3. DRILLING OPERATION

3–1 Preparatory Works

Drilling machines and materials were carried by truck from Manila to Sallapadan population, Abra Province, and by a helicopter from Sallapadan population to the first drilling site, RPJ–1. The flight and flying time from Sallapadan to the drilling site are approximately 20 km and 7 minutes, respectively.

Transportations of the drilling machines from RPJ–1 to RPJ–2 sites and from RPJ–2 to RPJ–3 sites were done by self power movement and man power.

The base camp was established at Ud-Udiao and it takes 15- to 20- minutes by walk from base camp to each site.

3–2 Moving Operation

The moving operations of each hole are shown in Table IV–2.

3–3 Withdrawing Operations

Immediately upon completion of RPJ–3 drill hole, such works as pulling out casing pipes, dismounting the drilling machine and a derrick were undertaken. Thereafter, the drilling machine and some heavy materials were transported by a helicopter while other equipments were carried by man power to Barrio Sallapadan and by jeep from Barrio Sallapadan to Sallapadan population. All equipments and supplies were gathered in Sallapadan population and were withdrawn to Manila by truck. All cores were accumulated in Baguio Regional Office of BMG. Withdrawing operations were completed on March 25, 1981.

3–4 Coring Condition and Hole-Wall Protection

Depths of overburden in RPJ–1, RPJ–2 and RPJ–3 are 8.30 m, 2,00 m and 6.80 m, respectively. The total coring depth is 915.10 m while total core length is 899.60 m, so that the average core recovery is 98.3 %.

For the protection of wall of each drill hole, HW size casing pipes were used in the overburden and highly weathered zone, and after inserting pipes HX-WL process was used. This method is one of the reasons in the improvement of core recovery.

Bentonite mud-fluid was effective for removing sludge. Cutting oil mixed with

Table IV–2 Details of Moving Operation

Item \ Hole No.		RPJ–1		RPJ–2		RPJ–3		Total	
Moving Operation	In	Jan. 12, 1981		Feb. 8, 1981		Feb. 22, 1981			
		Jan. 23, 1981		Feb. 13, 1981		Feb. 24, 1981			
	Out	Feb. 11, 198		Feb. 24, 1981		Mar. 6, 1981			
		Feb. 12, 1981		Feb. 27, 1981		Mar. 25, 1981			
		Day	Man-day	Day	Man-day	Day	Man-day	Day	Man-day
Preparation	Road Reinstatement	6	80					6	80
	Haulage	6	171	4	44	1	37	11	252
	Installation	2	60	2	22	2	22	6	104
	Test Run, etc.								
	Total	14	311	6	66	3	59	23	436
Removal	Dismounting	1	33	2	26	2	30	5	89
	Pull out of Casing pipes	1	33	1	13	1	13	3	59
	Haulage					17	320	17	320
	Road Reinstatement								
	Others			1	13			1	13
	Total	2	66	4	52	20	363	26	481
Grand Total		16	377	10	118	23	422	49	917

circulating water was used in order to reduce drill hole friction, to prevent abration of drill tools and to protect the wall of drill hole from caving-in.

The drilling results shown in Fig. IV–2–A ~ C indicates that drilling length per shift for the total works is 9.32 m.

3–5 Drilling Conditions

The results of each hole are as follows:

3–5–1 RPJ–1

Drilling was commenced by using HX (101 m/m) size single diamond core bit. After reaching the bedrock at 18 m depth, HW size casing pipes were inserted and HQ–WL process was used up to 74.95 m depth. However, the drill hole encountered several water-running out zones that NX size casing pipes were pushed down to 75 m depth and changed to NQ–WL process.

The rocks between 18 m and 113 m depths are hornfelsic andesite lava with numerous intrusive bodies of quartz diorite but the depth from 113 m to 310.00 m, the bottom of hole, was favorably drilled due to the continuation of very stable quartz diorite and granodiorite.

3–5–2 RPJ–2

Drilling was started by HX size single diamond core bit up to 15 m depth and HW size casing pipes were inserted to the same depth, after which HQ–WL process was used. This process drilled through stable quartz diorite and hard andesite hornfels up to 93 m depth. At 93 m depth, NX size casing pipes were inserted and changed to NQ–WL process.

In this process, circulating water ran out at 103.50 m depth. But after continuous drilling without water, the loss of water stopped and drilling was continued up to 310.90 m. The rock from 93 m to 264 m depths is mostly andesite while quartz diorite is observed between 264 m and 310.90 m depths.

3–5–3 RPJ–3

Overburdens and highly weathered fracturing zone continued up to 17 m depth, and HX single diamond core bit and HW size casing pipes were used from the collar to the bedrock. After reaching the bedrock, HQ–WL process was adopted. The drill hole encountered many fractured zones in andesite between 17 m and 63 m depths, but below

63 m depth andesite was stable. However, the required depth was 300 m, so NX size casing pipes were pushed down to 111.40 m depth and HQ–WL process was changed to NQ–WL process. This process was used up to the bottom at 311.30 m depth.

Table IV–3–A ~ C show the summary records of drilling results while Table IV–4 shows the generalized results of all the holes.

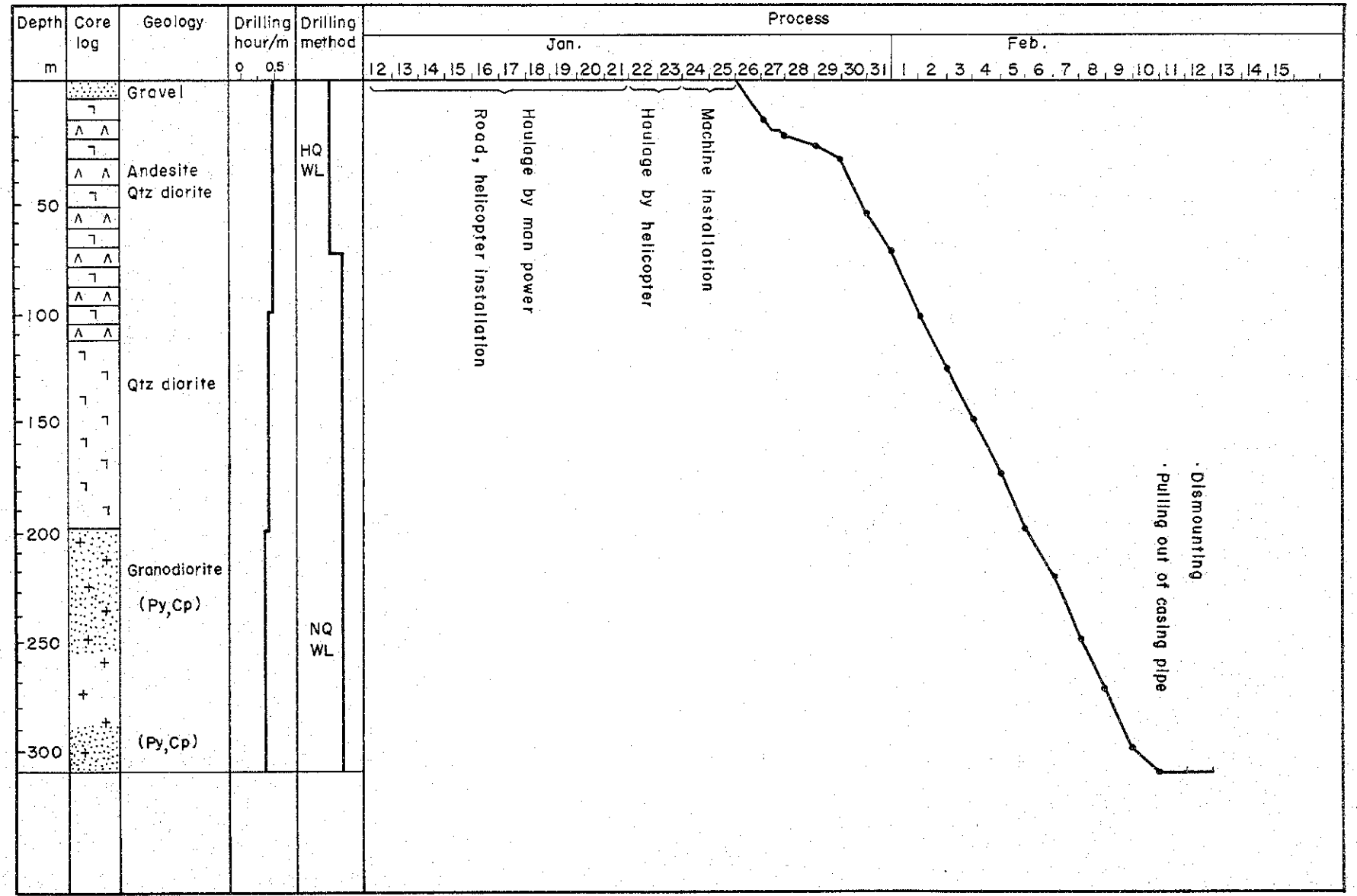


Fig. IV–2–A Drilling Progress of Each Hole : RPJ–1

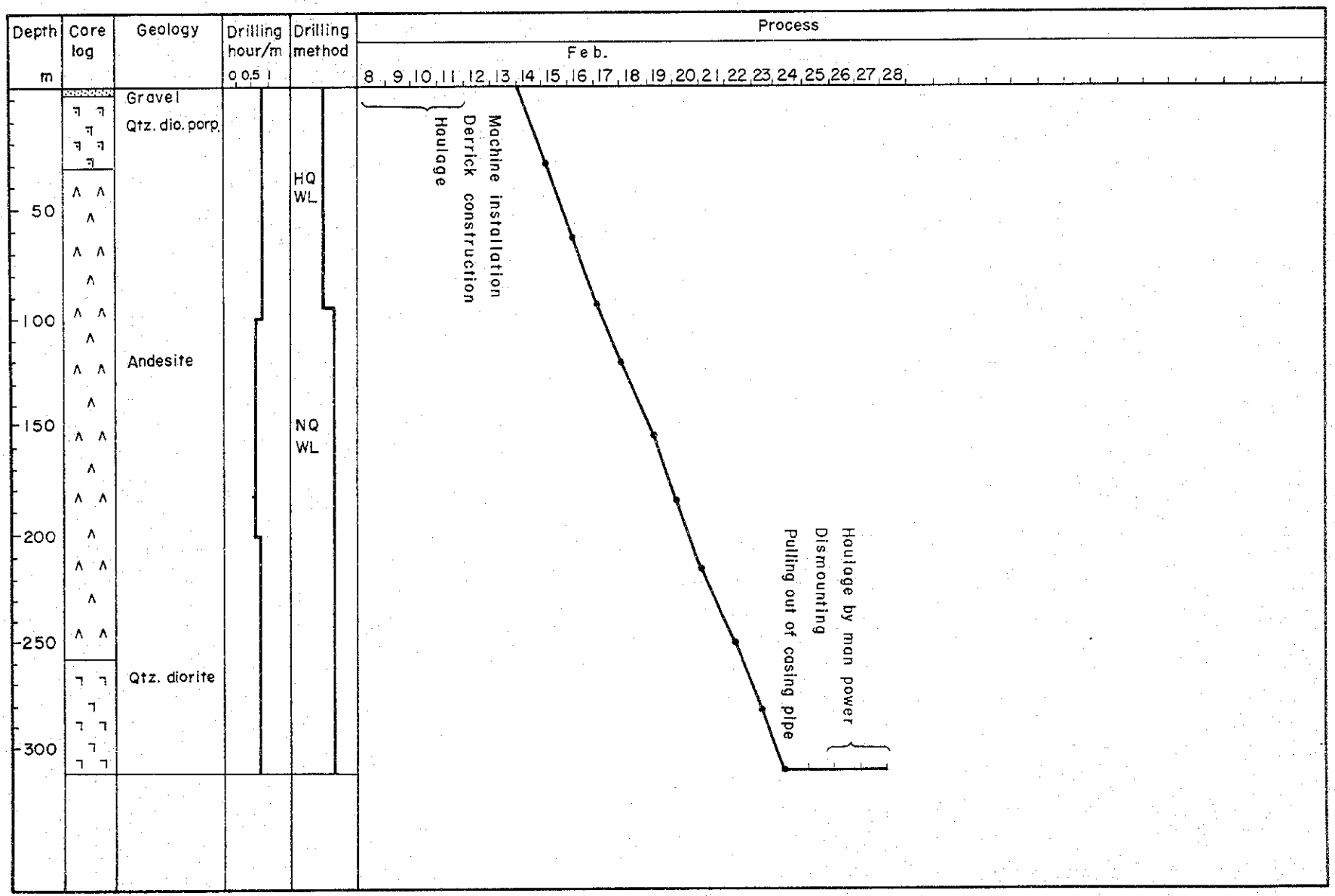


Fig. IV–2–B Drilling Progress of Each Hole : RPJ–2

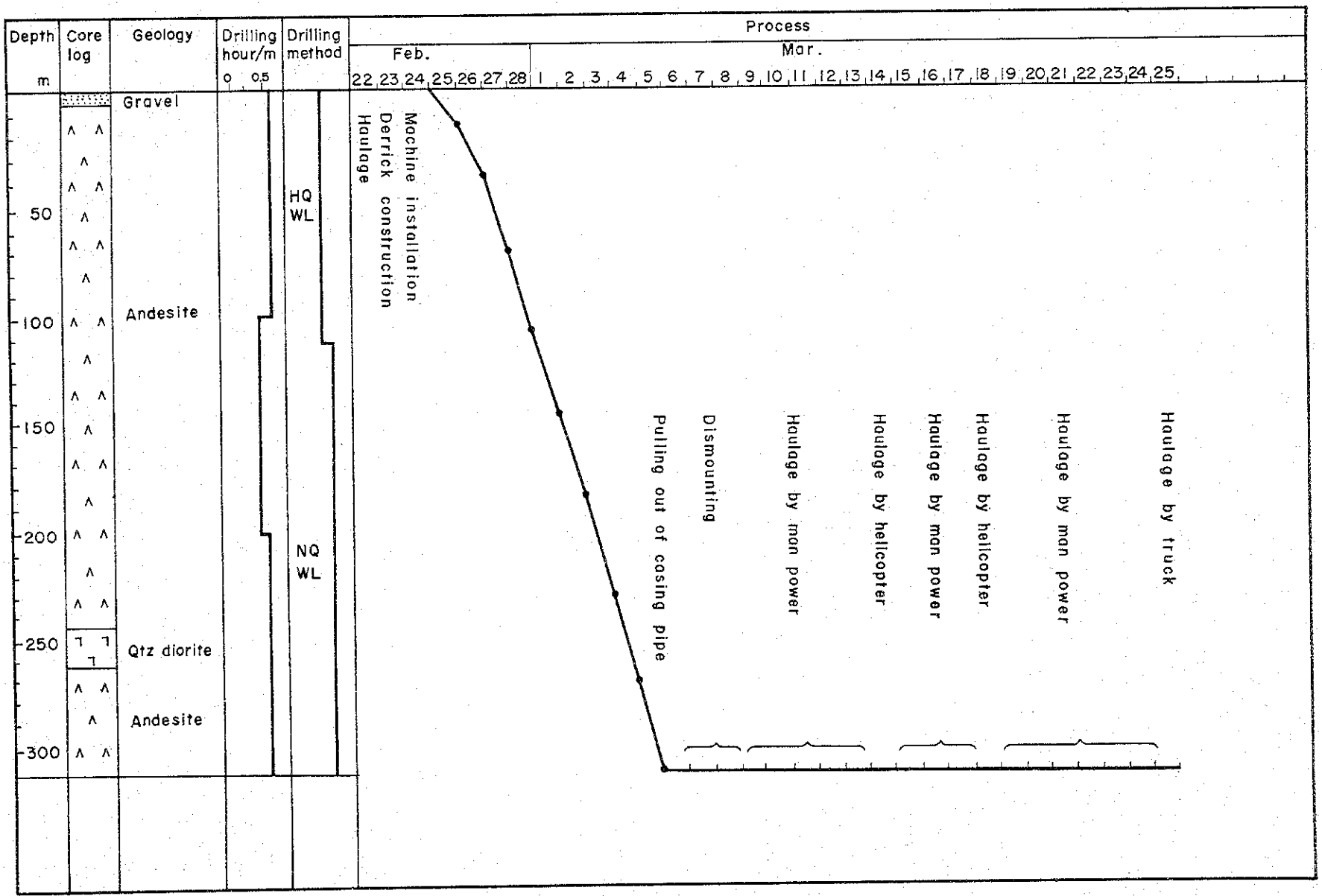


Fig. IV–2–C Drilling Progress of Each Hole : RPJ–3

Table IV–3–A Summary Record of Drilling Results ; RPJ–1

		Periods			Number of Days	Actual Working Days	Pay off	Total Number of Workers
Drilling Period	Preparation	Jan. 12, 1981 – Jan. 23, 1981			14	14	–	311
	Drilling	Jan. 26, 1981 – Feb. 10, 1981			16	16	–	208
	Removing	Feb. 11, 1981 – Feb. 12, 1981			2	2	–	66
	Total	Jan. 12, 1981 – Feb. 12, 1981			32	32		585
Drilling Length	Planned Length	300.00 m	Overburden	8.30 m	Core Recovery for Each 100 m Section			
	Increase or Decrease in Length	– m	Core Length	299.10 m	Depth (m)	Section (%)	Total (%)	
	Drilled Length	310.00 m	Core Recovery	99.1 %	0–100	97.6	97.6	
Working Time	Drilling	136°00′	41.5 %	29.8 %	100–200	100	98.8	
	Accompanying Works	190°00′	57.9	41.7	200–300	100	99.1	
	Repairing	2°00′	0.6	0.4	300–400			
	Total	328°00′	100	71.9	Drilling Efficiency			
	Preparation	40°00′		8.8	310.00 m/32 days ($\frac{\text{Total Length (m)}}{\text{Drilling Period}}$)			9.69 m/Day
	Moving	16°00′		3.5	310.00 m/32 days ($\frac{\text{Total Length (m)}}{\text{Working Days}}$)			9.69 m/Day
	Others	72°00′		15.8	310.00 m/16 days ($\frac{\text{Total Length (m)}}{\text{Net Drilling Days}}$)			19.38 m/Day
	Grand Total	456°00′		100	208 men/310.00 m ($\frac{\text{Net Drilling Workers}}{\text{Total Length (m)}}$)			0.67 men/m
Inserted Casing Pipe	Pipe size & Inserted Length (m)	$\frac{\text{Inserted Length}}{\text{Drilling Length}} \times 100\%$ Recovery of Casing Pipe (%)			Remarks			
	HX C.S.G 18.00 m	5.8		100				
	NX C.S.G 75.00 m	24.2		85				

Table IV–3–B Summary Record of Drilling Results ; RPJ–2

		Periods			Number of Days	Actual Working Days	Pay off	Total Number of Workers
Drilling Period	Preparation	Feb. 8, 1981 – Feb. 13, 1981			6	6	–	66
	Drilling	Feb. 14, 1981 – Feb. 23, 1981			10	10	–	130
	Removing	Feb. 24, 1981 – Feb. 27, 1981			4	4	–	52
	Total	Feb. 8, 1981 – Feb. 27, 1981			20	20	–	248
Drilling Length	Planned Length	300.00 m	Overburden	2.00 m	Core Recovery for Each 100 m Section			
	Increase or Decrease in Length	– m	Core Length	301.25 m	Depth (m)	Section (%)	Total (%)	
	Drilled Length	310.90 m	Core Recovery	97.5 %	0–100	93.6	93.6	
Working Time	Drilling	146°40′	59.2 %	45.8 %	100–200	100	96.5	
	Accompanying Works	89° 0′	35.9	27.8	200–300	99.9	97.5	
	Repairing	12°20′	4.9	3.9	300–400			
	Total	248° 0′	100	77.5	Drilling Efficiency			
	Preparation	24° 0′		7.5	310.90 m/20 days ($\frac{\text{Total Length (m)}}{\text{Drilling Period}}$)			15.55 m/Day
	Moving	24° 0′		7.5	310.90 m/20 days ($\frac{\text{Total Length (m)}}{\text{Working Days}}$)			15.55 m/Day
	Others	24° 0′		7.5	310.90 m/10 days ($\frac{\text{Total Length (m)}}{\text{Net Drilling Days}}$)			31.09 m/Day
	Grand Total	320° 0′		100	248 men/310.90 m ($\frac{\text{Net Drilling Workers}}{\text{Total Length (m)}}$)			0.80 men/m
Inserted Casing Pipe	Pipe size & Inserted Length (m)	$\frac{\text{Inserted Length}}{\text{Drilling Length}} \times 100\%$ Recovery of Casing Pipe (%)			Remarks			
	HX C.S.G 15.00 m	4.8		90				
	NX C.S.G 93.00 m	30.0		80				

Table IV–3–C Summary Record of Drilling Results ; RPJ–3

		Periods			Number of Days	Actual Working Days	Pay off	Total Number of Workers
Drilling Period	Preparation	Feb. 22, 1981 – Feb. 24, 1981			3	3	–	59
	Drilling	Feb. 25, 1981 – Mar. 5, 1981			9	9		117
	Removing	Mar. 6, 1981 – Mar. 25, 1981			20	20		363
	Total	Feb. 22, 1981 – Mar. 25, 1981			32	32	–	539
Drilling Length	Planned Length	300.00 m	Overburden	6.80 m	Core Recovery for Each 100 m Section			
	Increase or Decrease in Length	– m	Core Length	299.25 m	Depth (m)	Section (%)	Total (%)	
	Drilled Length	311.30 m	Core Recovery	98.3 %	0–100	94.8	94.8	
Working Time	Drilling	144°35′	69.5 %	37.7 %	100–200	99.9	98.0	
	Accompanying Works	63°25′	30.5	16.5	200–300	99.9	98.3	
	Repairing	–			300–400			
	Total	208° 0′	100	54.2	Drilling Efficiency			
	Preparation	24° 0′		6.25	311.30 m/32 days ($\frac{\text{Total Length (m)}}{\text{Drilling Period}}$)			9.73 m/Day
	Moving	24° 0′		6.25	311.30 m/32 days ($\frac{\text{Total Length (m)}}{\text{Working days}}$)			9.73 m/Day
	Others	128° 0′		33.3	311.30 m/ 9 days ($\frac{\text{Total Length (m)}}{\text{Net Drilling Days}}$)			34.59 m/Day
	Grand Total	384° 0′		100	117 men/311.30 m ($\frac{\text{Net Drilling Workers}}{\text{Total Length (m)}}$)			0.38 men/m
Inserted Casing Pipe	Pipe size & Inserted Length (m)	$\frac{\text{Inserted Length}}{\text{Drilling Length}} \times 100\%$ Recovery of Casing Pipe (%)			Remarks			
	HX C.S.G 17.00 m	5.4		100				
	NX C.S.G 111.40 m	35.8		100 80				

Table IV–4 Generalized Drilling Result

Drill Hole No.	Machine Type	Drilling Period	Drilled Length	Core		Number of Drilling Shift			Drilling Speed		Remarks
				Length	Recovery	Drilling	Casing, etc	Total	m/shift *	m/shift **	
RPJ–1	TGM–2C	Jan. 12, '81 – Feb. 12, '81	310.00 m	299.10 m	99.1 %	40	1	41	7.56	7.75	
RPJ–2	TGM–2C	Feb. 8, '81 – Feb. 27, '81	310.90	301.25	97.5	32	1	33	9.42	9.71	
RPJ–3	TGM–2C	Feb. 21, '81 – Mar. 25, '81	311.30	299.25	98.3	25	1	26	11.97	12.45	
Total			932.20	899.60	98.3	97	3	100	9.32	9.61	

Notes * Drilling Length per one shift covering total works operated

** Drilling Length per one shift covering net drilling operations

4. RESULTS OF DRILLING EXPLORATION

4–1 General Statement

The drilling exploration was conducted in the Manikbel area to confirm the extention and nature of the mineralized zone distributed in the Mamising Creek basin under the Phase III of the project. It consists of three holes totalling 932.20 m.

