

付 録

付録V - I ロングウォール採炭方式の比較調査

		Full-Mechanized	Semi-Mechanized	Manual
Production data				
Face Length	meter	150	100	60
Working Height	meter	2	2	2
Advance rate	m/shift	3	1.2	0.6
Specific Gravity	ton/m ³	1.25	1.25	1.25
Production/face-shift	ton/shift	1,125	300	90
Face number		1	2	4
Shift/day	shift/day	3	3	3
Production/day	ton/day	3,375	1,800	1,080
Operation days(effective)	days	250	280	300
Production Longwall	ton/year	843,750	504,000	324,000
Development meter	meter/year	6,750	6,048	6,480
Production Development	ton/year	126,563	90,720	64,800
Production total	ton/year	970,313	594,720	388,800
Preparation yield				
	%	92	92	92
Satable coal	ton/year	892,688	547,142	357,696
Manpower				
Productivity (direct)	ton/man-year	4,251	1,303	542
Material cost (Development)				
	MRp/meter	0.30	0.12	0.10
Material cost (Longwall)	Rp/ton	1000	2000	3000
Utility	MRp/day	12.00	6.00	4.00
Labor cost	MRp/man-year	3.00	2.80	2.50
Initial investment				
	million US\$	45.49	23.65	12.71
Production cost/year				
	MRp		MRp	MRp
Depreciation		10,451	5,607	3,121
Parts & Maintenance		6,941	3,928	2,001
Material cost (Development)	MRp/meter	2,025	726	648
Material cost (Longwall)	MRp/ton	844	1,008	972
Utility		3,000	1,680	1,200
Labor		630	1,176	1,650
Others (10%)		2,389	1,413	959
Contingency (10%)		2,628	1,554	1,055
Total in million Rp		28,908 MRp/year	17,092 MRp/year	11,606 MRp/year
Exchange Rate		2,300 Rp/US\$	2,300 Rp/US\$	2,300 Rp/US\$
Total in million US\$		12.57 MUS\$/year	7.43 MUS\$/year	5.05 MUS\$/year
Production cost/ton				
		14.1 US\$/ton	13.6 US\$/ton	14.1 US\$/ton

*Cost estimation is just for mining.
 Tax and duties are not considered.
 Straight line method is applied for depreciation.
 Land cost is not included.

付録 V - II 柱房式採炭の比較調査

		Full-Mechanized	Semi-Mechanized	Manual
Production data				
Advance rate	m/shift	6	3	1.2
Cross Section	m ²	15	12	8
Specific Gravity	ton/m ³	1.25	1.25	1.25
Production/face-shift	ton/shift	113	45	12
Face number		2	5	15
Shift/day	shift/day	3	3	3
Production/day	ton/day	678	675	540
Operation days	days	300	300	300
Production	ton/year	203,400	202,500	162,000
Preparation yield	%	92	92	92
Salable coal	ton/year	187,128	186,300	149,040
Advance meter	meter/year	5,400	13,500	16,200
Manpower		90	210	330
Productivity (direct)	ton/man-year	2,079	887	452
Material cost	MRp/meter	0.28	0.13	0.10
Utility	MRp/day	2.00	1.80	1.20
Labour cost	MRp/man-year	3.00	2.80	2.50
Initial investment	million US\$	7.54	6.05	4.07
Production cost/year		MRp	MRp	MRp
Depreciation		1,608	1,364	934
Maintenance		1,196	812	490
Materials		1,512	1,755	1,620
Utility		600	540	360
Labour		270	588	825
Others (10%)		519	506	423
Contingency (10%)		571	557	465
Total in million Rp		6,276 MRp/year	6,122 MRp/year	5,117 MRp/year
Exchange Rate		2,300 Rp/US\$	2,300 Rp/US\$	2,300 Rp/US\$
Total in million US\$		2.73 MUS\$/year	2.66 MUS\$/year	2.22 MUS\$/year
Production cost/ton		14.6 US\$/ton	14.3 US\$/ton	14.9 US\$/ton

*Cost estimation is just for mining.
 Tax and duties are not considered.
 Straight line method is applied for depreciation.
 Land cost is not included.
 Supporting system of Mechanized method is Roof bolting,
 and Semi-mechanized and Manual are wooden support.

付録 V - III (a) ロングウォールおよび柱房式採炭の投資・運営コスト

Case A : Mechanized	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (\$/year)(1000\$)	
Investment							
Studies	1	2,000	2,000	20	100	0	0
Site Preparation	1	1,000	1,000	20	50	0	0
Power Roof Support	105	100	10,500	10	1,050	5	525
Double Ranging Drum Shearer	1	2,000	2,000	10	200	10	200
AFC	1	2,000	2,000	10	200	10	200
BSL, Crusher, Pantehnicon	1	800	800	10	80	10	80
Hydraulic system	1	1,000	1,000	10	100	10	100
Longwall Electrics	1	2,000	2,000	10	200	5	100
Road Header	3	800	2,400	10	240	10	240
Shuttle car	6	400	2,400	10	240	10	240
Main Conveyor	2	1,000	2,000	8	250	8	160
Longwall conveyor	2	1,000	2,000	8	250	8	160
Development conveyor	4	800	3,200	8	400	8	256
Longwall transporter	1	2,000	2,000	10	200	5	100
Man & Material transporter	6	400	2,400	8	300	10	240
Main fan	1	400	400	15	27	5	20
Local fan	5	50	250	8	31	5	13
Drainage	1	500	500	8	63	5	25
Power supply	1	2,000	2,000	20	100	3	60
Lamp, Safety devices, etc.	1	500	500	10	50	5	25
Sub-total			41,350		4,131		2,744
Others							274
Total (US\$)			45,485		4,544		3,018
Total (R Rp)	2,300		104,616		10,451		6,941

Case B : Semi-Mechanized	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (\$/year)(1000\$)	
Investment							
Studies	1	800	800	20	40	0	0
Site Preparation	1	600	600	20	30	0	0
Single props and iron bar	3	300	900	10	90	10	90
Coal cutter	3	400	1,200	10	120	10	120
AFC	3	600	1,800	10	180	10	180
BSL, Crusher, Pantehnicon	3	400	1,200	10	120	10	120
Hydraulic system	3	200	600	10	60	10	60
Longwall Electrics	3	800	2,400	10	240	5	120
Hydraulic Excavator	6	200	1,200	10	120	10	120
Pneumatic pick	1	100	100	5	20	10	10
Main Conveyor	2	600	1,200	8	150	8	96
Longwall conveyor	4	500	2,000	8	250	8	160
Development conveyor	8	300	2,400	8	300	8	192
Material transporter	6	200	1,200	8	150	10	120
Main fan	1	400	400	8	50	5	20
Local fan	6	50	300	8	38	5	15
Drainage	1	500	500	8	63	5	25
Power supply	1	1,500	1,500	20	75	3	45
Compressed air supply	1	600	600	10	60	5	30
Lamp, Safety devices, etc.	1	600	600	10	60	5	30
Sub-total			21,500		2,216		1,553
Others							155
Total (US\$)			23,650		2,438		1,708
Total (R Rp)	2,300		54,395		5,607		3,928

Case C : Manual	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (\$/year)(1000\$)	
Investment							
Studies	1	600	600	20	30	0	0
Site Preparation	1	500	500	20	25	0	0
Single props and iron bars	5	200	1,000	10	100	10	100
Chain conveyor	5	150	750	10	75	10	75
Hydraulic system	5	100	500	10	50	10	50
Pneumatic pick	1	200	200	5	40	10	20
Main Conveyor	2	400	800	8	100	8	64
Longwall conveyor	4	300	1,200	8	150	8	96
Development conveyor	8	200	1,600	8	200	8	128
Material transporter	5	200	1,000	8	125	10	100
Main fan	1	300	300	8	38	5	15
Local fan	10	50	500	8	63	5	25
Drainage	1	300	300	8	38	5	15
Power supply	1	600	600	20	30	3	18
Compressed air supply	1	1,200	1,200	10	120	5	60
Lamp, Safety devices, etc.	1	500	500	10	50	5	25
Sub-total			11,550		1,234		791
Others							79
Total (US\$)			12,705		1,357		870
Total (R Rp)	2,300		29,222		3,121		2,001

付録V - III (b) ロングウォールおよび柱房式採炭の投資・運営コスト

Case A : Mechanized	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (%/year)(1000\$)	
Investment							
Studies	1	500	500	20	25	0	0
Site Preparation	1	500	500	20	25	0	0
Road Header	2	800	1,600	10	150	10	150
Shuttle car	3	400	1,200	10	120	10	120
Conveyor system	3	400	1,200	8	150	8	96
Material transporter	2	200	400	8	50	10	40
Main fan	1	200	200	15	13	5	10
Local fan	3	50	150	8	19	5	8
Drainage	1	100	100	8	13	5	5
Power supply	1	800	800	20	40	3	24
Lamp, Safety devices, etc	1	200	200	10	20	5	10
Sub-total			6,850		635		473
Others			685		64		47
Total (US\$)			7,535		699		520
Total (MRp)	2,300		17,331		1,608		1,195

