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STUDY FOR MAKING MASTER PLAN FOR LAND EROSION AND VOLCANIC DEBRIS CONTROL IN THE AREA OF MT. MERAPI, THE REPUBLIC OF INDONESIA

LYST OF TABLES

MARCH 1978

JAPAN INTERNATIONAL COOPERATION AGENCY

No._____

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TABLE I LIST OF ORDINARY RAINFALL STATION .

1 . ADMINISTRATION : SIE PROYEK PROGO

No.of station	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
81	Kandangan	634	26	-
87	Badran	430	26	-
-	Duwet	-	26	-
97	Ngablak	1363	26	-
101	Muntilan	359	26	-
75	Kaliangkrik	823	26	-
67	Jumo	695	26	-
72	Kledung	1390	26	-

2 . ADMINISTRATION : P U. SLEMAN

No :	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
5.a	Ledok Nongko	413	18	-
13.a	Jetis Wedari	150	18	-
22.	Beran Rejosari	160	17	-
27.a	Jambon	142	18	-
-	Ngaran	-	18	-
-	D o l o	-	18	-
63	Sorogeduk	109	18	-
48	Bekas pabrik (Banjar Larjo)	375	18	-
-	Kaliwaru	-	17	-

3. ADMINISTRATION : P U. Kab. MAGELANG

No.	STATION	ULTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
94	Grabag	682	25	-
97	Ngablak	1363	25	-
-	Kaponan	-	8	-
98	Kintelan	1175	17	-
87	Badran	430	25	-
74	Kalegen	710	25	-
88	Pler d	536	24	-
90	Magelang	380	24	-
85	Slorog	747	25	-
90.b	Seneng	-	25	-
75	Kalingkrik	823	25	-
84	Kajoran	694	10	-
91	Tempuran	275	25	-
77	Salaman	296	24	-
91.a	Borobudur	246	23	-
75.a	Kaliloro	± 525	15	-
93	Kendut	247	25	-
102	Salam	346	25	-
101.d	Srumbung	486	25	-
100.c	Dabadan	1278	25	-
98.b	D u ku n	± 571	24	-
99	Sawangan	497	24	-
92.a	Blabak	318	23	-
101	Muntilan	359	25	-
	Mungkid	-	2	-

4 . ADMINISTRATION : SIE PENGAIRAN WONOSARI

No:	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
-	Wonodoyo	-	11	-
77	Semin	202	15	-
75.a	Ngawen	235	15	-
74.d	Gading	212	19	-
75	Nglipar	506	16	-
76	Wonosari	210	15	-
-	Kebonkuning	-	18	-
-	Bunder	-	2	-
-	Giriharjo	-	17	-
76.a	K e r j o (Kel.Genjakan)	-	7	-
-	Tepus	-	1	-

5 . ADMINISTRATION : SIE PUGERAN WATES

No:	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
40.c	W a t e s	19	9	-
44.c	G a l u r	6	9	-
14.e	K e n t e n g	95	9	-

6 . ADMINISTRATION : PU. TEMANGGUNG .

No:	Station	Altitude M	Duration of data collected (year)	Remarks
72	Kledung	72	7	-
69	Jumprit	1275	7	-
68	Ngadirejo	245	7	-
67	Jumo	695	7	-
79	Kebraman	694	7	-
81	Kandangan	634	7	-
86	Temanggung	586	7	-
71	Parakan	788	7	-
66	Candiroto	713	7	-
28.a	Limbangan	337.5	7	-
65.a	Rejosari	±1021	7	-

7 . ADMINISTRATION :P U. D.I.Y.

No:	Station	Altitude M	Duration of data collected (year)	Remarks
-	Kotapraja (Dumijo)	-	18	-
21.a	Resort Kota (Gandok)	220	18	-
62	Bantul	25	7	-
-	Pundong	-	18	-
-	Krican	-	13	-
70	Tanjung Tirto	114	12	-
46.o	Babadan	193	12	-
-	Pajangan	-	11	-
66.a	Sonoyan	107	5	-
-	Santan	-	7	-
-	Wonodoyo	-	10	-
-	Kebonongan	-	5	-

8 . ADMINISTRATION : P U. KLATEN

No:	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
14.d	D e l e s	-	19	-
14.c	W o r o	-	19	-
2..b	N g e l o	160	19	-
38.a	K l a t e n	108	19	-
39.c	Kalijoran	120	19	-
-	C e p e r	-	19	-
-	Grojogan	-	19	-
29	Gedoren	240	19	-
29.a	Keposong "	506	18	-
-	Manissrenggo	-	18	-
19.a	Prambanan	173	19	-
39	Kebonarom	195	19	-
44.a	Gantiwarno	125	17	-
52	W e d i	150	19	-
46	Demangan	150	19	-
-	Wd.Djombor	-	19	-
95	Karang Nongko	250	19	-
86	Ketandan	211	19	-
92	T r u c u k	155	19	-
85	Karanganom	157	19	-
96.a	B e j i	110	19	-
80	Juwiring	125	19	-
77	Delanggu	125	19	-

ADMINISTRATION : P U . KLATEN (CONTINUED)

No of station	STATION	ALTITUDE M	DURATION OF DATA COLLECTED (YEAR)	REMARKS
78	W a r e n g (Polanharjo)	225	19	-
71	Cokrotulung	283	19	-
-	J a b u n g	-	9	-
14.a	S u r o w o n o	625	19	-
17.b	Candisewu	160	17	-
19	Kemudho	175	18	-
19.b	Tambangan	160	19	-
37	Gayamprit	200	19	-
41	Gondang	200	19	-
-	Wonosari	-	19	-
30	Ngipit	200	19	-
45	Satriyan	409	19	-
4	Togalduwur	-	19	-
72.a	Ponggok	250	19	-
97	Karangdowo	130	19	-
99	M l e se	94	19	-
99.b	B a w a k	90	19	-
-	B a y a t	-	19	-
16	Genengsari	375	17	-
-	Djogonaln	-	19	-
98	Plagan	150	19	-
-	B a t u r	-	19	-
-	Gempol	-	17	-
-	Pundong	-	19	-

Table 2 Probable daily rainfall

Return period	Temanggung	Kaliurang	Yogyakarta
100 year	200 mm	245 mm	185 mm
50	190	230	175
10	150	190	150
5	130	175	135
2	105	145	115

Note ; Thomas plot : F = i/(N+1) is used where i is an order and N is a number of Data.

Table 3 Largest events of daily rainfall (1951 - 1970)

Order	F(x)	Temanggung	Kaliurang	Yogyakarta
1	4.8 %	161 mm	213 mm	163 mm
2	9.5	153	202	154
3	14.3	125	167	150
4	19.0	111	162	147
5	23.8	110	160	146
6	28.6	109	160	137

Order	F(x)	Temanggung	Kaliurang	Yogyakarta
7	33.3 %	107 mm	153 mm	119 mm
8	38.1	105	149	111
9	42.9	105	147	110
10	47.6	97	140	102
11	52.3	96	139	99
12	57.1	96	137	95
13	61.9	96	136	95
14	66.7	89	135	94
15	71.4	87	133	91
16	76.2	87	131	90
17	80.9	86	129	90
18	85.7	83	129	90
19	90.5	83	127	89
20	95.2	82	-	?
log mean	-	101.5	148.4	111.7

Table 4 Estimated hyetograph in B.Sala bacin

N-year	Probalbe daily rainfall	Rainfall in Mth-hour of a rain in mm					
		1	2	3	4	5	6
100	187 mm	108	36	25	9	6	3
50	174	100	34	23	8	6	3
10	140	81	27	19	7	4	2
5	126	73	24	17	6	4	2
2	104	60	20	14	5	3	2
Mass-curve of rainfall in %		57.7	77.0	90.4	95.2	98.4	100.0
Difference of mass-curve, M-1 and M,%		57.7	19.3	13.4	4.8	3.2	1.6

Table 5 Location of five new automatic rainfall stations.

No.	Station	Estimated Altitude	River Basin	Remarks
1	Kadisepi	1.400 m	Pabelan	Progo
2	Tegalrejo	1.300 m	Batang	Progo
3	Blaburan	150 m	Krasak	Progo
4	Glagahan	630 m	Gendol	Opak
5	Koromulan	350 m	Gendol	Opak

Table 6 Number of main stage stations in the study area

River system	Recording gage	Staff gage with rating curve	Staff gage without rating curve	Total
Progo river	4 (1968)	4	5	13
Opak river	0	2	0	2
Dengkeng river	1 (1977)	0	0	1
Total	5	6	5	16

Note ; Numeric in ( ) shows the oldest available year among stations.

The stage stations which are collected their records in

TABLE 7 STAGE STATION IN THE STUDY AREA

NO.	NAME	RIVER SYSTEM	RIVER	CATCHMENT AREA	GAGE ZERO	ADMINISTRATION	START OF RECORD	REMARKS
				Km^2	+ M.S.L.		year	
1.	Krangan I	Progo	Progo	424	454.35	D.P.M.A.	1968 (1962)	O.S.W.
2.	Krangan II	Progo	Progo	424	446.54	D.P.M.A.	1970 (1969)	R.S.
3.	Kendut	Progo	Elo	441	219.76	D.P.M....	1970 (1967)	O.S.W.
4.	Susukan	Progo	Tangsi	119	249.33	D.P.M.A.	1969 (1967)	O.S.W.
5.	Borobudur	Progo	Progo	994	216.67	D.P.M.A.	1970 (1967)	R.S.
6.	Duwet	Progo	Progo	1763	112.62	D.P.M.A.	1970 (1969)	R.S.
7.	Sentolo	Progo	Progo	1962	41.01	D.P.M.A.	1970 (1969)	R.S.
8.	Karangsemut	Opak	Opak	453	33.06	D.P.M....	1970 (1969)	O.S.W.
9.	Dogongan	Opak	Oyo	1017	23.90	D.P.M.A.	1970 (1967)	O.S.W.
10.	Jurum	B.Solo	Dengkeng	-	-	P.S.S.	1977 (1977)	R.S.

Note : R.S. : RECORDING STATION
O.S.W : ORDINARY STATION WITH RATING CURVE.
O.S.N : ORDINARY STATION WITHOUT RATING CURVE.