It has been established by the geological and geochemical surveys in Phase II and III that numerous dissemination and/or network type mineralized outcrops were mainly distributed in the eastern basin of the Mamising Creek. These mineralized outcrops are composed of pyrite, malachite and few amount of chalcopyrite. Most of them are formed in the marginal portion of the quartz diorite mass and some outcrops in andesite lava near the contact between andesite and the mass. The detailed geochemical investigation in Phase III shows strong Cu anomalous zones covering the distribution area of mineralized outcrops and eastern periphery, and this suggests that the mineralized zone extends further eastward.

Remarkable FE anomalous zones were detected in the eastern and western peripheral portions of the mineralized zone by the IP electric survey conducted in Phase III. The eastern anomalous zone overlies the eastern margin of mineralized and geochemical anomalous zones and their eastern vicinities. The eastern FE anomalous zone continued toward depth.

In the distribution area of the mineralized outcrops and geochemical anomalies accompanied by very low IP anomalous zone, BMG had formerly drilled six holes (approximate length of each hole is 100 ~ 160 m) in which local Cu mineralizations was manifested in only one hole.

Based on the above-mentioned survey results, it can be considered that the mineralized zone exposed in the Mamising Creek is formed in the margin of quartz diorite mass and its vicinity and extends toward eastern depth due to the distribution features of the quartz diorite mass and IP anomalous zone. Therefore, drilling sites for the three holes were designated in the eastern portion of the mineralized zone.

Consequently, disseminated zones of pyrite with a small amount of chalcopyrite were observed below 195.20 m depth of RPJ–1 hole, however, no mineralized zones were found in RPJ–2 and RPJ–3 holes.

Geology and mineralization on each hole is described hereafter. Detailed core logs of

each hole are shown in Fig. A–4.

4–2 RPJ–1

As shown in Fig. IV–1, the drilling site of RPJ–1 is located on the divide between the Manikbel River and the Mamising Creek where it is situated at 550 m NE of MA–4 mineralized zone. At about 300 m west from this drilling site, the location of previous drilling site, BM-NO.6, is situated. The drilling site, RPJ–1 is also located at NO.15.3 of Line-C of IP survey.

Geology of the drilling site consists mainly of andesite lava of the Licuan Group Formation II, as shown in PL. I–1–1 and PL. I–1–3. Quartz diorite intruding into the andesite lava is exposed at 70 m northwest of the site, and the boundary of quartz diorite and andesite gently dips toward the drilling site. Near the site and at the southern portion of the site, some dykes of quartz diorite porphyry and dacite are observed to be distributed.

After reaching the bedrock at 8.30 m depth, light gray colored coarse-grained quartz diorite is encountered extending up to 29.20 m depth. From 29.20 to 113.10 m andesite lava intruded by many dykes of quartz diorite, quartz diorite porphyry were observed and altered to hornfels. The core between 113.10 and 196.00 m depths shows complicated occurrence of quartz diorite, granodiorite and quartz diorite porphyry. This occurrence seems to suggest that quartz diorite is exhaustively intruded by dykes and/or stocks of granodiorite and quartz diorite porphyry in its marginal parts as shown in PL. I–1–3. Quartz diorite shows light gray and often porphyritic texture. Granodiorite is light-greenish gray colored medium- to coarse-grained leucocratic rock with equigranular and porphyritic textures in same parts.

Granodiorite is observed from 196.00 to 260.00 m, 282.60 to 299.60 m and 303.70 to 310.00 m depths and is accompanied by dissemination of pyrite and chalcopyrite as will be described later. From 260.00 to 282.60 m depths, it is gray fine-grained quartz diorite and from 299.60 to 303.70 m, it is quartz diorite porphyry accompanied by no mineralization.

The mineralization in this hole is the most predominant among three holes and it occures in all of andesite, quartz diorite and granodiorite. The occurrences of the mineralization are veinlets and/or network of veinlets in andesite and dissemination in quartz diorite and granodiorite.

Usually veins occurred in andesite consist of chlorite, calcite and epidote and their width are less than 1 cm, mainly film- or hair-shaped. Quartz is generally very poor, but

some of veins contain abundant quartz with wide widths. Principal ore minerals are pyrite and lesser amount of chalcopyrite which is abundant in rather chlorite-calcite-epidote veins than quartz-rich veins.

Metal contents of some remarkable veins obserbed in andesite are as follows:

Depth (m)	Core length (m)	Au (g/t)	Ag (g/t)	Cu (%)
44.60 ~ 44.80	0.20	0.0	5.4	1.64
55.70 ~ 55.80	0.10	0.0	7.7	4.76
84.60 ~ 84.90	0.30	0.0	2.2	0.72

Each vein shows relatively high Cu content but vein width is very thin.

The mineralized zones formed in quartz diorite and granodiorite are mostly of dissemination type and only few zones show network of micro-veinlets. Principal mineralized zones are dissemination of pyrite with lesser amount of chalcopyrite in 195.20 to 260.00 m depth, that of pyrite accompanied by moderate amount of chalcopyrite within 292.30 to 299.60 m in depth and pyrite dissemination between 303.70 and 308.40 m. All of them are formed in granodiorite.

The average contents of Au, Ag and Cu are as follows:

Depth (m)	Core length (m)	Au (g/t)	Ag (g/t)	Cu (%)
198.00 ~ 210.00	12.00	0.0	0.5	0.14
210.00 ~ 222.00	12.00	0.0	1.0	0.31
222.00 ~ 231.00	9.00	0.0	0.6	0.17
246,00 ~ 260.00	14.00	0.0	1.3	0.22
292.30 ~ 299.60	7.30	0.0	2.1	0.58
303.70 ~ 308.45	4.75	0.0	1.0	0.20

Among these zones, three of them, from 198.00 to 231.00 m, are divided parts of the same mineralized zone. It has a wide extent but Cu grade is not encouraging amount.

The polished section taken from 202.50 m in depth is composed mainly of minor

amount of pyrite and chalcopyrite with abundant magnetite, but this section shows occurrence of aggregated of lamella molybdenite in granodiorite.

Some samples are randomly analized for S, and its maximum content is 1.31 %. Although high content of S was expected on the basis of the intensity of the FE enomalous zone, these analytical data seem to suggest that pyrite is relatively poor in each mineralized zones.

4–3 RPJ–2

This hole is located at 250 south of RPJ–1 where is equivarent to the crossing of Line-D and Line-H of IP electric survey. The site is enclosed with andesite lava and the contact between andesite lava and quartz diorite is situated at around 250 m west of this hole. A dyke of quartz diorite porphyry passes over this site in the direction of WNW–ESE and other some small dykes are exposed in the northern portion of this dyke.

In the RPJ–2 hole, overbardens are only 2 m in thickness, and the rock from 2 to 39.00 m depth is medium-grained quartz diorite porphyry. From 39.00 m depth, dark-greenish gray andesite altered mostly to hornfels continues up to 7,150 m and the below 71.50 m depth light-greenish gray quartz diorite is recognized. Between 100.30 m and 263.90 m in depth andesite hornfels is distributed with dyke-shaped quartz diorite, the marginal part of the dyke shows distinct porphyritic texture. Fine-grained gabbroic rock is seen from 263.90 to 305.20 m depth and below this depth quartz diorite porphyry is observed up to 310.90 m which is the bottom of RPJ–2 hole.

As the above-stated, geology of this hole is characterized by exhaustive intrusion of various dykes. However, it can be roughly said that the boundary between andesite lava and quartz diorite is situated at 264 m depth and various dykes and/or apophysis intrude into around the boundary.

The mineralization observed in RPJ–2 hole shows the different feature from RPJ–1, that is, it is characterized by numerous film or hair-shaped veinlets of pyrite. These veinlets occur mainly in andesite lava as isolated veinlets and/or network. The widely spreaded dissemination like of RPJ–1 was not obtained in this hole.

Metal contents of remarkable veins in RPJ–2 are as follows:

Depth (m)	Core length (m)	Au (g/t)	Ag (g/t)	Cu (%)
254.10 ~ 254.40	0.30	0.0	10.0	2.42
288.50 ~ 289.40	0.90	0.0	3.6	0.86

4–4 RPJ–3

This drilling site is located near the trail connecting Ud-Udiao with Nagasasan and also located on NO.15.4 of Line-E. This site is also enclosed by andesite lava but the contact between this rock and quartz diorite is exposed at 200 m east of the site.

This hole had overbardens of 6.80 m in thickness. After reaching bedrock, the hole drilled andesite lava up the bottom, and only one dyke of dark gray quartz diorite porphyry was observed from 247.80 to 264.70 m depth. The andesite lava is mostly aphanitic but occasionally porphyritic.

Numerous pyrite-chlorite veinlets and quartz-chlorite veinlets with clay are formed in andesite but chalcopyrite is very few or absent in veins. A few calcite-quartz veins with scattered pyrite are found between 268 m depth and the bottom, and they contain a small amount of chalcopyrite. But their Cu contents are less than 0.1 %. Only a network of pyrite-chalcopyrite-calcite veinlets shows Cu content of 0.40 %. No mineralization occurs in dyke of quartz diorite porphyry.

As described above, quartz diorite is not recognized in this hole, therefore, it seems to be considered that the northern boundary of the batholith-shaped quartz diorite mass distributed in the southern part of the Manikbel River shows more steep dip than expected one before drilling.

4–5 Summary of Drilling Results

The gology and mineralization on each hole were described above in detail, and these results can be summarized as follows:

The expected mineralized zone which is considered to be the extension of the mineralized outcrops was recognized between 195.20 and 260.00 m depth of RPJ–1. The zone is dissemination of pyrite with a small amount of chalcopyrite formed in granodiorite, its Cu content ranged from 0.2 to 0.3 % and the maximum content is 0.43 % Cu. This result seems to suggest that the mineralized zone occurred in the Mamising Creek consists primarily of dissemination of pyrite and chalcopyrite, and high Cu content of outcrops can be considered to be caused by partial secondary enrichment.

In RPJ–2, the boundary between andesite and quartz diorite was confirmed at 263.90 m depth but the mineralized zone was not observed around the boundary because of vaiolent intrusions of various apophysis and dykes. The RPJ–3 hole drilled in andesite only.

As the result of the drilling exploration, it can be concluded that the mineralized zone

occurs along the surficial zone of quartz diorite mass as like crust of the mass. Its thickness is not clear but seems to be less than 100 m on the basis of the result of RPJ–1 and lacking of IP anomalies below the mineralized zone.

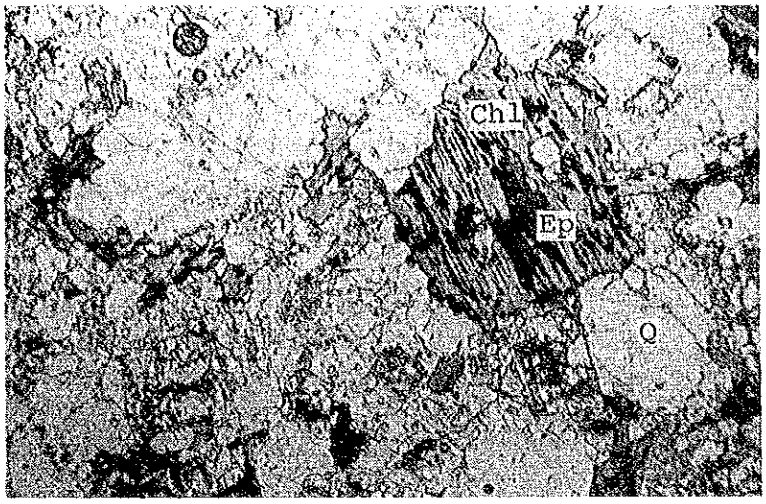
The intense IP anomalous zone detected in the eastern part of the mineralized zone may be considered to be caused by numerous film- and/or hair-shaped veinlets containing abundant pyrite because of the results of drilling.

APPENDICES

Fig. A–1 Microphotography of thin section

Abbreviation

Q	:	quartz
Pl	:	plagioclase
Bi	:	biotite
Hb	:	hornblende
Ch	:	chlorite
Ep	:	epidote
Op	:	opaque mineral
RF	:	rock fragment

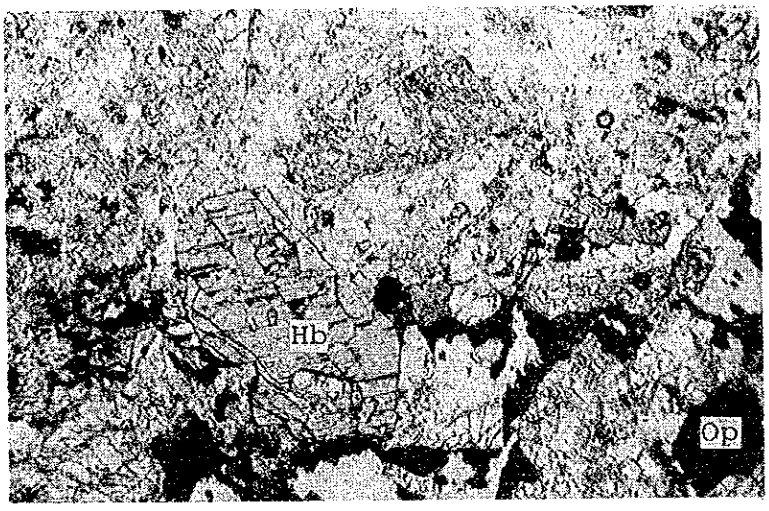


b–3135

Porphyritic quartz diorite

Open nichol

0 0.5mm

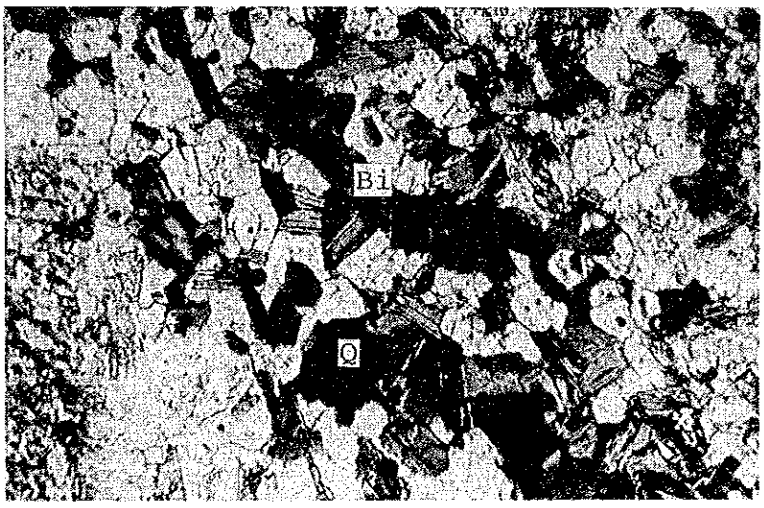


RPJ–2 23.8 m

Quartz diorite

Open nichol

0 0.5mm

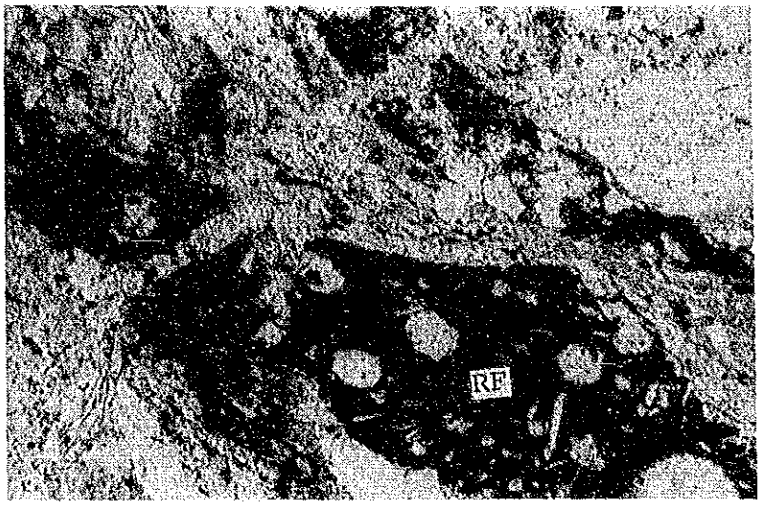


RPJ–1 244.5 m

Porphyritic granodiorite

Cross nichol

0 0.5mm

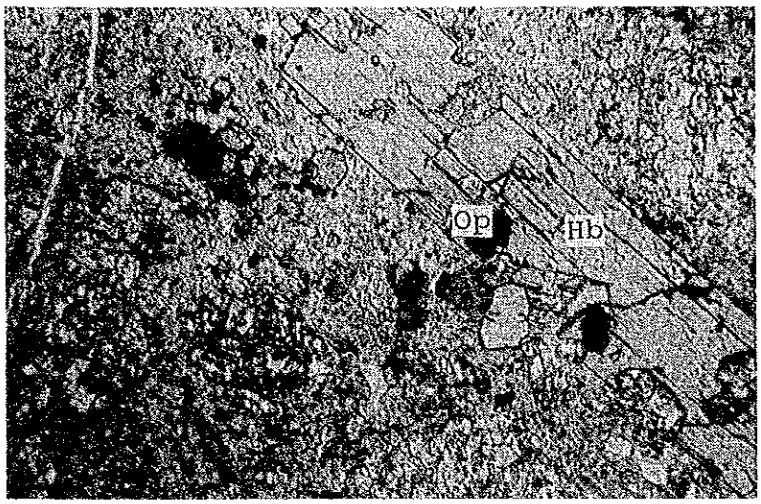


m–3152

Lapilli tuff

Open nichol

0 0.5mm



b–3105

Andesite

Open nichol

0 0.5mm

a–3112

Dacite

Cross nichol

0 0.5mm

Fig. A–2 Microphotography of Polished section

Abbreviation

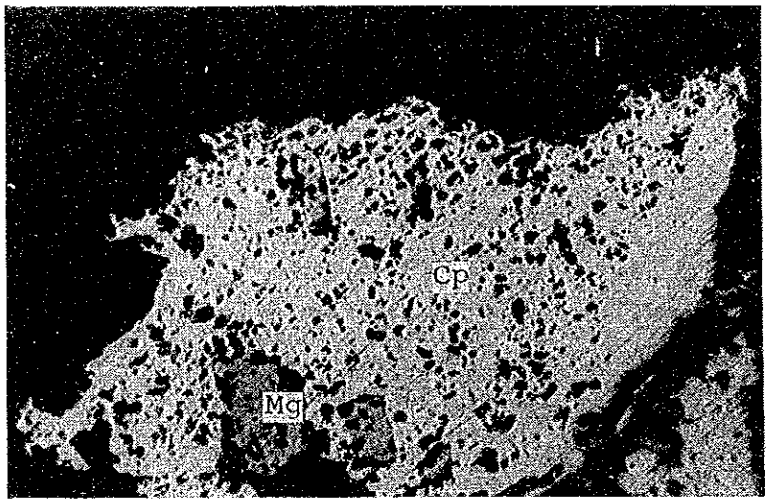
Py	:	pyrite
Cp	:	chalcopyrite
Bo	:	bornite
Dg	:	digenite
Cv	:	covelline
gco	:	grey copper ore
Mo	:	molybdenite
Mg	:	magnetite
Hm	:	hematite
Sp	:	sphalerite

RPJ–1 202.5 m

Tiny molybdenite rarely occur in granodiorite.

Open nichol

0 1mm



RPJ–1 220.5 m

Chalcopyrite (0.5 ~ 1.0 mm) disseminated in granodiorite. Magnetite grain (0.1 ~ 0.2 mm) occur in irregular-shaped chalcopyrite.

Open nichol

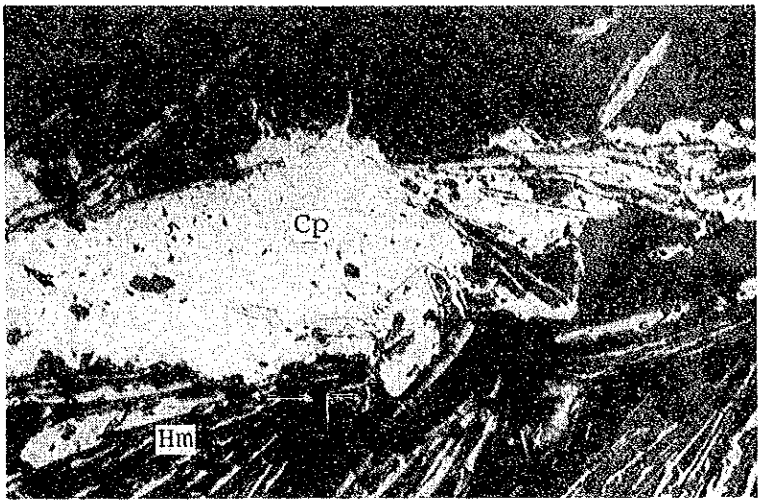
0 1mm

RPJ–1 299.15 m

Chalcopyrite-molybdenite-pyrite bearing quartz veinlet (15 ~ 18 mm) in chloritized granodiorite. Foliated molybdenite and granular pyrite observed in this photo.

Open nichol

0 1mm

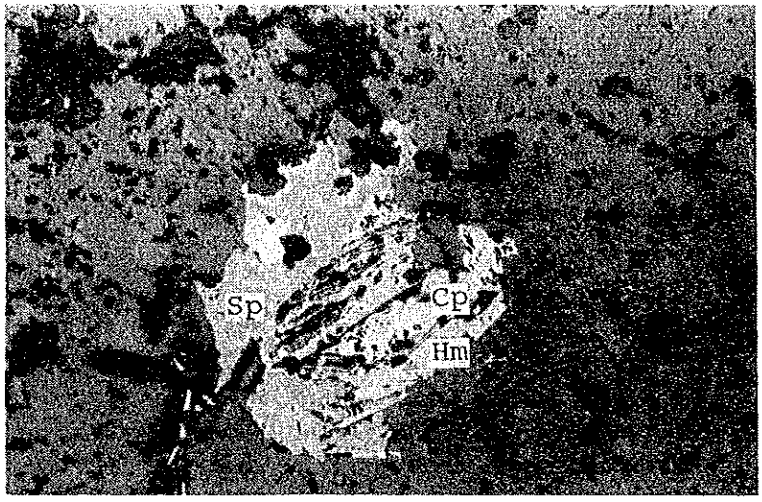


0 1mm

RPJ–3 287.0 m

Hematite-chalcopyrite veinlets (1 ~ 2 mm) in andesite.
Hematite shows straightly elongated lamellas, and chalcopyrite fills in their aperture.

Open nichol

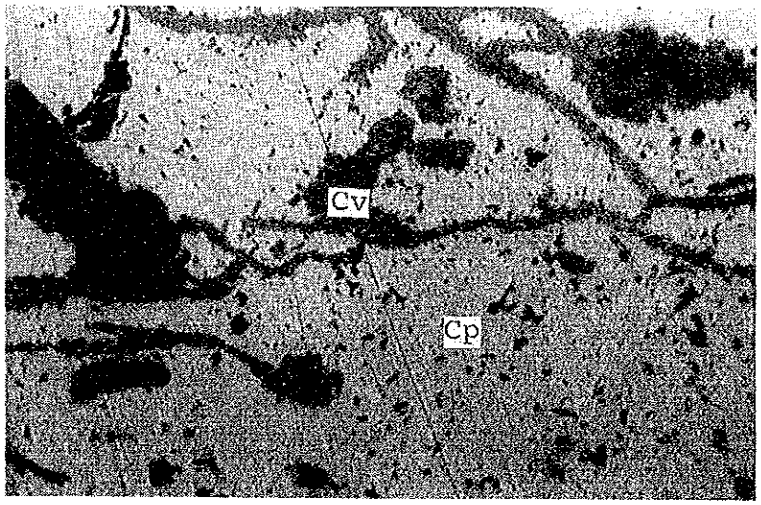


0 1mm

RPJ–3 287.0 m

Sphalerite-chalcopyrite-hematite aggregates occur in andesite.
Sphalerite and chalcopyrite fill in the aperture of hematite lamellas.
Chalcopyrite also occur in sphalerite as tiny dots.

