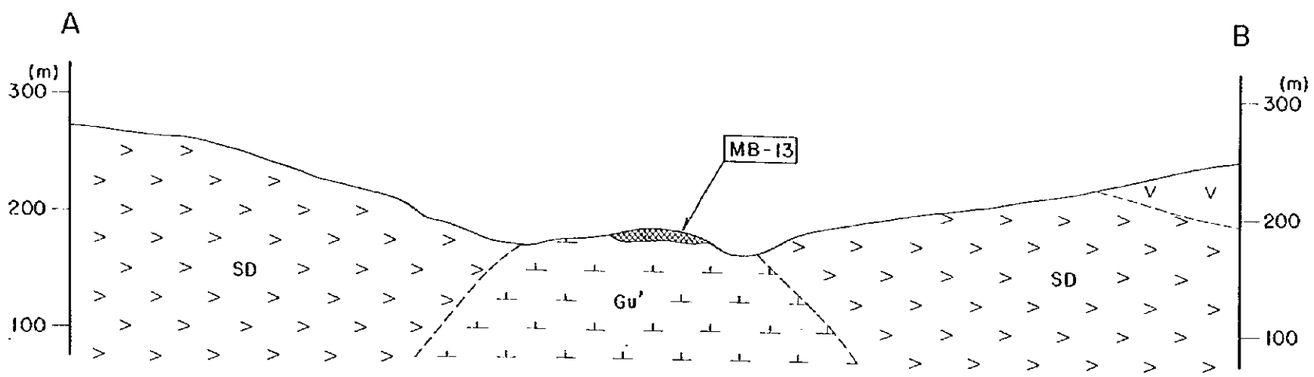
METAL MINING AGENCY OF JAPAN
MARCH, 1998



LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 — Olistolith derived from the Matbat Formation
  - Si1 — Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
  - V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, VI-1, VI-2 and so on
  - U1 — Umber or metalliferous sediments with radiolarian chert
  - VI-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
  - VI-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
  - SD — Sheeted dyke; doleritic and basaltic dyke
  - CG — Cumulate gabbro
- INTRUSIVES
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Slag





SAMAIL VOLCANICS

- Vl-3 : Lower extrusives 3 ; basaltic pillow lava with radiolarian chert
- Vl-2 : Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
- Vl-1 : Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
- SD : Sheeted dyke ; doleritic and basaltic dyke
- CG : Cumulate gabbro

INTRUSIVES

- Td' : Trondhjemite or quartz diorite
- Gu' : Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 : Strike and dip of bedding
- 50 : Strike and dip of dykes and sills
- Fault ; dashed where inferred or concealed

- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

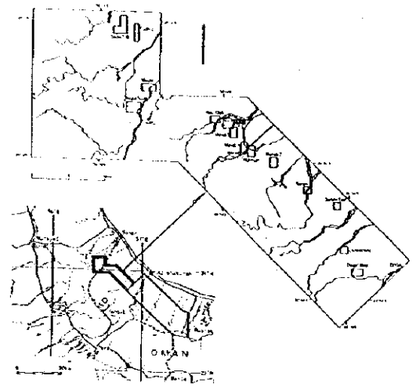
Plate II-1-7

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

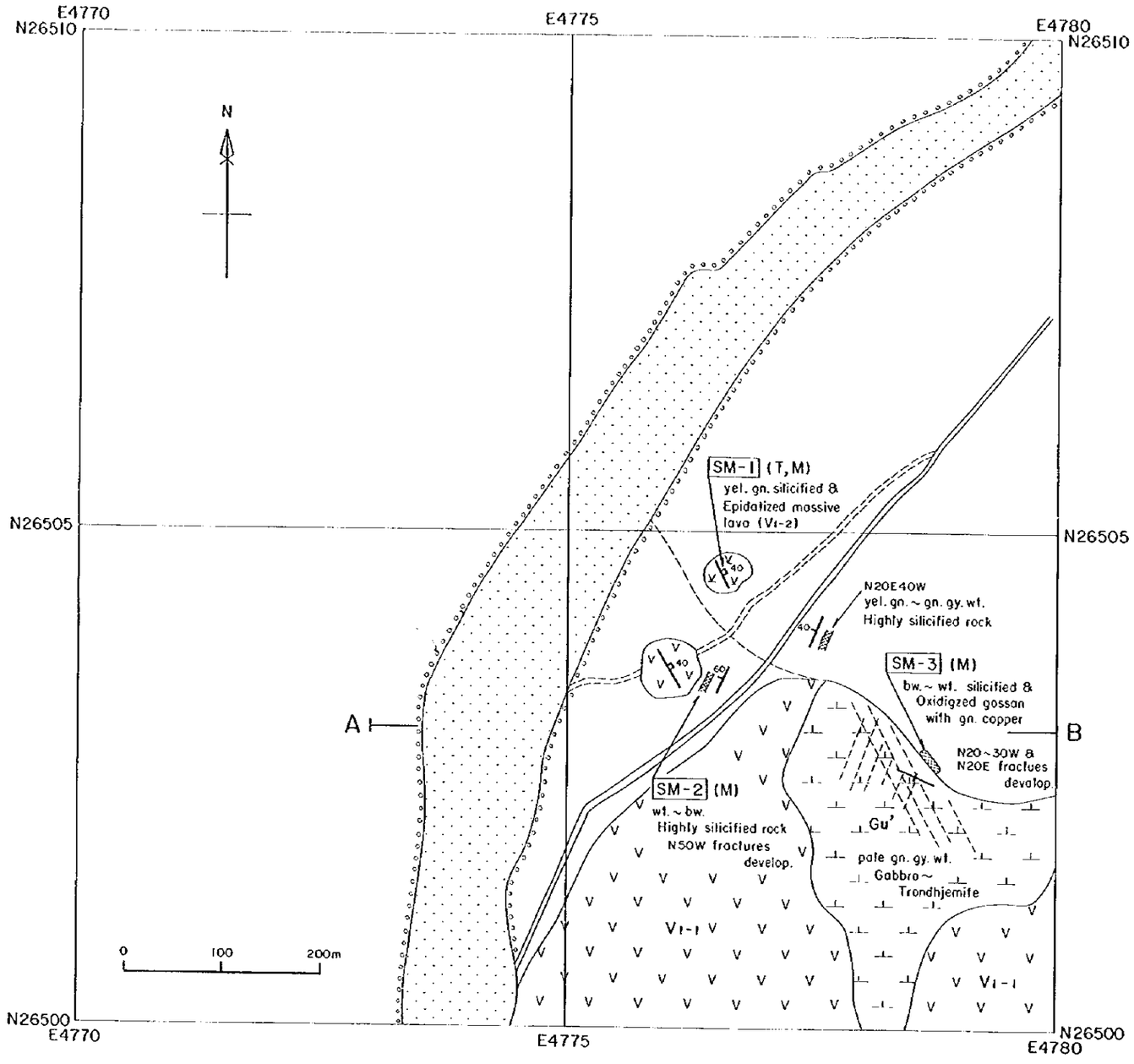
PHASE I

GEOLOGIC MAP AND PROFILE OF SARAMI

(Scale 1:2,500)

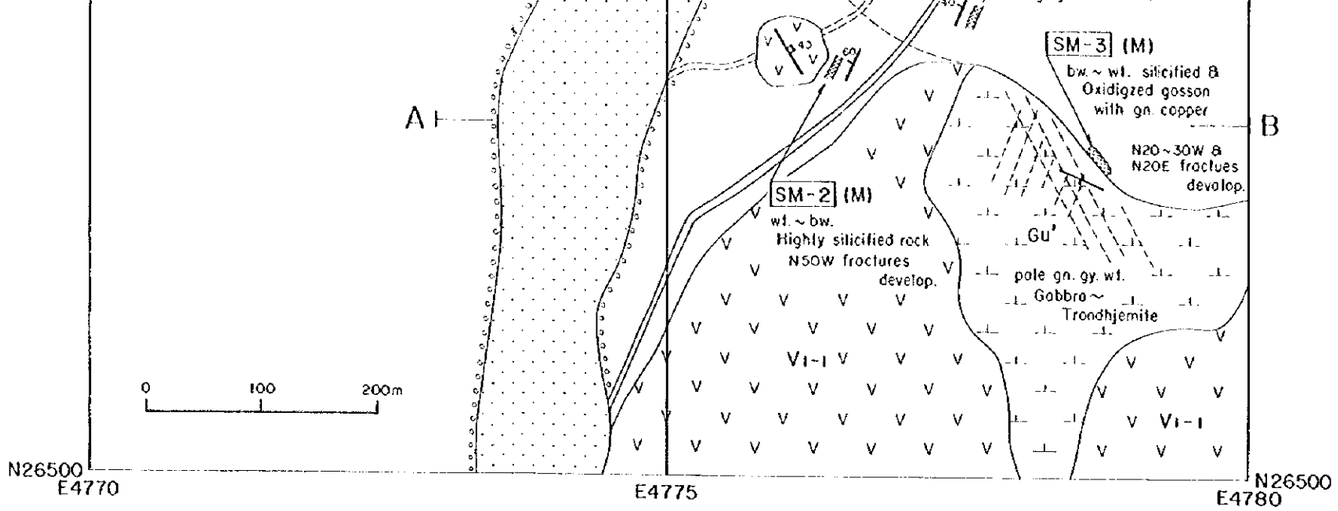


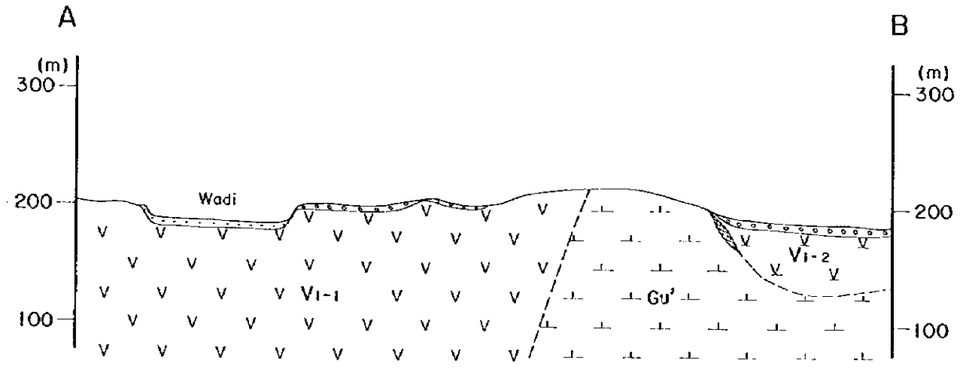
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998



LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mbt — Olistolith derived from the Matbat Formation
  - Si1 — Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives ; basaltic to andesitic pillow lava and massive lava with two pyroxene
  - V2C — Volconic conglomerate or breccia ; reworked rocks composed of SD, V1-1, V1-2 and so on
  - U1 — Umber or metalliferous sediments with radiolarian chert
  - V1-2 — Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
  - V1-1 — Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
  - SD — Sheeted dyke ; doleritic and basaltic dyke
- INTRUSIVES
  - CG — Cumulate gabbro
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Slag





Wadi

Alluvial fans and alluvium

BATINAH OLISTOSTROME

Mb1 — Olistolith derived from the Matbat Formation

Si1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS

V2 — Middle extrusives ; basaltic to andesitic pillow lava and massive lava with two pyroxene

V2C — Volcanic conglomerate or breccia ; reworked rocks composed of SD, V1-1, V1-2 and so on