Case B : Semi-Mechanized	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (%/year)(1000\$)	
Investment							
Studies	1	400	400	20	20	0	0
Site Preparation	1	400	400	20	20	0	0
Hydraulic Excavator	5	200	1,000	10	100	10	100
Pneumatic pick	1	50	50	5	10	10	5
Baby conveyor	15	20	300	10	30	10	30
Conveyor system	3	300	900	8	113	5	45
Material transporter	3	200	600	8	75	10	60
Main fan	1	200	200	8	25	5	10
Local fan	6	50	300	8	38	5	15
Drainage	1	100	100	8	13	5	5
Power supply	1	600	600	20	30	3	18
Compressed air supply	1	400	400	10	40	5	20
Lamp, Safety devices, etc	1	250	250	10	25	5	13
Sub-total			5,500		539		321
Others			550		54		32
Total (US\$)			6,050		593		353
Total (MRp)	2,300		13,915		1,354		812

Case C : Manual	Quantity	Unit price (1000\$)	Total (1000\$)	Life (year)	Depreciation /year (1000\$)	Parts & Maintenance (%/year)(1000\$)	
Investment							
Studies	1	300	300	20	15	0	0
Site Preparation	1	300	300	20	15	0	0
Pneumatic pick	1	100	100	5	20	10	10
Baby conveyor	25	20	500	10	50	10	50
Conveyor system	3	200	600	8	75	5	30
Material transporter	3	100	300	8	38	10	30
Main fan	1	200	200	8	25	5	10
Local fan	5	20	100	8	13	5	5
Drainage	1	100	100	8	13	5	5
Power supply	1	300	300	20	15	3	9
Compressed air supply	1	600	600	10	60	5	30
Lamp, Safety devices, etc	1	300	300	10	30	5	15
Sub-total			3,700		369		191
Others			370		37		19
Total (US\$)			4,070		406		213
Total (MRp)	2,300		9,351		934		490

付録 VI - 1 インドネシア石炭生産量予測総表

(百万ト)

Name of Company	Area (Coal Seam Condition)	Reserves (Mill.t)			Coal Quality H.V. Kcal/kg (Ash, S)	Production TWh/Day	Production (Mill.tpa)							
		Meas.	Indl.	Inf.			Minobl	1995	2000	2008	2020			
PTBA Ombilin	Ombilin : U/G (A: 2.0m; 10' ±) Ombilin : (A: 1.5m; C: 4-15m; <10') Ombilin : (A: 1.5m; C: 1.5m; <10') Tanah Hitam, Karidi (A: 1.5m; C: 5.5m; 10-2.5') Total	0.45 8.0 110.0 7.1 125.55			0.45 8.0 20.0 6.7 35.15	2.17	0.06	0.07	1.00	1.00	1.00	0.30	0.50	1.50
PTBA Tanjung Enim	Air Laya (A1: 8.0, A2: 9, B1, 10, B: 23m; <40') N. Muara Tiga Besar (A1: 8, A2: 12, B: 18m; 15') West Banko (A1: 7.0, A2: 10, B1: 12; <19') Bukit Kendi (A: 10, B: 13.5, C1: 4.0; <72') South M.T.B. Total	103 371 560 14 26 1074	25	10	112 82 165 154 30 389	2.93	4.48 2.30	3.00 4.00 3.90 4.50 1.00 14.90	5.00 4.00 4.00 4.50 0.80 14.60	3.00 4.00 3.90 4.50 0.80 14.60	4.50 4.00 4.00 4.50 0.80 14.60	4.50 4.00 4.00 4.50 0.80 14.60	4.50 4.00 4.00 4.50 0.80 14.60	4.50 4.00 4.00 4.50 0.80 14.60
PTBA Total						7.86	7.95	12.65	16.07	15.90	12.10			
PT Kalimantan Prima Coal	Pinang (O/P) (10/20 seams; 2.4-6.5m; 9' ±) Bengalon (O/P)	156	206		154	5.75	10.21	16.00	22.00	22.00	22.00	22.00	22.00	22.00
PT Arutmin Indonesia	Seraijin (O/P) (1 seam; 6-7m; 2-12') Santi (O/P) (2 seams; 3.4-7m; 15') Mula (O/P) (7') Asam Asam (O/P) Batulihin Total	112 114 336 155 85 802	12 108 22 96 68 306	5 79 80 158 64 386	6.65	5.36	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20	4.00 2.00 0.60 0.39 1.20 7.20
PT Adaro Indonesia	Paringin (O/P) (1 seam; 20-40m; 5-15') Tutuban (O/P) (multiple; 40m; 35-40') Wana (O/P) (3 seams; 25m; 35-40') Total	50 570 160 780	12 20 260 292	15 310 325	77 590 730 1397	12.88	5.55	7.00 7.00 2.00 16.00	6.00 8.00 2.00 20.00	6.00 8.00 2.00 20.00	6.00 8.00 2.00 20.00	6.00 8.00 2.00 20.00	6.00 8.00 2.00 20.00	6.00 8.00 2.00 20.00
PT. Keadilo Coal Indonesia	Penanggis (O/P) (1 seam; 4.0 ± m; 15') Bintu Total	30 42 75	<100m 10 10	11 11		11.22	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PT. Muti Harapan Utena	Bussang (O/C) (7 seams; 1.5-6m; 8.0') Jonggon (1.1m; 4') Gitan, Sonuk (1.5m; 20') Loakulu (1.4m; 40') Belumpar (1.4m; 45') Pusak Total	77.4	22.6	15.5	74.3	6.70	1.40 0.57	1.40 1.00	1.00 1.00	1.40 1.00	1.00 1.00	0.50 0.50	0.80 1.30 1.20 0.50 3.00	0.80 1.00 0.70 0.50 3.00
PT. Tanito Harum Mine	Bussang (O/P) (4 seams; 1.5-6m; 2-50') Pondok (O/P) Sukodadi (U/G) Mine : (O/P) (2 seams; 3.5-1m; 3-15') Total	31.8 39.6 71.4	5.9 2.2 8.1	44.8 42.9 87.7		3.94	1.11	1.40 0.30	1.50 0.50	1.50 0.50	1.50 0.50	1.50 0.50	1.50 0.50	1.50 0.50
PT. Berau Coal	Lasi (O/P) (4 seams; 3m ±; 5') Benuangan (O/P) (13 seams; 15-20') Other areas Total	150 103 300 553	253 253	525 525		3.71	0.67	2.00 1.70	4.50 3.20	2.00 4.00	2.00 4.00	2.00 4.00	2.00 4.00	2.00 4.00
PT. Kideco Jaya Agung	Roto (O/P) (8 seams; 3.5-23; 70-80') Saru (30-75') Sulabong (30-75') Samarangan (8 seams; 3.5-23; 15-40') Pinang (25-40') Total	31.0 85.1 36.2 714.0 42.1 908.4	44			4.81	2.50	4.00	5.00	4.00	5.00	5.50	5.50	5.50
PT. Allied Indo Coal	O/C Paranbaban (B, B, C, C, C, 3-8m; 12-20') Riau Baharum Total	14.1 14.1			9.6 9.6	4.06	1.19	1.20	1.00	1.00	1.00	1.00	1.00	1.00
PT. Chung Hua Overseas	Coal Belt I (1.5-7m; 18-34') Coal Belt II (2.5-4m; 18-34') Coal Belt V (4-6m; 18-34') Total	300 300			39 39			0.50 0.50	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00
PT. Indomineo Mandiri	Western Block (13; 1.6-9.7; 0-15') Bassem Block (19; 1.5-8.9; 0-24') Total				94 107 201			1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	3.50 3.50	3.50 3.50	3.50 3.50
CCOW Total						6.30	29.58	55.10	74.89	87.80	85.70			
PT. Kitadin	Mine 1 (U/G) (#9; 2.1, 1.0; 1.5m; 30') Mine 2 (U/G) (#7; 1.7m; 28') Mine 3 (U/G) (#3; 2.0, 4; 1.2m; 30') O/P/P Total	9 2 11		2.2 2.2		0.98	0.42 0.30	0.40 0.10	0.50	0.50	0.50	0.50	0.50	0.50
P.T. Fajar Bumi Sakti	Mine 1 (D: 1.4m; 6-9') L/W C: 2-2.3m; 6-9') R+P LoaUtung (A: 1.2 A: 1.8 B: 2.3 C: 1.1 / 11' ± 5') Total	11				1.25	0.58	0.10	0.80 (17.00)	0.80	0.80	0.80	0.80	0.80
P.T. Bukit Sunur	Anariga Selatan (US; 4; MS; 7-8m; 8') Lubuk Bungin Utara (US; 4; MS; 7-8m; 10') Sulung Barat (US; 4; MS; 7-8m; 8') Total	(17) 6.0 0-uo				5.35	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
PT. Bukit Baiduri	Moresdaik (A: 1.2, B: 3.0, C: 1.8, D: 4.0/ 9-12') Galaxo Telink Dalam N. Total	3.8 12.0 2.0 17.8		3.8 12.0 2.0 17.8		3.07	0.75	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00	0.30 0.40 0.30 1.00
PT. Darus Mas Hitam	Simpau (US; 2.0 LS; 4.5m/ 18') Kandis (Sim: 1-1.7m; 1-5.5m; 37') Telang Egarim Total	2.4 4.7	4.7	7.0 7.0	2.4 2.4	?	0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Others						?	0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.50
KP Mines Total						1.90	4.22	3.95	4.30	4.30	4.30	4.30	4.30	4.30
KUD Mines Total						2.18	0.23	0.30	0.30	0.30	0.30	0.30	0.30	0.30
New Contract Total														
Grand Total							41.98	72.00	100.36	122.40	123.70			

