PART III DIAMOND CORE BORING

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Part III Diamond Core Boring

Chapter 1 Outline of Operation

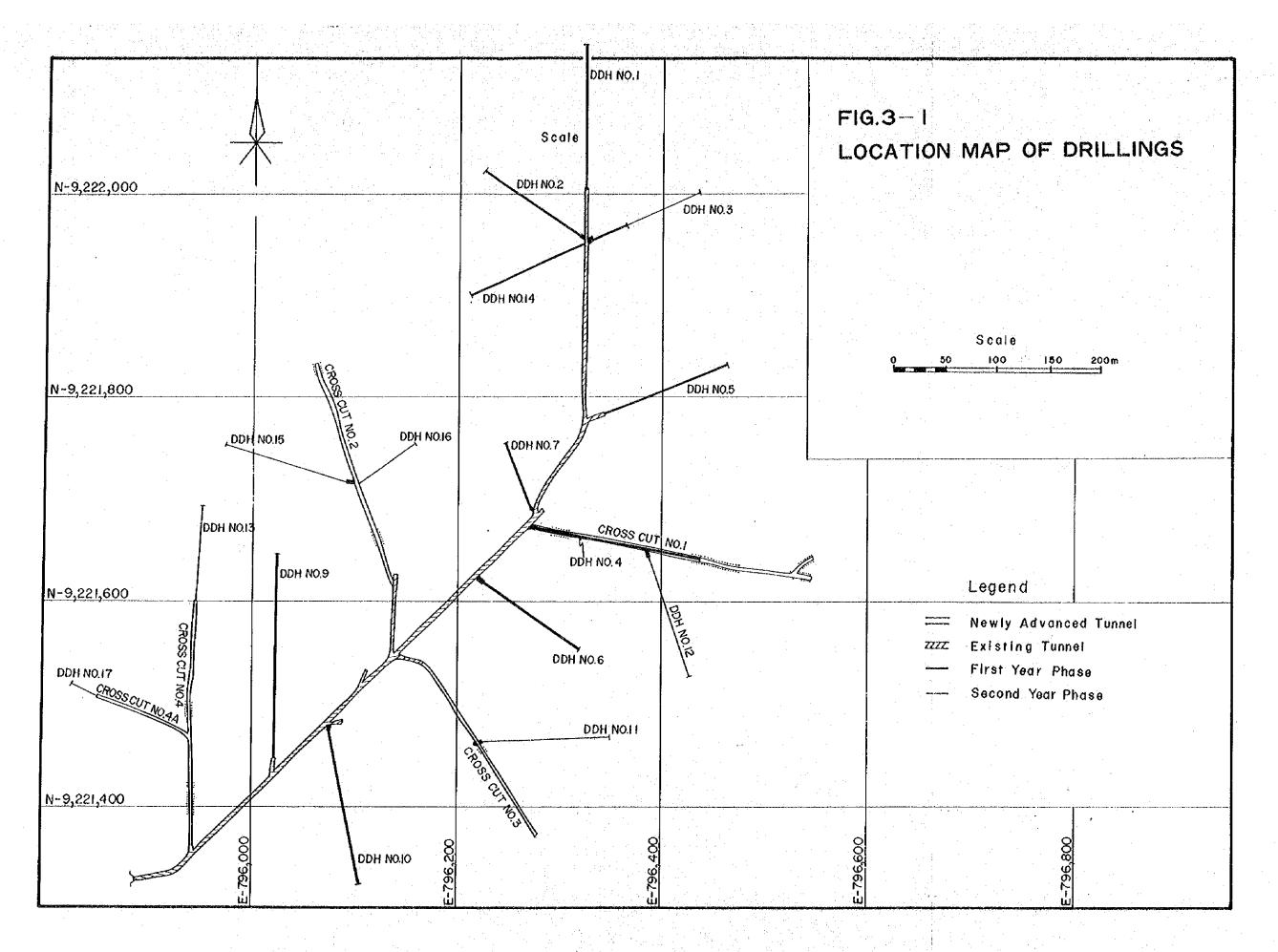
This operation was aimed to investigate the geological features of the Michiguillay Ore Deposit.

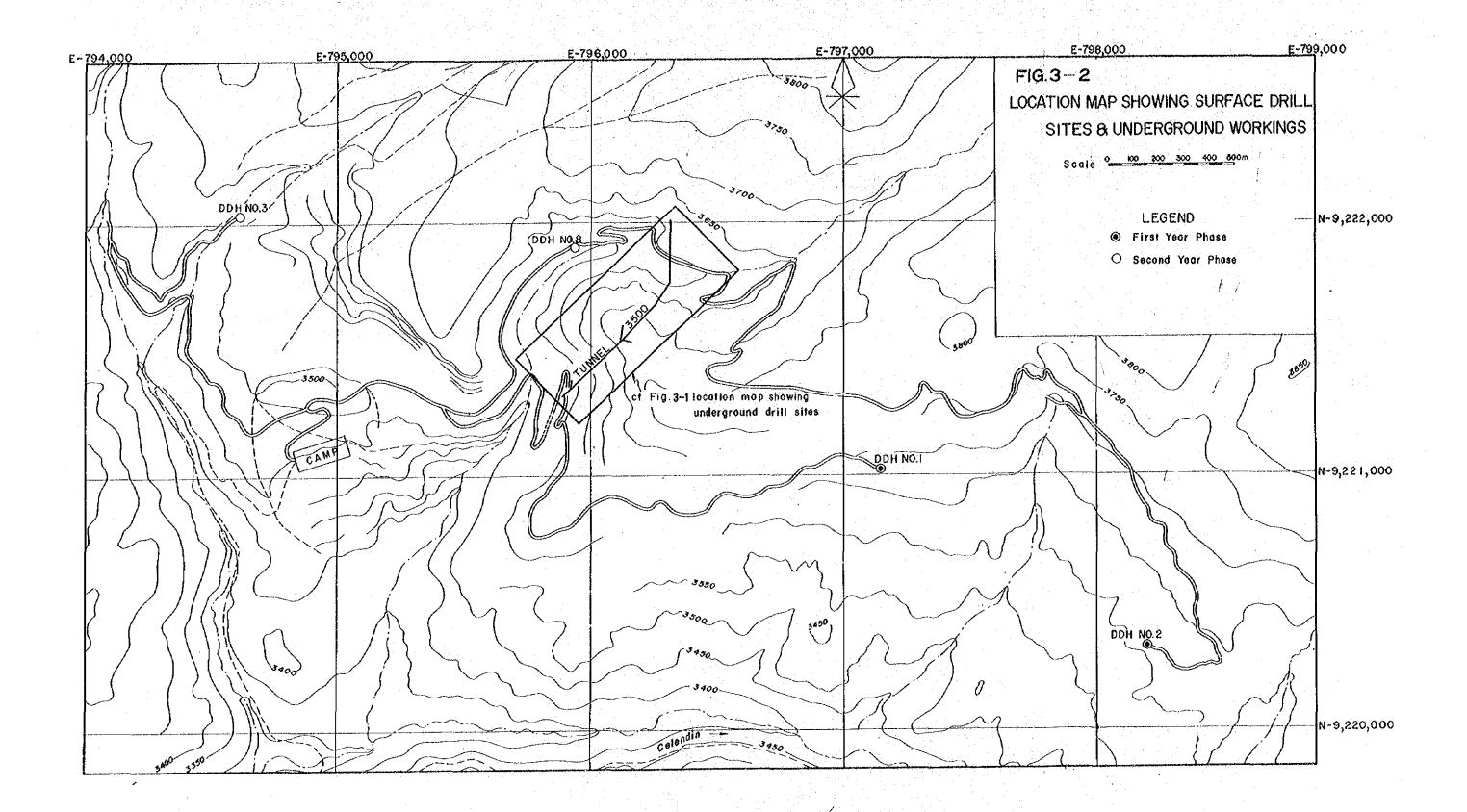
The works accomplished during the period of 285 days amounted to 16 holes of underground borings with the total drilled length of 1,893.72 meters and 4 surface borings with the total drilled length of 706.28 meters, the over-all advance being 2,600 meters. All the underground borings were drilled horizontally, and vertically in all the surface borings.

The works were done by the Peruvian supervisors and local laborers on two-shift basis under the guidance of these engineers from Minero Peru and from Japan. The technical training was also given to them.

The drilling equipments used were BBU-2 and JV-8 for the underground works and S-37A and S-17 for the surface. The drilling methods applied were the wire-line method as well as conventional ones.

The rate of works was aimed at 20 to 25 meters per day, but the abundance of gushing water and the frequent encounter of shattered zones in general allowed the average meterage per day only 8.10 meters at maximum and 2.00 meters at minimum, being caused by the quicker abrasion of drill rods, core barrels, and drill bits.





Chapter 2 Technical Procedures and Equipments Used

As the technical procedures to be applied, the wire-line method was taken to be practiced, under the anticipation that the formation to be drilled was mostly monzonite porphyry as well as with the consideration of occasional encounters of argillized zones, shattered zones, and gushing water.

The types and specifications of the equipments used are shown on Table 2-1.

Table 3-1 Drilling Machines Used and Materials Consumed

A. Surface Drilling Machines; S-37A, S-17

Item	Model	Quantity	Capacity, Type, and Specification
Drilling Machine	S-37A	l set	Capacity NX 400 m Inner Diameter of Spindle 86 m/m Weight (excl. engine) 1,200 kg
Drilling Machine	S-17	l sot	Capacity NX 150 m Inner Diameter of Spindle 48 m/m Weight (excl. engine) 800 kg
Drill Engine	2713 E	l set	Diesel Engine 1,250 rpm/55 HP ~ 2,500 rpm/96 HP
Drill Engine	1564 E	l set	Diesel Engine 1,300 rpm/25 HP ~ 2,600 rpm/50 HP
Pump	BBP 25	l set	Capacity 40 1/min ~ 120 1/min
Engine for Pump	ES-785	1 set	Diesel Engine 2,600 rpm/20 HP
Generator	GM-205B4M	l set	2.5 KVA 230 V 11 A
Generator Engine		1 set	Gasoline Engine
Derrick		1 set	Steel-pipe Made, Tripod Type, Height 9 m
Mud Mixer		l set	Jet Type
Rod Holder		1 set	
Drill Rods		65 pcs 80 pcs	NX 3.05 m BX 3.05 m
Casing Pipes		15 pes 40 pes	114 m/m 3.05 m NX 3.05 m BX 3.05 m

B. Underground Drilling Machines; BBU-2, JV-8

Item	Model	Quantity	Capacity, Type, and Specification
Drilling Machine	вву-2	2 sets	Capacity NX 240 m BX 300 m Inner Diameter of Spindle 46 m/m Weight 467 kg
Drilling Machine	JV-8	l set	Capacity NX 100 m BX 120 m Inner Diameter of Spindle 46 m/m Weight 247 kg
Motor		2 sets	Built-in Air Motor 1,000 rpm/20 HP
Motor		1 set	Built-in Air Motor 1,000 rpm/10 HP
Hoist		3 sets	Built-in Hoist and Rod Puller
Drill Rods		60 pcs 80 pcs 100 pcs	NX 3.05 m BX 3.05 m 42 m/m 3.05 m
Casing Pipes		40 pcs 100 pcs	NX 3.05 m BX 3.05 m

C. Supplies and Drill Parts Consumed

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Chapter 3 Drilling Operation

3-1 Preparatory Works

The works were promoted to aim at the earlier attainment of the proarranged schedule for the works. At the moment when the access road to the drill site of the surface boring No. 1 was completed by the effort of Minero Peru, the transportation of the equipments and materials were begun by trucks.

At the same time, the equipments and supplies were begun to be transported to the scheduled drill site of underground No. 9, where the space
for the immediate drilling could be secured in the existing tunnels.

Drilling water was supplied from the near-by streams or swamps in the surface boring, and from the near-by side ditches of the tunnel and partly from the water supply for rock drills in the underground boring.

The office and other facilities were availed by using in common what was provided for the tunnelling operation.

Table 3-2 Moving Operation

DDH No.	Unde	rground o. 1	Unde	rground	Unde	rground o. 3	Unde	rground Io. 4	Unde	rground o. 5	Unde	rground o. 6	Space N	rground o. 7	Unde	Underground No. 9
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lation	1.0	5.0	0.0	5.0	7.0	7.5	0.5	2.0	0.5	3.0	0.5	2.0	1.0	7-0	2.0	10.0
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an & Others			0.5	2.0					0.5	2.0	,		·		3.0	15.0
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Total	4.0	24.0	2.5	14.0	4-0	25.5	2.0	8.0	3.0	12.0	2.0	8	3.0	000	0.11	54.0
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Moving Operation

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		Days	Days Manshifts	Days	Manshifts	Days	Manshifts	Days	Manshifts	Days	Manshifts	Days	Manshifts	Dayrs	Marshifts	Days	Manshifts
	Site Clearing			0.5	3.0	_ 										34	
NI.	Transportation	0.5	2.0	0.5	6.0			0.3	2.5			1.0	7.0	0-5	5.0	1.0	4.0
арго	Installation	2.5	8.0	1.0	6.0	1.0	10.0	0.2	2.5	1.0	3.0	0.5	4.0	0.5	4.0	1.0	0.7
18d0	Water Piping						<u>.</u>										
ı,q	Test Rum & Others																
	Total	3.0	10.0	2.0	15.0	3.0	10.0	0.5	5.0	1.0	3.0	1.5	0.11	1.0	9.0	2.0	11.0
	Dismantling																
[BW	Removal of Piping	1.0	3.0	3.0	27.0	0.5	3.0	1.0	8.0	1.0	4.0	1.0	0.5	0.1	4.0	0.1	10.0
BTbil	Transportation																
114	Others																
	Total	1.0	3.0	3.0	17.0	0.5	3.0	1.0	8.0	ù.ò	4.0	1.0	5.0	1.0	4.0	3.0	10.0
L	Grand Total	0	13.0	5.0	32.0	1.5	13.0	1.5	13.0	2.0	7.0	2.5	16.0	2.0	13.0	3.0	21.0

Moving Operation

\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	D D H No.	Surf	Surface No. 1	Surt	Surface No. 2	Surf	Surface No. 3	Sart	Surface No. 8
		Deys	Manshifts	Days	Manshifts	Days	Manshifts	Days	Manshifts
	Site Clearing							2.0	0.11
uc	Transportation	2.0	8.0	5-0	0.4	2.0	0.71		
178	Installation	1.5	7.0	0.5	4.5	2.0	17.0	3.5	15.0
1800	Water Piping	5-0	2.0			,		0.5	0.7
14	Test Run & Others					<u> </u>		 	
;	Total	4.0	17.0	1.0	8.5	¢-0	34.0	0-9	33.0
	Dismentling	r							
Íav	Removal of Piping	7.0	3.0	1.0	6.9	0.5	5.0	2.0	0-11
anpi	Transportation	:=:==							
1TA	Others								
	Total	1.0	3.0	1.0	6.5	0.5	5.0	2.0	11.0
	Grand Total	5.0	20.0	2.0	15.0	4.5	39.0	8	4.0

3-2 Moving Operation

The moving operation required for each drill hole are shown on the attached Table 3-2.

3-3 Withdrawal Operation

Pulling-out of the casing pipes and removal of the drilling equipments were done right after the completion of No. 17 in the underground boring and immediately after the completion of No. 8 in the surface boring.

3-4 Progress Records (cf. Table 3-23)

The progress records of 17 underground drill holes and 4 in the surface borings are stated as follows; in which all the underground holes were drilled horizontally, and the surface holes vertically.

3-4-1 Underground Drill Hole No. 1 (cf. Table 3-3, 3-24)

Total Length Drilled

144.38 meters

Core Recovery

77.4%

Direction of Hole

N 00 27' 51" E

It was started by using NXC bits and the hole reached as far as 122 m. With the insertion of BX casings, the hole was extended till 144.38 m by using BXC bits. But the hole had to be abandoned at this advance, as it was found that the hole was severely caved and could not be advanced any farther.

Not only clay but also water caused frequent chokings of the hole, which naturally caused to lower the core recovery, and some devise, such as to decrease the water feed, was tried but nothing proved to be the proper remedy.

3-4-2 Underground Drill Hole No. 2 (cf. Table 3-4, 3-25)

Total Length Drilled

116.19 meters

Core Recovery

59.8%

Direction of Hole

N 540 40' 11" W

Being started by using NXC bits, the initial advance of 83.67 m was made, for which BX casings were inserted, and the hole was extended till 116.19 m by using BXC bits. But the hole had to be avandoned at this advance only, as it was made impossible for the hole to be drilled any farther, due to the increase of gushing water from 40 1/min to 80 1/min causing severe cavings of the hole. The core recovery was also extremely lowered by a shattered zone accompanying clay.

3-4-3 Underground Drill Hole No. 3 (cf. Table 3-5, 3-26)

Total Length Drilled

114.21 meters

Core Recovery

76.9%

Direction of Hole

N 65° 43' 29" E

The initial advance of 67.30 m was made by using NXC bits. After inserting BX casings to this depth, the hole was extended to 96.71 m by using BX bits. But the drilling was made impossible to proceed any farther due to a shattered zone with clay at about 71 m, which caused the cavings of the hole. Consequently, the hole was reamed by using BX casing shoe to 75.99 m, and after inserting BX casings, the hole was re-drilled to 114.21 m. But the hole was severely caved due to a shattered zone with clay encountered near 102 m. While the hole was cleaned up, it was found that the rods were jammed up at about 104 m, and the assembly was broken at the joint of BX rods and core barrel. Tapping was tried to recover them but ended in vain.

3-4-4 Underground Drill Hole No. 4 (cf. Table 3-6, 3-27)

Total Length Drilled

163.45 meters

Core Recovery

91.3%

Direction of Hole

S 78° E

The drilling was started by using NXC bits and reached as far as 98.50 m. Then, the hole was drilled by using BXC bits after inserting BX casings, and the advance was made as far as 163.45 m, when the BX casings were cut off near 25 m. Recovery of the broken casings was tried by reaming the hole with NCD bits (outer diameter, 92 m/m) for 25 m, but it ended unsuccessful, as the broken edge of the casing was not properly fished, being hampered by the severe cavings of the hole in a shattered zone with clay between 20 m to 40 m. Consequently the hole was abandoned.

3-4-5 Underground Drill Hole No. 5 (cf. Table 3-7, 3-28)

Total Length Drilled

120.90 meters

Core Recovery

95%

Direction of Hole

N 67° 35' 38" E

The drilling was initiated by using NXC bits for the advance of the first 90 m. Then, the advance was made as far as 129.90 m with BXC bits after inserting BX casings. But the drilling became impossible to make any more advance caused by the severe cavings around 125 m, which necessitated the extended insertion of BX casings as a remedy. In view of this, all the casings were pulled out and the hole was reamed with NXC bit. When the reaming reached to 109 m, the rods were cut off at about 30 m. In order to recover the remained rods, the reaming was replaced by NCD bit, but the broken edge was not fished successfully and thus the hole had to be abandoned.

3-4-6 Underground Drill Hole No. 6 (cf. Table 3-8, 3-29)

Total Longth Drilled

115.75 meters

Core Recovery

88%

Direction of Hole

S 550 181 52" E

It was advanced as far as 115.75 m by using NXC bits, when the hole was caved severely and the advance was made impossible. While the hole was cleaned by NXC bit, the rods were jammed up near 113 m which caused the break-off the core barrel and core tube at their joint. The salvage was tried by taps but ended in vain as the caving was too severe. As an alternative, it was drilled inclined from about 112 m, but the joint of bit and core tube was broken near 114 m which was unable to be recovered, and thus the drilling had to be given up.

3-4-7 Underground Drill Hole No. 7 (cf. Table 3-9, 3-30)

Total Length Drilled

72.15 meters

Core Recovery

60.1%

Direction of Hole

N 220 221 34" W

The initial 30.63 m was drilled by using NXC bits, but as the advance was made impossible due to the severe cavings caused by a shattered zone with clay, the hole was cleaned up by NCD bit, but the bit was broken at 29.63 m. After salvaging the bit, the NCD casings were inserted as deep as 30.63 m, then the advance was made till 72.15 m. However, as it was found that a severe caving happened again near 38 m, the BX casings were inserted for 46.82 m and the advance was made to 72.15 m by BXC bits.

Being caused by the repeated severe cavings occurred near 64 m, the hole was again tightly choked up and the advance was made impossible. In order to extend BX casings, all the pipes were pulled out and the hole was tried

to be reamed again, but the cavings occurred repeatedly near 58 m, and the hole had to be given up as the advance was made impossible.

3-4-8 Underground Drill Hole No. 9 (cf. Table 3-10, 3-31)

Total Length Drilled

200.00 meters

Core Recovery

94.6%

Direction of Hole

N 00 301 41" E

Being started by using NXC bits, the initial advance was made to 82 m. Then, the bit was replaced by BXC and the hole was extended till 90 m. Because of the severe cavings, the farther advance was made by using NXC bits again and reached to 102 m. Inserting BX casings thereon, the drilling was completed to the scheduled depth of 200 meters by using BXC bits.

3-4-9 Underground Drill Hole No. 10 (cf. Table 3-11, 3-32)

Total Length Drilled

154.96 meters

Core Recovery

66.6%

Direction of Hole

S 10° 541 40" E

Drilling was commenced by using NXC bits, and the hole was advanced to 108.5 m, for which BX casings were inserted, and another advance was made to 154.96 m by using BXC bits. But the farther drilling had to be given up, as the amount of outcoming water was increased to about 100 l/min and the cavings became severe too, which made the insertion of the rods impossible.

3-4-10 Underground Drill Hole No. 11 (cf. Table 3-12, 3-33)

Total Length Drilled

126.52 meters

Core Recovery

88.2%

Direction of Hole

N 87° 51' 17" E

It was drilled to 92.26 m with NXC bits. Then, the BX casings were inserted and was drilled to 98.21 m by using BXC bits, but the drilling was made impossible due to the cavings near 95 m. At this moment, the casings were all pulled out so that the hole was reamed to 98.21 m by NXC bits. After inserting BX casings, the hole was advanced to 126.52 m with NXC bits. But the drilling had to be quitted at this advance, as the hole encountered a gougy zone near 119 m from which water was coming out at the rate of 20 1/min accompanying the cavings of the hole. While the reaming and cleaning of the hole were done alternatively whenever the rods were lowered, the hole was tightly choked up at last and was forced to be bandoned.

3-4-11 Underground Drill Hole No. 12 (cf. 3-13, 3-34)

Total Length Drilled

121.74 motors

Core Recovery

86.8%

Direction of Hole

S 19° 10' 17" E

It was drilled to 91.90 m with NXC bits. After inserting BX casings it was drilled with BXC bits to 121.74 m. But as it encountered a shattered zone about 108 m, which caused the severe cavings of the hole. While the hole was being cleaned, the joint between the rods and core barrel was broken and the assemblies of core tube and drill bit were left inside. Although they were tried to be recovered by tapping, the hole had to be abandoned without salvaging them because of the repeated cavings of the hole.

3-4-12 Underground Drill Hole No. 13 (cf. Table 3-14, 3-35)

Total Length Drilled

95.95 meters

Core Recovery

73.5%

Direction of Hole

N 50 151 02" E

It was drilled to 74.31 m with NXC bits, but in view of the severe cavings of the hole caused by a shattered zone encountered, BX casings were inserted and was advanced to 95.95 m with BXC bits. However, as the caving near 88 m made the rods unable to be taken down to the bottom, the casings were tried to be pulled out so that the BX casings were inserted deeper. But as it was found that the casings were in a condition of jamming due to the shattered zone, they were tried to be pulled out enforcively by means of a drive hammer. The hole was tried to be reamed by NXC bits, but the reaming was made difficult due to the severe cavings of the hole which occurred after the pulling out of the BX casings.

3-4-13 Underground Drill Hole No. 14 (cf. Table 3-15, 3-36)

Total Length Drilled

123.20 meters

Core Recovery

78.3%

Direction of Hole

S 650 361 56" W

The initial advance of 50.08 m was made by using NXC bits, for which BX casings were inserted, and then the hole was drilled to 123.30 m with BXC bits. But the farther advance was made impossible by the cavings of the hole which was caused by encountering water coming out at the rate of 200 1/min.

3-4-14 Underground Drill Hole No. 15 (cf. Table 3-16, 3-37)

Total Length Drilled

121.95 meters

Core Recovery

78.9%

Direction of Hole

N 72° 47' 56" W

The initial advance of 70.10 m was drilled by using NXC bits.

After inserting BX casings, it was advanced to 121.95 m with BXC bits, but the hole was tightly choked up by the severe cavings of the hole, which caused the work quitted at this advance only.

3-4-15 Underground Drill Hole No. 16 (cf. Table 3-17, 3-38)

Total Length Drilled

67.67 motors

Core Recovery

84.9%

Direction of Hole

N 55° 21' 00" E

Being started by using NXC bits, it was advanced till 23.90 m, but the farther advance by NXC bits was made impossible due to the sovere cavings of the hole as well as gushing water at the rate of 20 1/min from the point about 21 m. Then the farther advance was made by drilling with BXC bits to 67.67 m after inserting BX casings. In view of the severe cavings near 60.50 m, the casings were tried to be pulled out in order to extend the depth of their insertion, but it was found the casings were tightly jammed up and the farther drilling was found impossible.

3-4-16 Underground Drill Hole No. 17 (cf. Table 3-18, 3-39)

Total Length Drilled

25.70 meters

Core Recovery

68.3%

Direction of Hole

N 70° 22' 56" W

The drilling was completed by using NXC bits till the said advance.

Surface Drill Hole No. 1 (cf. Table 3-19, 3-40)

Total Length Drilled

200.00 meters

Core Recovery

3-4-17

90.5%

The drilling was started by using tricone bit of 3-7/8". After drilling for 3 meters with it, 114 m/m casings were inserted and the farther advance was made to 20.90 m with NCD bits, for which NX casings were inserted. Thence, the hole was advanced to 132.65 m by using NXC bits, but on account of the water escape and cavings of the hole caused by fractured shale, the BX casings were given to this portion and it was drilled as deep as 200 meters by using BXC bits.

3-4-18 Surface Drill Hole No. 2 (cf. Table 3-20, 3-41)

Total Length Drilled

150.55 meters

Core Recovery

81.8%

Drilling was started by using 3-7/8" tricone bits and the initial advance was made to 12.20 m, for which 114 m/m casings were inserted.

Next advance was made by using NCD bits, and NX casings were inserted to 21.30 m. When the hole was drilled as deep as 35.80 m with NXC bits, it encountered a shattered zone, which caused so severe cavings that the assemblies were tightly jammed up. Although nothing was able to be pulled out, the rods only were recovered by blasting dynamite inside the rods. However, as the bit and core tube were still remaining in the hole, it was decided to drill a new hole.

In the renewed drilling, the first advance to 12.20 m was done by using 4-3/4" tricone bit with 114 m/m casings, and the next step was made to 17.95 m by using 3-7/8" tricone bit with NX casings. Drilling was continued to 21.30 m by NXC bits, but on account of severe cavings, NX casings were inserted to this depth after reeming the hole with NX casing shoe. To the depth of 57 m, drilling was done by NXC bits, but a shattered zone encountered caused severe cavings of the hole, for which cementation was given, and extended till the depth of 74 m by BXC bit to insert BX casings as deep as 67.50 m. As the farther insertion of the casings were found difficult, all the casings were once pulled out to be replaced as follows; 114 m/m casings to the depth of 20 m, NX casings to 55.95 m, and BX casings to 72.40 m. Then the drilling was proceeded as deep as 150.55 m. But the farther advance was made impossible due to the severe cavings happened near 120 m. While the hole was cleaned up,

the rods were cut off from the core barrel head, which made impossible for them to be recovered. Thus the hole had to be abandoned.