Open nichol

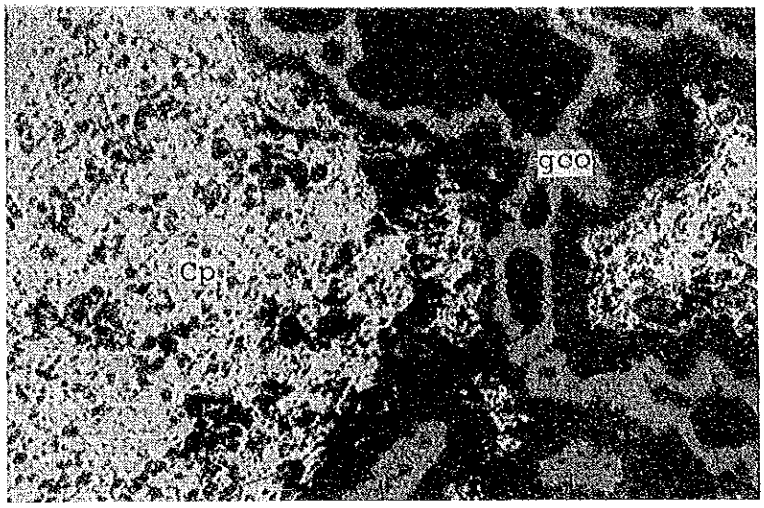


0 1mm

a–3143 (a)

Massive chalcopyrite ore with supergene covelline and grey copper ore.
Covelline and grey copper ore occur along the cracks in chalcopyrite as secondary sulfide.

Open nichol

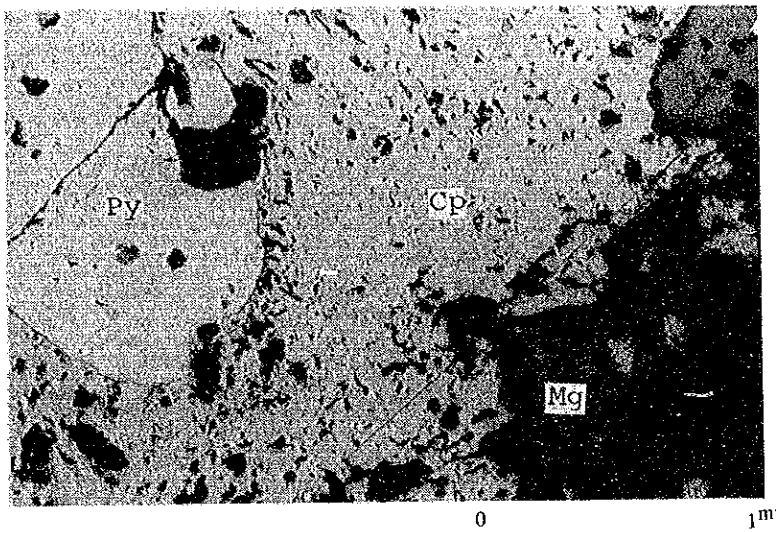


0 1mm

a--3143 (c)

Massive chalcopyrite partly replaced by grey copper ore along the cracks.

Open nichol

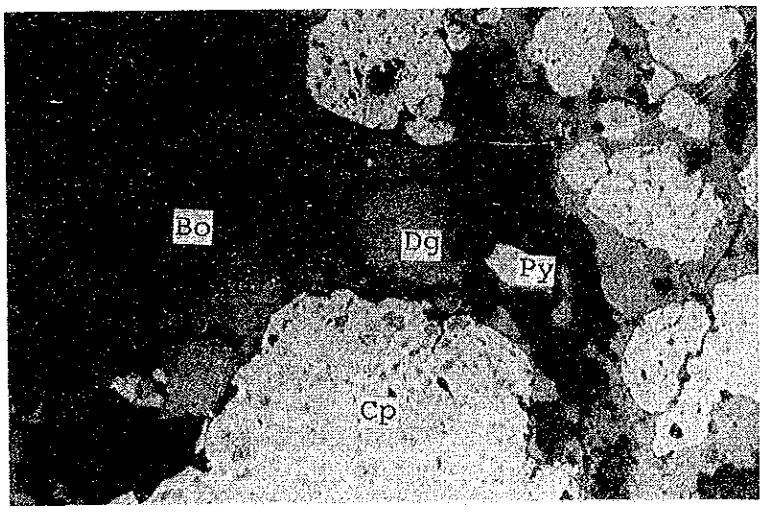


0 1mm

f--3124

Magnetite-bearing rock cut by pyrite-chalcopyrite vein.
Magnetite is unevenly disseminated in altered rock.
Pyrite grain is enclosed by chalcopyrite.

Open nichol



0 1mm

a--3355

Enriched pyrite-chalcopyrite ore.
Chalcopyrite is replaced by supergene bornite and digenite.

Open nichol

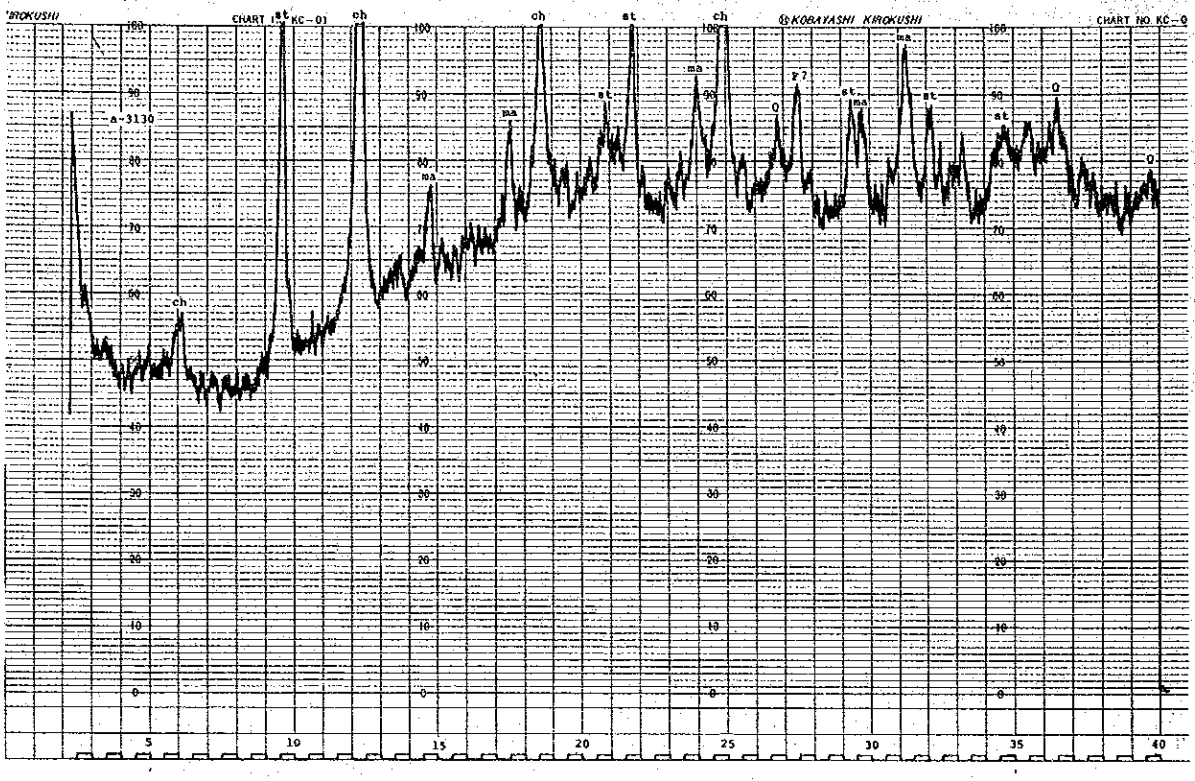
Fig. A–3 Cart of X-ray Diffractive analysis

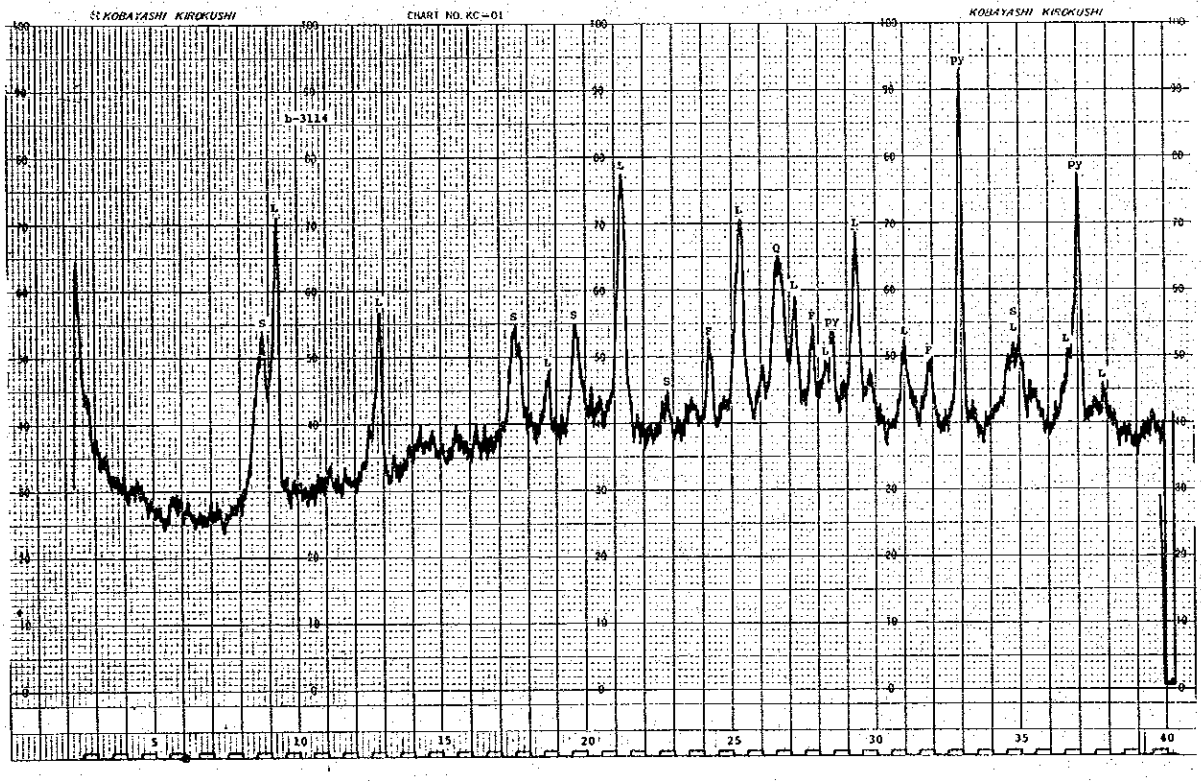
Abbreviation

Q	:	quartz
F	:	feldspar
ep	:	epidote
ch	:	chlorite
S	:	sericite
K	:	kaoline
P	:	pyrophyllite
dias	:	diaspore
al	:	alunite
mi	:	mirabilite
est	:	epistilbite
st	:	stilbite
L	:	laumontite
J	:	jarosite
py	:	pyrite
ma	:	malachite

Condition

X-ray	:	Cuk
Filter	:	Ni-filter
Voltage	:	30KV
Current	:	14mV
Time constant	:	1 sec.
Full scale	:	1,000 cps.
Scan speed	:	2° /min.
Chart speed	:	2cm/min.
D-slit	:	1°
R-slit	:	0.3


KOBAYASHI KIROKUSHI
CHART NO. KC-01
a-3130


KOBAYASHI KIROKUSHI
CHART NO. KC-01
b-3114

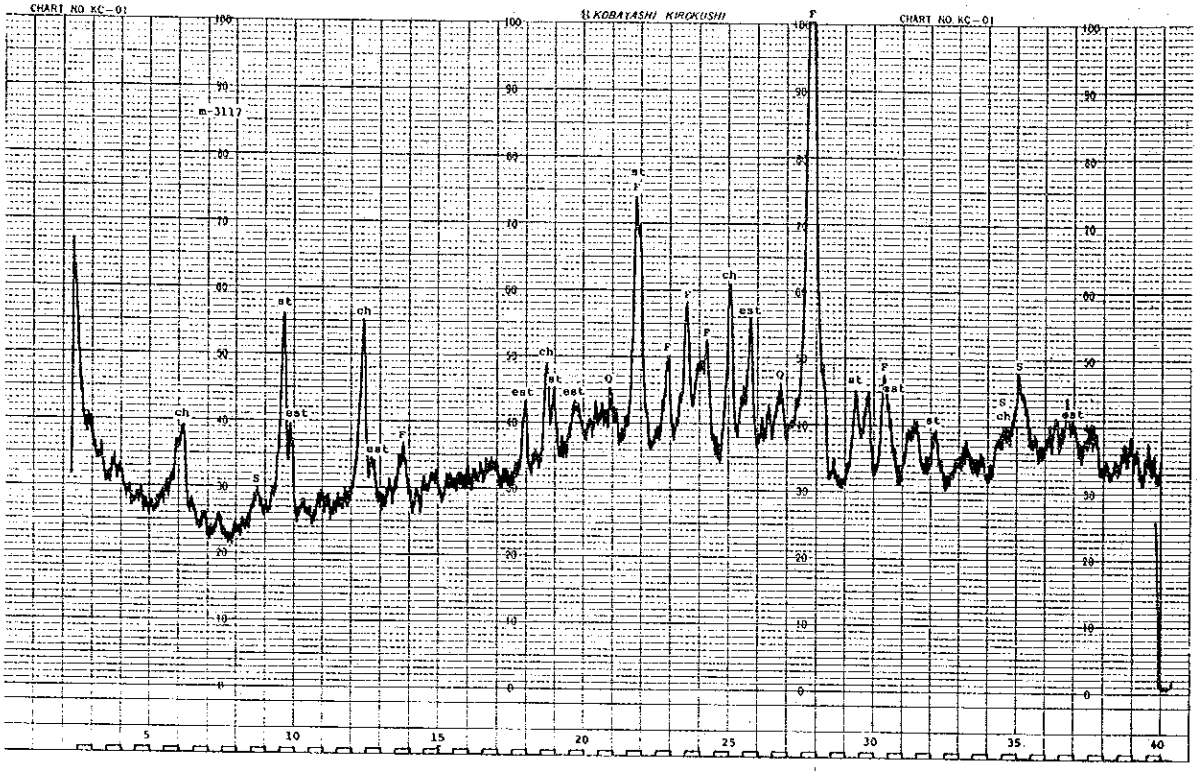
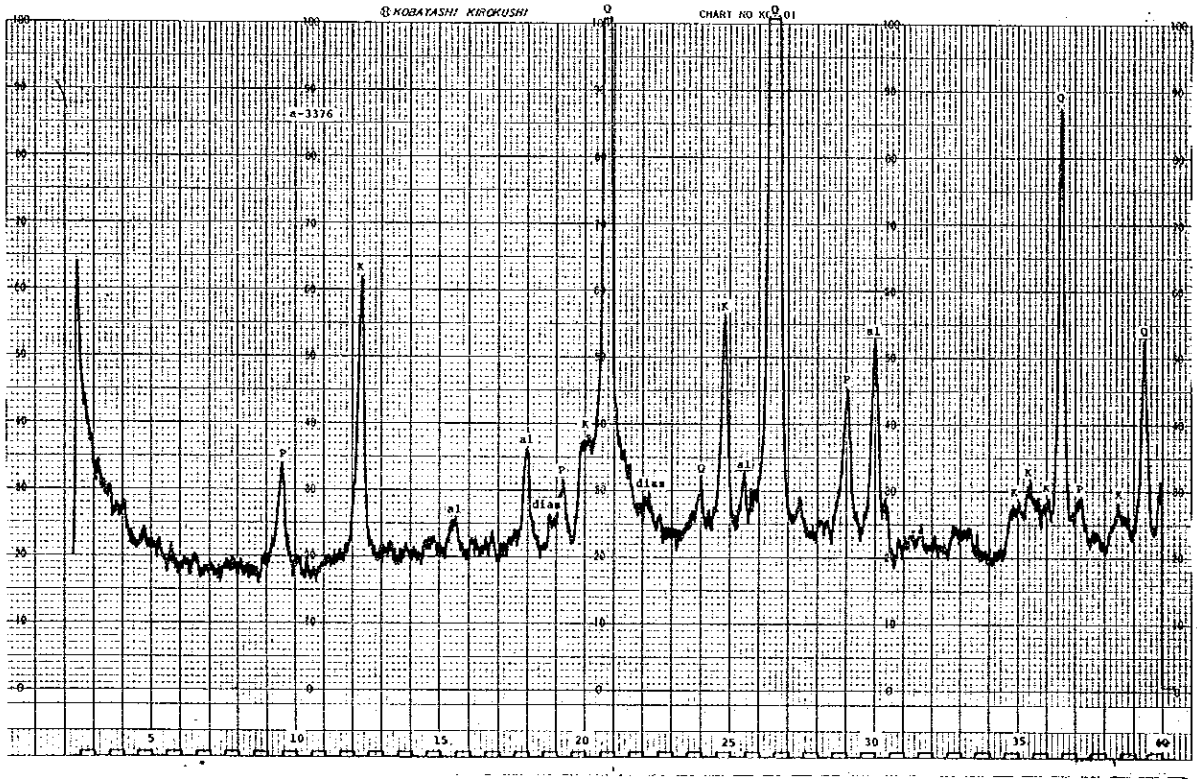
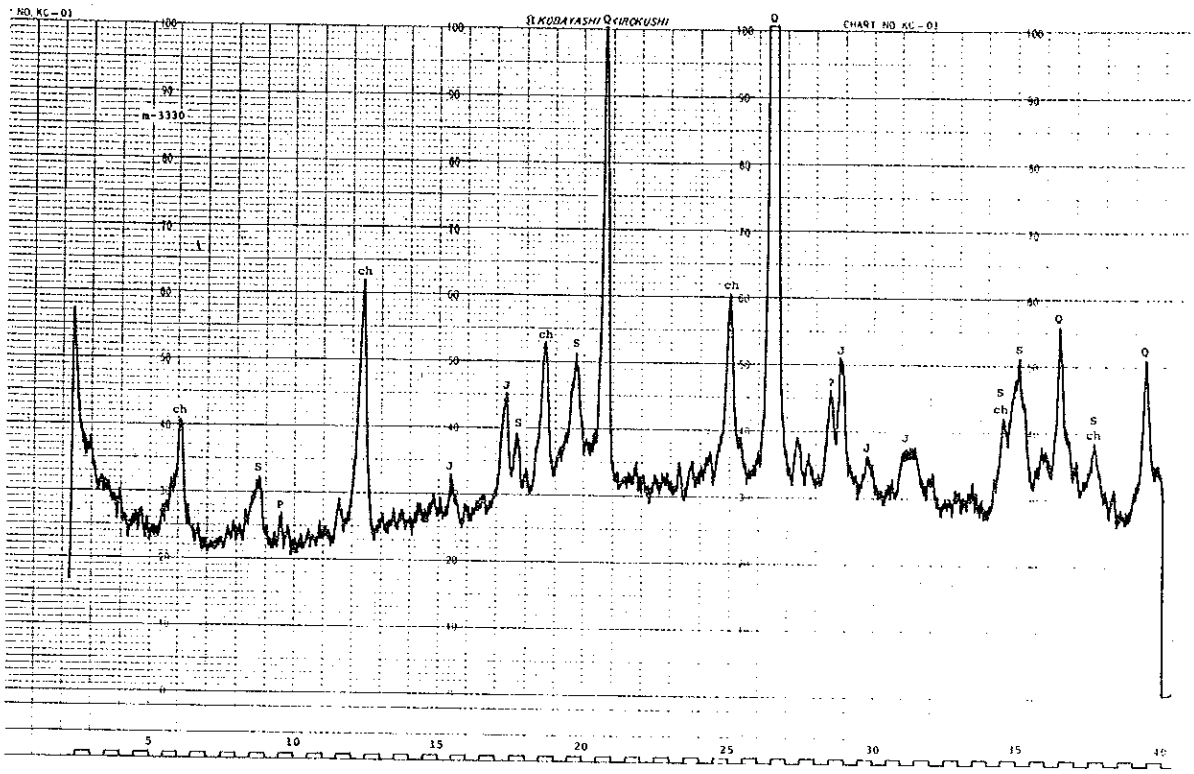
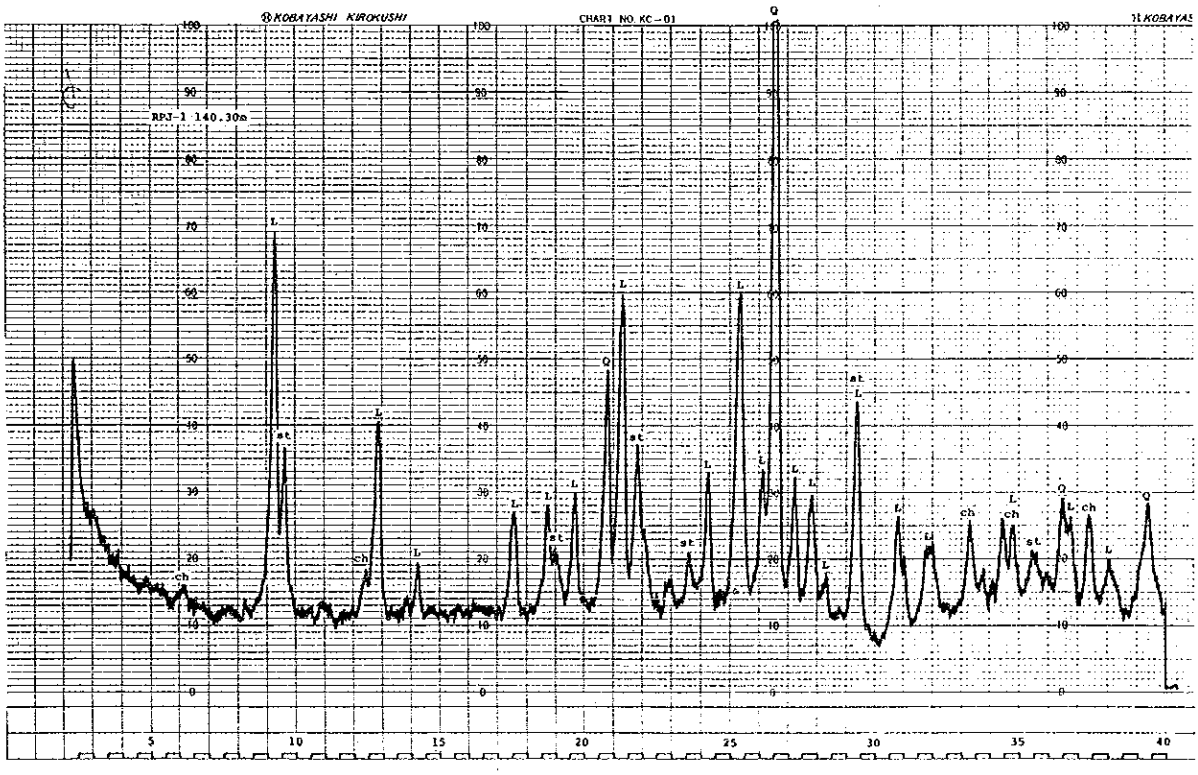