TABLE 8 ANNUAL MAXIMUM DISCHARGE AT WEIR SITE

RIVER	KALI [illegible]				KALI TJODE				KALI OPAK							
WEIR	SIR[illegible]		GESIT[illegible]		SIDOMULYO		BOK[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
CACTHMENT Sq Km	33.35		36.75		44.75		48.5		[illegible]2.73		98.50		111.35		368.61	
CREST LENGTH M	24.75		26.0		28.0		30.0		[illegible]2.5		60.0		6[illegible].0		80.0	
	H	Q	H	Q	H	Q	H	Q	H	Q	H	Q	H	Q	H	Q
1950	0.[illegible]	40.2	0.75	38.5	1.10	73.5	1.20	89.3	-	-	0.90	116.8	-	-	0.90	155.5
1951	0.65	29.4	0.60	27.4	0.95	56.8	0.98	65.4	-	-	0.95	126.0	-	-	1.00	181.5
1952	0.90	42.0	0.83	49.4	1.25	88.7	1.05	73.1	-	-	0.95	126.0	-	-	1.20	238.9
1953	1.15	69.3	1.00	59.0	1.00	63.5	1.28	97.8	-	-	0.85	106.8	0.80	100.5	1.20	238.9
1954	1.20	73.3	1.05	63.5	0.85	49.8	0.90	58.0	-	-	0.90	116.8	0.85	110.2	1.30	269.0
1955	1.25	69.5	0.97	56.4	0.75	41.4	0.83	59.9	-	-	0.90	116.8	0.85	110.[illegible]	1.50	324.0
1956	1.1[illegible]	[illegible]6.6	1.10	65.3	1.15	76.[illegible]	1.25	94.3	-	-	0.95	126	0.90	121.0	1.30	269.0
1957	1.13	68.0	0.96	55.5	0.90	54.5	0.78	46.8	-	-	0.90	116.8	0.85	110.2	1.25	251.4
1958	0.[illegible]	4[illegible].0	0.80	42.2	1.25	88.7	0.95	62.4	-	-	0.95	126.0	0.90	121.0	1.20	238.9
1959	1.10	59.9	1.00	59.9	1.30	94.0	1.35	107.0	-	-	0.95	126.0	0.90	121.0	1.20	238.0
1960	1.20	73.3	1.15	72.7	1.25	88.7	0.98	65.4	-	-	1.00	136.0	0.90	121.0	1.30	269.0
1961	1.14	68.4	1.02	60.[illegible]	0.95	58.8	0.80	43.2	-	-	0.95	126.0	0.85	110.2	1.30	269.0
1962	1.06	61.3	0.96	55.5	1.05	60.5	1.35	107.0	-	-	0.95	126.0	0.90	121.0	1.25	251.4
1963	0.95	52.0	0.87	47.[illegible]	1.00	63.5	1.28	97.8	-	-	0.95	126.0	0.90	121.0	1.30	269.0
1964	1.15	69.3	1.00	59.0	-	-	1.05	73.1	-	-	0.90	116.8	0.85	110.2	1.60	305.0
1965	0.83	42.5	0.75	38.5	-	-	-	-	0.70	94.0	0.90	116.8	0.85	110.2	2.50	718.0
1966	1.30	83.3	1.30	87.5	0.65	33.3	-	-	0.80	113.0	1.40	225.0	1.40	233.0	3.00	4[illegible]4.0
1967	0.80	40.[illegible]	0.75	38.5	1.30	94.0	-	-	0.70	94.0	1.10	152.0	1.20	187.4	1.70	403.0
1968	1.30	83.3	1.20	85.0	1.70	149.7	-	-	0.60	73.2	0.80	97.5	0.85	110.2	1.50	344.0
1969	-	-	-	-	-	-	-	-	0.90	135.[illegible]	0.80	97.5	0.80	100.5	1.40	301.0
1975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.60	761.0

Table 9 Flood hydrographs and peak stages in Progo river.

No.	Year	Date	Kranggan	Borobudur	Duwet	Sentolo
1	1973	1- 3 Feb	-	4.74	3.97	2.50
2	1973	10-12 Feb	2.48	3.52	3.37	2.44
3	1974	31- 2 Feb.	2.90	4.17	3.28	3.05
4	1974	4- 5 Feb.	3.20	3.95	3.42	2.68
5	1974	19-20 Feb.	2.31	4.70	3.97	3.12
6	1975	9-10 Jan.	2.73	4.47	3.70	2.80
7	1975	10-11 Mar.	5.29	-	7.11	-
8	1976	1- 2 Mar.	2.20	-	4.20	-
9	1976	22-23 Nov.	2.23	3.85	4.82	3.26
10	1976	25-26 Nov.	2.93	4.45	4.87	3.18
11	1977	8- 9 Feb.	2.59	4.50	3.70	2.72

Note ; Peak stages show heights above gage zero in M
shows non-records..

Table 10 Probable discharge at Blawang weir

Return period in year	Probable discharge in m^3/s	Specific discharge in $m^3/s/km^2$
100	1.100	2.98
50	960	2.60
20	780	2.12
10	640	1.73
2	330	0.89

Note ; catchment area = 368.6 km^2

New design discharge = 700 m^3/s.

Table 11 Flood marks and Peak Discharge at the Krasak weir.

No.	Year	Height above crest in m.	Estimated discharge m^3/s	Specific discharge $m^3/s/km^2$
1	Apr.1934	3.97	545	19.4
2	Dec.1960	3.17	388	13.8
3	Jan.1969	3.30	412	14.7
4	Feb.1969	3.55	460	16.3

Note ; Discharges are estimate by equation (3.1)

Catchment area is 28.1 Km^2

The weir was constructed in 1919 year.

Table 12 Probable Discharge in Bengawan Solo.

(a) Juranggempal and Jurug .

Return Period in year	Probable discharge in m^3/s		
	Juranggempal site	Jurug site	
	Existing condition	Existing condition	Improved - river condition
100	4.300	2.300	5.500
50	4.000	2.100	4.700
10	2.450	1.170	2.900
5	1.670	1.000	2.200
2	1.080	600	1.300

Note : Catchment area at Jurug is 3.120 in Km^2 .

Catchment area at Juranggempal is - .

1.350 in Km^2

(b) Main tributaries in Surakarta - Wonogiri basin,

Tributary	Cacthment area in km^2	Existing condition	Improved river condition
K.Walikan	198	500	500
K.Jlantah	75	130	350
K.Dengkeng	833	285	830
K.Pucur	43	110	290
K.Brambang	125	165	410
K.Samin	305	220	580

Note ; Warikan river does not inundate in existing condition.

Return period of probable discharge is 40-year.

Table 13 Mean grain size (dso)

No.	River	Site	d 50 in mm	specific gravity
	Progo	Nanggulan	0.9	
	Progo	Sentolo	0.7	mean 2.80
	Progo	Kalidjoro	0.4	
	Progo	Srandakan	0.2	
1	Krasak	Kemiri	1.4	2.83
2	Krasak	Jrakah	1.6	2.78
3	Krasak	Jombong	1.5	2.90
4	Krasak	Sudimoro	4.6	2.81
5	Krasak	Salam Bridge	0.94	2.80
6	Krasak	Krasak weir	0.64	2.80

Note : As regard to Progo river. the result are after the Progo river basin study in 1971.

Table - 14

主要河川一覧表

水系	河川名	延長	流域面積	河床勾配				記事
				Km	%	Km	%	
I	K. Pabelan	46 Km	103 Km²	0 ~ 3.3	47.6	9.5 ~ 13.8	4.4	to K. Plejc
				3.3 ~ 5.5	13.2	13.8 ~ 22.3	2.9	
				5.5 ~ 9.5	7.6	23.3 ~ 46.0	1.4	
	K. Blongkeng	27 Km	70 Km²	Km	%	Km	%	〃
				0 ~ 2.2	17.9	9.2 ~ 19.5	2.8	
				2.2 ~ 4.5	10.5	19.5 ~ 27.0	1.4	
				4.5 ~ 9.2	5.3			
	K. Putih	27 Km	27 Km²	Km	%	Km	%	〃
				0 ~ 2.6	55.6	6.6 ~ 9.3	6.7	
				2.6 ~ 4.0	20.4	9.8 ~ 17.5	4.0	
				4.0 ~ 6.6	9.9	19.5 ~ 27.0	2.1	
	K. Batang	20 Km	23 Km²	Km	%	Km	%	〃
				0 ~ 3.2	8.5	12.0 ~ 24.0	2.5	
				3.2 ~ 5.7	6.4			
				5.7 ~ 12.0	3.6			
	K. Beleng	17 Km	9 Km²	Km	%	Km	%	to K. Krasak
				0 ~ 3.3	47.6	5.7 ~ 10.7	5.6	
				3.3 ~ 5.0	16.9	10.7 ~ 17.0	4.2	
				5.0 ~ 8.7	8.5			
	K. Krasak	29 Km	34 Km²	Km	%	Km	%	to K. Plejc
				0 ~ 3.1	47.6	10.0 ~ 17.0	3.9	
				3.1 ~ 4.5	24.4	17.0 ~ 21.7	2.9	
				4.5 ~ 8.0	9.9	21.7 ~ 27.0	2.0	
				8.0 ~ 10.0	6.4			
II	K. OPAK	24 Km	67 Km²	Km	%	Km	%	to M.W.
				0 ~ 3.2	7.8	10.1 ~ 16.9	2.8	
				3.2 ~ 6.8	5.3	16.9 ~ 24.0	1.0	
				6.8 ~ 10.1	4.6			
	K. Gendol	22 Km	21 Km²	0 ~ 2.2	62.5	6.5 ~ 9.7	5.7	to K. [illegible]
				2.2 ~ 4.0	22.2	9.7 ~ 14.0	2.3	
				4.0 ~ 6.5	12.0	14.0 ~ 22.0	1.4	

ｽﾘｯﾄ	河川名	延長	流域面積	河床勾配				記事
				Km	%	Km	%	
Ⅲ	K. Woro	34 Km	90 Km^2	0 ~ 5.5	34.5	19.0 ~ 23.0	2.6	to K.Dengkeng
				5.5 ~ 10.4	6.7	23.0 ~ 28.5	1.3	
				10.4 ~ 19.0	3.8	28.5 ~ 34.0	0.4	
Ⅲ	K. Boyong	37 Km	76 Km^2	Km	%	Km	%	to Yogyakarta
				0 ~ 3.5	47.4	13.4 ~ 20.3	3.1	
				3.5 ~ 5.1	16.9	20.3 ~ 29.0	1.7	
				5.1 ~ 9.7	8.5	29.0 ~ 37.0	0.5	
				9.7 ~ 13.4	4.7			
	K. Kuning	38 Km	48 Km^2	Km	%	Km	%	to K.OPAK
				0 ~ 3.8	45.5	15.0 ~ 20.8	3.0	
				3.8 ~ 6.2	14.7	20.8 ~ 27.0	1.7	
				6.2 ~ 15.0	8.3	27.0 ~ 38.0	0.7	

Table 15 Specific Gravity of Sample

DAFTAR BERAT JENIS (γ_s).

Proyek : M E R A P I.

No. Urut	Contoh NO	Di atas ø saringan 2,00 mm	Di atas ø saringan 0,074mm	Di bawah ø saringan 0,074 mm
		γ_s	γ_s	γ_s
1.	I - 1	2,80 - 2.81	2,93 - 2,90	2,71 - 2.71
2.	I - 2	2,80 - 2.76	2,89 - 2.83	2,73 - 2.73
3.	II - 1	2.81 - 2,80 - 2.77	3.20 - 3,20 - 2.97 2.97 - 2.96 - 3.20	2.84 - 2,70 - 2.56
4.	II - 2	2,74 - 2.78	2,83 - 2.83	2,70 - 2.69
5.	II - 3	2.74 - 2,79 - 2,79 - 2.78	2.94 - 3,09 - 2.74 - 2.76	2.62 - 2,55 - 2.65
6.	III - 1	2,77 - 2.81	2,85 - 2.82	2,73 - 2.71
7.	III- 2	2,79 - 2.79	2,88 - 2.87	2,68 - 2.76
8.	III- 3	2,81 - 2.79	2,83 - 2.82	2,51 - 2.71
9.	IV - 1	2,82 - 2.81	2,96 - 2.90	2,70 - 2.79
10.	IV - 2	2,73 - 2.75	2,77 - 2.79	2.68 - 2,70 - 2.65
11.	IV - 3	2,81 - 2.76	2,84 - 2.84 - 2.83	2,70 - 2.71
12.	V - 1	2,79 - 2.79	2,89 - 2.87	2,71 - 2.71
13.	V - 2	2.79 - 3,08 - 2.78 2.76 - 2.79 - 2.80	3,17 - 2.86 3,16 - 3,18	2.82 - 2,67 - 2.84

Table 16 Grain Size Analysis-Mechanical

GRAIN SIZE ANALYSIS - MECHANICAL

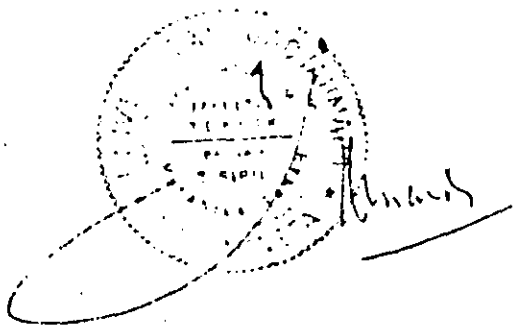
Project : MERAPI .