3-4-19 Surface Drill Hole No. 3 (cf. Table 3-21, 3-42)

Total Length Drilled

201.50 meters

Core Recovery

93.3%

The initial advance was made by using 4-3/4" tricone bits to 5.20 m with 114 m/m casings. The next advance to 97.90 m was made by using NXC bits, but as the caving was found in the shallow zone about 7 m deep, NX casings were inserted as deep as 14.50 m after reaming the hole with NX casing shee. Then, the drilling was continued to the depth of 193.10 m with NXC bits, but as the caving was found near 190 m, BX casings were inserted. The hole was advanced farther to 196 m but the advance was made impossible due to the cavings caused by gougy shattered zone. In view of this, the BX casings were pulled out in order to ream the hole with NXC bits to the depth of 195.40 m, and the drilling was proceeded with BXC bits after inserting BX casings to the depth of 201.50 m and the work was completed.

Although it encountered water coming out at the rate of 60 ~ 100 1/min near 102 m, the work, generally speaking, was carried out rather smoothly being favored by less cavings.

3-4-20 Surface Drill Hole No. 8 (cf. 3-22, 3-43)

Total Length Drilled

154.23 meters

Core Recovery

70.4%

It was drilled to 3.05 m with 4-3/4" tricone bits, for which 114 m/m casings were inserted, and the NXC bits to 6.49 m. But the 114 m/m casings were pulled out due to cavings, and the hole was drilled as well as reamed

with tricone bits to 9.14 m, for which 114 m/m casings were inserted again. Next advance was made to 29.41 m with NXC bits, but on account of the severe cavings caused by a shattered zone, NX casings were inserted to this depth after reaming the hole with NX casing shee. From here to 72.69 m, the advance was made with NXC bits by repeating the drilling comentations against the cavings for which BX casings were inserted. Then, the advance with insertion of BX casings was made to 105.77 m by repeating the drilling with BXC bits and reamings with BX casing shee. When the advance was made to 154.23 m, the hole was choked up due to the severe cavings caused by a shattered zone near 135 m, which made the extension of BX casings very difficult and the drilling advance was practically made impossible. Thus, the work was quitted at this advance.

Table 3-3 Underground NO.1

SGO		1	TAL Ays		T WORKING (DAYS)	LA	Yoffs			TOTAL MANSHIPTS			
PERIODS	PREPARATION		2		2				14				
1	DRILLING		39		32		7			256			
DRILLING	REMOVING		3		2		1	:		10			
置	TOTAL		44		36		8			280			
LENGTH	PLANNED LENGTH	200m			CORE RE	COVERY	VERY FOR EACH 100 ^m SECTION						
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGTH	-55.62m	CORE LENGTH	111.73m	DEPTH OF	SECT - ION			I OP	SECT- ION	TOTAL		
	LENGTH DRILLED	14438 ^m	CORE RECO- VERY	77.4%	0 - 100 ^m	80.1 [%]	80.1 ⁹						
	DRILLING	222°25'	30.1%	28.8%	<u></u>			-					
	HOISTING & LOWERING RODS	8635	11.7%	11.2%	300 - 300 ^m								
જિ	HOISTING & LOWERING I.T.	13700'	18.6%	17.8%		EFFICIENCY OF DRILLING							
(HRS)	MISCELLANEOUS	174°10′	23.6%	22.6%	144.38 ^m /work period 3.23			28 m/	0AY				
TIME	REPAIRING	21 20 1	2.9%	2.8%	144,38	m/WORKI	NG DAY	(S	4.	4.01 ^M /DAY			
	others	97°00′	13.1%	12.5%	144,38				3.	70 ^m /	DAY		
WORKING	TOTAL	738°30 ′	100 %	95.7%	144,38	n/NET DRILL	ING DA	YS	4.	51 ^m /	DAY		
	PREPARATIO MOVING	N 24°00'		3.1%			·	·					
	图 FI MOVING	9°00′		1.2%	TOTAL M	ANSHIFT	rs/144.	3 gm	1.94	MANSHI	FTS/ra		
	GRAND TOTAL	771°30'		100 %	DRILLING	G MANSI	HFTS/	/14438 ^a	1.77	MANSHI	FTS/m		
TED	METERAGE	INSERTED LENGTH DRILLED LENGTH	CASI	VERY OF NG IPES	TIMES OF LOWERING		NG &	TIMES LOVER		HOISTI	NG &		
NG F	BX 122.00 ^m	84.5%	10	00%		92				98	~ • • • · · · · · · · · · · · · · · · ·		
CASING PIPE INSERTED					REMARKS								
							·	-					

Table 3-4 Underground NO.2

SOC		· ·)TAL)AYS		T WORKING (DAYS)	LA	Yopps			Potal Vshipt	S		
PERIODS	PREPARATION		2		2				10				
1	DRILLING		19		17		2		111				
DRILLING	REMOVING		1		1					<u> </u>			
g	TOTAL.		22		20		2		125				
DRILLED LENGTH	PLANNED LENGTH	200m			CORE RE	COVERY	FOR EA	CH 100					
	INCREASE OR DECREASE IN DRILLED LENGT	-8381m	CORE LENGTH	69.5 ^m	DEPTH OF HOLE	ION	TOTAL	DEPTH HOLE	OF	SECT- ION	TOTAL		
DRII	LENGTH DRILLED	1 16.19 ^R	CORE RECO- VERY	59.8%	0 - 100 ^m		63.4 [%]						
	DRILLING	93°10	23.6%	22.9%	200 -		 	·	···				
	HOISTING & LOWERING RODS	152 40	38.8%	37.6%	300 ^m		<u> </u>				<u> </u>		
(ERRS)	HOISTING & LOWERING I.T.				,	efficie	NCY OF	DRILL	ING	ING.			
F I	MISCELLANEOUS	94°10′	23.9%	23.2%	116.19	"/WORK	PERIOD		5.28 m/DAY				
TIME	REPAIRING	12°30	.3.2	3.1%	116.19	"/WORKII	NG DAY	S	5.	81 ^m /	DAY		
	OTHERS	41°30	10.5%	10.2%					6.	12 ^m /	DAY		
WORKING	TOTAL	39400	100 %	97.0%	116.19	DRILL	ING DA	YS	6.	83 ^m /	DAY		
	PREPARATI	ON 8°00		2.0%					<u>.</u>		······		
	를 F MOVING	1°00		1.0%	TOTAL MA	NSH I FT	S/1 [6.1	9m	1.0	BMANSHI	FTS/m		
	GRAND TOTAL	406°00		100 %	DRILLING	MANSII	ifts/i	1619 ^m	0.9	GMANSHI	FTS/m		
11 GE	PIPE SIZE & METERAGE INSERTED	INSERTED LENGTH DRILLED LENGTH	CAST	VERY OF NG IPES	TIMES OF LOWERING			Times Loyeri			NG &		
NG P	BX 83.67 ^m	72.0%	1	00%		181					<u> </u>		
CASING PIPE INSERTED					REMARKS						<u> </u>		
$ $													

Ta	ble 3-5 Undergi	ouna N	0.3			<u></u>					
DS		tal. Áys		T WORKING (DAYS)	LAX	offs		TOTAL MANSHIPTS			
PERIODS	PREPARATION		2	2 2						1.5	
	DRILLING		53	3 3			46			1.5	
DRILLING	REMOVING		2		2	2			11	<u> </u>	
H.	TOTAL		57		37	46		247	7		
стн	PLANNED LENGTH	200m			CORE RECO	OVERY I	or ea		rion		
LED LENGTH	INCREASE OR DECREASE IN DRILLED LENGTH	-85.79m	CORE LENGTH	87.87 ^m	DEPTH OF S	SECT - ION	тотлі	DEPTH HOLE	OF SEC	111111111	
DRILLED	LENOTH DRILLED	114.21m	CORE RECO- VERY	76.9%	0 - 100 ^{fti} 100 - 200 ^{fti}	77.6% 72.3%					
	DRILLING	72°10	11.2%	10.5%							
	HOISTING & LOWERING RODS	172°25'	26.7%	25.1%			-			.]	
(S3	HOISTING & LOWERING I.T.				EF	FICIEN	IENCY OF DRIFFING				
(ERS)	MISCELLANEOUS	257°55′	40.0%	37.6%	114.21 ^m /	/WORK PERIOD 2.00 m/D/				m/DAY	
TIME	REPAIRING	70°00'	10.9%	10.2%	114.21 ^m /	/WORKING DAYS 3.09 in/				m/day	
	OTHERS	7200	11.2%	10.5%		DRILLI	NG PE	RIOD	2.15	m/DAY	
PORKING	TOTAL	644030	100 %	93.9%	m	, NET DRILLI	NG DA	YS	3.46	m/DAY	
	PREPARATION	35°30 '		5.2%							
	PREPARATION MOVING	6,00	,	0.9%	TOTAL MAN	SULFT	S/1142	1m	2.16 MAN	SHIFTS/	
	GRAND TOTAL	68600		100 %	DRILLING	Mansii	i fts/	11421 ^m	194MAN	SHFT8/	
INSERTED	METERAGE DRINSERTED LEI	SERTED NGTH ILLED NGTH	CASTI P	IPES	}		O = 0 = 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		TIMES OF HOISTING &		
NG 3		23.3%	10	00%]	1.83	· · · · · · · · · · · · · · · · · · ·				
CASING INSE	BX 75.99 ^m	66.5%	10	00%	REMARKS						

Table 3-6 Underground NO.4

Sao			TAL AYS		r working (days)	LA	Yoffs			Total NSHTPP	S	
PERIODS	PREPARATION		1		1					4		
1	DRILLING		40		36		4		244			
DRILLING	REMOVING		1		1					4		
岩	TOTAL		42	38 4					252			
DRILLED LENGTH	PLANNED LENGTH	200m			CORE RE	COVERY	FOR EA	V				
	INCREASE OR DECREASE IN DRILLED LENGT	3 6.5 5 th	core Length	149.20 ⁿ	DEPTH OF HOLE	SECT -	TOTAL	DEPTH HOLE	OF	SECT- ION	TOTAL	
DRII	LENGTH DRILLED	163A5m	CORE RECO- VERY	91.3%	0 - 100 ^m	94.0 [%] 87.1 [%]	94.0					
	DRILLING HOISTING &	158°00′	ļ	24.8% 30.4%	200 - 300 ^m							
(3)	LOWERING RODS HOISTING & LOWERING I.T.	19420	71.7	70.14		EFFICIE	NCA OB	DRILL	JING			
(HRS)	MISCELLANEOUS	115°00'	18.7%	18.0%	163.45 ⁿ	M/WORK	PERIOD	1	3.89 m/DAY			
TIME	REPAIRING	73°45′	12.0%	11.5%	163.45 ¹¹	"/WORKI	NG DAY	S	4:30 ^m /DAY			
	OTHERS	74°45'	12.1%	11.7%	163.45 ⁿ	n/DRILL	ING PE	RIOD	4.	09 ^m /	DÁÝ	
WORKING	TOTAL	616,00,	100 %	96.4%	163.45 ⁿ	NET DRILL	ING DA	Y\$	4.	54 ^m /	DAY	
1 12 1	PREPARATI			2.3%	TOTAL MA	Out 7 Da		e 170	15	1 MANSII	LEVES AN	
		8,00,		1.3%	DRILLING					9MANSH		
	GRAND TOTAL	INSERTED	1-1			MUMACI			1.4	2 MANAGO I	LE 197 M	
TED	PIPE SIZE & METERAGE INSERTED	LENGTH DRILLED LENGTH	CASI	/ERY OF VG IPES	TIMES OF LOWERING		NG &	TIMES LOWERI			NG &	
CASING PIPE INSERTED	BX 95.80 ^m	58.6%	7	1%	*. * * * * * * * * * * * * * * * * * *	164						
ASI				· · · · · · · · · · · · · · · · · · ·	REMARKS		· · · ·			2.5		
١٠											1.4	

Table 3-7 Underground NO.5

ODS			Tai, Ays		T WORKING (DAYS)	La	Vopps			TOTAL MANSHIFTS			
PERIODS	PREPARATION		3		2		1		8				
	DRILLING		57		42		15		255				
DRILLING	REMOVING		1		1					4			
Ä	TOTAL		61		15		16		267				
LENGTH	PLANNED LENGTH	20 0m			CORE RECOVERY FOR EACH 100 SEC					m TION			
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGTH	~70.10 ^m	CORE LENGTH	123.45 ⁿ	DEPTH OF HOLE	SECT ION			OF	SECT~ ION	тотаь		
DRII	LENGTH DRILLED	129.90m	CORE RECO- VERY	95.0%	0 - 100 ¹¹¹ 100 - 200 ^m	96.3% 90.4%			مدوند بد د	· · · · · · · · · · · · · · · · · · ·	t and the second		
	DRILLING	96°25'		15.2%	200 -			<u> </u>					
	HOISTING & LOWERING RODS	156°35'	25.4%	24.7%	300 ^m								
(33)	HOISTING & LOWERING I.T.]	EPPICIENCY OF DRILLING					and the second second		
(HRS	MISCELLANEOUS	15800	25.6%	24.9%	129.90	m/work	PERIO)	2.13 ^m /DAY				
TIME	REPAIRING	91°00′	14.8%	14.4%	129.90 M/WORKING DAYS 2.					.89 ^m /DAY			
ING	OTHERS	114°30	18.6%	18.1%	129,90 1	m/DRIL	LING PA	RIOD	2	28 ^m /	DAY		
WORK ING	TOTAL	616°30'	100 %	97.3%	129.90 [[]	"/drili	JING DA	YS	3.	.09 ^m /	DAY		
	PREPARATION MOVING	11000		1.7%			<i>,</i> -						
	a Moving	6°00'		1.0%	TOTAL M	ansiii f	TS/129.	90 m	200	MANSH	IFTS/m		
	GRAND TOTAL	633°30′		100 %	DRILLING	G MANS	HIFTS	129.90m	190	MANSH	I₽TS∕m		
TEC	METERAGE DRI	erted GTH LLED GTH	CASI	VERY OF NG IPES	Times of Lowering		ING &	TIMES LOWERI			NG &		
NG E		9.3%		67%		151							
CASING PIPE INSERTED					BEWYÉKS	· ·	······································						
				-						······································			

Table 3-8 Underground NO.6

							<u> </u>	:								
SE	:				TAL AYS	N	et Workin (Days)	G	LAY	offs		TOTAL MANSHIFTS				
PERIODS	PRE	PARATION			2		1	1		1		4				
1	DRI	LLING			33		29			4			202			
DRILLING	REMOVING				1		1						4			
E	тот	ΑĽ			36	.	31			5		210				
GTH	PLANNED LENGTH			200m			CORE R	EC	overy i	or ea	CH 100 SEC		N			
DRILLED LENGTH	INCREASE OR DECREASE IN DRILLED LENGTH		-84.25 th	core Length		DEPTH O HOLE	F	SECT - ION	ECT - TOTAL DEPTH		OF	SECT- ION	TOTAL			
DRII	LENGTH DRILLED			115.75 ^m	CORE RECO- VERY	88.09	0 - 100 100 - 200 ^m	m[- 	91.9% 58.3%							
	DRILLING		122°25'	23.1%	22.49		-									
	HOISTING & LOWERING RODS		143°25	27.0%	26.29							<u> </u>	, L			
(HRS)	HOI	HOISTING & LOWERING I.T.						El	PFICIEN	CY OF	DRILL	ING				
1	MIS	CELLANEOU	S	87°30	16.5%	16.09	115.75 M/WORK PERIOD 3.21				.21 ^m /	DAY				
TIME	REP	AIRING		107°104	20.2%	19.69	115.75	m	/WORK IN	G DAY:	S	3	.73 ^m /	DAY		
	отн	ERS		70°30	13.2	12.8		m	/DRILLI	NG PE	RIOD	3	,51 ^m /	DAY		
WORKING	TOT.	AL		531°00'	100 %	97.09	115.75	m	DRILLI	NG DA	YS	3.	10N FOT 3.21 m/DAY 3.73 m/DAY 3.51 m/DAY 3.99 m/DAY 181MANSHIFTS 1.75MANSHIFTS F HOISTING 6			
	REMOV-	PREPARAT	ION	8°00′		1.5%	6							·		
	質白	MOVING		800'		1.5%	TOTAL A	۱۸N	SHIFT	3/115.7	5 m	18	I MANSH	FFS/m		
	GRA	ND TOTAL		54700'		100 %	DRILLIA	1G	MANSII	FTS/	15.75m	1.7	5 MANSH	FTS/in		
CASING PIPE INSERTED	METERAGE DRI		LEN DR1	ERTED IGTH LLED IGTH	CASI	VERY O NG IPES	TIMES C LOWERIN				TIMES LOWERI			NG &		
NG F NSER	вх	113 ^m		7.6%	1	00%		1	16					· · · · · · · · · · · · · · · · · · ·		
CASI				~			REMARKS	3			<u> </u>		· .	· · ·		
		-									·			·		

Tal	ole 3-9 Undorg	round N	0.7							
DS		1	TAL AYS	NE	T WORKING (DAYS)	LAS	OPIS		TOTAL MANSHIFTS	
PERIODS	PREPARATION		2		S		re a ványa		14	
	DRILLING		28		24		4		165	
DRILLING	REMOVING		1		1				6	
떮	TOTAL		31		27		4		185	
стн	PLANNED LENGTH	200 m			CORE REC	OVERY I	FOR E		m Tion	
DRILLED LENGTH	INCREASE OR DECREASE IN DRILLED LENGTH	-127.85 ^m	CORE LENGTH	43.39	DEPTH OF HOLE	SECT -	ТОТАІ	DEPTH	OF SECT	PERFE
	LENGTH DRILLED	72.15 ^m	CORE RECO- VERY	60.1%	0 ~ 100 ^m	60.1%	60.17	6		
	DRILLING	44°25	8.3%	8.0%						
	HOISTING & LOWERING RODS	95°30	17.9%	17.1%	300 ^m					
(HRS)	HOISTING & LOWERING I.T.	9°50′	1.9%	1.8%	Е	EPPICIENCY OF DRILLING				
	MISCELLANEOUS	175°45'	33.0%	31.5%	72.15 ^m	2.15 M/WORK PERIOD 2.33 M/				
TIME	REPAIRING	15300	28.7%	27.4%	72.15 ^m	WORKING DAYS 2.67 m/1				
ING	OTHERS	54°00	10.2%	9.7%	1				2.58 10	/DAY
WORKING	TOTAL	533°00′	100 %	95.5%	72.15 ^m	DRILLI	NG DA	YS	3.01 m	/DAY
	PREPARATION	2000		3.6%					<u> </u>	
	MOVING	5°00'		0.9%	TOTAL MA	nsii i ft:	S/72.1	5m	25 6MANS	HIFTS/
	GRAND TOTAL	558001	i	100 %	DRILLING	MANSIL	i FTS/	72.15 th	ISUVW62'8	HFTS/
CASING PIPE INSERTED	PIPE SIZE & INSERTED METERAGE INSERTED LENGTH		CASI	VERY OI NG IPES	TIMES OF LOWERING		NG &		OF HOIST	'ING &
NSE H	NX 2810 m	3 8.9 %		00%	1	11			21	
CASI	BX 41.20 m	57.1%	i	00%	REMARKS					
~ [;						

Table 3-10 Underground NO.9

SDS			Tal Ays		T WORKING (DAYS)		LAY	OPFS			Potal Vshift	S
PERIODS	PREPARATION)	.1		10			1			47	
1 1	DRILLING	5	1		38			13			255	
DRILLING	REMOVING		2		1		-,	. 1			7	
E E	TOTAL	6	4	<u> </u>	49	ا	L	15			309	:
LENGTH	PLANNED LENGTH	2 0 0 ^m			CORE RE	COV	ERY 1	OR EA	CH 100		N	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGTH		CORE LENGTH	189.25 ^m	DEPTH OF HOLE		CT -	TOTAL	DEPTH HOLE	OF	SECT- ION	TOTAL
DRII	LENGTH DRILLED	200 ^m	CORE RECO- VERY	94.6%	0 - 100 ⁱⁿ			96.4% 94.6%				
	DRILLING	122°35′	18.1%	16.5%					 		<u>.</u>	
	HOISTING & LOWERING RODS	215°30'	31.8%	29.0%	200 ~ 300 ^m							
(S)	HOISTING & LOWERING I.T.				I	EFF	CIEN	CY OF	DRILL	ING		
(HRS)	MISCELLANEOUS	115°50′	16.5%	15.1%	200 ⁿ	n/W	ORK I	ERIOD		3	.13 ^m /	DAY
TIME	REPAIRING	83°30′	12.3%	11.2%	200 ⁿ	n/W	ORKIN	G DAY	S	1	.08 ^m /	DAY
Si l	others	144°05'	21.3%	19.4%	ļ	<u></u>		NG PE		3	.92 ^m /	DAY
YORKING	TOTAL	677°30′	100 %	91.2%	200 ⁿ	"/ <u>p</u>	NET RILLI	NG DA	YS	5	.26 ^m /	DAY
	PREPARATION MOVING	45001		6.1%								
 	MOVING	5 0 ,00		2,7%	TOTAL MA	NS	HIFT	8/800n	n . <u></u>	1.5	MANSH	IFTS/m
	GRAND TOTAL	742°30′		100 %	DRILLING	MA	NSHI	FTS/20	00 ^m	1.2	RMANSH	IFTS/m
11. 12. 13.	METERAGE D	nserted Ength Rilled Ength	CASI	VERY OF NG IPES	TIMES OF LOWERING	H(DISTII DDS	NG &	TIMES LOWERI			NG &
NG P	BX 102 ^m	51%]	100%		18						·.
CASING PIPE INSERTED		:			REMARKS			·				· · · · · · · · · · · · · · · · · · ·
									· · · · · · · · · · · · · · · · · · ·	<u>.</u>		

Table 3-11 Underground NO.10

				·									
ODS					Tal Ays		T WORKING (DAYS)	IA	Yofvs			Potal Vshift	S
PERIODS	PRE	PARATION			6		3		3			10	
1	DRI	LLING		3	31		Ź 4		7			185	
DRILLING	REM	OVING			1		1				,	. 3	
胃	TOT	AL		2	8		28		10			198	
LENGTH	PLA	LENGTH NNED		200m			CORE RE	COVERY	FOR E	лсн 100 ⁾ Sec		N	
	DEC	REASE OR REASE IN LLED LENG	rii	-45.04 m	CORE LENGTH	103.23m	DEPTH OF HOLE	SECT - ION	TOTAL	DEPTH HOLE	op	SECT-ION	тотаі
DRILLED	LEN	oth drilled		154.96m	CORE RECO- VERY	66.6%	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		72.6%		·		
	DRI	LLING		114°30′	22.3%	21.0%	1						
	HOI	STING & ERING RODS	s	68°55'	13.4%	12.7%	300 ^m			<u> </u>			
(HRS)	FOM HOI	STING & ERING I.T		97°10′	18.9%	17.9%]	EFFICIE	NCY OF	PRILL	ING		
	MIS	CELLANEOU	S	154°10′	30.0%	28.3%	154.96	m/work	PERIOR)	4	08 ^m /	DAY
TIME	REP	AIRING		22°154	4.3%	4,1%	154.96	MORKI	NG DAY	(S	5	53 ^m /.	DAY
PORKING	OTIE	ers		57°00′	11.1%	10.5%					5	00 ^m /.	DAY
WORK	TOT.	AL		514°00′	100 %	94.5%	154.96	DRILL	ING DA	YS	6	46 ^m /	DAY
	REMOV-	PREPARAT	ION	22001		4.0%							
	題日	MOVING		8°00′		1.5%	TOTAL MA	NSHIFT	S/154.9)6m	1.2	8MANSHI	LFTS/m
	GRA	ND TOTAL	· ·	544°00′		100 %	DRILLING	MANSI	HFTS/	154.96 m	1.13	MANSH	LPS/m
TED	METH	e size & Erage Vserted	LEN DRI	ERTED IGTH LLED IGTH	CAST	VERY OF NG IPES	TIMES OF LOWERING		NG &	Times Lovert			NG &
NG P	вх	111.20 ^m		71.8%	1	00%		94			10	08	
CASING PIPE INSERTED							REMARKS						

Table 3-12 Underground NO.11

Sac		:			TAL AYS	N		' WORKING DAYS)		IЛY	offs			TOTAL NSHIFT	s
PERIODS	PRE	PARATION	******		2			2						15	
	DRI	LLING		2	3			21			2			142	
DRILLING	REM	OVING			3			3						17	
E E	тот	ÅΙ		2	8	. _		26		<u> </u>	2			174	·
LENGTH	PLA	nned Length		120 ⁱⁿ				CORE RE	COV	ery i	OR EA		m TTO	Ŋ	
DRICLED LEN	DECI	REASE OR BEASE IN LIED LENGTI	I	6.5 2m	CORE LENGTH	111.61 ⁿ	nt l	DEPTH OF HOLE		CT -	TOTAL	HOLE	oF	SECT- ION	TOTAL
DRII	LENG	OTH DRILLED		1 26.52 ^m	CORE RECO- VERY	88.2	%	$0 - 100^{m}$ $100 - 200^{m}$	بسسم	8.3%					
	DRI	LLING		86°15′	18.2%	17.2	%	200 -	· ·			<u> </u>			
	HOL	STING & SRING RODS		160°45'	34.0%	32.0	%	300 ^m			·				
(33	HOIS	STING & ERING 1.T.						F	EFF	ICIEN	CY OF	DRILL	ING		
(HRS		CELLANEOUS		144°00′	30.4%	28.7	%	126.52	۱/ _W	ORK P	ERIOD)	4	.52 ^m /	DAY
TIME	REP	AIRING		1330'	3.2%	3.0	%	126.52	n/W	ORKIN	G DAY	S	4	.87 ^m /	DAY
ING	отни	ers		6 7° 30′	14.2%	13.4	%	126.52 ⁿ					5	.50 ^m /	DAY
WORKING	TOTA	\L		472001	100 %	94.0	%	126.52 ⁿ	<u>م/^</u>	NET RILLI	NG DA	YS	6	.02 m/	DAY
	REMOV- ING	PREPARATIO	ON	27°00′		5.4	%			<u> </u>			_		·
	現代	MOVING		3°00'		0.6	%	TOTAL MA	NS.	HIFTS	/126.5	i2 ^m	1.3	8MANSH	IFTS/m
	GRA	ND TOTAL		502°00′		100	%	DRILLING	M	ANSILI	FTS/	126.52 ^m	12	1 MANSII	IFTS/m
3. E	METE		LEN DRI	ERTED GTH LLED GTH	CASIN	VERY C NG IPES	· - -	TIMES OF LOWERING			VG &	TIMES LOVERI		HOISTI I.T.	NG &
NSER TO PO	вх	98.21 ^m		7.6%	1	.00%		1	18				• •	·	· .
CASING PIPE INSERTED	_, ,,, _ ,,							REMARKS							· ·
											·				