U1 — Umber or metalliferous sediments with radiolarian chert

V1-2 — Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava

V1-1 — Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava

SD — Sheeted dyke ; doleritic and basaltic dyke

INTRUSIVES

CG — Cumulate gabbro

Td' — Trondhjemite or quartz diorite

Gu' — Gabbro

Slag

ECONOMIC GEOLOGY SYMBOLS

Gossanized mineral showing

Small gossanized mineral showing and name of mineral showing

Quartz vein and network

STRUCTURAL FEATURES

50 — Strike and dip of bedding

50 — Strike and dip of dykes and sills

Fault ; doshed where inferred or concealed

HK-1 : Sample location

T : Thin section

P : Polished section

M : Chemical analysis

X : X-ray diffraction analysis

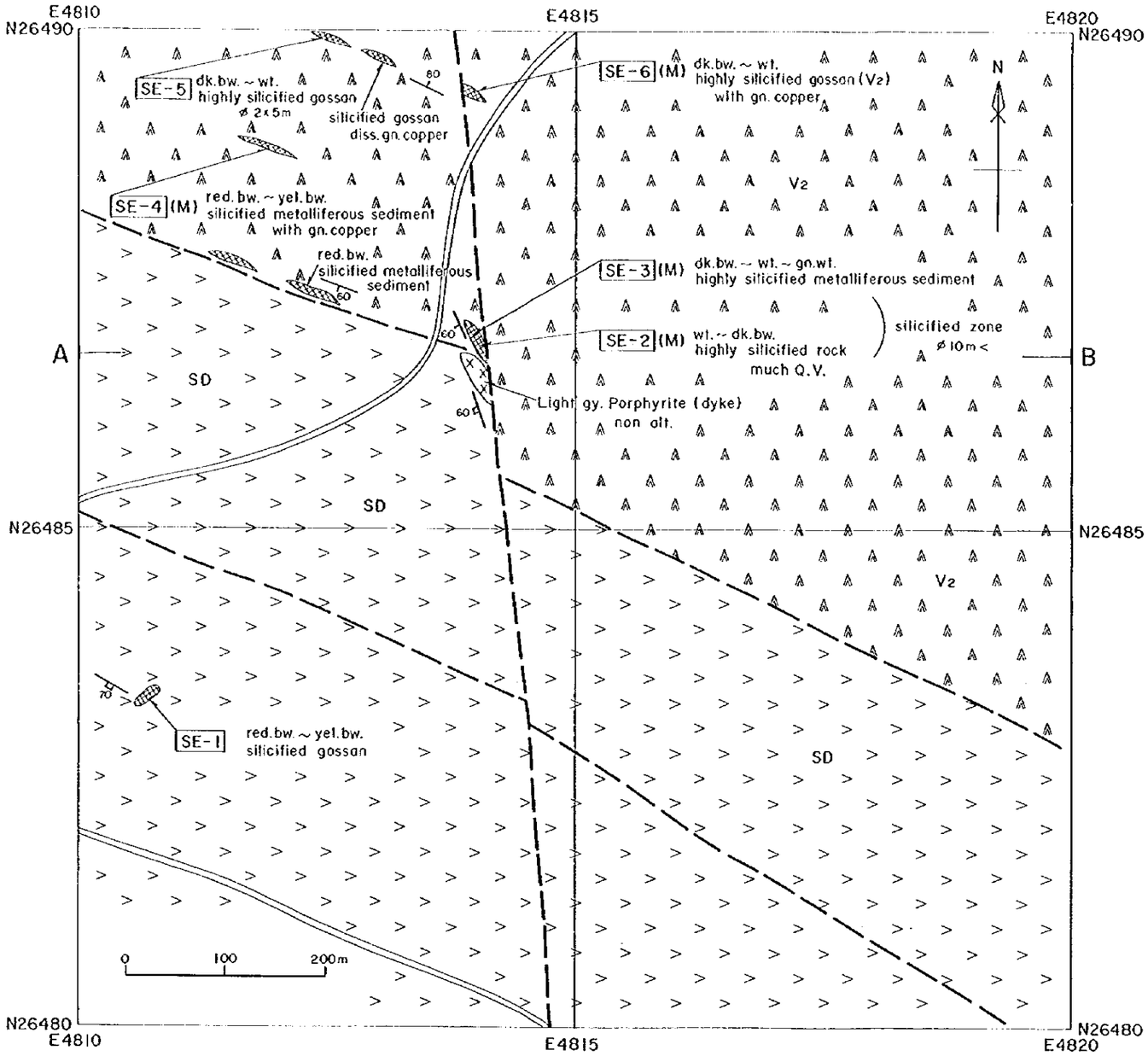


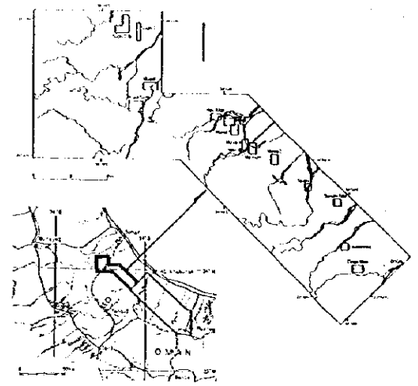
Plate II-1-8

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF SARAMI EAST

(Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

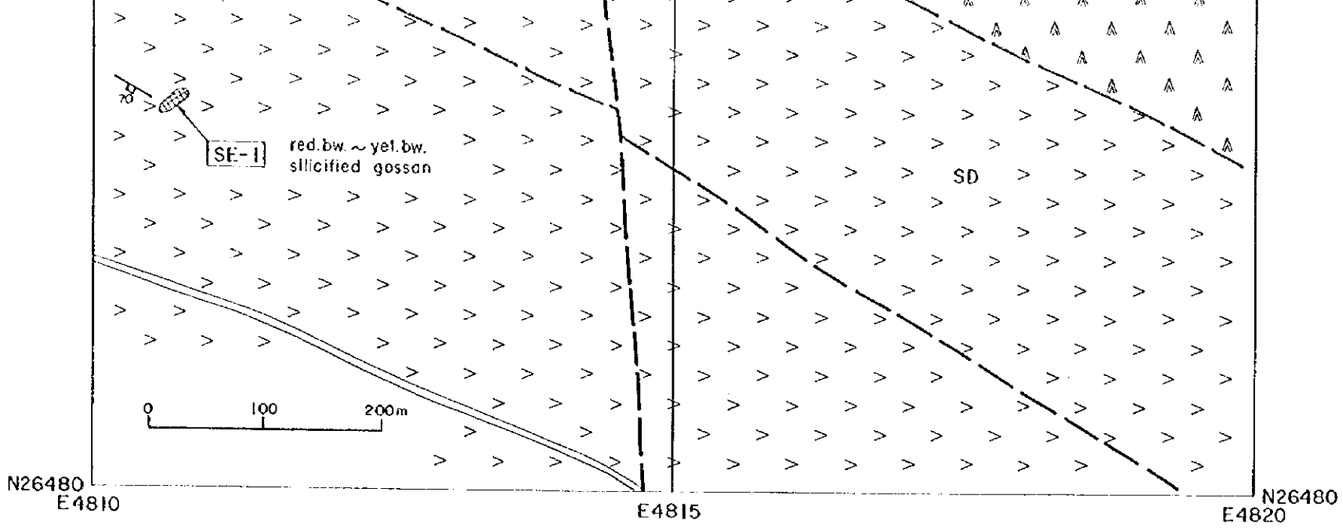
- Wadi
- Alluvial fans and alluvium

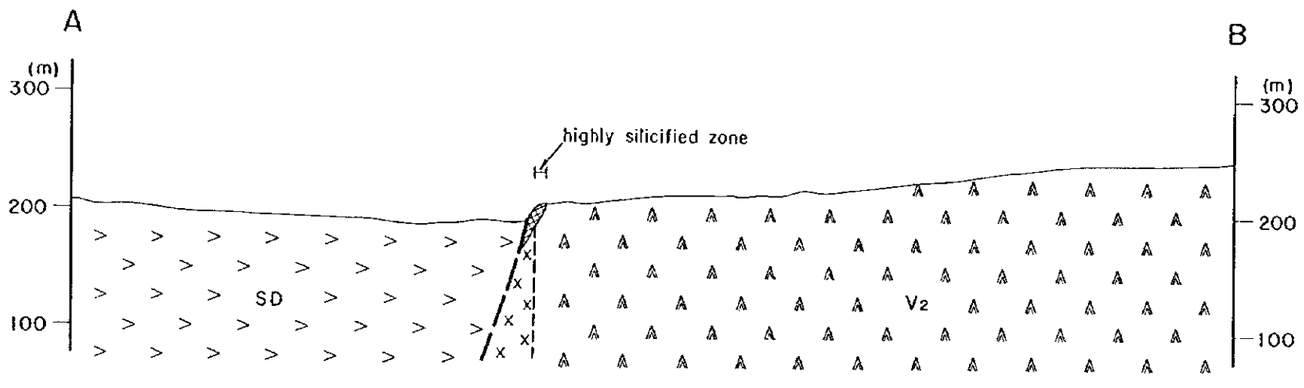
BATINAH OLISTOSTROME
- Mb1 — Olistolith derived from the Matbat Formation
- Si1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rockes composed of SD, V1-1, V1-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES
- CG — Cumulate gobbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro

- Slag





BATINAH OLISTOSTROME

- Wadi
- Alluvial fans and alluvium
- Mb1 — Olistolith derived from the Matbat Formation
- Si1 — Chert and silicified micritic limestone

SAMAIL VOLCANIC ROCKS

- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava

- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES

- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro

- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

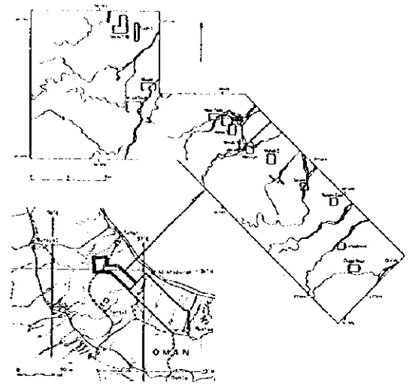
- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

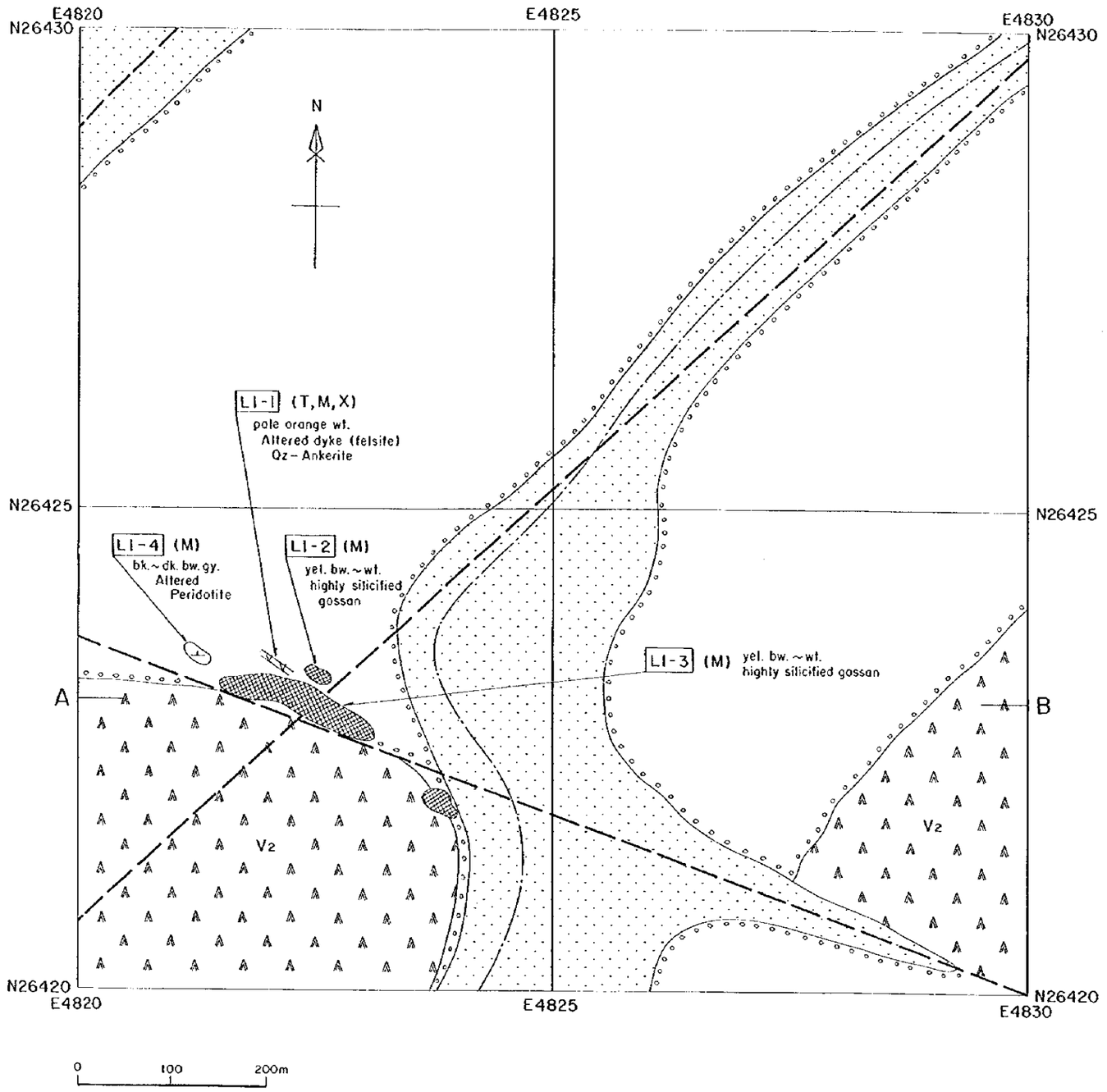
PHASE I

GEOLOGIC MAP AND PROFILE OF LISTWAENITE

(Scale 1:2,500)

