

**THE INTERIM REPORT  
FOR  
THE FEASIBILITY STUDY  
ON  
EFFECTIVE UTILIZATION OF BANKO COAL  
IN  
THE REPUBLIC OF INDONESIA**

**— STAGE II —  
ATTACHMENT**

**March, 1988**

**JAPAN INTERNATIONAL COOPERATION AGENCY**



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17678

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(Separate Volume)

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## ATTACHMENT 7-1

### 1. Figures of Section 7-1-1

Fig. 7-1-1' Surveyed Area by Shell Mijonbow N.V. in South Sumatra

Fig. 7-1-2' Most Promising Area Around Bukit Asam Coal Mine

Fig. 7-1-3' Basin formed in Tertiary Epoch in South Sumatra

Fig. 7-1-4' Tectonical Structures in South Sumatra

Fig. 7-1-5' Geological Structure in Banko-Suban Jeriji Area





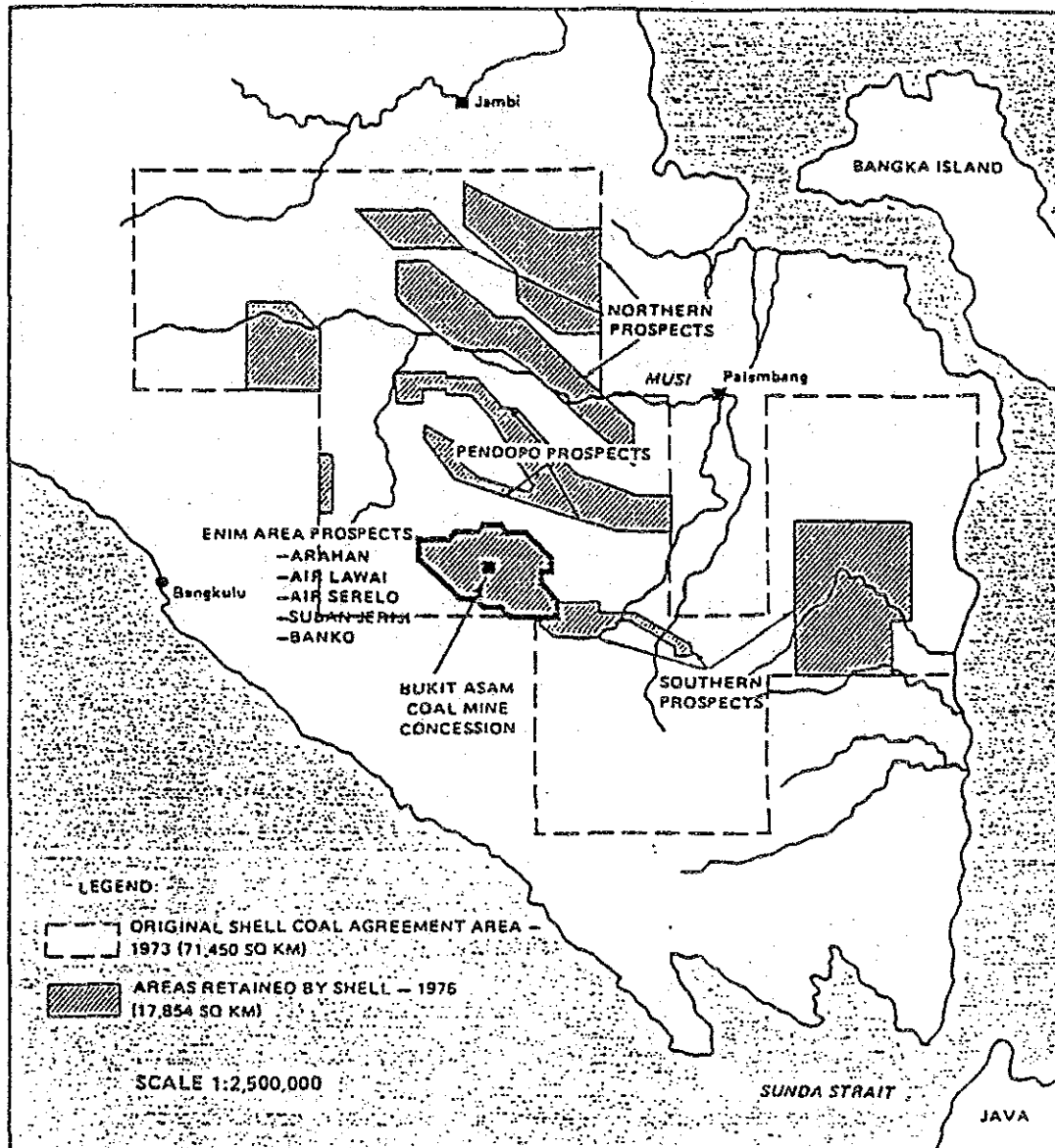


Fig. 7-1-1' Surveyed Area by Shell MiJonbow N.V. in South Sumatra