CHART NO KC-01
KOBAYASHI KIROKUSHI
CHART NO KC-01
m-3117

2


KOBAYASHI KIROKUSHI
CHART NO KC-01
a-3376


NO. KC-01
KOBAYASHI KIROKUSHI
CHART NO. KC-01
m-3330


KOBAYASHI KIROKUSHI
CHART NO. KC-01
RPJ-1 140.30m

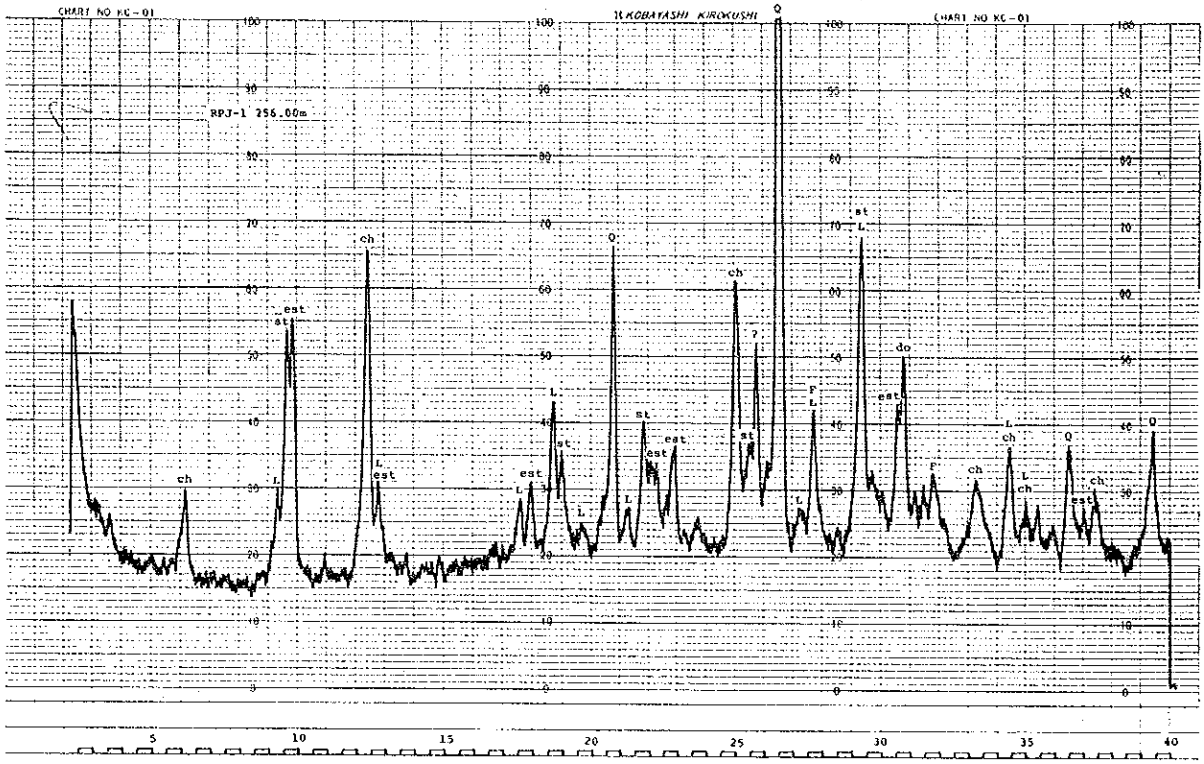


CHART NO KC-01
KOBAYASHI KIROKUSHI
RPJ-1 256.00m

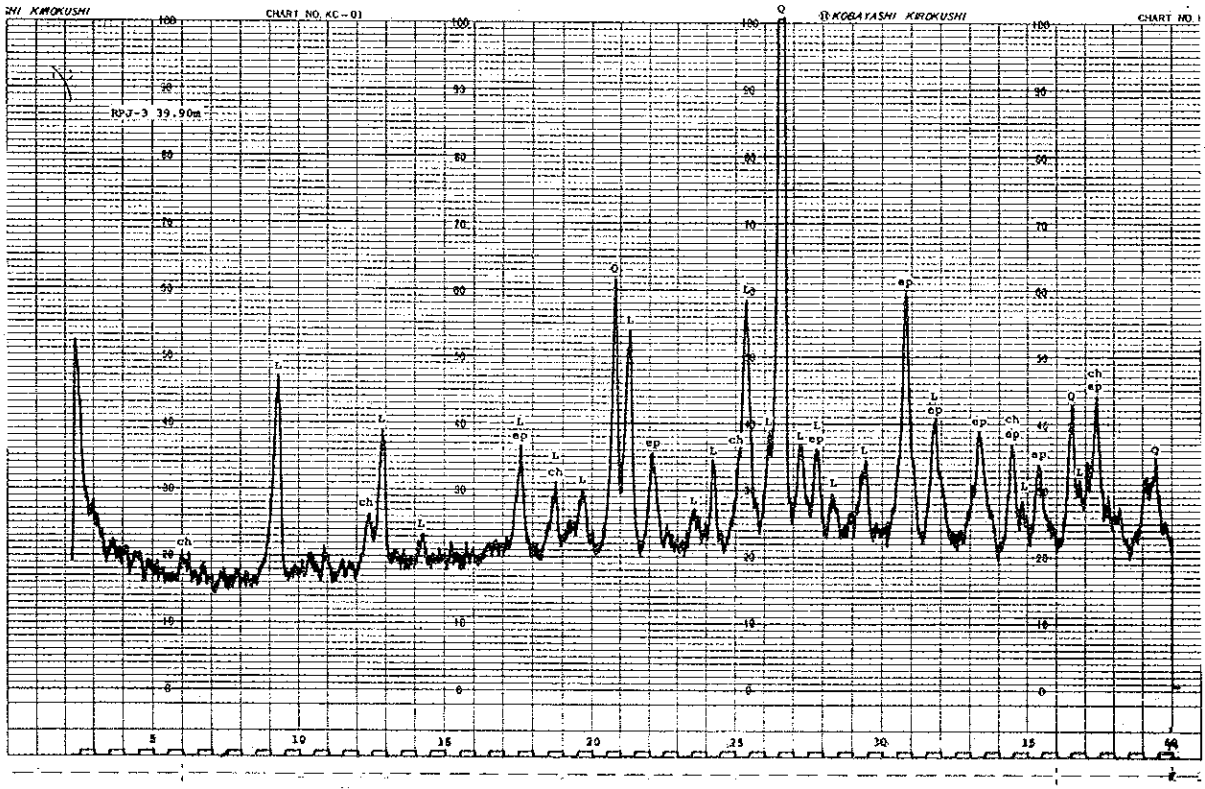


CHART NO. KC-01
KOBAYASHI KIROKUSHI
RPJ-3 39.90m

Fig. A–4 Core Log and Assay
(1:200)

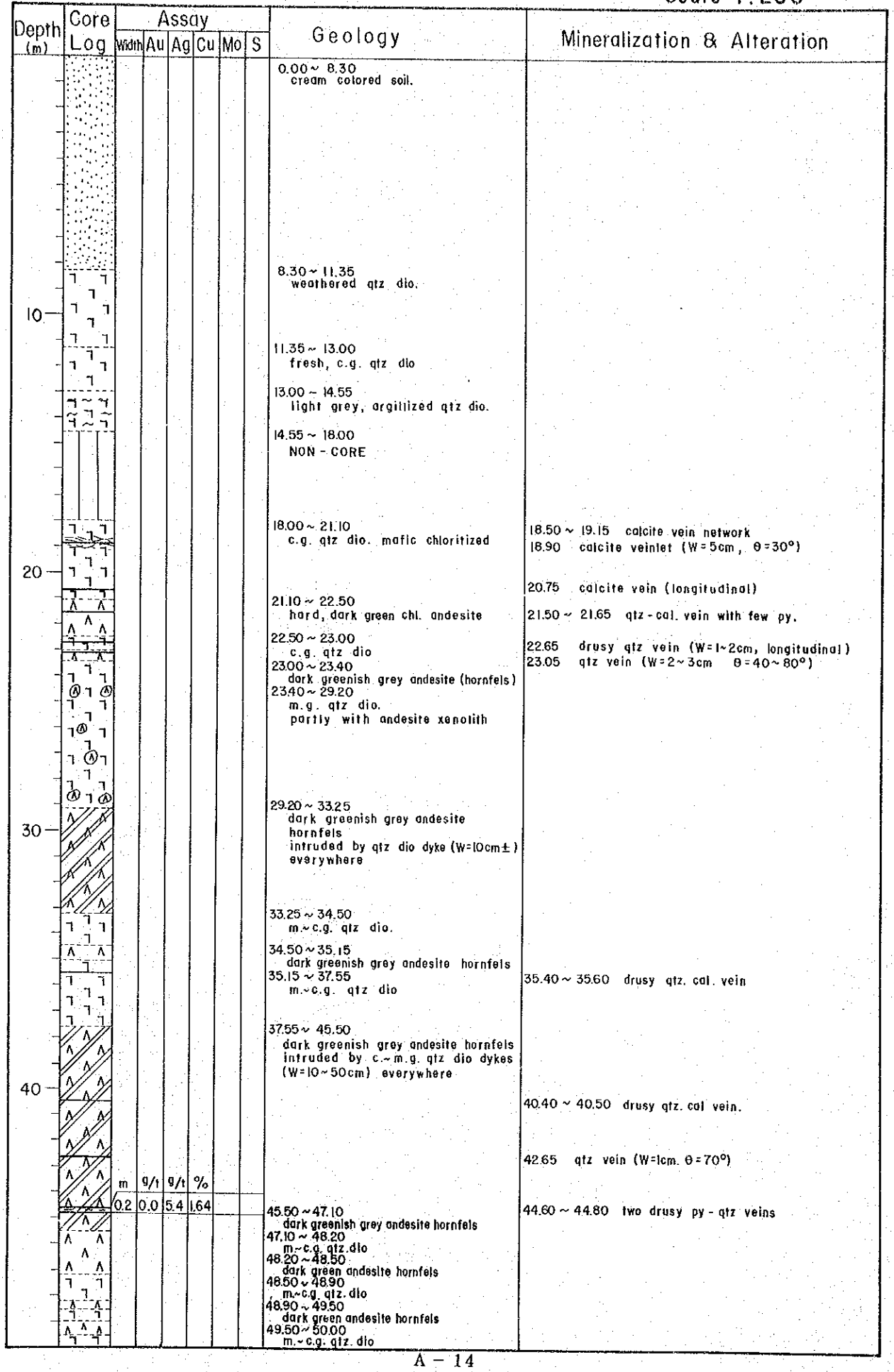
RPJ–1 (310.0m)

RPJ–2 (310.9m)

RPJ–3 (311.3m)

RPJ - 1

Scale 1:200



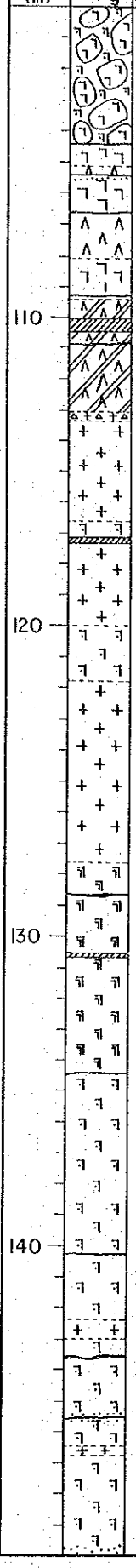
RPJ - 1

Scale 1:200

Depth (m)	Core Log	Assay Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								50.00~53.00 dark greenish grey andesite hornfels intruded by qtz. dio. dykes everywhere	
								53.00~54.00 m.~c.g. qtz dio. porphyritic	
		m	g/t	g/t	%			54.00~54.70 dark greenish grey andesite sil. hornfels	
		0.1	0.0	7.7	2.76			54.70~55.70 c.g. qtz. dio. porphyritic	55.70~55.80 py. cal. drusy patch (W=2cm±)
								55.70~56.40 dark greenish grey andesite	55.80~56.40 qtz. py. drusy film. network
								56.40~62.10 greenish grey qtz dio por.	
60									60.50 qtz. vein (W=1cm. longitudinal)
								62.10~63.30 dark greenish grey andesite only	62.00~65.00 qtz. vein network (longitudinal)
								63.30~67.10 dark greenish grey andesite hornfels intruded by qtz dio. por. dykes everywhere	
								67.10~72.20 θ=20° qtz dio. por.	
									68.60~69.00 qtz. epi. cal. drusy vein (W=3cm.longitudinal)
70									
								72.20~74.80 dark greenish grey andesite hornfels	72.20 cp. grain bearing cal. vein (W=2cm. θ=20°)
								74.80~79.30 qtz dio. por. chl. epi	75.25~75.40 drusy cal. vein (W=15cm. θ=70~80°)
									75.60~76.10 py. bearing chl. cal. drusy vein (θ=20°)
									76.40~76.50 cp. cal. epi. chl. druse
									77.05~77.20 cp bearing epi. cal. drusy vein
									77.70 cp. cal. patch (W=2~3cm)
								79.30~80.00 dark greenish grey andesite	
80								80.00~81.40 light greenish grey qtz. dio. por. epi. chl.	80.00 cp. py epi. veinlet (W=1cm. θ=90°)
									80.00~81.40 epi. cal. veinlet network (longitudinal)
								81.40~85.15 dark greenish grey andesite hornfels intruded by qtz. dio. por. (W=30cm-)	81.40~85.15 cp. diss. & film
		0.3	0.0	2.2	0.72				84.60~84.90 mg. cp. qtz. epi. drusy vein
								85.15~87.40 light greenish grey qtz dio. por. partly biotite bearing	
								87.40~88.50 dark greenish grey andesite hornfels	
								88.40~91.50 c.g. qtz. dio por. partly with andesite xenolith	89.60~89.65 chl. cal. epi. drusy veinlet (θ=40°)
90									90.40 epi. cal. drusy veinlet (W=5mm±. θ=45°)
								91.50~93.50 dark greenish grey qtz dio por.	
								93.50~96.40 light greenish grey, c.g. qtz dio.	
								96.40~96.60 greenish grey qtz dio. dyke	96.70 cp. disseminated
								96.60~98.70 light greenish grey, c.g. qtz. dio.	
								98.70~104.40 brecciated qtz dio. intruded by qtz dio por.	

RPJ - 1

Scale 1:200



Assay						
Width	Au	Ag	Cu	Mo	S	

Geology

104.40 ~ 105.20
m~f. g. qtz. dio. (leucocratic)
105.20 ~ 105.40
dark greenish grey andesite
105.40 ~ 106.65
c.~m.g. qtz dio.
106.65 ~ 108.20
dark greenish grey andesite hornfels. intruded by qtz. dio. dyke
108.20 ~ 109.50
m. g. qtz. dio.
109.50 ~ 113.10
dark greenish grey andesite hornfels intruded by sil. qtz dio. dyke

113.10 ~ 113.40
brecciated gra - dio.
113.40 ~ 116.60
m.g. gra~dio. partly porphyritic epi, chl.

116.60 ~ 117.15
qtz. dio. por.
117.35 ~ 120.10
gra-dio.

120.10 ~ 121.80
dark greenish grey qtz. dio. por.

121.80 ~ 127.00
gra ~ dio. partly porphyritic
sil. andesite xenolith bearing in some parts.

127.70 ~ 134.50
dark grey dolerite~micro-dio. gra - dio. xenolith bearing

134.50 ~ 142.40
chl. epi. qtz. dio. por. partly almost holocrystalline

142.40 ~ 143.00
light grey gra - dio.
143.00 ~ 146.50
dark grey. typical qtz. dio. por.

146.50 ~ 146.80
gra - dio. dyke
146.80 ~
dark grey, typical qtz dio. por.

Mineralization & Alteration

104.40 light greenish grey, clay ~ qtz. vein (W=10cm, θ=40°)
105.45 py. qtz. drusy veinlet (W=10cm)
py. cp. diss.

106.65 ~ 106.75 fissure filling py-cp-cal-ep-chl. veinlet

109.30 ~ 109.40 py-cp-qtz vein
110.10 ~ 110.50 highly py. cp. network and diss. zone
110.90 ~ py. veinlet

117.15 ~ 117.35 light olive green & light brownish grey cal. epi. vein (W=20cm, θ=55°)
with py. diss.

128.00 ~ 128.80 highly. chl. epi. zone
128.70 epi. qtz veinlet (W=2cm, θ=70°)

130.00 ~ 131.00 epi. chl. zone
131.60 ~ 131.80 epi. chl. cal qtz vein (θ=30°)

133.00 epi. cal. veinlet (θ=35°)

134.50 qtz. epi vein (W=1cm. θ=50°)

140.30 cal. epi. vein (W=1~2cm. θ=30°)

143.60 qtz. cal. epi. drusy vein (W=1~2cm, longitudinal)

145.50 ~ 145.70 qtz. cal. drusy vein (W=1cm±, longitudinal)
py. diss.

149.60 152.80 py. diss.

R P J - 1

Scale 1:200

Depth (m)	Core Log	Assay						Geology	Mineralization & Alteration
		Width	Au	Ag	Cu	Mo	S		
								152.80 ~ 155.00 gradually change gra - dio.	
								155.00 ~ 161.50 qtz. dio. por.	
160									
								161.50 ~ 163.00 m.~c.g. gra - dio. partly porphyritic	162.00 epi. veinlet (W=3cm, θ=25°)
								163.00 ~ 164.10 qtz. dio. por.	
								164.10 ~ 166.30 (θ=30°) porphyritic gra - dio.	
								166.30 ~ 168.00 grey qtz. dio. por.	166.80 qtz. cal. veinlet (W=1cm, θ=10~20°) with py. diss.
								168.00 ~ 174.80 m.g. gra - dio. partly porphyritic	
170									
								175.00 ~ 189.40 grey ~ greenish grey qtz. dio. por.	174.80 ~ 175.00 (cp) py. cal. drusy veinlet (network)
180									182.00 qtz. chl. epi. veinlet (W=1~2cm, θ=15°) 182.30 ~ 185.30 drusy veinlet with much py.
								189.40 ~ 189.60 m.g. gra - dio.	
190								189.60 ~ 189.80 qtz. dio. por	
								189.80 ~ 190.00 m.g. gra - dio	
								190.00 ~ 191.00 qtz. dio. por.	
								191.00 ~ 191.40 m.g. gra - dio	
		m	g/t	g/t	%	%	%	191.40 ~ 196.00 greenish grey qtz. dio. por.	195.20~200.00 a few cp. and py. diss.
								196.00 ~ 217.00 f. and m.g. gra - dio.	
		2.8	0.0	0.4	0.09				
		3.0	0.0	0.5	0.10	0.000	0.33		

R P J - 1

Scale 1:200

Depth (m)	Core Log	Assay Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
		3.0	0.0	0.5	0.06	0.006	0.35		202.90 cp. diss. 203.60~204.60 highly chl. epi. 204.00 py.-cp. diss.
		3.0	0.0	0.5	0.12	0.000	0.26		205.70~205.90 py.-cp. diss.
		3.0	0.0	0.6	0.14	0.000	0.30		208.05~208.90 py.-cp. diss.
210		3.0	0.0	0.9	0.20				
		3.0	0.0	1.4	0.43	0.000	0.85		212.80 py.-cp. network 213.55~213.70 cp. diss. 213.70~216.00 highly epi, py.-cp. diss.
		3.0	0.0	0.8	0.33	0.000	0.81	217.00~260.00 gra.-dio. partly porphyritic	216.00~217.00 highly chl. py.-cp diss. 217.00~218.40 py.-(cp.) diss.
220		3.0	0.0	0.7	0.26	0.000	0.48		220.20 qtz. vein with cp. 221.50~222.00 many qtz. veinlet with minor amount of py. and cp. 222.00~223.50 py. diss.
		3.0	0.0	0.6	0.11				225.10 py. cp. diss.
		3.0	0.0	0.5	0.18				226.00~228.80 py. cp. diss.
230		3.0	0.0	0.6	0.21	0.000	0.63		228.35~228.80 highly chl. 228.80~229.25 highly py. diss 230.00~230.50 highly chl.
		3.0	0.0	0.2	0.06				231.00~232.00 py. diss. 232.30~232.80 abundant py in the fissures.
		3.0	0.0	0.4	0.12	0.000	1.17		234.50~235.00 highly chl. 235.40~237.80 highly chl. epi. and. py.-(cp.) diss.
		3.0	0.0	0.2	0.11				237.80~239.50 cp.-py. diss
240		3.0	0.0	0.4	0.08				239.50~242.45 highly chl. epi. and py. diss.
		3.0	0.0	0.4	0.05				243.70~244.70 highly chl. and py. diss. 244.30 cp. dots. found 244.70~249.00 py. diss.
		3.0	0.0	1.1	0.14	0.000	1.25		

R P J - 1

Scale 1:200

Depth (m)	Core Log	Assay Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
		3.0	0.0	0.6	0.18				249.00 ~ 292.30 py. diss 249.00 ~ 260.00 partly cp. diss.
		5.0	0.0	2.0	0.29			255.70 ~ 257.00 argillized zone with barren cal. veinlets network	
		3.0	0.0	1.2	0.22			257.00 ~ 260.00 c.g. gra.- dio.	
260								260.00 ~ 263.00 micro - dio. ~ f.g. qtz. dio. 261.30 ~ 262.55 sheared zone with light grey clay & cal. veinlets 263.00 ~ 263.40 c.g. gra - dio. 263.40 ~ 282.60 dark grey ~ blackish grey micro - dio.	
								267.00 ~ 269.30 argillized zone with white clay. epi. cal. veinlets	
270								269.30 ~ 282.60 dark grey ~ black micro - diorite	
280								282.60 ~ 299.60 c.g. gra.- dio.	
290		m	g/t	g/t	%	%	%		
		2.7	0.0	2.2	0.52				292.30 ~ 295.00 py. cp. diss. and partially cp. stringer bearing
		3.0	0.0	2.0	0.58				295.00 ~ 298.00 py. cp. diss. ~ stringer
		1.6	0.0	2.2	0.66	0.026	1.31		298.00 ~ 299.60 py. cp. highly diss. 299.00 ~ 299.30 cp.- py.- (Mo) - qtz veinlet (W=1cm)
								299.60 ~	

RPJ - 1

Scale 1:200

Depth (m)	Core Log	Assay						Geology	Mineralization & Alteration
		Width	Au	Ag	Cu	Mo	S		
		m	g/t	g/t	%	%	%	m.g. qtz. dio. por.	
		1.3	0.0	0.9	0.10			303.70 ~ 310.00 m. ~ c.g. gra.- dio. 303.70 ~ 305.00 highly argil. sil. zone 305.50 ~ 306.70 highly argil. sil. zone	303.70 ~ 305.00 cal.- epi - clay veinlet network weak py. cp. diss.
		1.2	0.0	1.4	0.28				
		1.75	0.0	0.9	0.23	0.000	0.33		306.70 308.45 cp. py. diss.
310.0									

RPJ-2

Scale 1 : 200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								0.00 ~ 2.00 light brown colored soil	
								2.00 ~ 13.20 weathered, chl. m.g. qtz. dio. por.	
10									
								13.20 ~ 34.00 m.g. qtz. dio.	
									16.40 ~ 17.50 qtz.-cal. veinlet (W:1cm, longitudinal)
									18.70 ~ 18.90 qtz.-chl. veinlet (W:1cm, longitudinal)
20									20.00 ~ 24.00 many qtz. veinlets (W=1cm±, longitudinal)
									25.20 ~ 27.00 2~3 qtz. veinlets (W=1cm±, longitudinal)
30									
								34.00 ~ 39.00 f.~ m.g. qtz. dio.	34.00 drusy qtz. veinlet (W=0.3cm, θ=30°)
								39.00 ~ 71.50 dark greenish grey andesite hornfels	38.40 ~ 39.70 py.-qtz.-cal.-epi. veinlet along the boundary of andesite and qtz. dio.
40									41.00 ~ 46.00 py.~ epi.-qtz. veinlets abundant

RPJ - 2

Scale 1:200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								dark greenish grey andesite hornfels	
									58.70 ~ 59.70 py.-qtz.-chl. vein (W=5~10cm, longitudinal)
60									60.30 ~ 60.50 py.-qtz. drusy veinlet (W=3cm, θ=25°)
									60.50 ~ 61.70 py. film much
									61.70 ~ 63.30 py.-qtz.-epi veinlet (W=2cm, longitudinal)
									64.10 ~ 64.90 py. veinlet (W=1cm, longitudinal)
70									70.50 ~ 70.80 py.-qtz.-chl. vein (W=7cm, θ=30°)
								71.50 ~ 100.30 light greenish grey qtz. dio. por.~qtz.dio. holocrystalline in middle part.	71.90 ~ 74.00 some. qtz.-epi. veinlets.
									74.00 ~ 74.20 qtz.-epi veinlet (W=1cm, θ=30°)
									75.80 ~ 80.20 some qtz.-epi veinlets. (θ=30~40°)
80									
90									96.30 ~ 96.50 qtz. veinlet (W=1cm, θ=15°)

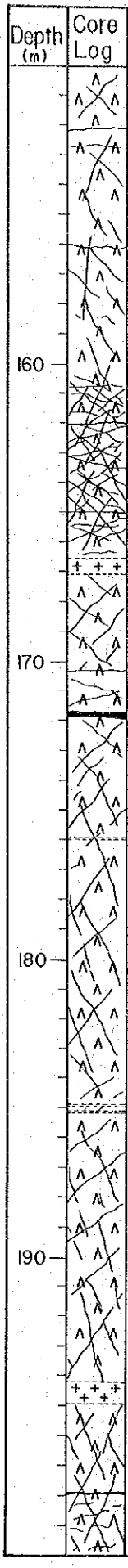
RPJ - 2

Scale 1: 200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								100.30 ~ 128.40 dark grey ~ greenish grey slt. aphanitic andesite hornfels	100.30 ~ 128.40 Py.-qtz.-chl. veinlets network (W = 1~ 5mm)
110									111.60 py.-qtz.-chl. veinlet (W = 1cm)
								117.30 leucocratic, holocrystalline rock dyke (W=5cm, θ = 70~80°)	
120									
								128.40 ~ 131.80 qtz. dio. por.	
130								131.80 ~ 138.40 porphyritic qtz. dio. ↓ gradual change	
								138.40 ~ 139.40 qtz. dio. por.	
140								139.40 ~ 150.00 dark greenish grey andesite hornfels.	139.40 ~ 254.10 py.-qtz.-chl. veinlet network in andesite hornfels.