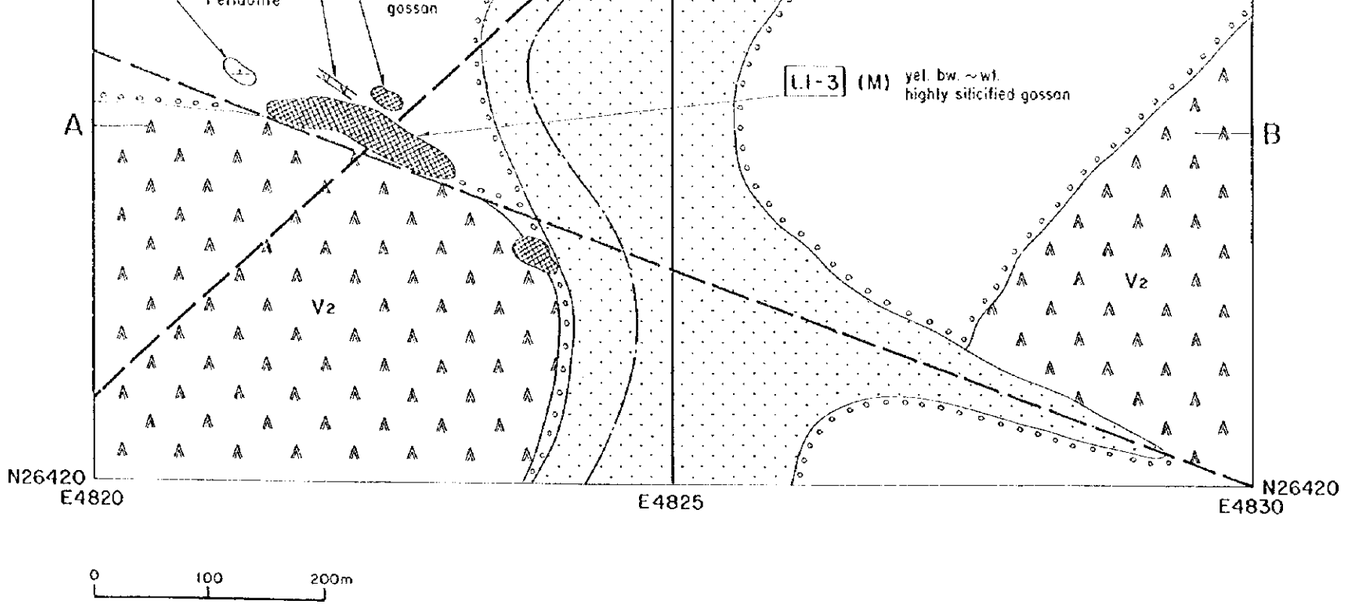


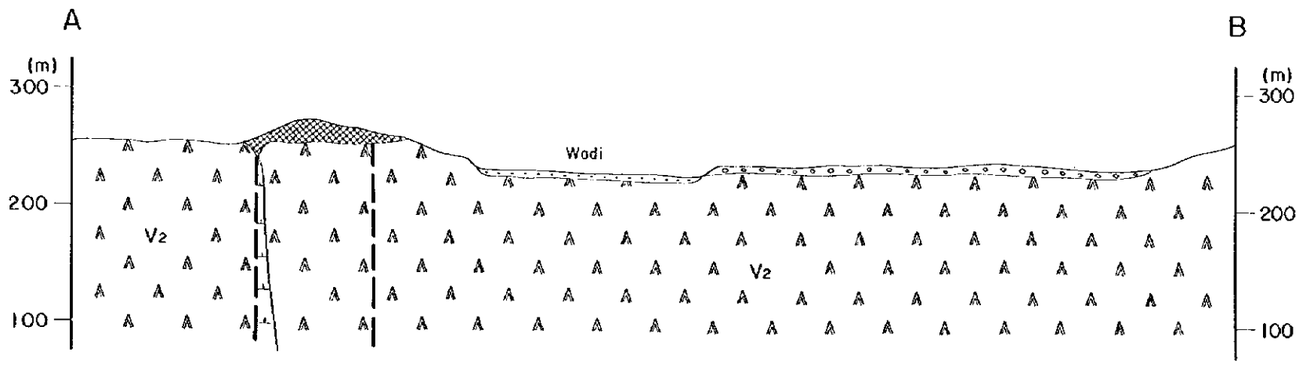
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

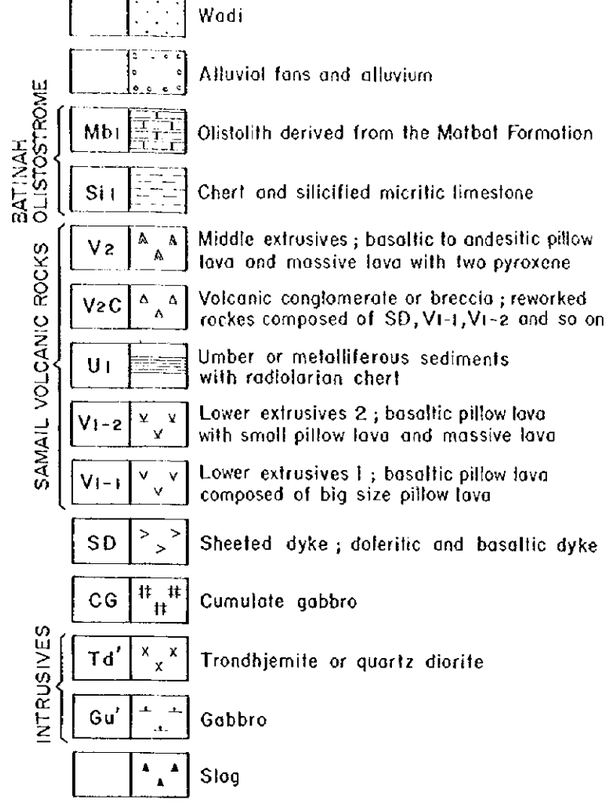


LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mbl — Olistolith derived from the Matbat Formation
  - Sil — Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives ; basaltic to andesitic pillow lava and massive lava with two pyroxene
  - V2C — Volcanic conglomerate or breccia ; reworked rockes composed of SD, V1-1, V1-2 and so on
  - Ul — Umber or metalliferous sediments with radiolarian chert
  - V1-2 — Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
  - V1-1 — Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
  - SD — Sheeted dyke ; doleritic and basaltic dyke
- INTRUSIVES
  - CG — Cumulate gabbro
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Slag


Persaimie
gossan
L1-3 (M) yel. bw. ~ wt.
highly silicified gossan
A
B
V2
N26420
E4820
E4825
N26420
E4830
0
100
200m


A
B
(m)
300
200
100
Wadi
V2
V2
(m)
300
200
100


Wadi
Alluvial fans and alluvium
BATINAH OLISTOSTROME
Mb1
Olistolith derived from the Matbat Formation
Si1
Chert and silicified micritic limestone
SAMAIL VOLCANIC ROCKS
V2
Middle extrusives ; basaltic to andesitic pillow lava and massive lava with two pyroxene
V2C
Volcanic conglomerate or breccia ; reworked rockes composed of SD, V1-1, V1-2 and so on
U1
Umber or metalliferous sediments with radiolarian chert
V1-2
Lower extrusives 2 ; basaltic pillow lava with small pillow lava and massive lava
V1-1
Lower extrusives 1 ; basaltic pillow lava composed of big size pillow lava
SD
Sheeted dyke ; doleritic and basaltic dyke
INTRUSIVES
CG
Cumulate gabbro
Td'
Trondhjemite or quartz diorite
Gu'
Gabbro
Slag
ECONOMIC GEOLOGY SYMBOLS
Gossanized mineral showing
Small gossanized mineral showing and name of mineral showing
Quartz vein and network
STRUCTURAL FEATURES
50
Strike and dip of bedding
50
Strike and dip of dykes and sills
Fault ; dashed where inferred or concealed
HK-1 : Sample location
T : Thin section
P : Polished section
M : Chemical analysis
X : X-ray diffraction analysis

E4835 E4840 E4845 E4850

N26400 N26400

DO-10 bk.~red bw. Highly silicified gossan with Mn mineral

N

V2C

V2

DOQAL WEST

B

N26395 N26395

DO-7 (M) red. bw.~bw. wf. Silicified gossan

DO-9 yel. gy.~red. bw. Silicified gossan

N55W30N red. bw. Cherty shale

DO-6 (M) bw. wf. highly silicified gossan Q.V. network

DO-4 yel. bw.~wf. Highly silicified gossan

DO-5 (M,X) wf.~bw. wf. Q.V. with Mn + Fe minerals

DO-8 (X) wf. cryst. vein

A

0 100 200m

N26390 N26390

E4835 E4840 E4845 E4850

LEGEND

- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME — Mb1 — Olistolith derived from the Mo
- BATINAH OLISTOSTROME — Si1 — Chert and silicified micritic l
- SAMAIL VOLCANIC ROCKS — V2 — Middle extrusives; basaltic to lava and massive lava with
- SAMAIL VOLCANIC ROCKS — V2C — Volcanic conglomerate or bre rocks composed of SD, V1-
- SAMAIL VOLCANIC ROCKS — U1 — Umber or metalliferous sedi with radiolarian chert
- SAMAIL VOLCANIC ROCKS — V1-2 — Lower extrusives 2; basaltic with small pillow lava and m
- SAMAIL VOLCANIC ROCKS — V1-1 — Lower extrusives 1; basaltic composed of big size pillow
- SD — Sheeted dyke; doleritic an
- INTRUSIVES — CG — Cumulate gabbro
- INTRUSIVES — Td' — Trondhjemite or quartz dio
- INTRUSIVES — Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