Sample No. : I - 1 .

Date of testing : 21 / 10 / 1977.

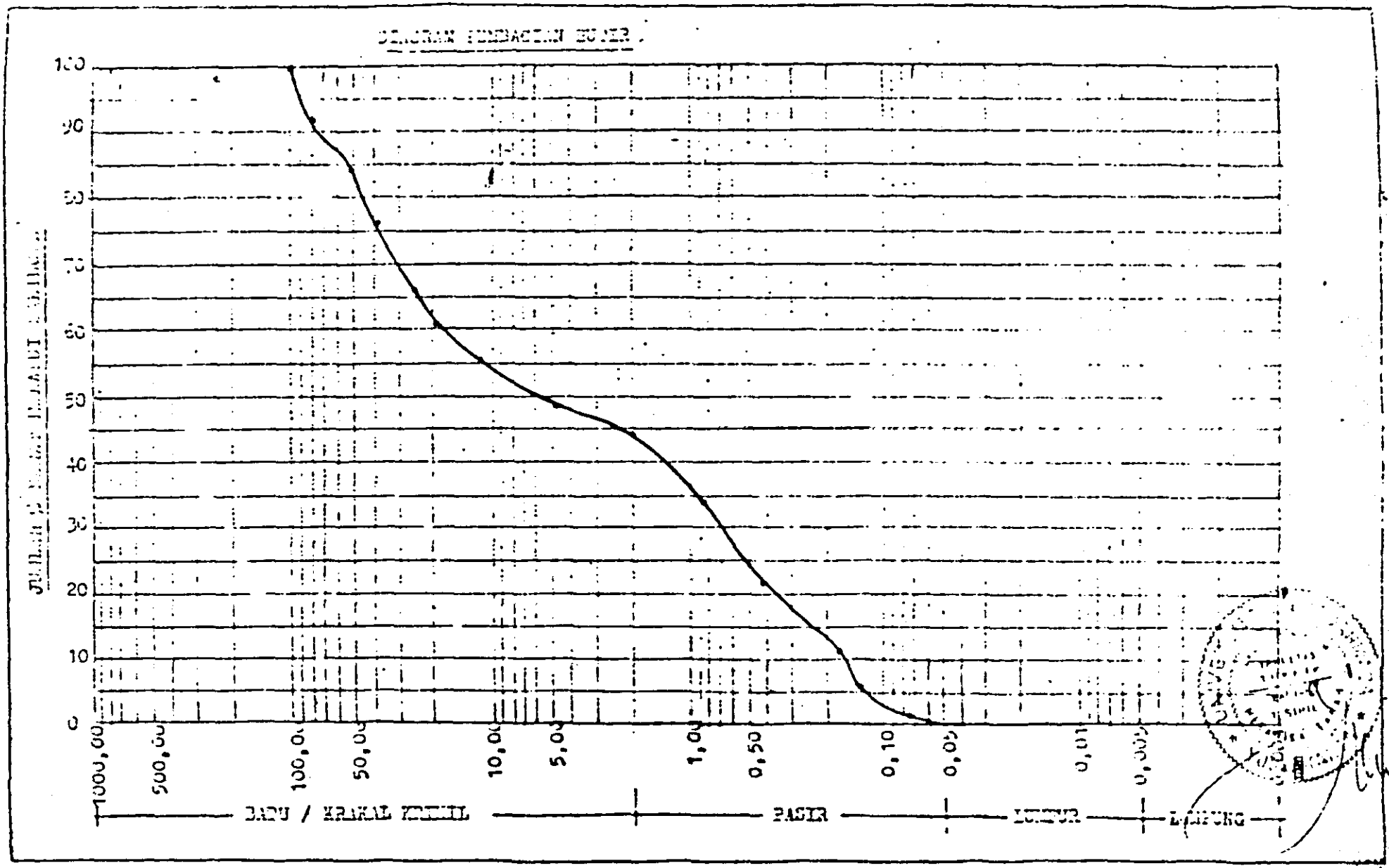
Weight of sample : 32.573 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	80,000	2.410	7,40	92,60
3	-	50,800	2.726	8,38	84,22
4	-	38,100	2.440	7,49	76,73
5	-	25,400	3.280	10,07	66,66
6	-	19,050	1.722	5,29	61,37
7	-	12,700	1.734	5,32	56,05
8	4	4,760	2.565	7,87	48,18
9	10	2,000	1.400	4,30	43,88
10	20	0,840	3.325	10,21	33,67
11	40	0,420	3.710	11,39	22,28
12	80	0,177	3.465	10,64	11,64
13	100	0,149	2.028	6,23	5,41
14	200	0,074	1.075	3,30	2,11
15	PAN	< 0,074	690	2,11	0,00
			32.570		
			$\frac{32.570}{32.573}$ = 99,991 %		
			0,009 % lost.		



Proyek : I E R A P I .

Contoh No : 1

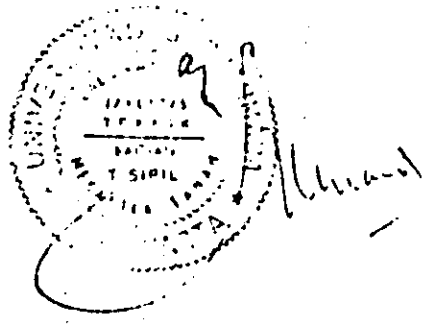


GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : I - 2 .

Date of testing : 23 / 10 / 1977. Weight of sample : 26.638 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	50,800	0	0,00	100,00
3	-	38,100	69	0,26	99,74
4	-	25,400	705	2,65	97,09
5	-	19,050	250	0,94	96,15
6	-	12,700	352	1,32	94,83
7	4	4,760	196	0,74	94,09
8	10	2,000	3.680	13,81	80,28
9	20	0,840	6.915	25,96	54,32
10	40	0,420	6.895	25,88	28,44
11	80	0,177	4.485	16,84	11,60
12	100	0,149	398	1,49	10,11
13	200	0,074	1.645	6,17	3,94
14	PAN	< 0,074	1.045	3,92	0,02
			26.635		
			$\frac{26,635}{26,638}$ = 99,99 %		
			0,01 % lost .		



GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : II - 1 .

Date of testing : 22 / 10 / 1977 . Weight of sample : 33.713 gram.

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	80,000	705	2,09	97,91
3	-	50,800	2.803	8,31	89,60
4	-	38,100	1.790	5,31	84,29
5	-	25,400	1.430	4,24	80,05
6	-	19,050	1.075	3,19	76,86
7	-	12,700	1.150	3,41	73,45
8	4	4,760	2.374	7,04	66,41
9	10	2,000	2.300	6,82	59,59
10	20	0,840	9.380	27,82	31,77
11	40	0,420	6.585	19,53	12,24
12	80	0,177	3.335	9,89	2,35
13	100	0,149	224	0,66	1,69
14	200	0,074	455	1,35	0,34
15	PAN	< 0,074	105	0,31	0,03
			33.711		
			$\frac{33.711}{33.713}$ = 99,99 %		
			0,01 % lost .		

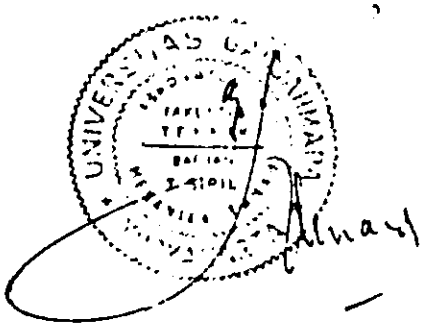
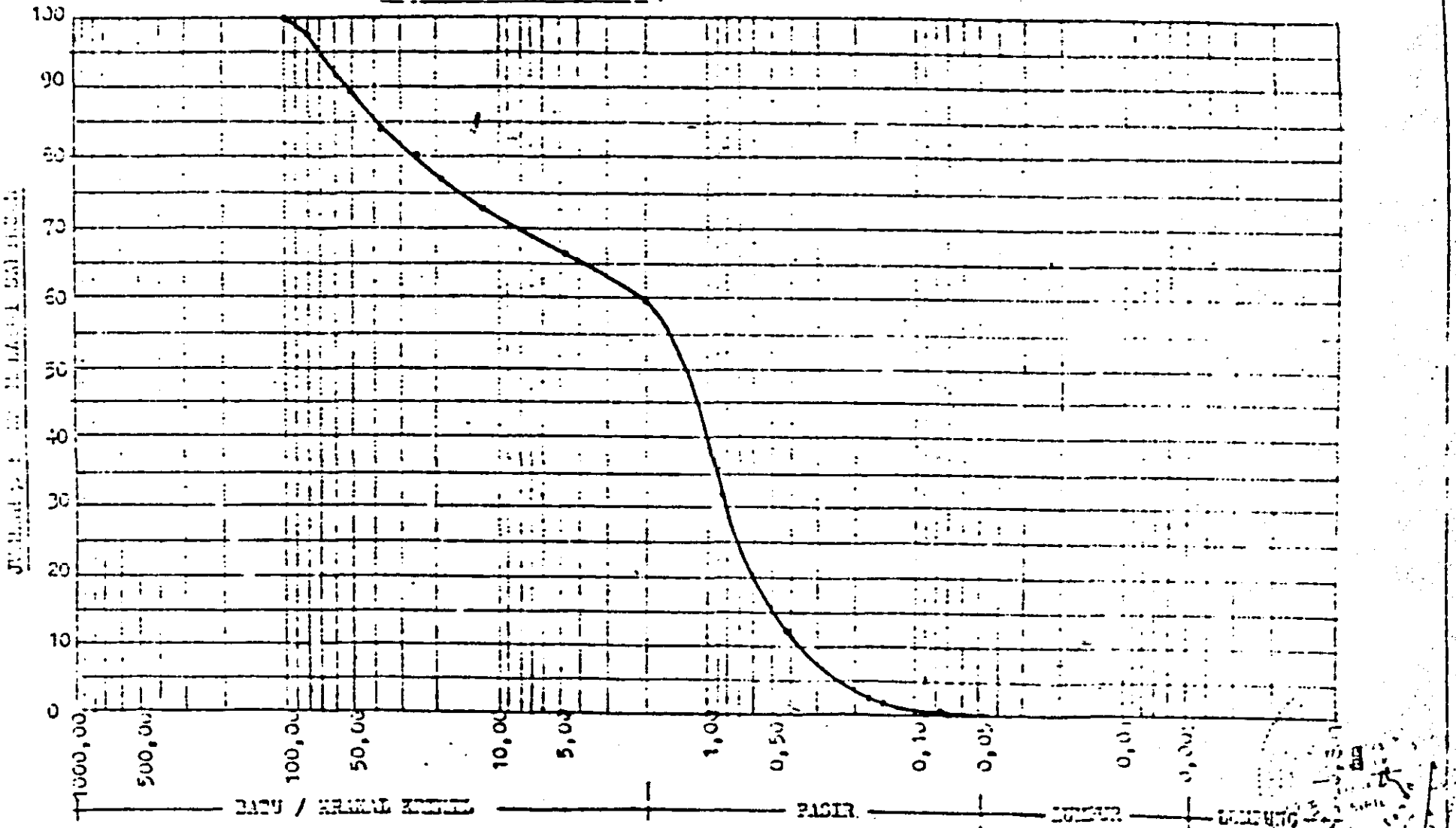


DIAGRAM PEMBAGIAN BUTIR



GRAIN SIZE ANALYSIS - MECHANICAL

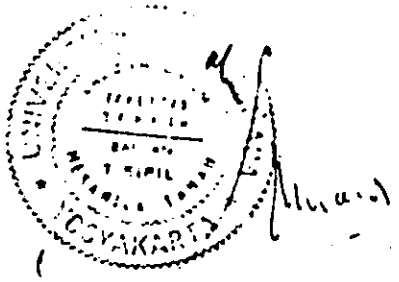
Project : MERAPI .