付録VI - II (a) 質問状及びヒアリングの総括表

Company	Mines	Reserves (Mill. tons)		Coal Seams (m)	Dip	Mining	Manpower (Oir/Cont./T.)	Production (Mill. tons)									
		Meas. Indic.	Infer. Min-b					1995	1996	1998	2000	2005	2010	2015	2020		
PT Bukit Asam	Sawauwung Ombilin Sigitul Tengah Hitam Kendi, etc. Tanjung Enim (Air Laya Pit) North Muara Tiga Besar West Banku Bukit Kendi South Muara Tiga Besar	0.45	-	0.45	A2.0.B1.C.6.0	13~18°	U/G	415/38/453	0.06	0.05	0.05	-	0.50	1.40	1.50	1.00	
		110	-	110	A1.5.B1.C.5.5	13~18°	U/G		1.11	0.90	0.60	0.07	0.05	0.53	0.57	0.50	
		7.1	-	7.1	A1.5.B1.C.5.5	10~23°	O/P(1.9)		4.48	3.00	3.00	5.00	6.00	3.00	-	-	-
		103	25	128	A1.7.5.A2.11.B.1.10.B2.4.5.C.7	10~20°	O/P(1.9)	1645/431/2076	2.30	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
		371	-	371	A1.7.5.A2.12.9.B.17.7.C.8.6	10~40°	O/P(1.2.5)	1616/163/1779	-	3.90	3.90	4.50	5.00	5.00	5.60	5.60	5.60
PT Bukit Asam Total	O/P (Tanjung Enim) O/P (Ombilin) U/G (Ombilin, Sigelut) T.P.TBA	14	53	67	A1.7.5.A2.10.B.11.12.7.B2.4.5.C.1.5.C2.6.2	5~19°	O/P(1.2.5)	336/163/499	-	0.30	0.60	1.00	0.80	1.00	1.00	1.00	
		26	80	106	A1.8.2.A2.12.4.B.16.4.C.8.1	15~72°	O/P(1.7)	163/407/570	-	0.30	0.50	0.40	0.40	1.00	1.00	1.00	
		112	12	124	S1.9.5-3.03.SL.0.68-1.45	2~12°	O/P	1211/1317/2528	6.78	7.90	12.00	14.90	15.20	13.00	10.60	10.60	
		114	108	222	S2.7.5.SL.4.70	15°	O/P		1.11	0.90	0.60	0.40	-	-	1.93	2.07	1.50
		336	22	358				2.95	8.85	12.85	15.37	15.35	15.53	12.67	12.10		
PT Arutmin Ind.	Sensuk Santai Mulle Asam Asam Batuicin Total	30	-	30	K4.4.0.KB.0.5	15°	O/P	71/156/227	5.36	6.00	7.10	6.89	13.70	11.20	7.20	7.20	
		45	10	55				1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
		117	470	587				1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
		150	250	400	R3.G3.E3.1.3	5°	O/P(1.4)		0.67	1.10	2.00	4.50	5.30	6.00	6.00	6.00	
		300	505	805	R13.seams	15~20°	O/P(1.6)		0.50	1.70	3.20	3.60	4.00	4.00	4.00	4.00	
PT Berau Coal	Other Areas (Qarapatan Kelai) Busang Jongon Citan (Senauk) Loakula (T.Dalam) La Han (Belumpur) Putek (Beruyap) Total	553	253	806	R2.1.2.#3.1.2.#7.1.5	8°	O/P(1.9)	967/100/1067	0.87	1.80	3.70	7.70	9.50	10.00	10.00	10.00	
		77.4	22.6	100	A1.1.#1.1.1	4°	O/P	1998-1995/14/900	1.40	1.40	1.00	1.00	1.00	0.50	-	-	
		103	250	353	A1.1.5	20°	O/P	2005-250/25/800	0.57	0.70	1.00	1.00	1.00	0.50	0.80	0.80	
		300	505	805	A1.4	40°	O/P		-	-	-	0.80	1.00	1.30	1.00	1.00	
		553	253	806	A1.4	45°	O/P		-	-	-	-	0.50	1.20	1.20	0.70	
PT Kideco Jaya Agung	Roto 1 / II Semu Susubang Samarangau Pinarag Total	31.0	44	75	#109.#8.15.#6.1.4.7.5.#4.12.#3.8	70~80°	O/P(1.7.8)	700/187/887	1.97	2.10	2.40	2.80	3.00	3.00	3.00	3.00	
		85.1	-	85.1					2.50	2.80	4.00	5.00	5.50	5.50	5.50	5.50	
		362	-	362					-	-	0.50	1.00	1.50	1.50	2.00	3.00	
		714.0	-	714.0					-	-	-	0.50	1.00	1.50	2.00	2.50	
		42.1	-	42.1					-	-	-	0.20	1.00	1.50	2.00	2.50	
PT Kaltim Prima Coal	Pinang Area (P.L. Hatan, Surya, Bintang, C North, C South, H North, K. D. U) Bengalon Prospect Separi-Santan Prospect Total	908.4	44	952.4	10/20seams(2.4~6.5)	9°	O/P(1.7)	2200/D	2.50	2.80	4.50	7.00	10.00	11.00	13.00	15.00	
		156	206	362					-	-	-	-	-	-	-	-	
		85.1	-	85.1					-	-	-	-	-	-	-	-	
		362	-	362					-	-	-	-	-	-	-	-	
		714.0	-	714.0					-	-	-	-	-	-	-	-	
PT Allied Iudo Coal	Parembahan Total	391	152	543					10.21	11.50	10.00	22.00	22.00	22.00	22.00	22.00	
		14.1	-	14.1	B1.2.B3.1.C1.3.C2.3	5~10°	O/P(1.9)	885/870	1.19	1.20	1.00	1.00	1.00	1.00	1.00		
		405.1	152	557.1					1.19	1.20	1.00	1.00	1.00	1.00	1.00		
		31.8	5.9	37.7	POL.2.5.CB.3.0.SK0.2.0	5~12°	O/P(1.10)	845/47/892	1.11	1.30	1.40	1.50	1.50	1.50	1.50		
		39.6	2.2	41.8	SB.2.0.SG.1.5.KIP.1.5	10~24°	O/P(1.10)		1.11	1.30	1.40	1.50	1.50	1.50	1.50		
PT Tanta Hartum	1998-U/G Mine II: Sebulu/Sighan/ Kutumbang Total	71.4	8.1	79.5					1.11	1.30	1.40	1.50	1.50	1.50	1.50		
		81.7	55.8	137.5					1.11	1.30	1.40	1.50	1.50	1.50			
		81.7	55.8	137.5					1.11	1.30	1.40	1.50	1.50	1.50			
		81.7	55.8	137.5					1.11	1.30	1.40	1.50	1.50	1.50			
		81.7	55.8	137.5					1.11	1.30	1.40	1.50	1.50	1.50			

付録 VI - II (b) 質問状及びヒアリングの総括表
 APPENDIX VII-la Summary of Questionnaire and Hearing with PTBA and CCOW Mines of 1st Generation (2)

Company	Mines	Reserves (Mill. tons)		Coal Seams (m)	Dip	Mining	Manpower (Dir/Cont./T.)	Production (Mill. tons)								
		Mass	Infer.					1995	1996	1998	2000	2003	2010	2015	2020	
PT Adaro Indonesia Overseas	Paringin	50	12	77	9500-30.0	5~15°	O/P(1:2)	2007/1200/1400	5.55	7.20	7.00	6.00	10.00	10.00	10.00	10.00
	Tutupan	570	20	590	1100-30, 1200-25, 1300-30, 1400-25	35~40°			-	-	7.00	8.00	10.00	10.00	10.00	10.00
	Wara	160	260	310	700, 1100-25, 1200-25, 1300-25	35~40°			-	-	2.00	6.00	10.00	10.00	10.00	10.00
	Total	780	292	325	1397				5.55	7.20	16.00	20.00	20.00	20.00	20.00	20.00
PT Chung Hwa Overseas (PT. Beredara setrya)	Coal Belt II	300	-	-	391.5~7(7000)	18~34°	O/P(1:4)	100/340 S-C/340								
	Coal Belt IV				2.5~4											
	Coal Belt V				4~6(HG.40)											
Total	300	-	-	39					0.20	0.50	1.00	1.00	1.00	1.00	1.00	1.00
PT Indomineo Mandiri	Western Block		94		13 Seams: 1.0~9.7, 11.8, 1	0~15°	O/P(1:)	125								
	Eastern Block		107		19 Seams: 1.05~8.9, 1.50, 6	0~24°										
Total		-	-	201												
CCOW (O/G)																
	Total															
PTBA (O/G)																
	Total															
-CCOW (U/G)																
	Total															