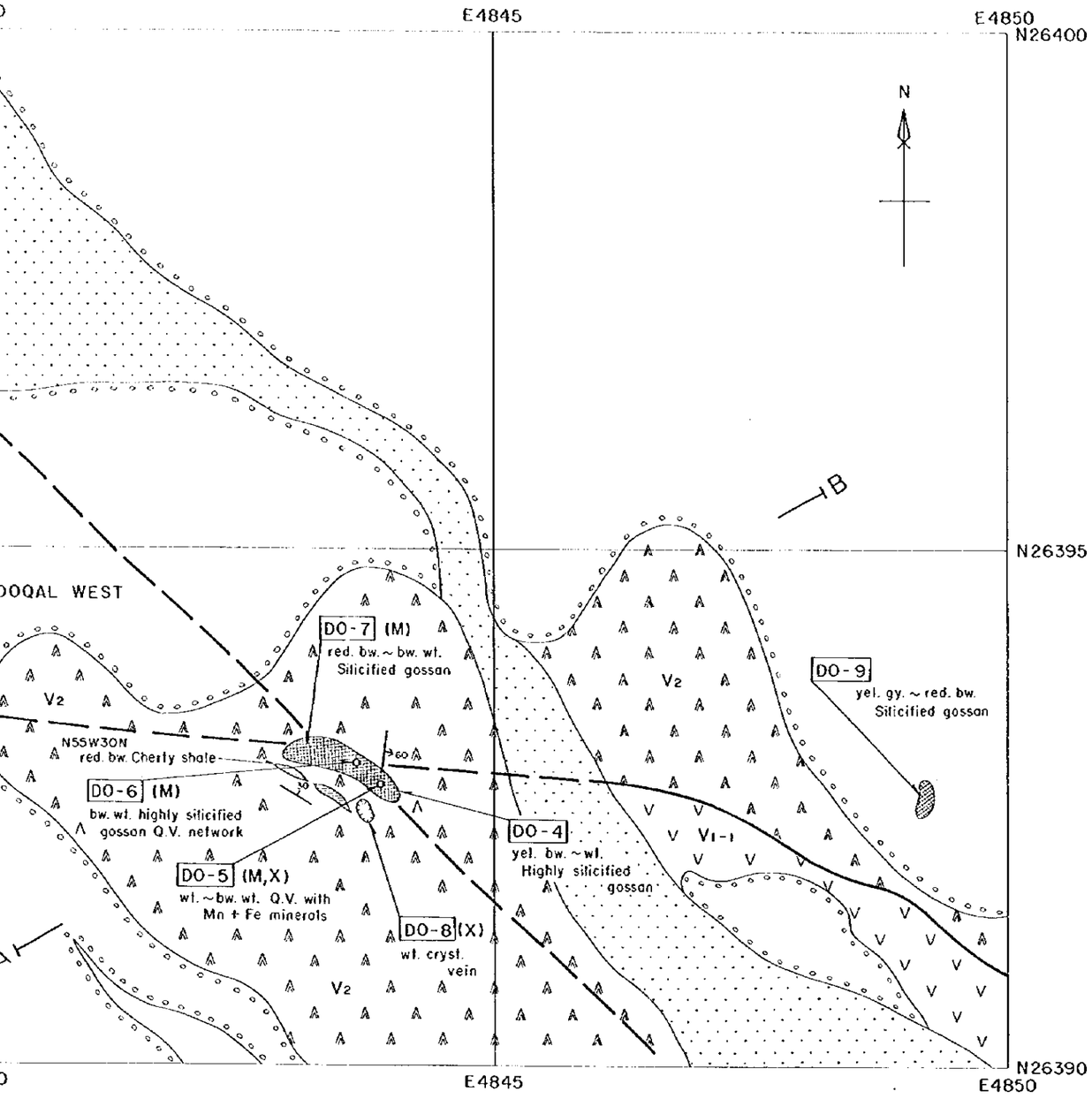
A B

(m) 300 200

silicified gossan

V2 V2 V2

(m) 300 200



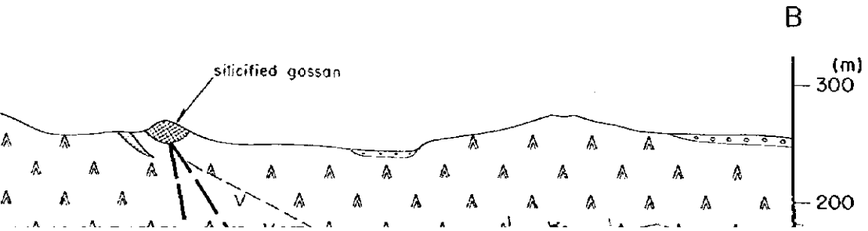


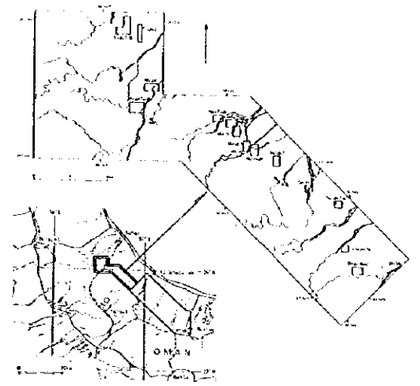
Plate II-1-10

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF DOQAL WEST

(Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

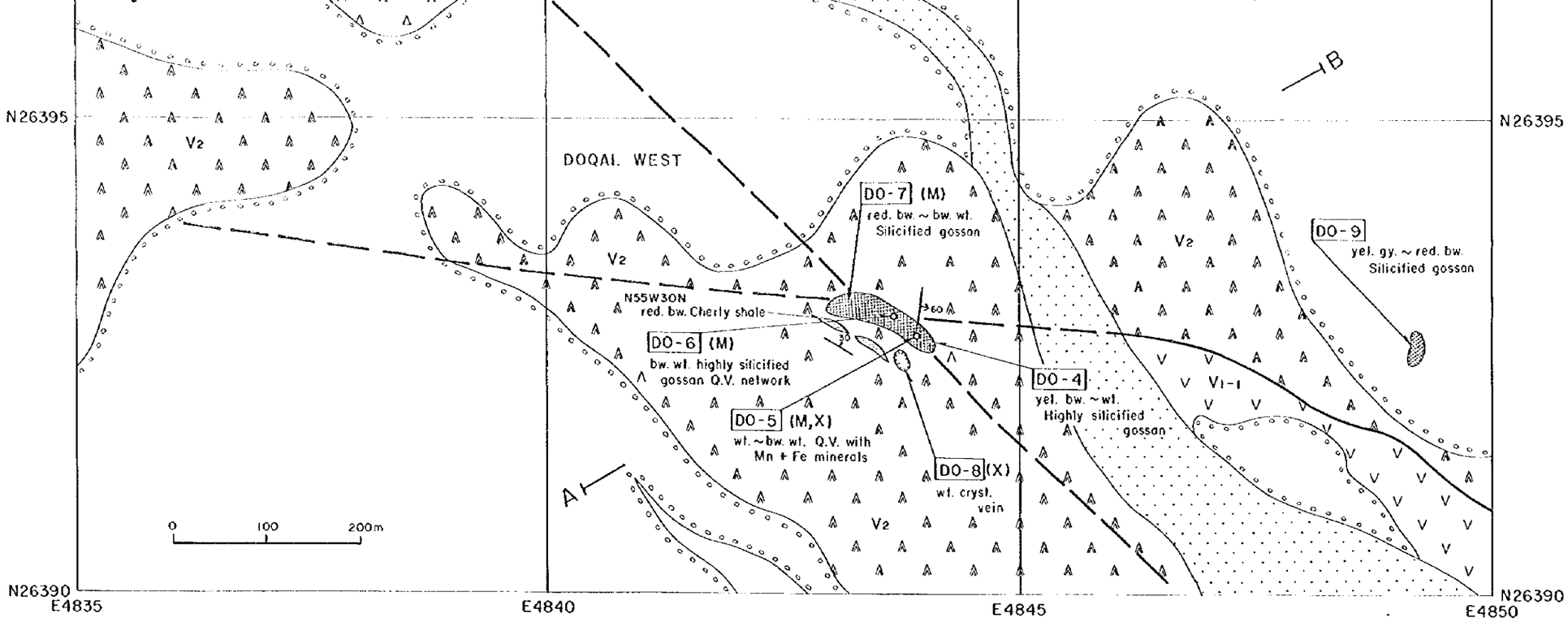
- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 — Olistolith derived from the Matbat Formation
  - Si1 — Chert and silicified micritic limestone
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
  - V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
  - U1 — Umber or metalliferous sediments with radiolorian chert
  - V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
  - V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke
- INTRUSIVES
  - CG — Cumulate gabbro
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Stag

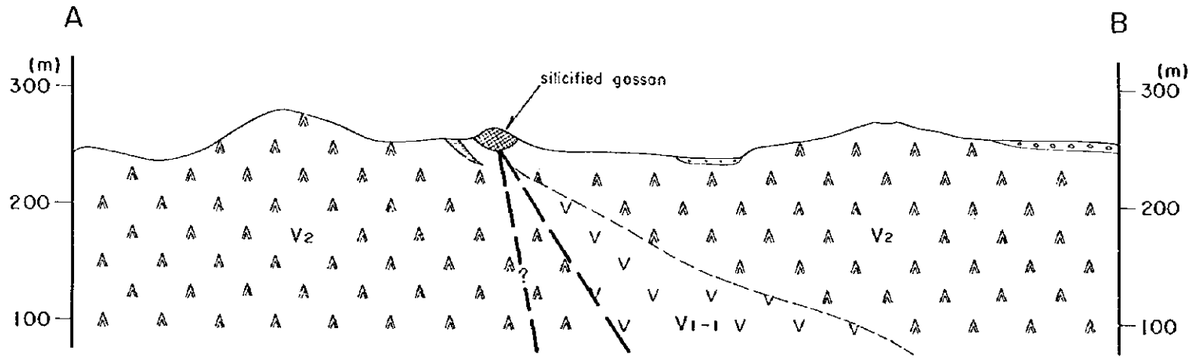
ECONOMIC GEOLOGY SYMBOLS

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed

DK-1 ; Sample location



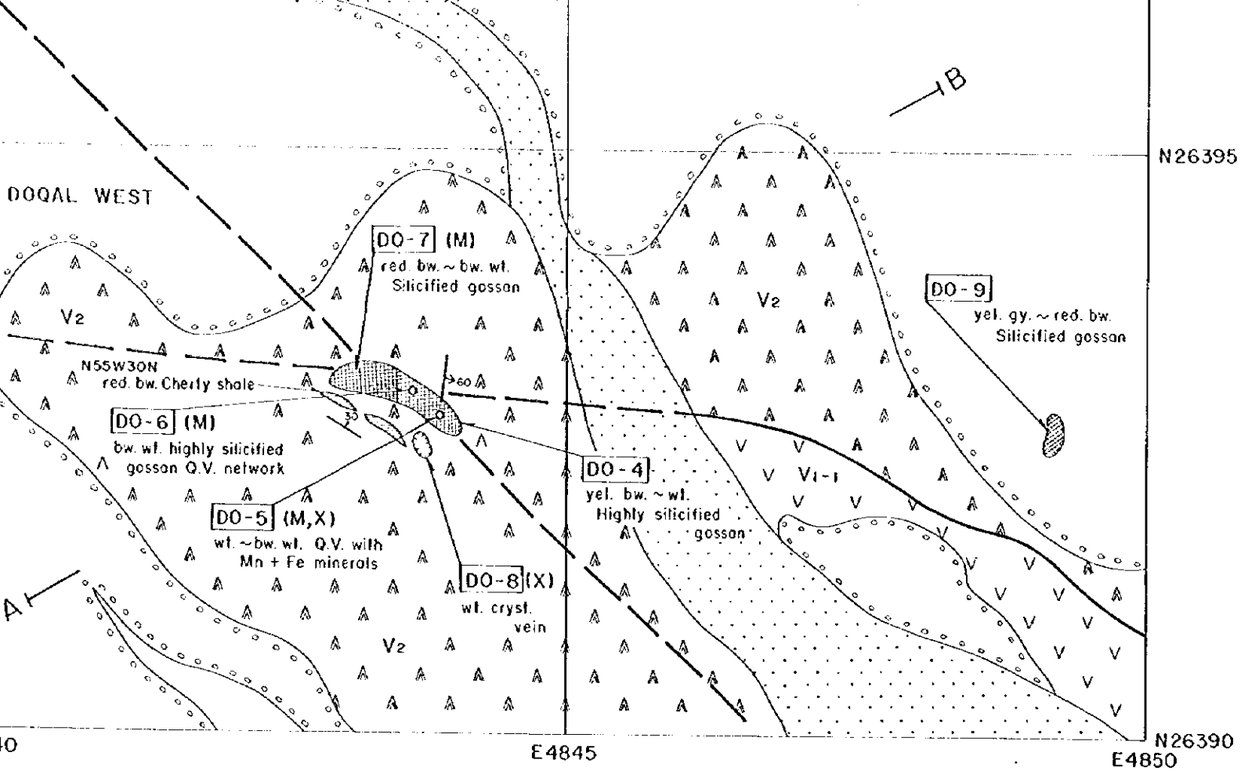


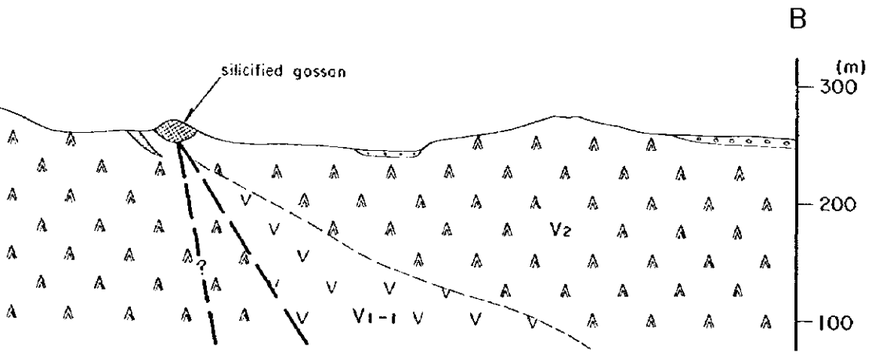
LEGEND

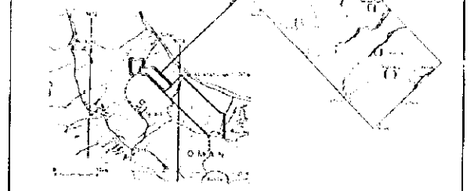
- Wadi
- Alluvial fans and alluvium
- BATINAH OLISTOSTROME
  - Mb1 — Olistolith derived from the Matbo
  - Si1 — Chert and silicified micritic lime
- SAMAIL VOLCANIC ROCKS
  - V2 — Middle extrusives; basaltic to and lava and massive lava with two
  - V2C — Volcanic conglomerate or breccia rocks composed of SD, V1-1, V
  - U1 — Umber or metalliferous sedimen with radiolarian chert
  - V1-2 — Lower extrusives 2; basaltic pill with small pillow lava and mass
  - V1-1 — Lower extrusives 1; basaltic pill composed of big size pillow lava
  - SD — Sheeted dyke; doleritic and b
  - CG — Cumulate gabbro
- INTRUSIVES
  - Td' — Trondhjemite or quartz diorite
  - Gu' — Gabbro
- Slag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showin and name of mineral showing
- Quartz vein and network







JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

SAMAIL VOLCANIC ROCKS / BATINAH OLISTOSTROME

- Wadi
- Alluvial fans and alluvium
- Mb1 — Olistolith derived from the Matbat Formation
- Si1 — Chert and silicified micritic limestone
- V2 — Middle extrusives; basaltic to andesitic pillow lava and massive lava with two pyroxene
- V2C — Volcanic conglomerate or breccia; reworked rocks composed of SD, V1-1, V1-2 and so on
- U1 — Umber or metalliferous sediments with radiolarian chert
- V1-2 — Lower extrusives 2; basaltic pillow lava with small pillow lava and massive lava
- V1-1 — Lower extrusives 1; basaltic pillow lava composed of big size pillow lava
- SD — Sheeted dyke; doleritic and basaltic dyke

INTRUSIVES

- CG — Cumulate gabbro
- Td' — Trondhjemite or quartz diorite
- Gu' — Gabbro
- Stag

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Small gossanized mineral showing and name of mineral showing
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

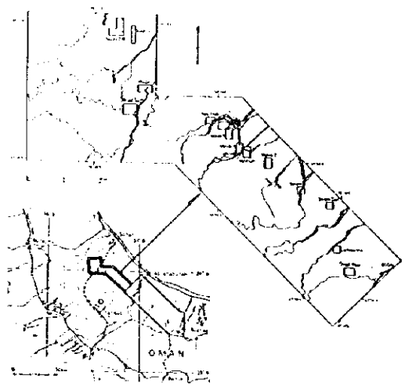
Plate II-1-11

REPORT ON THE MINERAL EXPLORATION
IN
HE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

EOLOGIC MAP AND PROFILE OF SALAHI V&VI

(Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

LEGEND

- Wadi sediments
- Alluvial fans and alluvium
- Batinah Olistostrome
  - Sp — Serpentinite
  - Mg — Metagabbro
  - Hz — Harzburgite
  - Sc — Schist
  - Osb — Basaltic pillow lava
  - Osl — Limestone dominant facies
  - Osc — Chert dominant facies
- Upper Volcanic Rocks
  - Upper extrusives
    - V3p — Basaltic pillow lava
    - V3m — Doleritic basalt massive lava
  - Sh3 — Cherty shale and shale
  - U3 — Metalliferous sediments
- Middle Volcanic Rocks
  - Middle extrusives
    - V2d — Doleritic basalt lava
    - V2m — Basaltic massive lava
    - V2p — Basaltic pillow lava
  - U2 — Metalliferous sediments
- Lower Volcanic Rocks
  - U1 — Metalliferous sediments with radiolarian chert
  - Lower extrusives
    - V1-2 — Lower extrusive 2; basaltic pillow lava and massive lava
    - V1-1 — Lower extrusive 1; basaltic pillow lava and massie lava
- Sheeted-dyke Complex
  - SD — Doleritc and basaltic dyke
- Intrusive Rocks
  - D' — Doleritic and basaltic dyke
  - Td' — Trondhjemite
  - P' — Peridotite
  - Gu' — Gabbro

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- Thrust fault
- Anticline
- Syncline

HK-1 : Sample location

T : Thin section

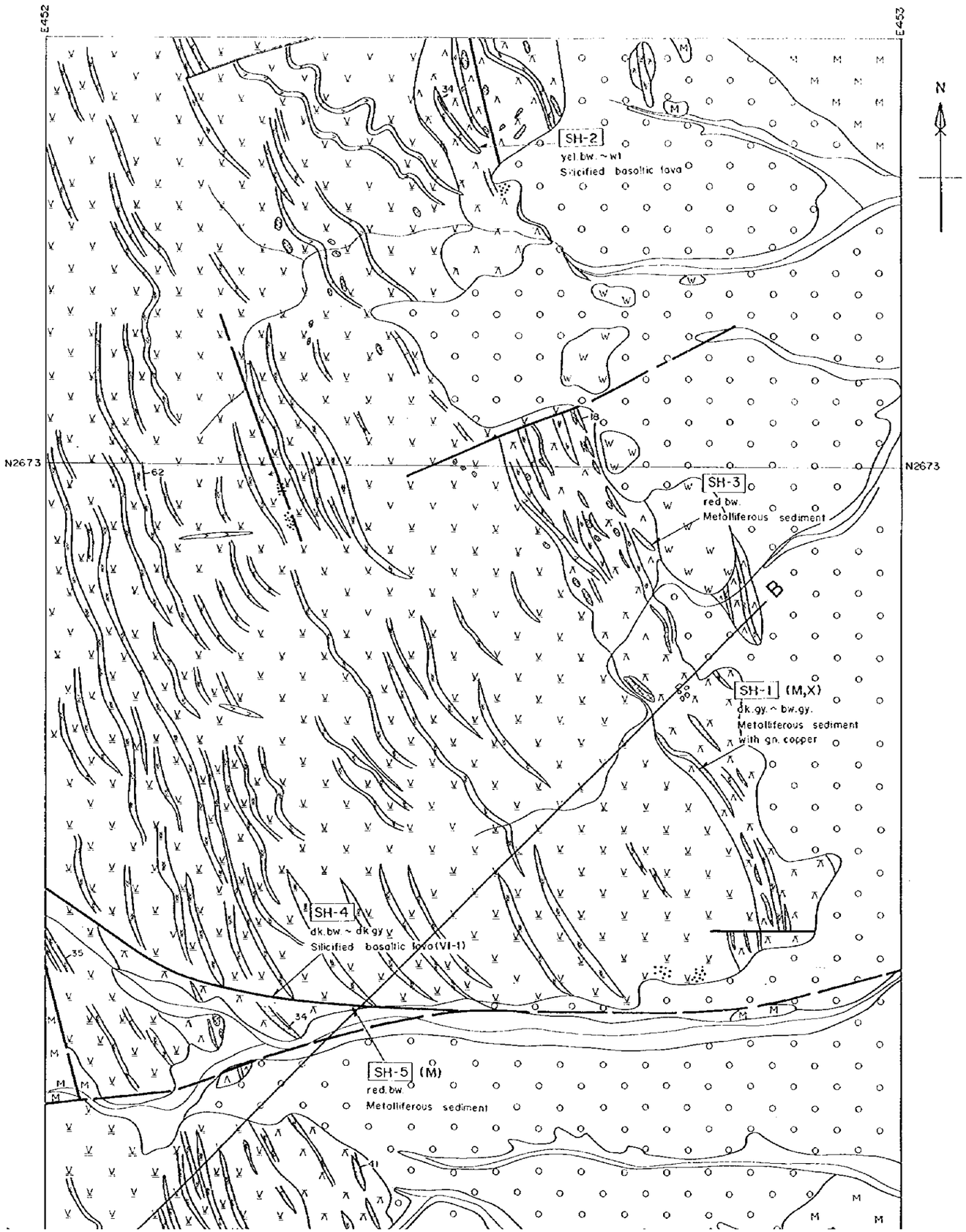
P : Polished section

M : Chemical analysis

X : X-ray diffraction analysis

ECONOMIC GEOLOGY SYMBOLS

- Gossonized mineral showing
- Rusty zone



50 Strike and dip of bedding

50 Strike and dip of dykes and sills

Fault; dashed where inferred or concealed

Thrust fault

Anticline

Syncline

HK-1 : Sample location

T : Thin section

P : Polished section

M : Chemical analysis

X : X-ray diffraction analysis

Lower Volcanic Rocks

- U1 — Metalliferous sediments with radiolarian chart
- Lower extrusives: V1-2 — Lower extrusive 2; basaltic pillow lava and massive lava
- Lower extrusives: V1-1 — Lower extrusive 1; basaltic pillow lava and massive lava

Sheeted-dyke Complex

- SD — Doleritic and basaltic dyke

Intrusive Rocks

- D' — Doleritic and basaltic dyke
- Td' — Trondhjemite
- P' — Peridotite
- Gu' — Gabbro

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Rusty zone
- Quartz vein and network

E451

N2672

SH-4
dk bw ~ dk gy V
Silicified basaltic lava(VI-1)

SH-5 (M)
red bw
Metalliferous sediment

SH-8
red bw
Metalliferous sediment

SH-7 (M,X)
dk gy.~ dk.bw.gy
Silicified basaltic lava(VI-1)
with gn copper and epidote

SH-6 (M)
red bw
Metalliferous sediment
with gn copper and epidote

red bw.
Metalliferous sediment

SH-7 (M,X)
dk gy.~ dk bw.gy
Silicified basaltic lava(VI-1)
with gn. copper and epidote

SH-6 (M)
red. bw.
Metalliferous sediment
with gn. copper and epidote

85
25
45

N2671

E451
E452
E453

0 100 200m

A

E 452

B

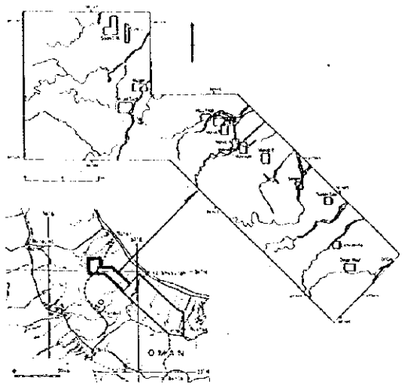
400m
300
200
100

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

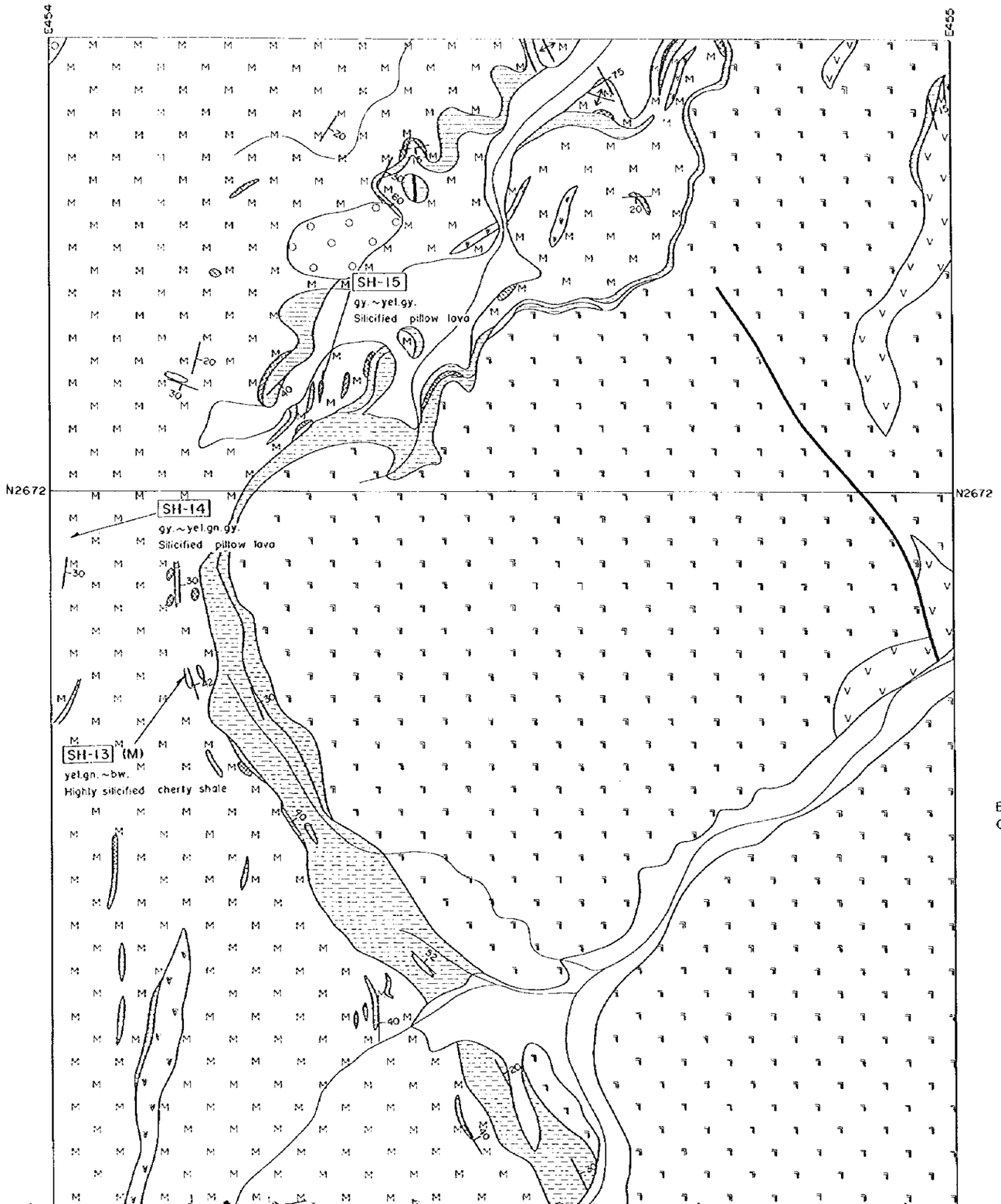
PHASE I

GEOLOGIC MAP AND PROFILE OF SALAHI I

(Scale 1:2,500)

