2-2 Geochemical Exploration

Geochemical exploration using stream sediments, panned concentrates and soil samples was carried out for finding indications of mineralized zones which would otherwise be undetected by geological survey, as well as for clarifying the extension of mineral occurrences discovered by the geological survey. Stream sediment samples were 312 fine sands of -80 mesh and panned concentrates were 53 samples. Soil samples which were taken from the B-layer 40 to 70 cm below the surface, amounted to 600 in total number. Six elements, Au, Sn, W, Th, Ce and U, were analysed.

2-2-1 Geochemical Exploration with Stream Sediments

(1) Results of data processing

Appendices Table 16 shows the geometric means and the maximum and minimum values of each element. The abundance of elements in crustal rocks (Mason, 1966) are also given for reference. The geometric means show somehow similar values to the average abundance of crustal rocks.

The result of principal component analysis carried out for six elements is followings.

The first principal component:

The highest values are obtained from W, and next from Sn. These elements are the ones which are expected to be associated with tin deposit in this area. Hence, this principal component is interpreted to represent the mineralization. Samples having factor scores of 2.0 or over are distributed over the WNW-ESE elongated zones at the upper reaches of S.Isahan.

The second principal component:

Positive values is shown by Au, and negative values by Ce and Sn. Geological significance of this component is not clear.

The third principal component: High positive value is obtained from U. There is no distinctive relationship between the localities of the high factor scores and geology. The significance of this component is difficult to explain geologically.

(2) Geochemical anomalies and anomalous zones

These results are stated in Chapter 1 Pegunungan Tigapuluh Area.

2-2-2 Geochemical Survey with Panned Concentrates

(1) Results of statistical processing

Appendices Table 18 shows the geometric mean, the maximum and minimum values of all samples. Comparing the mean values of the panned concentrates to that of the stream sediments, the former is fifteen times as high in Sn content as the latter, while the other elements in the panned concentrates are up to twice as high. This fact indicates that the heavy minerals in the stream sediments contain only a significant level of Sn and the other elements are not concentrated in the heavy minerals.

The result of principal component analysis carried out for the six elements is following.

The first principal component:

Sn, Th, Ce and U show high positive values. Samples with factor scores over 2.0 were distributed in the zones between S.Laki and S.A.Antan, and at the branches of S.Tulang. They show no clear correspondence with geology. It is difficult to understand the significance of this principal component.

The second principal component:

Sn and W show positive values. High factor scores were obtained from the upper reaches of S.Isahan. This is interpreted as the principal component related to the mineralization.

The third principal component:

Au shows high positive values. Au has no close relationship with other elements, it shows its independent behavior.

(2) Geochemical anomalies and anomalous zones

These results are explained in Chapter 1 Pegunungan Tigapuluh Area.

2-2-3 Geochemical Exploration with Soil Samples

Soil geochemistry was carried out in an area of 6 km^2 in which the known mineralized zones such as the S.Isahan and the S.Sikambu are located, aiming at delineating the extension of known zones and also finding new zones in the area. Sampling locations were arranged systematically in a grid pattern of 100 m× 100 m in the 3 km× 2 km rectangular area extending in the NW-SE direction. Samples were taken from the B-layer 40 to 70 cm below the surface using hand auger.

(1) Results of statistical processing

Appendices Table 20 shows the geometric mean, the maximum and minimum values for each element.

The result of principal component analysis which was carried out for six elements, is following.

The first principal component:

High positive values are shown by Au, Sn and W. High factor scores are obtained in two zones; one which is elongated in the WNW-ESE direction from the upper reaches of S.Isahan and another one which is at the junction of S.Sikambu and S.Tulang. This component is understood to represent Sn mineralization, because tin-mineralized zones are found in these zones.

The second principal component:

Th and Ce shows high positive values. High factor scores are obtained from the middle reaches of S.Tulang and the lower reaches of S.Sikambu, where leucocratic granites are expected to occur. Therefore, this principal component represents the nature of the leucocratic granite.

(2) Geochemical anomalies and anomalous zones

Thresholds for assay values of soil samples in this area are shown in Appendices Table 22.

Three anomalous zones were identified in the survey area; the zone extending approximately in the WNW-ESE direction from the upper reaches of S.Isahan to S.Tulang (named the S.Isahan-S.Tulang zone), the zone at the middle reaches of S.Isahan, and the zone near the junction of S.Sikambu and S.Tulang.

S.Isahan-S.Tulang: This zone is the largest (0.3×2 km) of the three zones. The anomalies of Au, Sn and W overlap in greater part of the zone, and Sn, Th, U anomalies are observed at the eastern extension of this zone as well. Anomalous values are 10 to 65 ppb Au, 16 to 72 ppm Sn and 33 to 90 ppm W. Th (37 to 69 ppm) and U (6.8 to 13.2 ppm) are also anomalous. The S.Isahan tin-mineralized zone and the leucocratic granite are distributed in this zone.

Middle reaches of S.Isahan: This is composed of three Sn anomalies (23 to 150 ppm). Mineralization and intrusive body are not known in this zone.

Junction of S.Sikambu and S.Tulang: Anomalies of Au and Sn are distributed. Anomalous values of Au and Sn are 10 ppb and 16 to 68 ppm, respectively. The S.Sikambu mineralized zone and leucocratic granite are distributed in the zone.

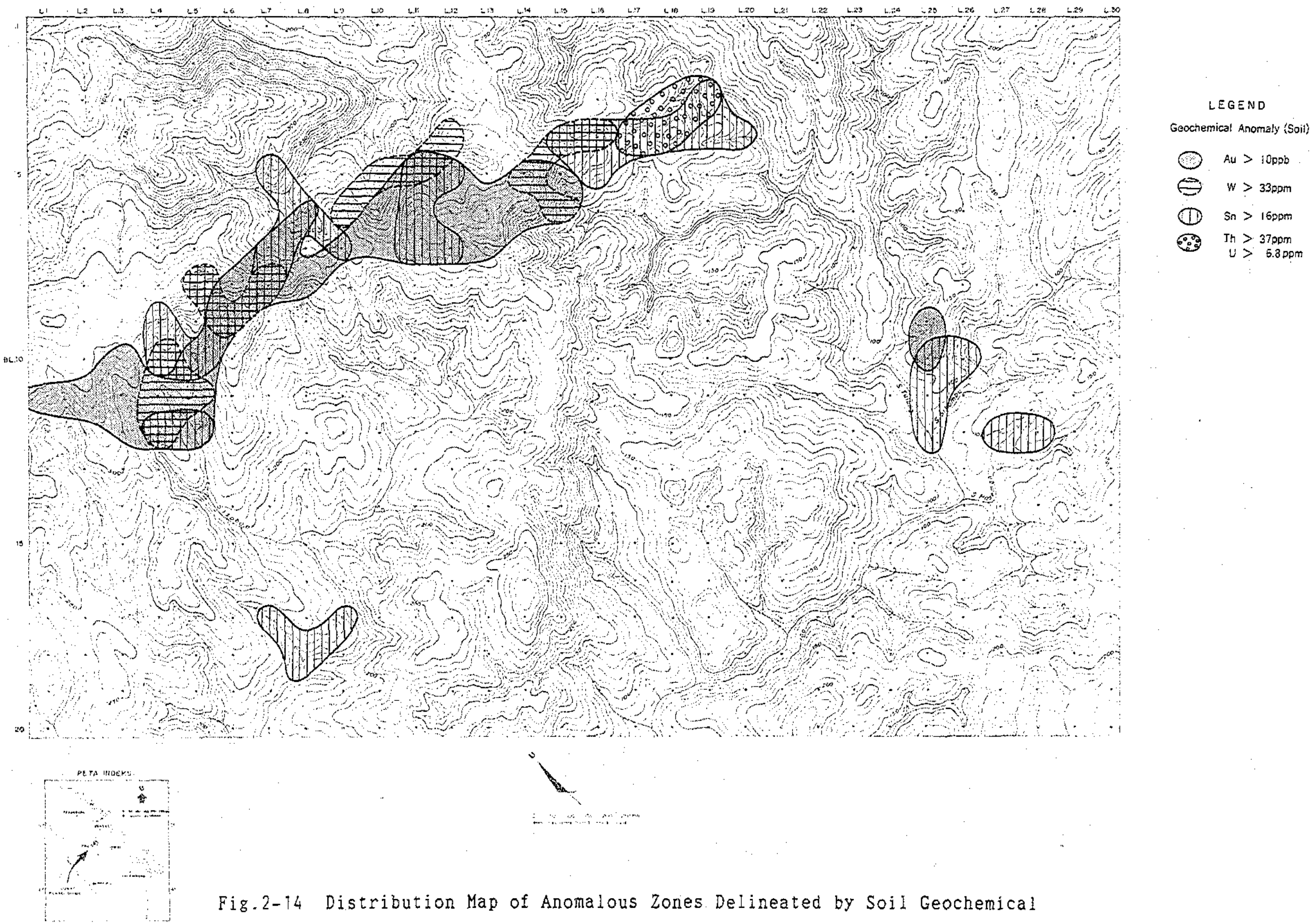

Fig.2-14 Distribution Map of Anomalous Zones Delineated by Soil Geochemical Exploration in the Bt.Pintutujuh Area

2-2-4 Relationship of Geochemical Anomalies of soil samples to Mineralization and Alteration

Three anomalous zones were identified; namely the zone extending approximately in the WNW-ESE direction from the upper reaches of S.Isahan to S.Tulang (the S.Isahan-S.Tulang zone), the zone at the middle reaches of S.Isahan, and the zone near the junction of S.Sikambu and S.Tulang. Mineralization and alteration are observed in the zones except for the middle reaches of S.Isahan.

At the zone from the upper reaches of S.Isahan to the branches of S.Tulang, leucocratic granite bodies occur at three localities. Tin mineralization occurs in a body at the upper reaches of S.Isahan (the S.Isahan mineralized zone).

At the junction of S.Sikambu and S.Tulang, tin mineralization is developed (the S.Sikambu mineralized zone).

The A-rank anomaly of stream sediments at the middle reaches of S.Isahan is not reflected in the anomalies of panned concentrates. This zone, therefore, is regarded to be in the lower rank of overall geochemical assessment.

2-3 Drilling

2-3-1 Objectives, Locations and Total Lengths of Holes

For evaluating the mineral occurrence in the cassiterite-bearing mineralized zones extracted from the results of geological survey and geochemical exploration, a drilling programme consisting of four holes at S.Isahan and another two holes at S.Sikambu was carried out. The localities and lengths of the drilling programme are summarized in Table 2-3. Figures 1-10 to 11 show the drill hole location, geology and geologic sections.

Table 2-3 Localities and Lengths of Drilling Programme

Drill No.	Locality	Coordinates		Elevation	Inclination	Drilled length
		Latitude	Longitude			
MJIT-1	S. Sikambu	S0°49′28″	E102°20′30″	78m	-90°	101.0m
MJIT-2	ditto	S0°49′26″	E102°20′28″	102m	-90°	101.7m
MJIT-3	S. Isahan	S0°48′37″	E102°19′44″	167m	-90°	101.0m
MJIT-4	ditto	S0°48′39″	E102°19′41″	155m	-90°	101.4m
MJIT-5	ditto	S0°48′39″	E102°19′46″	238m	-90°	100.5m
MJIT-6	ditto	S0°48′34″	E102°19′41″	215m	-90°	100.4m

2-3-2 Drilling Methods, Equipment and Progress

(1) Methods

For the surface weathered soil with gravel layers (up to 4 m thick), drilling was done by normal method using NX-CP metal shoe (diameter 92 mm), and NX casing pipes were inserted. For the bedrock, wire-line method was used with NQ (diameter 79 mm) and BQ (diameter 62 mm) oversized diamond bit. Drilling fluid was often lost in the holes where fractures were developed. This trouble were prevented by injecting the Tel-stop and oil bentonite.

(2) Equipment

The rig used was Longyear L-24 and the specifications of the major machines and pumps are shown in Appendices Table 22.

(3) Working system

① Working system

Drilling operation was carried out by three shifts per day (8 hours per shift), while the appurtenant works such as construction, mobilization and demobilization were carried out by one shift per day. Each shift consisted of one Japanese, one Indonesian engineer and three Indonesian workers. Additional fifteen Indonesian workers participated in the appurtenant work.

All of the team members stayed in the camps established near the drilling sites during the work. Drilling crew commuted to the drilling site on foot. The summary of working time in drilling is shown in Appendices Table 24.

② Construction of transportation tracks

An existing road for timber transportation passes the point 1.5 km east of the S.Sikambu area. From that point, two tracks (7 m wide), one 3.6 km long to the S.Sikambu area and another 5.0 km long to the S.Isahan area, were newly constructed by bulldozer for transporting the drilling equipment. Construction periods were 17 days in the S.Sikambu area and 42 days in the S.Isahan area.

③ Transportation

Most of the equipment were shipped from Japan and landed at Padang in west Sumatra. From there to the base camp in Pangkalankasai, they were transported by truck and unloaded temporarily. Four wheel drive trucks carried the equipment from the base camp to the end of the existing road. From that point to the sites, they were transported by bulldozer.

④ Water

Water for drilling was pumped from S.Sikambu or S.Isahan. Pumping length was up to 650 m, and water head up to 90 m.

⑤ Withdrawal

After the completion of operation, most of the equipment were sent back to Japan. Drilled cores were transported to Bandung and stored in the D.M.R..

2-3-3 Results

2-3-3-1 Geology

The subsurface geology of the area confirmed from the study of drill cores is composed of siltstone, shale and pebbly siltstone of the S.Tulang Member of the Paleozoic Bt.Pintutujuh Formation, leucocratic granite which intruded into the Paleozoic System, fine-grained sandstone and conglomerate of the Neogene S.Empelu Formation, and the Quaternary sand and gravel.

The leucocratic granite was penetrated in three holes; MJIT-1, 2 and 3. The rock is composed of quartz, potassium feldspar, plagioclase and muscovite as major rock-forming minerals. A part of the potassium feldspar and plagioclase was saussuritized. The phenocrysts were cracked and muscovite (sericite) filled voids among the fragments. Secondary quartz was crystallized. Kaoline is observed as an alteration product.

The Paleozoic rocks contain fragments of quartzite and quartz. Muscovite, biotite, calcite and dolomite were formed in the matrix.

2-3-3-2 Mineralization

Ore minerals observed in drill cores are pyrite, arsenopyrite, cassiterite, molybdenite, chalcopyrite and sphalerite. Gangue minerals are quartz, calcite, potassium feldspar, tourmaline, muscovite and fluorite. These minerals occur as veinlets or dissemination.

The widest vein is in MJIT-3. It is a quartz-muscovite (-tourmaline-limonite) vein and is 43 cm wide. The numbers of veins which are wider than 1 cm and 5 cm in each hole are listed in the following table.

Hole No.	Numbers of veins(>1cm)	Numbers of veins(>5cm)
MJIT-1	1	1
MJIT-2	10	1
MJIT-3	45	18
MJIT-4	9	5
MJIT-5	4	3
MJIT-6	17	5

Quartz is the major constituent in these veins, followed by pyrite, muscovite, tourmaline, calcite and arsenopyrite in the order of abundance. Cassiterite and molybdenite occur very rarely. Cassiterite-bearing quartz vein was found in MJIT-3 only. Molybdenite was intersected in MJIT-3 and MJIT-4.

Most of the thin veins less than 1 cm ranges between 0.5 mm and 3 mm in width. They are network veinlets, and the frequency of occurrence is 5 to 40 veins in 1 m of drill core. The mineral assemblages of the veinlets are quartz-muscovite (-tourmaline-pyrite-potassium feldspar), quartz (-potassium feldspar), quartz (-pyrite), quartz-calcite (-pyrite), and pyrite only. The quartz-calcite (-pyrite) veinlets are limited to Paleozoic siltstone, while quartz-muscovite (-tourmaline-pyrite-potassium feldspar) is limited to leucocratic granite.

The sequence of mineralization is inferred from the mineralization of the veins as follows; quartz-potassium feldspar-tourmaline-muscovite-pyrite-arsenopyrite (-cassiterite or-molybdenite), quartz-potassium feldspar-pyrite, quartz-pyrite and calcite-quartz-pyrite.

The disseminated ore mineral is mainly pyrite, and is limited to leucocratic granite. Cassiterite is observed only at 67.1 m of MJIT-2.

The nature of alteration observed in this area is silicification, argillization and dissemination of muscovite and tourmaline. Both silicification and muscovite dissemination (tourmaline or pyrite associated in rare cases) were observed to occur in leucocratic granites in MJIT-1 and MJIT-3. The alteration, greisenization, was intersected at five different depths in MJIT-1 (10 to 150 cm wide), and also at five depths in MJIT-3 (10 to 100 cm wide). Tourmaline dissemination was found in leucocratic granite in MJIT-1. Argillization consisting of muscovite (sericite) and kaoline was observed in leucocratic granite and Paleozoic strata. Occurrence of chlorite was reported in some of the leucocratic granite bodies.

As already mentioned above, most veins are not thick (nearly 1 cm in average width). The network veinlets are also thin with less than 1 cm in width. Also cassiterite is observed to occur disseminated and it is concluded that these mineral deposits should be treated as massive bodies for evaluation purpose. Samples for assaying were collected from every 1.5 m in MJIT-1, 2 and 3. In case of MJIT-4 and 6, samples were collected in parts where quartz veins and networks were developed. A drill core was cut into four columns and one column was used for assay samples. Six elements - Au, Sn, W, Th, Ce and U - were analysed. Results of chemical analysis of core samples and drilling geology of six holes are shown in Appendices Table 25 and Appendices Figure 1, respectively. The results are summarized as follows.

Au: Rather low with highest at 0.07 g/t.
Sn: Up to 0.24 %. Most of them are less than 0.01 % (93 % of all samples).
W: All less than 0.01 %.
Th: ditto
Ce: All less than 0.02 %
U: All less than 0.01 %

It is seen that they are all very low grade. Of these, samples with Sn content of more than 0.1 % were obtained from the following depths.

Hole No.	Depth(m)	Width	Sn(%)
MJIT-2 (S.Sikambu)	51.0-52.5	1.5m	0.24
	55.5-57.0	1.5m	0.22

The average grade of Sn at 49.5 to 57.0 m (7.5 m in length) in MJIT-2 including the two samples in the above table is 0.11 %.

Relationship between Sn-grade and mineralization was considered as follows. Regarding the constituent minerals and the Sn grade of the veins, high Sn values occur in the parts in which quartz-tourmaline-pyrite veins are densely developed. On the other hand, the parts in which clay veins or quartz-calcite-pyrite veins are developed, has low content of Sn. High Sn values were also observed in the parts of cassiterite dissemination in leucocratic granite.

Of the six elements, W-U showed negative correlation. Siltstone has high content of W, while U is high in the leucocratic granite.

Chapter 3 Discussions

3-1 Pegunungan Tigapuluh Area

The geology of this area is composed of the Carboniferous to Permian sedimentary strata, the Jurassic to Early Cretaceous granitic rocks, the Paleogene tuffs, the Neogene sedimentary strata and the Quaternary sediments.