Table 3-13 Underground NO.12

. :							محب حبثت				
SQ			TAL AYS		r working (Days)	LA	Yopps			Potal Vshiev	S
PERIODS	PREPARATION		1		1					10	
	DRILLING	4	2.5		29.5		13			166	
DRILLING	REMOVING		0.5		0.5					3	
胃	TOTAL	1	14		31		13			179	www.naa.au.au.au
OTH	PLANNED LENGTH	1 20 m			core re	COVERY	FOR EA	CH 100 ^t SEC'		N	:
DRILLED LENGTH	INCREASE OR DECREASE IN DRILLED LENGTH	1.74 m	CORE LENGTH	105.72 m	DEPTH OF HOLE	SECT - ION	TOTAL	DEPTH HOLE	OF	SECT- ION	TOTAL
DRIL	LENGTH DRILLED	121.74 ^m	CORE RECO- VERY	86.8%	0 - 100 ^m		88.3%]			
	DRILLING	98000	19.6%	18.8%			<u> </u>	 			ļ
	HOISTING & LOWERING RODS	159°40′	32.0%	30.6%	200 - 300 ^m		[.				
(S)	HOISTING &				I	EFFICIE	NCK OF	DRILL	ING		
(HRS)	MISCELLANEOUS	125°35′	25.2%	24.0%	121.74	"/WORK	PERIOD	·	2	.77 ^m /	DAY
TIME	REPAIRING	18,30,	3.7%	3.5%	121.74 ^{ff}	n/work i	NG DAY	\$	3	.93 ^m /	DΛY
	OTHERS	97°00′	19.5%	18.6%	l				2	.86 ^m /	DAY
WORKING	TOTAL	498°45′	100. %	95.5%	121.74 ¹	n/NET DRILL	ING DA	YS	4	.13 ^m /	DAY
	PREPARATION MOVING	21°15′		4.1%							
	資 口 MOAING	2°00′		0.4%	TOTAL MA	NSIIIFT	S/121.7	4 ^m	1.4	7 MANSH	IFTS/m
	GRAND TOTAL	522°00'		100 %	DRILLING	MANSH	I FTS/	121.74 ^m	1.3	6 MANSH	HTS∕m
TEE	METERAGE DRI	ERTED GTH LLED GTH	CASI	VERY OF NG IPES	TIMES OF LOWERING		NG &	TIMES LOWERI			NG &
NG I		75.5%	1	00%		180					
CASING PIPE INSERTED					REMARKS		·		·	·	
L						·			/		

Table 3-14 Underground NO.13

SQC			Tal Ays		T WORKING (DAYS)	LAY	YOPPS			TOTAL NSIII FT	s
PERIODS	PREPARATION		0.5		0.5					5	
	DRILLING	2	5.5		23.5		2			140	
DRILLING	REMOVING		1		1					8	
를 다	TOTAL	2	7		25		2			153	
LENGTH	PLANNED LENGTH	120m			CORE RE	COVERY 1	FOR EA	ACH 100 SEC		N	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGTH	-24.05 ^m	Core Length	70.57 m	DEPTH OF HOLE	SECT - ION	IATOT	DEPTH	of	SECT- ION	TOTAL
DRII	LENGTH DRILLED	95.95 ^m	CORE RECO- VERY	73.5%	0 - 100 ^m	73.5%	73.5%	6	<u></u>		
	DRILLING	73°30'	18.8%	17.9%	 :						
	HOISTING & LOWERING RODS	1 26°25 '	32.3%	30.8%	200 - 300 ^m						
(33	HOISTING & LOWERING I.T.		-		l	EFFICIE	VCY OF	DRILL	ING		
(ERS)	MISCELLANEOUS	122°05′	31.1%	29.8%	95.95	ⁿ /WORK I	PERIOD)	3	•55 ^m /	DAY
TIME	REPAIRING	14°451	3.8%	3.6%	95.95 ⁿ	NORKIN	NG DAY	's	3	.84 ^m /	DAY
	OTHERS	54°454	14.0%	13.4%		u\driiyi	ING PE	RIOD	3	.76 ^m /	DAY
WORKING	TOTAL	391°30′	100 %	95.5%	95.95 ^m	DRILL)	NG DA	YS	4	.08 ^m /	DAY
	PREPARATION	N 1600'		3.9%							· .
	PREPARATION MOVING	So.30 1		0.6%	TOTAL MA	nshi ft	S/95.91	5 ^m	1.5	MANSH	(FTS/m
	GRAND TOTAL	410°00′		100 %	DRILLING	MANSH	if ts/	95.95 ^m	1.4	6 MANSH	IFTS/m
TEE	METERAGE T	NSERTED ENGTH PRILLED ENGTH	CASI	VERY OF NG IPES	TIMES OF LOWERING		NG &	Times Loveri			NG &
NG P	BX 74.31 ^m	77.4%	10	00%		152	Ì				
CASING PIPE INSERTED					REMARKS		-				
								· · · · · · · · · · · · · · · · · · ·		· ···	· · · · · · · · · · · · · · · · · · ·

Table 3-15 Underground NO.14

SODS			Tay, Ays	. F	T WORKING (DAYS)	J	ayoffs			Total Nsiii Pt	S
PERIODS	PREPARATION		2		1		1			3	
	DRILLING		18		16		2			110	
DRILLING	REMOVING		1		1				,	. 4	
E	TOTAL		21		18		3			117	
LENGTH	PLANNED LENGTH	200 ^m			come re	COVER	FOR EA		o ^m CTIO	N	
	INCREASE OR DECREASE IN DRILLED LENGTH	-76.80 ^m	CORE LENGTH	96.5 l ^m	DEPTH OF ROLE	SECT ION	~ TOTAL	DEPTI HOLE	H OP	SECT- ION	TOTAL
DRILLED	LENGTH DRILLED	12320 ^m	CORE RECO- VERY	78.3%	0 - 100 ^m	77.9°					
	DRILLING	86'45'	23.5%	23.0%				ļ	·		
	HOISTING & LOWERING RODS	166°25′	45.2%	44.2%	200 ~ 300 ^m						
(HRS)	HOISTING & LOWERING I.T.]	EPPICI	ENCY OF	mii	.1NG		
	MISCELLANEOUS	69°50′	19.0%	18.6%	123.20	m/work	PERIOD	· 	5	.87 ^m /	DAY
TIME	REPAIRING	4°00'	1.1%	1.1%	123.20	"/WORK	ING DAY	S	6	.84 ^m /	DAY
ING	OTHERS	41°30 ′	11.2%	11.0%	1		JANG PE		6	.84 m/	DAY
WORKING	TOTAL	368,30,	100 %	97.9%	123.20	DRII	LING DA	YS	7	.70 ^m /	DAY
	PREPARATION	6,00,		1.6%			_				
	MOV ING	2°00′	.,	0.5%	TOTAL MA	ANSHII	TS/1 23.	0 ^m	0.9	5MANSH	IFTS/m
	GRAND TOTAL	37630'	<u></u>	100 %	DRILLING	MAN	SHI FTS/	1 23.20 ^m	0.8	HENAM 0	IFTS/m
TED	METERAGE DI	ISERTED ENGTH ETLLED ENGTH	CASI	VERY OF NG IPES	TIMES OF LOWERING	HOIS'	ring &	TIMES LOVER		ROISTI L.T.	ING &
CASING PIPE INSERTED		40.9%	10	00%	21						
CASI				· · · · · · · · · · · · · · · · · · ·	REMARKS			····		معسمه درج المديوج	
				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<u></u>					

Table 3-16 Underground No.15

SOS			lar Lar		T WORKING (DAYS)	LA	opps			Potal NSHIPT	S
PERIODS	PREPARATION		1.5		1.5					11	
	DRILLING	2	9.5		23.5		6			145	
DRILLING	REMOVING		1		1		<u> </u>			5	
岩	TOTAL	3	2		26		6			161	
LENGTH	PLANNED LENGTH	120 ^m			CORE RE	COVERY I	FOR EA	CH 100 SEC	400	Ŋ	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGT!	1.95 ^m	CORE LENGTH	96.19 ^m	DEPTH OF HOLE	SECT -	TOTAL	DEPTH	OF	SECT- ION	TOTAL
DRII	LENGTH DRILLED	121.95 ^m	CORE RECO- VERY	78.9%	0 - 100 ^m	75.4% 94.5%		ļ		! 	
	DRILLING	9945	22.1%	20.9%	l i	, <u></u>		<del> </del>	<del></del>		
•	HOISTING & LOWERING RODS	156°50′	34.9%	32,9%	300 ^m					 	<u> </u>
છે	HOISTING & LOWERING I.T.				1	EFFICIEN	ICY OF	DRILL	ING	· 	
(ERES)	MISCELLANEOUS	103°20′	23.0%	21.7%	121.95	"/WORK I	ERIOD		3	.81 ^m /	DAY
TIME	REPAIRING	27351	6.1%	5.8%	121.95 ^f	n/MOUKIV	IG DAY	S	4	.69 ^m /	DAY
	OTHERS	62°00'	13.8%	13.0%					4	.13 ^m /	DAY
FORK ING	TOTAL	449°307	100 %	94.3%	121.95	DRILLI	NG DA	YS	5	.19 ^m /	DAY
	PREPARATION MOVING	)N 25°30′		5.3%							
	MOVING	2°00'		0.4%	TOTAL MA	ANSHIFT:	S/121.9	)5 ^m	1.3	2 MANSH	IFTS/m
	GRAND TOTAL	477°00'		100 %	DRILLING	MANSH	I FTS/	121.95 ^m	1.1	9MANSII	IFTS/m
TPE	METERAGE	INSERTED LENGTH DRILLED LENGTH	CASI	very of NG IPES	TIMES OF LOWERING		NG &	Times Loveri			NG &
NG P	BX 70.10 ^m	57.5%	1	.00%		213					
CASING PIPE INSERTED					REMARKS		·				

Table 3-17 Underground No.16

SOOS			TAL AYS		T WORKING (DAYS)	LA	opps			TOTAL NSHIFT	S
PERIODS	PREPARATION		1.		1					9	
	DRILLING		13		12		1			75	
DRILLING	REMOVING		2		1		1			4	
l e	TOTAL		16		14		2			88	
IENGTA	PLANNED LENGTH	120 ^m			CORE REC	COVERY	POR EA	CH 100 ¹ SEC		N	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGTH	~52.33 ^m	core Length	57.43 ^m	DEPTH OF HOLE	SECT - ION	TOTAL	DEPTH HOLE	or	SECT- ION	TOTAL
DRI	LENGTH DRILLED	67.67 ^m	CORE RECO- VERY	84.9%	0 - 100 ^m 100 - 200 ^m	84.9%	84.9%				\
	DRILLING	50°50′	21.4%	20.3%	200				<del></del>	ļ	
	HOISTING & LOWERING RODS	67°20'	28.3%	27.0%						İ	
હિ	HOISTING & LOWERING I.T.				Ţ	SPFICIEN	ICY OF	DRILL:	ING		
(HRS)	MISCELLANEOUS	95°50′	40.3%	38.3%	67.67 ⁿ	n/work i	ERIOD		4	.23 ^m /	DAY
TIME	PEPAIRING	2°00′	0.8%	0.8%	67.67 ⁿ	"/WORKIN	IG DAY:	5	.4	.84 ^m /	DAY
	OTHERS	5 <b>2</b> °00′	9.2%	8.8%	67.67 ⁿ	^/DRILLI	NG PE	RIOD	5	.21 ^m /	DAY
WORKING	TOTAL	23800'	100 %	95.2%	67.67 ⁿ	n/net Drilli	NG DA	YS	5	.64 m/	DAY
	PREPARATION MOVING	9°30′		3.8%					<u> </u>		
	현 ^되 MOVING	2°30′		1.0%	TOTAL MA	anshift	S/67.67	m	1.3	OMANSH	IFTS/m
	GRAND TOTAL	250°00'		100 %	DRILLING	3 MANSH	ifts/	67.67 ^m	1.1	1 MANSH	IFTS/m
CASING PIPE INSERTED	METERAGE D	NSERTED ENGTH RILLED ENGTH	CASI	very of NG IPES	TIMES OF LOWERING			TIMES LOWERI			ING &
NG P	BX 23.90 ^m	35.3%		100%		94					
CASI			,		REMARKS			· · · · · · · · · · · · · · · · · · ·		*.*·	,
								·			

Tal	ble 3-18 Und	orgr	ound l	No.17								
DS.				TAL AYS		T WORKING (DAYS)	LAY	OPPS			POTAL ISHLFI	'S
PERIODS	PREPARATION		<del></del>	2		2		·			11	
	DRILLING			6		3		3			21	
DRILLING	REMOVING			1		1					10	
DR	TOTAL			9		6		3			42	
LENGTH	PLANNED LENGTH		120 ^m			CORE RE	COVERY 1	FOR EA		ⁱⁿ TTO	1	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LENGT	гн	-9430 ^m	CORE LENGTH	17.55 ⁿ	DEPTH OF HOLE	SECT - ION	TOTAL	DEPTH	OF	SECT- ION	ТОТАІ
DRI	LENGTH DRILLED		25.70 ^m	CORE RECO- VERY	68.3%	$0 - 100^{m}$ $100 - 200^{m}$	68.3%	68.3%	3		<u> </u>	
	DRILLING		18°40'	31.1%	18.7%	200 -		ļ . 	<u> </u>			ļ
ļ	HOISTING & LOWERING RODS	s	11°50′	19.7%	11.8%	l m.		 				
(FES)	HOISTING & LOWERING I.T					]	EFFICIEN	CY OF	DRILL	ING		
	MISCELLANEOUS		16°45 '	27.9%	16.8%	25.70	m/work r	ERIOD		2	86 ^m /	DAY
TIME	REPAIRING		3°45'	6.3%	3.7%	25.70	m/WORKIN	IG DAY	s	4	. 28 ^m /	'DAY
ING	OTHERS		9°00 ′	15.0%	9.0%	25.70	m/drilli	NG PE	RIOD	4	.28 ^m /	DAY
WORKING	TOTAL		60,00	100 %	60.0%	25.70	m/drilli	NG DA	<u>Ys</u>	8	.57 ^m /	DAY
	PREPARAT	ION	30,00,	<u></u>	30.0%	÷		· ·	<del> </del>	_	<del></del>	
	MOAING		100004		10.0%	TOTAL MA	MSHIFT:	g/25.70	, m	1.63	MANSII	IFTS/m
	GRAND TOTAL		100000		100 %	DRILLING	G MANSH	ifts/	25.70 ^m	082	MANSH	IFTS/m
CASING PIPE INSERTED	PIPE SIZE & METERAGE INSERTED	LEN	LLED	CASI	VERY OF NG IPES	TIMES OF LOWERING		NG &	TIMES LOWER			ING &
ING :			···-				38				· · ·	
CAS	·^	·		<del> </del>		REMARKS	· · · · · · · · · · · · · · · · · · ·					
			····									

				Summe	iry Ro	oord o	f Drilli	ng Resu	lts b	y Hol	Le :	٠	
Ta	blo	3-19 St	rfac	e No.1	L								
Sas			<del></del>		TAL Ays		T WORKING (DAYS)	I,A)	opps			POTAL NSILIPT	s
PERIODS	PRE	PARATION	· · · · · · · · · · · · · · · · · · ·		4		4					17	
	DRI	LLING .			45		29		16			192	
DRILLING	RE	NOA LNG			1		1					3	
범	тот	'AL			50		34		-			212	
ELLS.	PLA	nned Length		200 ^m			CORE RE	COVERY	FOR EA		o ^m CTIO	N	
HISNET CEN	DEC	REASE OR REASE IN LLED LENGT	eH		CORE LENGTH	180.95 ^m	DEPTH OF HOLE	SECT -	TOTAI	DEPT	H OF	SECT- ION	тотаі
DRILLED	<del>, , , , , , , , , , , , , , , , , , , </del>	GTH DRILLED		200 ^m	CORE RECO- VERY	90.5%	0 - 100 ^m	89.9 [%]	ļ	ļ	13. 	<u></u>	
	DRI	LLING	<del></del>	189°10′	33.7%	32.0%	<b></b>					· · · · · · · · · · · · · · · · · · ·	
		STING & ERING RODS	<u> </u>	29°00′	5.2%	4.9%	200 ~ 300 ^m						
$\widehat{\mathbf{g}}$	HOT	STING & ERING I.T		85°20′	15.2%	14.47	1	EFFICIEN	ACA OI	diet i	LING		
(EECS)	l .	CELLANEOU	. 1. 1	184°15′	32.9%	31.2%	500	m/work 1	PERIOI	)	1	.00 m	DAY
TIME	REP	AIRING		8°00′	1.4%	1.4%	200	m/WORKIN	IG DAY	'S	5	.88 ^m /	DAY
	ОТН	ERS		640451	11.6%	10.9%	200	m/DRILL	ING P	er 10D	4	.44 ^m /	DAY
WORKING	TOT	AL		560°30′	100 %	94.8	200	m/DRILLI	ING DA	YS	6	.90 ^m /	DAY
	REMOV-	PREPARAT	ION	2800'		4.7%							·
	E C	MOVING		3,00,		0.5%	TOTAL M	ansiii ft	S/200	m	1.04	6 MANSIL	1FT8/in
	GRA	ND TOTAL		591°30′		100 %	DRILLIN	G MANSH	IFTS/	′200 ^m	0.9	6 MANSH	IFTS/m
1135 1250	MET	e size & erage nserted	LEN DRI	ERTED GTH LLED GTH	CASII	very of NG IPES	Times of Lowering		NG &	TIME:		HOIST	ING &
NG P	114	m/m 3m		1.5%	10	00%		31				70	
CASING PIPE INSERTED	NX	22.90m	]	11.5%	10	00%	REMARKS						
	вх	132.65 ^m	. (	56.3%	10	00%							

Table 3-20 Surface No.2

			<u></u>						<del></del>	·		<del></del>
SOC				TAL AYS	NE	T WORKING (DAYS)	L	ayoffs			Potal Vshipt	s
PERIODS	PREPARATION	······		1		1					8.5	<u>.</u>
	DRILLING			56		51		5			398.5	<u>,</u>
DRILLING	REMOVING			1		1		-0-1		-	6.5	j
엄	TOTAL			58		53		. 5			413.5	
LENGTH	PLANNED LENGTH		200 ^m			CORE RE	COVERY	FOR EA	CH 100 SEC		¥	
DRILLED LEN	INCREASE OR DECREASE IN DRILLED LEN	٠.	-49.45 ^m	CORE LENGTH	1 2 3.2 0	DEPTH OF HOLE	SECT ION	TOTAL	DEPTH HOLE	of	SECT- ION	TOTAL
DRII	LENGTH DRILLED	<del> </del>	150.55 ^m	CORE RECO- VERY	81.89	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		73.99 81.89	<del> </del>		<del></del>	
	DRILLING		157°25′	16.4%	15.79	,		_				
	HOISTING & LOWERING RO	DS	34°15′	3.6%	3.49			<u> </u>	<u></u>			
જ્ઞ	HOISTING &		54°154	5.7%	5.49	4	efficii	ENCY OF	DRILL	ING		
(HRS)	MISCELLANEO		282°20′	29.4%	28.29	150.55	m/work	PERIOR	)	2	.60 ^m /	DAY
TIME	REPAIRING		334°45′	34.9%	33.49	150.55	m/WORK	ING DAY	S	2	.84 ^m /	DAY
	OTHERS		96*001	10.0%	9.69		m/DRIL	LING PE	RIOD	2.	.69 ^m /	DAY
WORKING	TOTAL		959001	100 %	95.7%	150.55	m/DRILI	JING DA	YS	2	.95 ^m /	DAY
	PRIEPARA	TION	25,001		2.5%	6	·					
	MOVING		18°00'		1.87	TOTAL M	ANSILLE	TS/150	.55 ^m	2.71	MANSH	IFTS/m
	GRAND TOTAL		1,002°001		100 %	DRILLIN	G MANS	HIFTS/	150.55 ^{rn}	26	HRNAM	IFIS/m
TEED.	PIPE SIZE & METERAGE INSERTED	LEN DR1	ERTED IGTH LLED IGTH	CASTI	very oi ng ipes	TIMES OF LOWERING		ING &	TIMES LOWERI			NG &
NG P	114m/m 20 ^m		13.3%	]	100%	1	48				134	
CASING PIPE INSERTED	NX 55.95	m	37.2%	,	100%	REMARKS						
	BX 72.40		18.1%	]	100%							

Гa	b1e 3-21 Surf		iry Ro	sora oi	f Drillia	ig nest	11 rs 1	y nore		
<b>f</b>				T						<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Sgo			TAL AYS		r Working (Days)	LA	Yopps		TOTAL MANSHII	
PERIODS	PREPARATION		4		4			<u> </u>	3.	4
	DRILLING		20.5		19.5		1		12	9
DRILLING	REMOVING		0.5		0.5		· ·		! - م <u>ن</u> ب مستومها	5
Ä	TOTAL		25		24		1		16	8 .
LENGTH	PLANNED LENGTH	200 ^m		1 .	CORE RE	COVERY	FOR E		n rion	
	INCREASE OR DECREASE IN DRILLED LENGTH	1.50 ^m	CORE LENGTH	188.10 ^m	DEPTH OF HOLE	SECT - ION	тотлі	DEPTH HOLE	OF SECT	1 376 1 47 4 1
DRILLED	LENGTH DRILLED	201.50 ^m	CORE RECO- VERY	93.3%	$0 - 100^{\text{m}}$	91.2% 95.5%	91.29	<b></b>		
	DRILLING	165°20'	39.2%	36.1%						
	HOISTING & LOWERING RODS	14°25′	3.4%	3.2%	200 - 300 ^m	93.3%	93.3	70		
્રિજ્ઞ	HOISTING & LOWERING I.T.	61°35′	14.6%	13.4%		eppicie	NCY O	7 DRILL	ING	
(HBS)	MISCELLANEOUS	117°10'	27.8%	25.6%	201.50	m/work	PERIO	)	8.06	DAY _
TIME	REPAIRING	24°30′	5.8%	5.3%	201.50	m/WORKI	NG DA	rs	8.40	¹/DAY
VOPKING	others	3 9000 4	9.2%	8.5%	201.50	m/DRILL	ING PI	ERIOD	9.83	DAY_
WORK	TOTAL	422000	100 %		201.50	n/DRILL	ING DA	YS	10.33	1/DAY
	PREPARATIO	N 32°00'		7.0%		·				
	MOVING	4°00'	· · · · · · · · · · · · · · · · · · ·		TOTAL M.	· · · · · · · · · · · · · · · · · · ·				SHIFTS/m
	GRAND TOTAL	458°00' INSERTED		100 %	DRILLIN	g mansi	HFTS/	/201.50 ^m	0.64 MANS	SHIFTS/m
TEE	METERAGE	LENGTH DRILLED LENGTH	CASII	very of NG IPES	TIMES OF LOWERING		NG &		OF HOIS NG I.T.	
NG P NSER	114 ^{m/m} 5.20 ^m	2.6%		100%		14			152	omen e memocana el anno o el min
CASING PIPE INSERTED	NX 14.50 ^m	7.2%		100%	REMARKS			رسان بالمعادة المان يرسون ف	***********	
	BX 195.40 ^m	97.0%		100%		·	·			

Table 3-22

	<u> </u>	T									
SO			TAL AYS	NE	r working (Days)	[A.I	opps			Potal NSHIPT	\$
PERIODS	PREPARATION		6		6					33	
	DRILLING		50		42		8			265	
DRILLING	REMOVING		2		2					11	
- A	ТОТАЬ		58		50		8			309	<del></del>
LENGTH	PLANNED LENGTH	200m	.		core re	COVERY 1	FOR EA		m TIO	N	
	INCREASE OR DECREASE IN DRILLED LENGTH	-45.77 ^m	CORE LENGTH	107.18 ^m	DEPTH OF HOLE	SECT - ION	TOTAL	DEPTH	OF	SECT- ION	TOTAL
DRILLED	LENGTH DRILLED	154.23 ^m	CORE RECO- VERY	70.4%	0 - 100 ^m	61.4% 84.4%				<del></del>	
	DRILLING	111°40′	13.6%	12.9%				<del> </del> -			ļ
1	HOISTING & LOWERING RODS	28°30′	3.5%	3.3%	200 ~ 300 ^m			<u> </u>			<u> </u>
(ERS)	HOISTING & LOWERING I.T.	93°15	11.4%	10.7%	]	EFFICIE	CY OF	DRIFT	ING		
	MISCELLANEOUS	378°40'	46.3%	43.6%	154.23 ^f	"/work i	PERIOD	) 	2	.66 ^m /	ΝΛΥ
TIME	REPAIRING	124°26	15.2%	14.3%	154.23	n/WORKIN	IG DAY	S	3.	.08 · ^m /	DAY
WORKING	OTHERS	82°00′	10.0%			n/DRILL	ING PE	RIOD		.08 m/	~~~~
WORK	TOTAL	818°30′	100 %		134.43	"\driff	ING DA	YS	3.	.67 ^m /	DAY
	PREPARATION MOVING	43°30′		5.0%							
	MOVING	6°00'		0.7%	TOTAL MA	<del></del>		<u> </u>	<del></del>	O MANSII	
<del></del> .	GRAND TOTAL	868°00' ERTED	<u>_</u>	100 %	DRILLING	3 MANSH	IFTS/	154.2371	1.77	2 MANSII	IFTŞ/m
TED	METERAGE DRI	IGTII ILLED IGTII	CASI	VERY OF NG IPES	TIMES OF LOWERING		NG &	TIMES LOWERI			ENG &
ING PIPE	114 ^{m/m} 9.14 ^m	5.9%	]	.00%		41			18	7	
CASING	NX 29.41 ^m	19.1%	]	00%	REMARKS						
	BX 105.77 ^m (	8.6%	]	00%	-		•			1 :	

Table 3-23 Generalized Results of Diamond Core Drilling

							* .			
roe of			Drilled	ပိ	Core	Numbers of	f Drilling	Shift	Drilling	ng Speed
Machine		Total Days	Length	Length m	Recovery %	Drilling Shift	Casing, etc. Shift	Total Shift	*m/Shift	**m/Shift
BBU-2	N	32	114.38	111.73	4.77	45	, <u></u>	65	1.76	1.79
378		17	116.19	69.52	59.8	34	pri	35	3.32	3.42
JV-8 BBU-2	2	33	114.21	87.87	76.9	40	31	T	1.61	2.85
BBU-2	-5	36	163.45	149.20	91.3	58	æ	65	2.77	2.82
BBU-2	2	42	129.90	123.45	95.0	52	5	54	2.41	2.50
BBU-2	-2	29	115.75	101.90	88.0	42	12	54	2.14	2.76
BBU-2	2	24	72.15	43.39	1.09	25	ιΛ	30	2.41	2.89
BBU-2	7	38	200:00	189.25	9**6	95	3	59	3.39	3.57
贸	BBU-2	24	154.96	103.23	9*99	41	ź	43	3.60	3.78
BBU-2	-2	21	126.52	19-111	88.2	37	4	41	3.09	3.42
<u> </u>	BBU-2	29.5	121.74	105.72	8.38	42	4	97	2.65	2.90
Ė	37V-8	23.5	95.95	25-02	73.5	33	4	37	2.59	2.91
🖺	JV-8	91	123.20	15.96	78.3	32	<b>-</b> T	33	3.73	3.85
88 2	BBU-2 JV-8	23.5	121.95	61.96	78.9	40	5	42	2.90	3.05
7	JV-8	12	19-19	57.43	84.9	19	3	22	3.08	3.56
BB	BBU-2	3	25.70	17.55	68.3	9-		9	4.28	4.28
			1,893.72	1,559.09	84.0	621	76	697	2.72	3.05

Drilled length per one shift covering total works conducted. Drilled length per one shift covering net drilling operations. ** * Notes:

Generalized Results of Diamond Core Drilling

		_			-		احسسا	<del>,,,,,,,,,,,,,,,,,</del>
Drilling Speed	**m/Shift		3.76	6.30	2.97			4.20
Drillin	*m/Shift	4.26	2.39	5.60	2.08			3.21
Shift	Total Shift	47	63	36	74			220
Numbers of Drilling Shift	Casing, etc. Shift	3	23	4	22			52
Numbers of	Drilling Shift	4	40	32	52	. ;		1.68
Core	Recovery	6.06	81.8	93.3	70.4			84.9
Ö	Length	180.95	123.20	188.10	107.18			599.43
Drilled	Length m	200.00	150.55	201.50	154.23			706.28
	rotal bays	29	51	19.5	42			
Type of	Machine	S-37A	S-37A	S-37A	S-17			
Drill Hole	No. Surface	No. 1	No. 2	No. 3	No. 8			Total

Notes: * Drilled length per one shift covering total works conducted.