APPENDIX VII-lb. Summary of Questionnaire and Hearing with KP Mines

Company	Mines	Reserves (Mill. tons)		Coal Seams (m)	Dip	Mining	Manpower (Dir/Cont./T.)	Production (Mill. tons)								
		Mass	Infer.					1995	1996	1998	2000	2003	2010	2015	2020	
PT Bukit Sanduri Ent.	Meraqn dai (O/P)	3.8	3.8	A1,2,3,4,5~3.0	17°	O/P(1:8)	360/840(SC)		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.70
	Galaxy (O/P)	12.0	12.0	A6~16,2~7.0	16°	B Seam	/1200		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.70
	Teluk Dalam North (O/P)	2.0	2.0	A2~8,2~3	12°				0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.70
	Total	17.8 (10.6)	17.8 (9.5)		(8~12°)				0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PT Kualan (U/G)	Mine 12 (U/G)	9	22	#1:1.6, #2:2.0, #3:2.1, #10:1.5	26~28°		2486/270/2756		0.42	0.40	0.40	0.50	0.50	0.60	0.60	0.70
	Mine 3 (U/G)	2	-	#3:2.0, #4:1.2	30°	O/P(1:8)			0.30	0.10	0.10	-	-	-	-	-
	#19 O/P	11	-	#19:5.0	9~20°	O/P or U/G			0.72	0.50	0.50	0.50	0.50	0.60	0.60	0.70
Total	22	0	44		Short-W			0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.60	
PT Danau Mas Hitam (Bengkulu)	Simpur (O/P)			Sm 1: 2.5, Sm II (Low): 1.5~8.8	18°	O/P or U/G			0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.60
	Kandis (O/P)			Sm 1: 1.7, Sm II (Low): 5.5~12.2	15~37°				0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.60
PT Fajar Bumi Selat	Mine 1 (U/G)	2.4	4.7	7.0	2.4				0.67	0.50	0.50	0.50	0.50	0.50	0.50	0.60
	Lee Ulung (U/G)	11	-	-	11	6~9°			0.58	0.60	0.10	-	-	-	-	-
Total	11	-	-	11	11~5°			0.58	0.65	0.65	0.80	0.80	0.80	0.80	0.80	0.80
PT Bukit Sunur	Areniga Selatan (O/P)			US4,0,MS7~8.0 (US6000-6500)	8°	O/P(1:8)	159/337(S1C)		0.80	0.70	-	-	-	-	-	-
	Lubuk Bungin Utara (U/G)			US4,0,MS7~8.0 (US6000-7000)	10°		1496		-	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Sulung Barat (U/G)			US4,0,MS7~8.0 (US6000-7000)	8°				0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.20
Total								0.80	0.80	0.80	1.00	1.00	1.00	1.20	1.20	
PT Bukit Bara Utama									0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Total								0.36	0.40	0.40	0.40	0.40	0.40	0.40	0.40
PT Karbindo Abesyaerah									0.28	-	-	-	-	-	-	-
	Total								1.00	1.05	1.05	1.30	1.30	1.40	1.40	1.50
Other Mines	Kp Mines (U/G)								3.22	2.90	2.90	3.00	3.00	3.20	3.20	3.00
	Kp Mines (O/G)								4.72	3.95	3.95	4.30	4.30	4.60	4.60	4.50
Total									4.72	3.95	3.95	4.30	4.30	4.60	4.60	4.50

付録VI - II (c) 質問状及びヒアリングの総括表

Company	Mines	Reserves (Mill. tons)		Coal Seams (m)	Dip	Mining	Manpower (Dir/Cont./T.)	Production (Mill. tons)											
		Meas. Indic.	Infer. Min-b					1995	1996	1998	2000	2005	2010	2015	2020				
PT Sarensotose Lestari (SS)	Muara Kitan (O/P)	200	12~22 seams, 1~10	18°	O/P(13)														
	Total	200	12~22 seams, 1~10	18°	O/P(13)														
PT Wahana Barekama Mining (SK)	Satui No.1 Mine (U/G)	230	SM1.8, SL5.01	12~15°	U/G														
	Satui No.2 Mine (U/G)	415	SM1.8, SL4.06	12~15°	U/G														
	Satui No.3 Mine (U/G)	380	SM1.8, SL4.06	12~15°	U/G														
	Satui No.4 Mine (U/G)	340	SM1.8, SL4.06	12~15°	U/G														
PT Turbando (EX)	Muara Lawa	230	1405	1635	10 Seams, 1~13	20°	O/P	80/123											
	Total	230	1405	1635	10 Seams, 1~13	20°	O/P	80/123											
PT Astaka (SS)	Gebattonen (1700ha)	101	4.1	105	Angkr. Babat, 22, Tomang, 6.4	15°	O/P												
	Suban Burung (500ha)				Buluh, Nadjak, 9, Limang, 6.5	20°	O/P												
PT Yamabumi Palaka (NWP)	Nangemarak (A)			90	Tan Jati, 5	20°	O/P	100/2											
	Sansing (B)			50	Leung, 2.0	20°	O/P												
PT Bara Pramulya Abadi	Muara Uya			100	Sevarak Coal Seams, 1~4.0	15~40°													
	Total			30	Sevarak Coal Seams, 1~4.0	15~40°													
PT Arwang Cuhung Meratus (SK)	Rampah Block	4.9	4.5	4.2	Janjung, 2.5~3.5, War-A1.5, W-B.5, W-C.2	30~45°	O/P	15/40 (95)											
	Madang Block	7.8	8.0	7.1		29~87°	O/P	316 (2000)											
	Mawa Block	2.8	2.6	2.7	JJ-A1.5~5	14~68°													
	Puluu Block	6.7	8.0	7.9	W-A1.5, W-B.5, W-C.2	35~48°													
	Total	25.6	24.3	25.7															
PT Generalindo Prime Coal	Bulurejo	2.6	3.1	5.7	2.02, 2.1	15°		8/48/54 (98)											
	Total	2.6	3.1	5.7	2.02, 2.1	15°		8/48/54 (98)											
PT Ramdany Coal Mining (SS)	Gn. Merabala	2.4	5.3	8.0	2 seams, 7.5	15°													
	Batumarta	4.9	11.8	17.5	4 seams, 9.6	17°													
	Muncakabal	5.9	17.3	31.4	4 seams, 3.1	7°													
	Tonasan/Kurup	0.5	1.5	2.5	5 seams, 2.5	9°													
	Merbau	0.2	0.4	0.4	1 seam, 1.9	9°													
PT Outaputra Tenasatama (SS)	Total	13.9	36.3	59.8															
	Block I	11.7	23.1	35.2	1.35~10.6(1)	14°													
	Block II	15.9	25.7	38.9	1.1~12.75(0.9)	19°													
Block III	6.4	16.6	27.9	0.55~3.10(1.82)	7°														
	Total	34.0	65.4	102.0															

Remarks: Questionnaire = 1996/1~7; Hearing = 1996/1~2&7

付録Ⅷ - 1 (b) 探鉱エンジニアリング学科のカリキュラム

MINING ENGINEERING

SEMESTER III		
Social Studies (Religion)	2	
Matrices & Vector Analysis	3	
Analytical Chemistry	4(2)	
Physical Chemistry I	4(1)	
Physical Geology	2	
Crystallography	2(1)	
Elementary Statistics	3	20
SEMESTER IV		
Social Studies (Ethics)	1	
Modern Physics	3	
Physical Chemistry II	4(1)	
Dynamic Geology	2(1)	
Research Methodology	2	
Mineralogy	2	
Numerical Analysis & Simulation	3	17
SEMESTER V		
Mineral Genesis	2	
Rock Mechanics	3(1)	
Mining Law & Mine Safety	2	
Structural Geology	3(1)	
Petrology	3(1)	
Surveying	3(1)	
Introduction to Fluid Mechanics & Machineries	2	18
Elective Courses of Even Semester		
Geotechnics	3	
Mine Hydrology	2	
Tunneling	2	
Industrial Minerals	2	

METALLURGICAL ENGINEERING OPTION

<u>MINERAL PROCESSING</u>		
SEMESTER III		
Analytical Chemistry	4(1)	
Physical Chemistry I	4(1)	
Matrices & Vector Analysis	3	
Crystallography	2(1)	
Introduction to Metallurgy	2	
Social Studies (Religion)	2	17
SEMESTER IV		
Modern Physics	3(1)	
Physical Chemistry II	4(1)	
Mineralogy	2(1)	
Numerical Analysis & Simulation	3	
Introduction to Material Science	2	
Elementary Statistics	3	
or		
Applied Mathematics	3	17
SEMESTER V		
Metallurgical Thermodynamics	3(1)	
Transport Phenomena	3	
Unit Operation	3	
Communication	3(1)	
Extractive Metallurgy I	3	
Ore Microscopy	2	
Elective Courses	2	19
SEMESTER VI		
Mechanical Engineering	2	
Electrical Power Engineering	3	
or		
Basic Electronics	3	
Metallurgical Kinetics	3	
Concentration I	3(1)	
Extractive Metallurgy II	2	
Surface & Interfaces	2	
Elective Courses	3	19
SEMESTER VII		
Concentration II	2	
Hydrometallurgy	3	
Coal & Coles	2	
Labor Law & Industrial Regulation	2	
Mine Management	2	
Elective Courses	6	17
SEMESTER VIII		
Mill Plan Design	3	
Engineering Economics	3	
Thesis	5	
Social Studies (Ethics)	1	
Elective Courses	5	17

付録Ⅷ - 1 (c) 探鉱エンジニアリング学科のカリキュラム

EXTRACTIVE METALLURGY

SEMESTER III		
Analytical Chemistry	4(1)	
Physical Chemistry I	4(1)	
Matrices & Vector Analysis	3	
Crystallography	2(1)	
Introduction to Metallurgy	2	17
Social Studies (Religion)	2	
SEMESTER IV		
Modern Physics	3(1)	
Physical Chemistry II	4(1)	
Mineralogy	2(1)	
Numerical Analysis & Simulation	3	
Introduction to Material Science	2	
Elementary Statistics	3	17
or		
Applied Mathematics		
SEMESTER V		
Metallurgical Thermodynamics	3(1)	
Transport Phenomena	3	
Solid State Physics	3	
or		
Unit Operation	3	
Extractive Metallurgy I	3	
Physical Metallurgy I	3(1)	
or		
Comminution	2	
Fuel & Furnaces	2	19
Elective Courses		