The intrusive age of granitoids of the survey area ranges from Middle Jurassic to Early Cretaceous. The granitoids distributed in the western structural belt of Malay Peninsula, are of Late Triassic to Early Jurassic intrusion. These two plutonic rocks, therefore, have considerably close age of emplacement. The Carboniferous to Permian sedimentary strata of the survey area can be construed to be of marine glacial origin, particularly the conglomeratic mudstone. Then the Paleozoic strata and the granitoids of the survey area can be correlated to those of the western structural belt of Malay Peninsula. Those granitic rocks of Malay Peninsula carry tin mineralization and placer tin deposits are distributed in the vicinity. These placer deposits also contain Nb, Ta and other rare earth elements.

The granitic rocks in the area belong to the ilmenite series, based upon the results of the whole rock analysis and magnetic susceptibility. The granitic rocks are classified into porphyritic biotite granite, biotite granite, leucocratic granite, pegmatite and aplite, from their lithology and chemical composition. The metal concentration expected to be associated with the ilmenite series granitoids are lithophile elements such as Sn, W, Be, Nb, Ta and Th. Both porphyritic biotite granite and biotite granite bodies are distributed approximately in the NW-SE direction, and porphyritic biotite granite becomes younger northwestward. Biotite granite bodies are distributed to west of the porphyritic biotite granite distribution area, and ages of biotite granites are younger than those of porphyritic biotite granites. The chemical composition of the porphyritic biotite granite does not changed with age.

The photogeological interpretation pointed out that the trend of the majority of lineaments in the pre-Tertiary units is in the WNW-ESE and NNW-SSE direction.

There is a high possibility that a NNW-SSE to NW-SE trending graben or fracture zone, which formed during Late Cretaceous to Early Tertiary, underlies the Neogene zone along S.A.Antan in the west and along S.Gangsal in the central part of the survey area. The NNW-SSE fault system which became active in Oligocene changed to vertical slip fault because of the block uplift of the Paleozoic strata and the granitic bodies which occurred from Miocene.

Six A-rank anomalous zones of stream sediments were delineated for Sn, two zones for Sn, W and Au and one zone for Nb, W, Zr, Th, Ce, Y, U, Li and Sn. Four A-rank anomalous zones of panned concentrates were delineated for Sn, three zones for Sn and W or Au and three zones for Sn and Nb-W, Nb or Li and one zone for Sn, Zr and Li.

It is seen that A-rank geochemical anomalies were obtained for both stream sediments and panned concentrates at the two known mineralized zones. Localities other the above known mineralized zones, where both types of samples show A-rank anomalous geochemical values, are four Sn or Sn-W anomalous zones around the known mineralized zones.

The leucocratic granites distribute in the four A-rank geochemical anomalous zones included the known tin-mineralized zones. The six A-rank geochemical anomalous zones arrange approximately in the WNW-ESE direction. Thus it is considered that the structural weak line with the WNW-ESE direction controlled the distribution of mineralization.

It is concluded that the mineralization expected to occur in the Pegunungan Tipapuluh area is the primary mineralization of Sn and W and the Bt.Pintutujuh area is delineated as a promising area.

3-2 Bt.Pintutujuh Area

The geology of this area is composed of the Carboniferous to Permian sedimentary strata, the Jurassic to Early Cretaceous granitic rocks and the Neogene Tertiary sedimentary strata.

The granitic rocks of this area are classified into biotite granite, leucocratic granite and aplite from their lithology and chemical composition. The leucocratic granite hosts greisen whose radiometric age is Jurassic (160 to 150 Ma). This age is much closer to that of the porphyritic biotite granite (167 to 134 Ma) than that of the biotite granite (113 to 110 Ma). It is considered from the results of the geological survey and drilling exploration that the leucocratic granite is an intrusive facies of granite. This consideration and the age relationship, combined with the general phase relationship between muscovite granite and porphyritic biotite granite in Belitung, Indonesia (the muscovite granite is as the dyke facies of the porphyritic biotite granite, according to Schwartz, 1990), suggest the existence of porphyritic biotite granite intruded beneath the leucocratic granite.

Regarding the distribution of leucocratic granites which host the known tin mineralization, they are predominantly arranged approximately in the WNW-ESE direction from the upper reaches of S.Isahan to S.Tulang. This direction coincides with the trend of geochemical anomalous zones mentioned above. Thus it is considered that the WNW-ESE direction controlled distributions of leucocratic granite bodies and mineralized zones.

A soil geochemistry focusing on the area of 6 km^2 including the known mineralized zones was carried out. From the soil geochemistry, three anomalies were identified; one extending from the upper reaches of S.Isahan to S.Tulang in approximately WNW-ESE direction (the S.Isahan-S.Tulang zone), the middle reaches of S.Isahan, and the junction of S.Sikambu and S.Tulang. Of these, the S.Isahan tin-mineralized zone and three bodies of leucocratic granite are distributed in the S.Isahan-S.Tulang zone. In the junction of S.Sikambu and S.Tulang, the S.Sikambu tin-mineralized zone and a leucocratic granite bodies are distributed. Overlap of A-rank anomalous zones of both stream sediments and panned concentrates was observed in five localities. Three zones of these, which are upper reaches of S.Isahan, lower reaches of S.Sikambu and S.Tulang, overlap with soil anomalous zones.

The elements which constitute the A-rank anomalous zone in stream sediments/panned concentrates and soil anomalies are Sn and W. Thus the geochemical exploration results indicate the possibility of Sn-W mineralization in the survey area. All three geochemical methods showed the trend of anomalous zones arranged or extending in the WNW-ESE direction.

Mineralization in the S.Isahan and S.Sikambu tin-mineralized zones resulted in veinlets and dissemination. Quartz is the major constituent of the veins followed by pyrite, muscovite, tourmaline, calcite and arsenopyrite in decreasing order. Cassiterite and molybdenite occur very sparsely in the veins. The sequence of mineralization, which are inferred from the mineralization of the veins, is quartz-potassium feldspar-tourmaline-muscovite- pyrite- arsenopyrite (-cassiterite or -molybdenite), quartz-potassium feldspar-pyrite, quartz-pyrite, calcite-quartz-pyrite. Cassiterite, pyrite, tourmaline and muscovite are disseminated in the rock. Disseminated ore minerals are mainly composed of pyrite, and the distribution is limited in leucocratic granite. Cassiterite dissemination which can be observed by unaided eyes occur only in the leucocratic granite at the S.Sikambu zone.

The highest grade detected from cassiterite-bearing quartz vein outcrops is 3.84 % Sn, 0.07 % W and 0.02 % Ce. Samples from trenches 1 to 2 m in width which were excavated in the leucocratic granite contained 0.2 to 0.5 % Sn, and 0.08 to 0.24 % Ce.

Regarding drill cores, analysis showed that the contents of Au, W, Th, Ce and U are all low. The highest Sn content was 0.24 % and most of the samples contained less than 0.01 % (93% of all samples). One of the relatively high Sn zone (sampled 7.5 m in length from 49.5 m to 57.0 m in MJIT-2, leucocratic granite) contained an average 0.11 % Sn.

There is no clear relation between alteration and grades. High grade assay values were expected in greisen, but it showed no clear tendency of increase in the greisenized parts.

Statistical analysis of correlation coefficients of six elements -Au, Sn, W, Th, Ce and U- analysed in drilling exploration, showed that one of them, W-U, had the negative correlation. W has the tendency to have higher content in siltstone, while U has the high values in leucocratic granite. Tin-tungsten mineralization was expected to occur from the results of geochemical exploration in the survey area. Drilling results, however, showed that the mineralization which could be expected in the area was only tin mineralization.

The study of resource potential of the survey area was carried out separately for two parts, namely the drill-tested zone of S.Isahan and S.Sikambu, and other zones.

【 S.Isahan and S.Sikambu 】

The element which can be expected to occur in the S.Isahan and S.Sikambu mineralized zones is Sn, from the results of geological and geochemical surveys and drilling. Drilling exploration showed that the ore grade tin mineralization could occur as either cassiterite-bearing quartz veins or cassiterite dissemination in leucocratic granite. Leucocratic granite bodies which can be found to host mineralization cannot be expected to be very large, because it is the intrusive facies of porphyritic biotite granite. The data obtained and presently available is insufficient to conduct ore reserve calculation. However, since the grade exceeds 0.1 % Sn at only two points of MJIT-2 with width of 1.5 m and the maximum content is low at 0.24 % Sn, it is concluded that economically feasible deposits do not occur in the S.Isahan and S.Sikambu zones.

【 Other zones 】

Evaluation of soil anomalous zones overlapping with results of stream sediment and panned concentrate geochemistry is as follows.

The Sn geochemical anomalies ranging from 16 to 72 ppm were detected in the broad anomalous zone in the S.Isahan-S.Tulang zone (excluding the drill-tested area at S.Isahan). These anomalous values are similar to the Sn content obtained from soil samples at the drilling site. As leucocratic granite is distributed, tin mineralization can be expected in this zone. It is concluded from the values and the areal extent of the anomalies of the soil geochemical work that the grade and scale of the mineralization which can be expected here would be similar to those of the S.Isahan and S.Sikambu zones.

Examination of geochemical anomalies other than those of soil is as follows.

A-rank geochemical anomalies of stream sediments and panned concentrate are obtained in only one locality, at the S.Pinang zone west of the S.Isahan mineralized zone. Anomalous values are distributed along the main stream of S.Pinang, which shows the possibility of mineralization at the upper reaches. The upper reaches of S.Pinang is located at the western extension of leucocratic granite developed between S.Isahan and S.Tulang.

PART Ⅲ CONCLUSIONS

Part Ⅲ Conclusions

Chapter 1 Conclusions

1-1 Pegunungan Tigapuluh Area

The geology of the survey area is composed of Carboniferous to Permian sedimentary strata, Jurassic to Early Cretaceous granitoids, Paleogene pyroclastic rocks, Neogene sedimentary strata and Quaternary sediments.

The granitoids distributed in this area are classified into porphyritic biotite granite, biotite granite, leucocratic granite, pegmatite and aplite, from their lithology and chemical composition. All of these rocks belong to the ilmenite series from their chemical compositions and magnetic susceptibilities. The porphyritic biotite granite is in a more advanced stage of differentiation than the biotite granite.

The porphyritic biotite granite is arranged in the central to the eastern part while the biotite granite from the western to the central part of the survey area in NW-SE direction.

The mineralized zones are the cassiterite-bearing quartz vein network and cassiterite dissemination at the upper reaches of S.Isahan and the lower reaches of S.Sikambu in the western part of the area.

Six A-rank anomalous zones of stream sediments were delineated for Sn, two zones for Sn, W and Au and one zone for Nb, W, Zr, Th, Ce, Y, U, Li and Sn. Two of these nine zones correspond to the known tin-mineralized zones, with the Sn geochemical anomalies ranging from 70 to 710 ppm.

Four A-rank anomalous zones of panned concentrates were delineated for Sn, three zones for Sn and W or Au and three zones for Sn and Nb-W, Nb or Li and one zone for Sn,Zr and Li. Two of these eleven zones correspond to the known tin-mineralized zones.

The known mineralized zones show A-rank geochemical anomalies both with stream sediment and panned samples. There are four A-rank anomalous zones(Sn or Sn-W) located around the known mineralized zones.

These six A-rank geochemical anomalies are distributed approximately in the NNW-SSE direction. This fact indicates that the mineralization of this area was controlled by the weak structure line of NNW-SSE direction.

From the results of geological survey and geochemical exploration in the Pegunungan Tigapuluh area, primary Sn and W mineralization is prospective in the area. Primary Sn, W mineralization is expected in the Bt.Pintutujuh area.

1-2 Bt.Pintutujuh Area

The geology of the Bt.Pintutujuh area is composed of Carboniferous to

Permian sedimentary strata, Jurassic to Early Cretaceous granitic rocks and Neogene sedimentary strata.

The granitic rocks distributed in the area are classified into biotite granite, leucocratic granite and aplite from their lithology and chemical composition. It is considered that the leucocratic granite is the intrusive facies of granite, and thus it is inferred that the porphyritic biotite granite exist beneath the leucocratic granite without surface exposures.

Fault systems of WNW-ESE and NNW-SSE trends are developed in the survey area. The leucocratic granites which host the known tin mineralization, are arranged approximately in the WNW-ESE direction from the upper reaches of S.Isahan to S.Tulang.

Whole survey area of this area was covered by geochemical exploration using stream sediments and panned concentrates. In addition to that, soil geochemical survey was carried out over an area of 6 km^2 in which the known mineralized zones were located. Six elements, Au, Sn, W, Th, Ce and U, were analyzed.

The results of geochemical exploration using stream sediments and panned concentrates are already stated in (1) Pegunungan Tigapuluh Area.

Three anomalous zones were identified from the soil geochemistry; one extending from the upper reaches of S.Isahan to S.Tulang approximately in the WNW-ESE direction (the S.Isahan-S.Tulang zone), the middle reaches of S.Isahan, and the junction of S.Sikambu and S.Tulang. Among the three soil anomalous zones, the S.Isahan-S.Tulang zone occupies the largest area (0.3 × 2 km).

The elements which constitute A-rank anomalous zones for both stream sediments, panned concentrates and soil anomalies are Sn and W. All these geochemical surveys showed a trend of anomalous zones arranged in the WNW-ESE direction. It coincides with the direction which controlled the intrusions of leucocratic granite.

Mineralization is composed of small veins and dissemination in the S.Isahan and S.Sikambu tin-mineralized zones. Quartz is the major constituent mineral in veins. Pyrite, muscovite, tourmaline, calcite and arsenopyrite are associated with quartz in decreasing order. Cassiterite and molybdenite are very seldom found in veins. The sequence of mineralization, which is assumed from the vein mineralization, is quartz-potassium feldspar-tourmaline- muscovite- pyrite- arsenopyrite (-cassiterite or-molybdenite), quartz-potassium feldspar-pyrite, quartz-pyrite and calcite-quartz-pyrite.

Cassiterite, pyrite, tourmaline and muscovite are disseminated in the host rock. Dissemination of ore mineral is mainly composed of pyrite, and the distribution is limited in leucocratic granite. Cassiterite dissemination was only observed in the leucocratic granite at the S.Sikambu zone.

The highest grade detected from cassiterite-bearing quartz vein outcrops was 3.84 % Sn, 0.07 % W and 0.02 % Ce. Samples from trenches 1 to 2 m wide including the quartz veins in the leucocratic granite have composition ranging from 0.2 to 0.5 % Sn and 0.08 to 0.24 % Ce.

Assay results of drill cores are summarized as follows:

Au: Rather low grade in general, up to 0.07 g/t.
Sn: Up to 0.24 %. Most of them are less than 0.01 % (93 % of total samples).
W: All less than 0.01 %.
Th: ditto
Ce: All less than 0.02 %
U: All less than 0.01 %

The leucocratic granite is composed mainly of quartz, potassium feldspar, plagioclase and muscovite. Phenocrysts of these minerals are broken. Muscovite (sericite) is recrystallized in the matrix filling the void among the fragments of these phenocrysts. Secondary fine-grained quartz is also formed. Greisen was observed in some of the drill cores both in the S.Sikambu and S.Isahan zones. Kaoline was detected as an alteration product. There is no close relationship between the numbers of veins and the alteration in leucocratic granite.

Siltstone, shale and pebbly siltstone of the S.Tulang Member of the Paleozoic Bt.Pintutujuh Formation contain fragments of quartzite and quartz. They also contain muscovite, biotite, calcite or dolomite in the matrices. Parts of the rock adjacent to quartz veins are bleached, often containing secondary fine quartz.

There is no clear relation between alteration and grades. High grade assay values have been expected in greisen, but there is no clear tendency of increase of grade in the greisenized parts.

The type of ore deposit which are expected to occur in the survey area can be cassiterite-bearing primary deposit, based on the results of geological survey, geochemical exploration and drill. The possibility in each zone are summarized as follows.

【 S.Isahan and S.Sikambu 】

The element which can be expected to occur in the S.Isahan and S.Sikambu mineralized zones is Sn, from the results of geological and geochemical surveys and drilling. Drilling exploration showed that the ore garde tin mineralization could occur as either cassiterite-bearing quartz veins (whose mineral assemblage is quartz-potassium feldspar-tourmaline-muscovite-pyrite-arsenopyrite-cassiterite) or cassiterite dissemination in leucocratic granite. Leucocratic granite bodies which can be found to host mineralization cannot be expected to be very large, because it is the intrusive facies of porphyritic biotite granite. The data obtained and presently available is insufficient to conduct ore reserve calculation. However, since the grade exceeds 0.1 % Sn at only two points of MJIT-2 with width of 1.5 m and the maximum content is low at 0.24 % Sn, it is concluded that economically feasible deposits do not occur in the S.Isahan and S.Sikambu zones.

【 Other zones 】

Evaluation of the resource potential was carried out on the basis of the soil geochemistry as follows.

The Sn geochemical anomalies ranging from 16 to 72 ppm were detected in the broad anomalous zone in the S.Isahan-S.Tulang zone (excluding the drill-tested area at S.Isahan). These anomalous values are similar to the Sn content obtained from soil samples at the drilling site. As leucocratic granite is distributed, tin mineralization can be expected in this zone. It is concluded from the values and the areal extent of the anomalies of the soil geochemical work that the grade and scale of the mineralization which can be expected here would be similar to those of the S.Isahan and S.Sikambu zones. Other soil anomalies are not of interest, because they are either independent anomalies not overlapping with results of other methods or their areal extent is small.

Examination of geochemical anomalies other than those of soil is as follows.

A-rank geochemical anomalies of stream sediments and panned concentrate are obtained in only one locality, at the S.Pinang zone west of the S.Isahan mineralized zone. Anomalous values are distributed along the main stream of S.Pinang, which shows the possibility of mineralization at the upper reaches. The upper reaches of S.Pinang is located at the western extension of leucocratic granite developed between S.Isahan and S.Tulang. It is inferred that a leucocratic granite related to tin mineralization occur in there. But, judging from values of geochemical anomalies of stream sediments and panned concentrates, it is difficult that a mineralized zone with ore grade exceeding those of the known mineralized zones is expected to occur.

From the results of these surveys, it was clarified that possibility of existence of economically feasible deposits in the survey area is low.