^{**} Drilled length per one shift covering net drilling operations.

Time Distribution in Drilling Works

Table 3-24 Underground No. 1

Working Time & EX-	Drilling		Hoisting & Lowering Rod	मुद्ध के सुरुद	Hoisting & Lowering I.T.		Miscellaneous	neeus	Repairing	ing	Others	ţ	Total	ret.	Manshifts	ifts
Depth of Section	Working Time		Time/Working M Time	Time/	Time/Working M Time	Time/ M	Tine/ Working M Tine	Time/ M	Time/ Working M Time	Time/ M	Time/Working M Time	Time/ M	Working Time	Time/ M	Total man- shifts	Man- shifts /M
0 - 50 m (0 - 50.50 m)	62°25	10151	14040' 0017'	00171	21015	00251	0025' 36010'	0043*	60001	. 2000	270001	00321	00321, 1670301	30191	64.5	1.28
50 - 100 m (50.50 - 100.10 m)	\$57,068	10481	50451 00071	1 2000	260101	10121	52°20' 1°03'	1,0031	100 ₀ 6	•1100	280301	00341	0°34' 244°00'	49551	82	1.65
100 - 150 m (100.10 - 144.38 m)	700451	10361	.0601 .01099		56,351	1017.	850401	10561	9°20	.8000	00081 410301	00561	00561 3270001	70231	109.5	0.25
150 - 200 m )									:							
•																
Total	222°251	1°32°	860351	19600	86°351 0°361 137°001	12500	0057* 174010*	1013	210201	0000	100°76	0040	0040. 7380301	2005	556	1.77
	30.1%		11.7%		18:5%		23.6%		2.9%		13.2%		100%			

Time Distribution in Drilling Works

Table 3-25 Underground No. 2

Working Time & Ef-	Drilling		Hoisting & Lowering Rod	80 H	Hoisting & Lowering I.T.		Miscellaneous	neous	Repairing	\$ui.	Others	S,	Total	1	Manshifts	fts
Depth of Section	Forking Time	Time/M	Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Time Time/M Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	Vorking Tine		fotal man- sbifts	Man- shifts /M
0 - 50 m (0 - 50.29 m)	47°20'	09261	470051	00561	-		35,0051	00421	110001	00131	190301	00231	00231 1600007	30,101	46	0.91
50 - 100 m (50.29 - 102.41 m)	35°00°	0940	830451	1°36'			420451	00491	10301	00021	17°00'	0050	00501 1800001	39271	53	1.02
100 - 150 m (102.41 - 116.19 m)	10021,	0047:	21°50'	10351			16°20'	1,111		····	20001	0022*	54°00'	39551	12	0.87
150 - 200 m )																
Total	93°101	0°48	93°10' 0°48' 152°40'	1019,			94°101	00491	120301	19000	410301	0°21'	0°21' 394°00'	30231	111	0.96
	23.6%		85.78				23.9%		3.2%		10.6%		100%			

Time Distribution in Drilling Works

Ti. Table 3-26 Underground No. 3

			ists.	Man- shifts /M	1.60	2.12	2.41			1.94	
			Manshifts	Total Man- shifts	79.5	103	39			221.5	
				Time/M	30451	60481	70571			50381	
			Total	Working Time	186°00°	330,001	0048' 128030'			644°301	100%
			ers	Time/M	0°331	00391	00481		<u></u>	00381	
		:	Others	Working Time/M	270301	31,0301	130001			720001	11.2%
Works			Repairing	Time/M	0001	1910.	00461			12600	·
Drilling 4			Repa	Working Time/M	1000	560301	12°30'			100001	30.9%
de Oriz	. '-	•	aneous	Time/M	10281	2047	3°071			2015'	·~~~
ion in			Miscellaneous	Working Time/M	72°30°	135°25'	\$0,00			257°55 °	40.0%
Distribution		-	ng & g I.T.	Time/M							
Φ	·		Hoisting & Lowering I.T.	Working Time/M							<u>-</u>
Tin	m M		ng & g Rođ	Time/M	1001	1,037.	20421	•		1030	
	Underground No.	*	Hoisting & Lowering Rod	Working Time/M Working Time/M	500301	78010	430451			00381 1720251	26.7%
	ergron		. '! !	Time/M	0°42	0035*	0034,				
			Drilling	Working Time	340301	28025	90151			720101	11.2%
	oz-C alor		Working Time & Eff	Depth of Section	0 - 50 m (0 - 49.56 m)	50 - 100 m (49.56 - 98.05 m)	100 - 150 m (98.05 - 114.21 m)	150 - 200 m )		lotal	
						10 -	- 53				•

Time Distribution in Drilling Works

Table 3-27 Underground No. 4

Time Distribution in Drilling Works

Table 3-28 Underground No. 5

Time Distribution in Drilling Works

Table 3-29 Underground No. 6

	ومحمسم ومستمين	······································		·····		سحسنج		استست
Manshifts	Yan- shifts M	0.98	1.44	5.35			1.75	
Mans	Total Man- shifts	20	72.	80			202	
	Time/M	20291	4°061	130171			40351	
Total	Working Time	00022 1260001	0°331 205°001	24°00' 1°36' 200°00' 13°17'			00361 531,001	100%
rs	Time/M	0°22"	00331	1,926,1			9600	 
Others	Working Time	19°00!	27°301	24°00'			106 ₀ 02	13.2%
gui	Time/M	2000	00,00	6°11			0,956	·
Repairing	Working Time	\$9501	r0208	930001			0045* 107010*	20.2%
snoau	Time/M	00261	00421	1°59'				
Miscellaneous	Working Time	22°201	35°10'	30000			\$70,30	16.5%
λg & λg ĭ.T.	Time/M							
Hoisting & Lowering I.T.	Working Time							,
क के अ	Tine/M	0031:	10331	20381			10151	
Hoisting & Lowering Rod	Working Time	26°00'	77°50'	390351			1003, 143025,	27.0%
	Time/M	1001	1,008	00531				
Drilling	Working Time/M Working Time/M Working Time/M Time Time/M Time Time/M Time Time/M Time Time	\$2050:	26°10°	13°25'			122°251	23.1%
Working Time & Er-	Depth of Section	0 - 50 m (0 - 50.80 m)	50 - 100 m (50.80 - 100.70 m)	100 - 150 m (100.70 - 115.75 m)	150 - 200 m )		Total	

Time Distribution in Drilling Works

Table 3-30 Underground No. 7

Vorking Time & Et-	Drilling	But	Hoisting & Lowering Rod	8 88 Food	Hoisting & Lovering I.T.	£i	Miscellaneous	snoeu	Repairing	Ju;	Others	S'H	Total		Manshifts	fts
Depth of Section	Working Time/M Working Time/M Time Time/M Time Time/M Time Time/M Time Time/M Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	Vorking Time	Time/M	Working Time	Time/M	Working Time	Time/M	Total Man- shifts	Man- shifts /M
0 - 50 m (0 - 49.77 m)	33°251	00401	48°301	00581	90504	00121	08127 1128301	20171	20171 430451	00531	32°30'	00381	.75003 1050672 18500	.26003	87	1.75
50 - 100 m (49.77 - 72.15 m)	11,000;	0°291	470001	20061			630151	2°50	2050: 1090151	49531	23000	10021	1002' 253°30' 11°20'	11920'	7.8	3.49
100 - 150 m )																
150 - 200 m )																
											•··					
Total	44°251	00371	95°30،	.61 ₀ 1	10506		00081 1750451	2°261	2°26* 153°001	20071	540301	0045*	00451 5330001	7023	165	2.29
	8.3%		17.9%		1.8%		33.0%		28.8%		10.2%		100%			

Time Distribution in Drilling Works

Table 3-31 Underground No. 9

	т			<del></del>		 , <u>.</u>	<u>-</u>
Manshifts	Man- sbifts /M	0.76	1.56	1.43	1.38	1.28	
Mans	Total Man- shifts	37	62	72	29	255	
	Time/M	1051	1007	30431	39591	 30231	
Total	Working Time	93°007 1°51'	10127 2040001	0°25' 187°00'	0026' 193030'	00431 6770301	100%
r.s	Time/M	00501	10127			 L	
Others	Working Time	41,0501	60°30°	200451	21°00'	0025: 144005:	21.3%
jng	Time/M	, 20,0	00451	00421	00,00	00251	
Repairing	Working Time/M Vine/M Time Time/M Time Time/M Time Time/M Time Time/M Time	2°00'	38°30'	35°001	80001	83°301	12.3%
neous	Time/M	00081	0°341	35°10' 0°42'	410101 00511	24.	
Miscellaneous	Working Time	6,20	29°107	35°107	410101	11105111	16.5%
Hoisting & Lovering I.T.	Time/M						
Hoisting & Lowering I	Working Time					 <b> </b> 	
ng & Rod	Time/M	10500	,∞°1	10251	19351	 ig of	
Hoisting & Lowering Rod	Vorking Time	249501	50°30'	63°201	76°501	00371 2150301	31.8%
ing	Time/M	00211	06,901	16600	.7500	 37.	
Drilling	Working Time/M Time	180001	25°201	320451	460301	1220351	18.1%
Working Time & Ef-		т .25 m)	50 - 100 m (50.25 - 101.00 m)	100 - 150 m (101.00 - 151.40 m)	150 - 200 m (151.40 - 200 m)	Total	
	Depth of Section	0 - 50 m (0 - 50.25 m)	50 - 100 m (50.25 - 14	100 - 150 m 1 - 00.101)	150 - 2	ફર્લ	

Time Distribution in Drilling Works

Table 3-32 Underground No.10

Working Time & Ef ficiency	Drilling	gu	Hoisti	Hoisting & Lowering Lod	Hoisting & Lowering I.	, E4	Miscellaneous	neous	Repairing	garı	Others	es.	Total		Manshifts	difts
Depth of Section	Working Time	Time/M	Working Time	Time/M	Working Time/M Wine Time/M Working Time/M Working Time/M Working Time/M Time Time Time Time Time Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	fotal Man- shifts	Man- shifts /M
0 - 50 m (0 - 51.18 m)	39°201	00461	36,981	00461			190051	00221	1,0∞1	, 1000	17°00' 0°21' 116°00'	00211		2016.	45	0.88
50 - 100 m (51.18 - 101.50 m)	370401	370401 00451	10°20'	00121	400401	00481	40°35' 0°48'	00481	180451	0°22°	20000	0°241	0°241 168°001	3°20	8	1.39
100 - 150 m (101.50 - 154.96 m)	37°30°	0.42	37°30° 0°42° 19°00°	00211	57°10°	1,004	1,004. 94030.	1046.	2°30'	0°021	20000	0°22°	20°00' 0°22' 230°40'	40191	70	1.31
150 - 200 m )											<del> </del>					
Total	1149301		68°55'		97°50		154°10'		22015.		57°ω°		514°401		185	1.19
	22.2%		13.4%		19.2%		29.9%		4.3%		11.0%		100%		: .	

Time Distribution in Drilling Works

Table 3-33 Underground No.11

			<u> </u>				
Man- shifts /M	0.81	1.25	1.49			7.12	
Total Man- shifts	41	83	39			142	
Time/M	2014	40111	50461			30431	
Working Time	113°30'	2070301	151°00'			4720001	100%
Time/M							
Working Time	25°30°		190301		* *:		14.3%
Time/M	0021		00031			19000	
Working Time			1				2,8
Тіпе/М	00261	10131	2°22+				
Working Time	210451	•00 ₀ 09	620151			1440001	30.5%
Time/M							
Working Time							
Time/M	0°381	10331					
Working Time	32000	17,00.	510451			160°451	34.0%
Time/M	0038	0,461	00371			. 17,0	
Working Time	320151	38,001	16°00'			86015'	18.3%
g	0 - 50 m (0 - 50.84 m)	50 - 100 m (50 84 - 100.31 m)	100 - 150 m (100.31 - 126.52)	150 - 200 m		Total	
	Total Time   Time	Incremely Working Time/M Working Time/M Time	Incremely Working Time/M Working Time/M Time Time	Total   Morking   Time   Ti	100 m 32°15' 0°38' 32°00' 0°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38' 1°38	Dm	Northing   Northing   Northing   Nime/M   Nime   Nime

Time Distribution in Drilling Works

			ñ	Man- shifts /M	1.25	1.12	8, 3,			1.36
et Tur			Manshifts	s	2	26	2	****		166
										4006.
• .			Total	g Time	3°20'	3052.	60311			
			£0	Forkin Time	0°35' 170°45'	0°48' 194°00'	1018, 134000			0048' 498045'
			s:	Time/M			l			
			Others	Norking Time	300151	40,00.	260451			.00,26
orks			gata	Time/M	00121		0°25•			60,0
Time Distribution in Drilling Works		٠. ا	Repairing	Working Time/M Working Time/M Working Time/M Time/M Time	10001		80301	.,		18°30'
Dril		į	neons	Time/M	1200	00-201	2,08,	, , , , , , ,		1002'
i doi			Miscellaneous	Working Time	39°551	410401	44000			125035*
tribut			Hoisting & Lovering I.T.	Time/M						
e Dis		. !	Hoisti	Working Time	-				. i	
된	12		मेठ हैं अठ स्व	Time/M	0,55	10281	1054"			10191
	ad No.12		Hoisting & Lowering Rod	forking Tine	47°05°	73°301	39,05.			00481 1590401
* *	Underground		म इंद	Time/M	00511	00461	0°461			00481
	Unde		Drilling	Working Time/M Working Time/M Working Time/M Time	43,30	38°50'	15940	!		98,00.
	Table 3-34		Working Time & Ef- ficiency		0 - 50 m (0 51.05 m)	50 - 100 m (51.05 - 101.16 m)	100 - 150 m (201.16 - 121.74 m)	150 - 200 m }		Total
					<u></u>			<b></b>		

Time Distribution in Drilling Works

Table 3-35 Underground No.13

<del></del>						· · · · · · · · · · · · · · · · · · ·	·	بنجيب
Manshifts	Total Man- Shifts Shifts /M	1.32	1.61				1.46	
Mens		99	74				340	
	Time/M	3935.	4°35'				4004	
Total	Working Time	00371 180000	0°311 211°301				0°34' 391°30'	100%
ø	Time/M		00311					
Others	Working Time	30°45°	24000	:			540451	14.0%
Repairing	Time/M	16000	,6000				,60 ₀ 0	
Repai	Working Time	10801	70151				140451	3.7%
neous	Time/M	06461	83°35' 1049'	!			.9T ₀ T	·
Miscellaneous	Working Time	38,301	83°351				1220051	31.1%
ક છે. જે છે.	Time/M							
Hosting & Lowering I. T.	Working Time			·				
3 Su	Time/M	19101	10221				16101	
Hoisting & Lowering Rod	Working Time	63°401	62045				73°30° 0°46° 126°25°	32.2%
धु	Time/M	00471	00441				0°46°	
Drilling	Working Time/M Working Time/M Working Time/M Working Time/M Time Time/M Time Time/M Time	390351	330551				73°30°	19.0%
Working Time & Ef- fictency		0 - 50 m (0 - 50.02 m)	50 - 100 m (50.02 - 95.95 m)	100 – 150 m	150 - 200 m )		Total	
	Depth of Section	00	5,00	007	150			

Time Distribution in Drilling Works

Table 3-36 Underground No.14

Working Time & Ef- ficiency	Drilling	ģ	Hoisting & Lowering Rod	क क क	Hoisting & Lowering I.T.	વ્ય	Miscellaneous	Snoan	Repairing	ring	Others	s	Totel		Manshifts	fts
derion	Working Time	Time/M	Working Time	Time/K	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Tive/M	Tine Ine/M Time Time/M Time Time/M Time Time/M Time Time/M Time Time/M Time Time Time Time Time Time	Time/M	Total Man- shifts	Man- shifts M
0 - 50 m (0 - 50.32 m)	42010	0,201	599151	1011		<del></del>	340351	0041.	4000,	i	0°05' 18°00' 0°20' 158°00'	00201	158000	3007	ĸ	1.01
50 - 100 m (50.32 - 99.24 m)	30,00	00371	68°30'	10241			190151	00241			140151	0,12.	00171 1320001	20421	82	0.78
100 - 150 m (99.24 - 123.20 m)	14°35'	14°35' 0°36'	38°401	1037*			16°00'	00401			90151	0°23*	90151 00231 780301	3016	21	0.88
150 - 200 m )											<del></del>					
		i		• ······								The state of the s				
Total	860451		00421 1660251	1021,			,05,69	2,7%	40001	0.02	41,030	0020	00201 3680301	20291	110	0.89
	23.5%		45.3%				18.9%		1.1%		11.3%		100%			

Time Distribution in Drilling Works

Table 3-37 Underground No.15

Working Time & Ef- ficiency	Drilling	89 0	Hoising & Lowering Rod	68 B9	Hoisting & Lowering	98 98	Miscellaneous	snoaut	Repairing	rîng	Others	<b>6</b> 0	Total		Manshifts	ì£ts
Depth of Section	Working Time	Time/M	Working , Time	Fime/M	Working Time/M Time Time/M Time Time/M Time Time/M Time M Time Time M Time Time Time Time Time Time	lime/M	Working Time	Time/M	Morking Time	Тіпе/М	Vorking Time	Time/M	Working Time	Time/M	Total Man-Man- shifts shifts //	Men- sbifts /M
0 - 50 m (0 - 52.21 m)	490151	00561	610201	1,005			410501	00481	26°35"	0°31'	31,030.	.9600	31°30' 0°36' 210°30' 3°56'	3°56.	r.	0.74
50 - 100 m (52.21 - 98.88 m)	36°00' 0°46'	0046	610451	1019,	. :		31,030	0,40			18045'	0°24'	18°45' 0°24' 148°00'	3910.	46	1.01
100 - 150 m (98.88 - 121.95 m)	140301 00381	0,38	330451	10281			30001	19181	1,000,1	. 6000	110451	0031	910001	30571	83	0.82
150 - 200 m				i							***			•		
											-					
Total	990451	0,491	0949: 1569501	1017.		٠.	103°201	0051,	27035	00741	62900	0031	0031, 4490301	3041	145	0.84
	22.2%		34.9%			•	23.0%		6.1%		13.8%		100%			

Time Distribution in Drilling Works

Table 3-38 Underground No. 16

٦	·	тТ		1	····	<del></del> -	
ifts	Man shifts /M	0.97	0.77	•			00
Manshifts	Total Man- sbifts	Š	\$2				\$2
	Time/M	3°23.	40151				3031.
Total	Working Time	00171 1560301 30131	810301				0020* 238000*
s)	Time/M		0025				
Others	Working Time	14000.	.000,8	, ,			22°00°
ring	Time/M	0005					0,00
Repairing	Working Time	2000.			omboo da'a laku gaa ge-Ar-		2°00
snoam	Time/M	1013.	1°56				1°25•
Miscellaneous	Working Time	\$80507	37°00'				95°501
	Time/M						
Hoisting & Lowering I. T.	Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Time Time						
अ अ	Time/M	00531	1917	,			1,000.
Hoisting & Lowering Rod	Working Time	42040	24040				67°20° 28.3%
Drilling	Time/M	00,481	0037.				0°451
		39°001	11°50'				50°50
Working Time & Ef- floiency		0 - 59 m (0 - 48.52 m)	50 - 100 m (48.52 - 67.67 m)	100 - 150 m )	150 - 200 m )		Total

Time Distribution in Drilling Works

Table 3-39 Underground No. 17

s	Man- shifts	1.22				1.22
Manshifts	Total :	21				 23.
7	Time/M	2020				2020.
Total	Vorking Time	60000				100%
92	Time/M	0021				0021.
Others	Working Tine	2006				15.0%
gai	Time/M	6000				.6000
Repairing	Vorking Time	3045	·	i		3045
neons	Time/M	16500				.6500
Miscellaneous	Working Time	16045				16°45°
	Tine/M					
Hoisting & Lowering I.T.	Working Time/M Time/M Time/M Time		,			
න න න න	Time/M	0028				0028.
Hoisting & Lovering Rod	Working Time	110501				11,050.
gail	Time/M	18°40. 0°44.				0°44'
Drilling	Working Time	18940				18°40'
Working Time & Ef- ficiency			-	6	B	
	Depth of Section	0 - 50 m (0 25.70 m)	50 - 100 m	100 - 150 m	150 - 200 m	Total

Time Distribution in Drilling Works

Table 3-40 Surface No. 1

Manshifts	Totel Men- Men- shifts shifts	60 1.08	40 0.88	55.5 1.16	36.5 0.71		
Total	Time/M	3°23	20331	3011.	2002		
2	Vorking Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Man- Time	00321 1880001	11,000 0014 116000	00181 152000	00121 1050001 20021		
Site	Тіпе/Ж	0032	0°1.4°	00181			L.
Others	Working Time	29045	<b>1</b> .	140001	10000.		
Repairing	Time /M	804.	00041		0,00		
Repai	Working Time	4900.	3000		10001		
snoec	Time/M	1024'	00261	1021,	00261	·.	
Miscellaneous	Working Time	770301	19°45'	640301	22°30'		
8 50 59	Time/M	0018	. 420	00291	0°28'		
Lowering I. T.	Vorking Time	17000. 0018.	200301	23°30" 0°29"	240201 00281		
સ્ટ સ્ટ્રેટ ક	Time/M	,60%	. 2000	00141	0,006	 	
Lowering	Vorking Time	.0008	50001	110001	2000		
Suç	Time/M	0.567	19151	00491	00491		
Drilling	Working Time	519451	56045	399001	42010.		
Time & ficiency	Depth of Section	0 - 50 m (0 - 55.50 m)	50 - 100 m (55.50 - 100.95)	100 - 150 m (100.95 - 148.60 m)	150 - 200 m (148.60 - 200)		

Time Distribution in Drilling Works

Table 3-41 Surface No. 2

<u> </u>			·	1			~~~	
ites	Workers /M	2.07	2.99	2.93			2.65	
Manshifts	Total Man- shifts	110.5	134.5	153.5			398.5	
18.	Time/M	56321	7°56'	5054.			6°22	
Total	Working	27°00 0°29 294°00	00421 357000	00421 308000			00,656 8500	100%
s s	Time/M	0°291	0042					
Others	Working	27°00.	320001	37°001			,∞,96	10.0%
Repairing	Time/M	2°02′	29311	2°091			2°13•	
Repa	Working	109°15	2°56' 113°30'	1°30' 112°00'			10527 3340451	35.0%
snoau	Time/M	1,22,	2°561	1030.			10521	
Miscellaneous	Working	10°45' 0°11' 71°45' 1°27' 109°15'	0°27' 131°50'	78045			0022 282020	29.4%
લ્સ	Time/M	0,111	0°27	0°27				
Hoisting & Lowering I. T.	Working	10°45'	200101	23°20°			540151	5.6%
के के क	Time/M	00141	0018*	6000			00141	
Hoisting & Lovering Rod	Working Time	13°30'	13015.	7030'			340151	3.6%
gui	Time/M	19091	1,002	0057			1,003.	
Drilling	Working Time /M Fine /M Forking Time /M Working Time /M Working Time /M Working Time /M Forking Time /M Forking Time /M	619451	46°15°	499251			1570251	16.4%
Working Time & Ef- ficiency	rion ion	0 - 50 m (0 - 53.30 m)	50 - 100 m (53.30 - 98.30 m)	100 - 150 m (98.30 - 150.55 m)	150 - 200 m )		Total	
	Depth of Section	-0)	50 -	100	150			.;

Time Distribution in Drilling Works

Table 3-42 Surface No. 3

Working Time & Ef- ficiency	Drilling	<u> </u>	Hoisting Lowering Rod	იც ხე ხე	Hoisting & Lowering 1. T.	***************************************	Miscellaneous	snoec	Repairing	ing	Others	ψ	Total		Manshifts	t S
Depth of Section	Working Time	Time/M	Working Time/M Vorking Time/M Time M Time	Time/M	forking . Time	Tin /M	Working 1	гіве/м	Working Time	Time/M	Forking Time	Time/M	Working Time	Time/M	9	Men- shifts /M
0 - 50 m (0 - 53.90 m)	46°20°	0°521	1 ⁰ 25'	0,05	9°201	00101	21055	00247			11,000	0°12•	.00,06	10401	23.5	0.44
50 - 100 m (53.90 - 102.05 m)	350001	00461	20001	2000	12000.	00151	170001	00211			,00°è	0,00	72°00°	1030.	24.5	0.51
100 - 150 m (102.05 - 152.70 m)	360151	00431	10001	001.	18°45'	0,22.	10000. 0012.	00121			.0009	0007	72000+	1°25°	22.5	0.4
150 - 200 m (152.70 - 201.50)	47045	.8500	10,000	00124	21°30'	0°26°	68015 1023	1023	24°30	0690	16,000	.61,0	09191 1880001 3048	3°48	58.5	1.18
. :														:		
Total	165°20°	.6700	140251	000	0°04' 61°35'	.8100	0018, 117010, 0035.	.55,0	24°30'	.7000	39°001	00121	00121 4220001	20061	129	0.64
	39.2%		×4.0		14.6%		27.8%		5.8%		9.2%		100%			

Time Distribution in Drilling Works

Table 3-43 Surface No. 8

Norking Tine & Bf- ficiency	Drilling	Su	Hoisting Lowering Rod	-33 -53 (5)	Hoisting & Lowering I. T.		Miscellaneous	re on s	Repairing	Sai	Others		Total	-	Manshifts	Ę.
Depth of Section	Working Time	Working Time/M Wo	Working Time	Time/M	Working Time	Time /M	rking Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Working Time/M Man-	Time/M	Working Time	Time/M	Working Time	Time/M	Working Time	Time/M	m 8	Man- shifts /M
0 - 50 m (0 48.80 m)	36°00°	0044+	10°30'	0013,	20015.	0025	0025' 167020'	3026.	80°551	1039.	41,000,	0500	0000 3260001	7017	122	2.50
50 - 100 m (48.80 - 99.00 m)	330501	00401	11000,	00131	340401		0°41' 133°00'	20391	36,000	00431	24,000	0°291	0°29' 272°30'	50251	8	1.79
100 - 150 m (99.00 - 154.23 m)	410501	0045	70007	.8000	389201	0042	78°20°	1,025.	10802	.80,0	17°00'		00,061 130,000	3026.	æ	0.96
150 - 200 m )																
				i												
Total	111040	0043	28°30	11100	930151	00361	00361 3780401	2027	20271 1240251	.6700	82°00'	0032	0032 818030	5018.	265	1.72
	13.6%		3.5%	<b></b>	11.4%		46.3%		15.2%		10.0%		100%			