Sample No. : II - 2 .

Date of testing : 20 / 10 / 1977.

Weight of sample : 33.062 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	80,000	1.665	5,03	94,97
3	-	50,000	2.760	8,35	86,62
4	-	38,100	1.345	4,07	82,55
5	-	25,400	3.660	11,07	71,48
6	-	19,050	2.060	6,23	65,25
7	-	12,700	2.369	7,16	58,09
8	4	4,760	3.171	9,59	48,50
9	10	2,000	1.946	5,88	42,62
10	20	0,840	4.270	12,92	29,70
11	40	0,420	4.020	12,16	17,54
12	80	0,177	3.554	10,75	6,79
13	100	0,149	339	1,03	5,76
14	200	0,074	1.027	3,11	2,65
15	PAN	< 0,074	874	2,64	0,01
			33.060		
			$\frac{33,060}{33,062}$ = 99,99 %		
			0,01 % lost .		



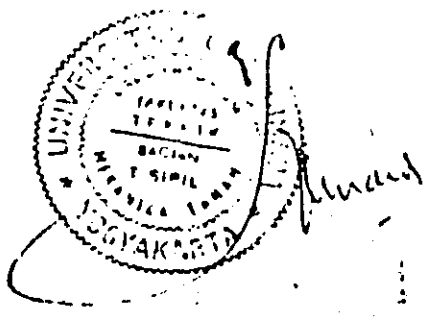
0,05
0,10
0,50
1,00
5,00
10,00
50,00
100,00
500,00
1000,00
100
90
80
70
60
50
40
30
20
10
0

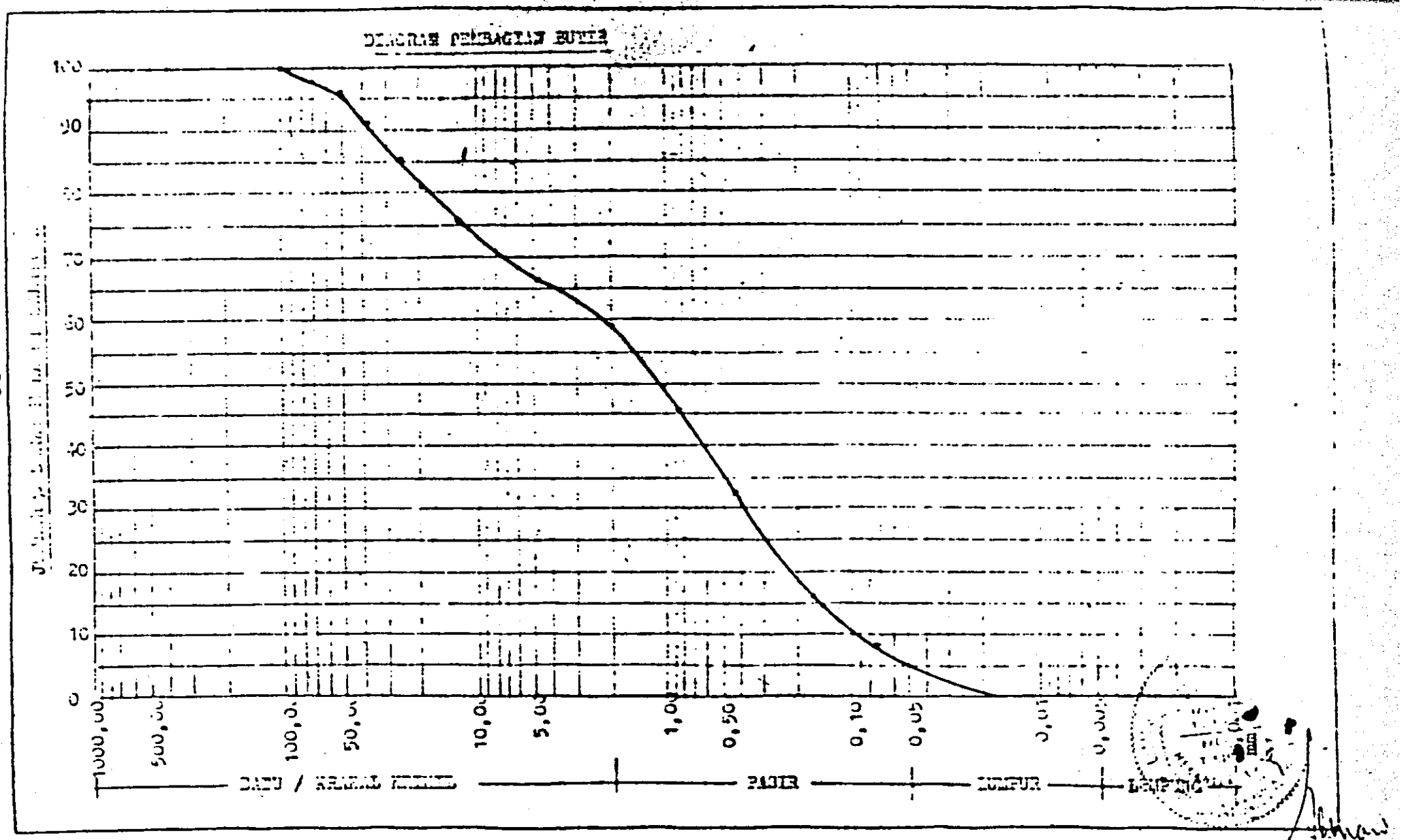
GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : II - 3 .

Date of testing : 19 / 10 / 1977. Weight of sample : 35.250 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	70,000	700	1,98	98,02
3	-	50,800	890	2,53	95,49
4	-	38,100	1.624	4,61	90,88
5	-	25,400	1.930	5,48	85,40
6	-	19,050	1.615	4,58	80,82
7	-	12,700	1.755	4,98	75,84
8	4	4,760	3.195	9,06	66,78
9	10	2,000	2.640	7,49	59,29
10	20	0,840	4.794	13,60	45,69
11	40	0,420	4.680	13,28	32,41
12	80	0,177	5.767	16,36	16,05
13	100	0,149	555	1,57	14,48
14	200	0,074	2.290	6,50	7,98
15	PAN	< 0,074	2.810	7,97	0,01
			35.245		
			$\frac{35.245}{35.250}$ = 99,98 %		
			0,02 % lost .		




100
90
80
70
60
50
40
30
20
10
0
1000,00
500,00
100,0
50,0
10,0
5,0
1,0
0,50
0,10
0,05
SABLE
LIMON

GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : III - 1 .

Date of testing : 20 / 10 / 1977 . Weight of sample : 28.155 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	70,000	402	1,43	98,59
3	-	50,800	1.048	3,72	94,85
4	-	38,100	1.370	4,86	89,99
5	-	25,400	1.635	5,81	84,18
6	-	19,050	850	3,02	81,16
7	-	12,700	1.007	3,58	77,58
8	4	4,760	2.810	9,98	67,60
9	10	2,000	3.220	11,44	56,16
10	20	0,840	7.275	25,84	30,32
11	40	0,420	4.410	15,66	14,66
12	80	0,177	2.760	9,80	4,86
13	100	0,149	205	0,73	4,13
14	200	0,074	694	2,46	1,67
15	PAN	< 0,074	467	1,66	0,01
			28.153		
			$\frac{28,153}{28,155}$ = 99,99 %		
			0,01 % lost .		

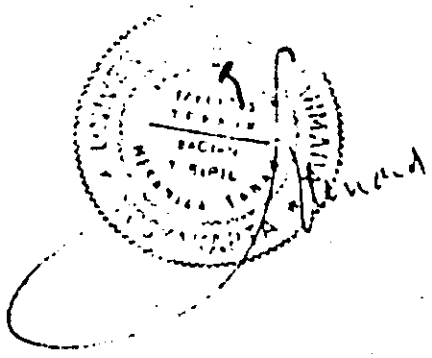


DIAGRAM ERBAGIN BUTER

GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI .

Sample No. : III - 2 .

Date of testing : 17 / 10 / 1977.

Weight of sample : 32.530 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	70,000	1.375	4,23	95,77
3	-	50,800	281	0,86	94,91
4	-	38,100	273	0,84	94,07
5	-	25,400	1.284	3,95	90,12
6	-	19,050	1.371	4,21	85,91
7	-	12,700	2.016	6,20	79,71
8	4	4,760	4.148	12,75	66,96
9	10	2,000	2.973	9,14	57,82
10	20	0,840	6.299	19,36	38,46
11	40	0,420	6.382	19,62	18,84
12	80	0,177	4.192	12,89	5,95
13	100	0,149	122	0,37	5,58
14	200	0,074	1.299	3,99	1,59
15	PAN	< 0,074	495	1,52	0,07
			32.520		
			$\frac{32.520}{32.530}$ = 99,96 %		
			0,04 % lost .		