R P J - 2

Scale 1:200



Assay						
Width	Au	Ag	Cu	Mo	S	

Geology

150.00 ~ 200.00
dark greenish grey andesite hornfels partly intruded by holocrystalline leucocratic rock dyke.

166.50 ~ 167.00
holocrystalline leucocratic rock dyke

175.90
f.g. leucocratic rock dyke
(W = 2cm, θ = 70°)

185.00 and 185.20
f.~m.g. leucocratic rock dyke
(W = 2cm, θ = 45°)

194.20 ~ 194.90
white ~ grey, m.~f.g. leucocratic rock dyke. partly porphyritic.

Mineralization & Alteration

152.10 py.- qtz.- epi. veinlet (W = 2cm, longitudinal)

160.50 ~ 166.50 py. qtz. chl. veinlets more abundant

162.00 py.- qtz. vein (W = 3cm, longitudinal)

165.00 py.- qtz.- cal.- epi veinlet (W = 2cm, θ = 15°)

170.20 py.- qtz.- chl. vein (W = 5cm, θ = 40°)

171.60 ~ 171.80 py.- chl.- qtz. vein (θ = 40°)

175.00 py.- qtz. veinlet (W = 1cm, θ = 30°)

178.40 ~ 179.30 py.- qtz. veinlet (W = 1cm, longitudinal)

180.40 py.- qtz.- epi. vein (W = 1cm, θ = 45°)

187.20 qtz.- epi, vein (W = 2cm, θ = 40°)

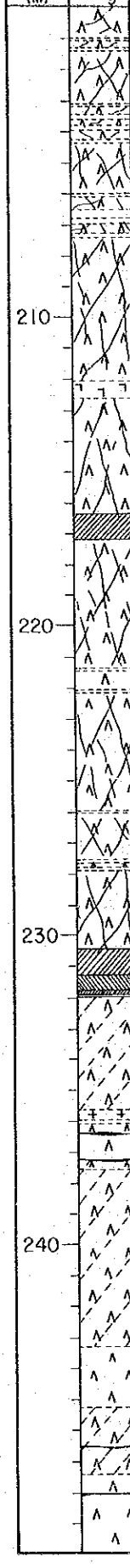
188.00 py.- qtz.- epi. vein (W = 2cm, θ = 50 ~ 60°)

197.70 cp.- py.- qtz.- epi, vein (W = 5cm, θ = 25°)

197.70 ~ 199.70 cp.- py. film ~ veinlets.

R P J - 2

Scale 1:200



Assay						
Width	Au	Ag	Cu	Mo	S	

Geology

201.00 ~ 201.05
m.~f.g. leucocratic rock dyke (θ=70°)
201.30 ~ 201.50
m.~c.g. qtz.dio. dyke (θ=60°)
203.10 ~ 203.20
m.g. qtz.dio. (θ=70°)
203.40 ~ 203.60
m.g. qtz.dio. (θ=80°)
203.80 ~ 203.90
qtz.dio. heterogeneous (θ=40°)
204.20 ~ 204.40
m.~f.g. qtz.dio. (θ=40°)
206.00 ~ 206.10
m.g. qtz.dio. (θ=80°)
206.50 ~ 206.80
m.~c.g. leucocratic rock (θ=40°) py.diss.
206.80 ~ 207.00
m.g. qtz.dio. (θ=40°) py. diss.
207.30 ~ 207.40
m.~f.g. gabbro (θ=50°)

212.10 ~ 212.70
m.g. qtz. dio. (θ=20°)

221.40
m.g. leucocratic rock (θ=70°)
222.10 ~ 20
m.g. leucocratic rock (θ=90°)

226.00 ~ 226.10
m.g. leucocratic rock (θ=70°)
227.70 ~ 227.80
m.g. leucocratic rock (θ=45°)
227.90 ~ 228.00
m.g. leucocratic rock (θ=40°)

232.00 ~ 236.10
light grey highly sil. andesite

235.70 ~ 236.10
sil. leucocratic rock (θ=50°)

237.60 ~ 243.40
light grey, highly sil. andesite

243.40 ~ 245.30
reddish grey porphyritic andesite hornfels.
245.30 ~ 247.50
highly sil. andesite

247.50 ~ 250.00
dark greenish grey andesite hornfels.

Mineralization & Alteration

200.00 ~ 230.50 py.-qtz.-chl. veinlets network (W=1~5mm)

218.40 ~ 219.20 py.-qtz.-cal.-epi.-chl. vein (longitudinal)

230.50 ~ 231.30 qtz.-chl.-py vein
231.30 ~ 231.80 qtz. vein (or silicified zone)
231.80 ~ 232.00 qtz.-chl. vein

236.40 py.-qtz. veinlet (W=1cm, θ=60°)
237.30 cal.-chl. vein (W=1cm, θ=30~60°)

246.60 ~ 246.80 chl.-epi.-qtz. vein (W=2cm, θ=15°)

248.10 py.-qtz. vein (W=2cm, θ=40°)

RPJ-2

Scale 1 : 200

Depth (m)	Core Log	Assay Width (m)	Au (g/t)	Ag (g/t)	Cu (%)	Mo	S	Geology	Mineralization & Alteration
									250.30~250.70 py.-qtz.-epi. veinlet (W=1cm, θ=10°)
		0.3	0.0	10.0	2.42				254.10~254.40 cp.-qtz.-epi.-chl. vein (θ=45°)
									254.90~255.20 epi.-chl-qtz. network zone
								255.20~256.20 highly sil. epi. py. andesite 256.20~263.90 light greenish grey, highly sil. andesite like micro-gabbro	256.20~263.90 py.-epi.-qtz. veinlets network
260									
								263.90~268.70 micro-diorite	264.80. qtz.-cal.-chl. veinlet (W=1cm, θ=10°)
								268.70~269.30 white, m.~f.g. leucocratic rock 269.30~273.60 dark brownish grey, f. and m.g. gabbro	268.70~273.60 py. film and diss. much
270									
								273.60~274.10 m.g. leucocratic rock (θ=55°) 274.10~275.50 m.~f.g. gabbro 275.50~275.90 f.~m.g. leucocratic rock 275.90~276.70 c.g. gabbro~qtz. dio. 276.70~287.40 f. and m.g. gabbro~diorite	275.50~275.90 py.-epi veinlets network
280									
									285.50~285.60 py.-hem.-qtz-chl.-epi vein (θ=30°)
								287.40~287.80 greenish grey chl. andesite	
		0.9	0.0	3.6	0.86			287.80~288.10 m.g. leucocratic rock dyke 288.10~296.20 dark greenish grey andesite	288.50~289.40 cp.-py.-hem. bearing chl.-epi. vein
290									
								296.50~296.90 m. f.g. leucocratic rock dyke 296.90~298.00 f.g. gabbro~qtz.dio. 298.00~298.60 c.g. qtz. dio. 298.60~300.00 heterogeneous. f.g. gabbro-diorite	296.20~296.50 py.-chl.-epi. vein

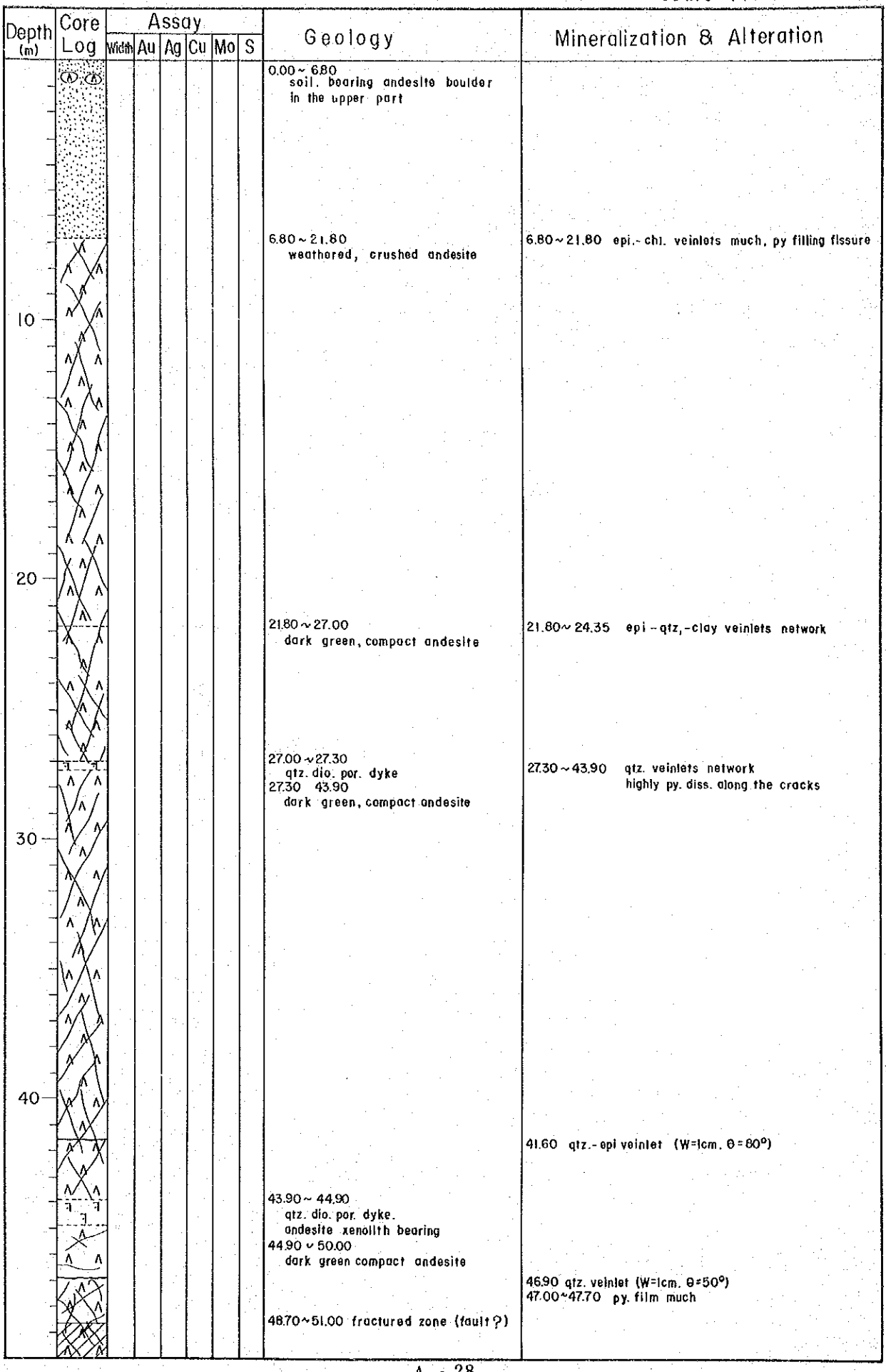
RPJ-2

Scale 1:200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								300.00 ~ 302.90 heterogeneous. f.g. gabbro ~ qtz. dio.	
								302.90 ~ 304.80 c.g. gabbro ~ qtz. dio.	
								304.80 ~ 305.20 f.g. leucocratic rock	305.70 ~ 305.90 py. bearing qtz.-epi-chl. vein (W: 2cm, θ=15°)
								305.20 308.30 dark greenish gray, qtz. dis. por.	306.70 ~ 307.00 highly sil. zone with chl.-py. veinlets 307.30 ~ 308.30 highly sil. zone with epi.-qtz. veinlets
								308.30 ~ 308.80 c.g. gabbro ~ qtz. dis.	308.80 qtz.-epi. vein (W=3cm, θ=20°)
310								308.80 ~ 310.90 qtz. dio. por.	
310.90									310.80 ~ 310.90 qtz.-chl.-epi. vein (W=10cm, θ=35°)

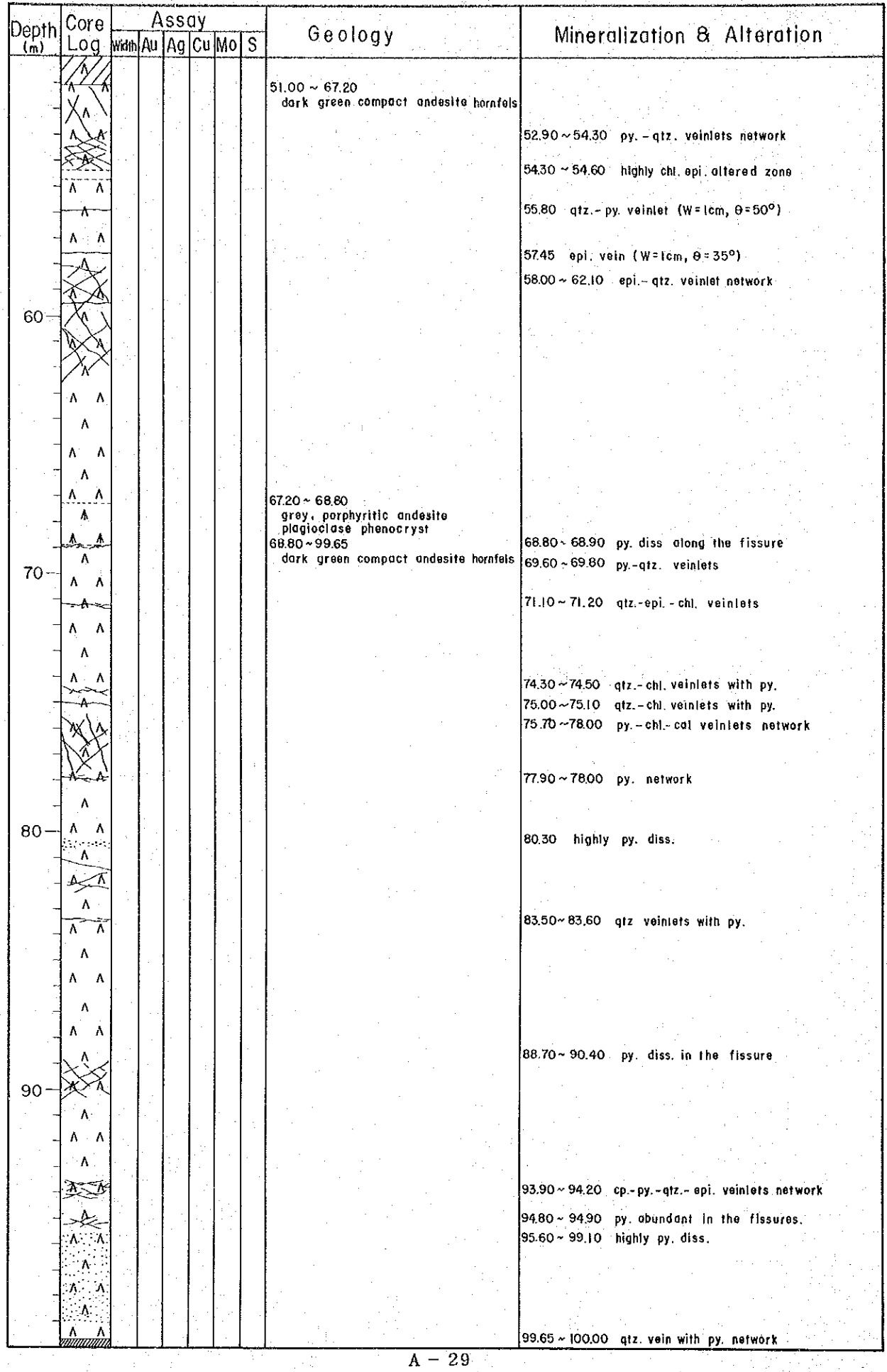
RPJ - 3

Scale 1:200



RPJ - 3

Scale 1:200



RPJ-3

Scale 1:200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								101.60 ~ 102.80 grey porphyritic andesite	101.00 ~ 101.10 argillized zone with chl. epi
								102.80 ~ 105.30 dark green, compact andesite hornfels	
								105.30 ~ 106.40 grey, andesitic lap. tf	
								106.40 ~ 122.00 dark green, compact andesite hornfels	106.40 ~ 107.80 sheared zone with cal.-chl.-epi. veinlets
									107.80 ~ 107.90 py.-epi vein
									108.80 py. veinlet (W=1cm, θ=45°)
110									110.50 py. veinlet (W=1cm)
									110.50 ~ 113.60 qtz.-epi veinlets network with minor amount of py.
									113.60 ~ 115.50 fractured zone with py. diss. much
									115.50 qtz. vein (θ=60°) with py. veinlets network
120									119.80 ~ 119.90 clay vein
								120.80 ~ 122.00 fractured. zone	
								122.00 ~ 122.80 grey, porphyritic andesite	
								122.80 ~ 127.20 dark green compact andesite hornfels	
									124.90 py.-qtz.-chl.-epi. veinlet (W=1cm, θ=60°)
									125.60 py.-qtz. veinlet (W=1cm, θ=20°)
								127.20 ~ 136.00 grey, porphyritic andesite phenocryst : plagioclase	127.20 ~ 129.90 qtz. veinlets with py.
130									129.90 ~ 136.00 py. diss.
									133.80 py veinlet (W=1cm, θ=45°)
								136.00 ~ 137.20 sheared zone	
								137.20 ~ 138.50 grey, andesitic lap. tf partly brecciated	
								138.50 ~ 149.20 dark green, compact andesite hornfels.	138.50 ~ 146.00 py.-qtz.-epi veinlet network
140									144.00 ~ 144.40 py. network with minor amount of cp.
								149.20 150.30 porphyritic andesite, brecciated	149.20 ~ 150.30 py. network

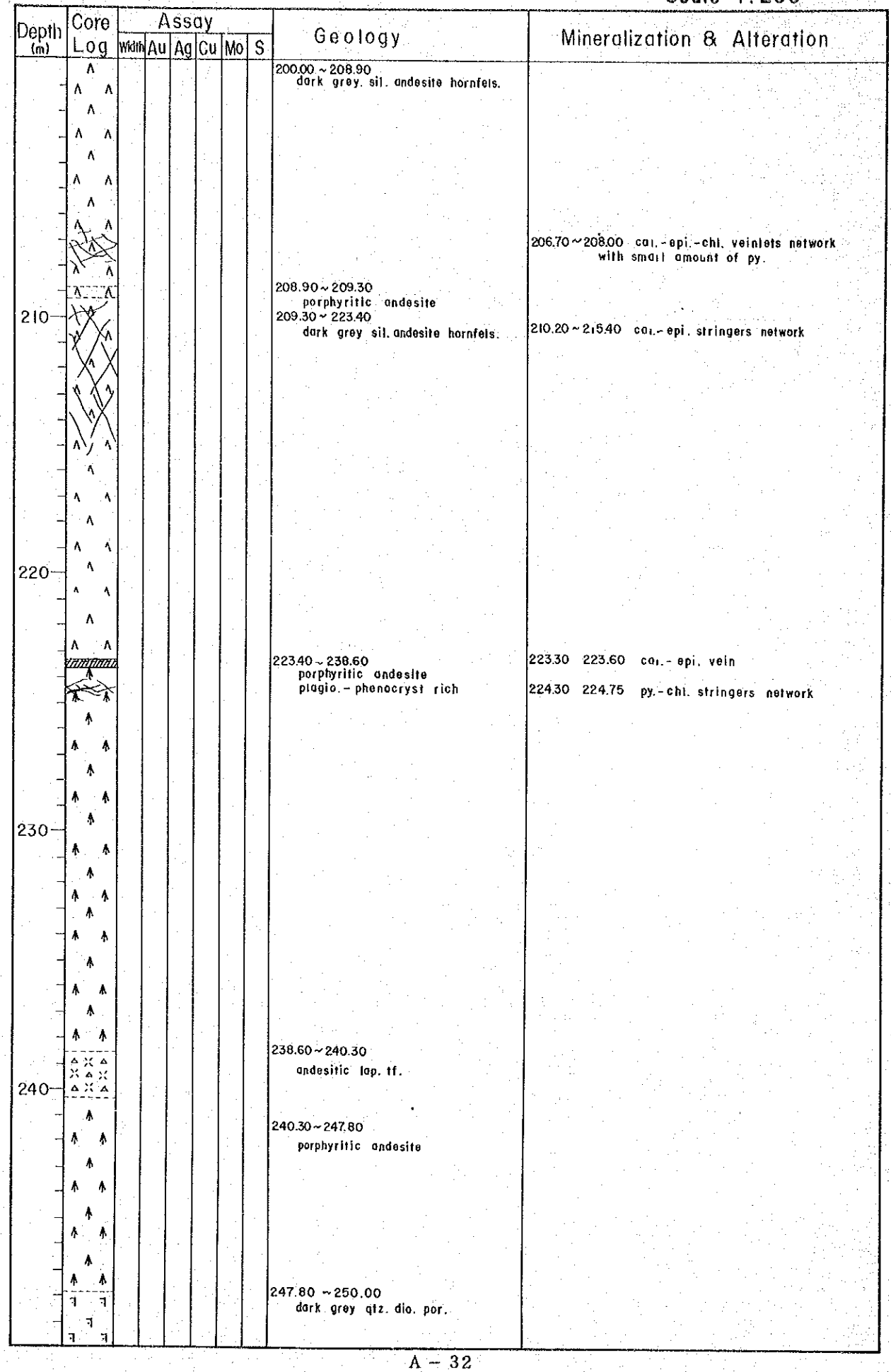
RPJ-3

Scale 1:200

Depth (m)	Core Log	Assay: Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								150.30 ~ 153.15 dark green, compact andesite hornfels	151.00 py. vein (W=1cm, θ=70°) 151.50 carbonate veinlets
								153.15 ~ 153.95 porphyritic andesite 153.95 ~ 169.70 dark green, compact andesite hornfels.	
160									159.00 ~ py. veinlet network
									163.00 irregular shaped, cal.-epi vein (W=2cm) with a few py. 164.30 cal.- epi. veinlet (W=1cm) 165.20 ~ 165.50 cal.- epi. veinlets network with small amount of py.
170								169.70 ~ 170.20 brecciated andesite 170.20 ~ 185.10 dark grey sil. andesite hornfels.	169.70 ~ 170.20 cal veinlets network
180									180.60 ~ 180.80 cal.- epi. veinlets network with py diss. ~ stringers. 183.10 ~ 183.30 cp.- py.- chl. veinlets network zone cut by barren cal. stringers
								185.10 ~ 187.10 brecciated andesite	185.10 ~ 187.10 py.- chl. stringers network
190								191.90 ~ 192.30 porphyritic andesite 192.30 ~ 200.00 dark grey andesite hornfels	192.30 ~ 192.90 cal.- epi. stringers network with py. stringers and diss. 196.40 ~ 196.80 py.- cal.- epi. stringers network

RPJ - 3

Scale 1:200



RPJ - 3

Scale 1:200

Depth (m)	Core Log	Assay Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
								250.00 ~ 264.75 dark grey, qtz. dio. por. hornblende phenocryst dominant qtz. phenocryst few. groundmass : chloritized	no mineralization in qtz. dio. por.
								258.00 ~ 264.00 hornblende phenocryst larger	
260									
								264.75 ~ 268.80 dark grey, porphyritic andesite plagioclase phenocryst	265.50 ~ 265.60 irregular-shaped veinlet. py. diss. ~ stringers
		m	g/t	g/t	%				
		2.3	0.0	0.5	004			268.80 ~ 270.10 brecciated zone	268.80 ~ 270.10 cal. - epi. veinlets with py. diss. ~ stringers
270		0.3	0.0	0.5	003			270.10 ~ 280.00 dark grey ~ blackish grey porphyritic andesite. plagioclase phenocryst smaller and more abundant.	270.65 ~ 270.95 py. ~ cal - chl. - epi. veinlets network
									279.00 py. - chl. - cal. stringers with few cp.
280								280.00 ~ 300.00 dark grey ~ blackish grey andesite.	
									285.40 ~ 287.90 mg. - cp. - py - cal. - epi. veinlets network
		2.5	0.0	0.7	006				
		1.15	0.0	0.7	0.16				288.40 ~ 289.55 cp. - mg. - py. - cal. - epi. - chl. veinlets network
290									291.50 cp. - mg. - py. veinlets
									294.00 ~ 294.20 cal. - epi veinlets with py. diss.
									299.50 ~ 299.55 py. - cal. - epi. veinlet.