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APPENDICES

Table 1 Analytical Results of Major Elements and Weight Ratios of C.I.P.W. Norm Minerals of Granitic Rocks in Pegunungan Tigapuluh Area

No.	A-7	A-18	A-20	A-25	A-28	CR-28	CR-35	CR-38	DR-38	ER-17
Rock	Gp	Gb	Gb	Gb	Gp	Gp	Gb	Gb	Gp	Gp
SiO_2	71.81	66.47	64.12	63.08	72.88	71.94	61.11	65.36	71.86	70.66
TiO_2	0.33	0.54	0.59	0.67	0.26	0.30	0.70	0.49	0.33	0.27
Al_2O_3	13.98	15.33	15.37	15.42	13.88	13.97	15.58	15.00	14.08	14.59
Fe_2O_3	0.24	0.90	1.24	1.26	0.50	0.83	1.38	0.91	0.80	0.75
FeO	2.35	4.12	4.60	5.11	2.11	2.29	5.48	4.07	2.32	2.43
MnO	0.05	0.08	0.10	0.12	0.05	0.05	0.11	0.09	0.06	0.08
MgO	0.72	1.18	1.98	2.20	0.55	0.62	2.56	1.81	0.66	0.55
CaO	1.57	3.32	4.07	4.46	1.59	1.86	4.87	3.50	2.06	1.47
Na_2O	2.73	2.38	2.46	2.34	3.05	2.87	2.34	3.07	3.03	2.81
K_2O	4.96	4.10	3.78	3.68	4.39	4.73	3.54	4.08	4.57	5.59
P_2O_5	0.22	0.26	0.25	0.28	0.17	0.22	0.28	0.22	0.20	0.23
BaO	0.04	0.12	0.08	0.10	0.03	0.05	0.09	0.08	0.03	0.06
LOI	0.96	1.11	1.01	0.99	0.44	0.74	1.54	1.23	0.16	0.68
Total	100.20	100.30	100.10	100.20	100.10	100.70	100.20	100.30	100.40	100.40
F(ppm)	530	600	510	640	410	780	650	540	630	800
Q	31.47	26.04	21.36	19.95	33.18	31.45	17.04	19.73	30.48	27.99
C	1.79	1.56	0.43	0.15	1.63	1.27	0.00	0.00	0.88	1.79
or	29.31	24.23	22.34	21.75	25.95	27.95	20.92	24.11	27.01	33.04
ab	23.09	20.13	20.80	19.79	25.79	24.27	19.79	25.96	25.62	23.76
an	6.36	14.78	18.57	20.31	6.79	7.80	21.56	15.10	8.92	5.80
di-wo	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.35	0.00	0.00
di-en	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00
di-fs	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.20	0.00	0.00
hy-en	1.79	2.94	4.93	5.48	1.37	1.54	6.23	4.36	1.64	1.37
hy-fs	3.67	6.08	6.64	7.46	3.12	3.11	7.79	5.88	3.16	3.55
mt	0.35	1.31	1.79	1.83	0.73	1.21	2.00	1.31	1.16	1.09
il	0.63	1.03	1.12	1.27	0.49	0.57	1.33	0.93	0.63	0.51
ap	0.52	0.62	0.59	0.66	0.40	0.52	0.66	0.52	0.47	0.54
Total	98.96	98.69	98.56	98.64	99.43	99.68	97.97	98.60	99.97	99.43
D.I.	83.87	70.40	64.50	61.49	84.92	83.67	57.75	69.80	83.11	84.79

Abbreviation

Gp:Porphyritic Biotite Granite. Gb:Biotite granite.

Table 2 Analytical Results of Major Elements and Weight Ratios of C.I.P.W. Norm Minerals of Intrusive Rocks in Bt.Pintutujuh Area

No.	FR-5	FR-7	FR-9	FR-14	FR-15	FR-16	FR-19	FR-27	GR-29	GR-63
Rock	La	Gb	Gl	Gl	Gl	Gl	Gl	Gl	Gb	Gb
SiO_2	47.32	59.27	71.28	76.26	63.65	73.11	69.36	74.17	63.12	60.07
TiO_2	0.63	0.84	0.01	0.01	<0.01	0.01	0.03	0.01	0.56	0.61
Al_2O_3	12.89	14.92	16.61	14.73	20.84	14.22	18.06	14.86	15.38	15.43
Fe_2O_3	0.86	1.31	0.51	0.06	0.53	1.10	0.09	0.00	1.11	1.49
FeO	6.60	6.05	0.36	0.22	1.17	0.57	0.52	0.20	4.05	5.08
MnO	0.13	0.14	<0.01	<0.01	0.08	0.01	0.02	<0.01	0.09	0.13
MgO	8.24	2.67	0.02	0.34	0.07	<0.01	0.04	0.20	1.95	2.74
CaO	6.80	4.98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.95	4.60
Na_2O	2.68	2.12	0.11	<0.01	0.13	0.15	0.08	0.11	2.69	2.80
K_2O	1.41	3.64	6.12	3.65	7.93	8.58	4.75	6.98	4.38	3.49
P_2O_5	0.12	0.20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	0.11
BaO	0.07	0.12	0.05	0.04	0.08	0.04	0.04	0.04	0.12	0.11
LOI	9.07	1.22	4.30	3.72	3.37	1.97	5.48	2.70	1.27	1.59
Total	96.82	97.48	99.39	99.05	97.87	99.77	98.48	99.28	98.79	98.25
Q	0.00	15.52	47.09	61.60	31.60	39.33	50.27	46.36	17.47	14.10
C	0.00	0.00	9.81	10.77	12.05	4.69	12.79	7.13	0.00	0.00
or	8.33	21.51	36.17	21.57	46.87	50.71	28.07	41.25	25.89	20.63
ab	22.66	17.93	0.93	0.04	1.10	1.27	0.68	0.93	22.75	23.68
an	18.98	20.45	0.00	0.00	0.00	0.00	0.00	0.00	16.96	19.23
di-wo	5.83	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.77	1.20
di-en	3.62	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.57
di-fs	1.87	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.61
hy-en	12.16	6.12	0.05	0.85	0.17	0.01	0.10	0.50	4.50	6.25
hy-fs	6.29	8.20	0.23	0.35	1.85	0.14	0.87	0.36	5.35	6.72
ol-fo	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ol-fa	1.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
mt	1.24	1.89	0.74	0.08	0.77	1.59	0.13	0.00	1.61	2.17
il	1.20	1.60	0.02	0.02	0.01	0.02	0.06	0.02	1.06	1.16
ap	0.28	0.47	0.01	0.01	0.01	0.01	0.01	0.01	0.28	0.26
Total	87.67	96.14	95.04	95.28	94.41	97.76	92.96	96.54	97.39	96.55
D.I.	30.99	54.96	84.19	83.21	79.57	91.31	79.02	88.54	66.11	58.41

Abbreviation

Gb:Biotite granite, Gl:Leucocratic granite, La:Lamprophyre

Table 3 Assay Values of Trace Elements of Intrusive Rocks in Bt.Pintutujuh Area

No.	Rock	F ppm	W ppm	Sn ppm	Li ppm	Rb ppm	Sr ppm	Ce ppm	Th ppm	Ta ppm	U ppm	Nb ppm	Y ppm	Zr ppm
FR-5	La	380	3	2	35	37	190	40	11.0	<2.0	2.4	11	23	89
FR-7	Gb	560	17	4	35	110	205	100	26.0	<2.0	4.4	15	48	185
FR-9	Gl	260	125	3	6	295	5	6	35.0	4.0	7.6	25	110	79
FR-14	Gl	1450	95	5	33	330	2	6	37.0	14.0	10.8	46	155	71
FR-15	Gl	1460	17	90	64	830	3	4	22.0	<2.0	10.4	24	240	76
FR-16	Gl	620	3	2	34	460	8	22	34.0	<2.0	8.0	16	110	73
FR-19	Gl	770	175	4	29	410	4	16	28.0	4.0	24.6	18	120	61
FR-27	Gl	1120	225	5	27	540	3	8	27.0	6.0	13.6	20	170	73
GR-29	Gb	530	<2	5	25	145	215	106	33.0	<2.0	7.4	16	41	150
GR-63	Gb	510	<2	3	23	123	215	64	24.0	<2.0	10.4	18	45	140

Abbreviation

Gb:Biotite granite, Gl:Leucocratic granite, La:Lamprophyre

Table 4 Results of Principal Component Analysis of Assay Values of Trace Elements of Intrusive Rocks in Bt.Pintutujuh Area

	1		2		3	
	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading
F	0.25	0.66	0.40	0.60	0.10	0.11
W	0.29	0.77	-0.21	-0.32	-0.24	-0.27
Sn	0.17	0.46	0.47	0.71	0.08	0.09
Li	0.00	0.01	0.61	0.92	-0.05	-0.06
Rb	0.33	0.89	0.11	0.16	0.20	0.22
Sr	-0.36	-0.97	0.03	0.05	0.16	0.18
Ce	-0.33	-0.88	0.01	0.01	0.31	0.35
Th	0.19	0.52	-0.26	0.39	0.63	0.72
Ta	0.27	0.74	-0.30	-0.46	-0.11	-0.13
U	0.28	0.74	-0.02	-0.03	0.31	0.35
Nb	0.29	0.79	-0.10	-0.14	0.19	0.21
Y	0.36	0.96	0.09	0.14	0.06	0.07
Zr	-0.28	-0.74	0.05	0.07	0.47	0.53
Eigen.	7.23		2.26		1.27	
Propo.	0.56		0.17		0.10	
Cum. prop	0.56		0.73		0.83	

Table 5 Results of K-Ar Dating

Sample No.	Locality	Rock Name	Sample Type	Potassium (k wt%)	Rad. 40Ar (10^{-6}cc/g)	K-Ar age (Ma)	Air cont. (%)
A20	S. Manggajohan	Bi-Gr	Whole rock	3.02	15.5±0.2	128±3	3.2
				±0.06	15.4±0.2	127±3	3.3
A28	S. Muara	Por-Gr	Whole rock	3.40	18.5±0.2	135±3	2.7
				±0.07	18.2±0.2	133±3	2.3
CR38	S. Tulang	Bi-Gr	Whole rock	3.22	14.1±0.2	109±3	4.6
				±0.06	14.3±0.2	111±3	4.8
DR38	S. Mentaus	Por-Gr	Whole rock	3.70	21.4±0.2	144±3	1.9
				±0.07	21.2±0.2	142±3	1.8
ER17	S. Salai	Por-Gr	Whole rock	3.46	23.3±0.2	166±3	1.8
				±0.07	23.5±0.2	167±3	1.5
GR63	S. Tulang	Bi-Gr	Whole rock	3.13	14.2±0.2	113±2	4.1
				±0.06	14.1±0.2	113±2	3.9
MJIT-1	S. Sikambu	Greizen	Whole rock	5.42	35.2±0.5	160±4	2.0
44.7m				±0.11	35.1±0.6	160±4	1.9
MJIT-3	S. Isahan	Greizen	Whole rock	4.19	25.2±0.4	149±4	1.8
11.8m				±0.08	25.5±0.3	150±3	1.7

Abbreviation

Bi-Gr : Biotite Granite,   Por-Gr : Porphyritic Biotite Granite

Leu-Gr : Leucocratic Granite

Table 6 Results of Microscopic Observation of Thin Sections(1)

Sample No.	Locality	Rock Name	Texture	Phenocryst								Alteration
				Qz	Af	Pl	Bi	Mu	Ho	Ep	Fe	
A7	S. Tabuh	Gr	Equi	○	◎	△	○				△	Bi→Ch, Pl→Se
AR18	S. Manggojahan	Gr	Equi	◎	○	○	○				△	Bi→Ch, Se
A20	ditto	Gd	Equi	○	○	○	◎		△		△	Bi→Ch, Se, Ho→Ch
A25	ditto	Gd	Glom	○	○	○	◎		○		△	Bi→Ch, Se, Ho→Ch
A28	S. A. Muara	Gd	Equi	○	◎	○	○		△		•	
CR10	S. Keruntung	Pe	Grap	○	◎	△		•				Pl→Se
CR13	S. Mentaus	Gr	Grap	◎	◎	△	△				△	Bi, Pl→Se
CR14	ditto	Pe	Pegm	○	◎							Af→Se
CR16	ditto	Gr	Equi	◎	○	△	○				•	Bi→Ch, Se
CR18	ditto	Gr	Porp	○	△	△	◎		△			Ho→Ch
CR25	S. Nibul	Gr	Equi	◎	○	○	○				△	Bi→Ch, Se
CR28	ditto	Gr	Equi	○	◎	△	○				△	Bi→Ch
CR35	S. Tulang	Gd	Equi	○	○	○	○		○		△	Bi→Se, Ch, Ho→Ch
CR38	ditto	Gd	Equi	○	○	○	○		○		•	Bi→Se, Ch, Ho→Ch
CR45	S. Isahan	Gr	Pegm	△	◎	△						Af→Mu, Mf→Fe
CR49	ditto	Gr	Grap	○	◎	△					•	Af, Pl→Mu
CR51	ditto	Gr	Equi	◎	◎	△						Af, Pl→Mu
CR56	S. Sikambu	Gr	Equi	○	◎	△		○			△	Af, Pl→Se
DR1	S. Lemang	Qv~Ap		◎				△	•	•	△	
DR2	S. Penal	Qv~Ap		◎			•	•	•			
DR7	S. Tualang	Qv~Ap		◎	△			•		•		
DR38	S. Akar	Gr	Equi	△	○	○	○				△	Bi→Ch
ER17	S. Nibul	Gr	Equi	○	○	○	○					Bi→Ch

Sample No.	Locality	Rock Name	Texture	Mineral Chip									Matrix	Altered or Metamor. Mineral								
				Qz	Af	Pl	Bi	Mu	Ho	Py	Mf	Fe	Se	Qz	Af	Pl	Bi	Mu	Ho	Ch	An	Fe
AR27	S. A. Muara	Ho	Horn	○					○								○			◎		○
CR34	S. Tulang	Ho	Porp	○		△	△	○									•		•			
DR20	S. Sepegas	Ss		◎									◎									
ER1	S. Sesirih	Ph	Cata	◎	△	△	○	◎		△							△	△		◎		
ER4	ditto	Ho	Cata	◎	△	△												◎		◎		
ER6	ditto	Ho	Pobl	○	△	△	○	○									○	○		○	○	
ER7	S. Usul	Gn	Cata	◎	△	○	○		○								○	○			△	
ER11	S. Selensen	Ho	Schi											△	△	△	○	○		○		△

Abbreviations

Texture
Equi; Equigranular
Glom; Glomeroporphyritic
Grap; Graphic
Pegm; Pegmatitic
Porp; Porphyritic
Cata; Cataclastic
Pobl; Porphyroblastic
Schi; Schistose

Rock Name
Gr ; Granite
Gd ; Granodiorite
Pe ; Pegmatite
Qv ; Quartz vein
Ap ; Aplite
Ho ; Hornfels
Ss ; Sandstone
Ph ; Phyllite
Gn ; Gneiss

Mineral
Qz; Quartz
Af; Alkali feldspar
Pl; Plagioclase
Bi; Biotite
Mu; Muscovite
Ho; Hornblende
Ep; Epidote
Fe; Iron minerals
Py; Pyrite
Mf; Mafic minerals
Se; Sericite
Ch; Chlorite
An; Andalusite

Table 6 Results of Microscopic Observation of Thin Sections(2)

Sample No. (Drill No.)	Locality (Depth)	Rock name	Texture	Phenocryst											Alteration
				Qz	Kf	Pl	Bi	Mu	Ho	Ac	Cu	Ca	Zr	Fe	
FR5	S. Sikambu	La	Ophi	△		◎	◎	○		○		○		△	
FR6	ditto	Ap-Qv	Apli	○	○	◎	△	△				○			Bi-Ch, Pl-Sa
FR7	ditto	Gd	Equi	△	○	◎	○		○		○		△		Pl-Sa
FR9	S. Peseman	Da	Apli	○		△									→Qz, Se, Fe
FR10	ditto	Gr	Equi	○	○	◎		◎						•	Pl, Kf-Sa
FR16	S. Sikambu	Gr	Equi	◎	○	◎		○						•	Pl, Kf-Sa
FR19	ditto	Gr	Equi	○	△	○									Pl, Kf-Mu, Ch
GR29	S. Tulang	Gr	Equi	◎	◎	◎	○		○		○			•	Pl-Sa
GR59	S. Lemang	Ap	Apli	◎	•	•		◎							
GR63	S. Tulang	Qd	Equi	◎	◎	◎	○		○			○		•	Bi-Ch
MJIT-1	26.7m	Gr	Equi	◎	◎	○		△						•	→Mu, Pl, Kf-Sa
MJIT-1	42.5m	Gr	Porp	◎	◎	◎		△							→Mu, Qz Pl, Kf-Sa
MJIT-1	51.2m	Gr	Equi	◎	◎	○		○						•	→Mu, Pl, Kf-Sa
MJIT-1	80.4m	Gr	Equi	◎	○	◎								•	→Se, Pl, Kf-Sa
MJIT-2	67.0m	Gr	Porp	◎	○	◎									→Se, Qz Pl, Kf-Sa
MJIT-2	86.5m	Gr	Equi	◎	○	△		△							Pl, Kf-Sa
MJIT-2	94.7m	Gr	Equi	◎	△	○		○							→Se, Qz Pl, Kf-Sa
MJIT-3	56.7m	Gr	Equi	◎	○	○		△							→Se, Qz, To Pl, Kf-Sa
MJIT-3	89.0m	Gr	Equi	◎	○	△	•	△							→Qz Pl, Kf-Sa
MJIT-3	93.0m	Gr	Equi	◎	○	○									→Mu, Qz Pl, Kf-Sa

Abbreviations

Rock Name

Gr ; Granite
Gd ; Granodiorite
Qd ; Quartz diorite
Ap ; Aplite
Da ; Dacite
La ; Lamprophyre
Qv ; Quartz vein
Hr ; Hornfels
Si ; Siltstone
Sr ; Silicified rock

Texture

Equi; Equigranular
Porp; Porphyritic
Apli; Aplitic
Ophi; Ophitic

Mineral

Qz ; Quartz
Kf ; K-feldspar
Pl ; Plagioclase
Bi ; Biotite
Mu ; Muscovite
Ho ; Hornblende
Ac ; Actinolite
Cu ; Cummingtonite
Ca ; Calcite
Zr ; Zircon
Fe ; Fe mineral
Ch ; Chrolite
Sa ; Saussurite
Se ; Sericite
Ct ; Chert
Cl ; Clay
Sn ; Cassiterite
To ; Tourmaline

Table 6 Results of Microscopic Observation of Thin Sections(3)

Sample No. (Drill No.)	Locality (Depth)	Rock Name	Rock and Mineral Chips			Matrix						
			Ct	Qz	Ho	Qz	Mu	Bi	Ho	Cl	Ca	Fe
FR2	S. Sikambu	Hr	△	◎			◎	◎				·
FR12	S. Peseman	Hr		◎			◎	◎			·	·
FR13	S. Sikambu	Hr		◎			◎					·
FR32	ditto	Hr	△	◎	·		◎	◎			·	·
GR38	S. Tulang	Si		◎	·					◎		
GR39	ditto	Si		◎					·			·
GR47	S. Isahan	Si		◎		◎			·			·
GR61	S. A. Antan	Hr	△	◎			◎	◎				·
MJIT-1	89. 7m	Si	△	◎		○	◎				○	
MJIT-2	95. 0m	Si	○	◎		○	◎	○				
MJIT-3	34. 9m	Si	△	◎		○				◎		
MJIT-4	52. 0m	Si		◎		○	△				△	
MJIT-4	82. 0m	Si	○	○		○	◎					·
MJIT-4	96. 0m	Si		◎		◎	○				△	·
MJIT-4	98. 0m	Si		◎		◎				◎		
MJIT-5	60. 5m	Si	△	◎			○					·
MJIT-6	84. 0m	Si	△	◎			○			○		·
MJIT-6	85. 3m	Si		◎			◎					·
MJIT-6	99. 3m	Si		◎		○				◎	○	·