# APPENDICES (Geological Data)

### **APPENDICES**

# GEOLOGY

A-1	List of Rock Samples
A-2	Locality Map of Rock Samples on Level 3,500 m, Michiquillay Ore Deposit
<b>A-</b> 3	List of Microphotographs Thin Sections
A-4	List of Microphotographs Polished sections
A-5	Chart of Xray Diffraction Analysis
A-6	Photographs of Fossils
A-7	Flowsheet of Preparation of Assay Samples
A-8	Flowsheet of Chemical Analysis
A-9	Comparison of Ore Grades between Crosscut No.1 and Underground Drill Hole No.4
À-10	Comparison of Assays between C.R.L. and Plenge C.R.L.:
	Central Research Laboratory of Mitsui Mining and Smelting Co Tokyo

# A-1 List of Rock Samples

l Remarks			
Fossil			
X-ray analysis	0 0	0000	
analysis Ore	o o	0	
Chemical Rock	۰ ۰	0	
Polished section	00000		
Thin Section	00000		
Rock	qtz monzonite porphyry "	<pre>qtz monzonite porphyry     "     "     "  qtz monzonite porphyry     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "     "</pre>	qtz : quartz
Formation			
Location	Cross cut No.1	Cross cut No.3 Cross cut No.2	
No.	3101 3102 3103 3104 1432 1818	3201 3202 3203 3204 3205 3206 2508 2508 3302 3302 3304 3305 3306 3305	
		A - 3	

qtz : guartz

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Fossil											· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·					· · ·
X-ray analysis		•	0	•												· · · · · · · · · · · · · · · · · · ·			
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Chemical Rock						•					-		*****						
Polished section	0	٥	0	•	<b>\</b>	0	۰	0	0	0	•	0	0		VII.			į 	
Thin section	٥	0	0	٥	•	0	o	0	0	٥	٥	٥	٥	٥	٥	0	0	٥	0
Rock	qtz monzonite porphyry	<b>±</b>	<b>E</b>	•	<b>=</b>	qtz monzonite porphyry	qtz monzonite porphyry	*	<b>F</b>	qtz monzonite porphyry	£	sandstone / magnetite	magnetite	porphyrite	andestic sandy tuff	shale with sandstone	black shale (tuff)	porphyrite	qtz monzonite porphyry
Formation								+ 1				•			Inca	r	E		
Location						Cross cut No.4-A	5.0Mog	on nugu	Und gro Bo	Surface	Boring No.8	Surface	Boring	No.1	Surface	Boring	No.2	Surface	Boring
Sample No.	3401	3402	3403	3404	3405	5221	4501	4601	4701	2821	2822	2102	2103	2104	2201	2202	2203	2301	2302

dtz : duartz

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Rock Thin section	te porphyry	•		¢ .		····-	rock	£	sbale		quartzite	shale		sandy shale	shale	& skarn	garmet skarn					
Rock Thin section	te porphyry	0		¢		····-	rock	£	shale		quartzite	shale	<b>±</b>	sandy shale	shale	limestone & skarn	garnet skarn					
Rock Thin section	te porphyry	•		¢ .		····-	silicified rock		" shale		" quartzite	" shale	1	" sandy shale	" sbale	limestone & skarn	" garnet skarn	quartzite			shale	
Rock Thin section	te porphyry	0		·		····-	silicified rock	£	" shale	±	" quartzite	" shale		" sandy shale	" shale	limestone & skarn		quartzite			shale	
Thin	te porphyry	•		¢ .		····-	rock	£	" sbale		" quartzite	" shale	#	" sandy shale	" shale	& skarn						
Formation Rock Thin section	9tz monzonite porphyry		*	¢ .		····-	silicified rock	£	" sbale		" quartzite	" shale	#	" sandy shale	" shale	limestone & skarn		quartzite			shale	
Formation Rock Thin section	9tz monzonite porphyry		<b>.</b>	£		····-	silicified rock	£	" shale	r.	" quartzite	" shale	#	" sandy shale	" shale	limestone & skarn		quartzite			shale	
Formation Rock Thin section	9tz monzonite porphyry		<b>.</b>	£		····-	silicified rock	£.	" shale	r.	" quartzite	" shale	# #	" sandy shale	" shale	limestone & skarn		quartzite			shale	
Location Formation Rock Thin section	te porphyry		*	£		qtz monzonite porphyry	Inca silicified rock		ε	ŧ	£	<b>F</b>	E	<b>‡</b>	<b>£</b>	Chulec limestone & skarn		quartzite			shale	
Location Formation Rock Thin section	Surface qtz monzonite porphyry	Borino	No.3	£		qtz monzonite porphyry	Inca silicified rock		ε	ŧ	£	<b>F</b>	E	<b>‡</b>	<b>£</b>	Chulec limestone & skarn	<b>*</b>	Inca quartzite	monz. & shale contact	qtz monzonite porphyry	Inca shale	
Formation Rock Thin section	Surface qtz monzonite porphyry		<b>.</b>	£		····-	silicified rock	0401C " "	O402A " sbale	04028	0402C " quartzite	0402D " shale	0402E	0402F " sandy shale	0403 " shale	limestone & skarn		quartzite			shale	

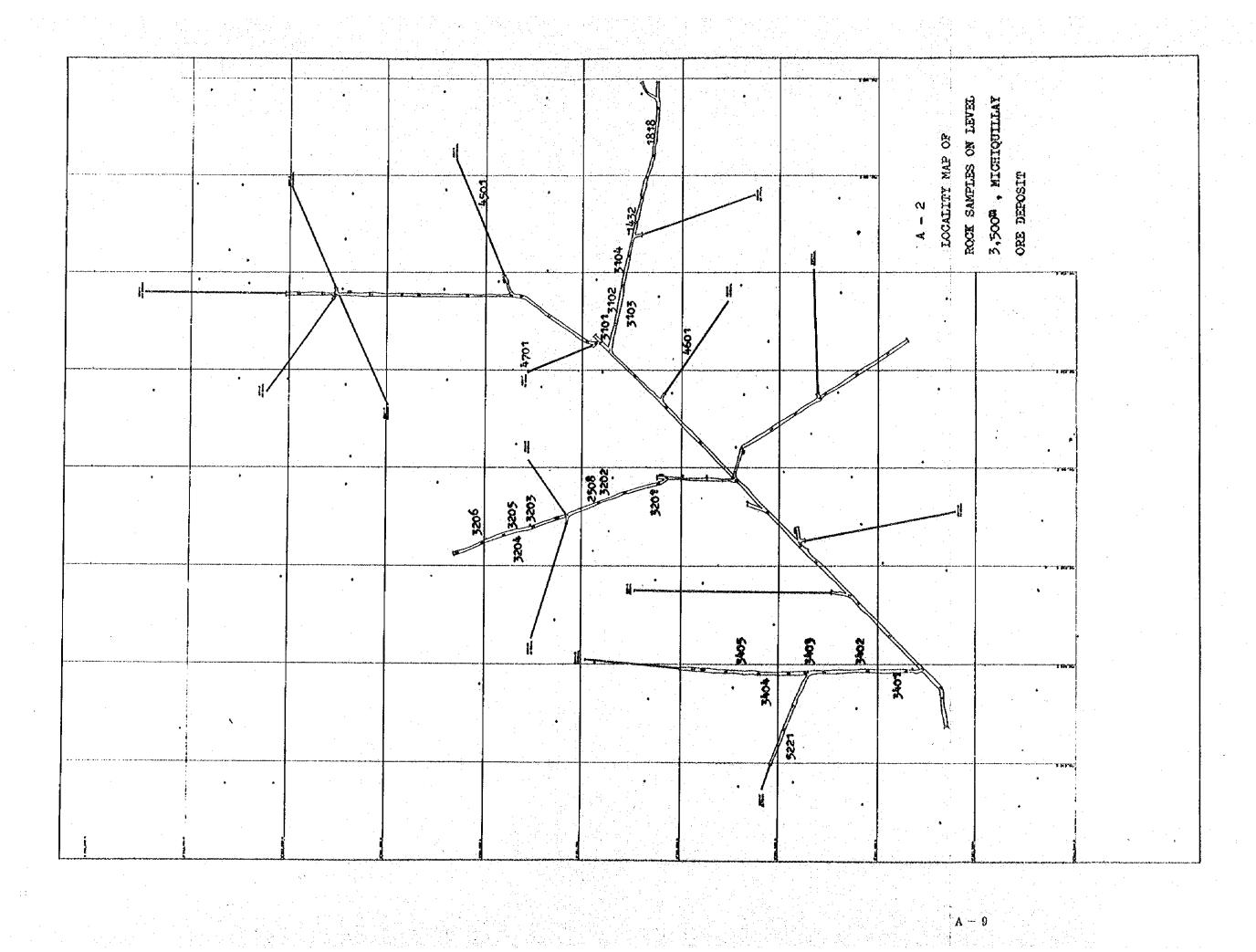
qtz : quartz monz : monzonite

monz : monzonite qtz : quartz

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qtz monzonite porphyry	shale	monz. with xenolith	qtz monzonite porphyry	shale	quartzite	quartzite & shale	quartzite	qtz monzonite porphyry	<b>*</b>	gossan	qtz monzonite porphyry	ŧ	limestone	qtz monzonite porphyry	2	sandstone	qtz monzonite porphyry	magnetite
	Inca			Inca	Goyaris-	r ggzīnb	<b>E</b>						Chulec			Inca	.•·	Inca
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жоож	gossan	sandy shale	<b>#</b>	brecciated shale	<b>5</b>	sandstone	limestone	fossile	porphyrite	fossile	<b>:</b>	fossile	=	andesite tuff	fossile	\$	r	
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Sample No.	2903	2904	1001	2905	1002	1301	1302	1303	1304	1305	1306	2905	2906	2907	3001	3002	3003	
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A-2 Locality Map of Rock Samples on Level 3,500 m,
Michiquillay Ore Deposit



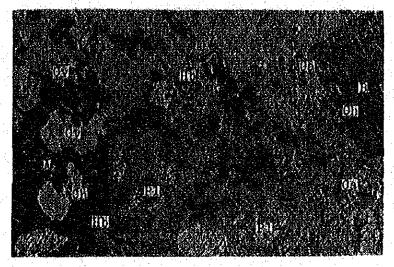
# A-3 List of Microphotopraphs

## Thin Sections

	Sample No.	Rock Name	Location
(1)	2805	hornblende quartz monzonite porphyry	western valley
(2)	2307	<b>n</b>	surface boring No.3
(3)	2821	biotite quartz monzonite porphyry	surface boring No.8
(4)	1818	n	crosscut No.1
(5)	1432	n	crosscut No.1
(6)	3202	**	crossout No.2
(7)	5221	$\mathbf{n}$	crosscut No.4-A
(8)	5221	<b>11</b>	e e
(9)	3101	U	crosscut No.1
(10)	3515	n	crosscut No.3
(11)	3515	u ·	crosscut No.3

Sample No.2805

Location: western valley
Rock Name: hornblende quartz monzonite perphyry



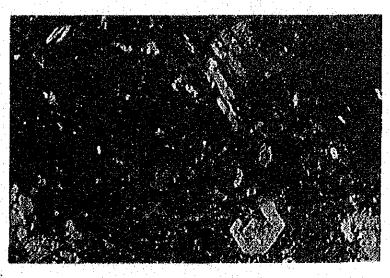
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Hb: hornblende Pl: plagioclase

Ca: calcite Ch: chlorite

B : green biotite

Ap; apatite Cv; cavity



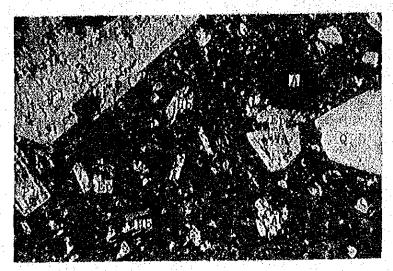
crossed nicols

) 1^m

1^{mm}

Location: surface boring No.3
Rock Name: hornblende quartz monzonite porphyry

0



## crossed nicols

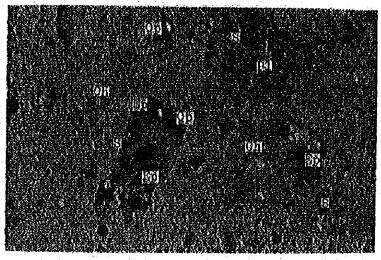
Hb: hornblende

Q : quartz

Pl: plagioclase Ep: epidote A: antiperthite

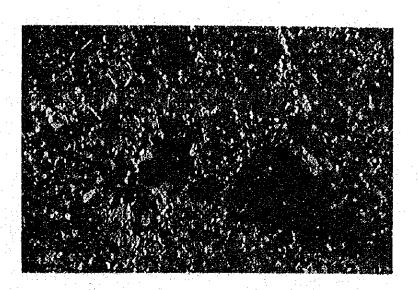
Sample No.2821

Location: surface boring No.8



## opened nicol

Ch: chlorite
Ep: epidote
S: siderite Pl: plagioclase Op: opaque

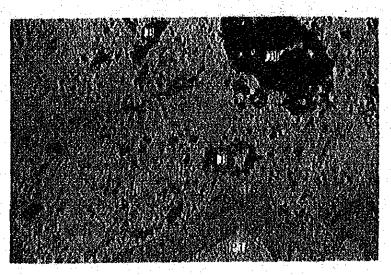


crossed nicols

 $1^{mm}$ 

 $\tilde{1}^{mm}$ 

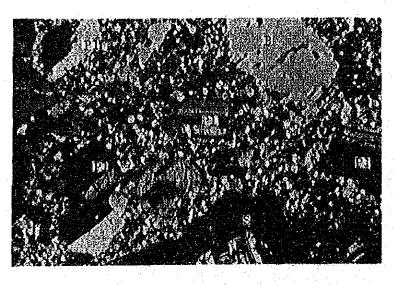
Location: crosscut No.1



opened nicol

O J_{mm}

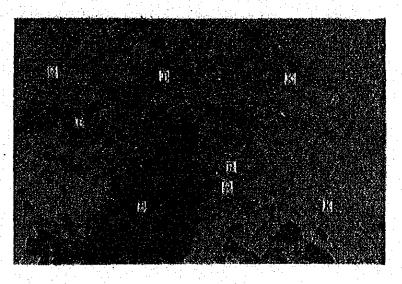
B : biotite
Pl: plagioclase
S : sericite



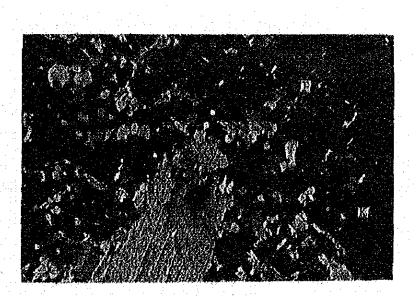
crossed nicols

0 1 mm

Location: crosscut No.1



- B : biotite
  K : orthoclase
  P : perthite
  Q : quartz

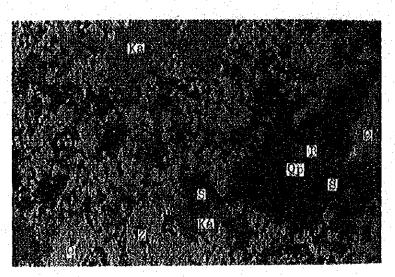


crossed nicols

0.5^{mm}

0.5^{mm}

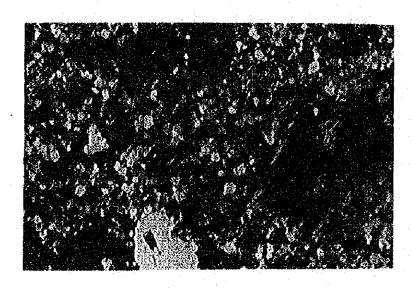
Location: crosscut No.2



opened nicol

Q : quartz
B : biotite

Z: zircon
Ka: kaoline
S: sericite
Op: opaque

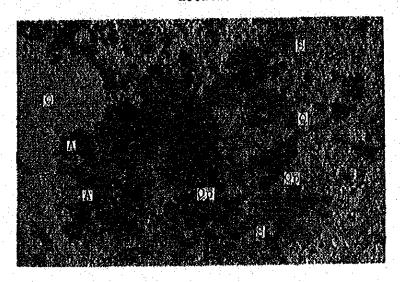


corssed nicols

1^{mm}

1^{mm}

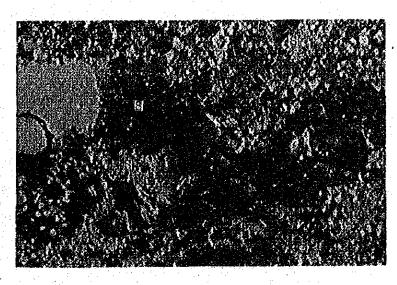
Location: crosscut No.4-A



# opened nicol

Q: quartz
A: andalucite
S: sericite
Op: opaque

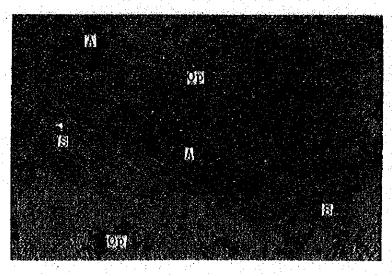




crossed nicols

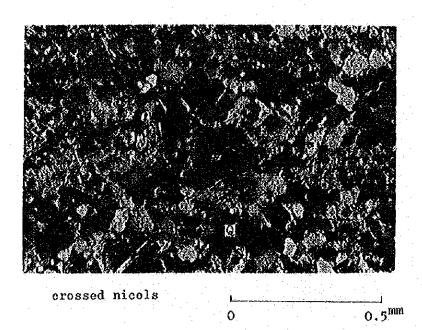
0 J_{mm}

### Location: crosscut No.4-A

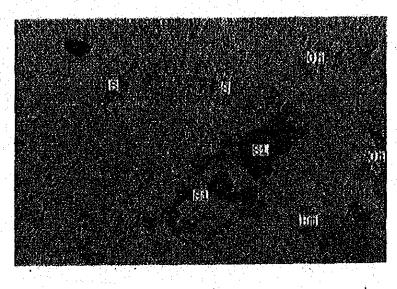


opened nicol 0.5^{mm}

A ; andalucite Q ; quartz S ; sericite Op; opaque

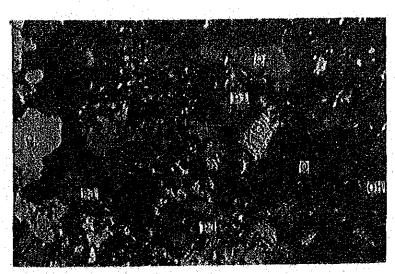


# Location: crosscut No.1



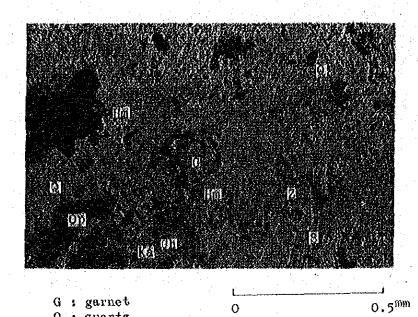
opened nicol 0.5 mm

Si: siderite
Ch: chlorite
S: sericite
Hm: hematite
Pl: Plagioclase
Q: quartz



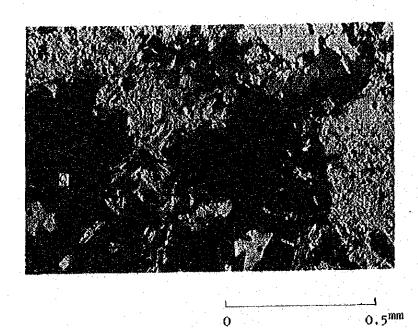
crossed nicols
O.5mm

# Location: crosscut No.3



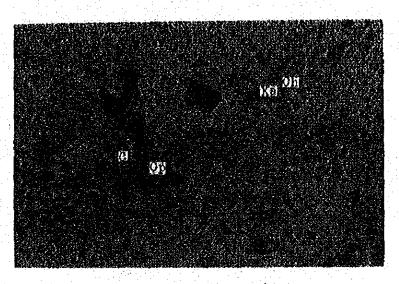
0

G: garnet
Q: quartz
Z: zircon
S: sericite
Ka: kaoline
Ch: chlorite
Hm: hematite
Op: opaque



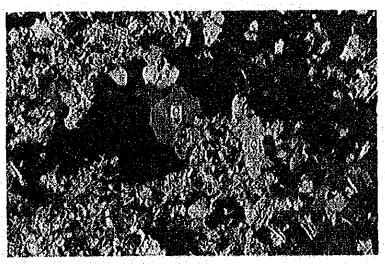
Location: crosscut No.3

0.5^{mm}



opened nicol

C: corumdum
Q: quertz
S: sericite
Ka: kaoline
Ch: chlorite
Op: opaque



erossed nicols
0 0.5^{mm}

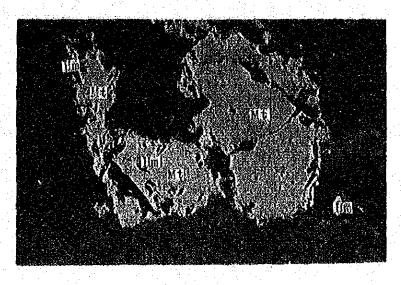
#### A-4 List of Microphotographs

#### Polished Sections

	Sample No.	Rock Name	Location
(1)	3000	Hornblende quartz monzonite porphyry	Magnetite hill
(2)	3101	Biotite quartz monzonite porphyry	Crosscut No.1
(3)	1818	n	Crosscut No.1
(4)	1432	· · · · · · · · · · · · · · · · · · ·	Crosscut No.1
(5)	3306	H.	Crosscut No.3
(6)	3402	n · ·	Crosscut No.4
(7)	3203	#	Crosseut No.3
(8)	4501	<b>tt</b>	Underground boring No.5
(9)	3403	II .	Crosscut No.4
(10)	3205	n .	Crosscut No.2
(11)	3515	U U	Crosscut No.3
(12)	3201	n e	Crosscut No.2

Sample No.3000

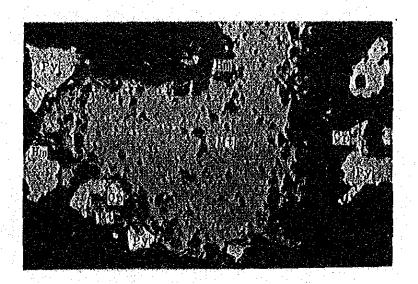
Location: magnetite hill Rock Name: hornblende quartz monzonite perphyry