RPJ-3

Scale 1:200

Depth (m)	Core Log	Assay Width	Au	Ag	Cu	Mo	S	Geology	Mineralization & Alteration
		m	g/t	g/t	%			300.00 ~ 311.30 dark grey andesite	301.40 ~ 303.60 py.-mg.-cal.-epi. veinlets network
		2.2	0.0	0.5	0.04				
									305.00 py.-cal. veinlets
310		0.5	0.0	1.4	0.40				309.65 ~ 310.15 cp.-mg.-py-cal.-epi. veinlets network
311.30									

List of Microscopic Observations

Abbreviation

Rock Forming Minerals

Q	:	quartz
K-f	:	potash feldspar
Pl	:	plagioclase
Bt	:	biotite
Hb	:	hornblende
Au	:	augite
Hy	:	hypersthene
Ol	:	olivine
Op	:	opaque mineral
An	:	anorthite
Si	:	silica
Cpx	:	clino-pyroxene
Opx	:	ortho-pyroxene
Gl	:	glass

Secondary Minerals

Cc	:	calcite
Ser	:	sericite
Mon	:	montmollironite
Sap	:	saponite
Chl	:	chlorite
Kao	:	kaoline
Act	:	actinolite
Epi	:	epidote
Zeo	:	zeolite
Ab	:	albite
Sp	:	sphene
Pr	:	prehnite

Ore Minerals

Cp	:	chalocopyrite
Bo	:	bornite
Cv	:	covelline
Py	:	pyrite
Mg	:	magnetite
Hm	:	hematite
Sph	:	sphalerite
Mo	:	molybdenite
Dig	:	digenite

Table A–1–1 List of Microscopic Observation (Plutonic Rocks)

Sample No.	Rock Name		Constituent Minerals									Secondary Minerals														Remarks
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	
a–3118	granodiorite	equigranular	○	•	◎	○	○				•				•			•									
a–3120	porphyritic quartz diorite	porphyritic	◎		◎													○				•	•			•	all of mafic minerals are altered to Chl and Epi.
a–3123	porphyritic quartz diorite	porphyritic	◎	•	◎										•			○				•	•		•	•	ditto
a–3124	porphyritic quartz diorite	porphyritic	◎	•	◎										•			○				•	•			•	ditto
a–3126	porphyritic quartz diorite	porphyritic	◎		◎		•											○				•	•			•	
a–3128	porphyritic quartz diorite	poikilitic porphyritic	○		◎		◎				•							○				•	•			•	
a–3131	porphyritic granodiorite	porphyritic	◎	•	◎	○									•			•				•	•			•	
a–3132	porphyritic quartz diorite	porphyritic	◎		◎										•			○				•	•			•	all of mafic minerals are altered to Chl and Epi.
a–3133	porphyritic granodiorite	porphyritic	◎		◎	○	•											○				○	•				
a–3134	porphyritic quartz diorite	porphyritic	◎		◎	•	○				•				•			○				•	•				
a–3135	porphyritic quartz diorite	porphyritic	◎		◎	•												○				•	•				
a–3136	porphyritic quartz diorite	porphyritic	◎		◎	•												○				•	•			•	
a–3137	quartz diorite	equigranular	○		◎		○											•				•	•			•	
a–3138	diorite	equigranular			◎		○	•			•							•									
a–3139	diorite	equigranular			◎		◎	•	•									•					•				
a–3140	quartz diorite	equigranular	◎		◎		○											○					○				
a–3141	porphyritic quartz diorite	porphyritic	◎		◎		○											•				•	•				
a–3142	porphyritic quartz diorite	porphyritic	◎		◎		○			•								•				•					
a–3149	silicified quartz diorite	equigranular	○		◎							○			•			○				•				•	all of mafic minerals are altered to Chl and Epi.
b–3135	porphyritic quartz diorite	porphyritic	◎	•	◎										•			○				•	•				ditto
b–3139	granite	equigranular	◎	◎	○									•				•				•				•	ditto
b–3143	quartz diorite	equigranular	○	•	◎		○											○		○							
d–3106	diorite	equigranular	•		◎		◎											•				•	•				
d–3114	granite	equigranular	◎	◎	○	•												•				•	•				fine grained
d–3138	porphyritic quartz diorite	porphyritic	○		◎		○											○				•	•			•	
d–3143	quartz diorite	poikilitic equigranular	○		○		◎	•			•																
d–3144	quartz diorite	poikilitic equigranular	○		◎		◎	•			•							○				•	•				
m–3122	granodiorite	equigranular	○	○	◎		○				•				•			•					•				
m–3140'	granodiorite	equigranular	○	○	◎							•						○		•		•	•			•	all of mafic minerals are altered to Chl and Epi.
m–3149	granodiorite	equigranular	○	○	◎		○											○				•	•				
RPJ–1 196.5m	granodiorite	equigranular	○		◎	○	○							•				•				•					
RPJ–1 202.5m	granodiorite	equigranular	◎		◎	○					•							•				•	•				
208.5m	granodiorite	equigranular	◎		◎	○					•				•			•				•					
214.5m	granodiorite	equigranular	◎		◎	○					•							•				•	•				
220.5m	porphyritic granodiorite	porphyritic	◎		◎	○					•				•			•				•	•				

Sample No.	Rock Name		Constituent Minerals									Secondary Minerals														Remarks
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	
RPJ−1 226.5m	porphyritic granodiorite	porphyritic	◎		◎	○					•							•			•						
232.5m	porphyritic granodiorite	porphyritic	◎		◎	•												•			•						
238.5m	porphyritic granodiorite	porphyritic	◎	•	◎	•									•			•			•	•				•	
244.5m	porphyritic granodiorite	porphyritic	◎		◎	○									•			•			•	◦					
248.5m	porphyritic granodiorite	porphyritic	◎		◎	•												○			•	•	•				
258.5m	altered granodiorite	equigranular	○		○							○		•	◎			◎			•	•	•				all of mafic minerals are altered to Chl and Epi.
266.4m	micro-diorite	equigranular	•		◎	•	◎				•							•			•	•					fine grained
279.6m	micro-diorite	equigranular	•		◎	•	◎				•							•				•					fine grained
RPJ−2 23.8m	quartz diorite	equigranular	•		◎		○	○			•							•			•	•					
166.6m	granodiorite	equigranular	◎		○									•				•			•	◦					fine grained, all of mafic minerals are altered.
206.9m	quartz diorite	equigranular	○		○							○			•			○	○			•					strongly altered
212.2m	quartz diorite	equigranular	◎		◎										•			•			•	•			•		all of mafic minerals are altered to Chl and Epi.
298.2m	quartz diorite	equigranular	○		◎		○											•	•			•				•	
b−3307	porphyritic quartz diorite	porphyritic	○		◎		○				•							•				•					
b−3322	quartz diorite	equigranular	○		◎						•						•	◎									fine grained, all of mafic minerals are altered.
d−3316	diorite	equigranular			◎		◎				•	•			•			•			•						
d−3343	diorite	equigranular			◎									◎				•			○	•					all of mafic minerals are altered to Chl and Epi.
d−3349	quartz diorite	equigranular	○		◎		○				•							•				•					fine grained

Table A–1–2 List of Microscopic Observation (Lava and Dykes)

(1)

Sample No.	Rock Name	Texture	Phenocryst									Groundmass										Secondary Minerals																	
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	K-f	Pl	Bt	Hb	Cpx	Opx	Ol	Op	Gl	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	Pr
a–3107	diorite porphyry	porphyritic			◎		◎					•			◎		◎												•					•		•	•	
a–3110	porphyritic andesite	intergranular			◎		◎								○		○				○																	
a–3112	dacite	microcryptocrystalline	•		◎		•					◎			○														○				•	•			•	
a–3113	andesite	intergranular			◎		•								◎	•					•								•									
a–3115	silicified andesite	poikilitic			•		○								◎		○						◎											○				
a–3116	silicified andesite	pilotaxitic													◎		◎				○		•						•									
b–3101	andesite	pilotaxitic													◎		◎				○		•						•				•					
b–3102	quartz diorite porphyry	porphyritic	•		◎	•	•					○			◎	•	○				•								•				•	•			•	
b–3103	andesite	cryptocrystalline			◎		○	•			•		◎			•	•				•							•	•								
b–3105	andesite	pilotaxitic			○		○					•			◎		•				•				•				•							•		
b–3107	quartz diorite porphyry	porphyritic			◎		○					○			◎	◎	◎				•								•				•					
b–3116	quartz diorite porphyry	porphyritic	•		◎							•			◎										•	•			○				○					
b–3119	quartz diorite porphyry	porphyritic	•		◎		•					○			◎		•				•				•	•			○					•				
b–3122	andesite	pilotaxitic soherulitic			◎		○				•		◎		◎		•				•				•				•				•					
b–3123	quartz diorite porphyry	porphyrytic	○		○							○			◎						•				•				○				•	•				
b–3127	silicified rock																						◎						○				◎	•			•	
b–3129	andesite	porphyritic			◎	•	○					•			◎		○				•								•				•					
b–3136	andesite	pilotaxitic			◎		•								◎		◎				•		•						•				•					
b–3142	quartz diorite porphyry	micrographic porphyritic	•	•	◎		•	•			•	•			○														○				•	•		•		
b–3144	dacite	cryptocrystalline	•		○						•	•	◎		•						•								•				•				•	
d–3102	diorite porphyry	porphyritic			◎		○				•				◎														•				•			•		
d–3104	quartz diorite porphyry	micrographic porphyritic	○	•	◎		○				•	○			◎										•				○				○	•				
d–3115	andesite	pilotaxitic			◎		•								◎		•				•								•					•		•		
d–3128	quartz diorite porphyry	micrographic porphyritic	○	•	◎							•			◎														○				•	•				
d–3134	quartz diorite porphyry	porphyritic	•		◎		○					○			◎		•												•					•				
m–3129	andesite	intergranular			◎		•					•			◎		◎				•								•				•	•			•	
m–3146	quartz diorite porphyry	porphyritic	•		○		•					○			◎		•				•				•				•				•	•			•	
RPJ–1 166.8m	quartz diorite porphyry	porphyritic	•		◎	•	○					○			◎						•								•				•	•				
RPJ–1 195.8m	quartz diorite porphyry	porphyritic	•		◎	•	○					○			◎						•								•				•					
302.6m	quartz diorite porphyry	porphyritic	○		◎																•								•				•					
RPJ–2 65.0m	altered andesite				•		•								◎								○						•			•	•		○			
74.0m	quartz diorite porphyry	porphyritic			◎		•	•				•														•			○					•	•			
97.1m	quartz diorite porphyry	micrographic porphyritic	○	•	◎		•	○			•										•								•					•	•			
100.05m	quartz diorite porphyry	porphyritic			◎		•	•				•			◎		•				•								•					•	•			
107.3m	andesite	intergranular					•								◎		○						•						•				○		•			
128.5m	quartz diorite porphyry	porphyritic			○			○				•			◎			•			•				•				•						•			
234.0m	silicified rock														•								◎		•				○					•	•		•	

Sample No.	Rock Name	Texture	Phenocryst								Groundmass										Secondary Minerals														
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	K-f	Pl	Bt	Hb	Cpx	Opx	Ol	Op	Gl	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	Pr
RPJ-2 265.7m	quartz diorite porphyry	porphyritic	•		○		•					•			○		•				•		○						•				•	•		•		
175.5m	quartz diorite porphyry	porphyritic	•		◎		•					•									•		•		•						○	○		•			•	
RPJ-3 46.5m	intergranular	intergranular					•								◎		◎				•								•			•						
153.3m	altered andesite																						◎		•	○			•				◎	•				
257.0m	quartz diorite porphyry	porphyritic micrographic	○	•	◎		○	•				•			◎		○								•				•					•				
a-3303	andesite	intergranular										•			◎						•		•						◎					•				
a-3304	dolerite	doleritic										•			◎						•								◎				•					
a-3306	dacite	microcryptocrystalline	•		◎						•	◎			◎						•				○													
a-3307	dacite	microcryptocrystalline	•		○						•	○	◎								•				○	○			•									
a-3308	dacite	microcryptocrystalline	•		◎							○	◎		○						•		•		•	•			○					•				
a-3313	dacite	pilotaxitic	•		○							○			◎						•		•			•			○					•				
a-3316	basalt	intersertal													◎								○						◎					•				
a-3319	quartz diorite porphyry	porphyritic	•		◎							◎			○											•			○				•	•				
a-3321	andesite	intergranular			•		•								◎		•				•		•						•									
a-3323	andesite	pilotaxitic													◎		◎				○				•				•									
a-3325	andesite	pilotaxitic	•		•								◎		◎								•		•								◎					
a-3328	andesite	cryptocrystalline	•		○			•			•	•	◎								•				•	•												
a-3334	andesite	intersertal amygdaloidal													◎						•		•				◎	•					○	•				
a-3336	dolerite	doleritic			◎																					○			◎				○	•			•	
a-3341	andesite	microcryptocrystalline			○		○	•				•			◎		•				•						•					•						
a-3342	quartz diorite porphyry	porphyritic			◎		•					•			◎						•		•						○				•	•		•	•	
a-3347	andesite	intersertal			○							•	○		○						•				•				○				•	•				
a-3348	quartz diorite porphyry	porphyritic			◎		○					○			○						•								•		•			•				
a-3364	andesite	pilotaxitic			•										◎						•				•	○			◎						○			
a-3365	altered dacite	microcryptocrystalline	•																				○			◎								•				
a-3367	andesite	pilotaxitic			○		○	•							◎		○				•														○		•	
a-3368	dacite	cryptocrystalline	•		○		○					•	◎		•						•				•				•				•					
a-3370	dacite	cryptocrystalline	•		◎		○				•	•	◎				•				•																	
a-3372	andesite	intersertal			◎		○				•														•				○			•		•				
a-3374	andesite	intersertal			•										◎		◎				○				•				○									
b-3309	granodiorite porphyry	porphyritic	•									◎														◎			○					•				
b-3314	andesite	intersertal amygdaloidal													◎		○				•			◎	○				•			•	•					
b-3318	andesite	intersertal					•								◎		◎				•		•						○					•	•			
b-3328b	andesite	cryptocrystalline			◎						•		◎														•			•							•	
b-3331	andesite	pilotaxitic											◎		◎								○				•			◎					○	•		
b-3332	andesite	intergranular													◎		◎				•		•												•			
b-3335	quartz diorite porphyry	porphyritic			◎							◎			○											•			○					○				

Sample No.	Rock Name	Texture	Phenocryst									Groundmass										Secondary Minerals																
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	K-f	Pl	Bt	Hb	Cpx	Opx	Ol	Op	Gl	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	Pr
b–3337	andesite	cryptocrystalline	•		◎		○					◎									•				•								•	○	•		•	
b–3338	silicified andesite																						◎			◎								•				
b–3340	andesite	intergranular			○		○								◎		◎				•		•						•					•				
b–3344	quartz diorite porphyry	porphyritic			◎		•					◎			◎										•				○					•				
b–3345	quartz diorite porphyry	porphyritic poikilitic			◎		•					◎			◎		•								•				•					•				
b–3346	quartz diorite porphyry	porphyritic			○		○				•	○			◎		•				◦				•				•				•	•				
b–3350	dacite	cryptocrystalline			◎		○	•			•		◎								•								•					•				
b–3351	basalt	intersertal			○			○			•				◎			○			•		•				○		•					•				
b–3352	andesite	cryptocrystalline			○						•				◎						•				○	○	•		•									
b–3353	quartz diorite porphyry	porphyritic	•		○		•					◎			◎										•	•			•					•				
b–3354	andesite	cryptocrystalline			○		○				•		◎		•						•				•													
b–3355	dacite	cryptocrystalline	•		○								◎								•				•	•			•				•	•				
b–3356	andesite	cryptocrystalline			◎		○				•		◎		•		•				•						•											
d–3307	andesite	cryptocrystalline			◎						•										•				◎				○					•				
d–3309	andesite	sphrulitic											◎		•		○												•				•	○				
d–3312	quartz diorite porphyry	porphyritic	•		◎							•			○								•						◎			•	○			•	
d–3314	diorite porphyry	porphyritic			◎							•			◎											•	•		•				•				
d–3328	altered andesite	cryptocrystalline			•							•	◎										•			○											
d–3329	silicified andesite	cryptocrystalline			○								◎										○			•	•	•						•	•			
d–3331	dacite	cryptocrystalline	•		○							•	◎												•	•	•	•	•									
d–3332	quartz diorite porphyry	porphyritic	•		◎							•			○														◎			•					
d–3334	dacite	microcryptocrystalline	◯		○							◎			◎										•				○				•				
d–3344	dacite	microcryptocrystalline	○	•	○							○			◎						•		•		•				•									
d–3346	dacite	cryptocrystalline	○		○								◎		•								•		•				○					•				
d–3351	silicified rock																						◎											•				
d–3352	dacite	cryptocrystalline	•		◎		○				•		◎												•				•					•				
d–3354	basalt	intersertal													◎										•				○				•	•	○			
d–3356	dacite	cryptocrystalline	•		◎		◎				•	•	◎		•						•							•						•				
d–3359	dacite	microcryptocrystalline	•		○		•					○			◎		•				•												•					
d–3365	basalt	intersertal			•										◎						○												•		•			
m–3307	dacite	cryptocrystalline	○		◎							•	◎		•										•	•								•		•		
m–3317	andesite	cryptocrystalline			◎		◎						◎																•				•	•				
m–3318	quartz diorite porphyry	porphyritic	•		◎							○			○										•			◎									
m–3321	basalt	intersertal amygdaloidal													◎			•							•			•				○		○			
m–3322	dolerite	doleritic porphyritic			◎			○							○			○							•		○							•	◎			
m–3329	andesite	cryptocrystalline	•		◎								◎								•		•			•			○					•			•	
m–3350	andesite	microcryptocrystalline			◎		•								◎		•									•								•				

Sample No.	Rock Name	Texture	Phenocryst									Groundmass										Secondary Minerals															
			Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	K-f	Pl	Bt	Hb	Cpx	Opx	Ol	Op	Gl	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	Pr
m-3351	dacite	cryptocrystalline	•		◎		○				•		◎								•								•				•		•			
m-3356	quartz diorite porphyry	porphyritic	•		◎							•			•						•					•			◎					○				
m-3357	basaltic andesite	amygdaloidal intersertal													○	◎													•			•	•	•	○			
m-3359	basalt	intersertal			•										◎						•	◎	○						○				•					

Table A–1–3 List of Microscopic Observation (Pyroclastic Rocks)

Sample No.	Rock Name	Maximum Diameter of Fragment or Grain										Rock Fragment				Crystal Fragment									Secondary Minerals													
		mm >32	32	4	2	1	1/2	1/4	1/8	1/16	1/64≧	Phyolite Dacite	Andesite	Basalt	Others	Q	K-f	Pl	Bt	Hb	Au	Hy	Ol	Op	Q	Si	Cc	Ser	Mon	Sap	Chl	Kao	Bt	Act	Epi	Op	Zeo	Ab	Sp	Pr
a–3108	andesitic coarse tuff					○	○	•										○		•					•									○	•	•			•	
m–3152	andesitic lapilli tuff			○	○	•							◎					•		•																			
RPJ–3 105.7m	andesitic lapilli tuff			○	○	•							◎					○							○		•				•			○		•				
137.6m	andesitic lapilli tuff			○	○	•							◎					◎		•				•	•									○		•				
239.5m	andesitic lapilli tuff			○	•	•							◎					○		•					•		•							○						•
a–3373	altered fine tuff				◦	○																			•		◎				•				•	•	○			
b–3313b	altered fine tuff							○	○				•			•									•		○	○			•				•	•				
b–3317	altered fine tuff							○	○							•		•									•								◎		•			
b–3327	dacitic lapilli tuff			○	○	•							◎			•		•		•											○				•		•			
b–3336	andesitic lapilli tuff			○	○	•							◎			•		◎										•	•		•					•			
d–3325	silicified fine tuff							○	○																◎				○	•						•			
d–3348	altered fine tuff					•	•	○	○							•									○											•			◎
d–3357	silicified fine tuff					•	•	○	○							•									◎											•			○
d–3367	dacitic coarse tuff					○	○	•					•			○		•									•		•		•				•		•			
m–3308	dacitic lapilli tuff			○	○								•			○		•									•	○											
m–3314	andesitic coarse tuff				○	○	•						◎					◎													•			•	•				
m–3360	andesitic lapilli tuff			○	○							•	○			•		○									○	•	•		◎					•			
m–3362	dacitic fine tuff							○	○							•		•							•			•	•	•					•				

Table A–1–4 List of Microscopic Observation (Ore)

