PART III CONCLUSIONS AND RECOMMENDATIONS

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CHAPTER 1 CONCLUSIONS

Analysis of existing data including GEOSCAN image analysis, satellite image analysis, and geological survey and geochemical survey were carried out in Region I during the first year survey and the following conclusions were reached.

1. Many alteration zones were extracted in Paleogene and older formation and vicinity and in Miocene-Quaternary volcanic rocks by TM image analysis. These alteration zones are aligned in the NW-SE~NNW-SSE direction in the northern part, and in N-S~NNW-SSE direction in the central to the southern parts of the survey area. The above direction of alteration zone alignment is harmonious with the prominent direction of the lineaments developed in the alteration zones.

2. Analysis of images of visible near infrared-short-wave infrared region, short-wave infrared region, and thermal infrared region was carried out and the following results were obtained. Detailed geologic structure was clarified; alteration zones consisting of sericite, kaolin, alunite, and silica were extracted at Tignamar, Palca, Queen Elizabeth, Cerro Colorado, Copaquiri, and Collahuasi areas; and sericitized zone was extracted at Mocha area.

3. Mineralization of the known deposits and mineral prospects of the survey area was classified from the analysis of existing data on geology and ore deposits. And porphyry copper-type mineralized zones and possibly closely related prospects (Mo veins, irregular Cu, Cu veins, unknown-shaped Cu, Au veins, unknown-shaped Au) were selected.

4. Many mineral prospects closely related to porphyry copper-type mineralized zones are distributed in Paleocene-early Eocene porphyry copper belt in the northern part, and in Paleocene-early Eocene and late Eocene-early Oligocene porphyry copper belts in the central to southern parts of the survey area. Epithermal mineralized zones related to Miocene-Quaternary igneous activity occur in the northern to central parts of the area and some of it is believed to overlap with the porphyry copper mineralized zones.

5. Porphyry copper mineralized zones and possibly closely related prospects occur in and near Cretaceous-Tertiary intrusive bodies (plutonic and hypabyssal rocks).

6. Porphyry copper mineralized zones occur; in the northern and central parts in Cretaceous-Tertiary intrusive bodies or in Cretaceous volcanic rocks, and in the southern part in Paleozoic sedimentary and volcanic rocks, Cretaceous volcanic rocks, Paleozoic granitic rocks, or in Cretaceous-Tertiary intrusive bodies.

7. Faults on geological maps and fractures expressed as lineaments extracted from TM images are fractures which are generally closely related to the occurrence of ore deposits and prospects. The direction of the lineaments near the deposits and prospects is diverse. The porphyry copper mineralized zones occur either in the peripheries of the zones where lineaments are developed (Cerro Colorado, Collahuassi, etc.,) or near the center of lineament concentration (Quebrada Blanca, Copaquire, etc.).

8. In the central and southern parts many mineral prospects including porphyry copper mineralized zones occur in the alteration zones or vicinity, while in the northern part many of them occur in localities where alteration zones have not been extracted.

9. Assuming that hydrothermal activity related to mineralization is effective within a range of 4km from the alteration zones and ore deposits and prospects, hydrothermal zones are generally elongated in the NNW-SSE direction, but existence of those elongated in the E-W direction intersecting the major NNW-SSE direction is inferred. The known porphyry copper mineralized zones occur in this E-W hydrothermal system. The hydrothermal zones coincide with lineament concentration in the central and southern parts, but the correlation between the two is relatively poor in the northern part, with better coincidence with the distribution of Miocene-Quaternary volcanoes.

10. The following localities were selected as promising for porphyry copper occurrence.
Porphyry copper-type mineral prospects and within 4km range.
Mineral prospects possibly related to porphyry copper mineralization in Oligocene and older formations (Mo veins, irregular Cu, Cu veins, unknown-shaped Cu, Au veins, unknown-shaped Au) and alteration zones (acidic alteration zones and sericitized zones extracted by GEOSCAN image analysis and alteration zones

extracted by TM image analysis), and within 4km of the above.

CHAPTER 2 RECOMMENDATIONS FOR THE SECOND YEAR SURVEY

1. It is recommended that verification survey be carried out in localities selected as promising for porphyry copper occurrence and were not surveyed during the first year.

2. Geomagnetic anomalies at right angles to the axis of Central Andes are probably closely related porphyry copper-type mineralized zones. The existing airborne geomagnetic maps are not sufficiently precise for extracting promising zones. Therefore, it is recommended that high precision airborne geomagnetic survey be carried out and the details of the above trans-Central Andes geomagnetic anomalies be clarified. This will result in more focused targeting of the promising localities and in selection of promising localities for blind buried deposits in areas where alteration zones were not detected because of coverage by younger formations.

3. It is recommended that gravity survey be carried out in localities extracted as promising for porphyry copper occurrence by the above high precision airborne geomagnetic survey so that the thickness of the formations overlying mineralized zones can be inferred.

4. It is recommended that geological reconnaissance be carried out in localities considered to be promising from the results of image analysis and high precision airborne geomagnetic survey.

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