Mt: magnetite Hm: hematite

Sample No.3101

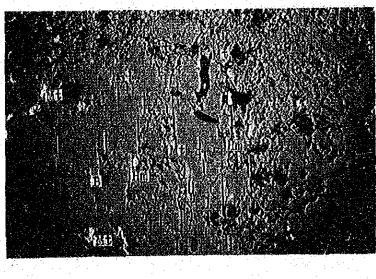
Location: crosscut No.1



Mt: magnetite Hm: hematite Py: pyrite Cp: chalcopyrite

## Sample No.1818

# Location: crossout No.1

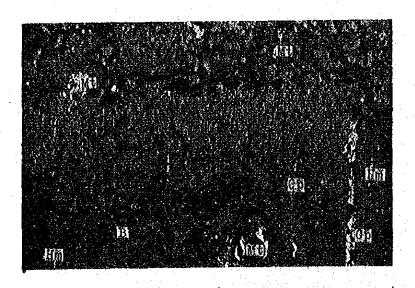


) 1^{num}

B: biotite
Mt: magnetite
Hm: hematite

Sample No.1432

Location: crosscut No.1

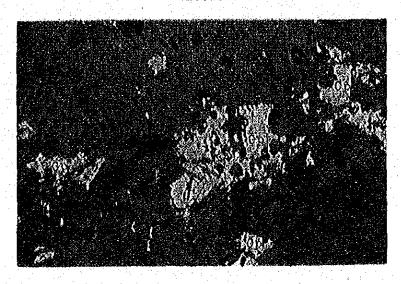


B : biotite

Cp: chalcopyrite
Mt: magnetite

Hm: hematite

Location: crosscut No.3

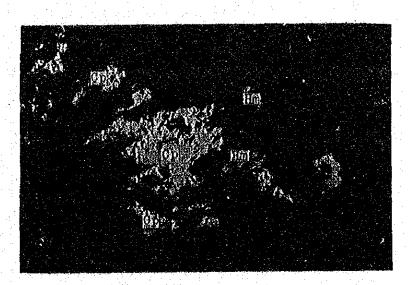


0 0.5^{mn}

Cp: chalcopyrite

Sample No.3402

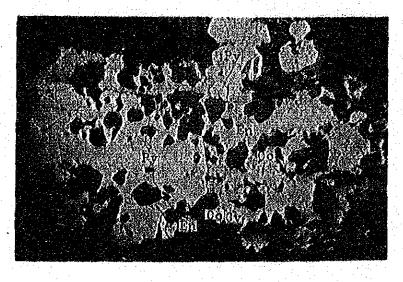
Location: crosscut No.4



0.5^{mm}

Cp: chalcopyrite Hm: hematite

Location: crosscut No.3

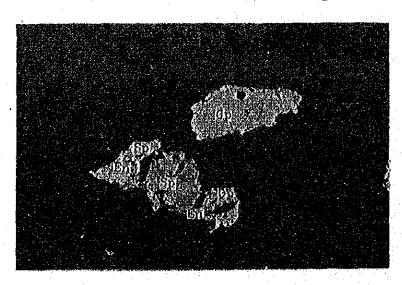


Py: pyrite
En: enargite
Cc: chalcocite
Cv: covelline

o 1^{mm}

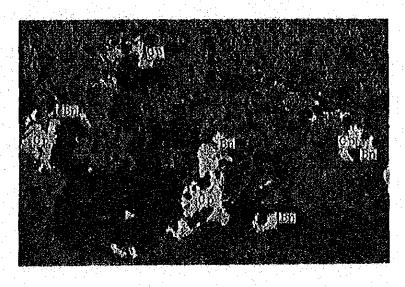
Sample No.4501

Location: underground boring No.5



Cp: chalcopyrite En: enargite Sp: sphalorite 0 0.5^m

Location: crosscut No.4

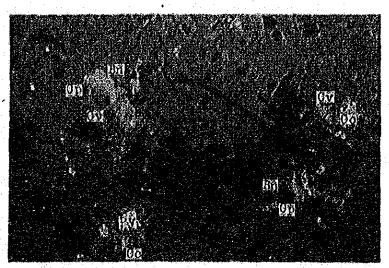


Cp: chalcopyrite Bn: bornite

0,5^{mm}

Sample No.3205

Location: crosscut No.2

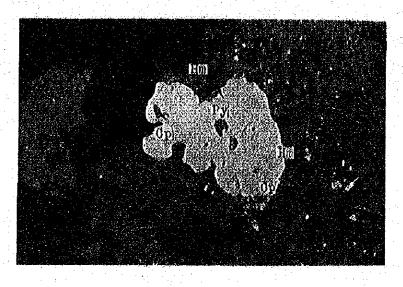


Py: pyrite
Cp: chalcopyrite
Bn: bornite
Cv: covelline
Cc: chalcocite

0.5^{mm}

## Sample No.3515

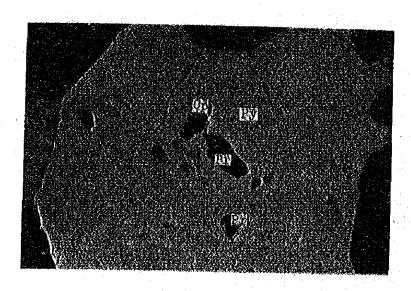
## Location: crosscut No.3



Py: pyrite
Hm: hematite
Cp: chalcopyrite

Sample No.3201

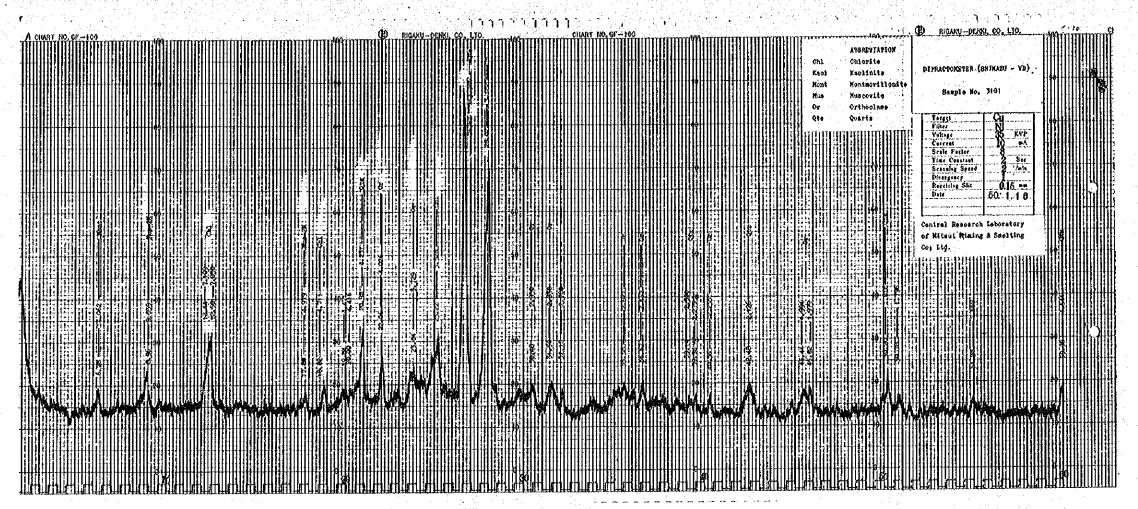
## Location: crosscut No.2

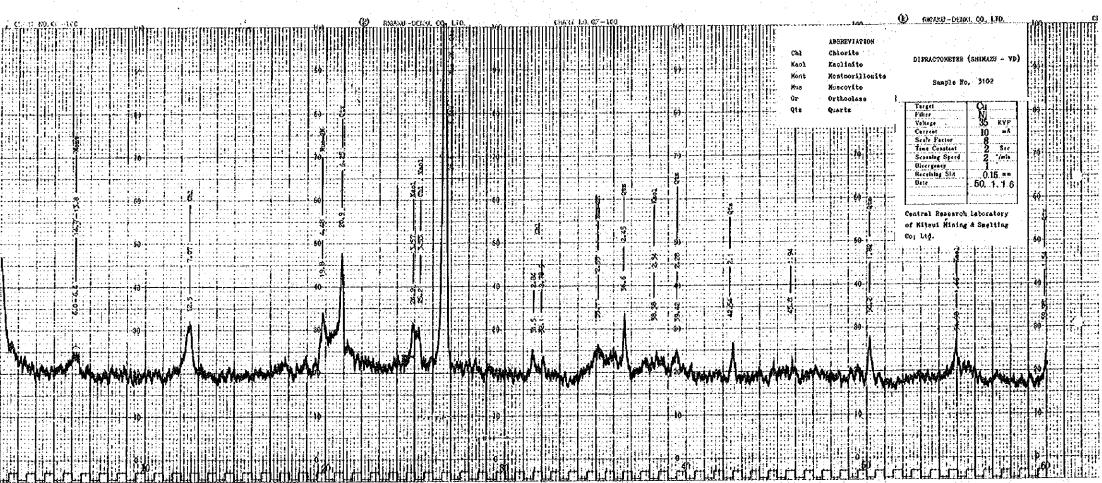


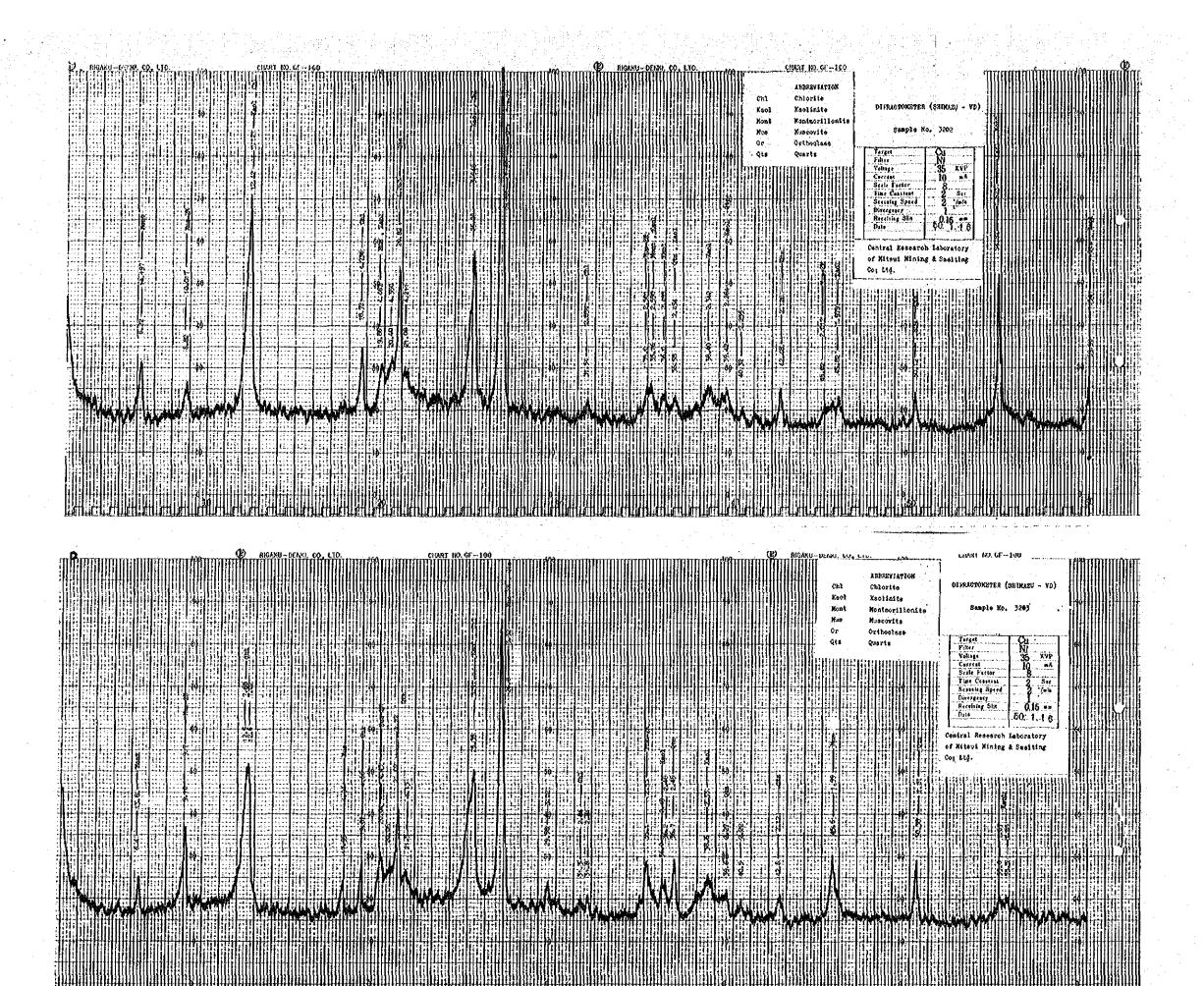
Py: pyrite Cp: chalcopyrite Pr: pyrrhotite

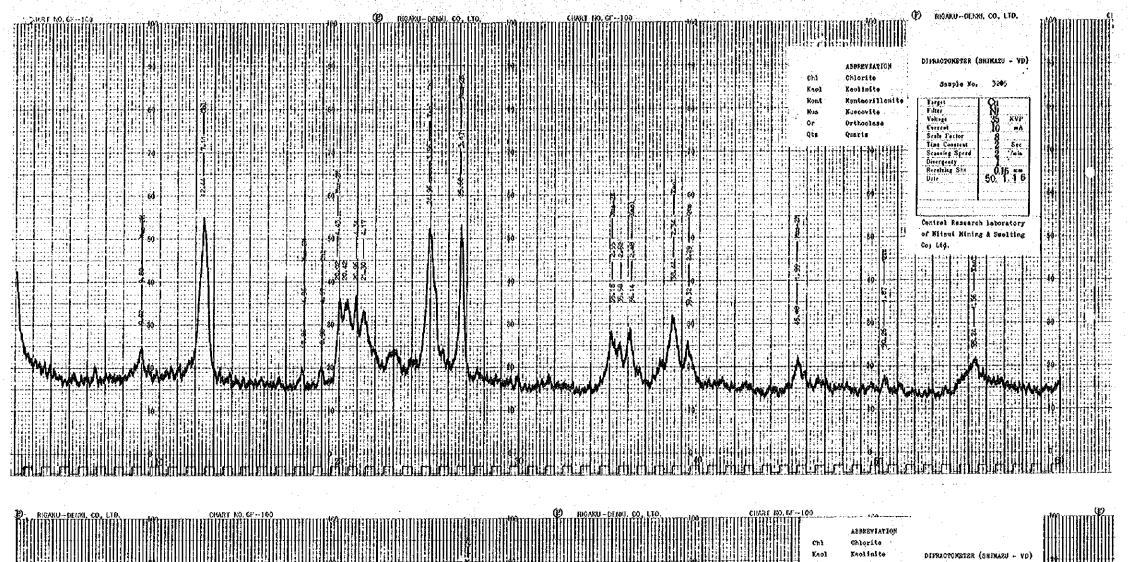
# A-5 Chart of X-ray Diffractive Analysis

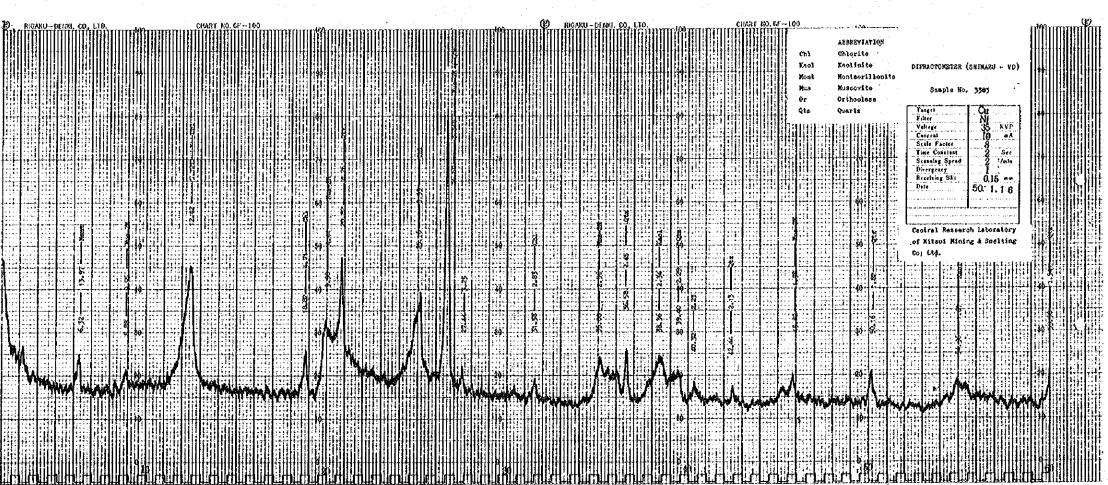
Sample	No.		Location
3101			Crosscut No. 1
3102			ditto
3202			Crosscut No. 2
3203			ditto
3205			ditto
3303			Cross cut No. 3
3304			ditto
3305A	٠		ditto
3305B			ditto
3306Л		•.	ditto
3402	•		Crosscut No. 4
3403A		* .	ditto
3404			ditto

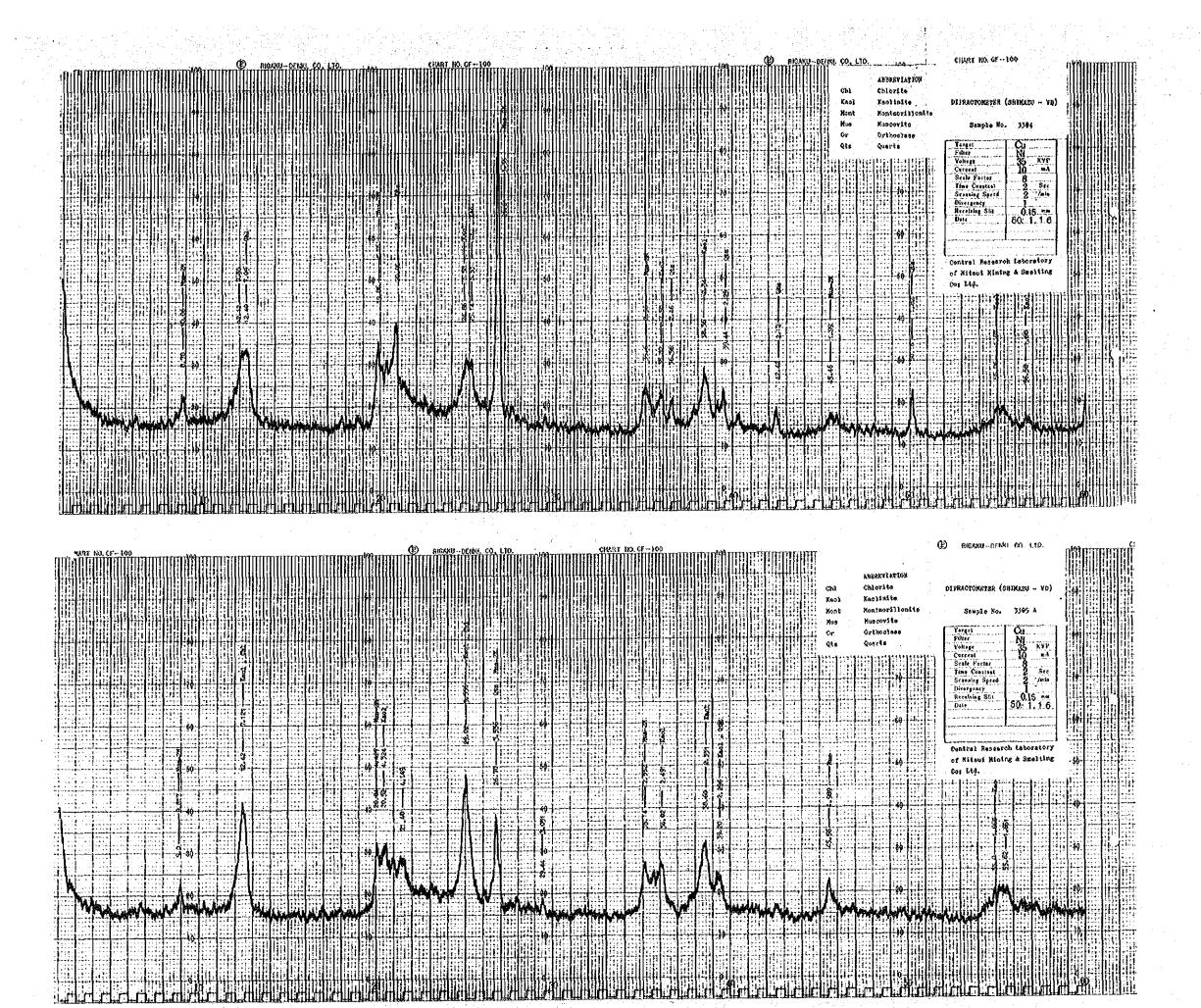


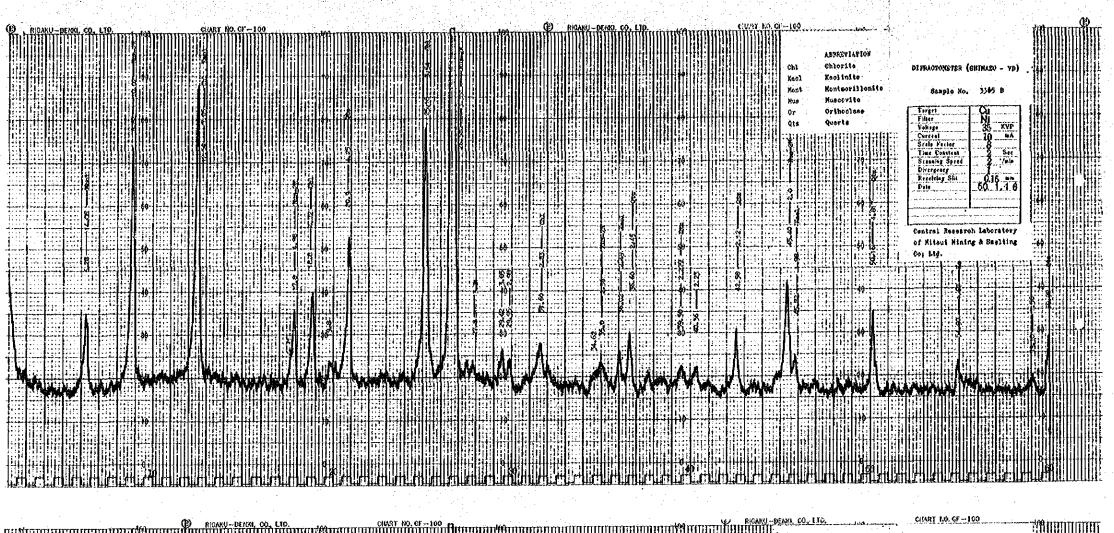


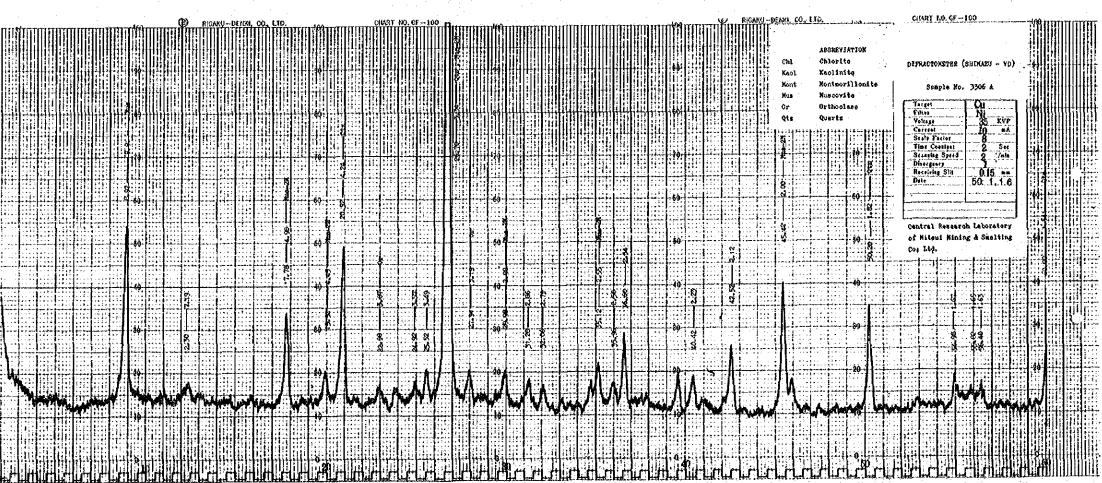


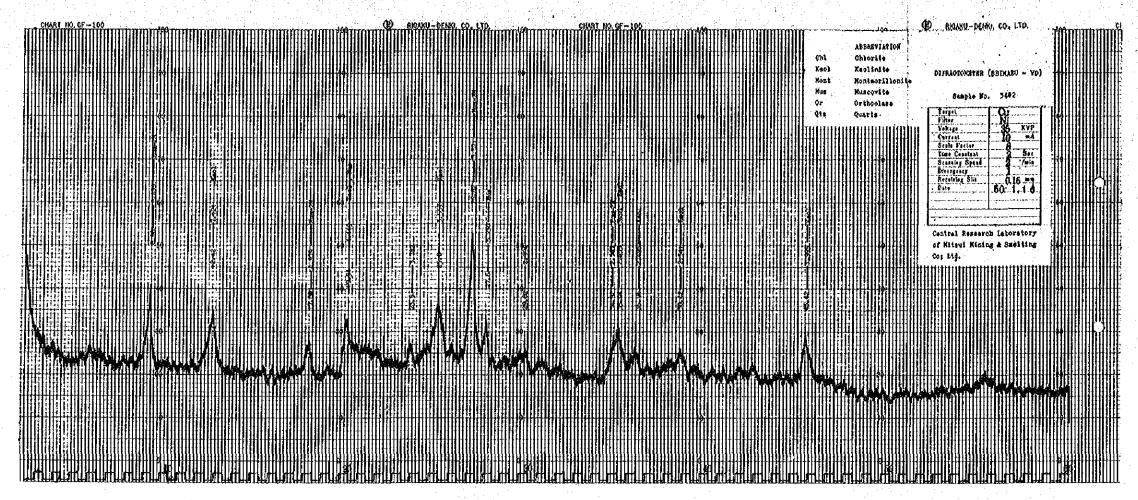


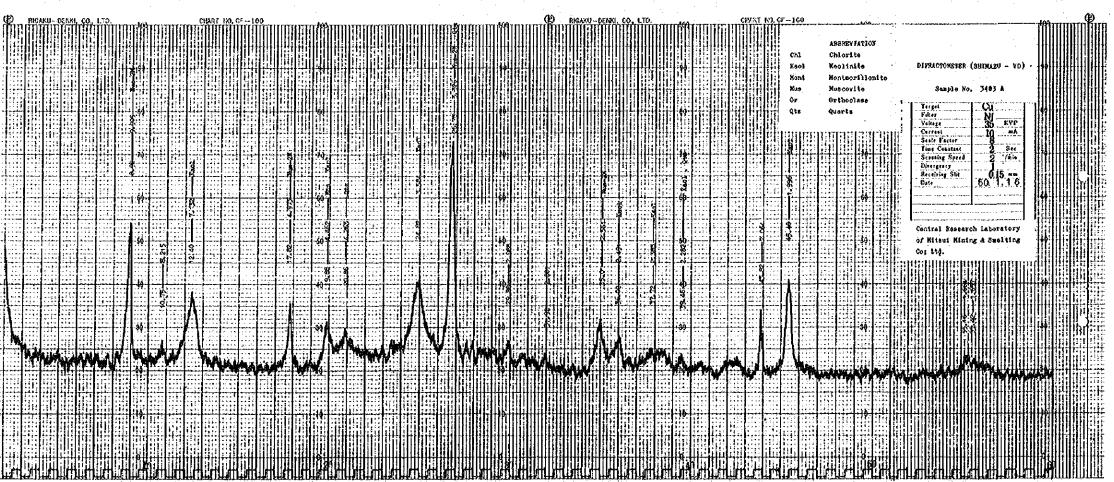


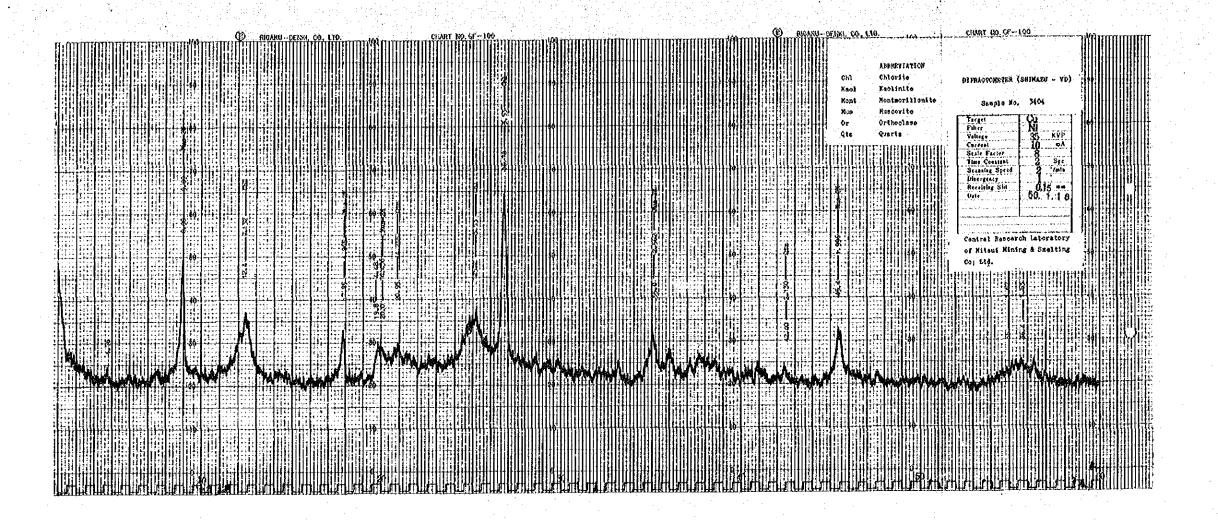








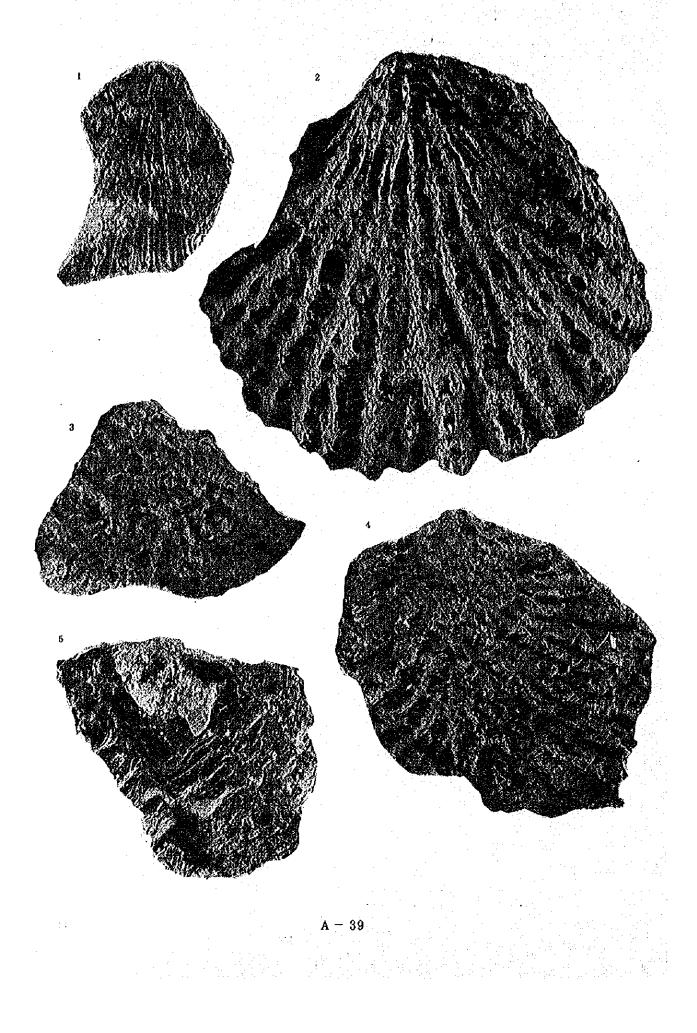




A-6 Photographs of Fossils

## (All figures X 1)

- Fig. 1. "Chlamys" sp. Sample No. 3003.
- Figs. 2-5. Lopha (Actinosteon) aff. bellaplicata (Shumard)
  - fig. 2. Lateral view of a large left valve. Sample No. 3003
  - fig. 3. Lateral view of a fragmental left valve. Sample No. 2904.
  - fig. 4. Lateral view of a typical left valve. Sample No. 2906.
  - fig. 5. Interior view of a fragmental left valve. Sample No. 3002.