Sample No.	Name of Area	Ore Minerals									Remarks
		Mg	Hm	Mo	Py	Cp	Bo	Dig	Cv	Sph	
a–3102	Manikbel	◎				◎				•	High grade chalcopyrite-magnetite ore
a–3120	Manikbel	○				•	•		•		Magnetite-bearing igneous rock with a few chalcopyrite
a–3121	Manikbel					•					Oxidized (limonitized) ore
a–3122 (b)	Manikbel					•					Oxidized (limonitized) ore
a–3130	Manikbel										Oxidized (limonitized) ore
a–3140	Manikbel				○						Igneous rock with pyrite veinlet
a–3143 (a)	Manikbel					◎			○		Network of chalcopyrite and covelline
a–3143 (b)	Manikbel		◎								Primary and secondary hematite
a–3143 (c)	Manikbel		◎			◎					Enriched copper ore
a–3143 (d)	Manikbel		◎			○					Highly hematitized, limonitized chalcopyrite
b–3117	Manikbel				○						Pyrite disseminated igneous rock
b–3126	Manikbel					○					Highly limonitized chalcopyrite
b–3130	Manikbel					•					Highly limonitized ore with malachite
d–3118	Manikbel	•			•	•					Magnetite-Pyrite-disseminated igneous rock
f–3124	Manikbel	◎			○	◎					Magnetite-disseminated rock with pyrite-chalcopyrite veinlet
RPJ–1 84.10 m	Manikbel (Drilling Core)	◎				◎					Chalcopyrite grains are surrounded with magnetite
RPJ–1 202.50 m	Manikbel (Drilling Core)	○		○	○	○					Disseminated
RPJ–1 214.50 m	Manikbel (Drilling Core)	•			○	○					Disseminated
RPJ–1 220.50 m	Manikbel (Drilling Core)	•			•	○					Disseminated
RPJ–1 235.50 m	Manikbel (Drilling Core)	•			○	○					Disseminated
RPJ–1 299.15 m	Manikbel (Drilling Core)			◎	◎	•					Chalcopyrite-disseminated rock with pyrite-molybdenite-quartz veinlet
RPJ–1 308.20 m	Manikbel (Drilling Core)	•		•		○					Disseminated
RPJ–2 197.70 m	Manikbel (Drilling Core)	•			•	•					Disseminated
RPJ–2 289.20 m	Manikbel (Drilling Core)	○	◎			◎					Chalcopyrite-magnetite-disseminated rock with chalcopyrite-hematite veinlets
RPJ–3 93.70 m	Manikbel (Drilling Core)	•			◎	○					Chalcopyrite-bearing massive pyrite
RPJ–3 183.20 m	Manikbel (Drilling Core)	◎			◎	○					Chalcopyrite-bearing massive pyrite-magnetite
RPJ–3 267.90 m	Manikbel (Drilling Core)				•						Disseminated
RPJ–3 287.00 m	Manikbel (Drilling Core)	•	◎			◎			•	•	Chalcopyrite-disseminated rock with hematite-chalcopyrite veinlets
RPJ–3 288.50 m	Manikbel (Drilling Core)	◎			◎	•					Irregular-shaped massive pyrite with chalcopyrite in magnetite-disseminated rock
RPJ–3 309.75 m	Manikbel (Drilling Core)	◎			◎	○					ditto
a–3310 (a)	Layacan				◎						Cracked, massive pyrite
a–3332	Layacan				◎						Disseminated, fine to coarse grained pyrite
a–3339	Layacan				◎						Pyrite sparsely disseminated
a–3344	Layacan	○			○						Disseminated pyrite
a–3345	Layacan				◎						Massive pyrite
a–3355	Layacan				◎	•	○	○			Enriched pyrite-chalcopyrite
a–3359	Layacan				•						Pyrite-disseminated rock
a–3360	Layacan				•						Pyrite-disseminated rock
a–3361	Layacan				◎		•				Pyrite-disseminated rock
a–3381	Layacan				◎				○		Massive pyrite with covelline along the cracks
b–3332	Layacan	○			○	•					Pyrite-magnetic disseminated igneous rock
b–3344	Layacan	○			○						Pyrite-magnetite disseminated igneous rock
d–3315	Layacan				◎						Pyrite-quartz vein
d–3322	Layacan		◎								Hematite ore
d–3341	Layacan				◎						Pyrite-disseminated, altered rock

Table A–2–1 List of X-ray Diffractive Analysis in Manikbel Area

No.	Sample No.	Occurrence	Minerals Detected by X-ray Diffractive Analysis																														
			Q	F	K-f	Cc	Do	Gy	Ep	Ch	S	K	P	Dia	Mi	Al	W	E-st	St	Y	Na	L	Zeo	Ha	Sap	M	J	Hm	Go	Mg	Py	Mal	Cp	Sph
1	a–3107	andesite	○	◎						○																							
2	a–3108	andesitic coarse tuff	◎	◎						○																							
3	a–3110	andesite with py. film	○	◎																													
4	a–3111	andesite with py. film	◎	◎						○																							
5	a–3112	qtz. dio. with py. gossan.	◎	◎			•			◎																							
6	a–3113	silicified andesite	◎	◎						○																							
7	a–3115	silicified andesite	◎	◎																													
8	a–3116	silicified andesite	○	◎						○																							
9	a–3117	brecciated zone consisting of qtz. dio. and andesite breccia	◎	○			•			◎	○																						
10	a–3118	chloritized qtz. dio.	◎	◎						○	•																						
11	a–3119	altered andesite	◎	◎						•									◎						•								
12	a–3120	highly altered qtz. dio.	◎	◎						○																							
13	a–3121	mal.-azu.-py. diss. ~ stringers network in qtz. dio.	◎	◎						○																							
14	a–3123	sil. chl. altered qtz. dio. with py. mal.	◎	◎						○													•										
15	a–3124	highly altered qtz. dio. with py. diss	◎	◎						◎																							
16	a–3125	highly altered qtz. dio. with py. diss.	◎	◎						○	•																						
17	a–3126	highly py. diss. qtz. dio. with few mal.	◎	◎						◎																							
18	a–3129	mal.-azu.-py. diss. ~ stringers network in qtz. dio.	◎	◎						◎													•										
19	a–3130	mal.-azu.-py. diss. ~ stringers network in qtz. dio.	•	•						◎									◎												◎		
20	a–3131	altered qtz. dio.	Clay minerals																														
21	a–3132	py. diss. qtz. dio.	◎	◎						◎																							
22	a–3133	qtz. dio. with py. film	◎	◎						○																							
23	a–3134	e.g. qtz. dio.	◎	◎						○																							
24	a–3135	qtz. dio. with py.	◎	◎						○																							
25	a–3136	silicified qtz. dio. with py. diss.	◎	◎						○																							
26	a–3137	altered qtz. dio. por.	◎	◎						○																							
27	a–3138	e.g. granodiorite	•	◎						•																							
28	a–3139	e.g. granodiorite	◎	◎						•																							
29	a–3140	py. diss. qtz. dio.	◎	◎						◎								•													•		
30	a–3141	chloritized qtz. dio. por.	◎	◎						○								•															
31	a–3142	qtz. dio.	◎	◎						○																							
32	a–3144	gossan with clay	◎	◎						○	○																						
33	a–3145	argillized qtz. dio. with mal.	◎							◎								○															
34	a–3148	white clay vein	◎							◎																							
35	a–3149	argillized qtz. dio.	◎							◎	○																						
36	a–3151	chloritized andesite	◎	○						○	○																						
37	b–3106	highly py. chl. qtz. dio.	◎							◎	○																						
38	b–3108	highly sil. py. gossan.	◎	◎	◎					○	○																				○		
39	b–3109	highly sil. altered rock	◎	○						◎	○						◎														◎		
40	b–3112	qtz.-chl.-cpi vein (w : 10 cm)	○	○						○																					○		
41	b–3114	py.-altered zone	○	○						○	◎											◎											
42	b–3115	altered qtz. dio.	◎	○							○											◎									◎		
43	b–3118	sil. py. cp. gossan.	◎								○												◎								•		
44	b–3120	highly silicified zone with py.	◎	◎	○					○	○						◎														○		
45	b–3125	altered qtz. dio.	◎	◎						○							○														○		
46	b–3126	fissure-filling gossan with cp. diss.	○	○		○				◎												◎			○								
47	b–3127	chloritized qtz. dio.	◎	○		○				◎																							
48	b–3130	sil. argil. zone with mal. azu.	○							○	○																						
49	b–3131	altered qtz. dio.	○	○					○	◎																							
50	b–3132	argil. qtz. dio. with mal.	○							◎	○																						
51	b–3134	white argil. qtz. dio.	◎	◎	○					◎	○																						
52	b–3137	clay veinlets networked zone in qtz. dio.	◎							◎																							
53	b–3140	white clay veinlet in qtz. dio. por.	◎							◎	○																				○		
54	m–3102	qtz. vein in andesite	◎	◎						◎	○											◎											
55	m–3105	qtz. veinlet in andesite	◎				•			○												◎	•								•		
56	m–3111	qtz. veinlet in andesite	◎							◎															•						○		
57	m–3112	aplitic rock dyke	◎	◎						○						○							•								•		
58	m–3117	gossan in andesite	○	◎						○	○						○	○															
59	m–3145	gossan in qtz. dio.	◎	◎						○	•																				○		

Remarks :

◎ Abundant ○ Common • Rare

Abbreviation :

Q	: Quartz	Ep	: Epidote	Al	: Alunite	Na	: Natrolite	J	: Jarosite	Cp	: Chalcopyrite
F	: Feldspar	Ch	: Chlorite	Mi	: Mirabilite	L	: Laumontite	Hm	: Hematite	Sph	: Sphalerite
K-f	: Potash-feldspar	S	: Sericite	W	: Wairakite	Zeo	: Zeolite	Go	: Goethite		
Cc	: Calcite	K	: Kaolinite	E-st	: Epistilbite	Ha	: Halloysite	Mg	: Magnetite		
Do	: Dolomite	P	: Pyrophyllite	St	: Stilbite	Sap	: Saponite	Py	: Pyrite		
Gy	: Gypsum	Dia	: Diaspor	Y	: Yugawaralite	M	: Montmorillonite	Mal	: Malachite		

Table A–2–2 List of X-ray Diffractive Analysis in Drilling Core

No.	Hole No.	Occurrence	Depth (m)	Minerals Detected by X-ray Diffractive Analysis																																
				Q	F	K-f	Cc	Do	Gy	Ep	Ch	S	K	P	Dia	Mi	Al	W	E-st	St	Y	Na	L	Zeo	Ha	Sap	M	J	Hm	Go	Mg	Py	Mal	Cp	Spa
1	RPJ–1	vein	18.90	◎	○																	◎													
2		vein	20.75	◎	○													○				◎													
3		vein	21.50	◎	•													○				◎													
4		vein	23.05	◎							•								○	◎	○														
5		altered andesite	31.40		◎						◎	○							○		○		◎													
6		vein	35.45	◎	○						◎																									
7		vein	40.40	○	○						◎	○							○			○	○									○				
8		vein	44.65	◎	○	◎					◎							○	○																	
9		vein	68.80	◎	○	•	○				○	○																								
10		vein	75.30	◎																◎												◎				
11		vein	75.90	○							○									◎			◎									•				
12		vein	89.60	◎			○			◎	○	○						○																		
13		vein	104.40	◎						○	○												○													
14		vein	117.25	◎		○	◎			◎																										
15		highly altered micro-diorite	128.50	◎						○	◎												◎													
16		vein	140.30	◎							○									◎			◎													
17		vein	145.60	◎							○												◎													
18		highly altered granodiorite	215.00	◎							○								○				◎													
19		highly altered granodiorite	216.00	◎	○						○								○				◎													
20		highly altered granodiorite	220.30	◎							◎												◎													
21		highly altered granodiorite	230.00	◎	○		•				○	○								◎																
22		highly altered granodiorite	233.00	◎	○		•	•			○	○							○																	
23		highly altered granodiorite	245.70	◎	○						◎												◎													
24		highly altered granodiorite	255.20	◎	○						◎								•				◎													
25		argillized granodiorite	256.00	◎	○			•			○								○	○			○													
26		argillized granodiorite	256.40	◎				○											◎	○																
27		highly altered granodiorite	258.40	◎	○			•			○								○		•		○													
28		sheared zone	262.00	◎				•			◎												◎													
29		highly altered micro-diorite	267.80	◎				○		○	○												○													
30		microdiorite	279.60	◎	◎						○													•								○				
31		granodiorite	293.00		○		•				○	•											◎													
32		granodiorite	298.30	◎	◎						○	○																								
33		highly altered granodiorite	304.00	○			•			◎	○																									
34		highly argillized granodiorite	306.00	◎							○												◎													
35		highly altered granodiorite	308.20	◎	◎		•				◎																									
36	RPJ–2	vein	17.00								•												◎													
37		vein	18.80	○							•												◎													
38		vein	25.70	○																			◎													
39		vein	39.00																				◎	◎												
40		vein	59.20								○												◎									•				
41		vein	60.40	◎	•						◎									◎												○				
42		vein	61.70	◎	○		•	•			○	•																				○				
43		vein	72.40	◎	○					◎	○												◎													
44		vein	111.20	◎	•			•			○												◎									◎				
45		vein	165.00	◎							◎							•					◎									○				
46		vein	216.80	•				•			◎									◎			◎									•				
47		vein	230.80	◎							◎												◎													
48		vein	289.20	○						○	○																		○				○	○	
49		vein	310.85	◎							◎							○	○			◎														
50	RPJ–3	vein	23.90	◎						◎	•																									
51		fractured, argillized andesite	28.50	◎						◎	○											◎														
52		brecciated, argillized andesite	34.00	◎						○	◎																					○				
53		fractured, argillized andesite	39.90	◎						○	○											◎														
54		vein	43.00	◎						◎	○											○														
55		vein	79.00	○						○	○											◎										•				
56		vein	119.90	◎						○	○											◎														
57		sheared andesite	136.70	◎						○	○											◎										•				
58		vein	164.30	○						○	◎											◎														
59		vein	213.30	◎						○												◎														
60		sheared andesite	239.50	◎	◎						○																									
61		quartz diorite porphyry	257.00	◎	◎						○												◎													
62		brecciated andesite	268.50	◎						○	◎									•																
63		andesite	279.80	○	◎						○						○																			
64		vein	285.60	◎	◎						○	•		○																						
65		vein	306.40	○	◎						◎																									

Remarks :

◎ Abundant ○ Common • Rare

Abbreviation :

Q : Quartz	Ep : Epidote	Al : Alunite	Na : Natrolite	J : Jarosite	Cp : Chalcopyrite
F : Feldspar	Ch : Chlorite	Mi : Mirabilite	L : Laumontite	Hm : Hematite	Sph : Sphalerite
K-f : Potash-feldspar	S : Sericite	W : Wairakite	Zeo : Zeolite	Go : Goethite	
Cc : Calcite	K : Kaolinite	E-st : Epistilbite	Ha : Halloysite	Mg : Magnetite	
Do : Dolomite	P : Pyrophyllite	St : Stilbite	Sap : Saponite	Py : Pyrite	
Gy : Gypsum	Dia : Diaspor	Y : Yugawaralite	M : Montmorillonite	Mal : Malachite	

Table A–2–3 List of X-ray Diffractive Analysis in Layacan Area

No.	Sample No.	Occurrence	Minerals Detected by X-ray Diffractive Analysis																														
			Q	F	K-f	Cc	Do	Gy	Ep	Ch	S	K	P	Dia	Al	Mi	W	E-st	St	Y	Na	L	Zeo.	Ha	Sap.	M	J	Hm	Go	Mg	Py	Mal	Cp	Sph
1	a–3309	highly sil. bleached zone (w : 5 ~6m) in dacite dyke	◎	◎						○	○																			•			
2	a–3310b	highly sil. zone (w : 10m)	◎	◎						○	○																						
3	a–3313	highly py.-diss. zone in andesite	◎	◎						◎	○																			•			
4	a–3317	py.-clay vein (w : 1.1m)	◎								○		◎																	◎			
5	a–3322	py.-clay vein (w : 0.3m)	◎										◎	○																◎			
6	a–3330	py.-clay vein (w : 0.2m)	◎								○		◎	○																○			
7	a–3337	sil. argil. zone (w : 3.5m) in basalt	◎									◎	○	•																◎			
8	a–3339	irregular-shaped qtz. vein (w : 0.3m)	◎							○																				○			
9	a–3343	py.-sil. vein (w : 2.0m)	◎									◎			◎															○			
10	a–3344	py.-rich zone in a–3343	◎									•			◎															◎			
11	a–3345	py.-clay zone in a–3343	◎									○			◎															◎			
12	a–3346	clay vein (w : 0.3m)	◎							◎	◎																			◎			
13	a–3349	white clay vein (w : 0.3m)	◎							○	○																						
14	a–3350	py.-clay vein (w : 0.2m)	◎								◎															◎				•			
15	a–3351	silicified zone (w : 1.5m) with py.	◎							○	○	○																		•			
16	a–3352	py.-clay vein (w : 0.6m)	◎	○						○	○	•																		○			
17	a–3353	silicified zone (w : 1.3m) with py. diss, clay-veinlets	◎										◎	○																•			
18	a–3356	highly sil. zone (w : 0.5m) with much py.	◎										◎	◎																•			
19	a–3357	clay vein (w : 0.1m) with py.	◎							◎										mixed layer mineral													
20	a–3358	clay vein with py. dis	◎	•						◎	• ?									mixed layer mineral													
21	a–3359	py.-clay vein (w : 0.2 ~ 0.4m)	◎										○													•				◎			
22	a–3362	py.-clay vein (w : 0.2m)	◎							○	◎									mixed layer mineral										○			
23	a–3363	py.-clay vein (w : 0.5m)	◎								•		•	○																○			
24	a–3365	sil. argil. bleached andesite	◎							○	○																			○			
25	a–3366	highly sil. zgail. andesite	◎									○																◎	○	◎				
26	a–3375	sheared zone (w : 0.25m) with qtz. veinlets and clay	◎								○		◎	•																•			
27	a–3376	highly sil. altered rock	◎									◎	○	•	◎																		
28	a–3377	qtz. vein	◎									○																		•			
29	a–3378	waste	◎							•	○	◎	○	○																			
30	a–3379	clay zone (w : 0.5m) with py.	◎								○	○	◎	•																○			
31	a–3380	silicified zone	◎									○		○	○																		
32	a–3381	py.-Cu ore	◎																										•	•	◎	○	
33	b–3303	white altered rock	◎										◎	○																			
34	b–3304	white clay zone (w : 0.2m)	◎										◎																				
35	b–3305	white clay zone (w : 0.2m)	◎									•	◎	○																			
36	b–3306	white clay zone (w : 0.2m)	◎										◎																				
37	b–3308	clay zone (w : 0.3m)	◎							○	◎															•				○			
38	b–3309	clay zone (w : 0.3m)	◎																	mixed layered mineral										○			
39	b–3310	chl.-clay vein (w : 0.4 ~ 0.5m)	◎							◎										mixed layered mineral													
40	b–3311	argil. gossan zone (w : 2.0m) in qtz. dio.	◎									•	◎													•				○			
41	b–3315	white altered rock	◎									◎																					
42	b–3316	argil. gossan zone (w : 0.2m). in andesite hornfels	◎								◎																						
43	b–3319	white clay zone	◎							•	◎									mixed layered mineral										○			
44	b–3320	white clay zone (w : 0.2m)	◎		•						◎																			◎			
45	b–3321	white clay zone with py.	◎							•	◎			○																○			
46	b–3326	sil. py. zone in andesite	◎							•	◎																			•			
47	b–3330	(mal)-py.-qtz vein (w : 0.1m)	◎	•						◎		•	◎	○																○			
48	b–3333	grey colored clay filling cracks in andesite	◎	◎						◎	○																			○			
49	b–3334	altered qtz. dio. por.	◎	◎						◎		○														○							
50	b–3339	white altered qtz. dio. por.	◎									○	◎	○	○					mixed layered minerals													
51	b–3341	py.-clay-qtz. vein	◎								◎																			○			
52	b–3343	py.-clay vein (w : 0.2m)	◎								◎																			◎			
53	b–3347	highly argil. rock	◎	◎							◎	•														○							
54	c–3318	py.-diss. altered rock	◎							○	•																			◎			
55	m–3324	white altered tuff	◎							○														○									
56	m–3325	clay vein (w : 0.9m)	◎									•	◎							mixed layered minerals										◎			
57	m–3326	clay vein (w : 0.2m)	◎							•		•	◎									○				•				•			
58	m–3327	sheared zone	◎					•			◎											○				•							
59	m–3328	sheared zone with mal. stain	◎	○				○		◎	○									mixed layered mineral													
60	m–3330	argillized zone (w : 1.6m)	◎							◎	○		•														○						
61	m–3331	clay vein (w : 0.36m)	◎								◎																			○			
62	m–3333	clay vein (w : 0.50m)	◎								◎																			○			
63	m–3334	clay vein (w : 0.50m)	◎							•	•		◎	○						mixed layered mineral										◎			
64	m–3335	waste	◎							◎	•									mixed layered minerals										○			
65	m–3352	waste	◎									○			◎															○			
66	m–3361	clay vein (w : 0.7m) with mal. stain.	◎							○	◎																			○			
67	g–3350	qtz.-py. vein (w : 2.0m)	◎									◎																		○			

Remarks :

◎ Abundant ○ Common • Rare

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K-f : Potash-feldspar	S : Sericite	W : Wairakite	Zeo : Zeolite	Go : Goethite	
Cc : Calcite	K : Kaolinite	E-st : Epistilbite	Ha : Halloysite	Mg : Magnetite	
Do : Dolomite	P : Pyrophyllite	St : Stilbite	Sap : Saponite	Py : Pyrite	
Gy : Gypsum	Dia : Diaspor	Y : Yugawaralite	M : Montmorillonite	Mal : Malachite	

Table A–3 Metal Content of Ore Samples

(1) Manikbel Area

(2) Layacan Area

Abbreviation

qtz. dio	:	Quartz diorite
qtz. dio. por.	:	Quartz diorite porphyry
micro-dio	:	Micro-diorite
py	:	Pyrite
cp	:	Chalcopyrite
bor	;	Bornite
mal	:	Malachite
azu	:	Azurite
cal	:	Calcite
qtz	:	Quartz
sil	:	Silicification
ch	:	Chloritization
f.g.	:	Fine-grained
c.q.	:	Coarse-grained

(1) Manikbel Area

No.	Sample No.	Location	Occurrence	Metal Contents					
				Au g/t	Ag g/t	Cu %	Fe %	Mo %	S %
1	a–3101	in the tunnel by the lower stream of the Manikbel R.	channel sample of py.-qtz. vein (w : 80cm)	0.2	38.6	4.82	–	–	5.30
2	a–3102	do	py-rich part of a–3101 vein	2.4	64.4	16.39	–	–	16.56
3	a–3103	do	channel sample of py.-qtz vein (w : 20cm), the branch of a–3101 vein.	0.5	37.2	6.50	–	–	7.98
4	a–3104	do	a part of networked zone (w : 30cm) of py.-qtz. veinlets.	0.1	3.2	0.26	–	–	3.79
5	a–3105	do	a part of py.-qtz.-clay vein (w : 25 ~ 45cm)	–	–	0.16	–	–	14.26
6	a–3106	do	sheared zone (w : 20cm) filled by cal. veinlets.	–	–	0.03	–	–	0.23
7	a–3117	western side of the lower stream of the Mamising Cr.	brecciated zone of qtz. dio. and andesite fragments.	–	–	0.24	–	–	0.42
8	a–3120	eastern side of the lower stream of the Mamising Cr.	highly altered c.g. qtz. dio. with py.-dissemination and stringers	–	–	0.42	–	–	0.48
9	a–3121	do	mal.-azu.-py. disseminated and stringers-networked part in porphyritic qtz. dio.	0.0	2.8	2.30	–	–	0.10
10	a–3122a	do	mal.-py. disseminated and stringers-networked part in porphyritic qtz. dio.	0.2	12.5	0.45	–	–	0.38
11	a–3122b	do	do	0.1	5.0	0.82	–	–	0.15
12	a–3129	eastern side of the middle stream of the Mamising Cr.	mal.-azu.-py. disseminated and stringers-networked zone in altered qtz. dio. (mal. py. rich part)	–	–	0.44	–	–	0.16
13	a–3130	do	do (mal. azu. rich part)	–	–	11.15	–	–	0.28
14	a–3131	do	altered qtz. dio.	–	–	0.47	–	–	0.07
15	a–3132	do	py.-disseminated qtz. dio. in trench	–	–	0.45	–	–	0.12
16	a–3140	between the Nagasasan and Mabindnok crs.	highly py.-disseminated micro-dio.	0.0	0.7	0.03	6.82	–	4.50
17	a–3143a	eastern side of the middle stream of the Mamising Cr.	cp. rich part in gossan vein (w : 10cm)	0.1	51.9	27.87	–	–	22.41
18	a–3143b	do	do	–	–	5.93	23.55	–	0.12
19	a–3143c	do	do	–	–	11.37	–	–	10.68
20	a–3143d	do	do	–	–	8.00	38.04	–	7.25
21	a–3144	do	clay rich part in a–3143 vein	0.0	0.9	0.21	–	–	0.05
22	a–3145	do	channel sample (w : 150cm) in argillized qtz. dio. with mal.	0.0	1.2	0.43	–	–	0.06
23	a–3146	do	channel sample (w : 150cm) in argillized qtz. dio. with mal.	0.0	0.5	0.32	–	–	0.08
24	a–3147	do	channel sample (w : 80cm) in chl. brecciated andesite	0.0	0.5	0.32	–	–	0.07
25	a–3148	do	white clay vein (w : 5cm)	–	–	0.87	–	–	0.04
26	a–3149	do	argillized qtz. dio. with mal.	–	–	0.49	–	–	0.04
27	a–3151	do	chl. brecciated andesite	–	–	0.08	–	–	0.06
28	b–3106	by the middle stream of the Agalo Cr.	highly argillized zone in granodiorite	–	–	0.14	–	–	5.38
29	b–3108	by the lower stream of the Malbibing Cr.	highly sil. py. zone with gossan	–	–	0.03	–	–	5.70
30	b–3114	by the lower stream of the Kulan Cr.	py.-clay vein (w : 20cm) in f.g. qtz. dio.	–	–	1.32	–	–	16.97
31	b–3117	by the small cr. of the middle stream of the Manising Cr.	cp. mal. rich part in cp.-gossan. vein (w : 15cm)	–	–	8.52	–	–	7.71
32	b–3118	by the branch of the Mabileng Cr.	py.-disseminated, silicified part in qtz. dio.	–	–	0.05	–	–	3.03
33	b–3120	by the middle stream of the Kaponelan Cr.	highly silicified zone (w : more than 100cm) in qtz. dio. por.	–	–	0.03	–	0.000	4.16
34	b–3123	by the branch of the middle stream of the Agalo Cr.	py.-disseminated, f.g. qtz. dio.	–	–	0.04	–	0.000	1.27
35	b–3126	by the small cr. of the middle stream of the Mamising Cr.	channel sample of fissure-filling cp-gossan vein (w : 15cm)	–	–	1.91	–	–	1.40
36	b–3127	do	chloritized qtz. dio.	–	–	0.62	–	–	0.58
37	b–3130	do	mal. azu. rich zone in qtz. dio	–	–	4.80	–	–	0.07
38	b–3132	do	argillized qtz. dio.	–	–	1.75	–	–	0.03
39	b–3133	do	channel sample (w : 50cm) of mal. azu. rich zone in qtz. dio	0.0	38.8	4.81	–	–	0.07
40	b–3140	by the middle stream of the Kalingayan Cr.	hgihly py. argillized zone (w : 200cm) in qtz. dio.	–	–	0.10	–	–	2.56
41	d–3113	by the lower stream of the Malwa Cr.	cp.-py. veinlet (w : 3cm) along the sheared zone (w : 25cm)	0.0	5.7	2.98	–	–	37.20
42	f–3124	by the upper stream of the Mabileng Cr.	cp.-py.-qtz. veinlet (w : 5cm) in qtz. dio.	–	–	1.41	–	–	3.35
43	m–3105	in the tunnel by the lower stream of the Manikbel R.	cp. py rich part in the same vein to a–3101	0.9	39.1	4.48	–	–	5.12
44	m–3170	eastern side of the middle stream of the Mamising Cr.	mal. azu. rich part in the same outcrop to b–3130	0.0	4.6	2.30	–	–	0.14