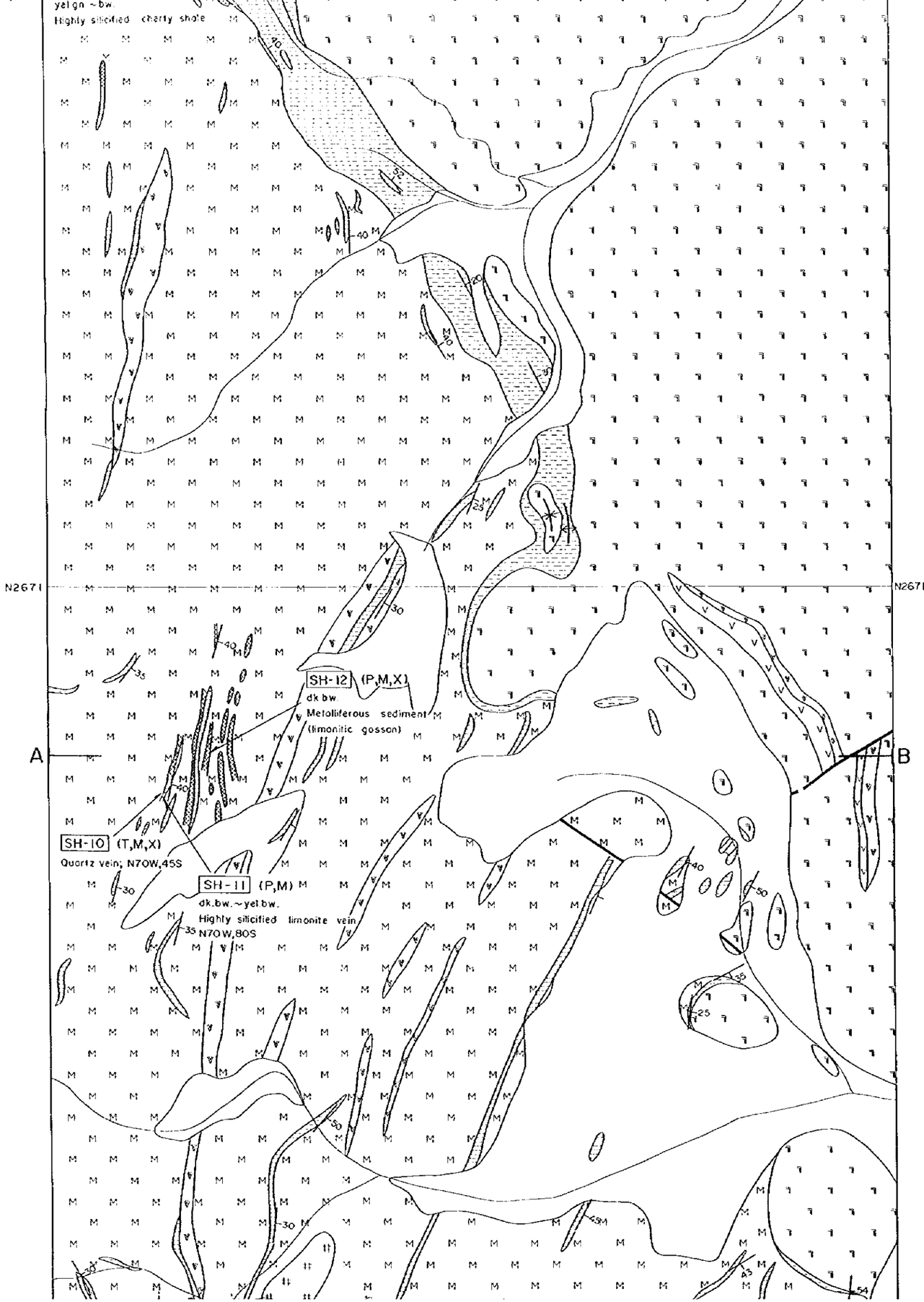


JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998



LEGEND

- Wadi sediments
- Alluvial fans and alluvium
- Batinah Olistostrome
  - Sp — Serpentinite
  - Mg — Metagabbro
  - Hz — Harzburgite
  - Sc — Schist
  - Osb — Basaltic pillow lava
  - Osl — Limestone dominant facies
  - Osc — Chert dominant facies
- Upper Volcanic Rocks
  - Upper extrusives
    - V3p — Basaltic pillow lava
    - V3m — Doleritic basalt massive lava
  - Sh3 — Cherty shale and shale
  - U3 — Metalliferous sediments
- V2d — Doleritic basalt lava



Batinoh Olistostrome
- Sc — Schist
- Osb — Basaltic pillow lava
- Osl — Limestone dominant facies
- Osc — Chert dominant facies

Upper Volcanic Rocks
- Upper extrusives
  - V3p — Basaltic pillow lava
  - V3m — Doleritic basalt massive lava
- Sh3 — Cherty shale and shale
- U3 — Metalliferous sediments

Middle Volcanic Rocks
- Middle extrusives
  - V2d — Doleritic basalt lava
  - V2m — Basaltic massive lava
  - V2p — Basaltic pillow lava
- U2 — Metalliferous sediments

Lower Volcanic Rocks
- U1 — Metalliferous sediments with radiolarian chert
- Lower extrusives
  - V1-2 — Lower extrusive 2; basaltic pillow lava and massive lava
  - V1-1 — Lower extrusive 1; basaltic pillow lava and massie lava

Sheeted-dyke Complex
- SD — Doleritic and basaltic dyke

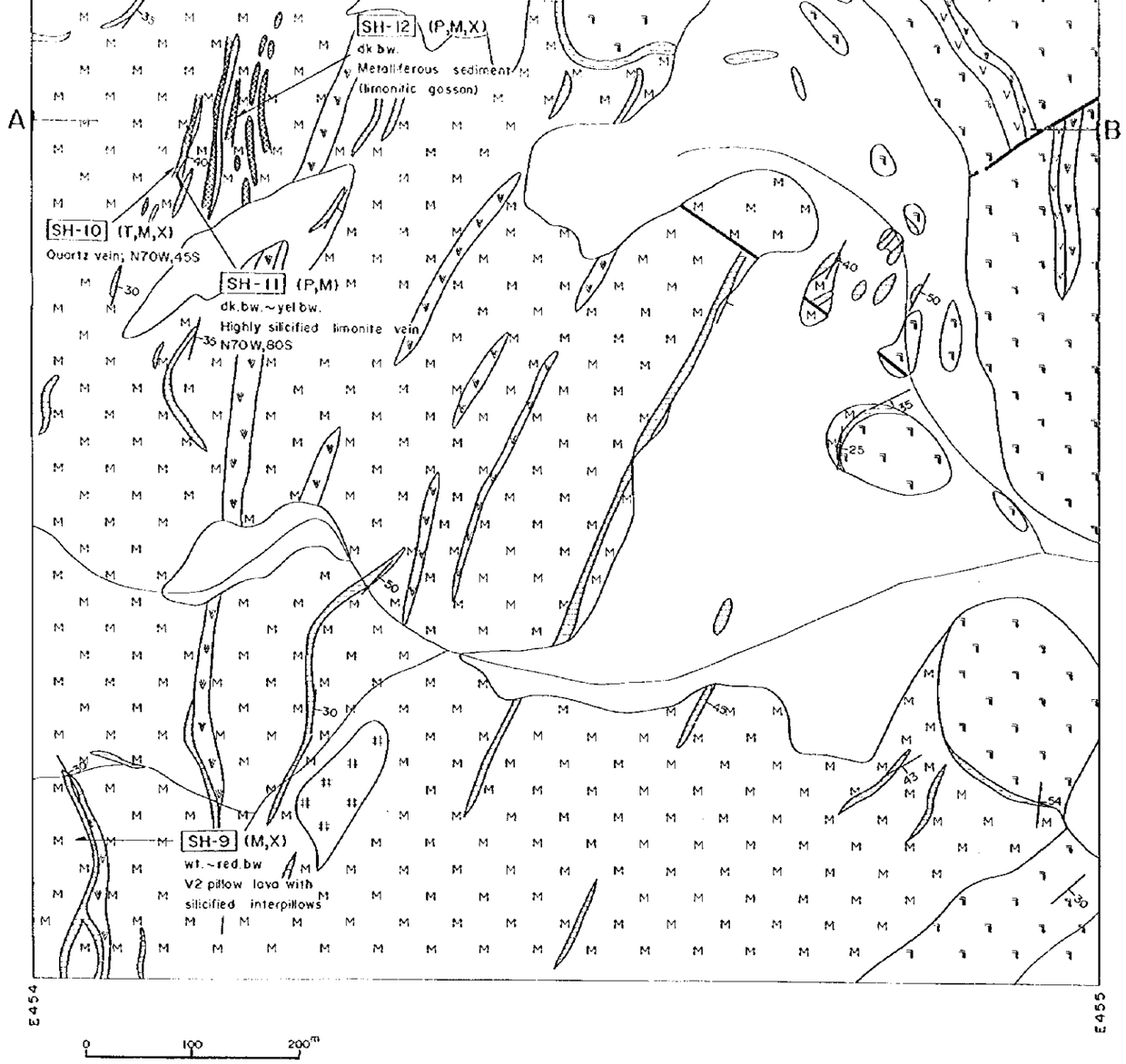
Intrusive Rocks
- D' — Doleritic and basaltic dyke
- Td' — Trondhjemite
- P' — Peridotite
- Gu' — Gabbro

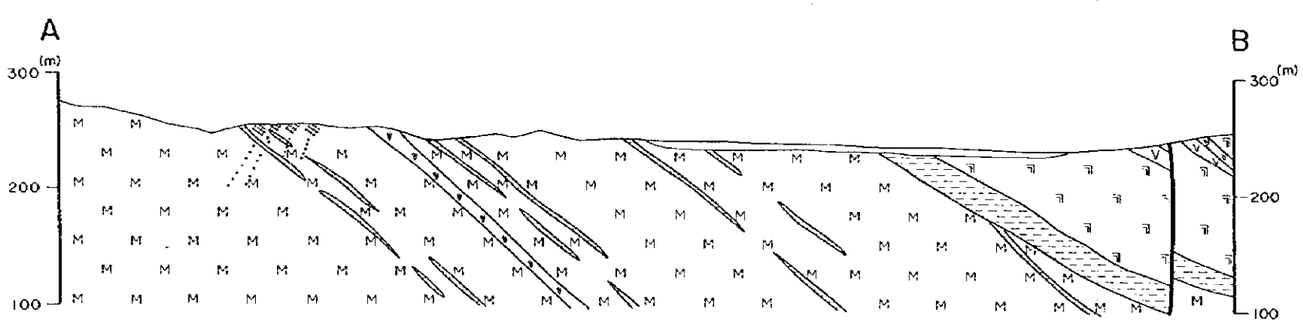
ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Rusty zone
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- Thrust fault
- Anticline





Sheeted-dyke Complex

- SD — Doleritic and basaltic dyke

Intrusive Rocks

- D' — Doleritic and basaltic dyke
- Td' — Trondhjemite
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ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Rusty zone
- Quartz vein and network

STRUCTURAL FEATURES

- Strike and dip of bedding
- Strike and dip of dykes and sills
- Fault; dashed where inferred or concealed
- Thrust fault
- Anticline
- Syncline
- HK-1 : Sample location
- T : Thin section
- P : Polished section
- M : Chemical analysis
- X : X-ray diffraction analysis