PHYSICAL METALLURGY

SEMESTER III		
Analytical Chemistry	4(1)	
Physical Chemistry I	4(1)	
Matrices & Vector Analysis	3	
Crystallography	2(1)	
Introduction to Metallurgy	2	17
Social Studies (Religion)	2	
SEMESTER IV		
Modern Physics	3(1)	
Physical Chemistry II	4(1)	
Mineralogy	2(1)	
Numerical Analysis & Simulation	3	
Introduction to Material Science	2	
Elementary Statistics	3	17
or		
Applied Mathematics		
SEMESTER V		
Metallurgical Thermodynamics	3(1)	
Transport Phenomena	3	
Solid State Physics	3	
Physical Metallurgy I	3(1)	
Extractive Metallurgy I	3	
Metallurgy	2	
Elective Courses	2	19
SEMESTER VI		
Metallurgical Kinetics	3	
Engineering Mechanics	2	
or		
Structure of Materials	3	
Electrical Power Engineering	3	
or		
Electronics Basic	3	
Physical Metallurgy II	3	
Extractive Metallurgy II	3(1)	
Foundry Engineering	2(1)	
Predictive Control	3	19

付録Ⅷ - 1 (d) 探鉱エンジニアリング学科のカリキュラム

SEMESTER VII

Metal Forming Engineering	2
Powder Metallurgy	2
Metal Heat Treatment	2
Labor Law & Industrial Regulation	2
Mine Management	2
Elective Courses	7

SEMESTER VIII

Phase Transformation	2
Non Destructive Testing	2
Engineering Economics	3
Thesis	5
Social Studies (Ethics)	1
Elective Courses	4

ELECTIVE COURSES

Elective Courses of Odd Semester :

Unit Operation	3
Solid State Physics	3
Comminution	3
Extractive Metallurgy I	3(1)
Physical Metallurgy I	3(1)
Fuel & Furnaces	2
Metallurgy	2
Concentration II	2
Metallurgy of Iron and Steel I	2
Metal Forming Engineering	2
Mineral Processing	3(1)
Metal Refining	2
Coal & Cokes	2
Hydrometallurgy	3
Powder Metallurgy	2
Special Topic	2
Pyrometallurgy	1
Metal Heat Treatment	2
Aqueous Corrosions	2(1)
Diffusion in Solids	2
Alloys Design	3
Metal Failure Analysis	2

Elective Courses of Even Semester :

Research Methodology	2
Elementary Statistics	3
Applied Mathematics	3
Concentration I	3
Extractive Metallurgy II	3(1)
Physical Metallurgy II	3
Surface & Interfaces	3
Foundry Engineering	2(1)
Metallurgy of Iron and Steel II	2
Phase Transformation	2
Boundary Layer Theory	2
Electrometallurgy	3
Non Destructive Testing	2
Refractory	2
Special Topic	2
Industrial Minerals	2
Mill Plan Design	3
Ceramics Engineering	3
Strengthening Mechanism	2
High Temperature Corrosion	2
Sampling Techniques	2
Surface Treatment	2
Metallurgy of Rare Metals	2

付録Ⅷ-Ⅱ LPPTの入学者、卒業生数

DATA LULUSAN LPPT Graduated LPPT

Tahun 1991 (Program Pendidikan 4-th)

• Jurusan Tambano	: 10 orang	Number of mining student
• Jurusan Mesin Tambano	: 15 orang	Number of Mechanical student
• Jurusan Listrik Tambano	: 11 orang	Number of Electrical student
	
	Jumlah	: 36 orang

Penempatan : Recruitment

• PT Kideco Jaya Agung	: 7 orang
• PTBA Tanjung Enis	: 14 orang
• PTBA Gabilin (UFG)	: 15 orang

Tahun 1992 (Program Pendidikan 4-th)

• Jurusan Tambano	: 17 orang	
• Jurusan Mesin Tambano	: 15 orang	
• Jurusan Listrik Tambano	: 14 orang	
	
	Jumlah	: 47 orang

Penempatan :

• PTBA Tanjung Enis	: 34 orang
• PTBA Gabilin (UFG)	: 13 orang

Tahun 1993 (Program Pendidikan 4-th)

• Jurusan Tambano	: 12 orang	
• Jurusan Mesin Tambano	: 13 orang	
• Jurusan Listrik Tambano	: 12 orang	
	
	Jumlah	: 37 orang

Penempatan :

• PTBA Tanjung Enis	: 16 orang
• PTBA Gabilin (UFG)	: 21 orang

Tahun 1994 (Program Pendidikan 2-th)

• Jurusan Tambano	: 15 orang	
• Jurusan Mesin Tambano	: 25 orang	
• Jurusan Listrik Tambano	: 13 orang	
	
	Jumlah	: 53 orang

Penempatan :

• PTBA Tanjung Enis	: 32 orang
• PTBA Gabilin (UFG)	: 21 orang

Tahun 1995 (Program Pendidikan 2-th)

• Jurusan Tambano	: 14 orang	
• Jurusan Mesin Tambano	: 17 orang	
• Jurusan Listrik Tambano	: 14 orang	
	
	Jumlah	: 45 orang

Penempatan :

• PTBA Tanjung Enis	: 25 orang
• PTBA Gabilin (BahanJute)	: 9 orang
• PT Baradinandika	: 7 orang
• LPPT Gabilin	: 4 orang

RENCANA LULUSAN TAHUN 1996 (PROGRAM 2 TH)

Graduate planing

• Jurusan Tambano	: 15 orang	
• Jurusan Mesin Tambano	: 15 orang	
• Jurusan Listrik Tambano	: 14 orang	
	
	Jumlah	: 44 orang

付録Ⅲ-Ⅲ (a) L P P T の学期毎のカリキュラム

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SEMESTER I (GENERAL)

Num.	MATA KULIAH / SUBJECT LESSONS	MKS
1	Pengantar Teknologi Pertambangan (Introduction to Mining Technology)	4
2	Pengantar Teknologi Permesinan Tambang (Introduction to Mining Mechanical Technology)	4
3	Pengantar Teknologi Kelistrikan Tambang (Introduction to Mining Electrical Technology)	4
4	Pengantar Pemanfaatan Batubara (Introduction to Coal Utilization)	2
5	Pengantar Komputer (Introduction to Computer)	2
6	Keselamatan Kerja (Working Safety)	2
7	Administrasi Perkantoran dan Penulisan Laporan (Office Administration and Report Writing)	2
8	Bahasa Inggris Terapan (Applied English Programme)	2
9	Etika (Etiquet)	2
10	Sikap Perilaku (Mental Attitude)	0
11	Ekstrakurikuler (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING
SEMESTER II

Num.	MATA KULIAH / SUBJECT LESSONS	MKS
1	Teknologi Tambang Bawah Tanah I (Underground Mining Technology I)	4
2	Teknologi Tambang Terbuka I (Surface Mining Technology I)	4
3	Ilmu Ukur Tanah (Surveying)	4
4	Alat-alat Mesin Tambang Bawah Tanah (Underground Mining Equipment)	4
5	Perpetaan (Mapping)	1
6	Geologi Dasar (Introduction to Geology)	2
7	Geologi Struktur (Geology Structure)	2
8	Perencanaan Tambang (Mine Planning)	2
9	Bahasa Inggris Terapan (Applied English Programme)	1
10	Sikap Perilaku (Mental Attitude)	0
11	Ekstrakurikuler (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING
SEMESTER III

Num.	MATA KULIAH / SUBJECT LESSONS	MKS
1	Teknologi Tambang Bawah Tanah II (Underground Mining Technology II)	4
2	Teknologi Tambang Terbuka II (Surface Mining Technology II)	4
3	Studi Kasus Pertambangan (Mine Case Study)	3
4	Pengolahan Batubara (Coal Preparation)	2
5	Supervisi (Supervision)	2
6	Perolongan Pertama Pada Kecelakaan (P3K) (Safety Aids)	2
7	Teknik Pemboran dan Eksplorasi (Drilling and Exploration)	2
8	Ekonomi Teknik (Technical Economy)	2
9	Bahasa Inggris Terapan (Applied English Programme)	1
10	Teknologi Sipil Tambang (Civil Work for Mining)	2
11	Sikap Perilaku (Mental Attitude)	0
12	Ekstrakurikuler (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING
SEMESTER IV

Num.	MATA KULIAH / SUBJECT LESSONS	MKS
1	Undang-undang Tambang dan Lingkungan (Mine Regulation and Environment)	2
2	Supervisi II (Supervision)	2
3	Bahasa Inggris Terapan (Applied English Programme)	4
4	Pembimbingan dan Presentasi Karya Tulis (Writing and Presentation Task)	5
5	Praktek Kerja Lapangan (PKL) (General Field Work)	5
6	Pemantapan Materi (Subject Comprehension)	2
7	Sikap Perilaku (Mental Attitude)	0
8	Ekstrakurikuler (Extracurricula)	0
JUMLAH / total		20

NOTE : MKS = MATERI KREDIT SEMESTER
(Value for Credit per Semester)

付録Ⅷ - Ⅲ (b) L P P T の学期毎のカリキュラム

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SEMESTER I (GENERAL)