Sample No. (Drill No.)	Locality (Depth)	Rock Name	Mineral			
			Qz	Mu	Sn	Fe
FR30	S. Isahan	Sr	◎	○		·
FR33	ditto	Qv	◎		◎	
MJIT-3	26. 0m	Sr	◎	◎		·

Table 7　Results of Microscopic Observation of Polished Sections

Boring No.	Depth	Py	Cp	Sp	Ap
MJIT-1	8.0m	△	•		
MJIT-1	15.2m	△			
MJIT-1	79.0m	△			
MJIT-2	94.4m	△	•	•	
MJIT-3	19.3m	△			
MJIT-3	36.8m	•			
MJIT-3	63.8m	◎			◎
MJIT-4	82.5m	△			
MJIT-6	13.7m	△			
MJIT-6	85.3m	○	△	•	
MJIT-6	88.2m				△

Abbreviations

Py;Pyrite, Cp;Chalcopyrite, Sp;Sphalerite,
Ap;Arsenopyrite
◎;Abundant, ○;Common, △;Rare, • ;Trace

Table 8 Results of X-ray Diffraction Analysis

Sample No. (Drill No.)	Locality (Depth)	Mineral														
		Qz	Kf	Pl	Ho	Mu	Bi	Ka	Ch	Be	To	Gi	Py	Ca	Do	Cs
A5	S. Tabu	◎				•		○								
CR6	S. Lemang	○	△	△		△		•								
CR11	S. Mentaus	◎	△										•			
CR12	ditto	◎				△							•			
CR14	ditto	◎	○	○		•										
CR17	S. Akar	○	△	•		•					•					
CR21	S. Keruntung	◎	•			•							•			
CR26	S. Nibul	◎	◎	○		△										
CR31	S. Salai	○	△			•		△								
CR32	ditto	○				•		•					△			
CR33	S. Tulang	◎	△			•		•								
CR37	ditto	○	△			△			•							
CR38	ditto	○	○	△	•				•							
CR42	S. Peseman	◎				•							•			
CR43	S. Isahan	◎				•		△								
CR44	ditto	◎				○										
CR45	ditto	○	•			△		•		•						
CR46	ditto	◎				△					•					•
CR48	ditto	○				△				•	•		•			
CR49	ditto	○	△			○		•								
CR50	ditto	○	○			△		△								
CR51	ditto	◎	○			△										
CR54	S. Sikambu	◎	○			△										
CR56	ditto	◎	○			△		△								
CR60	ditto	◎				•		△								
CR62	S. Isahan		•			◎		•								
CR64	S. Sikambu	◎	•	•		△										
D07	S. A. Batui	◎				•										
D08	S. Matah	◎				•		•					•			
ER16	S. Laki	◎	•			•										
EX1	S. Sesirih	◎				•										
TP1-3	S. Salai	◎				△		○								
FR1	S. Sikambu	◎	○			△		△						•		
FR14	S. Isahan	◎				•		•								
FR15	ditto	◎	△	•		△		•						•		
FR17	S. Sikambu	◎	△			•		△								
FR18	ditto	◎	•	•		•		△	•							
FR19	ditto	◎				△		•				•				
FR20	ditto	◎	•			•		△	•							
FR22	S. Isahan	◎	•				○									
FR23	ditto	◎					△	•								
FR24	ditto	○	•				△	•								
FR25	ditto	◎					•	△								
FR26	ditto	◎		•		△										
FR27	ditto	◎	○			△		△								
FR28	ditto	◎	•			•		△								
FR29	ditto	◎						△								
FR30	ditto	◎				○										
FR31	ditto	◎				•		△								
GR20	S. Laki	◎	△			△		•						•		
GR59	S. Lemang	◎	△	○		○		•						•		
GR60	S. A. Antan	◎	•			•							○			
MJIT-1	74.0m	◎	◎			•		•						•		
MJIT-2	72.5m	◎	△			△							•			
MJIT-3	65.1m	◎	△			△		•								
MJIT-3	84.6m	◎	△			△		•								
MJIT-3	89.0m	◎	◎	△		△		•	•					•		
MJIT-4	96.0m	◎				△									○	

Abbreviation

Qz:Quartz, Kf:K-feldspar, Pl:Plagioclase, Ho:Hornblende, Mu:Muscovite, Bi:Biotite
Ka:Kaolinite, Ch:Chlorite, Be:Beryl, To:Tourmaline, Gi:Gibbsite, Py:Pyrite
Ca:Calcite, Do:Dolomite, Cs:Cassiterite

Table 9 Assay Values of Ore Samples

Sample No.	Location	Sample name	Au (g/t)	Ag (g/t)	Sn (%)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	TiO_2 (%)	Th (ppm)	Ce (ppm)	Y (ppm)	Li (%)	La (ppm)	MnO (%)	Fe (%)	U (ppm)
C02	S. Lemang	Qtz. vein in the Paleozoic	<0.07	<0.5	<0.01	14	<1.0	<1	84	0.38	12.0	90	21	<0.01	45	0.06	2.77	
CR11	S. Mentaus	Silicified rock	<0.07	<0.5	<0.01	16	<1.0	12	115	0.46	13.0	170	37	<0.01	36	<0.01	2.95	
CR12	ditto	Silicified rock	<0.07	<0.5	<0.01	17	<1.0	6	140	0.52	9.0	200	39	<0.01	61	0.01	3.07	
CR14	ditto	Pegmatite with Qtz veinlet	<0.07	<0.5	<0.01	23	<1.0	<1	50	0.03	8.0	80	68	<0.01	36	0.01	0.81	
CR20	S. Akar	Qtz. vein with Py spot	<0.07	<0.5	<0.01	7	6.0	<1	11	<0.02	<1.0	250	<1	<0.01	31	0.01	2.45	
CR21	S. Keruntung	Qtz. vein with Py	<0.07	<0.5	<0.01	8	<1.0	9	22	0.06	<1.0	60	5	<0.01	<1	0.03	5.14	
CR31	S. Salai	Por. Bi. Granite with Py dis	<0.07	<0.5	<0.01	21	<1.0	12	115	0.26	33.0	79	49	<0.01	85	0.01	1.08	
CR32	ditto	Por. Bi. Granite with Py net	<0.07	<0.5	<0.01	19	<1.0	<1	135	0.20	29.0	191	37	<0.01	20	0.01	7.29	
CR41	S. Peseman	Qtz. vein	<0.07	<0.5	<0.01	12	<1.0	<1	90	0.28	11.0	121	19	<0.01	59	0.06	3.19	
CR42	S. Pesenan	Silicified rock with Py net	0.21	0.8	<0.01	15	<1.0	<1	95	0.24	<1.0	203	27	<0.01	21	<0.01	5.29	
CR44	S. Isahan	Greisen in shale	<0.07	0.5	0.11	19	8.0	43	46	0.10	24.0	390	198	<0.01	49	0.04	3.57	
CR46	ditto	Qtz. vein with cassiterite	<0.07	<0.5	3.84	64	19.0	660	16	0.02	<1.0	195	13	<0.01	<1	0.03	1.09	
CR48	ditto	Arsenopyrite vein	<0.07	<0.5	<0.01	26	7.0	21	68	<0.02	18.0	81	195	<0.01	<1	<0.01	5.48	
CR50	ditto	Greisenized granite	<0.07	1.0	0.25	23	7.0	45	44	<0.02	31.0	2420	210	<0.01	<1	0.04	2.77	
CR52	ditto	Greisenized granite	<0.07	1.0	0.52	17	7.0	26	34	<0.02	16.0	811	150	<0.01	<1	0.01	1.00	
CR58	S. Sikambu	Qtz. vein with Arsenopyrite	<0.07	0.5	<0.01	24	<1.0	15	40	0.06	24.0	372	36	<0.01	29	0.08	3.69	
CR64	ditto	Qtz. vein with Muscovite	<0.07	<0.5	<0.01	12	9.0	55	13	<0.02	<1.0	80	25	<0.01	<1	0.02	0.92	
D07	S. Balui	Silicified rock with Py	<0.07	<0.5	<0.01	13	7.0	<1	105	0.28	10.0	98	21	<0.01	<1	<0.01	2.20	
D08	S. Matah	Clay vein with Py	<0.07	<0.5	<0.01	15	<1.0	<1	160	0.46	11.0	162	56	<0.01	90	0.02	6.09	
ER16	S. Laki	Qtz. vein in the Bi. granite	<0.07	0.8	<0.01	23	<1.0	6	57	<0.02	28.0	616	27	<0.01	87	<0.01	1.27	
EX1	S. Sesirib	Qtz. vein in the paleozoic	<0.07	<0.5	<0.01	7	6.0	<1	10	<0.02	<1.0	24	<1	<0.01	50	0.02	1.20	
FR3	S. Sikambu	Qz-Arsenopyrite-musco vein	<0.07	-	0.01	-	-	3	-	-	3.0	2	-	-	-	-	-	1.0
FR13	S. Pinang	Qz-Arsenopyrite network	<0.07	-	<0.01	-	-	3	-	-	6.0	24	-	-	-	-	-	0.8
FR26	S. Isahan	Silicified shale	<0.07	-	<0.01	-	-	190	-	-	16.0	54	-	-	-	-	-	4.8
FR30	ditto	Sili-Muscovitized rock	<0.07	-	<0.01	-	-	9	-	-	13.0	<2	-	-	-	-	-	7.2
GR14	Tri. of S. A. Antan	Qz vein	<0.07	-	0.01	-	-	16	-	-	10.0	30	-	-	-	-	-	0.8

Table 10 Basic Statistics of Assay Values of Stream Sediments in Pegunungan Tigapuluh Area

	Au (ppb)	Ag (ppm)	Sn (ppm)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	Ti (ppm)	Th (ppm)	Ce (ppm)	Y (ppm)	U (ppm)	Li (ppm)	La (ppm)
Logarithmic Mean	<1	<0.2	2	16	8	<2	629	4019	12	71	17	4	11	27
Max.	57	0.5	875	45	31	22	10300	23700	220	680	360	165	47	360
Min.	<1	<0.1	<1	9	<1	<2	90	830	<1	<1	<1	<1	2	<1
Average Amounts of Crustal Rocks	4	0.07	2	20	2	1.5	165	4400	7.2	60	33	1.8	20	30
Concentation	14	7	438	23	16	15	62	5	31	11	11	92	2	12

Table 11 Results of Principal Component Analysis of Assay Values of Stream Sediments in Pegunungan Tigapuluh Area

	1		2		3		4	
	Eigenvector	Factor Loading	Eigenvector	Factor Loading	Eigenvector	Factor Loading	Eigenvector	Factor Loading
Au	0.04	0.08	-0.20	-0.26	-0.49	-0.53	0.46	0.48
Sn	0.03	0.06	0.44	0.57	-0.32	-0.34	0.16	0.17
Nb	0.43	0.85	-0.06	-0.07	0.00	0.00	0.02	0.02
Ta	-0.11	-0.22	0.51	0.66	0.08	0.09	-0.27	-0.29
W	0.27	0.53	0.26	0.33	-0.01	-0.02	0.51	0.54
Zr	0.29	0.58	0.31	0.40	-0.43	-0.46	-0.21	-0.22
Ti	0.31	0.62	-0.28	-0.36	-0.03	-0.03	-0.40	-0.42
Th	0.33	0.66	0.14	0.18	0.25	0.27	-0.20	-0.21
Ce	0.28	0.56	-0.09	-0.12	-0.31	-0.34	-0.14	-0.15
Y	0.43	0.86	-0.07	-0.09	0.09	0.10	0.05	0.06
U	0.19	0.37	0.44	0.57	0.30	0.32	0.10	0.10
Li	0.32	0.64	-0.19	-0.24	0.38	0.42	0.30	0.31
La	0.16	0.32	-0.05	-0.07	-0.24	-0.26	-0.25	-0.27
Eigen.	3.91		1.68		1.16		1.10	
Propo.	0.30		0.13		0.09		0.08	
Cum. prop	0.30		0.43		0.52		0.60	

Table 12 Thresholds for Assay Values of Stream Sediments in Pegunungan Tigapuluh Area

Au (ppb)	Sn (ppm)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	Ti (ppm)	Th (ppm)	Ce (ppm)	Y (ppm)	U (ppm)	Li (ppm)	La (ppm)
9	69	27	64	7	2048	9984	73	652	79	58	31	606

Table 13 Basic Statistics of Assay Values of Panned Concentrates in Pegunungan Tigapuluh Area

	Au (ppb)	Ag (ppm)	Sn (ppm)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	Ti (ppm)	Th (ppm)	Ce (ppm)	Y (ppm)	U (ppm)	Li (ppm)	La (ppm)
Logarithmic Mean	<1	<0.2	19	22	9	2	918	5385	15	107	22	4	7	41
Max.	270	0.5	3400	176	67	120	43260	48720	395	2814	441	126	74	1386
Min.	<1	<0.1	<1	3	<1	<2	73	420	<1	<1	<1	<1	<1	<1

Table 14 Comparison of Average Assay Values of Stream Sediments and Panned Concentrates in Pegunungan Tigapuluh Area

	Au (ppb)	Ag (ppm)	Sn (ppm)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	Ti (ppm)	Th (ppm)	Ce (ppm)	Y (ppm)	U (ppm)	Li (ppm)	La (ppm)
Stream sediments(A)	0.74	0.10	2.70	15.9	9.7	1.4	650	3861	11.8	69.7	16.4	4.2	10.9	33.0
Pan concentrate(B)	0.79	0.12	18.52	21.4	9.1	2.4	916	5282	14.5	106.5	21.9	3.5	7.2	39.6
B/A	1.1	-	6.7	1.3	0.9	1.7	1.4	1.4	1.2	1.5	1.3	0.8	0.8	1.2

Table 15 Thresholds for Assay Values of Panned Concentrates in Pegunungan Tigapuluh Area

Au (ppb)	Sn (ppm)	Nb (ppm)	Ta (ppm)	W (ppm)	Zr (ppm)	Ti (ppm)	Th (ppm)	Ce (ppm)	Y (ppm)	U (ppm)	Li (ppm)	La (ppm)
10	504	74	78	16	6974	20719	289	1240	216	72	52	1290

Table 16 Basic Statistics of Assay Values of Stream Sediments in Bt.Pintutujuh Area

	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
Logarithmic Mean	<5	3	2	8	40	2.4
Max.	40	710	32	37	240	22
Min.	<5	<2	<2	<1	<2	<0.2
Average Amounts of Crustal Rocks	4	2	1.5	7.2	60	1.8

Table 17 Results of Principal Component Analysis of Assay Values of Stream Sediments in Bt.Pintutujuh Area

	1		2		3	
	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading
Au	0.29	0.36	0.65	0.77	0.03	0.04
Sn	0.50	0.64	-0.38	-0.45	-0.37	-0.38
W	0.66	0.84	0.08	0.09	-0.23	-0.24
Th	0.44	0.56	0.06	0.07	0.47	0.50
Ce	0.10	0.13	-0.65	-0.77	0.23	0.24
U	0.13	0.16	-0.04	-0.04	0.73	0.76
Eigen.	1.61		1.41		1.09	
Propo.	0.27		0.23		0.18	
Cum. prop	0.27		0.50		0.68	

Table 18 Basic Statistics of Assay Values of Panned Concentrates in Bt.Pintutujuh Area

	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
Logarithmic Mean	<5	46	3	18	81	3.4
Max.	72	>1000	55	101	580	19
Min.	<1	<2	<1	<1	26	<0.2
Logarithmic Mean in Stream Sediments	<5	3	2	8	40	2.4

Table 19 Results of Principal Component Analysis of Assay Values of Panned Concentrates in Bt.Pintutujuh Area

	1		2		3	
	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading
Au	-0.10	-0.15	0.14	0.16	0.90	0.95
Sn	0.40	0.60	0.56	0.66	-0.10	-0.10
W	0.24	0.36	0.70	0.82	0.02	0.02
Th	0.47	0.71	-0.28	-0.33	0.40	0.42
Ce	0.56	0.84	-0.28	-0.33	-0.12	-0.13
U	0.50	0.75	-0.17	-0.20	0.01	0.01
Eigen.	2.28		1.40		1.10	
Propo.	0.38		0.23		0.18	
Cum. prop	0.38		0.61		0.80	

Table 20 Basic Statistics of Assay Values of Soil Samples in Bt.Pintutujuh Area

	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
Logarithmic Mean	<5	3	6	23	85	3.3
Max.	65	150	90	69	166	17.6
Min.	<5	<2	<2	5	12	<0.2
Average Amounts of Crustal Rocks	4	2	1.5	7.2	60	1.8

Table 21 Results of Principal Component Analysis of Assay Values of Soil Samples in Bt.Pintutujuh Area

	1		2	
	Eigen-vector	Factor Loading	Eigen-vector	Factor Loading
Au	0.48	0.70	-0.15	-0.19
Sn	0.58	0.86	0.01	0.01
W	0.55	0.80	0.00	0.00
Th	0.15	0.22	0.70	0.85
Ce	-0.20	-0.30	0.61	0.75
U	0.26	0.38	0.33	0.40
Eigen.	2.16		1.49	
Propo.	0.36		0.25	
Cum. prop	0.36		0.61	

Table 22 Thresholds for Assay Values of Soil Samples in Bt.Pintutujuh Area

Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
10	16	33	37	185	6.8

Table 23 Specifications of Drilling Machines and Equipment Used

Dilling machine ; Model "L-24"	1 set
Specifications:	
Capacity	170m (BQ-WL)
Dimensions LxWxH	1,600x830x1,380mm
Hoisting capacity	1,000kg
Spindle speed	Forward 148, 329, 611rpm
Engine ; Model "NF120EK"	11.5ps/2,400rpm
Drilling pump ; Model "WLMG10"	1 set
Specifications:	
Piston diameter	68mm
Stroke	60mm
Capacity	Discharge capacity 120ℓ/min
Dimensions LxWxH	1,860x600x690mm
Engine ; Model "NF90K"	9ps/2,400rpm
Wire line hoist ; Model "WLH-S"	
Specifications:	
Rope capacity	300m
Hoisting speed	8～105m/min
Engine ; Model "NSA50C-G"	6ps/2,400rpm
Mud mixer ; Model "MM-135"	1 set
Specifications:	
Capacity	100ℓ/600rpm
Engine ; Model "NSA50C-G"	6ps/2,400rpm
Generator ; Model "YDG3000"	2 sets
Specifications:	
Capacity	2.7KW 50Hz 100V
Water supply pump ; Model "WLMG5h"	1 set
Specifications:	
Piston diameter	68mm
Stroke	60mm
Capacity	Discharge capacity 65ℓ/min
Dimensions LxWxH	1,630x465x675mm
Derrick	1 set
Specifications:	
Height	7.5m
Max load capacity	2,000kg
Drilling Tools	
Drilling rod	NQ-WL 3m 15pcs
	BQ-WL 3m 60pcs
Casing pipe	NX-NU 0.5m 8pcs
	NX-NU 1.0m 1pcs
	NX-NU 1.5m 2pcs
	BX-NU 1.0m 2pcs
	BX-NU 3.0m 20pcs