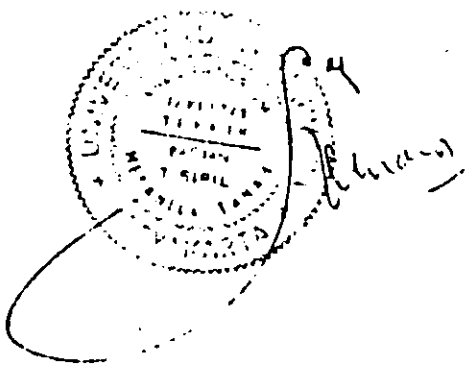
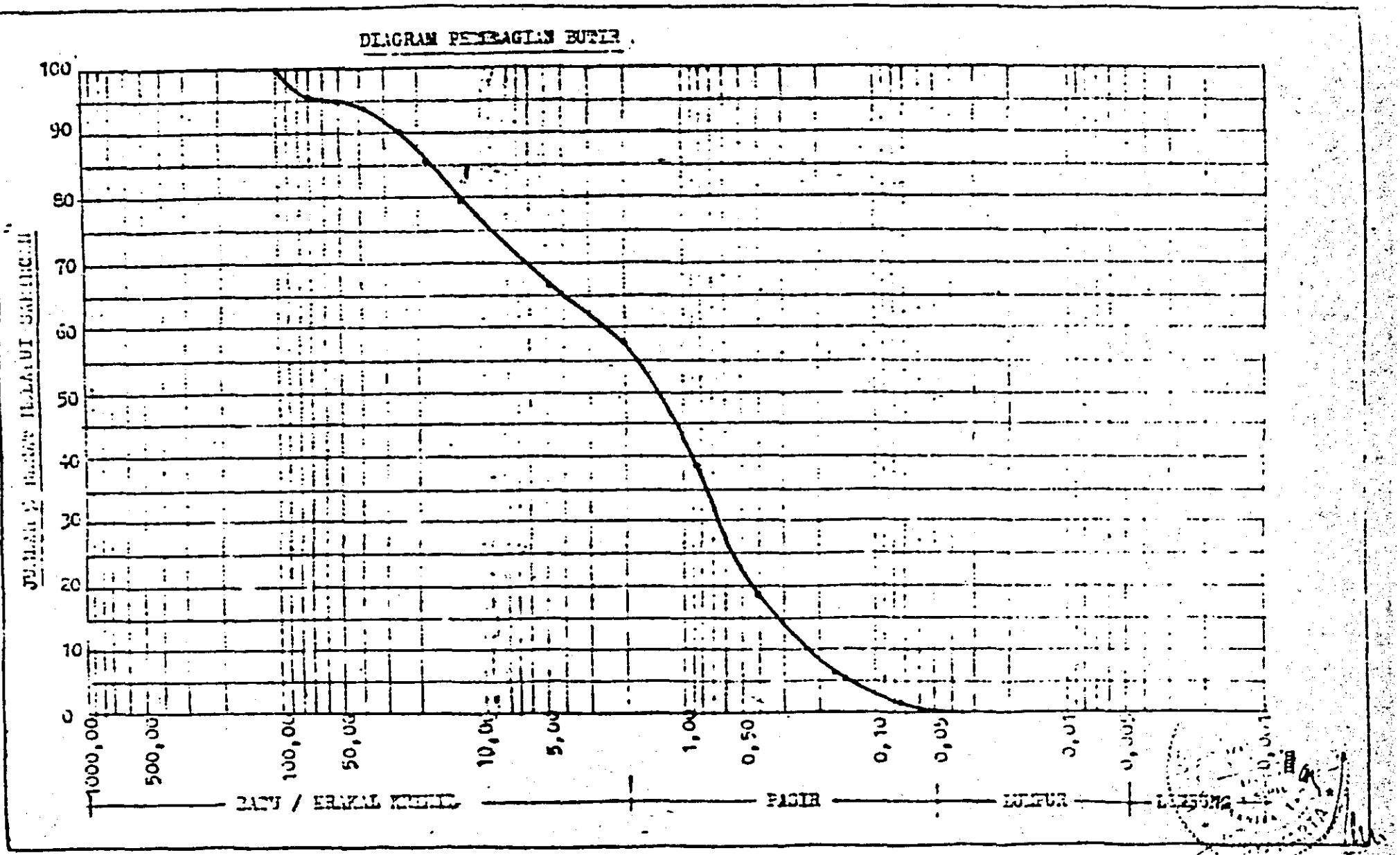


DIAGRAM PENGAGLAN BUTIR .



GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI .

Sample No. : III - 3 .

Date of testing 19 / 10 / 1977 .

Weight of sample : 33.277 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	70,000	1.140	3,43	96,57
3	-	50,800	260	0,78	95,79
4	-	38,100	977	2,94	92,85
5	-	25,400	2.950	8,86	83,99
6	-	19,050	2.370	7,12	76,87
7	-	12,700	2.857	8,59	68,28
8	4	4,760	3.982	11,97	56,31
9	10	2,000	2.760	8,29	48,02
10	20	0,840	5.900	17,73	30,29
11	40	0,420	4.769	14,33	15,96
12	80	0,177	3.649	10,97	4,99
13	100	0,149	212	0,64	4,35
14	200	0,074	837	2,51	1,84
15	PAN	< 0,074	609	1,83	0,01
			33.272		
			$\frac{33.272}{33.277}$ = 99,98 %		
			0,02 % lost .		

Proyek : W E R A P I.

Contoh No : III - 3.

DIAGRAM PENGALIR BUTIR

GRAIN SIZE ANALYSIS - MECHANICAL

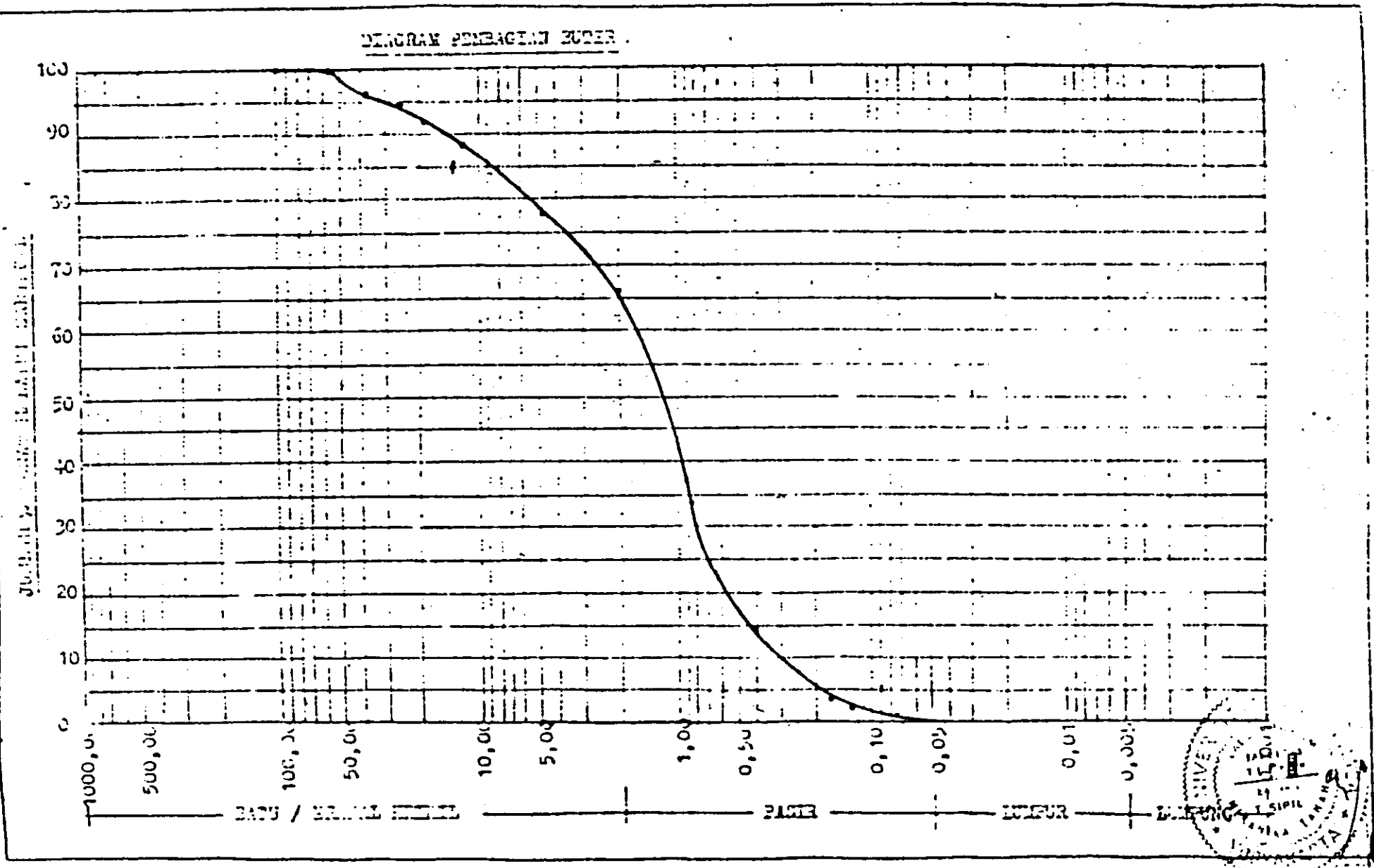
Project : MERAPI . Sample No. : IV - 1 .

Date of testing : 18 / 10 / 1977 . Weight of sample : 25.930 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	50,800	0	0,00	100,00
3	-	38,100	835	3,22	96,78
4	-	25,400	630	2,43	94,35
5	-	19,050	565	2,18	92,17
6	-	12,700	922	3,56	88,61
7	4	4,760	2.805	10,82	77,79
8	10	2,000	4,255	16,41	61,38
9	20	0,840	7.150	27,57	33,81
10	40	0,420	4.930	19,01	14,80
11	80	0,177	2,692	10,38	4,42
12	100	0,149	168	0,65	3,77
13	200	0,074	693	2,67	1,10
14	PAN	< 0,074	285	1,10	0,00
			25.930		

$\frac{25.930}{25.930}$ = 100,00 %

DIAGRAM PENGAGIAN BUTIR .



GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : IV - 2 .

Date of testing : 20 / 10 / 1977. Weight of sample : 32.440 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	80,000	915	2,82	97,18
3	-	50,800	607	1,87	95,31
4	-	38,100	280	0,86	94,45
5	-	25,400	1.010	3,11	91,34
6	-	19,050	885	2,73	88,61
7	-	12,700	1.634	5,04	83,57
8	4	4,760	3.639	11,22	72,35
9	10	2,000	3.162	9,75	62,60
10	20	0,840	6.410	19,76	42,84
11	40	0,420	5.479	16,89	25,95
12	80	0,177	4.973	15,33	10,62
13	100	0,149	395	1,22	9,40
14	200	0,074	1.580	4,87	4,53
15	PAN	< 0,074	1.470	4,53	0,00
			32.439		

$\frac{32.439}{32.440}$ = 99,99 %.

0,01 % lost .

Proyek : [illegible] Contoh NO : XV - 2.

GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI .

Sample No. : IV - 3 .

Date of testing : 25 / 10 / 1977.

Weight of sample : 34.945 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	130,000	1.335	3,82	96,18
2	-	100,000	1.850	5,29	90,89
3	-	50,800	1.044	2,99	87,90
4	-	38,100	704	2,01	85,89
5	-	25,400	1.162	3,33	82,56
6	-	19,050	940	2,69	79,87
7	-	12,700	1.271	3,64	76,23
8	4	4,760	2.724	7,80	68,43
9	10	2,000	2.815	8,06	60,37
10	20	0,840	6.394	18,30	42,07
11	40	0,420	5.915	16,93	25,14
12	80	0,177	5.365	15,35	9,79
13	100	0,149	405	1,16	8,63
14	200	0,074	1.760	5,03	3,60
15	PAN	< 0,074	1.260	3,59	0,01
			34.944		
			$\frac{34.944}{34.945}$ = 99,99 %		
			0,01 % lost .		

Contoh No : IV - 3.

Project : MERAPI.

DIGRAM PENGATUR BUTIR

GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI . Sample No. : V - 1 .

Date of testing : 21 / 10 / 1977. Weight of sample : 26.975 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	50,800	0	0,00	100,00
3	-	38,100	140	0,52	99,48
4	-	25,400	90	0,33	99,15
5	-	19,050	27	0,10	99,05
6	-	12,700	35	0,13	98,92
7	4	4,760	420	1,56	97,36
8	10	2,000	1.505	5,58	91,78
9	20	0,840	6.483	24,03	67,75
10	40	0,420	7.528	27,91	39,84
11	80	0,177	6.898	25,57	14,27
12	100	0,149	564	2,09	12,18
13	200	0,074	1.850	6,86	5,32
14	PAN	< 0,074	1.434	5,32	0,00
			26.974		

$\frac{26.974}{26.975}$ = 99,99 %

0,01 % lost .

Projek : M E R A P E
Contoh NO : A - 1.
100
90
80
70
60
50
40
30
20
10
0
0,05
0,10
0,50
1,00
5,00
10,00
50,00
100,00
500,00
1000,00

GRAIN SIZE ANALYSIS - MECHANICAL

Project : MERAPI .