Num	MATA KULIAH / SUBJECT LESSONS	MKS
1	<i>Pengantar Teknologi Pertambangan</i> (Introduction to Mining Technology)	4
2	<i>Pengantar Teknologi Permesinan Tambang</i> (Introduction to Mining Mechanical Technology)	4
3	<i>Pengantar Teknologi Kelistrikan Tambang</i> (Introduction to Mining Electrical Technology)	4
4	<i>Pengantar Pemanfaatan Batubara</i> (Introduction to Coal Utilization)	2
5	<i>Pengantar Komputer</i> (Introduction to Computer)	2
6	<i>Keselamatan Kerja</i> (Working Safety)	2
7	<i>Administrasi Perkantoran dan Penulisan Laporan</i> (Office Administration and Report Writing)	2
8	<i>Bahasa Inggris Terapan</i> (Applied English Programme)	2
9	<i>Etika</i> (Etiquet)	2
10	<i>Sikap Perilaku</i> (Mental Attitude)	0
11	<i>Ekstrakurikuler</i> (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING MECHANICAL
SEMESTER II

Num	MATA KULIAH / SUBJECT LESSONS	MKS
1	<i>Hidrolik dan Pneumatik I</i> (Hydraulic and Pneumatic I)	4
2	<i>Motor Bakar</i> (Internal Combustion Engine)	4
3	<i>Alat-alat Mekanik Tambang Terbuka I</i> (Heavy Earth Moving Mechanical Equipment I)	4
4	<i>Alat-alat Mekanik Tambang Bawah Tanah I</i> (Underground Mining Mechanical Equipment I)	4
5	<i>Gambar Teknik</i> (Technical Drawing)	2
6	<i>Teknologi Bengkel I</i> (Basic Workshop Technology I)	4
7	<i>Pengetahuan Alat-alat Mesin I</i> (Mechanical Element Technology I)	1
8	<i>Bahasa Inggris Terapan</i> (Applied English Programme)	1
9	<i>Sikap Perilaku</i> (Mental Attitude)	0
10	<i>Ekstrakurikuler</i> (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING MECHANICAL
SEMESTER III

Num	MATA KULIAH / SUBJECT LESSONS	MKS
1	<i>Hidrolik dan Pneumatik II</i> (Hydraulic and Pneumatic II)	4
2	<i>Alat-alat Mekanik Tambang Terbuka II</i> (Heavy Earth Moving Mechanical Equipment II)	4
3	<i>Alat-alat Mekanik Tambang Bawah Tanah II</i> (Underground Mining Mechanical Equipment II)	4
4	<i>Teknologi Bengkel II</i> (Basic Workshop Technology II)	4
5	<i>Pengetahuan Alat-alat Mesin II</i> (Mechanical Element Technology II)	2
6	<i>Manajemen Perawatan Mesin II</i> (Management and Preventive Maintenance)	1
7	<i>Supervisi I</i> (Supervision I)	2
8	<i>Bahasa Inggris Terapan</i> (Applied English Programme)	1
9	<i>Pertolongan Pertama Pada Kecelakaan (P3K)</i> (First Aid)	2
10	<i>Sikap Perilaku</i> (Mental Attitude)	0
11	<i>Ekstrakurikuler</i> (Extracurricula)	0
JUMLAH / total		24

LIST OF SUBJECT LESSONS
TWO YEARS PROGRAMME
SPECIALIZATION : MINING MECHANICAL
SEMESTER IV

Num	MATA KULIAH / SUBJECT LESSONS	MKS
1	<i>Undang-undang Tambang dan Lingkungan</i> (Mining Regulation and Environment)	2
2	<i>Supervisi II</i> (Supervision II)	2
3	<i>Bahasa Inggris Terapan</i> (Applied English Programme)	4
4	<i>Pembimbingan dan Presentasi Karya Tulis</i> (Writing and Presentation Task)	5
5	<i>Praktek Kerja Lapangan (P.K.L)</i> (General Field Work)	5
6	<i>Pemantapan Materi</i> (Subject Comprehension)	2
7	<i>Sikap Perilaku</i> (Mental Attitude)	0
8	<i>Ekstrakurikuler</i> (Extracurricula)	0
JUMLAH / total		20

NOTE : MKS = MATERI KREDIT SEMESTER
(Value for Credit per Semester)

付録Ⅶ - IV L P P T のトレーニング用設備

1. DORMITORIES (2 Buildings)

- a. First Dormitory (four floors) ; number of rooms = 32
- b. Second Dormitory (three floors) ; number of rooms = 24
- c. Multi Purpose Building ; include 21 table and 129 chairs
There are 2 or 3 beds for student in every single room.

2. LABORATORIES

- a. Mining Science Laboratory
- b. Mechanical Laboratory :
 - Laboratory of Mechanical Engineering Technology
 - Laboratory of Hydraulic and Pneumatic Technology
- c. Electrical Laboratory
- d. Computer Laboratory with 11 units computer.
Every laboratory is suitable for 15 students.

3. MEETING / AUDIO VISUAL ROOMS

Suitable for 20 persons. It's completed with audio visual facilities e.g. TV Monitor, Video Player, Radio Cassette Player, Over Head Projector, Slide Projector.

4. UNDERGROUND TRAINING GALLERIES

(at the 9th Block Sawah Rasau V, Ombilin Coal Mine)

5. CLASS ROOMS

- a. 4 (four) class rooms, every class suitable for 30 student.
- b. Drawing room , using 12 drawing tables.

6. OFFICE

- a. Manager Office Rooms = 4 rooms
- b. Lecturer or Instructor Rooms
- c. Administration Office

7. LIBRARY

8. WORKSHOP

- a. Mechanical Work Section :
 - Bench work and Machining section
 - Fabrication section
 - Automotive section
- b. Electrical Section
- c. Mining Section

MDCMのコースプログラム

- Exploration Safety In Mines
- Heavy Equipment Operator for Underground Mine
- Workshop Safety
- Mine Reclamation
- Mining Impact Assessment Super/visory
- Exhausted Gas Emission
- Mine Rescue
- Mining Ergonomics and Productivity
- First Aid for Mining Accident
- Seminar on Mine Safety
- Seminar on Mine Technology Research
- Seminar on Mine Environment
- Heavy Equipment Efficiency and Maintenance
- Creeping Operator
- Welding Technician
- Belt Conveyor Operator.

- General Geology Instrumentation
- Marine Geology Instrumentation
- Geocomputing/GIS
- Seminar and Display of Equipment for Earthsciences.

Mining Engineering Manpower Division :

- Miners
- Mine Inspector
- Regional Mine Inspector
- Mine Plan Design
- Second Class Blasting
- First Class Blasting
- Mining Engineering
- Mine Supervisor
- Safe and Efficiency Blasting
- Blasting Environment
- Mine Ventilation
- Mine Support
- Mine Transportation
- Soil Mechanics and Rock Mechanics
- Slope Stability
- Earth Moving
- Tunneling
- Mine Surveying
- Geology and Mining for Regional Government Official
- Geology and Mining for Regional Mining Concession Holder
- Preparation and Rock Comminution
- Gravity Concentration
- Flotation
- Magnetic and Electrostatic Concentration
- Pyrometallurgical Extraction
- Hydrometallurgical Extraction
- Electrometallurgical Extraction
- Gold Processing
- Tin Processing
- Coal Washing
- Coal Briquetting
- Coal Carbonisation
- Coal Liquefaction
- Lime Burning With Coal
- Brick and Roof tile Burning
- Carbide Manufacturing
- Kaolin Processing
- Bentonite Processing
- Light Carbonate Manufacturing
- Active Carbon from Coal
- X-ray analysis
- Ore Microscope
- Fire Assay
- Coal Analysis
- Industrial Minerals
- Mine Safety
- Heavy Equipment Operator for Surface Mining

Geological Engineering Manpower Division :

- Geotectonic of Indonesia
- Petrology of Igneous, Sedimentary and Metamorphic Rock
- Structural Analysis
- Stratigraphy of Indonesia
- Geophysics and Volcanology
- Remote Sensing for Geology
- Geochronology
- Surveying and Mapping
- Cartography
- Writing Report and Presentation Technique
- Quaternary Geology
- Marine Topography and Seafloor Structure
- Seafloor Stratigraphy
- Offshore and Coastal Detrital Mineral Resources (Tin, Gold, Diamond, etc.)
- Marine Mineral Resources
- Applied Geophysics
- Remote Sensing for Exploration
- Coal Geology
- Information on Mineral Exploration Management for Mining Concessionary
- Information on Industrial Mineral Exploration for Permata Bappeda Officials
- Geothermal Exploration
- Drilling Exploration Technique
- Advanced Course of Tectonic and Mineral Resources
- Terrain Analysis for Mining Development
- Terrain Analysis for Planning Natural Electric Power Plan
- Site Plan
- Seminar on Mineral Exploration Result
- Advanced Volcanology
- Volcano Monitoring
- Geovolcanological Mapping
- Volcanic Eruption Forecasting
- Mapping and Zonation of Volcanic Hazard Risk
- Monitoring and Zonation of Earthquake Hazard Risk
- Monitoring and Zonation of Landslide Hazard (Regional Authority) Officials
- Information on Geological Hazard for Permata
- Coordination System on Geological Disaster Mitigation
- Geohydrology Course
- Ground Water Drilling Technique
- Geotechnic Course
- Terrain Analysis and Environmental Geology for Land Use Planning
- Seminar on the result of Geological Hazard and Environmental Studies
- Geological Exploration Instrumentation
- Drilling Instrumentation
- Volcanological Investigation Instrumentation

Administration And Management Manpower Division :

- Lower Management Course
- Middle Management Course
- Top Management Course
- Training of Trainers (TOT)
- Management of Training (MOT)
- Training Officer Course (TOC)
- Supervisory Training Course
- Productivity Improvement Course
- Manpower Planning Course
- Job Analysis and Evaluation Course
- Computer Course
- Library Course
- General English Course
- Information Management Course

Regular Programme Division :

- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level C1
- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level C2
- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level C
- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level B
- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level AB
- Qualification Improvement Programme for Regional Mining Officials in Geology and Mining Level A

Education and training at the MDCM covers non-regular training programmes in the fields of geological engineering, mining engineering, and administration and management, and regular training programmes.