Table 24 Summary of Working Time in Drilling

Hole No.	Drilling			Shift		Men Working		Working Time						
	Bit size	Drilling length	Core	Drilling	Total	Engineer	Worker	Drilling	Other work	Total	Assemblage	Dismantlement	Transportation	Grand Total
		m	m	shift	shift	Number of men		h	h	h	h	h	h	h
MJIT-1	NX/NQ/BQ	101.0	93.7	16.0	23.0	78	260	61.0	67.0	128.0	16.0	16.0	24.0	184.0
MJIT-2	NX/NQ/BQ	101.7	87.5	15.0	21.0	66	220	63.7	56.3	120.0	16.0	16.0	16.0	168.0
MJIT-3	NX/NQ/BQ	101.0	93.4	15.6	20.5	60	200	63.1	61.9	125.0	16.0	7.0	16.0	164.0
MJIT-4	NX/NQ/BQ	101.4	99.7	14.0	16.5	40	200	53.8	58.2	112.0	8.0	8.0	4.0	132.0
MJIT-5	NX/NQ/BQ	100.5	98.9	12.5	15.0	36	180	52.1	47.9	100.0	8.0	4.0	8.0	120.0
MJIT-6	NX/NQ/BQ	100.4	97.7	14.0	17.0	40	200	52.3	59.7	112.0	8.0	8.0	8.0	136.0
Total	NX/NQ/BQ	606.0	570.9	87.1	113.0	320	1260	346.0	351.0	697.0	72.0	59.0	76.0	904.0

Table 25 Results of Chemical Analysis (Core Samples (1))

Sample No.	Driil No.	Depth (m) (m)	Width (m)	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
TB1	MJIT-1	4.7- 6.0	1.3	<5	<2	4	40	70	15.0
TB2	MJIT-1	6.0- 7.5	1.5	<5	5	3	43	56	14.8
TB3	MJIT-1	7.5- 9.0	1.5	<5	4	4	42	76	15.2
TB4	MJIT-1	9.0- 10.5	1.5	<5	<2	4	43	52	16.4
TB5	MJIT-1	10.5- 12.0	1.5	<5	<2	5	46	84	17.8
TB6	MJIT-1	12.0- 13.5	1.5	<5	<2	3	42	84	16.0
TB7	MJIT-1	13.5- 15.0	1.5	<5	<2	7	38	60	14.8
TB8	MJIT-1	15.0- 16.5	1.5	<5	<2	6	45	68	14.8
TB9	MJIT-1	16.5- 18.0	1.5	<5	36	6	42	72	16.0
TB10	MJIT-1	18.0- 19.5	1.5	10	26	8	43	66	17.4
TB11	MJIT-1	19.5- 21.0	1.5	30	<2	4	45	74	16.4
TB12	MJIT-1	21.0- 22.5	1.5	45	2	4	48	52	16.8
TB13	MJIT-1	22.5- 24.0	1.5	15	<2	4	46	38	16.6
TB14	MJIT-1	24.0- 25.5	1.5	10	2	3	44	54	17.2
TB15	MJIT-1	25.5- 27.0	1.5	5	2	4	41	48	18.0
TB16	MJIT-1	27.0- 28.5	1.5	<5	<2	4	42	50	14.8
TB17	MJIT-1	28.5- 30.0	1.5	<5	<2	4	44	62	14.8
TB18	MJIT-1	30.0- 31.5	1.5	10	2	3	40	58	16.4
TB19	MJIT-1	31.5- 33.0	1.5	30	<2	4	45	80	16.8
TB20	MJIT-1	33.0- 34.5	1.5	45	<2	4	44	72	15.8
TB21	MJIT-1	34.5- 36.0	1.5	5	20	3	24	32	10.0
TB22	MJIT-1	36.0- 37.5	1.5	35	2	4	39	50	18.2
TB23	MJIT-1	37.5- 39.0	1.5	20	<2	3	42	62	22.0
TB24	MJIT-1	39.0- 40.5	1.5	20	3	4	41	62	14.8
TB25	MJIT-1	40.5- 42.0	1.5	5	2	7	37	86	17.6
TB26	MJIT-1	42.0- 43.5	1.5	<5	2	3	47	66	17.4
TB27	MJIT-1	43.5- 45.0	1.5	5	<2	3	51	78	17.2
TB28	MJIT-1	45.0- 46.5	1.5	10	3	3	38	64	15.0
TB29	MJIT-1	46.5- 48.0	1.5	<5	<2	4	37	78	17.2
TB30	MJIT-1	48.0- 49.5	1.5	<5	<2	3	39	80	20.8
TB31	MJIT-1	49.5- 51.0	1.5	<5	2	3	37	80	15.0
TB32	MJIT-1	51.0- 52.5	1.5	<5	<2	4	39	66	15.0
TB33	MJIT-1	52.5- 54.0	1.5	<5	<2	<2	44	82	12.8
TB34	MJIT-1	54.0- 55.5	1.5	35	2	7	37	64	16.4
TB35	MJIT-1	55.5- 57.0	1.5	15	2	4	35	40	13.0
TB36	MJIT-1	57.0- 58.5	1.5	15	2	<2	37	50	14.6
TB37	MJIT-1	58.5- 60.0	1.5	<5	2	3	39	58	17.2
TB38	MJIT-1	60.0- 61.5	1.5	<5	3	3	36	42	16.6
TB39	MJIT-1	61.5- 63.0	1.5	<5	<2	3	34	68	16.0
TB40	MJIT-1	63.0- 64.5	1.5	<5	2	7	38	66	13.0
TB41	MJIT-1	64.5- 66.0	1.5	<5	<2	3	35	40	12.2
TB42	MJIT-1	66.0- 67.5	1.5	<5	<2	5	36	46	20.2
TB43	MJIT-1	67.5- 69.0	1.5	<5	<2	7	46	62	16.2
TB44	MJIT-1	69.0- 70.5	1.5	<5	<2	4	43	64	16.0
TB45	MJIT-1	70.5- 72.0	1.5	<5	<2	4	43	60	13.4
TB46	MJIT-1	72.0- 73.5	1.5	30	<2	4	42	54	14.4
TB47	MJIT-1	73.5- 75.0	1.5	15	<2	3	44	66	15.4
TB48	MJIT-1	75.0- 76.5	1.5	<5	<2	3	39	52	13.8
TB49	MJIT-1	76.5- 78.0	1.5	<5	<2	3	44	60	13.4
TB50	MJIT-1	78.0- 79.5	1.5	15	<2	2	44	54	15.0
TB51	MJIT-1	79.5- 81.0	1.5	<5	<2	<2	42	52	16.8
TB52	MJIT-1	81.0- 82.5	1.5	<5	<2	3	40	60	14.4
TB53	MJIT-1	82.5- 84.0	1.5	<5	<2	35	21	116	3.6
TB54	MJIT-1	84.0- 85.5	1.5	<5	<2	23	20	122	4.0

Table 25 Results of Chemical Analysis (Core Samples (2))

Sample No.	Driil No.	Depth (m) (m)	Width (m)	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
TB55	MJIT-1	85.5- 87.0	1.5	<5	2	17	20	104	4.0
TB56	MJIT-1	87.0- 88.5	1.5	<5	2	22	24	94	7.2
TB57	MJIT-1	88.5- 90.0	1.5	<5	6	12	18	100	3.0
TB58	MJIT-1	90.0- 91.5	1.5	<5	<2	9	18	90	4.6
TB59	MJIT-1	91.5- 93.0	1.5	<5	3	13	18	102	3.2
TB60	MJIT-1	93.0- 94.5	1.5	<5	<2	6	18	100	3.0
TB61	MJIT-1	94.5- 96.0	1.5	<5	2	7	18	104	3.0
TB62	MJIT-1	96.0- 97.5	1.5	<5	3	7	18	108	4.0
TB63	MJIT-1	97.5- 99.0	1.5	<5	2	4	28	60	11.8
TB64	MJIT-1	99.0-101.0	2.0	<5	2	8	33	80	11.6
TB65	MJIT-2	0.0- 1.5	1.5	<5	3	<2	57	124	8.0
TB66	MJIT-2	1.5- 3.0	1.5	<5	<2	3	54	196	8.4
TB67	MJIT-2	3.0- 4.5	1.5	<5	2	3	61	108	7.8
TB68	MJIT-2	4.5- 6.0	1.5	<5	13	4	46	186	8.0
TB69	MJIT-2	7.5- 9.0	1.5	<5	21	8	52	98	7.8
TB70	MJIT-2	9.0- 10.5	1.5	<5	14	4	55	74	8.6
TB71	MJIT-2	10.5- 12.0	1.5	<5	80	7	68	112	10.4
TB72	MJIT-2	12.0- 13.5	1.5	<5	18	4	60	82	10.6
TB73	MJIT-2	13.5- 15.0	1.5	<5	7	9	55	92	11.4
TB74	MJIT-2	15.0- 16.5	1.5	<5	3	5	59	120	10.2
TB75	MJIT-2	16.5- 18.0	1.5	<5	3	3	36	14	13.4
TB76	MJIT-2	18.0- 19.5	1.5	<5	4	3	30	20	9.2
TB77	MJIT-2	19.5- 21.0	1.5	<5	6	3	41	38	16.0
TB78	MJIT-2	21.0- 22.5	1.5	20	43	3	36	30	30.8
TB79	MJIT-2	22.5- 24.0	1.5	<5	3	7	36	44	10.8
TB80	MJIT-2	24.0- 25.5	1.5	<5	6	7	46	94	30.4
TB81	MJIT-2	25.5- 27.0	1.5	<5	9	4	37	48	35.0
TB82	MJIT-2	27.0- 28.5	1.5	<5	720	21	19	56	7.6
TB83	MJIT-2	28.5- 30.0	1.5	10	7	4	33	62	11.4
TB84	MJIT-2	30.0- 31.5	1.5	10	5	3	36	68	10.8
TB85	MJIT-2	31.5- 33.0	1.5	5	390	4	43	80	11.6
TB86	MJIT-2	33.0- 34.5	1.5	15	14	3	36	90	10.8
TB87	MJIT-2	34.5- 36.0	1.5	40	4	3	41	78	13.8
TB88	MJIT-2	36.0- 37.5	1.5	<5	7	3	37	66	12.2
TB89	MJIT-2	37.5- 39.0	1.5	10	4	3	41	64	13.4
TB90	MJIT-2	39.0- 40.5	1.5	10	2	3	46	76	18.0
TB91	MJIT-2	40.5- 42.0	1.5	<5	22	3	33	60	15.4
TB92	MJIT-2	42.0- 43.5	1.5	<5	7	3	32	74	12.4
TB93	MJIT-2	43.5- 45.0	1.5	<5	170	4	38	84	12.8
TB94	MJIT-2	45.0- 46.5	1.5	10	900	3	33	60	12.4
TB95	MJIT-2	46.5- 48.0	1.5	5	39	4	36	66	14.4
TB96	MJIT-2	48.0- 49.5	1.5	<5	7	4	40	36	12.8
TB97	MJIT-2	49.5- 51.0	1.5	<5	370	2	30	50	13.4
TB98	MJIT-2	51.0- 52.5	1.5	<5	2400	80	40	44	13.2
TB99	MJIT-2	52.5- 54.0	1.5	<5	290	6	40	46	14.2
TB100	MJIT-2	54.0- 55.5	1.5	<5	170	<2	47	62	16.8
TB101	MJIT-2	55.5- 57.0	1.5	<5	2200	5	53	80	18.6
TB102	MJIT-2	57.0- 58.5	1.5	<5	43	3	45	50	15.0
TB103	MJIT-2	58.5- 60.0	1.5	<5	34	3	47	58	15.8
TB104	MJIT-2	60.0- 61.5	1.5	<5	58	2	39	48	16.0
TB105	MJIT-2	61.5- 63.0	1.5	<5	550	2	45	58	15.6
TB106	MJIT-2	63.0- 64.5	1.5	<5	80	4	43	90	15.4
TB107	MJIT-2	64.5- 66.0	1.5	10	300	3	46	90	14.8
TB108	MJIT-2	66.0- 67.5	1.5	<5	930	<2	50	84	15.2
TB109	MJIT-2	67.5- 69.0	1.5	<5	72	2	46	86	12.4
TB110	MJIT-2	69.0- 70.5	1.5	5	19	4	43	86	15.0

Table 25 Results of Chemical Analysis (Core Samples (3))

Sample No.	Driil No.	Depth (m) (m)	Width (m)	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
TB111	MJIT-2	70.5- 72.0	1.5	<5	6	5	42	76	12.4
TB112	MJIT-2	72.0- 73.5	1.5	<5	10	4	41	70	14.2
TB113	MJIT-2	73.5- 75.0	1.5	<5	2	3	45	80	14.8
TB114	MJIT-2	75.0- 76.5	1.5	<5	3	4	47	88	15.2
TB115	MJIT-2	76.5- 78.0	1.5	35	3	3	42	80	15.8
TB116	MJIT-2	78.0- 79.5	1.5	30	3	3	40	64	12.0
TB117	MJIT-2	79.5- 81.0	1.5	15	3	5	35	48	11.6
TB118	MJIT-2	81.0- 82.5	1.5	<5	3	5	40	50	13.8
TB119	MJIT-2	82.5- 84.0	1.5	<5	3	6	40	50	12.8
TB120	MJIT-2	84.0- 85.5	1.5	<5	3	5	36	44	11.6
TB121	MJIT-2	85.5- 87.0	1.5	<5	2	4	38	52	13.2
TB122	MJIT-2	87.0- 88.5	1.5	<5	<2	4	37	60	13.4
TB123	MJIT-2	88.5- 90.0	1.5	<5	2	5	39	68	18.4
TB124	MJIT-2	90.0- 91.5	1.5	<5	2	3	40	34	15.6
TB125	MJIT-2	91.5- 93.0	1.5	<5	7	4	41	50	17.0
TB126	MJIT-2	93.0- 94.5	1.5	<5	3	4	39	52	13.2
TB127	MJIT-2	94.5- 96.0	1.5	<5	5	6	45	80	14.6
TB128	MJIT-2	96.0- 97.5	1.5	<5	4	4	44	90	12.8
TB129	MJIT-2	97.5- 99.0	1.5	10	4	6	43	82	14.8
TB130	MJIT-2	99.0-100.5	1.5	10	3	5	49	108	17.8
TB131	MJIT-2	100.5-101.7	1.2	20	3	3	45	150	17.8
TB132	MJIT-3	0.0- 1.5	1.5	<5	25	3	23	34	12.6
TB133	MJIT-3	1.5- 3.0	1.5	<5	41	4	21	26	9.8
TB134	MJIT-3	3.0- 4.5	1.5	<5	160	25	3	2	2.8
TB135	MJIT-3	4.5- 6.0	1.5	<5	17	6	22	12	13.4
TB136	MJIT-3	6.0- 7.5	1.5	<5	23	6	24	2	14.2
TB137	MJIT-3	7.5- 9.0	1.5	<5	170	17	25	80	17.0
TB138	MJIT-3	9.0- 10.5	1.5	<5	10	32	17	66	5.8
TB139	MJIT-3	10.5- 12.0	1.5	<5	4	21	17	70	4.0
TB140	MJIT-3	12.0- 13.5	1.5	<5	4	8	15	52	7.0
TB141	MJIT-3	13.5- 15.0	1.5	<5	<2	4	10	<2	9.2
TB142	MJIT-3	16.5- 18.0	1.5	<5	18	16	9	34	17.0
TB143	MJIT-3	18.0- 19.5	1.5	<5	4	32	14	34	9.8
TB144	MJIT-3	19.5- 21.0	1.5	<5	3	17	11	44	10.0
TB145	MJIT-3	21.0- 22.5	1.5	<5	2	12	17	60	5.2
TB146	MJIT-3	22.5- 24.0	1.5	<5	3	16	16	78	10.8
TB147	MJIT-3	24.0- 25.5	1.5	<5	<2	<2	26	<2	20.2
TB148	MJIT-3	25.5- 27.0	1.5	<5	29	6	23	8	17.0
TB149	MJIT-3	27.0- 28.5	1.5	<5	10	18	16	52	9.4
TB150	MJIT-3	28.5- 30.0	1.5	<5	2	23	12	40	10.2
TB151	MJIT-3	30.0- 31.5	1.5	<5	3	17	20	56	6.6
TB152	MJIT-3	31.5- 33.0	1.5	<5	3	8	20	64	7.2
TB153	MJIT-3	33.0- 34.5	1.5	<5	27	13	16	52	9.4
TB154	MJIT-3	34.5- 36.0	1.5	<5	740	11	16	30	11.4
TB155	MJIT-3	36.0- 37.5	1.5	<5	63	16	20	20	12.2
TB156	MJIT-3	37.5- 39.0	1.5	<5	26	25	18	42	6.2
TB157	MJIT-3	39.0- 40.5	1.5	<5	6	14	16	26	8.8
TB158	MJIT-3	40.5- 42.0	1.5	30	13	3	20	4	20.4
TB159	MJIT-3	42.0- 43.5	1.5	15	86	2	21	4	23.0
TB160	MJIT-3	43.5- 45.0	1.5	5	6	<2	27	<2	27.8
TB161	MJIT-3	45.0- 46.5	1.5	10	5	4	17	2	19.4
TB162	MJIT-3	46.5- 48.0	1.5	30	12	3	14	2	15.2
TB163	MJIT-3	48.0- 49.5	1.5	20	3	3	16	<2	18.6
TB164	MJIT-3	49.5- 51.0	1.5	<5	2	3	47	8	17.4

Table 25 Results of Chemical Analysis (Core Samples (4))