E455 E456 E457

A B

N2664

MQ-6 (P,M)
Float of massive pyrite ore

MQ-7 (M)
red bw.~olive gn.
Brecciated basaltic lava
with gn. copper

MQ-5 (M)
yel.bw.~bw.
Silicified basaltic lava
with quartz veinlets

MQ-2 (M)
wt.~gy.wt.
Silicified cherty shale
with quartz network and limonite

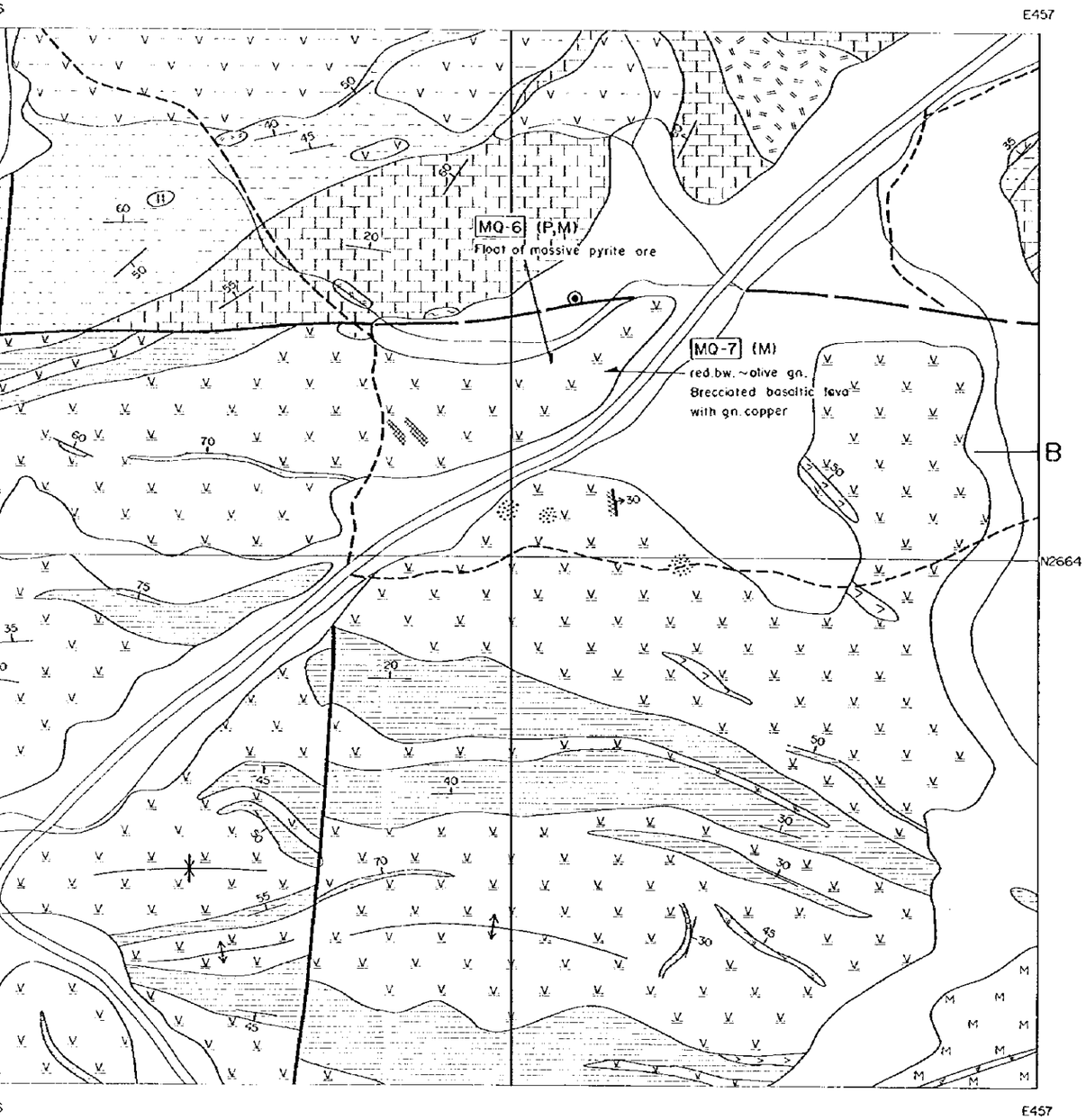
MQ-3 (M)
yel.bw.~dk.bw.
Silicified and oxidized rock

MQ-4
yel.bw.~gy.wt.
Silicified cherty shale

MQ-1
gy.wt.~bw.wt.
Silicified cherty shale

E455 E456 E457

0 100 200m



N

LEGEND

- Wadi sediments
- Alluvial fans and alluvium
- Batinah Olistostrome
  - Sp — Serpentinite
  - Mg — Metagabbro
  - Hz — Harzburgite
  - Sc — Schist
  - Osb — Basaltic pillow lava
  - Osl — Limestone dominant facies
  - Osc — Chert dominant facies
- Upper Volcanic Rocks
  - Upper extrusives
    - V3p — Basaltic pillow lava
    - V3m — Doleritic basalt massive lava
  - Sh3 — Cherty shale and shale
  - U3 — Metalliferous sediments
- Middle Volcanic Rocks
  - Middle extrusives
    - V2d — Doleritic basalt lava
    - V2m — Basaltic massive lava
    - V2p — Basaltic pillow lava
  - U2 — Metalliferous sediments
- Lower Volcanic Rocks
  - U1 — Metalliferous sediments with radiolarian chart
  - Lower extrusives
    - V1-2 — Lower extrusive 2 ; basaltic pillow lava and massive lava
    - V1-1 — Lower extrusive 1 ; basaltic pillow lava and massie lava
- Sheeted-dyke Complex
  - SD — Doleritc and basaltic dyke
- Intrusive Rocks
  - D' — Doleritic and basaltic dyke
  - Td' — Trondhjemite
  - P' — Peridotite
  - Gu' — Gabbro

ECONOMIC GEOLOGY SYMBOLS

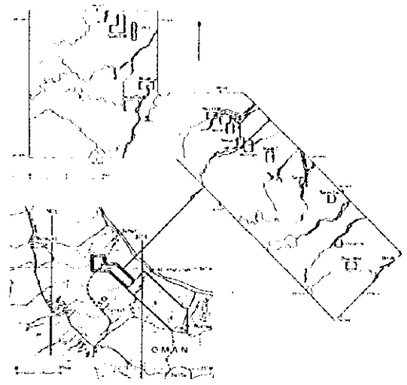
Plate II-1-13

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAQAIL

(Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

with quartz veinlets

MQ-2 (M)
wt.~gy.wt.
Silicified cherty shale
with quartz network and limonite

MQ-3 (M)
yel.bw.~dk.bw.
Silicified and oxidized rock

MQ-4
yel.bw.~gy.wt.
Silicified cherty shale

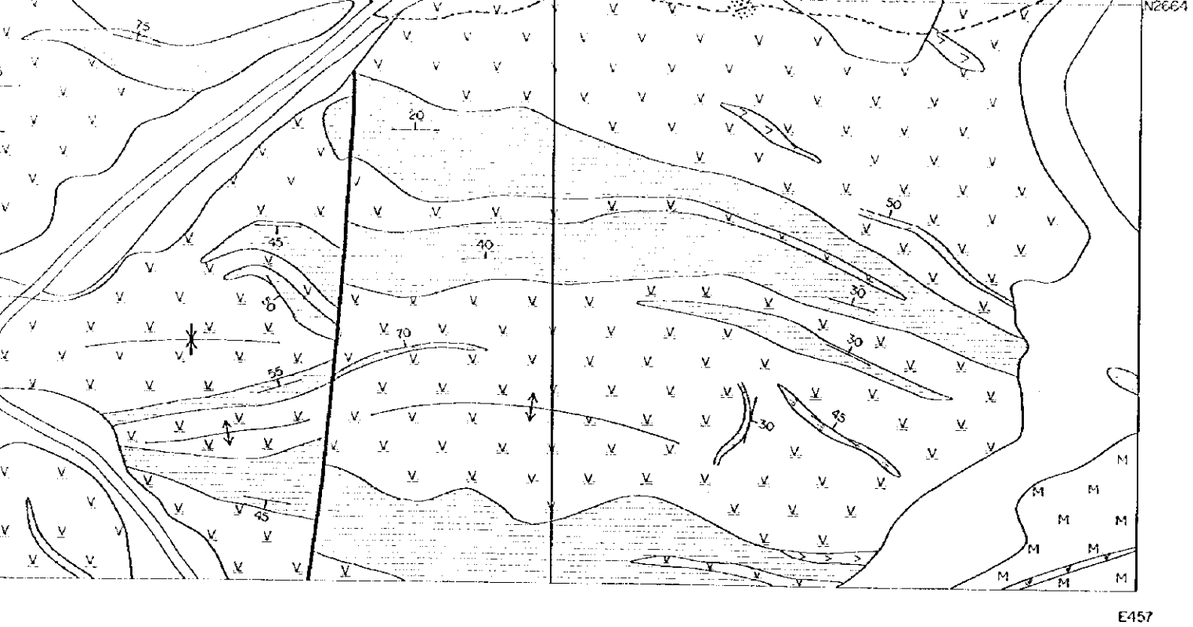
MQ-1
gy.wt.~bw.wt.
Silicified cherty shale

E455 E456 E457

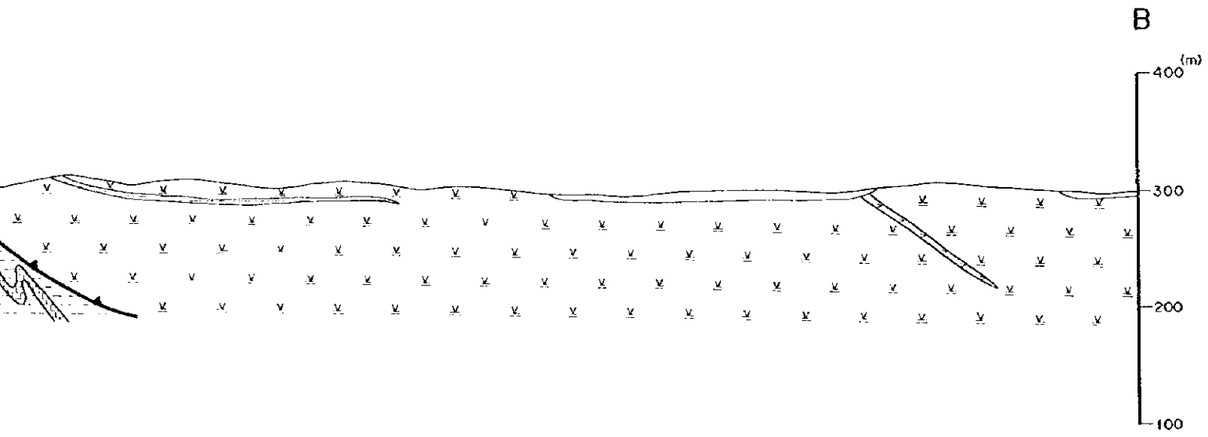
0 100 200m

A B

(m)
400
300
200
100



B



Middle Volcanic Rocks

Middle extrusives

- V_2m — Basaltic massive lava
- V_2p — Basaltic pillow lava
- U_2 — Metalliferous sediments

Lower Volcanic Rocks

- U_1 — Metalliferous sediments with radiolarian chart

Lower extrusives

- V_{1-2} — Lower extrusive 2; basaltic pillow lava and massive lava
- V_{1-1} — Lower extrusive 1; basaltic pillow lava and massie lava

Sheeted-dyke Complex

- SD — Doleritc and basaltic dyke

Intrusive Rocks

- D' — Doleritic and basaltic dyke
- Td' — Trondhjemite
- P' — Peridotite
- Gu' — Gabbro

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Rusty zone
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
- Fault; doshed where inferred or concealed
- Thrust fault
- Anticline
- Syncline

HK-1 : Sample location

T : Thin section

P : Polished section

M : Chemical analysis

X : X-ray diffraction analysis

E453 E454 E455 N2662

MQ-8 (P,M)
dk.bw.
Metalliferous sediment

MQ-10 (P,M,X)
dk.gy. dk.bw.
Metalliferous sediment, slightly cherty
with magnetite and chalcopyrite

Highly silicified boundory
between Vt-1 and Vt-2
with thin metalliferous sediment
or without it in places