- Figs. 1-6. Gryphaea (s. 1.) aff. regionis Camacho
  - figs. 1a-d. Loft, posterior, anterior and right views of a left valve, X 1. Sample No. 3001-A.
  - figs. 2a, b. Left and right views of a left valve, and left view of an another fragmental left valve, X 1. Sample No. 3001-B.
  - figs. 3, 4. Left view of the left valves, X1. Sample Nos. 3001-C, -D.
  - figs. 5a-d. Loft, posterior, anterior and right views of a left valve, X 1. Sample No. 3001-E.
  - fig. 6. Right view of a small right valve, X 2. Sample No. 1305-A.
- Pigs. 7a, b. Yoldia ? sp. Right and left valves, X 1. Sample No. 2905.
- Figs. 9, 10. Neithea (Neithea) ficalhoi (Choffat)

  Lateral view of two right valves, X 1.5. Sample No. 1306.
- Figs. 8a, b. <u>Cucullaea</u>? sp.

  Anterior and lateral views of a fragmental left valve, X 1.5.

  Sample No. 1305-B.
- Figs. 11, 12. Protarca sp.

  Lateral view of the left and right valves, X 1.

  Sample Nos. 1305-C, -D.
- Figs. 13, 15. Astarte? sp.

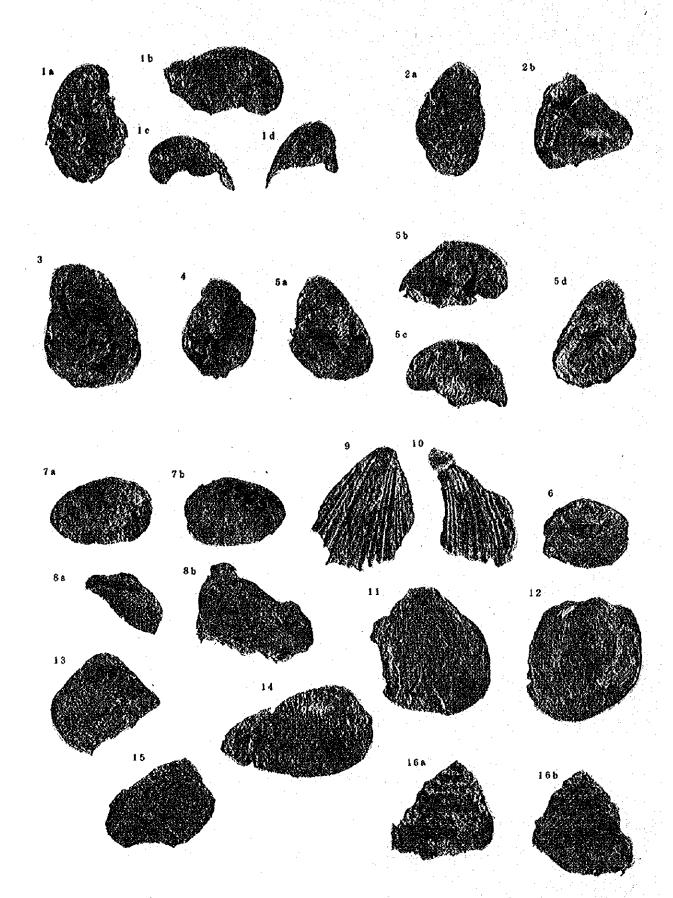
  Left and right valves, X 1.5. Sample Nos. 1305-E, -F.
- Figs. 14. Etea ? sp.

  Lateral view of an ill-preserved right valve, X 1.5.

  Sample No. 1305-G.
- Figs. 16a, b. <u>Conominolia</u>? sp.

  Adapertural and apertural views of an ill-preserved specimen,

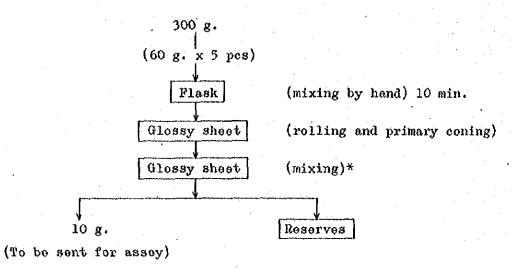
  X 2.5. Sample No. 1305-H.



A = 41

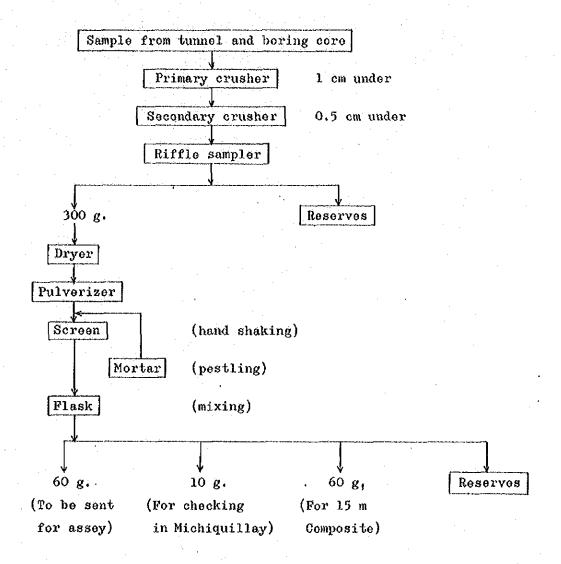
A-7 Flowsheet of Preparation of Assay Samples

Preparation of 15 m composite for MoS₂, Au, Ag, Fe and S



- * Procedure to Heap Up the sample into the Secondary Cone
  - (1) Flattening the primary cone into rectangular shape,
  - (2) Dividing the rectangle into 30 small rectangles as illustrated below,
  - (3) Scooping the sample by spatula from the first small rectangular section and spreading it over the glossy sheet,
  - (4) Repeating the scooping and spreading as stated above, but the sample is to be spread over the pre-spread sample, from the second spreading on.
  - (5) Repeating the said procedure of (4) until the entire sample is removed by picking up samples from the small section in order of numbering given on the illustration, and heaping each of them so that to build up the secondary cone
  - (6) Repeating the entire round for half an hour

13	16	10	25	1
20	11	17	2	26
12	21	3	18	6
27	4	22	7	19
5	28	8	23	14
30	9	29	15	24



A-8 Flowsheet of Analysis

```
Flow Sheet of Assay Method of Total-Cu.
         Sample
                  0.5 \sim 0.25 \text{ gr}
                  KC103
         Add
                  HNO<sub>3</sub>
         Boil
         Cool
         Add
                 HC1
         Boil to decompose all of oxides
                  Cone H2SO4 15ce
         Add.
         Boil
         Cool
                  Cool water 50 ~ 60 cc
         Boil for 10 min,
         Filtrate with filter paper No 40
         Wash 6 ~ 7 times by hot water
(filtrate)
                                   (residue)
Dilute to 200 ~ 250 °C
Heat weakly in air bath
Add 90% sodium thiosulfate solution 20°C
Boil for 20 min.
```

Filtrate with filter paper No 42

```
8 times by hot water.
 Wash
(residue)
                                      (filtrate)
       in air bath
 Dry
            at 500°C for 1/2 hour in electric muffle furnace
 Cool
 Add
        a few crystals of KClO2
        by HNO3
 Wash
       weakly to dissolve
 Heat
       HNO<sub>3</sub> 5°C
 Add
              at low temperature
 Evaporate
       H<sub>2</sub>0 15 00
 Add
        ammonium until the color of solution changes to blue
 Add
 Boil until the vapor of ammonium is smelled
 Add
        acetic acid a few c.c.
         until the vapor of acetate is smelled
 Boil
 Cool
 Dilute to 1000 cc by water
       10% Ag NO<sub>2</sub>
 Add
                       2 drops
        43% KI
        Almidon
 Titrate by standard sodium hyposulphite
         c.c. of standard solution x factor x 100
```

weight of sample

* Almidon

** Standard sodium hyposulphite

hyposulphite 
$$\begin{bmatrix} 20 \text{ g} \\ \text{NeOH} \end{bmatrix}$$
 dilute to  $1000^{\text{cc}}$  of  $\text{H}_2\text{O}$ 

in this case the factor is 0.005.

The Flow Sheet of Assay Method of Soluble Cu

```
Sample 2.0 gr
                  5% н<sub>2</sub>so<sub>4</sub> . 50<sup>сс</sup>
            Add
                    20 min.
            Heat
            Filtrate
                         with filter paper No.40
                    7 ~ 8 times by hot water
  (filtrate)
                                         (residue)
   Dilute to 200 or 250°C
          90% Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>
   Add
          20 min.
   Boil
   Filtrate with filter paper No.4
   Wash
           8 times by hot water
                                        (filtrate)
(residue)
Calcine at 500°C for 1/2 hour in the electric muffle furnace
Cool
        a few small crystals of KClO3
       by HNO<sub>3</sub> 10<sup>ee</sup>
Wash
Heat weakly to dissolve
             5<sup>00</sup>
       HNO<sub>3</sub>
Add
Evaporate at low temperature
      H<sub>2</sub>0 15<sup>co</sup>
Add
       Ammonium until the color of solution changes to blue
Add
```

Boil until the ammonium vapor is smelled.

Add acetic acid 5°C

Boil 10 min. until the vapor of acetate is smelled.

Cool

Add 10% AgNO₃ 2 drops

20% KI 5 ~ 10°C

Almidon * 5°C

Titrate by standard sodium hyposulphite solution  ** Soluble Cu  $\% = \frac{\text{c.c. of standard solution x factor x 100}}{\text{weight of sample}}$ 

### * Almidon

Starch 5 g

KI 10 g

Zn Cl₂ 4 g

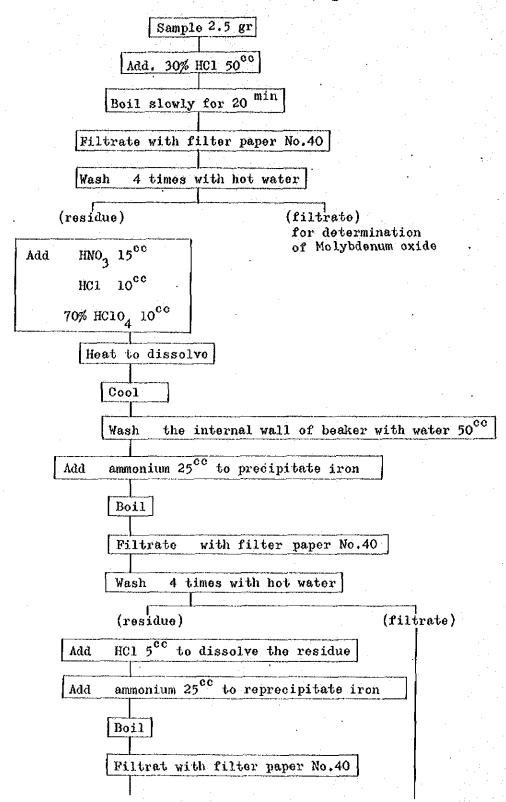
dilute to 
$$1000^{\text{cc}}$$

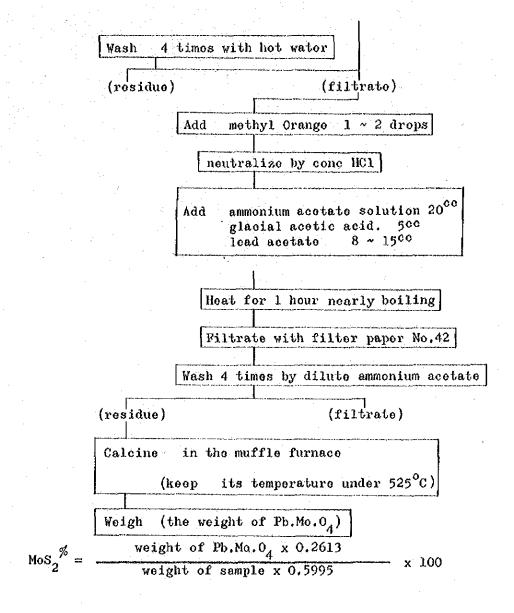
# ** Standard sodium hyposulphite solution

hyposulphite 20 grs dilute to 1000 of H20

in this case the factor is 0.005.

The Flow Sheet of Assay Method of MOS2





The Flow Sheet of Assay Methods of Au and Ag*

```
Sample 1 = 29.16667 \text{ gr} (assay-ton)
                      Flux
            Add
                      Mix
                      Cover on the charge with a few grams of litharge and borax.
                             heat at low temperature in the beginning and fuse at the temperature of 1,800 to 1900°F
                               gently to collect stray shorts of Pb
                       Whirl
                      Pour the contents into conical iron moulds
                      Cool
                       Separate
                  Pb buttons
                  Charge the buttons in cupel
Cupellation
                         the cupel in muffle furnace until the buttons are
                  Heat
                         melted completly
                  Cool
                  Clean the button of metal (Aq + Au) with stiff brush
                  Compress with pliers
                  Weigh the weight of metal (Au + Ag)
                  The motal (Au + Ag)
Parting
                  Dissolve by (1:9) HNO2
                              with heating
```

Decant the acid

Wash with water and (1:9) ammonium hydroxide solution

Dry

Calcine in the muffle furnace about 10 min.

Cool

Weigh the weight of metal (Au).

### Calculation

for 1 assay ton of sample, the calculation is as follow.

oz/ton Ag = weight of metal  $(Au+Ag)^{mgs}$  weight of metal Au  mgs . oz/ton Au = Weight of metal Au  mgs .

### The amount of flux

* The analysis of Au and Ag has been carried out by the assay ton system of furnace method.

### ** Depends on a sample as follow

crude ore cabezas : 5 ~ 30 gr KNO₃ + 50 gr litharge

Tailing : 2 ~ 25 gr KNO₃ + 50 gr litharge

Cu concentrate : 15 gr KNO₃ + 25 gr litharge + 25 gr Flux - B

Pb concentrate : 10 gr KNO₃ + 25 gr ligharge + 25 gr Flux -B

Zn concentrate : 15 gr KNO₃ + 50 gr Flux B

Fe concentrate : 20 gr KNO₃ + 50 gr Flux B

Quality of KNO3 depend on Fe contents of sample.

In case of less Fe content, add a few grams of flour.

Flux - B	consists of
PbO	18. ^{75 kg}
Na ₂ CO ₃	7.50 kg
$Ne_2B_4O_7$	3.00 kg
SiO ₂	1. ^{20 kg}

*** If the weight of Pb buttons are more than 28 gr, repeat the scorification.

```
The Flow Sheet of Assay Method of SiO2
```

```
Sample
            1.0 gr
   Mix with 8 to 10 gr of flux (sodium hydroxide
             1 | Sodium peroxide 1)
   Fuse for 5 min. by Bunsen burner
   Wash by hot dilute hydrochloric acid
   Dissolve
   Add conc hydrochloric acid
   Evaporate with air bath, stay 10 min.
              in a state of dry.
   Cool
              hydrochloric acid
   Add
              hot water
   Heat to dissolve
   Filtrate with filter paper No. 42 in a state of hot.
   Wash by hot dilute hydrochloric acid 2 times, then by
   hot water 8 times.
                               (filtrate)
(residue)
Calcine in muffle furnace
                               for determine of Fe
                                Woight of SiO,
Weigh
```

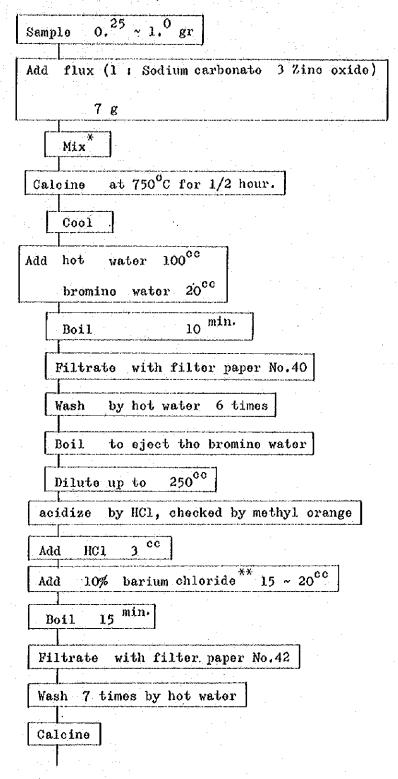
The Flow Sheet of Assay Method of Fe

```
from Analysis of SiO,
   Filtrate
         Ammonium chloride, 2 gr
   Boil
   Add hot ammonium hydroxide to precipitate iron
        hydroxide, and add about 15 cc excess
            lomin.
   Boil
   Filtrate with filter paper No.4 in state of hot
   Wash 5 times by hot water
                                          (filtrate)
(residue)
                                       for determination
 Wash by hot water
                                          of Ca O
 Add dilute hydrochloric acid to dissolve, and slightly
      excess of hydrochloric acid.
 Heat until boiling
 Reduce by stannous chloride and add 1 drop excess.
 Dilute up to 175 cc with H20
       sulphuric - phospharic acid 15°C
 Add
                          10°C
       mercuric chloride
       diphenylamine
                          3 drops.
```

Titrate by standard potasium bichromate solution.

 $Fe \% = \frac{\text{c.c of standard solution x factor x 100}}{\text{weight of sample}}$ 

The Flow Sheet of Assay Method of S



Weigh the weight of 
$$BaSO_4$$

S% = 

wt.  $BaSO_4 \times 013734 \times 100$ 

Weight of sample

- * Flux 3 zinc oxide, 1 sodium Carbonete.
- ** Barium Chloride

117 gr of Barium Chloride diluting to 1000 cc

A-9 Comparison of Ore Grades between Crosscut No. 1 and Underground
Drill Hole No. 4

Diste	inco	Crosscut	No. 1	Underground Drill H	lolo No. 4
From	To	Sample No.	Cu.%	Sample No.	Cu.%
0	3	3101	0.11	1401	0.10
3	6	2	0.14	2	0.09
6	9	3	0.13	3	0.09
9	12	4	0.12	4	0.12
12	15	5	0.10	5	0.13
15	18	. 6	0.09	6	0.17
18	21	7	0.14	7	0.10
21	24	<b>8</b> °	0.09	8	0.16
24	27	9	0.15	9	0.10
27	30	3110	0.12	1410	0.11
30	33	1	0.16	1	0.09
33	36	2	0.12	2	0.11
36	39	3	0.09	3	0.12
39	42		0.22	4	0.23
42	45	5 6	0.26	5 6	0.07
45	48		0.09		0.08
48	51	7	0.06	7 8	0.08
51	54	8	0.13	9.	0.23
54	57	9	0.07	1420	0.24
57	60	3120	0.20	1 1	0.71
60	63 66	1 2 3 4	0.50	2	0.58
63 66	69	2	0.43	3	0.33
69	72		0.64	4	0.69
72	75	<del> </del>	0.77	5	0.72
75	78	5 6	0.74	6	0.74
78	81	7	0.80	7	0.97
81	84	8	0.56	8	0.56
84	87	9	0.95	9	0.66
87	90	3130	0.89	1430	0.74
90	93	1	1.14	. 1	0.84
93	96	2 3 4	0.89	2	0.69
96	99	3	0.87	. 3	1.18
-99	102	4	0.66	4	0.72
102	105	5	0.66	5	0.97
105	108	6	0.84	6	0.87
108	111	7	0.59	7	0.87
111	114	8	0.77	8	0.77
114	117	9	0.89	9	0.82
117	120	3140	0.92	1440	0.70
120	123	1	0.95	1	0.79
123	126	2	0.79	2	0.72
126	129	3	0.84	3	0.79 0.66
129	132	4	1.09	4 5	0.84
132	135	5 6	0.95 0.79	2	1.16
135 138	138 141	7	0.79	6 7	0.85
141	144	8	0.74	8	0.68
141	147	9	0.69	9	0.60
147	150	3150	0.59	145Ó	0.63
150	153	1	0.61	1	0.60
153	156	2	0.57	$\overline{2}$	0.92
156	159	2 3 4	0.54	3	0.84
159	162	4	0.54	4	0.75
		<u> </u>	l		L

A-10 Comparison of Assays between C.R.L. and Plenge C.R.L.: Contral Research Laboratory of Mitsui Mining and Smelting Co., Tokyo

	Plen	`	C. R. L	•
Sample No.	Total-Cu %	MoS ₂ %	Total-Cu %	MoS ₂ %
0116	0.54	0.030	0.52	0.011
0132	0.28	0.017	0.28	0.013
0219	0.60	0.032	0.59	0.023
0317	0.75		0.60	
0418	0.11	0.007	0.11	0.003
0436	0.87	0.003	0.85	0.003
0514	0.95	0.003	0.86	0.003
0529	0.82	0.002	0.78	0.003
0620	0.31	tr.	0.16	0.003
0712	0.30	0.002	0.17	0.003
0917	0.41	0.027	0.36	0.038
0934	0.66	0.028	0.64	0.032
0951	1.00	0.008	0.96	0.007
1035	1.30	0.135	1.22	0.098
1050	0.43	0.042	0.41	0.090
1114	0.68		0.67	-
1128	0.74		0.87	
1214	0.46		0.44	
1228	0.69	•	0.66	
1316	0.91		0.88	·
1414	1.46	0.008	1.36	0.003
1428	0.43	0.005	0.42	0.003
1514	0.79	,,,,,	0.75	
1528	0.95		0.87	
1612	1.07		1.03	
1705	0.77		0.72	
2104	0.20	tr.	0.15	0.003
2816	0.07	, · · · ·	0.07	
2833	0,10		0.09	
3120	0.20		0.19	•
3140	0.92		0.83	
3150	0.59		0.52	
3160	0.55		0.49	
3180	1.16	l l	1.04	
3219	0.24	0.005	0.24	0.003
3239	1.18	0.010	1,12	0.007
3317	0.30	0.005	0.28	0.005
3334	0.87	0.005	0.82	0,003
3351	0.38	0.008	0.35	0.007
3420	0.84	0.217	0.80	0.234
3440	1.43	0.077	1.38	0.060
3460	1,33	""	1.22	
3516	1.68		1.66	
	1.71	0.003	1.08	0.003
4210	0,89	0.005	0.82	0.010
4310	2,10	0.012	1.56	````
4504 4605	$\frac{2,10}{1.38}$	0.012	$\frac{1.70}{1.72}$	0.025

# APPENDICES (Drilling Data)

The Metrage Drilled by Each Diamond Bit

Appex 1

: :

Total	*	13.80	10.70	11.70	8.8	1.50	10.05	11.85	8.10	33-80	3.55	13.35	55.65	29.10	41.61	44.50	28.30	38.40	28.70	5.70	13.40	9.02	24.18	49.05	40.48	17.50	19.90	21.94
	No.17	<b></b>		-	-									<b></b>										1 T				
	No.16 N		-						 	   		,					-											   
ŀ	No.15 N																								-			
	No. 14 N									<b>.</b>													-			-	9.14	21.19
	No.13 N	<u> </u>					<del></del> -			ļ									 						-			
	No.12 N	ļ								-						·*···				_								
(pan	No.11 N	 				-		_														•						0.75
ndergro	No.10 N				_	-									23.38			38.40					13.89	32.83				
Drill Holes (Underground)	No. 9 N	L	10.70			<u></u>															-							<del></del>
Deill I	No. 7		"		29.96										-					<u> </u>						0.82	10.76	
	No. 6											13.35	51.60	6.10	\ <u></u>					<b>.</b>								•
	No. 5	13.80		11.70					-											 								
	No. 4													23.00		44.50	28.30							! 				
	No. 3														18.23							\$.02						
	No. 2						-			;													10.29	16.22	40.48	16.68		
	No. 1		·			1.50	10.05	11.85	8.10	33.80	3.55		4.05						28.70	5.70	13,40							
ķ	I	10434	14019	14021	14486	14616		15685	15686	15984	15985	15986	15987	16004	16005	16006	16007	16008	16009	16010	16011	16012	16014	16015	16017	16437	18050	18051
Size		NX-W	l		I	L		لـــــا	L	قد سسا	ا ب		لممتا	<u>'</u>	1		·					L	لمحتا		•	ا		
, ,									••••									<del></del>										
Item		Diamond Bit								<b></b>							سند		<u></u>									

The Metrage Drilled by Each Diamond Bit

	To+o1		19.75	41.76	26.46	24.73	16.62	30.74	1.04	70 26.61	3.30	35.70	20.20	32.60	47.07	23.60	15.99	00.9	24.60	19.54	33.18	36.81	10.12	28.60	7.20	8.7	14.70	44.70	22.00	
		6 No.17		_	_	-				25.70	,			Ω											_	_				٠
		No.16		· 	_									23.90					:							_				
: 		No.15																	24.60	19.54	7.89	7.95	10.12	<u> </u>					-	
		No.14	19.75							 																,				
:		No.13							1.04	0.91	^				47.07		-				25.29			ļ —						
<b>4</b> >		No.12	<b></b> -		-			30.74						8.70		23.60						28.86								
id Bit	nd)	No.11 N		32.44	26.46		16.62										15.99					N .								
iamor	(Underground)	No. 10 No	<b></b>	32	8		16	-~									1.5		<u></u>						:	-				
The Metrage Drilled by Each Diamond	Ss (Und	9 %		ļ	_	<u> </u>						6													7.20	8.5			8	4
ii S	11 Holes	7 No.	-	-								35.70													7	14			22.00	Q1 (FX
[] ec	Drill	No. 7		ļ	ļ 								-					-								_				
L T T		No. 6																. <b>8</b>										44.70		
trage		No. 5											20.20											39.62			14.70			
e We		No. 4			-																									
E .		No. 3		9.32		24.73												0.9				 i				-				
		72				10																								
		No.			-						1:30															 			!	
	ږ	8	55	35	88	32	88	8	31	ខ		17	38	8	37	88	20	8	\$	10	ינו	12	13	<b>3</b> 8	.67	38	62:	16	88	
			18055	18056	18058	18037	18038	18234	18331	19103	30115	19117	31161	19236	19237	19238	18907	18908	18909	18910	18911	18912	18913	23766	23767	23768	23879	20091	100688	
	25.70		NX-W																· 					····-						
	#+ + m		Diamond Bit													<i>j</i> -	-			٠.										
													A	(	63									-				<del></del>	,	•

The Metrage Drilled by Each Diamond Bit

Total	% 17	18-40			40.06	14.33	74.40	17.05	10.55	46.15	7.88	27-12	8.60	19.22	17.73	24.92	12.90	17.53	16.83	23.64	46.78	52.21	5.78	20.34	13.96
	No.16							) 											8.36		22.86				
	No.15												] 					<u></u>		ļ			_		13.06
	No.14				40.06										6.90							23.16			_
	No.13															_				21.64		:			
	No.12																				23.92		-		
ground)	No.11																		8.47	<u> </u>			5.45	20.34	-
Drill Holes (Underground)	No.10										12.60	27.12		6.74							<u> </u>				
1 Holes	No. 9	18.40					74.40				ļ 														_
Dril	No. 7					14.33					,	ļ			7.83	4.88			ļ <u>.</u>						
	No. 6																								
	No. 5							17.05	10.55		 	 							<u> </u>				_		
	No. 4						<u> </u>			46.15			8.60				12.90						-		_
	No. 3	,	i						ļ									17.53		_		29.05	0.33		
	No. 2				<u>.</u>		<u></u>						 	12.48	 	20.04		ļ	 		-   	 			
	No. 1			 				ļ	   		22.38	<u></u>	·					: 	 					1	
Ş.	i i	8376			15901	15902	15978	15979	15980	15981	15982	15988	15989	15990	15991	15992	15993	15994	15995	15996	15997	15998	15999	16000	16003
Size		NX-M			BX-VL																			 	
		Diamond Bit										•													