Sample No.	Driil No.	Depth (m) (m)	Width (m)	Au (ppb)	Sn (ppm)	W (ppm)	Th (ppm)	Ce (ppm)	U (ppm)
TB165	MJIT-3	51.0- 52.5	1.5	<5	3	<2	18	16	15.6
TB166	MJIT-3	52.5- 54.0	1.5	<5	13	3	16	8	14.6
TB167	MJIT-3	54.0- 55.5	1.5	<5	29	4	18	6	17.4
TB168	MJIT-3	55.5- 57.0	1.5	<5	3	4	19	<2	18.2
TB169	MJIT-3	57.0- 58.5	1.5	<5	<2	3	15	<2	18.0
TB170	MJIT-3	58.5- 60.0	1.5	5	2	4	34	6	33.0
TB171	MJIT-3	60.0- 61.5	1.5	<5	2	<2	41	26	34.8
TB172	MJIT-3	61.5- 63.0	1.5	20	4	3	32	14	27.4
TB173	MJIT-3	63.0- 64.5	1.5	20	5	3	31	<2	29.2
TB174	MJIT-3	64.5- 66.0	1.5	15	9	<2	29	26	28.4
TB175	MJIT-3	66.0- 67.5	1.5	<5	3	3	36	2	29.4
TB176	MJIT-3	67.5- 69.0	1.5	<5	2	3	35	16	34.8
TB177	MJIT-3	69.0- 70.5	1.5	<5	3	<2	32	78	37.6
TB178	MJIT-3	70.5- 72.0	1.5	<5	10	3	30	18	29.4
TB179	MJIT-3	72.0- 73.5	1.5	<5	2	3	25	8	22.4
TB180	MJIT-3	73.5- 75.0	1.5	<5	<2	3	25	8	27.2
TB181	MJIT-3	75.0- 76.5	1.5	10	<2	<2	23	6	23.2
TB182	MJIT-3	76.5- 78.0	1.5	<5	<2	<2	27	20	24.2
TB183	MJIT-3	78.0- 79.5	1.5	<5	<2	3	25	2	27.4
TB184	MJIT-3	79.5- 81.0	1.5	<5	<2	<2	25	<2	32.0
TB185	MJIT-3	81.0- 82.5	1.5	<5	2	3	29	4	33.4
TB186	MJIT-3	82.5- 84.0	1.5	10	2	3	22	10	25.2
TB187	MJIT-3	84.0- 85.5	1.5	<5	2	3	34	10	32.4
TB188	MJIT-3	85.5- 87.0	1.5	<5	2	3	37	12	31.2
TB189	MJIT-3	87.0- 88.5	1.5	10	9	3	37	14	27.6
TB190	MJIT-3	88.5- 90.0	1.5	<5	4	4	44	6	32.8
TB191	MJIT-3	90.0- 91.5	1.5	<5	3	6	45	16	43.4
TB192	MJIT-3	91.5- 93.0	1.5	<5	<2	7	43	24	31.6
TB193	MJIT-3	93.0- 94.5	1.5	<5	<2	4	36	28	27.8
TB194	MJIT-3	94.5- 96.0	1.5	<5	<2	4	31	16	23.6
TB195	MJIT-3	96.0- 97.5	1.5	<5	<2	3	36	20	27.4
TB196	MJIT-3	97.5- 99.0	1.5	<5	<2	4	43	20	41.8
TB197	MJIT-3	99.0-101.0	2.0	<5	<2	5	34	18	29.4
TB198	MJIT-4	7.0- 8.5	1.5	<5	<2	17	15	98	2.2
TB199	MJIT-4	40.0- 41.5	1.5	5	<2	16	19	106	2.2
TB200	MJIT-4	41.5- 43.0	1.5	<5	<2	24	20	108	2.2
TB201	MJIT-4	43.0- 44.5	1.5	<5	3	10	16	56	2.6
TB202	MJIT-4	44.5- 46.0	1.5	<5	5	16	19	76	2.8
TB203	MJIT-6	13.5- 15.0	1.5	<5	4	19	21	60	2.4
TB204	MJIT-6	15.0- 16.5	1.5	<5	3	24	21	82	2.4
TB205	MJIT-6	16.5- 18.0	1.5	65	3	85	16	62	2.8
TB206	MJIT-6	18.0- 19.5	1.5	35	<2	55	12	40	2.0
TB207	MJIT-6	19.5- 21.0	1.5	<5	4	45	21	66	2.6
TB208	MJIT-6	21.0- 22.5	1.5	<5	2	32	19	66	2.2
TB209	MJIT-6	22.5- 24.0	1.5	<5	2	60	19	68	2.6

Figure 1 Drill Geology and Assay Results of Six Holes

Abbreviation

[Alteration]

Fe: Colour of Feldspar Phenocryst
Mu: Muscovite
To: Tourmalinization
Si: Silicification
Ar: Argillization

[Minerals]

As: Arsenopyrite
Cal: Calcite
Cas: Cassiterite
Fe: Potassium Feldspar
Fl: Fluorite
limo:Limonite
Mu: Muscovite
Py: Pyrite
Qtz: Quartz
To: Tourmaline

[Mineralization]

Su: Sulfide Dissemination
Qs: Quartz-Sulfide Veinlet
Qt: Quartz-Tourmaline Veinlet
L: Limonite Veinlet
QC: Quartz-Calcite
QE: Quartz-Calcite Veinlet
QF: Quartz-Potassium Feldspar Veinlet
QL: Quartz-Limonite Veinlet
QM: Quartz-Muscovite Veinlet

[Others]

wd: width
dissemi:dissemination
gy: grey
Si: silicified
wall:wall rock

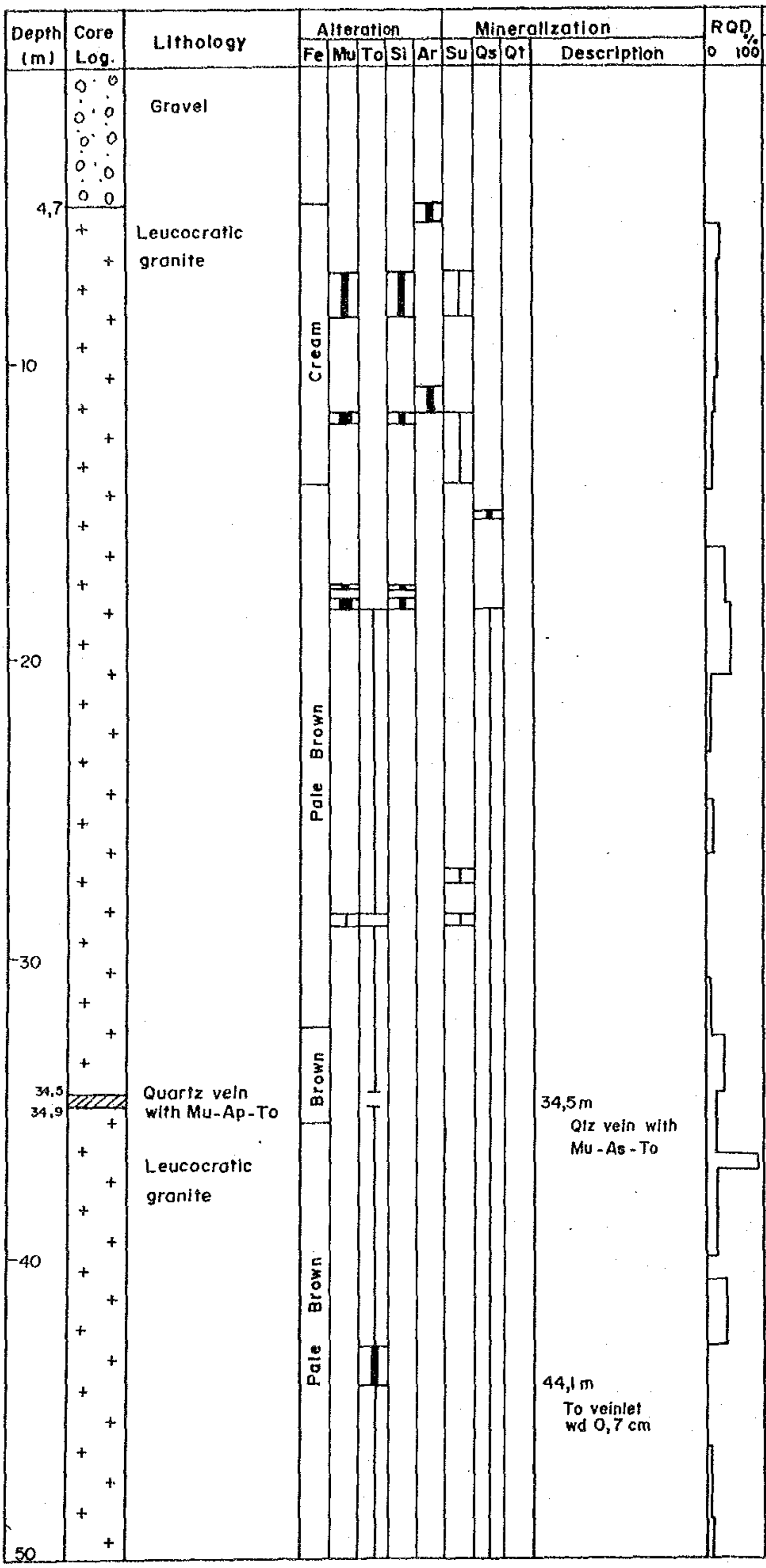
[Note]

Chemical assay values are expressed in following units.

Au--ppb, Sn--ppm, W--ppm, Th--ppm, Ce--ppm, U--ppm

Drilling hole No. MJIT – 1

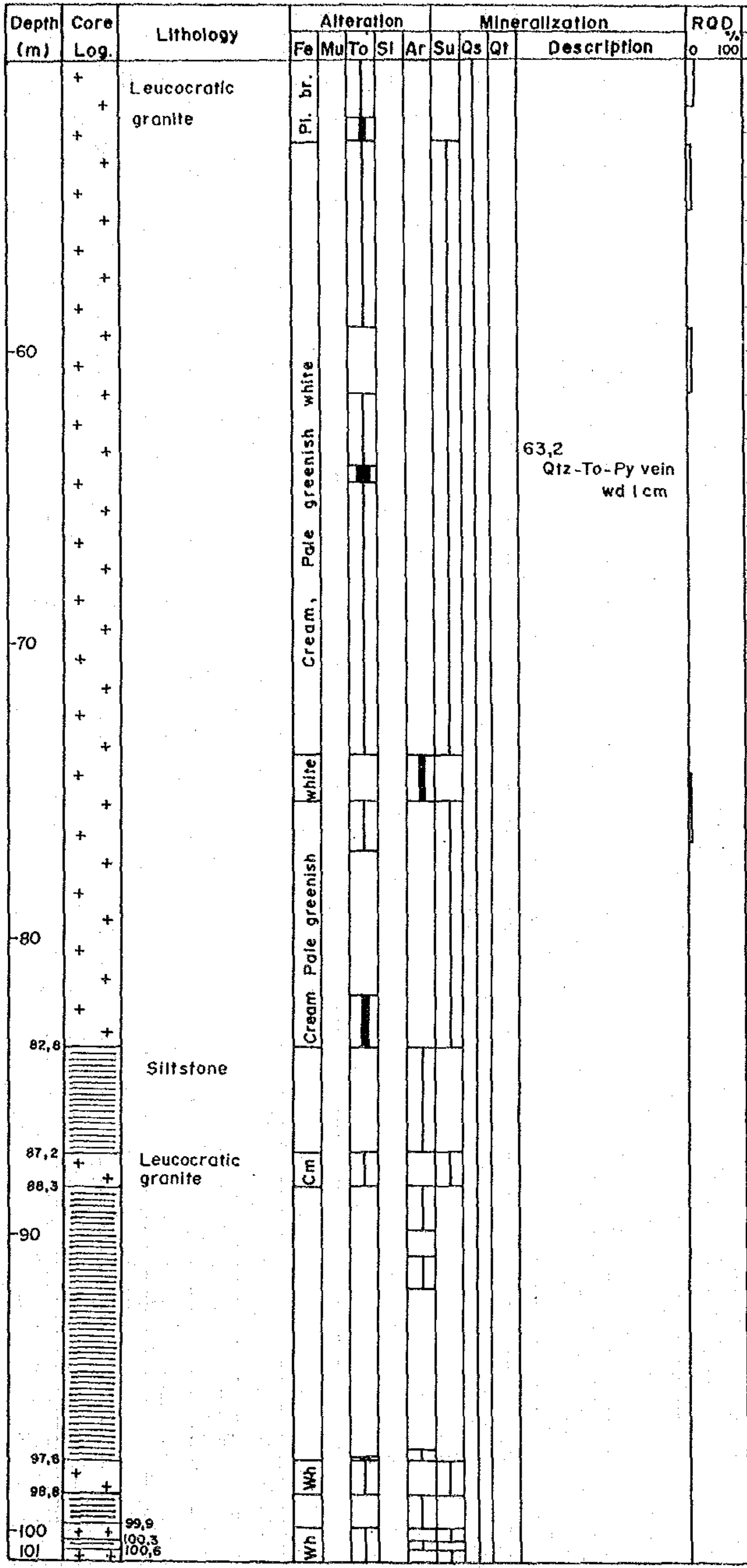
Latitude S 0° 49' 28" Longitude E 102° 20' 30" Elevation 78 m



Chemical Analysis

Au	Sn	W	Th	Ce	U
<5	<2	4	40	70	15.0
<5	5	3	43	56	14.8
<5	4	4	42	76	15.2
<5	<2	4	43	52	16.4
<5	<2	5	46	84	17.8
<5	<2	3	42	84	16.0
<5	<2	7	38	60	14.8
<5	<2	6	45	68	14.8
<5	36	6	42	72	16.0
10	26	8	43	66	17.4
30	<2	4	45	74	16.4
45	2	4	48	52	16.8
15	<2	4	46	38	16.6
10	2	3	44	54	17.2
5	2	4	41	48	18.0
<5	<2	4	42	50	14.8
<5	<2	4	44	62	14.8
10	2	3	40	58	16.4
30	<2	4	45	80	16.8
45	<2	4	44	72	15.8
5	20	3	24	32	10.0
35	2	4	39	50	18.2
20	<2	3	42	62	22.0
20	3	4	41	62	14.8
5	2	7	37	86	17.6
<5	2	3	47	66	17.4
5	<2	3	51	78	17.2
10	3	3	38	64	15.0
<5	<2	4	37	78	17.2
<5	<2	3	39	80	20.8

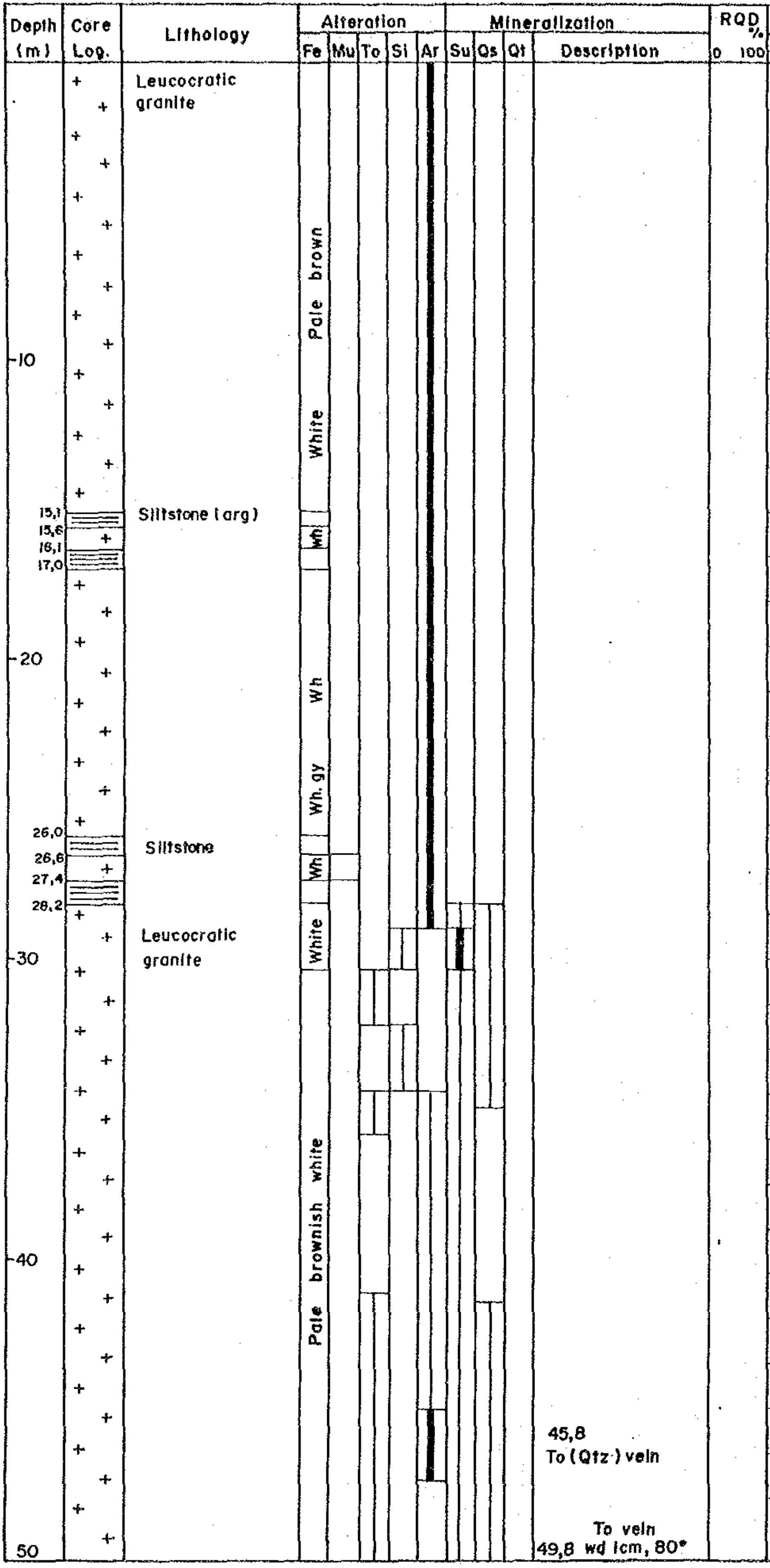
Drilling hole No. MJIT − 1



Chemical Analysis					
Au	Sn	W	Th	Ce	U
<5	2	3	37	80	15.0
<5	<2	4	39	66	15.0
<5	<2	<2	44	82	12.8
35	2	7	37	64	16.4
15	2	4	35	40	13.0
15	2	<2	37	50	14.6
<5	2	3	39	58	17.2
<5	3	3	36	42	16.6
<5	<2	3	34	68	16.0
<5	2	7	38	66	13.0
<5	<2	3	35	40	12.2
<5	<2	5	36	46	20.2
<5	<2	7	46	62	16.2
<5	<2	4	43	64	16.0
<5	<2	4	43	60	13.4
30	<2	4	42	54	14.4
15	<2	3	44	66	15.4
<5	<2	3	39	52	13.8
<5	<2	3	44	60	13.4
15	<2	2	44	54	15.0
<5	<2	<2	42	52	16.8
<5	<2	3	40	60	14.4
<5	<2	35	21	116	3.6
<5	<2	23	20	122	4.0
<5	2	17	20	104	4.0
<5	2	22	24	94	7.2
<5	6	12	18	100	3.0
<5	<2	9	18	90	4.6
<5	3	13	18	102	3.2
<5	<2	6	18	100	3.0
<5	2	7	18	104	3.0
<5	3	7	18	108	4.0
<5	2	4	28	60	11.8
<5	2	8	33	80	11.6