付録Ⅵ - VI 1995/96年に実施したM.D.C.M.のプログラム

A. Routine Program	B. Mineral Technology Training Program	C. Infrastructure & Mining Technology Development Program	D. Technology Up-Grading Program	E. Other Programs
1. Geological Drawing Technique 1C(20), 9D	1. Topographic Surveyor for Mines 1C(25), 4M	1. Stock Inventory Booking System 2C(40), 19D	1. Class II Blasting Expert 1C(33), 6D	1. Technology on Kartography 1C(20), 20D
2. English Language 4C(31), 20D	2. Regional Mine Control(Geology) & C1/C2 Mining 2C(60), 3M	2. Volcano I Observation 1C(20), 3M	2. Environmental & Planning Tech. for Mined-out Areas 1C(24), 18D	2. A Class Financial Officer Training 1C(30), 37D
3. Mine Inspection Planning 1C(20), 6M	3. Regional Geology for Area Development; 1C(20), 19D	3. Regional Mine Inspection Planner 1C(20), 3M	3. PTBA Mine Inspector 1C(30), 7D	3. Purpose of Fill Class III 1C(30), 19D
4. SPAMA(Middle High School in Administrative Education) Training 1C(30), 4M	4. Industrial Mineral Exploration 1C(20), 19D	4. Conference on Education/Training Demand for Mining General 1C(100), 3D	4. Basic Management of PTBA 2C(61), 30D	4. Technical Guide for Property Administration; 1C(90), 3D
5. Natural Disaster Mitigation Geology; 1C(20), 19D	5. Data Base C(30), 12D	5. Boring by Fluid 1C(20), 25D	5. Mine Safety 1C(40), 26D	5. Computerization of Mine Topog- raphic Survey; 1C(20), 30D
6. Analysis & Manufacturing of Coal Briquette; 1C(20), 25D	6. Class I Blasting Expert 1C(20), 25D	6. Regional Mine Control(Geology) & C Class Mining; 1C(20), 3M	6. Fluid Boring Technology 1C(16), 26D	6. Mineral Reserves Evaluation 1C(20), 16D
7. Technical Report Writing Course 1C(30), 10D	7. Mine Production Statistics 1C(30), 12D	7. Mining Industry & Energy Class A 1C(20), 3M	7. Coal Exploration Course 1C(15), 10D	7. Environmental Control Field Train' 1C(20), 30D
8. DPE II Research Technology 1C(20), 35D	8. Well Seismic Survey 1C(20), 11D		8. Evaluation of Class C Mineral 1C(11), 11D	8. Regional Environmental Manage- ment & Mined-out Area Plantation 1C(30), 7D
	9. Remote Sensing Geology 1C(20), 21D		9. Mineral Processing 1C(8), 15D	9. Training of Trainers 1C(25), 13D
	10. Mineral Raw Material Processing 1C(20), 15D		10. Mine Technical Manager	10. Training of Coal Exploration & Mining Development; 1C(30), 14D
	11. Research Technique of Geology & Mining for East Java Area(I) 1C(40), 6D		11. PTBA Middle Class I Management 1C(31), 20D	
	12. Technical Guidance of Financial Management; 1C(200), 5D		12. Course on Economics, Commerce & Project Evaluation for The Min- ing Industry; 1C(13), 5D	
	13. International Conference on Mining & Environment 1C(100), 2D		13. Mine Planning 1C(1), 12D	
			14. Class I Blasting Expert 1C(1), 25D	
			15. Mine Topographical Survey 1C(8), ?	

Remarks: C - Class; D - Day; M - Month; Numbers in parenthesis show those of attendants in each class.

ANNEX 1 Correlation between the Base Case Manpower and A Tentative Projection for Government's New Coal Production Projection Presented to the World Energy Conference Held in October, 1996

(Million Tons)

Coal Producers & Cases		1996/7			1998/9			2003/4			2004/5			2008/9		
		Production/Manpower/Prod' ty(W-D)			Production/Manpower/Prod' ty(W-D)			Production/Manpower/Prod' ty(W-D)			Production/Manpower/Prod' ty(W-D)			Production/Manpower/Prod' ty(W-D)		
PTBA	Base Case: Ombilin	0.95	1,700	1.86(300)	0.65	1,600	1.35(300)			0.56	1,400	1.33(300)	1.30	1,400	3.60(300)	
	Tanjung Enim	7.90	7,200	3.28(335)	12.00	10,300	3.48(335)			15.40	12,500	3.68(335)	14.60	11,940	3.65(335)	
	Sub-total	8.85	8,900	3.00(331)	12.65	11,900	3.19(333)			15.96	13,900	3.44(334)	15.90	13,340	3.59(332)	
	Revised 1: U/G	0.95	1,700	1.86(300)	0.95	1,700	1.86(300)	0.95	1,700	1.86(300)			1.30	1,400	3.10(300)	
	O/P	9.65	8,782	3.28(335)	10.65	9,135	3.48(335)	13.65	10,586	3.68(335)			14.70	12,022	3.65(335)	
	Sub-total	10.60	10,482	3.04(332)	11.60	10,835	3.22(332)	14.00	12,286	3.42(333)			16.00	13,422	3.59(332)	
	Revised 2: U/G	0.95	1,700	1.86(300)	0.95	1,700	1.86(300)	0.95	1,700	1.86(300)			1.30	1,400	3.10(300)	
	O/P	11.93	10,857	3.28(335)	20.05	17,198	3.48(335)	24.05	19,508	3.68(335)			24.70	20,200	3.65(335)	
	Sub-total	12.88	12,557	3.09(332)	21.00	18,898	3.34(333)	25.00	21,208	3.53(334)			26.00	21,600	3.61(333)	
CCOF	1st Gen. : U/G	0.00	-	- (-)	0.30	300	3.33(300)			0.50	830	2.77(300)	0.50	830	2.77(300)	
	Base Case O/P	35.76	14,166	7.11(355)	54.80	16,112	9.58(355)			85.70	20,538	11.75(355)	87.30	20,723	11.87(355)	
	Sub-total	35.76	14,166	7.11(355)	55.10	16,412	9.46(355)			86.20	21,368	11.36(355)	87.80	21,553	11.48(355)	
	2nd Gen. : U/G									1.50	3,623	1.44(288)	2.50	6,039	1.44(288)	
	Base Case O/P									3.50	1,590	7.08(311)	8.00	3,635	7.08(311)	
Sub-total									5.00	5,213	3.16(304)	10.50	9,674	3.55(306)		
	3rd Gen. : U/G									0.50	1,208	1.44(288)	4.00	9,662	1.44(288)	
	Base Case O/P									10.00	4,513	7.08(311)	30.00	13,630	7.08(311)	
	Sub-total									10.50	5,751	5.89(310)	34.00	23,292	4.74(308)	
	Total : U/G	0.00	-	- (-)	0.3	300	3.33(300)			2.50	5,661	1.52(290)	7.00	16,531	1.47(289)	
	Base Case O/P	35.76	14,166	7.11(355)	54.8	16,112	9.58(355)			99.20	26,671	10.66(349)	125.30	37,988	9.64(342)	
	Sub-total	35.76	14,166	7.11(355)	55.1	16,412	9.46(355)			101.70	32,332	9.04(348)	132.30	54,519	7.16(339)	
	Revised : U/G	0.00	-	- (-)	0.30	300	3.33(300)	2.50	5,661	1.52(290)			7.00	16,531	1.47(289)	
	1/2 O/P	39.50	15,649	7.11(355)	55.90	16,437	9.58(355)	69.50	18,912	10.50(350)			93.00	28,208	9.64(342)	
	Sub-total	39.50	15,649	7.11(355)	56.20	16,737	9.46(355)	72.00	24,573	8.40(349)			100.00	44,739	6.61(338)	
KP	Base Case: U/G	1.05	3,235	1.13(288)	1.05	3,469	1.05(288)			1.30	4,256	1.06(288)	1.30	4,256	1.06(288)	
	O/P	2.90	2,598	3.72(300)	2.90	2,361	4.09(300)			3.00	1,917	5.22(300)	3.00	1,917	5.22(300)	
	Sub-total	3.95	5,833	2.28(297)	3.95	5,833	2.28(297)			4.30	6,173	2.35(296)	4.30	6,173	2.35(296)	
	Revised : U/G	1.05	3,235	1.13(288)	1.05	3,469	1.05(288)	1.30	4,256	1.06(288)			2.00	6,551	1.06(288)	
	1/2 O/P	1.05	1,155	3.03(300)	1.75	1,925	3.03(300)	4.70	5,170	3.03(300)			9.00	9,901	3.03(300)	
	Sub-total	2.10	4,390	1.63(294)	2.80	5,394	1.75(296)	6.00	9,426	2.14(297)			11.00	16,452	2.24(298)	
KUD	Base Case: U/G	0.05	85	2.14(275)	0.05	85	2.14(275)			0.05	85	2.14(275)	0.05	85	2.14(275)	
	O/P	0.25	715	1.17(300)	0.25	715	1.17(300)			0.25	715	1.17(300)	0.25	715	1.17(300)	
	Sub-total	0.30	800	1.27(296)	0.30	800	1.27(296)			0.30	800	1.27(296)	0.30	800	1.27(296)	
	Revised : U/G	0.10	170	2.14(275)	0.10	170	2.14(275)	0.10	170	2.14(275)			0.10	170	2.14(275)	
	1/2 O/P	0.30	855	1.17(300)	0.30	855	1.17(300)	0.30	855	1.17(300)			0.30	855	1.17(300)	
	Sub-total	0.40	1,025	1.32(296)	0.40	1,025	1.32(296)	0.40	1,025	1.32(296)			0.40	1,025	1.32(296)	
Grand Total	Base Case: U/G	2.05	5,020	1.39(293)	2.05	5,454	1.28(293)			4.41	11,402	1.33(291)	9.65	22,272	1.49(290)	
	O/P	46.81	24,679	5.45(348)	69.95	29,491	6.80(349)			117.85	41,803	8.15(346)	143.15	52,560	7.72(353)	
	Sub-total	48.86	29,699	4.75(346)	72.00	34,945	5.94(347)			122.26	53,205	6.68(344)	152.80	74,832	5.85(349)	
	Revised 1: U/G	2.10	5,105	1.38(299)	2.40	5,639	1.45(294)	4.85	11,787	1.41(291)			10.4	24,652	1.45(290)	
	O/P	50.50	26,441	5.46(350)	68.60	28,352	6.91(350)	87.55	35,523	7.14(345)			117.00	50,986	6.79(338)	
	Sub-total	52.60	31,546	4.79(348)	71.00	33,991	6.00(348)	92.40	47,310	5.69(343)			127.40	75,638	5.01(334)	
	Revised 2: U/G	2.10	5,105	1.38(299)	2.40	5,639	1.45(294)	4.85	11,787	1.41(291)			10.40	24,652	1.45(290)	
	O/P	52.78	28,516	5.30(349)	78.00	36,415	6.16(348)	98.55	44,445	6.45(344)			127.00	59,164	6.35(338)	
	Sub-total	54.88	33,621	4.70(347)	80.40	42,054	5.53(346)	103.40	56,232	5.38(342)			137.40	83,816	4.91(334)	