The Metrage Drilled by Diamond Bit

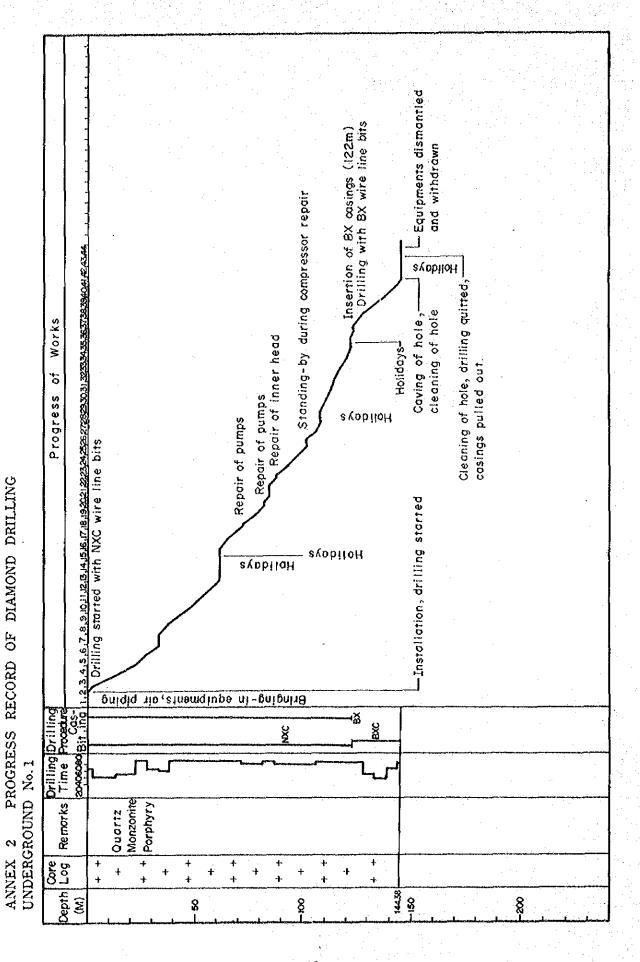
			<b></b>	۲.,	_		 Γ	····	<b></b>
Total		12.30	8.45	12.55	3.57	22.15			1893.72
	No.17								25.70
	No.16		i e	12.55		-			29-19
	No. 3 No. 4 No. 5 No. 6 No. 7 No. 9 No.10 No.12 No.13 No.14 No.15 No.16 No.17								Total 144.38   116.19   114.21   163.45   129.90   115.75   72.15   200.00   154.96   126.52   121.74   95.95   123.20   121.95   67.67   25.70   1893.72
	No.14								123.20
	X0.13								95.95
	No.12								121.74
ground)	No. 11								126.52
(Under	No.10								154.96
Drill Holes (Underground)	No. 9		8.45			22.15			200,00
Dexil	No. 7				3.57				72.15
	No. 6								115.75
	No. 5	12.30							129.90
	No. 4								163.45
	No. 3								114.21
	No. 2								116.19
	No. 1								144.38
ş		17326	17441	19950	15900	17325			Total
Size	7	BX-VL							
Iten	>	Diamond Bit							

The Metrage Drilled by Each Diamond Bit

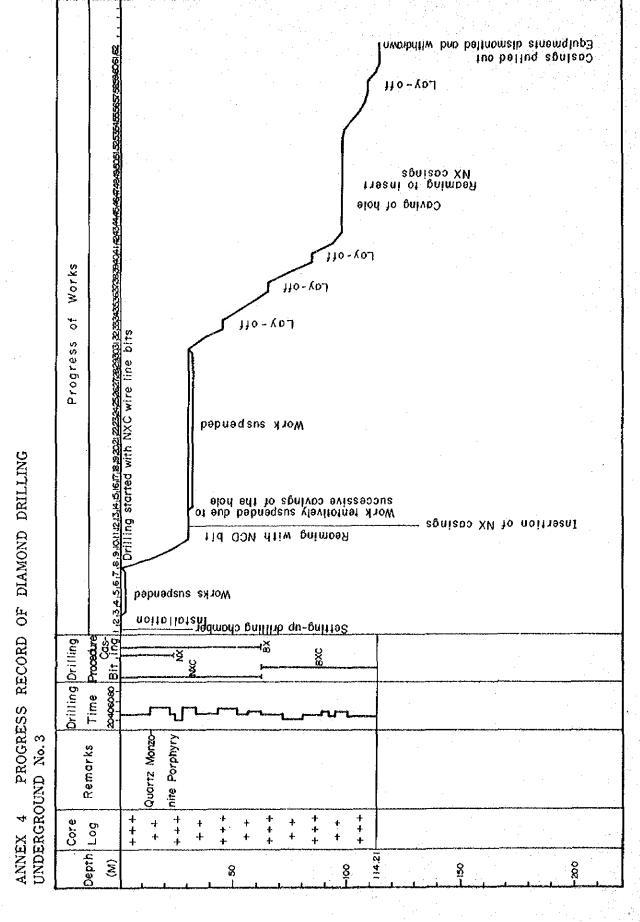
Total		3.65	7.70	22.80	1.55	10.25	17.00	0.85	13.15	64.65	16.85	24.65	38.65	42.75	0.37	5.20	11.60	7.30	23.89	13.87	13.71	17.07	0.73	8.8	4.50	25.30	11.10	1.50
	ķ																											
	ov.																											٠.
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(e)	No.		ļ									-																
Drill Holes (Surface)	No.														ļ			<u>.                                    </u>		<u></u>					_			ļ
1 Holes	No.	[   						+						<u></u>						_		·						 
Ä	%.											r								 		 			.			
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	8.0%	<u> </u>		ļ 						-				15	0.37			•	23.89	13.87	13.71	17.07	0.73				0	_
	No. 3	ļ 					_		_		16.85	24.65	38.65	42.75				,	! 		.	منند		0			05.01 0	
	No. 2					 	37.00	0.85		2.70							) (	0				-		30.00	0	0	08.0	0
_	No. 1	3.65	7.70	22.80	1.55	30.25		45	313.15	14.05		10		10	**	5.20	5 11.60	6 7.30	2	80	6	0	7	1	0 4.50	1 25.30	9	5 1.50
Ş	}	14020	14027	14074	14079	15656	15896	15898	15913	15914	15916	15985	16004	16005	18234	19020	19115	19116	19235	19238	18909	18910	18911	19881	23880	23881	77956	1945
8.4%	} }	7X-11				<u>,</u>																						· -
14.00		Diamond Bit										-								. •								

The Metrage Drilled by Each Diamond Bit

To the		16.20	20.85	23.00	15.50	3.50	8.8	20.25	17.20	8.80	20.21	13.83	9.15	38.35			10.25	20.25				706.28
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ice)	No.							ļ						i				ļ 				
Drill Holes (Surface)	No		_						 													
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Ē	No.		-	 					•								- 		_			<u> </u>
	No.	 				 			-						_	. پېرممره						_
	8			   		ļ					7	8	-	\$				2				3
	3 No.	0									20.21	13.83	9.15	38.35				3.05				201.50 154.23
	2 No.	16.20	2	0	0 }	0			٥١						, ,		15	0 5.20				
	હ		20.85	23.00	15.50	3.50	0	.5	17.20	0							0 6.15	12.00				0 150.5
	No. 1	i i	<b>%</b>	1	8	9:	38.30	×6 20.25	7.	8.80	92	11	8.	65			4.10			,		Total 200.00 150.55
Xo.		13341	14238	15411	15498	15916	15895	15896	15897	15898	15996	16001	16458	16459			344	, u.1				Tota
Size		BX-NL		<del>-</del>		 				<u>-</u> -				<del></del>		استم	.8/2-€ 3	4-3/4"	,		····	,
Item		Diamond Bit														 	Tricone Bit					



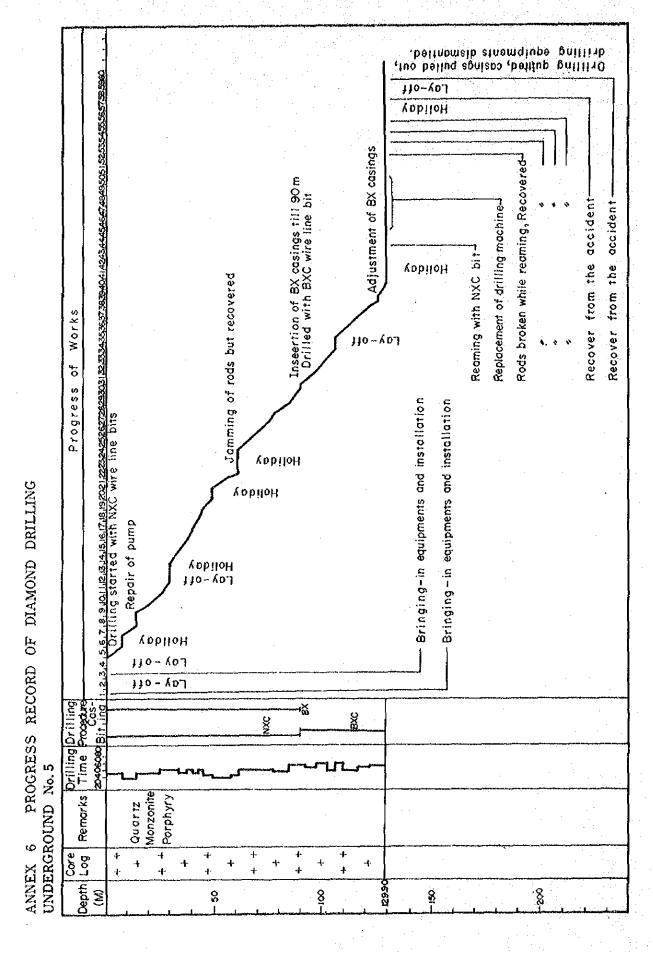
Reaming to replace the bit Insertion of BX casing (83.67m) Drilling with BX wire line bit Works Equipments dismantled BX casings pulled out -Drilling suspended Progress of Drilling started with NXC wire line bits Suspension of work for blasting Adjustment of core tubes 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22, Reaming to replace the bit PROGRESS RECORD OF DIAMOND DRILLING Adjustment of core tubes - Bringing-in equipments Hollday -Installation Ηομααλ Prilling|Drilling 20406080|Bit in X UNDERGROUND No. 2 Quartz + + |Porphyry ANNEX 3 Care Depth Log + -200 8 8 8



Reaming till 27m with 4-3/4" tricone bit, but found impossible Attempts to recover detached casings happened about 25 m. to recover, drilling quitted Rods were jammed but recovered 2.3.4.5.6.7.8.9.10.11.12.13.14.15.16.17.18.19.2021.223.24.258.2728.2330.31.2235.34335.57.383340.41.42.45. Storred drilling with NXC wire line bits Insertion of 8X casings (95.8m) Drilling with BX wire line bit Reaming with NCD bit Drilling machine JV-8 was replaced by BBU-2. Progress of Works Rods were jammed but recovered Attempts to recover the broken rods at about 20 m. Holiday Holiday Bringing-in the equipments and installation Holiday Orilling Orilling Remarks Time Procedure 20406080 Bit, ind ž UNDERGROUND No. 4 Monzonite + | Porphyry Quartz Core Depth Log + + ž 3 8 00 Ş

PROGRESS RECORD OF DIAMOND DRILLING

ANNEX 5



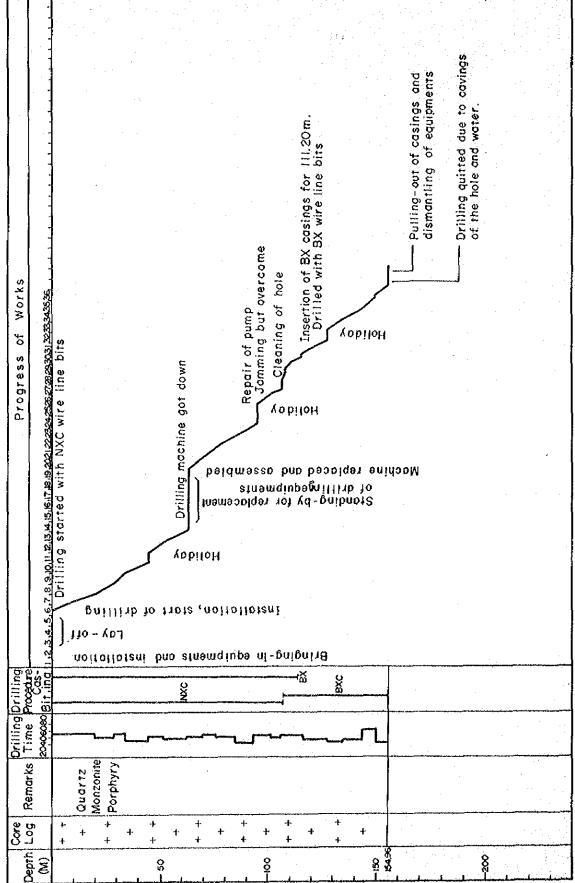
", but found impossible to recover Insertion of BX casings for 113m. -Bit broken and left behind drilling quitted, equipments dismantled. Preparation for inclined drilling Attempts to recover core tube of Works 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,2021,22,2324,2536,2728,2930,31,22,33,34,35,36 Holiday Progress Drilling started with NXC wire line bits Bringing-in equipments and installation Repair of water swivel Core barrel broken at its threads-Holiday Lay-off ANNEX 7 PROGRESS RECORD OF DIAMOND DRILLING UNDERGROUND No. 6 Holiday -Installation Ηομασλ Hollday Pemarks Time Programs 2240509811 ind Quartz Monzonite Porphyry င် လိုင် Depth E 8

Hole cleaned to be recovered Insertion of NX casings for 28.05m, and insertion of BX casin casings Insertion of BX casings for 41,2m, cleaning hole, Insertion of NX casings Bringing-in drilling equipments and preparation for drilling Drilling quitted, casings pulled out from jamming state Severe jamming - Dismantle Jamming was caused by clay about 64m. Severe jamming due to cavings near 39m. Works Insertion of NX casings for 30.63 m. ö Orilling suspended for 25 days to exchange drilling machines Reaming with NCD bits due to caving at 24m. Progress Drilling started with NXC wire line bits Casings pulled out by drive hammer, PROGRESS RECORD OF DIAMOND DRILLING - Installation, drilling started Holiday equipments dismantled Bringing-in equipments լած - օլլ and installation - Installation Atlempts to recover the Γαλ-οίί Procedure Procedure Cose š 20406080 B 11 INDERGROUND No. 7 Monzonite Porphyry Quartz Core Depth Log 4. + ANNEX -1-+ ၀ွ  $\widehat{\mathbf{S}}$ 

Rods broken but rehabilitared Pulling-out of casings and dismant, ling of equipments Insertion of BX casings for 102m, and drilled with BXC wire line bits. Repair of subs Measurment of bottom depth Lay-off Holiday Rods broken but rehabilitated Holiday 110-401 Insertion of BX casings for 83m. Recovered from jamming Holiday Progress of Works ነነው~ የወጋ Started drilling with NXC wire line bits Recovered from jamming Repair of NX core barrel head Holiday Sheltering for blasting Rods cut off Setting-up of drilling chamber ANNEX 9 PROGRESS RECORD OF DIAMOND DRILLING Holiday 110- VOJ Bringing-in equipments 110- KO7 Installation of compressor Ηοιίασλ noitaliotenL Drilling Drilling
Time Proodse X ă UNDERGROUND No. 9 Remarks Monzonite + + |Porphyry Quartz Core Depth Log Ê တ္

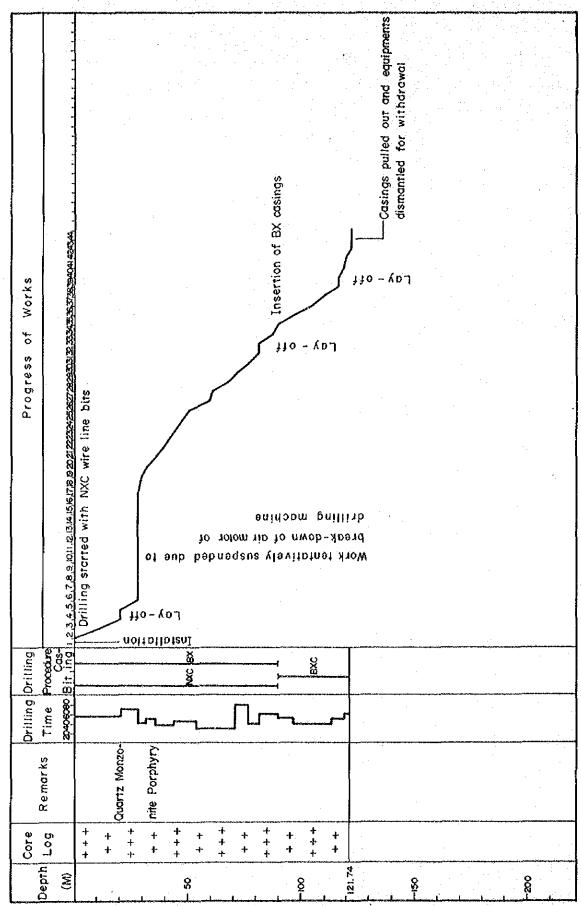
PROGRESS RECORD OF DIAMOND DRILLING

ANNEX 10



Reaming with NXC bits and insertion of BX casings thereafter -Casings pulled out and equipments dismontiled for withdrawai Works Progress of Insertion of BX casings Drilling started with NXC wire line bits 130- VDJ PROGRESS RECORD OF DIAMOND DRILLING γο-όξι 130-601 Time Procedure Drilling Drilling ANNEX 11 PROGRE UNDERGROUND No.11 + + Quartz Monzo-+ + + Inite Porphyry Remarks Depth Log Core † † † + +++ ++  $\mathbf{g}$ 8 150

PROGRESS RECORD OF DIAMOND DRILLING UNDERGROUND No.12 ANNEX 12



Casings pulled out and equipments dismantled for withdrawal Works Insertion of 8X casings Progress of 2.3.4.5.6.7.8.9.10,11,12,13,14.15,15,17,18,19,20,21,22,23,24,55,527, μο-κοη ANNEX 13 PROGRESS RECORD OF DIAMOND DRILLING ταν = οίτ Dritting Dritting 20406080 Bit ing UNDERGROUND No.13 Quartz Monzonite Porphyry Remarks Depth Log + + + Core + ++ +++ + +++ + \$ 800

-Drilling quitted due to jetting water at 240 1/min Casings pulled out and equipments dismantled. Works Insertion of BX casings for 50.08m, drilling with BXC wire line bits. ó Progress 4.5.6.7.8.9.10.11.2.13.415.16.17.18.18.20.21, Started drilling with NXC wire line bits Repair of the NX outer tubes PROGRESS RECORD OF DIAMOND DRILLING Holiday Holiday vabiloH nollollars Dritting Dritting

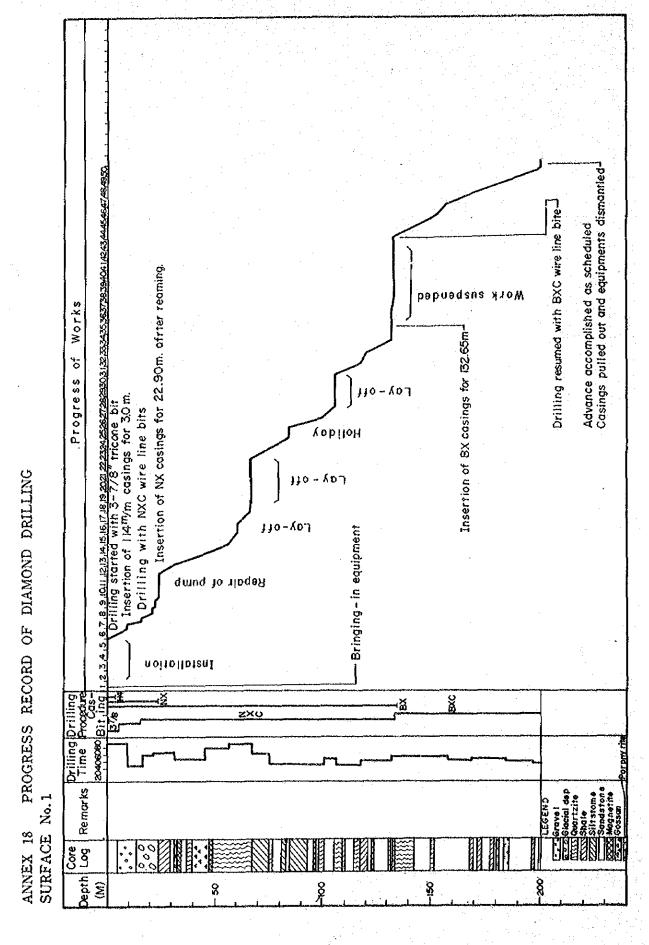
Remarks Time Procedure

Cos-XXC 20406080 Bit UNDERGROUND No.14 + Quartz Monzonite + + Porphyry ANNEX 14 Septh 8  $\widehat{\mathbf{z}}$ ပ္ပ 8

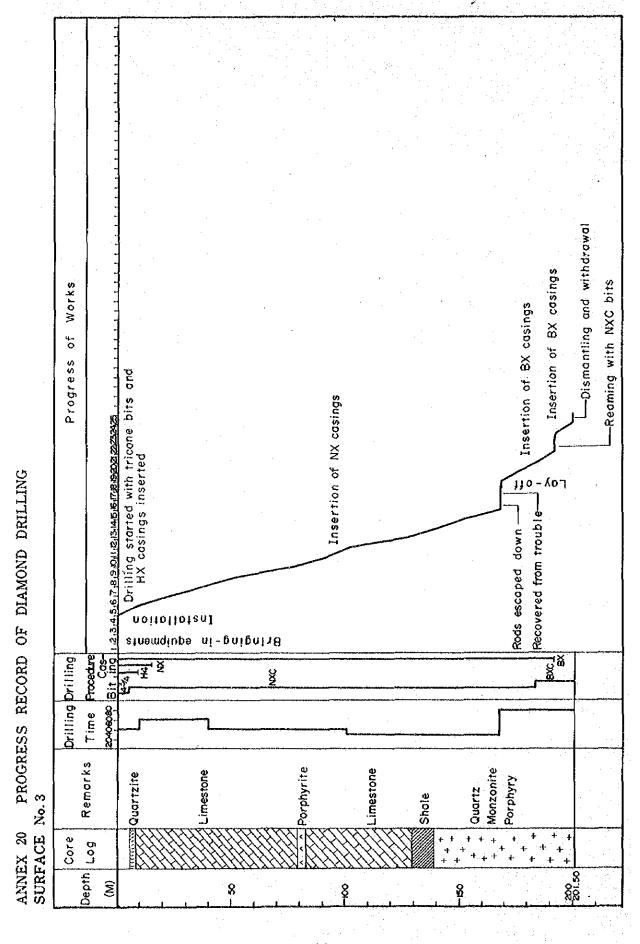
Cosings pulled out, equipments dismantled for withdrawal. Works Insertion of BX casings ŏ 2,3 4,5,6,7,8,9,10,1,12,13,14,15,16,17,18,19,2021*22,234*,25*26,27,2*8,23,51,32, Progress Ho-you ANNEX 15 PROGRESS RECORD OF DIAMOND DRILLING UNDERGROUND No.15 Lay-off Replacement of drilling machines to-vol Lay-off notabliotent bao striamquipo ni-gripalist Time Procedure Orilling Orilling + + + | nite Porphyry Quertz Monzo-Remarks Depth Core 507 8.2 È ģ

Works Progress of Drilling started with NXC wire line bits Insertion of BX casings PROGRESS RECORD OF DIAMOND DRILLING Lay-off Casings pulled out for withdrawal 1.2.5.4.5.6.7.8.9.1011,12,13,14,15,16,17 Lay - off Lay - off noltolitani Drilling Drilling Time Procedure 20406080 Bit ing UNDERGROUND No.16 nite Porphyry Quartz Monzo-Remarks ANNEX 16 Core 1.09 Depth  $\widehat{\mathbf{S}}$ 

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ILLING	Progress		ith NXC wirl line bit									y		<b>N</b>	
PROGRESS RECORD OF DIAMOND DRILL. ID No.17		5 5 5 6 7 8 9	Drilling Started with		ak qo <i>i</i>	prec	ot aub	ppepi	ខេត្តមាន	yləvi stnə	toine mgiu	Vork i of eq	۸		
RECORD	Drilling Drilling	Bit Cos-						12-1-6							
ESS F	Drilling	2040608				· · · · · · · · · · · · · · · · · · ·				·					······································
ANNEX 17 PROGREUNDERGROUND No.17	Remarks		Quartz Mone-	nite Porphyry						•					
ANNEX 17 UNDERGRO	Core	50	† + + +	+						· .					
NNE	Deoth	( <u>S</u>		ç	3	8			<u> </u>				Š.		8



Finding impossible to overcome the trouble,——i drilling quitted, casings pulled out, and equipments dismantled. Orilling resumed with BXC wire line bits 2.3.4.5.6.7.8.9.1001.2.1314.15.16.17.18.19.20.22.24.25.2.23.29.20.31.26.35.25.35.39.20.41.12.45.46.4.48.49.5051.26.35.456.57. Cleaning Cementation Rods broken at 121m while cleaning-No good results from cementation Insertion of BX casings in association with BX casing shoe and BXC wire line bits Insertion of BX casings for 67.60 m. Rods jammed while cleaning. Cleaning cavings in the hole— Core barrel cut off at 140m while cleaning Recovered from trouble-Cleaning the hole for-cementation Regained the previous advance, drilled with NXC wire line bits thereafter Works Drillied with 3-7/8" tricone bits ö Drilled with NXC wire line bits Progress Work suspended, caused by severe cavings — of the hole, for the provision of necessary equipments and materials Bringing-in eqipments and installation Hoffday -Insertion of NX casings and drilling Setting-up of rigs, installation of pump, and test run Cementation ANNEX 19 PROGRESS RECORD OF DIAMOND DRILLING with NXC wire line bits Holidoy Cementation Holiday Decision for re-drilling Filling started with 3-7/8 "tricone bit Cementation Hollday Prilling Drilling Remarks Time Progdure 20406080 Bir, ind A A Porphyrite <u>©oo</u>dGlecialdep Sandstone SURFACE No. 2 LEGEND Shote 000 E09 0000 Core 0 Sept h 3 8 8 8



Insertion of BX casings 8.9.1011.12.13.14.15.16.17.118.192021*22232422227262*3031.23354353537383940414244454647849551.2335455 Casings pulled out and equipments—dismantled for withdrawal Bentonite mud water used gulnaelo Works Widening cemented hole and-Lay-off Cementation and widening ő Progress Cementation and widening Repair of drilling machine Tentative suspension of work—due to break down of drilling machine Cementation against cavings Widening of cemented hole PROGRESS RECORD OF DIAMOND DRILLING Break down of drilling machine Lay-off Reaming noitallation Orilling Drilling Time Procedur 20406080 Sheared zone Remorks Monzonite Porphyry Quartz SURFACE No. 8 ANNEX 21 Core Depth Log ŝ 8