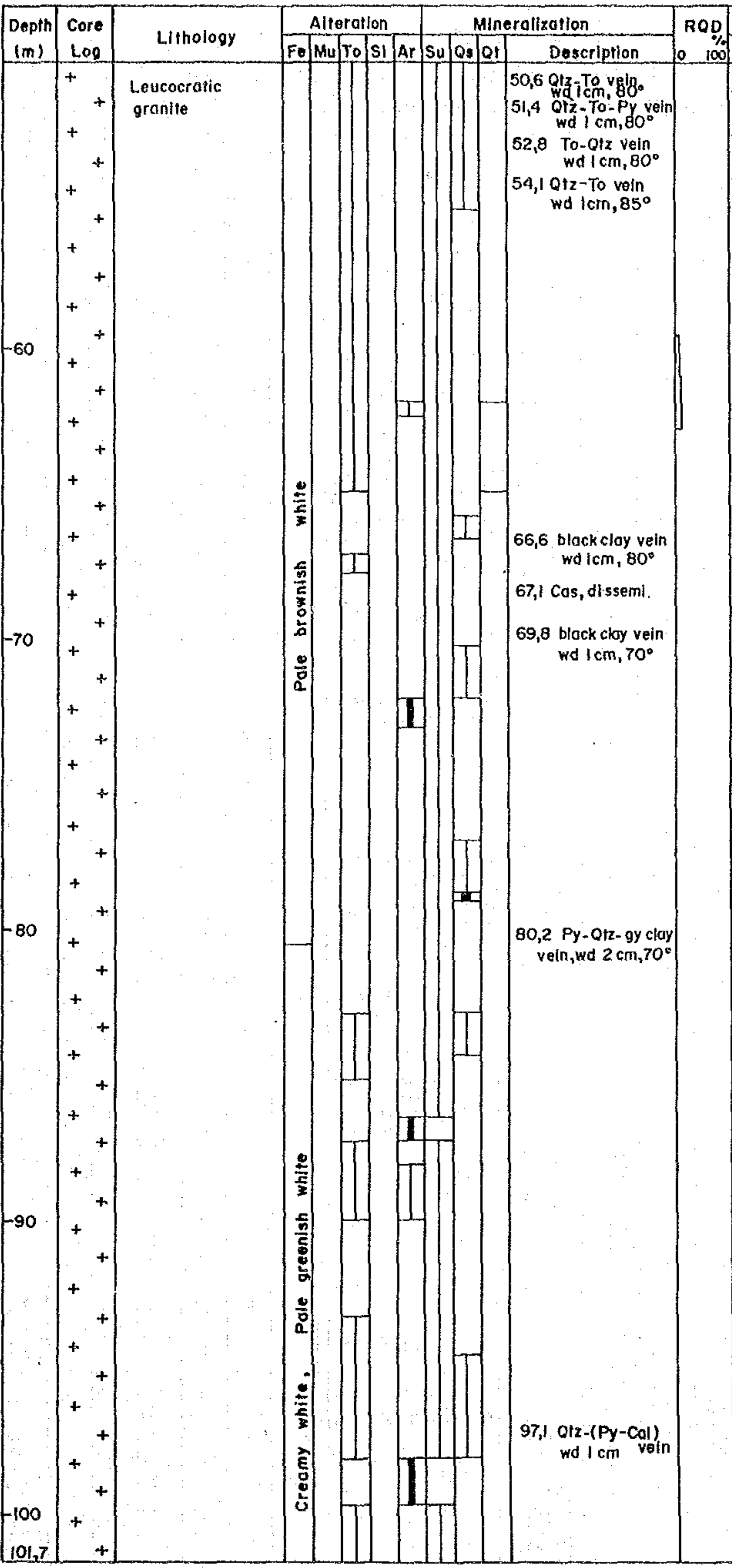
Drilling hole No. MJIT -2

Latitude S 0° 49' 26" Longitude E 102°20'28" Elevation 102 m



Chemical Analysis					
Au	Sn	W	Th	Ce	U
<5	3	<2	57	124	8.0
<5	<2	3	54	196	8.4
<5	2	3	61	108	7.8
<5	13	4	46	186	8.0
<5	21	8	52	98	7.8
<5	14	4	55	74	8.6
<5	80	7	68	112	10.4
<5	18	4	60	82	10.6
<5	7	9	55	92	11.4
<5	3	5	59	120	10.2
<5	3	3	36	14	13.4
<5	4	3	30	20	9.2
<5	6	3	41	38	16.0
20	43	3	36	30	30.8
<5	3	7	36	44	10.8
<5	6	7	46	94	30.4
<5	9	4	37	48	35.0
<5	720	21	19	56	7.6
10	7	4	33	62	11.4
10	5	3	36	68	10.8
5	390	4	43	80	11.6
15	14	3	36	90	10.8
40	4	3	41	78	13.8
<5	7	3	37	66	12.2
10	4	3	41	64	13.4
10	2	3	46	76	18.0
<5	22	3	33	60	15.4
<5	7	3	32	74	12.4
<5	170	4	38	84	12.8
10	900	3	33	60	12.4
5	39	4	36	66	14.4
<5	7	4	40	36	12.8

Drilling hole No. MJIT -2

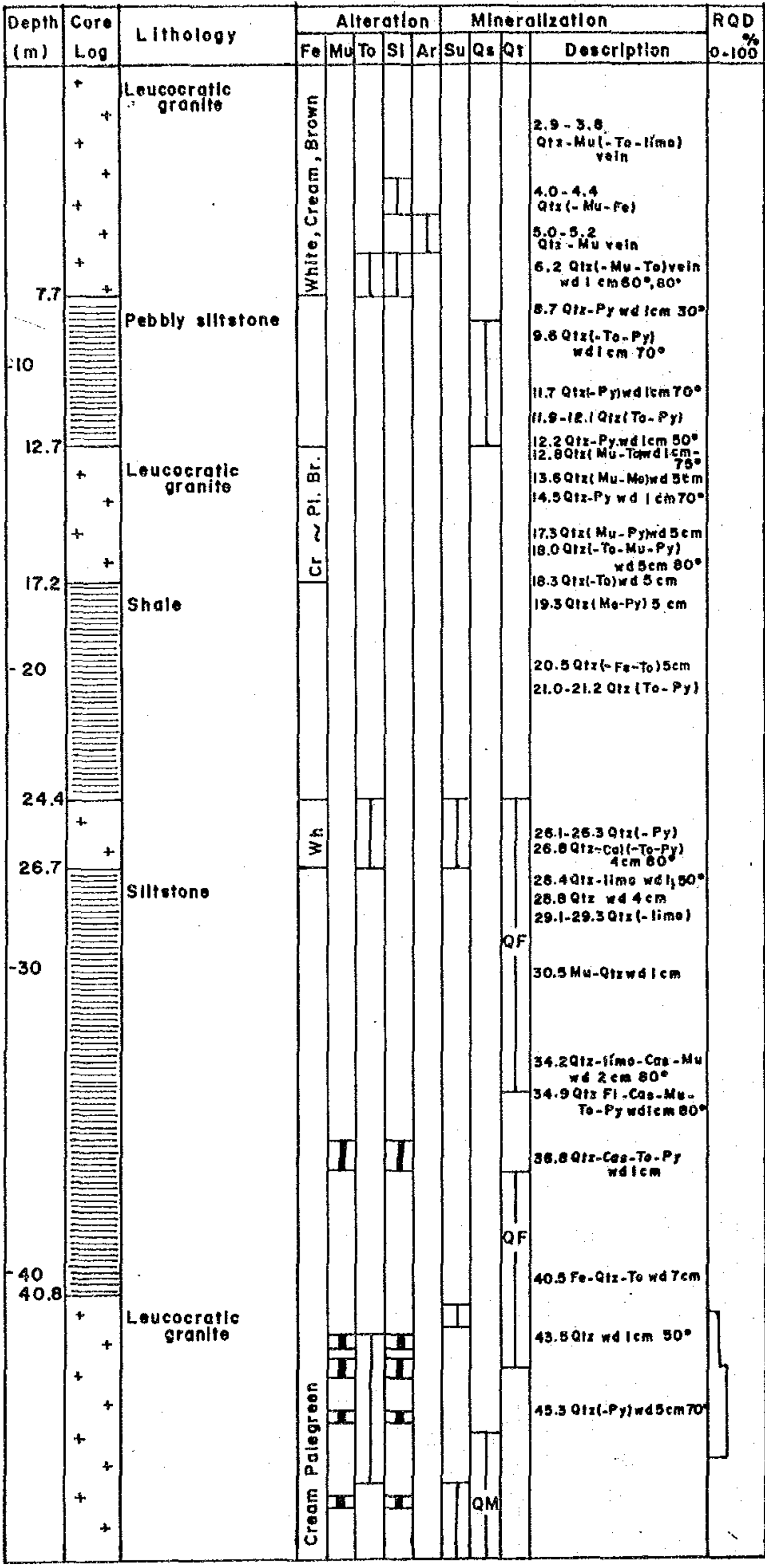


50,6 Qtz-To vein, wd 1cm, 80°
51,4 Qtz-To-Py vein wd 1 cm, 80°
52,8 To-Qtz vein wd 1 cm, 80°
54,1 Qtz-To vein wd 1cm, 85°
66,6 black clay vein wd 1cm, 80°
67,1 Cas, dissemi.
69,8 black clay vein wd 1 cm, 70°
80,2 Py-Qtz-gy clay vein, wd 2 cm, 70°
97,1 Qtz-(Py-Cal) vein wd 1 cm

Chemical Analysis					
Au	Sn	W	Th	Ce	U
<5	370	2	30	50	13. 4
<5	2400	80	40	44	13. 2
<5	290	6	40	46	14. 2
<5	170	<2	47	62	16. 8
<5	2200	5	53	80	18. 6
<5	43	3	45	50	15. 0
<5	34	3	47	58	15. 8
<5	58	2	39	48	16. 0
<5	550	2	45	58	15. 6
<5	80	4	43	90	15. 4
10	300	3	46	90	14. 8
<5	930	<2	50	84	15. 2
<5	72	2	46	86	12. 4
5	19	4	43	86	15. 0
<5	6	5	42	76	12. 4
<5	10	4	41	70	14. 2
<5	2	3	45	80	14. 8
<5	3	4	47	88	15. 2
35	3	3	42	80	15. 8
30	3	3	40	64	12. 0
15	3	5	35	48	11. 6
<5	3	5	40	50	13. 8
<5	3	6	40	50	12. 8
<5	3	5	36	44	11. 6
<5	2	4	38	52	13. 2
<5	<2	4	37	60	13. 4
<5	2	5	39	68	18. 4
<5	2	3	40	34	15. 6
<5	7	4	41	50	17. 0
<5	3	4	39	52	13. 2
<5	5	6	45	80	14. 6
<5	4	4	44	90	12. 8
10	4	6	43	82	14. 8
10	3	5	49	108	17. 8
20	3	3	45	150	17. 8

Drilling hole No. MJIT −3

Latitude S 0° 48' 37" Longitude E102°19'44" Elevation 167 m



2.9 - 3.6 Qtz-Mu(-To-limo) vein

4.0 - 4.4 Qtz(- Mu-Fe)

5.0 - 5.2 Qtz - Mu vein

6.2 Qtz(- Mu - To)vein wd 1 cm60°,80°

8.7 Qtz-Py wd 1cm 30°

9.6 Qtz(-To-Py) wd 1 cm 70°

11.7 Qtz(-Py)wd 1cm 70°

11.9-12.1 Qtz(To-Py)

12.2 Qtz-Py.wd 1cm 50°

12.8 Qtz(Mu-To)wd 1cm-75°

13.6 Qtz(Mu-Mo)wd 5cm

14.5 Qtz-Py wd 1 cm70°

17.3 Qtz(Mu-Py)wd 5cm

18.0 Qtz(-To-Mu-Py) wd 5cm 80°

18.3 Qtz(-To)wd 5 cm

19.3 Qtz(Mo-Py) 5 cm

20.5 Qtz(- Fe-To)5cm

21.0-21.2 Qtz (To- Py)

26.1-26.3 Qtz(- Py)

26.6 Qtz-Cal(-To-Py) 4cm 60°

28.4 Qtz-limo wd 1, 50°

28.8 Qtz wd 4cm

29.1-29.3 Qtz(-limo)

30.5 Mu-Qtz wd 1 cm

34.2 Qtz-limo-Cas-Mu wd 2cm 80°

34.9 Qtz Fl-Cas-Mu-To-Py wd1cm 80°

36.6 Qtz-Cas-To-Py wd 1cm

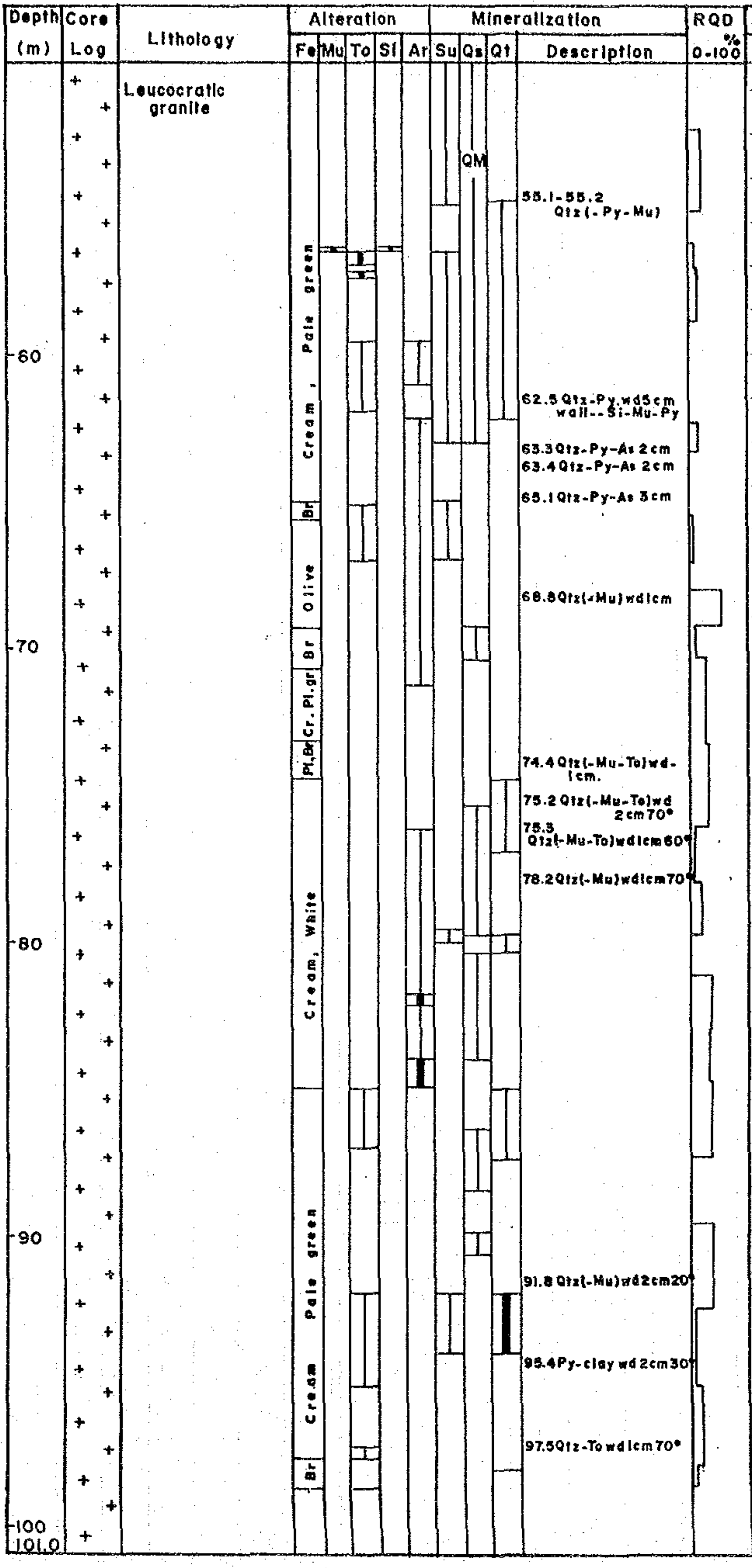
40.5 Fe-Qtz-To wd 7cm

43.5 Qtz wd 1cm 50°

45.3 Qtz(-Py)wd 5cm 70°

Chemical Analysis					
Au	Sn	W	Th	Ce	U
<5	25	3	23	34	12.6
<5	41	4	21	26	9.8
<5	160	25	3	2	2.8
<5	17	6	22	12	13.4
<5	23	6	24	2	14.2
<5	170	17	25	80	17.0
<5	10	32	17	66	5.8
<5	4	21	17	70	4.0
<5	4	8	15	52	7.0
<5	<2	4	10	<2	9.2
<5	18	16	9	34	17.0
<5	4	32	14	34	9.8
<5	3	17	11	44	10.0
<5	2	12	17	60	5.2
<5	3	16	16	78	10.8
<5	<2	<2	26	<2	20.2
<5	29	6	23	8	17.0
<5	10	18	16	52	9.4
<5	2	23	12	40	10.2
<5	3	17	20	56	6.6
<5	3	8	20	64	7.2
<5	27	13	16	52	9.4
<5	740	11	16	30	11.4
<5	63	16	20	20	12.2
<5	26	25	18	42	6.2
<5	6	14	16	26	8.8
30	13	3	20	4	20.4
15	86	2	21	4	23.0
5	6	<2	27	<2	27.8
10	5	4	17	2	19.4
30	12	3	14	2	15.2
20	3	3	16	<2	18.6

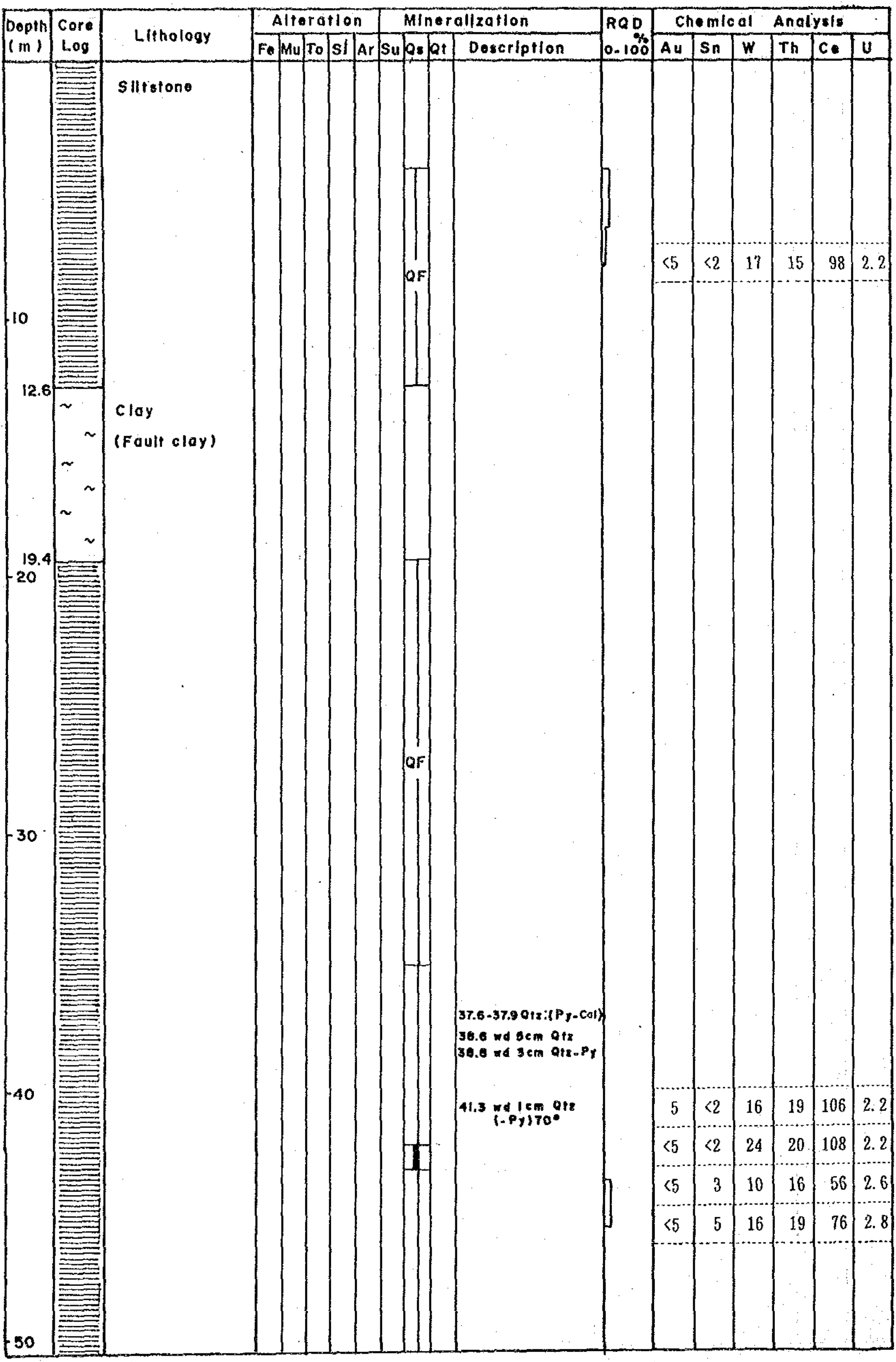
Drilling hole No. MJIT — 3



Chemical Analysis					
Au	Sn	W	Th	Ce	U
<5	2	3	47	8	17.4
<5	3	<2	18	16	15.6
<5	13	3	16	8	14.6
<5	29	4	18	6	17.4
<5	3	4	19	<2	18.2
<5	<2	3	15	<2	18.0
5	2	4	34	6	33.0
<5	2	<2	41	26	34.8
20	4	3	32	14	27.4
20	5	3	31	<2	29.2
15	9	<2	29	26	28.4
<5	3	3	36	2	29.4
<5	2	3	35	16	34.8
<5	3	<2	32	78	37.6
<5	10	3	30	18	29.4
<5	2	3	25	8	22.4
<5	<2	3	25	8	27.2
10	<2	<2	23	6	23.2
<5	<2	<2	27	20	24.2
<5	<2	3	25	2	27.4
<5	<2	<2	25	<2	32.0
<5	2	3	29	4	33.4
10	2	3	22	10	25.2
<5	2	3	34	10	32.4
<5	2	3	37	12	31.2
10	9	3	37	14	27.6
<5	4	4	44	6	32.8
<5	3	6	45	16	43.4
<5	<2	7	43	24	31.6
<5	<2	4	36	28	27.8
<5	<2	4	31	16	23.6
<5	<2	3	36	20	27.4
<5	<2	4	43	20	41.8
<5	<2	5	34	18	29.4