Sample No. : V - 2 .

Date of testing : 22 / 10 / 1977 .

Weight of sample : 19.756 gram .

No.	Sieve no.	Diameter (mm)	Weight retained	% retained	% passing
1	-	100,000	0	0,00	100,00
2	-	50,800	265	1,34	98,66
3	-	38,100	810	4,10	94,56
4	-	25,400	1.700	8,60	85,96
5	-	19,050	864	4,37	81,59
6	-	12,700	1.155	5,85	75,74
7	4	4,760	2.330	11,79	63,95
8	10	2,000	1.830	9,26	54,69
9	20	0,840	3.830	19,39	35,30
10	40	0,420	3.660	18,53	16,77
11	80	0,177	2.559	12,95	3,82
12	100	0,149	217	1,10	2,72
13	200	0,074	405	2,05	0,67
14	PAN	< 0,074	130	0,66	0,01
			19.755		
			$\frac{19.755}{19.756}$ = 99,99 %		
			0,01 % lost .		

DIAGRAM PENGAGLAN BUTIR

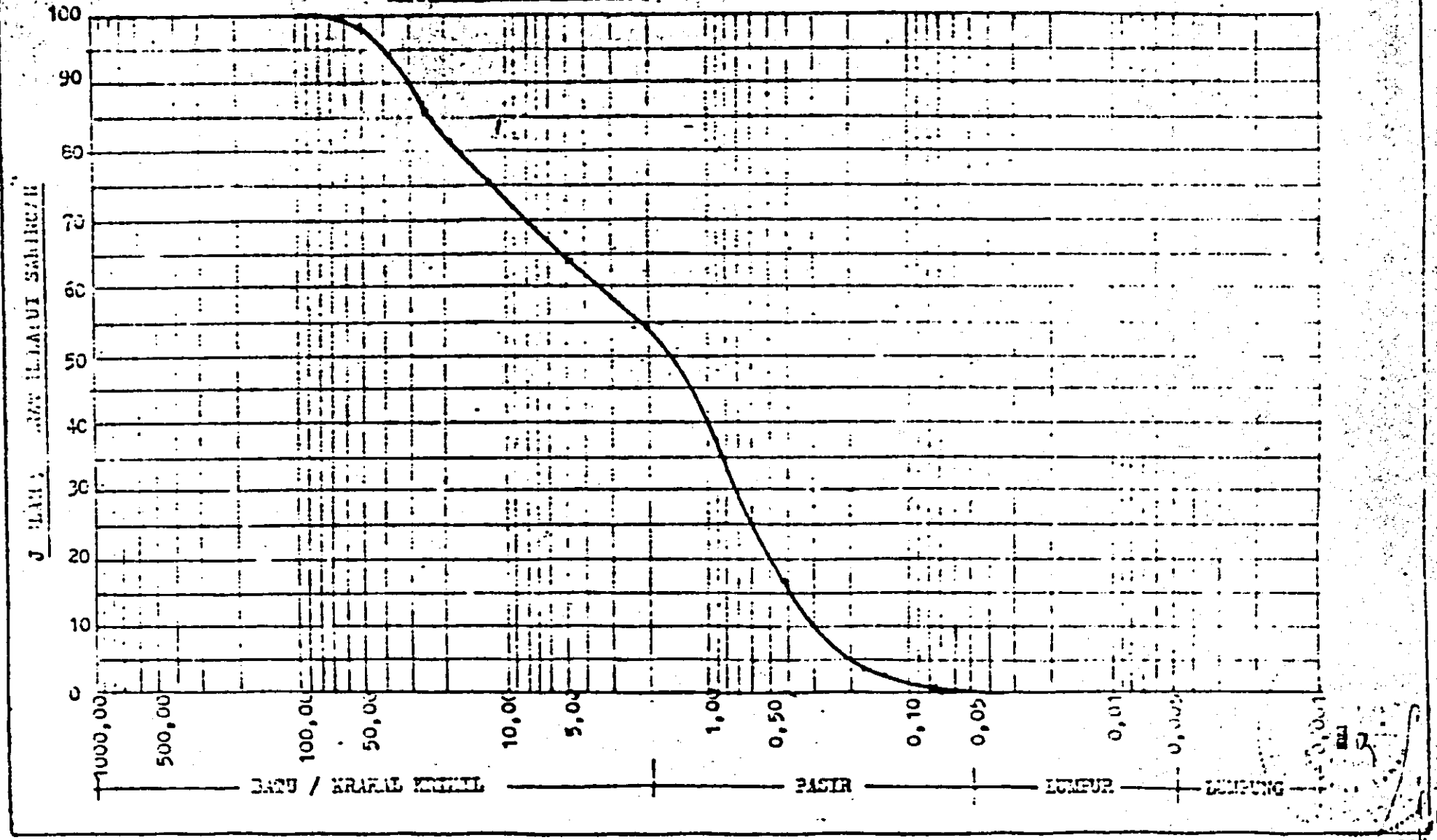


Table 17 Geologic Aspect of Sample

1. Lahar deposit of 1969(L)(灰部と岩塊)

Sample No.	72801
Locality	Jurangjeo
Name	安山岩質火山灰

ハ2～2.5mm大の火山岩片、及び0.2～0.4mm大の結晶片・火山岩片より成る石質火山灰。微細片は階無。

火山岩片は

- 橄欖石普通輝石安山岩
  - 橄欖石結晶を含み、やや玄武岩質。
- 含向内石普通輝石安山岩
  - 酸化ホルンブレンド結晶を少量含む。

に大別される。石基は半晶質～ガラス質で、ガラス部は無色。

斜長石ーソーシュライト化弱し。

Sample No.	予2801-B
Locality	Tsuruga-ko
Name	含角閃石紫蘇輝石普通輝石石英安山岩

斑状、半晶質。

斜長石斑晶は0.4～2.8mm大柱状で弱いソーシュライト化が全体に及んでいる。

普通輝石は0.2～2.8mm大で、時に紫蘇輝石の残晶を内包している。

角閃石は褐色ホルンブレンドの0.7mm大のものがわずかに観られる。

石基は半晶質で石英安山岩質。

2. Lahar deposit of 1930 (L_3) (灰部と岩塊)

Sample No.	ラスチラ
Locality	Jurangjero
Name	安山岩質火山灰

0.5～2 mm大時に3 mm大の火山岩片及び0.2～0.5 mm大の結晶片・火山岩片より成る石質火山灰。

火山岩片は

含橄欖石普通輝石安山岩
　少量の橄欖石斑晶を含み、やや玄武岩質。

含角内石普通輝石安山岩
　酸化ホルンブレンドの斑晶をわずかに含み
　やや石英安山岩質。

に大別できる。全体に石基は半晶質である。
斜長石のソーシュラ外化は弱い。

Sample No.	92507
Locality	Jurungje-o
Name	含橄欖石紫蘇輝石普通輝石玄武岩質(安山岩

斑状、完晶質。

斑晶は斜長石、普通輝石、磁鉄鉱及び橄欖石より成っており、稀に紫蘇輝石を含む。

斜長石斑晶は0.4～0.8mm大、時に2mm大で大きなものはソーシュライト化が進んでいる。普通輝石は0.4～1.5mm大、淡緑色。中心及び縁部に紫蘇輝石を含むことが稀にあり。橄欖石は0.1～0.5mm大。

石基は完晶質で玄武岩質な安山岩組成。

3. 古期 Lahar（L_5）（灰部と岩塊）

Sample No.	92521
Locality	K[illegible]ak (K Bodog)
Name	普通輝石石英安山岩質火山灰

1.5～3.5 mm大の岩片及び
0.5～1 mm大の結晶片・岩片より成る石質
火山灰。

岩片は斑状火山岩であり同質。斑晶は斜長
石・普通輝石・磁鉄鉱より成りホルンブレンドは
認められず。斜長石のソーシュライト化はあまり強
くなし。
石基は完晶質～半晶質で、石英安山岩質。

Sample No.	72501
Locality	K. Krosak (K. Bedrg)
Name	含角閃石紫蘇輝石普通輝石安山岩.

斑状、完晶質,

斜長石斑晶は0.5～1.5mm大柱状で中以上の大きさのものにはソーシュライト化が進行している。
普通輝石は0.2～1.2mm大。紫蘇輝石を内包することあり. また紫蘇輝石の単結晶もごくわずかあり。
角閃石は褐色ホルンブレンドで0.3mm大のものがごく少量点在する. オパサイト化が進行している。

石基は完晶質で安山岩組成。

4.　火山砕屑岩（Py）

Sample No.	92704
Locality	K Broughton
Name	含角閃石普通輝石安山岩質火山灰

1.6〜3mm大の火山岩片及び2.2〜2.5mm大の結晶片・火山岩片より成る石質火山灰。

火山岩片は斑状、半晶質〜ガラス質であり、

- 普通輝石安山岩、
- 含角閃石普通輝石安山岩
  前者とほとんど同じであるが斑晶に褐色ホルンブレンドをわずかに含む。

と大別できるが、前者は後者の角閃石斑晶に欠けた部分の岩片と考えられる。

斜長石のソーシュライト化は激しい。

Sample No.	ヲ2ヲ71/A
Locality	K Putik ～ K Slonghang の合流点付近
Name	安山岩質凝灰岩

2～4mm大の火山岩片より成る石質凝灰岩。

火山岩片は斑状、完晶質～半晶質であり、

- 含橄欖石普通輝石安山岩。
- 普通輝石安山岩。
- 角閃石普通輝石安山岩。

に大別される。石基のガラス部は淡褐色～無色、多くは安山岩組織であるが まれに玄武岩質のものも含まれている。

斜長石は多くがソーシュライト化されている。

5. 新期Merapr 火山岩（Ym）

Sample No.	101701
Locality	K河川(15B10のルート)最上流
Name	含橄欖石普通輝石玄武岩質安山岩.

斑状、完晶質。

斑晶は斜長石、普通輝石、磁鉄鉱及び少量の橄欖石より成る。

斜長石斑晶は0.2～2mm大柱状，大きな結晶ではソーシュライト化が進んでいる。普通輝石は0.5～2.4mm大で淡緑色－淡褐色。橄欖石は0.2～0.6mm大のものが散在している。

石基は完晶質で安山岩組成であるが玄武岩質である。

6. 古期 Merapi 火山岩 (Om)

Sample No.	ﾒﾗﾋﾔﾏ 1C1901
Locality	[illegible]
Name	角閃石紫蘇輝石普通輝石石英安山岩.