Rusty zone with gn. copper

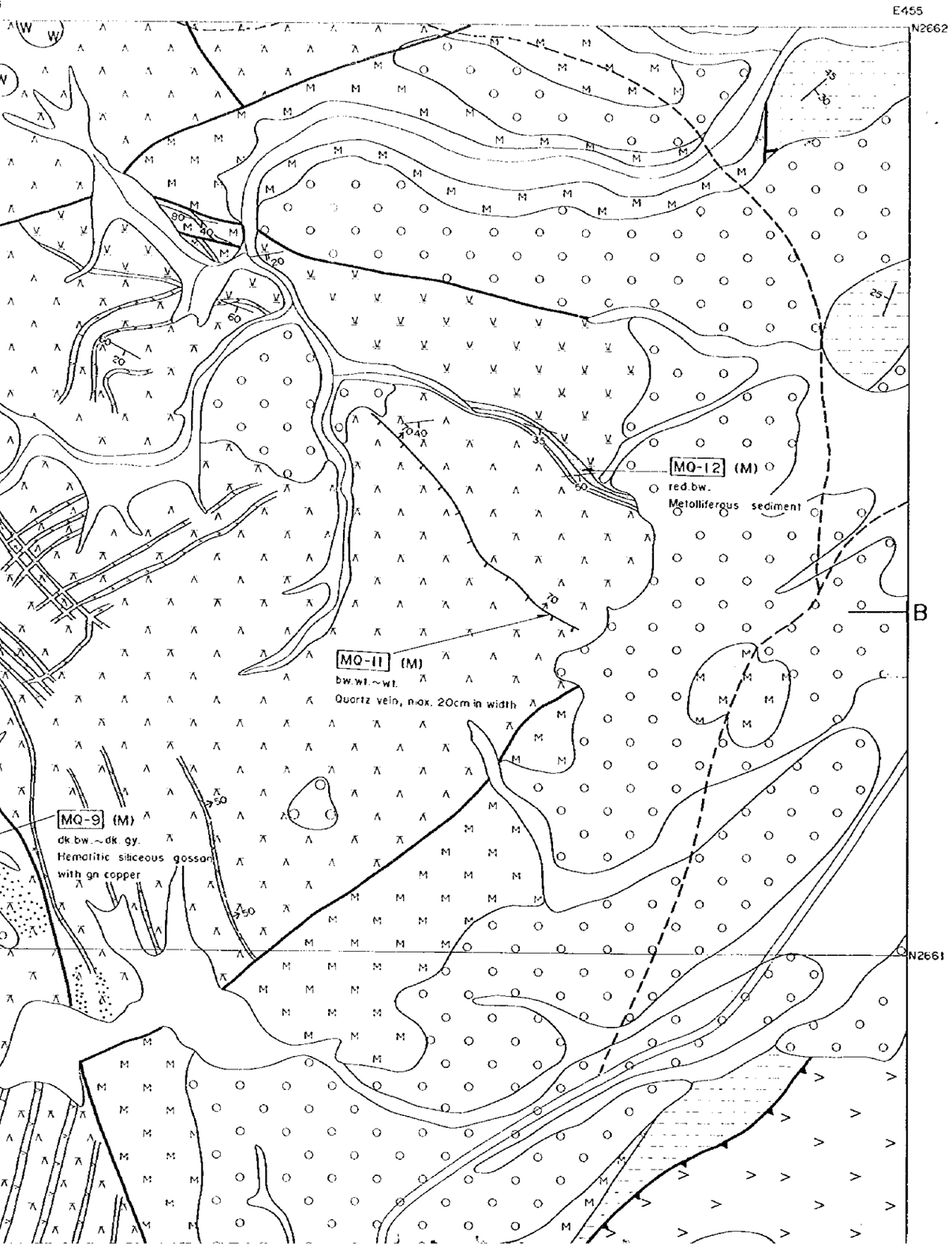
MQ-9 (M)
dk.bw.~dk.gy.
Hematitic siliceous gossan
with gn copper

MQ-11 (M)
bw.wt.~wt.
Quartz vein, max. 20cm in width

MQ-12 (M)
red bw.
Metalliferous sediment

A B

N2661



N

LEGEND

- Wadi sediments
- Alluvial fans and alluvium

Batinah Olistostrome

- Sp — Serpentinite
- Mg — Metagabbro
- Hz — Harzburgite
- Sc — Schist
- Osb — Basaltic pillow lava
- Osl — Limestone dominant facies
- Osc — Chert dominant facies

Upper Volcanic Rocks

Upper extrusives:

- V3p — Basaltic pillow lava
- V3m — Doleritic basalt massive lava
- Sh3 — Cherty shale and shale
- U3 — Metalliferous sediments

Middle Volcanic Rocks

Middle extrusives:

- V2d — Doleritic basalt lava
- V2m — Basaltic massive lava
- V2p — Basaltic pillow lava
- U2 — Metalliferous sediments

Lower Volcanic Rocks

- U1 — Metalliferous sediments with radiolarian chart

Lower extrusives:

- V1-2 — Lower extrusive 2 ; basaltic pillow lava and massive lava
- V1-1 — Lower extrusive 1 ; basaltic pillow lava and massie lava

Sheeted-dyke Complex

- SD — Doleritc and basaltic dyke

Intrusive Rocks

- D' — Doleritic and basaltic dyke
- Td' — Trondhjemite
- P' — Peridotite
- Gu' — Gabbro

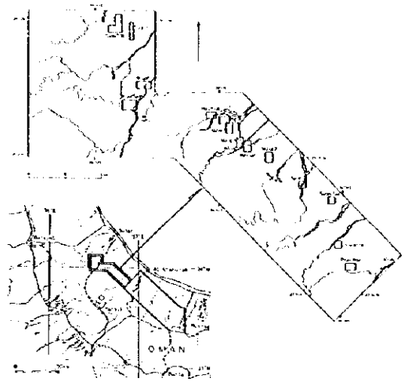
ECONOMIC GEOLOGY SYMBOLS

Plate II-1-14

REPORT ON THE MINERAL EXPLORATION
IN
THE SOUTH BATINAH COAST AREA, SULTANATE OF OMAN

PHASE I

GEOLOGIC MAP AND PROFILE OF MAQAIL SOUTH (Scale 1:2,500)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH, 1998

Highly silicified boundary between VI-1 and VI-2 with thin metalliferous sediment or without it in places

Rusty zone with gn copper

MQ-9 (M)
dk bw.~dk. gy.
Hematitic siliceous gosson with gn copper

Quartz vein, max. 20cm in width

N2661

N26

E453

E454

E455

0 100 200m

A

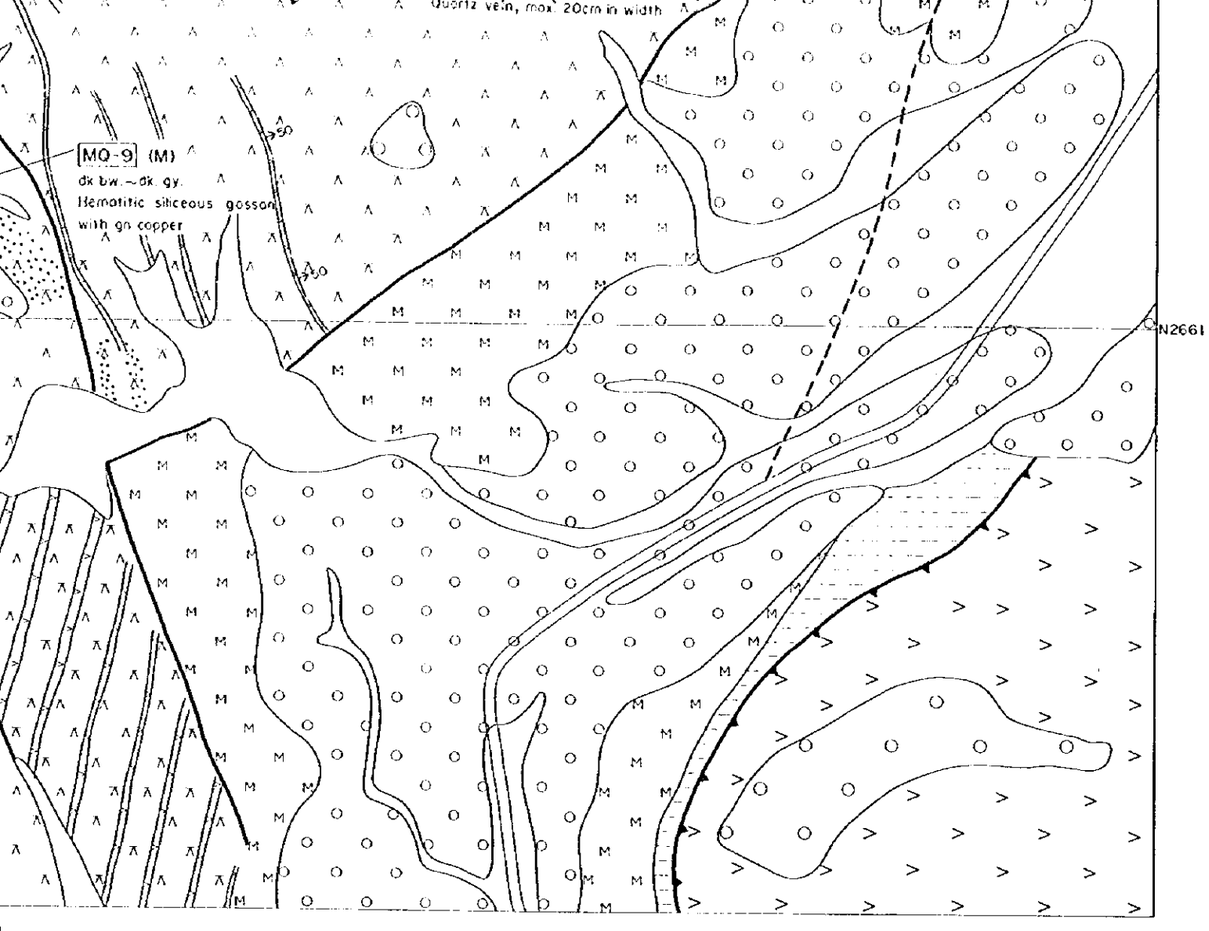
B

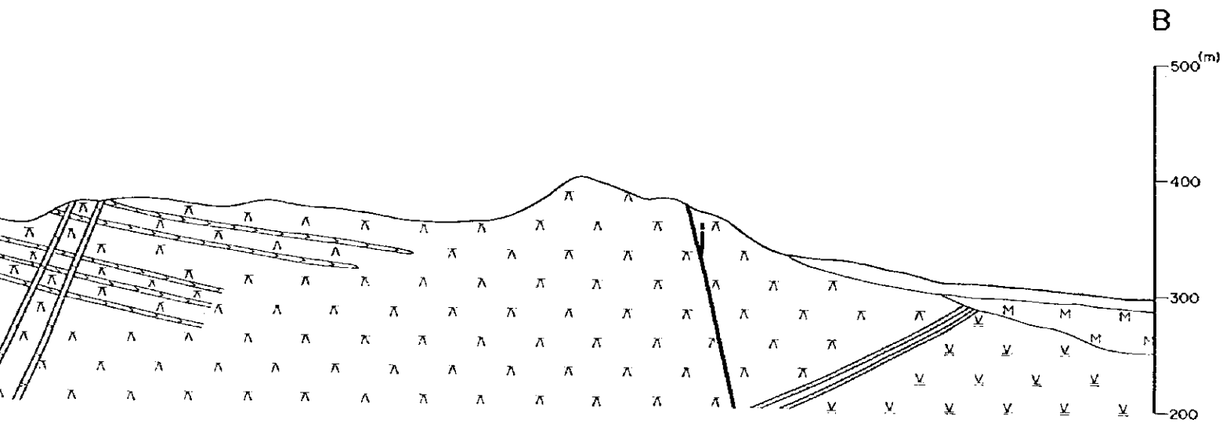
500 (m)

400

300

200





Lower Volcanic Rocks

Middle extrusives

- V_{2m} — Basaltic massive lava
- V_{2p} — Basaltic pillow lava
- U_2 — Metalliferous sediments

Lower extrusives

- U_1 — Metalliferous sediments with radiolarian chart
- V_{1-2} — Lower extrusive 2; basaltic pillow lava and massive lava
- V_{1-1} — Lower extrusive 1; basaltic pillow lava and massive lava

Sheeted-dyke Complex

- SD — Doleritc and basaltic dyke

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- D' — Doleritic and basaltic dyke
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- Gu' — Gabbro

ECONOMIC GEOLOGY SYMBOLS

- Gossanized mineral showing
- Rusty zone
- Quartz vein and network

STRUCTURAL FEATURES

- 50 — Strike and dip of bedding
- 50 — Strike and dip of dykes and sills
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- Syncline

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