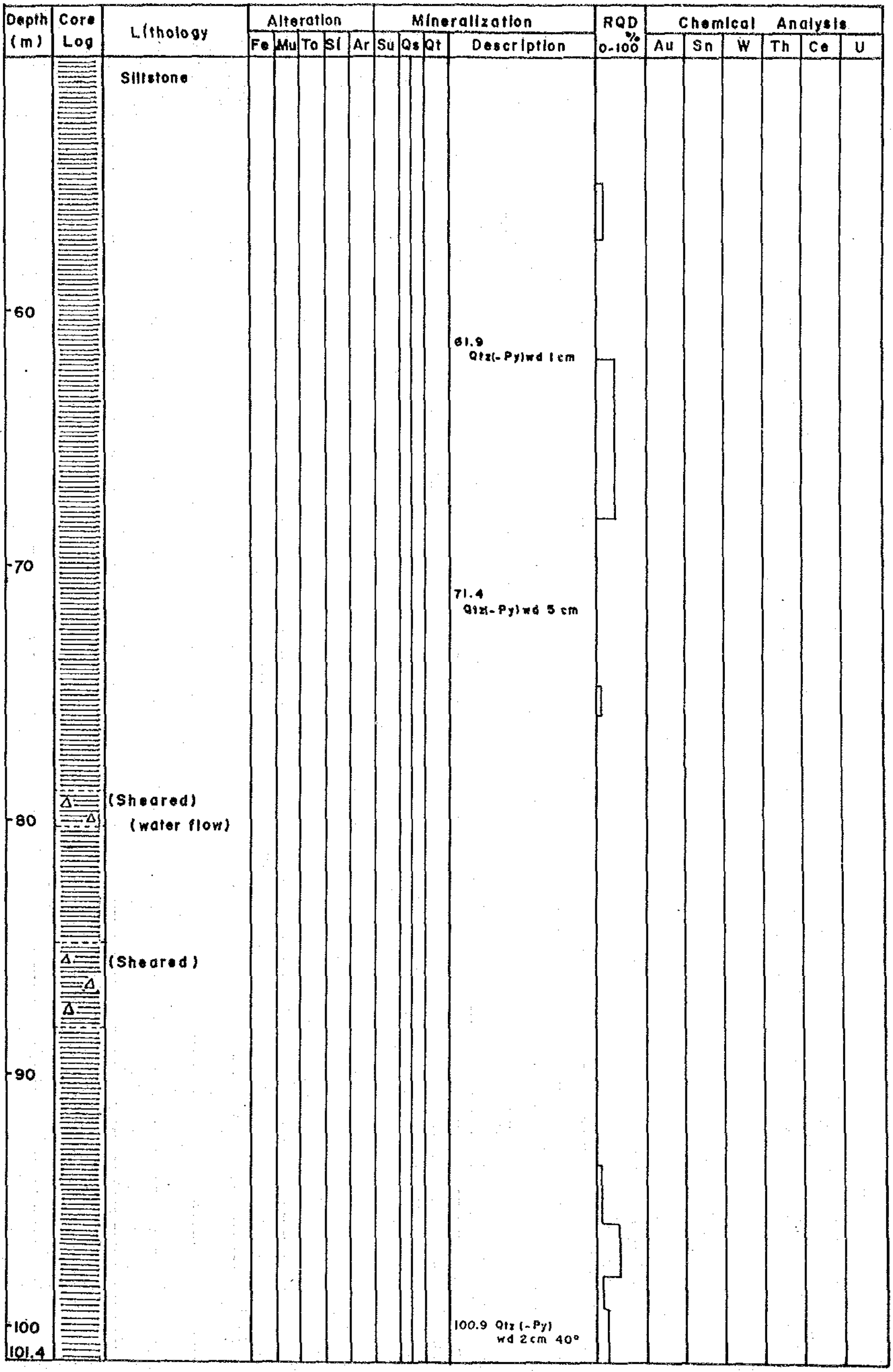
Drilling hole No. MJIT − 4

Latitude S 0° 48' 39"   Longitude E 102°19' 41"   Elevation 155 m



Au	Sn	W	Th	Ce	U
<5	<2	17	15	98	2.2
5	<2	16	19	106	2.2
<5	<2	24	20	108	2.2
<5	3	10	16	56	2.6
<5	5	16	19	76	2.8

Drilling hole No. MJIT − 4



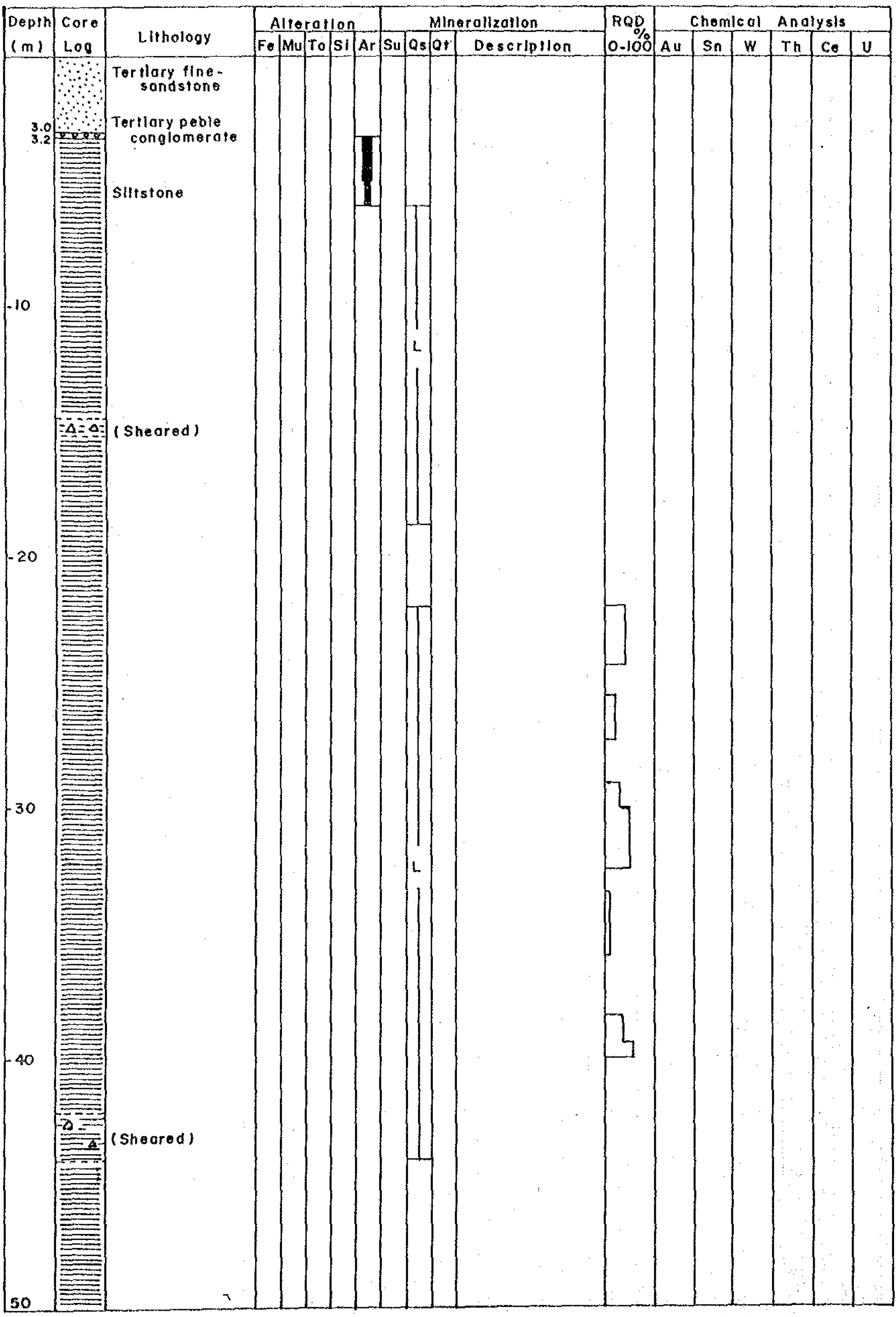
61.9
Qtz(-Py)wd 1 cm

71.4
Qtz(-Py)wd 5 cm

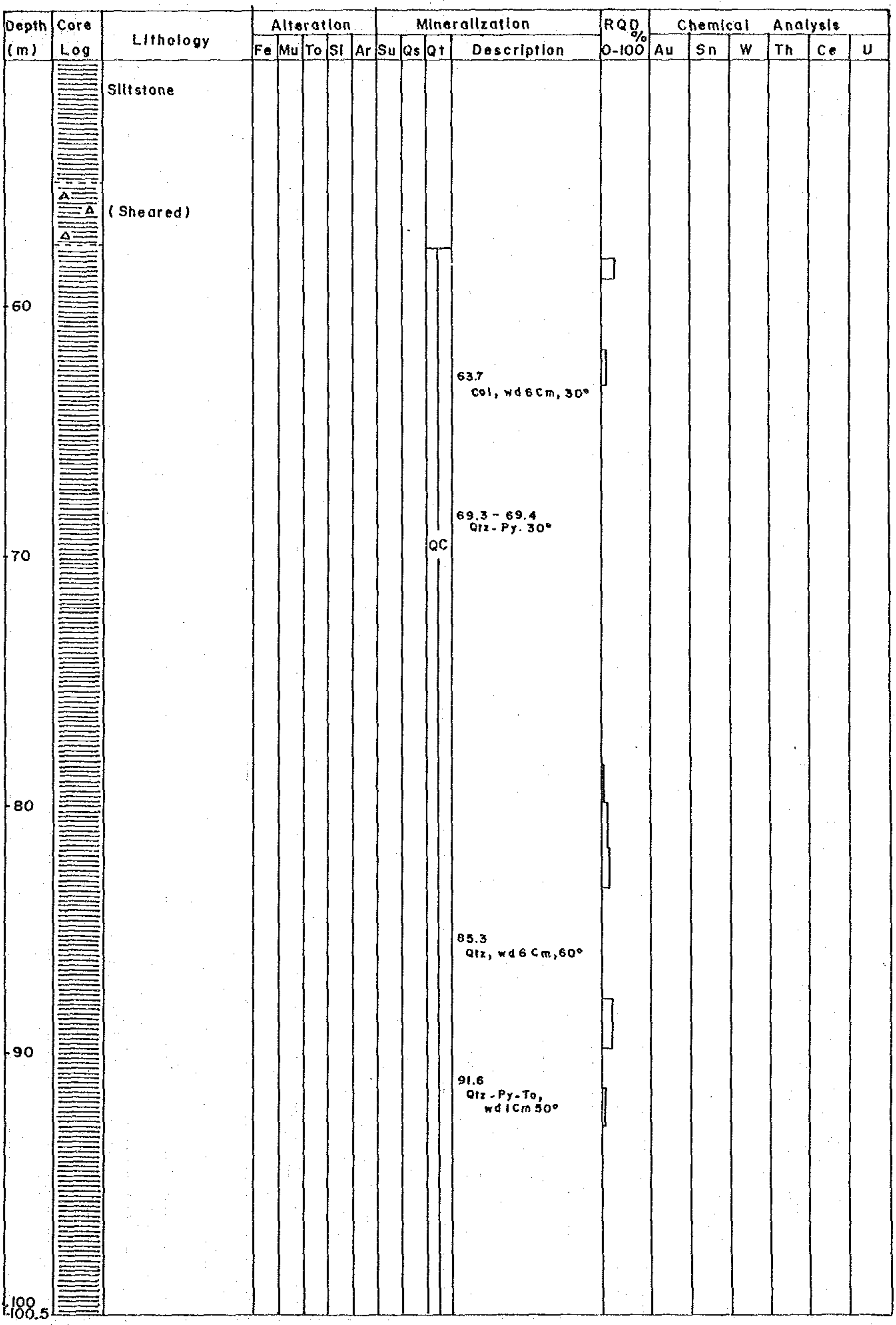
100.9 Qtz (-Py)
wd 2 cm 40°

Drilling hole No. MJIT - 5

Latitude S 0°48' 39" Longitude E 102°19' 46" Elevation 238 m

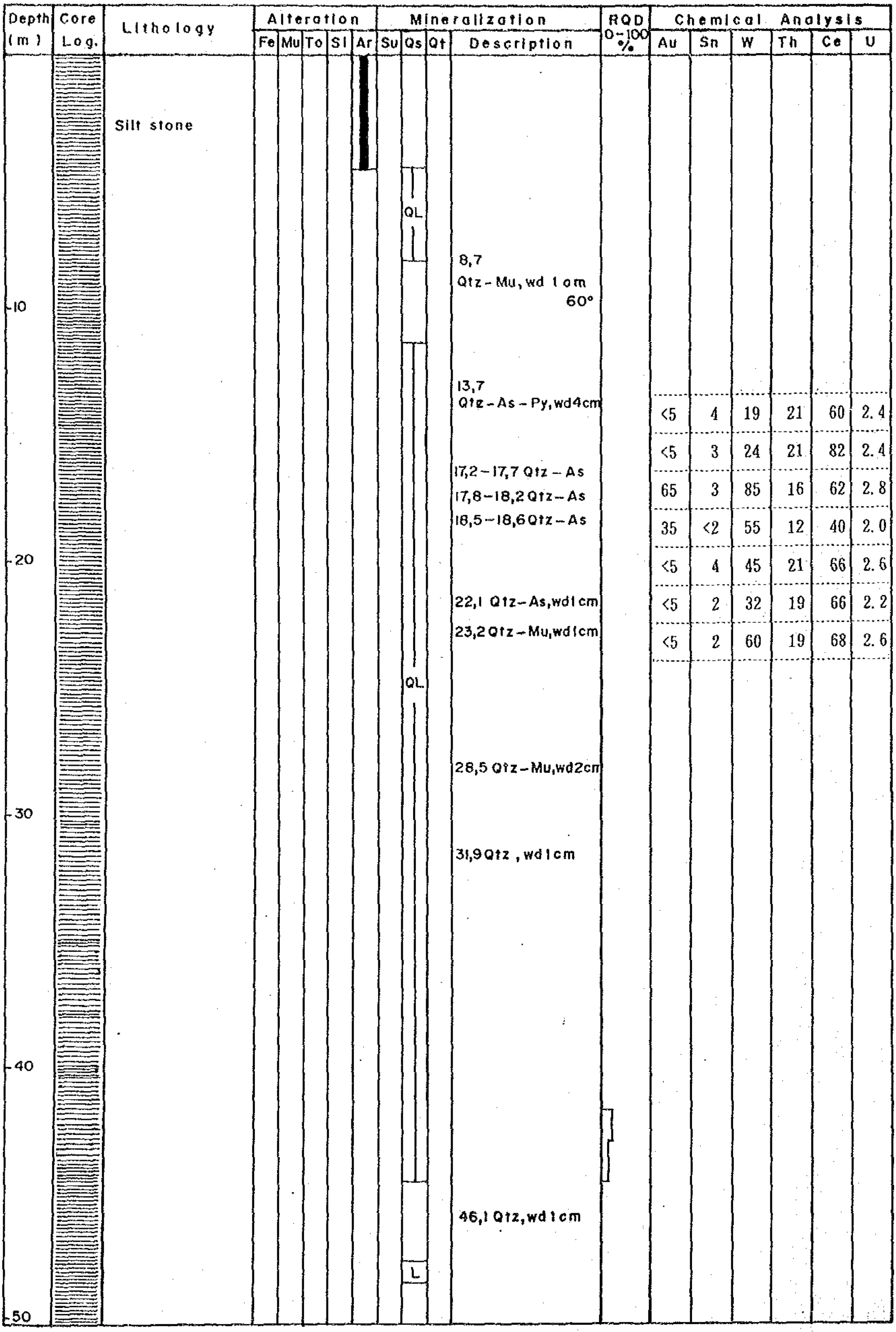


Drilling hole No. MJIT – 5



Drilling hole No. MJIT − 6

Latitude S 0° 48' 34" Longitude E 102°19'41" Elevation 215 m



8,7
Qtz − Mu, wd 1 cm
60°

13,7
Qtz − As − Py, wd4cm

17,2 − 17,7 Qtz − As
17,8 − 18,2 Qtz − As
18,5 − 18,6 Qtz − As

22,1 Qtz − As, wd1 cm
23,2 Qtz − Mu, wd1cm

28,5 Qtz − Mu, wd2cm

31,9 Qtz , wd1cm

46,1 Qtz, wd1cm

Au	Sn	W	Th	Ce	U
<5	4	19	21	60	2.4
<5	3	24	21	82	2.4
65	3	85	16	62	2.8
35	<2	55	12	40	2.0
<5	4	45	21	66	2.6
<5	2	32	19	66	2.2
<5	2	60	19	68	2.6

Drilling hole No. MJIT – 6