Remarks: a) The table is tentatively made to correlate the manpower forecast of JICA report and that of government's latest one, which is entitled as "Prospect of Coal Supply/Demand For Electric Steam Power Based on Long Term Coal Supply", presented by Dr. Kuntoro Mangkusubroto, Direktur Jenderal Pertambangan Umum, of Direktorat Jenderal Pertambangan Umum Departemen Pertambangan Dan Energi in the World Energy Conference held on October 15 - 17, 1996 in Jakarta; b) Prod-ty - Productivity (Man · day); c) W-D - Working days per annum; d) Gen. - Generation

ANNEX II Correlation between the Base Case Manpower and A Tentative Projection for Government's New Coal Production
Projection Presented to the World Energy Conference Held in October, 1996 (2010/11 - 2020/21)

Coal Producer & Cases	2010/11			2014/15			2020/21		
	Prod./Manpower/Prod' ty(W-D)			Prod./Manpower/Prod' ty(W-D)			Prod./Manpower/Prod' ty(W-D)		
PTBA:Base Case:Ombilin T. Enim Sub-total	1.93	1.850	3.48(300)	2.06	1.850	3.71(300)	1.50	1.400	3.57(300)
	13.60	11.130	3.65(335)	10.60	8.670	3.65(335)	10.60	8.850	3.58(335)
	15.53	12.980	3.61(331)	12.66	10.520	3.64(331)	12.10	10.250	3.57(331)
Rev. 1 :U/G O/P Sub-total	1.93	1.850	3.48(300)	2.06	1.850	3.71(300)	1.50	1.400	3.57(300)
	14.07	11.507	3.65(335)	13.94	11.401	3.65(335)	14.50	11.859	3.65(335)
	16.00	13.357	3.62(331)	16.00	13.251	3.66(330)	16.00	13.259	3.63(332)
Rev. 2 :U/G O/P Sub-total	1.93	1.850	3.48(300)	2.06	1.850	3.71(300)	1.50	1.400	3.57(300)
	24.07	19.685	3.65(335)	23.94	19.579	3.65(335)	24.50	20.037	3.65(335)
	26.00	21.535	3.64(332)	26.00	21.429	3.65(332)	26.00	21.437	3.64(333)
CCOV:Base Case:U/G 1st Gen. O/P Sub-total	0.50	830	2.77(300)	0.50	830	2.77(300)	0.50	830	2.77(300)
	87.30	20.433	12.04(355)	83.20	19.423	12.07(355)	85.20	19.873	12.08(355)
	87.80	21.535	11.63(355)	83.70	20.253	11.64(355)	85.70	20.703	11.66(355)
Base Case:U/G 2nd Gen. O/P Sub-total	3.00	7.246	1.44(288)	3.40	8.213	1.44(288)	3.60	8.696	1.44(288)
	12.00	5.452	7.08(311)	14.00	6.369	7.08(311)	14.40	6.542	7.08(311)
	15.00	12.698	3.86(306)	17.40	14.573	3.89(307)	18.00	15.238	3.89(306)
Base Case:U/G 3rd Gen. O/P Sub-total	6.00	14.493	1.44(288)	12.00	28.986	1.44(288)	13.65	32.971	1.44(288)
	40.00	18.173	7.08(311)	50.00	22.716	7.08(311)	54.60	24.808	7.08(311)
	46.00	32.666	4.57(308)	62.00	51.702	3.91(307)	68.25	57.777	3.86(306)
Base Case:U/G Total O/P Sub-total	9.50	22.569	1.46(288)	15.90	38.029	1.45(288)	17.75	42.497	1.45(288)
	139.30	44.058	9.33(339)	147.20	48.499	9.03(336)	154.20	51.221	8.99(335)
	148.80	66.627	6.65(336)	163.10	86.528	5.69(331)	171.95	93.718	5.56(330)
Rev. 1/2 :U/G O/P Sub-total	10.00	23.782	1.46(288)	16.00	38.314	1.45(288)	18.00	43.103	1.45(288)
	139.00	43.947	9.33(339)	147.00	48.450	9.03(336)	154.00	51.135	8.99(335)
	149.00	67.729	6.55(336)	163.00	86.764	5.68(331)	172.00	94.238	5.53(330)
KP :Base Case:U/G Mines O/P Sub-total	1.40	4.350	1.12(288)	1.40	4.350	1.12(288)	1.50	4.445	1.17(288)
	3.20	1.917	5.56(300)	3.20	1.917	5.56(300)	3.00	1.492	6.70(300)
	4.60	6.267	2.48(296)	4.60	6.267	2.48(296)	4.50	5.937	2.56(296)
Rev. 1/2 :U/G O/P Sub-total	2.00	6.551	1.06(288)	2.00	6.551	1.06(288)	2.00	6.551	1.06(288)
	9.00	9.901	3.03(300)	9.00	9.901	3.03(300)	9.00	9.901	3.03(300)
	11.00	16.452	2.24(298)	11.00	16.452	2.24(298)	11.00	16.452	2.24(298)
YUD :Base Case:U/G Mines O/P Sub-total	0.05	85	2.14(275)	0.05	85	2.14(275)	0.05	85	2.14(275)
	0.25	715	1.17(300)	0.25	715	1.17(300)	0.25	715	1.17(300)
	0.30	800	1.27(296)	0.30	800	1.27(296)	0.30	800	1.27(296)
Rev. 1/2 :U/G O/P Sub-total	0.10	170	2.14(275)	0.10	170	2.14(275)	0.10	170	2.14(275)
	0.30	855	1.17(300)	0.30	855	1.17(300)	0.30	855	1.17(300)
	0.40	1,025	1.27(296)	0.40	1,025	1.27(296)	0.40	1,025	1.27(296)
Grand:Base Case:U/G Total O/P Sub-total	12.88	28.854	1.54(290)	19.41	44.314	1.52(289)	20.80	48.427	1.49(289)
	154.25	57.620	7.80(342)	161.25	59.831	8.05(335)	169.05	62.278	8.08(334)
	167.13	86.674	5.70(338)	180.66	104.145	5.26(330)	188.85	110.705	5.19(329)
Rev. 1 :U/G O/P Sub-total	14.03	32.353	1.50(290)	20.16	46.885	1.49(289)	21.60	51.224	1.46(289)
	162.37	66.210	7.30(336)	170.24	70.607	7.22(334)	177.60	73.750	7.24(333)
	176.40	98.563	5.39(332)	190.40	117.492	4.93(329)	199.40	124.974	4.86(328)
Rev. 2 :U/G O/P Sub-total	14.03	32.353	1.50(290)	20.16	46.885	1.49(289)	21.60	51.224	1.46(289)
	172.37	74.388	6.99(336)	180.24	78.785	6.85(334)	187.80	81.928	6.88(333)
	186.40	106.741	5.24(333)	200.40	125.670	4.85(329)	209.40	133.152	4.79(328)

Remarks: a) The table is tentatively made to correlate the manpower forecast of RCA report and that of government's latest one, which is entitled as "Prospect of Coal Supply/Demand for Electric Steam Power Based on Long Term Coal Supply", presented by Dr. Kuntoro Mangkusubroto, Direktur Jenderal Pertambangan Umum of DGM, in the World Energy Conference on October 15-17, 1996; b) Prod' ty - Productivity, c) W-D - Working Days; d) Gen. - Generation; e) T.Enim - Tanjung Enim; f) Rev. - Revised; g) U/G - Underground; h) O/P - Open Pit

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