斑状、完晶質。

斑晶は斜長石、普通輝石、角閃石、磁鉄鉱及び少量の紫蘇輝石より成る。

斜長石は 0.4～1.5mm 大粒状でソーシュライト化が激しい。普通輝石斑晶は 0.2～1mm 大だが、他の試料に較べやや少量である。まれに紫蘇輝石斑晶を持つ。角閃石は褐色ホルンブレンドであり、0.2～0.7mm 大、オパサイト化が激しい。

石基は完晶質でクリプト結晶質である。石英安山岩組成。

7. 古期 Merapi 火山岩 (Om)

Sample No.	102×01
Locality	Kaliurang ~ 東山
Name	橄欖石紫蘇輝石普通輝石玄武岩

斑状、完晶質。

斜長石斑晶は 0.4 ~ 2.8 mm 大柱状。ソーシュライト化が全体に及しているが弱い。

普通輝石は 0.2 ~ 0.6 mm 大であり、稀に紫蘇輝石残晶を内包している。

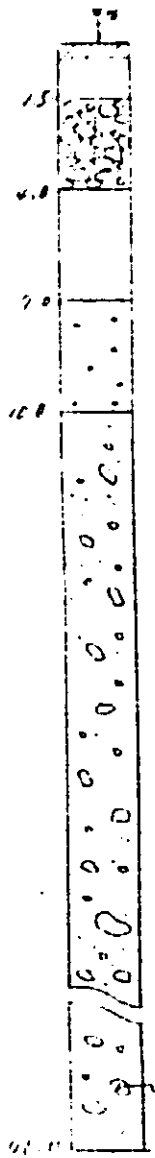
橄欖石は 0.2 ~ 2.8 mm 大で、輝石斑晶に劣らず多数存在する。イディングサイト縁に囲まれている。

石基は完晶質、玄武岩組成である。

石基中、小気孔に方解石が出来ている。

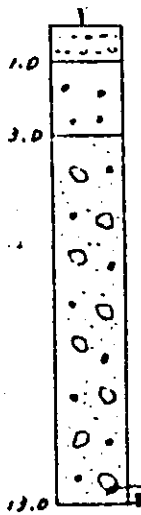
Columnar section K. Pulih. No. 1 (up stream part of old K. Blongkeng)

(P-1)



pine tree (25~30 year)
soil
ash layer (reddish gray)
debris flow · pyroclastic sed.
subangular, max φ · 50cm
ash (brownish gray)
ash (gray)
bearing pebble gravel
non bedding pyroclastic sediment
gravel (gray ~ white gray)
max φ = 100 cm
subangular
poorly sorted.
greater part
porous andesite
→ Sample NO.

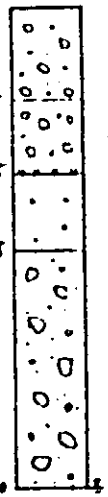
(P-2)



grass
over flow deposit (dark grays, weakly bedding. [1969]
ash (white gray)
bearing pebble gravel
non bedding pyroclastic sediment
(white gray)
gravel
max φ = 100 cm.
average φ = 5 cm
subangular
poorly sorted
a little loose.
→ Sample 92801.

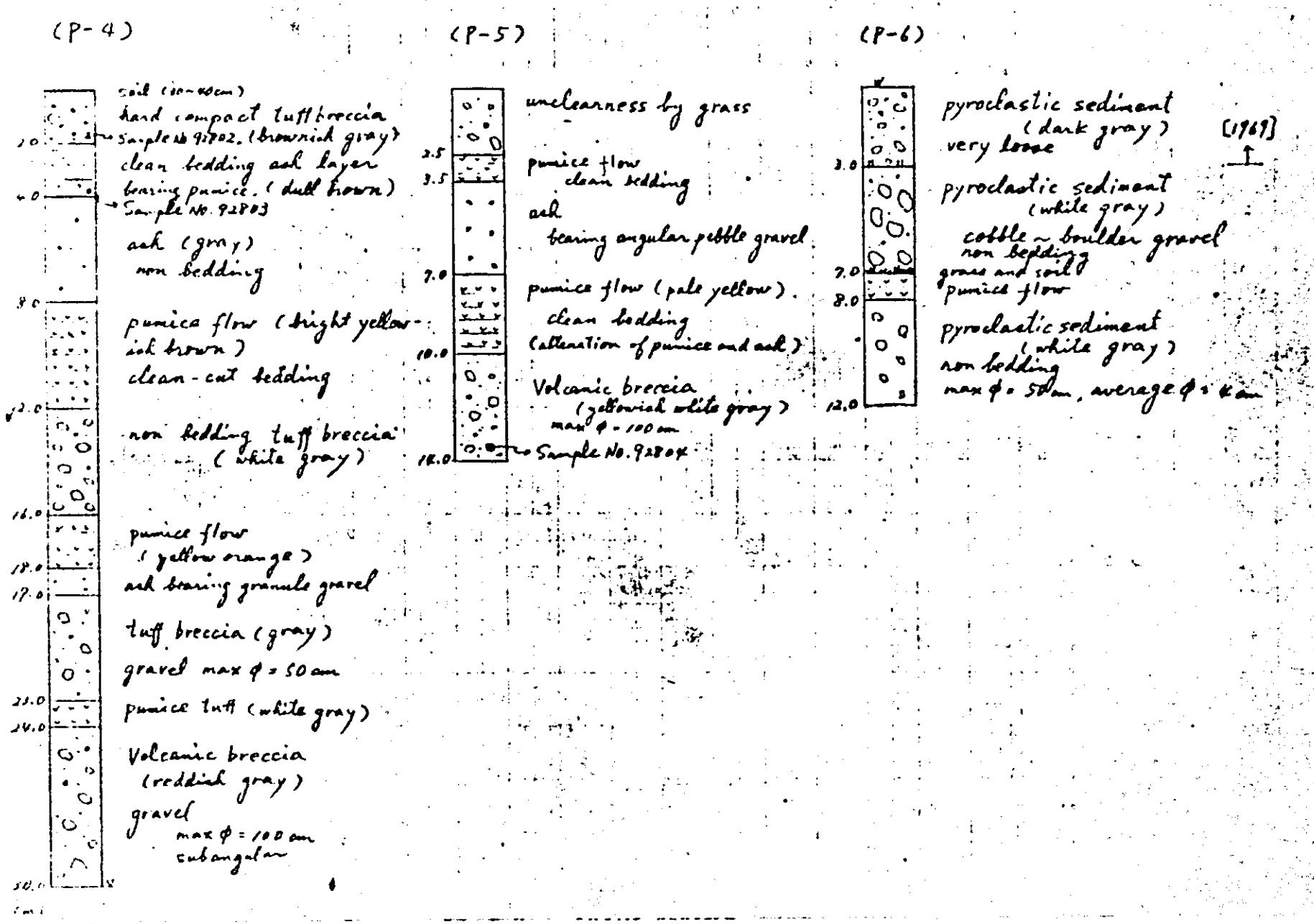
∴ gravel facies
grayish porous augite andesite
blackish glassy andesite
orangish two pyroxene andesite
etc

(P-3)

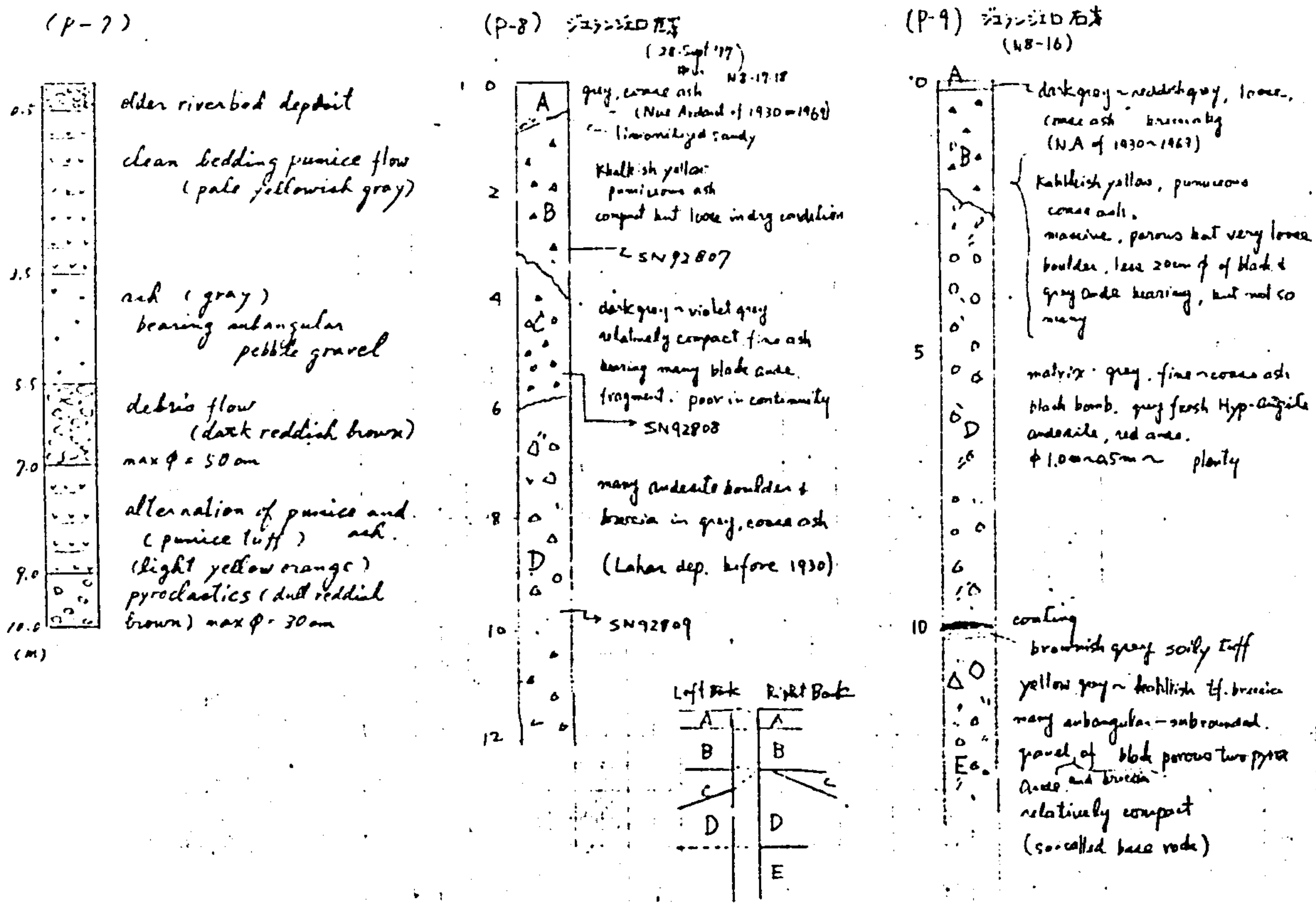


pyroclastic sediment
(dark gray)
pyroclastic sediment
(white gray) [1969]
ash (white gray)
bearing granule ~ pebble gravel
non bedding pyroclastic sediment
(white gray)
gravel
max φ = 100 cm.
subangular
andesite of various facies

K Pulih No. 2 · (upper part of old K. Blongkeng)

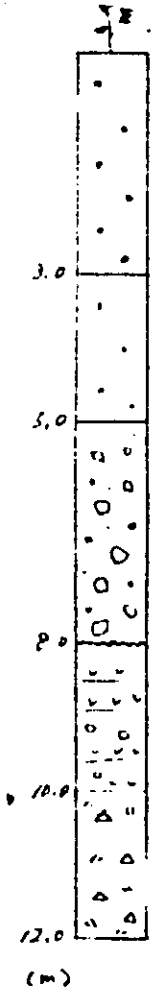


K. Putih No. 3


(P-7)
0.5
1.5
5.5
7.0
9.0
10.0
(m)
older riverbed deposit
clean bedding pumice flow (pale yellowish gray)
ash (gray) bearing subangular pebble gravel
debris flow (dark reddish brown)
max φ = 50 cm
alternation of pumice and ash (pumice tuff)
(light yellow orange)
pyroclastics (dull reddish brown) max φ = 30 cm
(P-8) ジュランジエロ西岸
(28 Sept '77)
N3-17-18
0
2
4
6
8
10
12
A
B
C
D
grey, coarse ash (New Ardent of 1930~1969)
limonitized sandy
Khalkish yellow pumiceous ash
compact but loose in dry condition
SN92807
darkgrey ~ violet grey
relatively compact fine ash
bearing many black ande. fragment. poor in continuity
SN92808
many andesite boulders & breccia in grey, coarse ash
(Lahar dep. before 1930)
SN92809
Left Bank
Right Bank
A
B
C
D
E
(P-9) ジュランジエロ右岸
(48-16)
0
5
10
A
B
D
E
darkgrey ~ reddish grey, loose, coarse ash · brecciating
(NA of 1930~1969)
Kahlkish yellow, pumiceous coarse ash.
massive, porous but very loose
boulder, less 20 cm φ of black & grey ande. bearing, but not so many
matrix · grey. fine ~ coarse ash
black bomb. grey fresh Hyp-Augite andesite, red ones.
φ 1.0 m ~ 0.5 m ~ plenty
coating
brownish grey soily tuff
yellow grey ~ khaki tf. breccia
many subangular ~ subrounded
gravel of black porous two pyroxene ande. and breccia
relatively compact
(so-called base rock)

K. Putih No. 4

(P-10)



ash (brownish gray) bearing pebble gravel non bedding

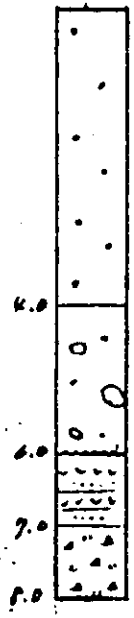
ash (gray) bearing granule ~ pebble gravel non bedding

non bedding pyroclastic sediment (white gray) gravel max φ = 50cm average φ = 5cm

ash bearing pumice (brownish yellow) include porlas andesite pebble gravel.