(2) Layacan Area

No.	Sample No.	Location	Occurrence	Metal Contents						
				Au g/t	Ag g/t	Cu %	Pb %	Zn %	Mo %	Mn %
1	a-3309	by the branch of the Bagset Cr.	highly sil. bleached zone (w : 5～6m) with py.-dissemination and qtz. veinlets in dacite dyke.	0.0	0.0	0.00	–	–	–	–
2	a-3310a	do	py. rich part in highly py. sil. zone (w : 10m)	0.0	1.0	0.00	–	–	–	–
3	a-3310b	do	qtz. clay rich part in the same zone to a-3310a	0.0	0.2	0.00	–	–	–	–
4	a-3313	do	highly py.-disseminated zone in porphyritic andesite	0.0	0.0	0.00	–	–	–	–
5	a-3317	by the lowermost stream of the Kawayen Cr.	py. clay vein (w : 110cm) in basalt	0.0	0.4	0.03	–	–	–	–
6	a-3321	by the middle stream of the Kawayen Cr.	clay vein (w : 10～20cm) in dolerite dyke.	0.6	6.8	0.06	–	–	–	–
7	a-3330	by the lower stream of the Tem-ing Cr.	py.-clay vein (w : 20cm) in highly altered basalt.	0.0	0.1	0.01	–	–	–	–
8	a-3331	do	channel sample of py. rich clay vein (w : 70cm)	0.1	1.1	0.12	–	–	–	–
9	a-3332	do	py.-concentrated zone (w : 30cm) in the same vein to a-3331.	0.1	0.6	0.06	–	–	–	–
10	a-3337	by the lower stream of the Calyang Cr.	py. rich part in silicified, argillized zone in aphanitic andesite	0.1	0.3	0.01	–	–	–	–
11	a-3339	do	irregular qtz. vein (w : 30cm) in aphanitic basalt.	0.0	0.0	–	–	–	–	–
12	a-3343	by the lower stream of the Balasian R.	channel sample of py. rich silicified clay vein (w : 200cm) in brecciated andesite.	0.1	0.2	0.05	–	–	–	–
13	a-3344	do	py. rich part in the same vein to a-3343.	0.0	0.1	0.01	–	–	–	–
14	a-3345	do	py.+clay part in the same vein to a-3343.	0.2	0.9	0.21	–	–	–	–
15	a-3346	do	channel sample of py.-disseminated clay vein (w : 75cm)	0.0	0.3	0.01	–	–	–	–
16	a-3349	near the hanging bridge of the lower stream of the Balasian R.	white clay vein (w : 30cm) in highly altered andesite near qtz. dio. por.	0.1	0.6	–	–	–	–	–
17	a-3350	do	py.-clay vein (w : 20cm) in altered andesite near qtz. dio. por.	12.2	5.6	0.01	–	–	–	–
18	a-3351	do	channel sample of silicified zone (w : 150cm) in qtz. dio. por.	1.3	18.3	0.01	–	–	–	–
19	a-3352	do	channel sample of py. rich clay vein	0.0	0.1	0.01	–	–	–	–
20	a-3353	by the lowermost stream of the Kawayen Cr.	silicified zone (w : 130cm) in clay vein with bor.-cp.-py	0.1	6.4	0.04	–	–	–	–
21	a-3354	do	bor. cp. py rich zone (w : 20cm) in the same vein to a-3353	0.5	41.4	25.25	0.01	0.04	–	–
22	a-3355	do	do	0.4	11.6	26.01	0.01	0.07	–	–
23	a-3356	do	highly silicified zone (w : 50cm) with f.g. py.	0.0	0.8	0.20	0.00	0.00	–	–
24	a-3357	do	py.-clay vein (w : 10cm) in altered andesite	0.0	0.3	–	–	–	–	–
25	a-3358	do	py.-clay vein (w : 10cm) in altered andesite	0.0	0.4	–	–	–	–	–
26	a-3359	do	py.-clay vein (w : 20～40cm)	0.3	3.6	0.29	–	–	–	–
27	a-3360	do	compact py. rich zone (w : 50cm) in py. rich silicified vein (w : more than 120cm) in qtz. dio. por.	0.0	4.2	0.24	–	–	–	–
28	a-3361	do	compact py. zone (w : 30cm) in py.-silicified vein	0.0	1.4	0.06	–	–	–	–
29	a-3362	by the middle stream of the Kawayen Cr.	py.-clay vein (w : 20cm) in highly altered basalt.	0.0	0.2	–	–	–	–	–
30	a-3363	do	py.-clay vein (w : 50cm) in highly altered basalt	0.0	2.3	0.12	–	–	–	–
31	a-3375	in the tunnel near the upper stream of the Segseg Cr.	sheared zone (w : 25cm) with qtz. and white clay veinlets.	0.0	0.0	–	–	–	–	–
32	a-3376	by the upper stream of the Segseg Cr.	highly silicified altered rock	0.6	0.2	–	–	–	–	–
33	a-3377	do	qtz veinlet in highly altered rock	0.3	0.0	–	–	–	–	–
34	a-3378	do	waste (argillized altered rock)	0.5	0.4	–	–	–	–	–
35	a-3379	do	clay vein (w : max 50cm) with py.	0.0	0.1	–	–	–	–	–
36	a-3380	do	silicified rock with qtz veinlets.	0.2	0.4	–	–	–	–	–

37	a-3381	do	stocked ore (py and Cu-ore)	16.0	7.1	14.64	–	–	–	–
38	b-3303	by the trail between the Kawayen Cr. and Adawey Cr.	white argillized rock	0.0	0.1	–	–	–	–	–
39	b-3304	do	white clay vein (w : 20cm) in silicified qtz. dio. por.	0.0	0.4	–	–	–	–	–
40	b-3305	do	white clay vein (w : 20cm) in silicified qtz. dio. por.	0.0	0.2	–	–	–	–	–
41	b-3306	do	silicified qtz. dio. por.	0.0	0.1	–	–	–	–	–
42	b-3310	by the lowermost stream of the Adawey Cr.	chl.-white clay vein (w : 40～50cm) in qtz. dio. por.	0.0	0.2	–	–	–	–	–
43	b-3316	near the entrance of the Adawey Cr.	qtz.-clay-gossan vein (w : 20cm) in andesite hornfels	0.0	0.1	–	–	–	–	–
44	b-3320	by the small branch of the lower stream of the Adawey Cr.	white clay vein (w : 20cm) in andesite	0.0	0.2	–	–	–	–	–
45	b-3321	do	py.-white clay vein (w : 20cm)	0.4	8.1	–	–	–	–	–
46	b-3324	by the branch of the Kawayen Cr.	py.-qtz. veinlet (w : 5cm) in basalt hornfels	–	–	0.06	–	–	–	–
47	b-3326	do	py.-silicified zone (w : 100cm) in basalt hornfels	0.0	0.1	–	–	–	–	–
48	b-3330	by the entrance of the Cotan Cr.	channel sample (w : 25cm) of mal.-py.-qtz. vein in andesite hornfels	–	–	0.21	–	–	–	–
49	b-3332	by the Cotan Cr.	py.-disseminated andesite	–	–	0.02	–	–	–	–
50	b-3333	do	grey colored clay filling cracks in andesite	0.0	0.2	–	–	–	–	–
51	b-3334	by the Mage Cr.	altered qtz. dio. por.	0.0	0.0	–	–	–	–	–
52	b-3343	by the small branch of the Adawey Cr.	py.-clay vein (w : 20cm) in aphanitic andesite	0.1	0.6	–	–	–	–	–
53	b-3344	do	py.-disseminated qtz. dio. por.	–	–	0.02	–	–	–	–
54	d-3315	near the entrance of the Bagset Cr.	py.-qtz. vein (w : 45cm) in andesite	0.0	0.2	0.01	–	–	–	–
55	d-3318	by the lower stream of the Bagset Cr.	py.-disseminated altered zone (w : 50cm) in andesite	0.1	0.2	0.02	–	–	–	–
56	d-3320	do	py.-qtz. vein (w : 30cm) in andesite	0.0	0.4	0.01	–	–	–	–
57	d-3322	on the top of the small hill in the eastern side of the Bagset Cr.	float of andesite with hematite	0.1	4.7	0.01	0.00	0.00	–	–
58	d-3345	by the small branch of the Balasian R.	gossan-py.-qtz. vein (w : 50cm) in andesite	0.0	0.7	0.00	–	–	–	–
59	d-3353	by the middle stream of the Bagset Cr.	py.-qtz vein (w : 100cm) with mal. stain in andesite	0.8	1.1	0.34	–	–	–	–
60	m-3322	about 200m to the southwest of Pangwew.	silicified fine tuff with limonite veinlets network	–	–	–	–	–	0.000	0.22
61	m-3324	do	white argillized tuff	0.0	1.2	–	–	–	–	–
62	m-3325	do	clay vein (w : 90cm) in white argillized tuff	0.2	8.9	–	–	–	–	–
63	m-3326	by the Balasian R, about 500m to the north of Babasig.	clay vein (w : 10cm) in andesite	0.0	0.5	–	–	–	–	–
64	m-3327	do	sheared zone (w : 10cm) filled with clay	0.0	0.0	–	–	–	–	–
65	m-3328	do	sheared zone (w : 30cm) with mal. stain.	–	–	0.06	–	–	–	–
66	m-3330	do	channel sample (w : 160cm) in argillized andesite	0.0	0.2	–	–	–	–	–
67	m-3331	do	clay vein (w : 36cm) in andesite	0.0	0.2	–	–	–	–	–
68	m-3333	do	clay vein (w : 50cm) in andesite	0.0	0.1	–	–	–	–	–
69	m-3334	do	clay vein (w : 50cm) in andesite	0.0	0.1	–	–	–	–	–
70	m-3335	do	waste	0.0	0.2	0.04	–	–	–	–
71	m-3352	by the middle stream of the Segseg Cr.	waste being deposited in front of tunnel	–	–	0.04	–	–	–	–
72	m-3361	in the eastern side of the upper stream of the Segseg Cr.	clay vein (w : 70cm) with mal. stain	0.9	1.3	2.18	–	–	–	–

Table A–4 Metal Content of Geochemical Soil Samples

Manikbel Area (1)

Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)
1	A–3101	141	51	D–3114	366	101	B–3107	353
2	A–3102	122	52	D–3115	254	102	B–3108	228
3	A–3103	129	53	D–3116	261	103	B–3109	254
4	A–3104	231	54	D–3117	63	104	B–3110	208
5	A–3105	297	55	D–3118	69	105	B–3111	485
6	A–3106	132	56	D–3119	165	106	B–3112	386
7	A–3107	627	57	D–3120	66	107	B–3113	317
8	A–3108	987	58	D–3121	1541	108	B–3114	525
9	A–3109	1495	59	D–3122	76	109	B–3115	327
10	A–3110	482	60	D–3123	89	110	B–3116	858
11	A–3111	297	61	D–3124	1505	111	B–3117	89
12	A–3112	422	62	G–3101	162	112	B–3118	294
13	A–3113	165	63	G–3102	76	113	B–3119	185
14	A–3114	122	64	G–3103	360	114	B–3120	53
15	A–3115	195	65	G–3104	155	115	B–3121	122
16	A–3116	231	66	G–3105	188	116	B–3122	89
17	A–3117	188	67	G–3106	89	117	B–3123	33
18	A–3118	419	68	G–3107	287	118	B–3124	56
19	A–3119	1419	69	G–3108	462	119	B–3125	264
20	A–3120	1551	70	G–3109	63	120	B–3126	231
21	A–3121	1505	71	G–3110	320	121	B–3127	66
22	A–3122	650	72	G–3111	188	122	B–3128	96
23	A–3123	488	73	G–3112	182	123	B–3129	129
24	A–3124	637	74	G–3113	63	124	B–3130	129
25	A–3125	627	75	G–3114	231	125	B–3131	152
26	A–3126	4077	76	G–3115	122	126	B–3132	132
27	A–3127	307	77	G–3116	89	127	B–3133	878
28	A–3128	637	78	G–3117	66	128	B–3134	83
29	A–3129	119	79	G–3118	92	129	B–3135	195
30	A–3130	1882	80	G–3119	627	130	B–3136	162
31	A–3131	4122	81	G–3120	165	131	B–3137	119
32	A–3132	957	82	G–3121	581	132	B–3138	1736
33	A–3133	363	83	G–3122	218	133	B–3139	1658
34	A–3134	1949	84	G–3123	152	134	B–3140	1135
35	A–3135	2094	85	G–3124	132	135	M–3101	129
36	A–3136	3774	86	G–3125	188	136	M–3103	264
37	A–3137	96	87	G–3126	132	137	M–3105	109
38	D–3101	360	88	G–3127	155	138	M–3107	383
39	D–3102	561	89	G–3128	86	139	M–3110	132
40	D–3103	340	90	G–3129	149	140	M–3111	142
41	D–3104	439	91	G–3130	152	141	M–3112	228
42	D–3105	1208	92	G–3131	683	142	M–3113	670
43	D–3106	1373	93	G–3132	2106	143	M–3114	426
44	D–3107	2094	94	G–3134	175	144	M–3115	251
45	D–3108	1297	95	B–3101	627	145	M–3116	261
46	D–3109	185	96	B–3102	419	146	M–3117	294
47	D–3110	647	97	B–3103	1746	147	M–3119	162
48	D–3111	789	98	B–3104	1551	148	M–3120	208
49	D–3112	188	99	B–3105	703	149	M–3121	234
50	D–3113	185	100	B–3106	327	150	M–3122	462

Manikbel Area (2)

Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)
151	F–3317	65	201	G–3330	273	251	M–3340	179
152	F–3318	63	202	G–3332	35	252	M–3341	130
153	F–3320	32	203	G–3333	29	253	M–3342	933
154	F–3322	43	204	G–3334	58	254	M–3343	182
155	F–3323	54	205	G–3335	44	255	M–3344	435
156	F–3329	75	206	G–3336	129	256	M–3345	240
157	F–3330	66	207	G–3337	140	257	M–3346	210
158	F–3331	49	208	G–3338	75	258	M–3347	72
159	F–3332	31	209	G–3339	30	259	M–3348	77
160	F–3333	94	210	G–3340	243	260	M–3349	64
161	F–3334	21	211	G–3341	65	261	M–3350	52
162	F–3335	27	212	G–3342	108	262	M–3351	60
163	F–3336	70	213	G–3343	94	263	M–3352	67
164	F–3337	27	214	G–3344	72	264	M–3353	88
165	F–3338	97	215	G–3345	82	265	M–3354	88
166	F–3339	159	216	G–3346	50	266	M–3356	360
167	F–3340	32	217	G–3347	163	267	J–3301	48
168	F–3342	29	218	M–3301	76	268	J–3302	121
169	F–3346	84	219	M–3302	51	269	J–3303	51
170	F–3348	18	220	M–3303	111	270	J–3304	82
171	F–3349	27	221	M–3304	22	271	J–3305	54
172	F–3350	26	222	M–3305	62	272	J–3306	59
173	F–3352	396	223	M–3306	986	273	J–3307	33
174	F–3353	330	224	M–3308	97	274	J–3309	58
175	F–3355	109	225	M–3309	49	275	J–3310	55
176	F–3356	107	226	M–3310	45	276	J–3312	212
177	F–3357	87	227	M–3311	28	277	J–3313	328
178	F–3358	44	228	M–3312	71	278	J–3314	479
179	F–3359	48	229	M–3313	81	279	J–3315	127
180	F–3360	211	230	M–3314	70	280	J–3316	38
181	G–3301	57	231	M–3315	110	281	J–3317	34
182	G–3302	66	232	M–3317	35	282	J–3318	35
183	G–3304	121	233	M–3319	66	283	J–3319	413
184	G–3305	256	234	M–3320	73	284	J–3320	61
185	G–3306	33	235	M–3321	7096	285	J–3321	65
186	G–3307	108	236	M–3322	3615	286	J–3322	78
187	G–3308	31	237	M–3323	79	287	J–3323	80
188	G–3309	46	238	M–3324	83	288	J–3325	25
189	G–3310	43	239	M–3325	124	289	J–3326	17
190	G–3311	30	240	M–3326	50	290	J–3327	29
191	G–3312	111	241	M–3327	32	291	J–3329	91
192	G–3313	65	242	M–3329	635	292	J–3330	72
193	G–3314	39	243	M–3330	391	293	J–3331	28
194	G–3317	121	244	M–3331	131	294	J–3332	96
195	G–3319	46	245	M–3332	100	295	J–3333	115
196	G–3320	105	246	M–3333	244	296	J–3334	116
197	G–3321	299	247	M–3334	84	297	J–3335	66
198	G–3324	55	248	M–3336	93	298	J–3336	69
199	G–3325	190	249	M–3337	125	299	J–3337	60
200	G–3329	68	250	M–3338	307	300	J–3338	83

Manikbel Area (3)

Ser No.	Sample No.	Cu (PPM)
301	J–3339	110
302	J–3340	95
303	J–3341	81
304	J–3342	111
305	J–3343	130
306	J–3344	185
307	J–3345	510
308	J–3346	73
309	J–3347	85
310	J–3348	48
311	J–3350	149
312	J–3351	154
313	J–3352	62
314	J–3353	137
315	J–3355	55
316	J–3356	348
317	J–3358	86
318	J–3359	107
319	J–3360	63
320	J–3362	61

Layacan Area (1)

Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)	Ser No.	Sample No.	Cu (PPM)
1	A–3301	52	51	B–3313	53	101	D–3308	98
2	A–3302	411	52	B–3314	86	102	D–3309	150
3	A–3303	101	53	B–3315	53	103	D–3310	32
4	A–3304	102	54	B–3316	114	104	D–3311	20
5	A–3305	93	55	B–3318	224	105	D–3312	40
6	A–3306	63	56	B–3319	106	106	D–3313	25
7	A–3307	35	57	B–3320	65	107	D–3314	91
8	A–3308	54	58	B–3321	158	108	D–3315	32
9	A–3309	57	59	B–3322	276	109	D–3316	80
10	A–3310	17	60	B–3323	168	110	D–3317	475
11	A–3311	262	61	B–3324	145	111	D–3318	25
12	A–3312	31	62	B–3325	143	112	D–3319	2
13	A–3313	109	63	B–3326	244	113	D–3320	3
14	A–3314	76	64	B–3327	19	114	D–3321	52
15	A–3315	117	65	B–3328	449	115	D–3322	3
16	A–3317	62	66	B–3329	312	116	D–3323	47
17	A–3318	13	67	B–3330	212	117	D–3324	2
18	A–3319	11	68	B–3331	193	118	D–3325	396
19	A–3320	66	69	B–3332	33	119	D–3326	114
20	A–3321	266	70	B–3333	30	120	D–3327	193
21	A–3322	251	71	B–3334	255	121	D–3328	1204
22	A–3323	220	72	B–3335	122	122	D–3329	451
23	A–3324	114	73	B–3336	252	123	D–3330	498
24	A–3325	72	74	B–3337	40	124	D–3331	69
25	A–3326	186	75	B–3338	340	125	D–3332	150
26	A–3327	179	76	B–3339	358	126	D–3333	52
27	A–3328	428	77	B–3340	58	127	D–3334	69
28	A–3329	264	78	B–3341	87	128	D–3335	79
29	A–3330	214	79	B–3342	79	129	D–3336	587
30	A–3331	246	80	B–3343	78	130	D–3337	498
31	A–3332	122	81	B–3344	100	131	D–3338	592
32	A–3333	180	82	B–3345	72	132	D–3339	406
33	A–3334	87	83	B–3346	34	133	D–3340	189
34	A–3335	21	84	B–3347	229	134	D–3341	120
35	A–3336	19	85	B–3348	182	135	D–3342	56
36	A–3337	108	86	B–3349	152	136	D–3343	40
37	A–3338	85	87	B–3350	33	137	D–3344	85
38	A–3339	99	88	B–3351	70	138	D–3345	100
39	A–3340	159	89	B–3352	105	139	D–3346	62
40	B–3301	68	90	B–3353	74	140	D–3347	47
41	B–3302	60	91	B–3354	78	141	F–3301	47
42	B–3303	61	92	B–3355	148	142	F–3304	68
43	B–3304	64	93	B–3356	62	143	F–3305	77
44	B–3305	23	94	D–3301	61	144	F–3306	42
45	B–3306	74	95	D–3302	78	145	F–3307	47
46	B–3307	97	96	D–3303	81	146	F–3308	33
47	B–3309	136	97	D–3304	47	147	F–3309	34
48	B–3310	231	98	D–3305	56	148	F–3310	38
49	B–3311	150	99	D–3306	77	149	F–3312	34
50	B–3312	198	100	D–3307	45	150	F–3314	22

Layacan Area (2)

Ser No.	Sample No.	Cu (PPM)
151	M–3123	614
152	M–3124	528
153	M–3125	330
154	M–3126	218
155	M–3127	287
156	M–3128	353
157	M–3129	264
158	M–3130	647
159	M–3131	264
160	M–3132	198
161	M–3133	221
162	M–3134	307
163	M–3135	482
164	M–3136	604
165	M–3137	1046
166	M–3138	825
167	M–3140	96
168	M–3141	1538
169	M–3142	947
170	M–3145	208
171	M–3146	195
172	M–3147	185
173	M–3148	99
174	M–3149	63
175	M–3150	63
176	M–3151	99
177	F–3101	300
178	F–3102	198
179	F–3103	198
180	F–3104	165
181	F–3105	221
182	F–3106	627
183	F–3107	759
184	F–3108	297
185	F–3109	188
186	F–3110	261
187	F–3111	162
188	F–3112	396
189	F–3113	327
190	F–3114	241
191	F–3115	66