Tuff breccia (pale yellow) a little compact

(P-11)



ash (pale yellowish gray) bearing pebble gravel (average φ = 5cm)

ash (gray) bearing pebble ~ cobble gravel (max φ = 50cm) subrounded.

pumice and sand layer by water deposite

Tuff breccia (reddish brown)

(P-12)

over flow river-bed deposit (1976)

non bedding pyroclastic sediment

silt ~ sandstone (dark brown) clean bedding by hematite

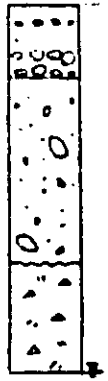
Tuff breccia very hard.

K. Putih No. 5

(P-13)

non bedding ash (brownish gray)
bearing pebble ~ cobble gravel (ϕ: 10cm)
clean bedding layer
non bedding ash (pale yellowish gray)
tuff breccia ~ volcanic breccia
very hard.
max ϕ = 100cm

(P-14)

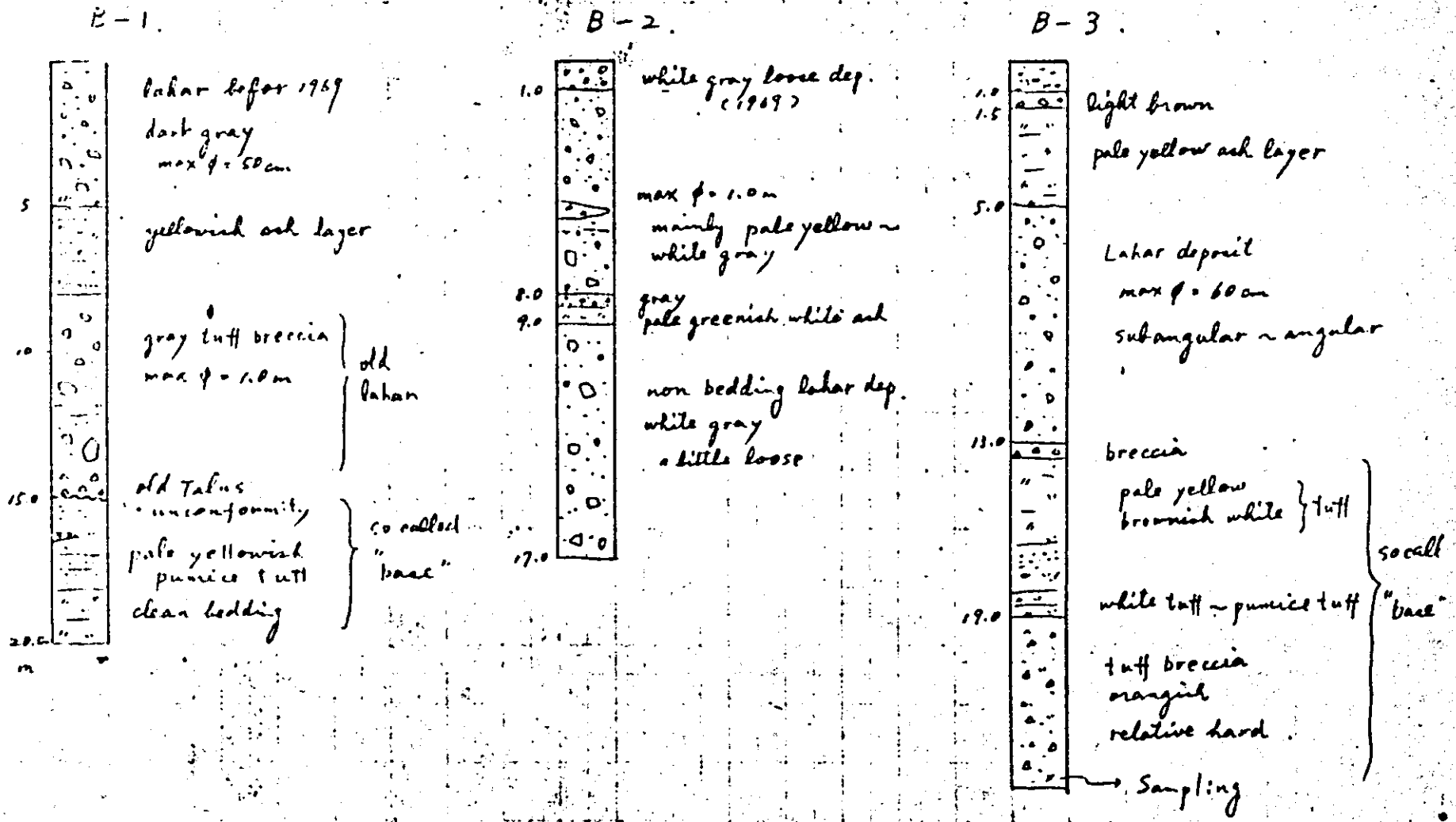


[1969]
over flow deposit (dark gray)
weakly flow structure.
non bedding pyroclastic sediment (white gray)
tuff breccia (dull orange)
very hard.

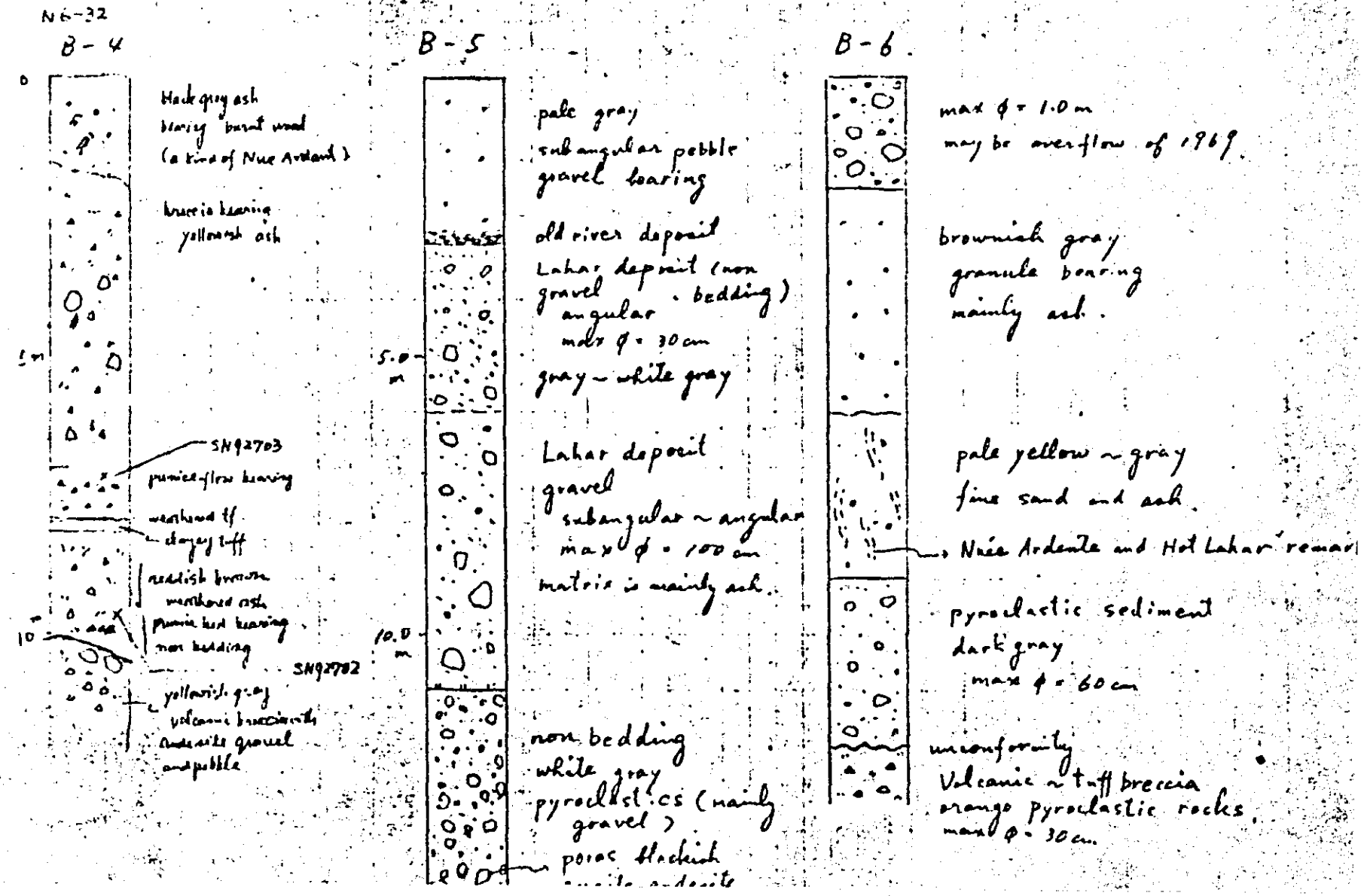
(P-15)

over flow deposit (dark gray)[1969]
white gray ash
bedding pumice flow
white ash
tuff breccia (yellowish brown)
max ϕ = 10cm
very hard and compact

K. Beberg No. 1


B-1.
lahar befor 1969
dark gray
max φ = 50cm
5
yellowish ash layer
10
gray tuff breccia
max φ = 1.0m
old lahar
15.0
old Talus
unconformity
pale yellowish pumice tuff
clean bedding
so called "base"
20.0
m
B-2.
1.0
white gray loose dep. (1969)
max φ = 1.0m
mainly pale yellow ~ white gray
8.0
gray
9.0
pale greenish white ash
non bedding lahar dep.
white gray
a little loose
17.0
B-3.
1.0
1.5
light brown
pale yellow ash layer
5.0
Lahar deposit
max φ = 60cm
subangular ~ angular
11.0
breccia
pale yellow
brownish white
tuff
white tuff ~ pumice tuff
19.0
tuff breccia
orangish
relative hard
Sampling
so call "base"

K. Beberg : (27 Sept. 77. Hakoyama).



Y Boring (Kawauchi 川内)

26 Sept. 71 by Nakayama

B-1 (N6-12)

B-2 (N6-15)

B-3 (N6-15-16-17)