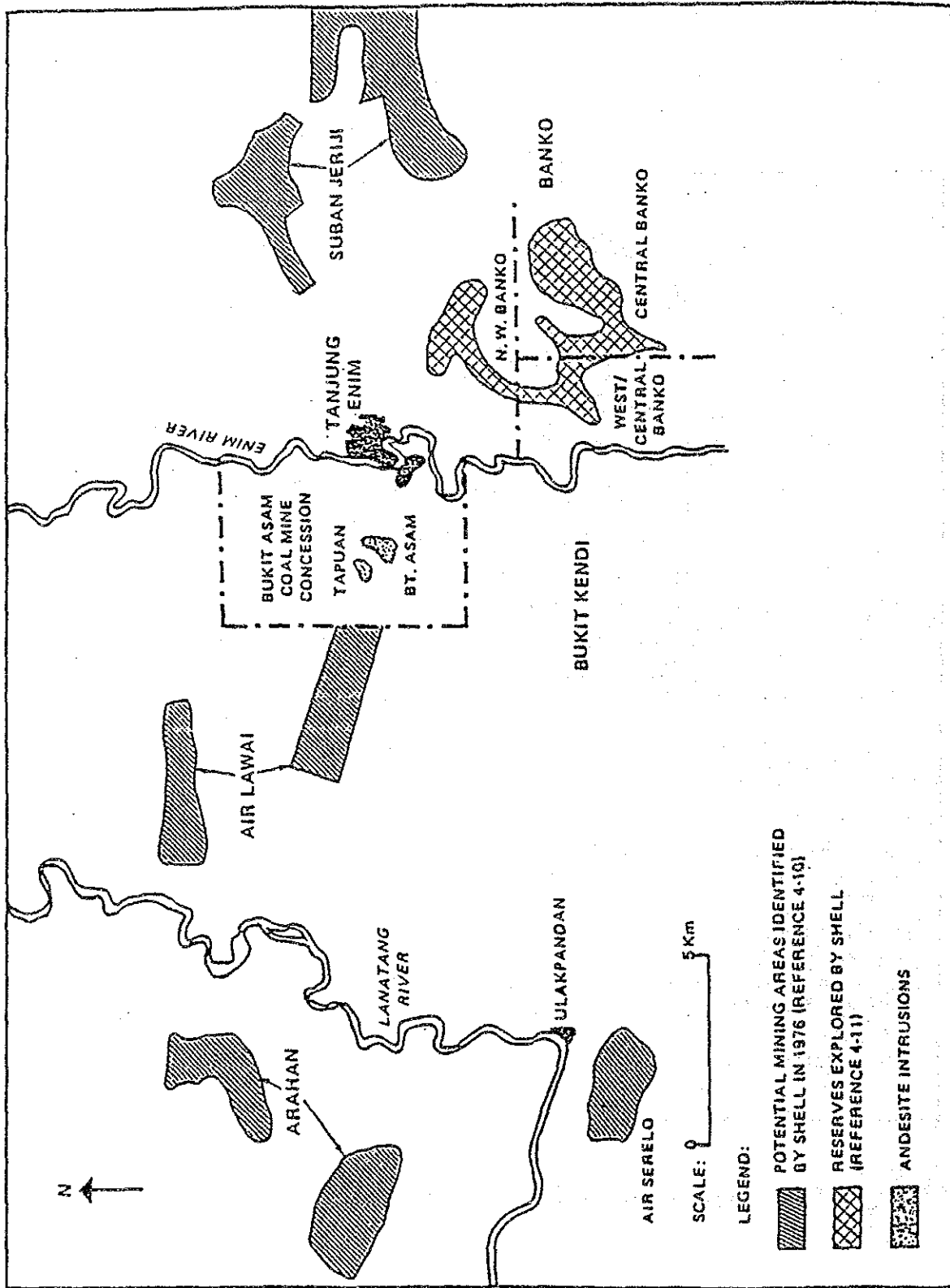


Fig. 7-1-2' Most Promising Area around Bukit Asam Coal Mine

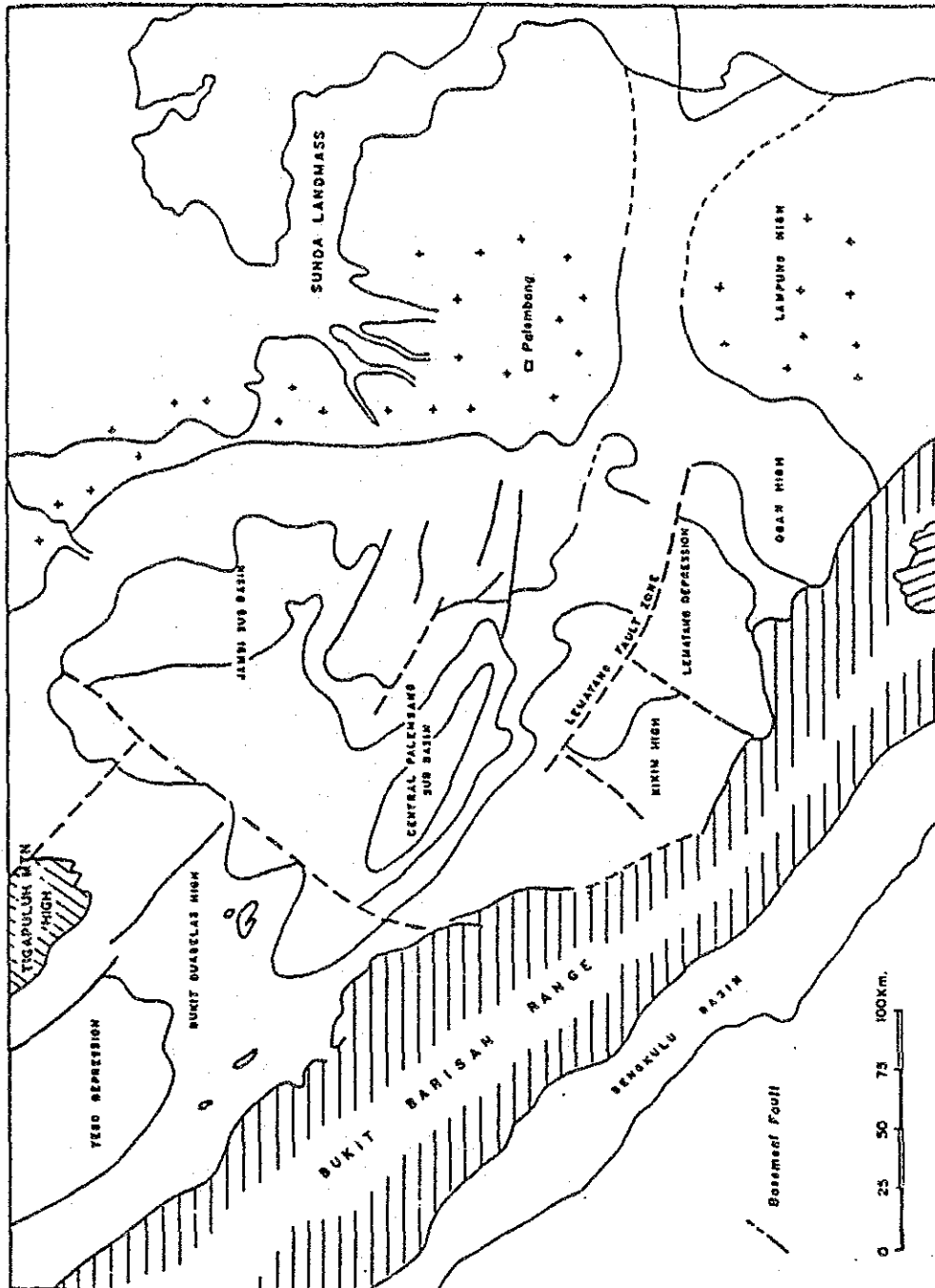
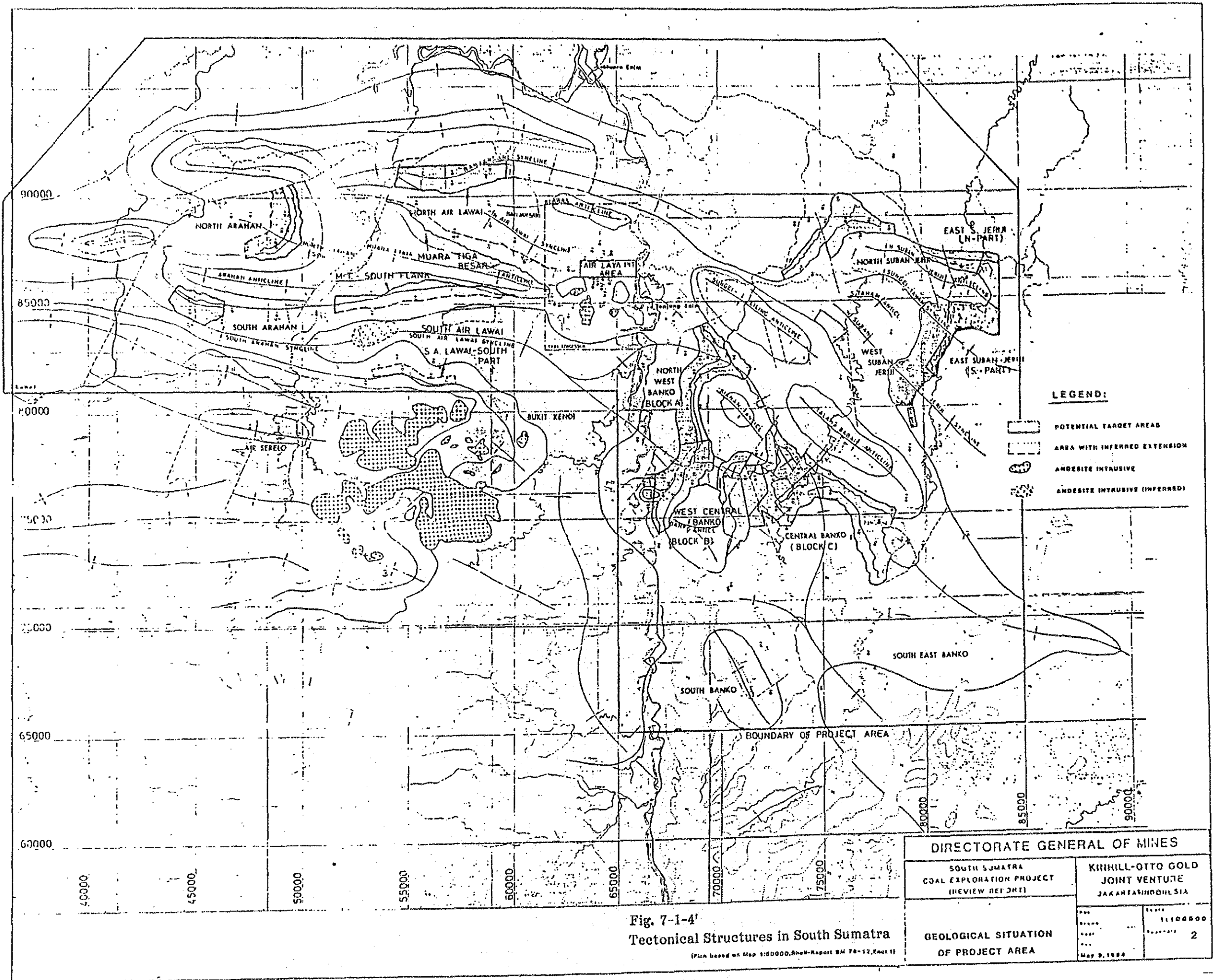


Fig. 7-1-3' Basin formed in Tertiary Epoch in South Sumatra





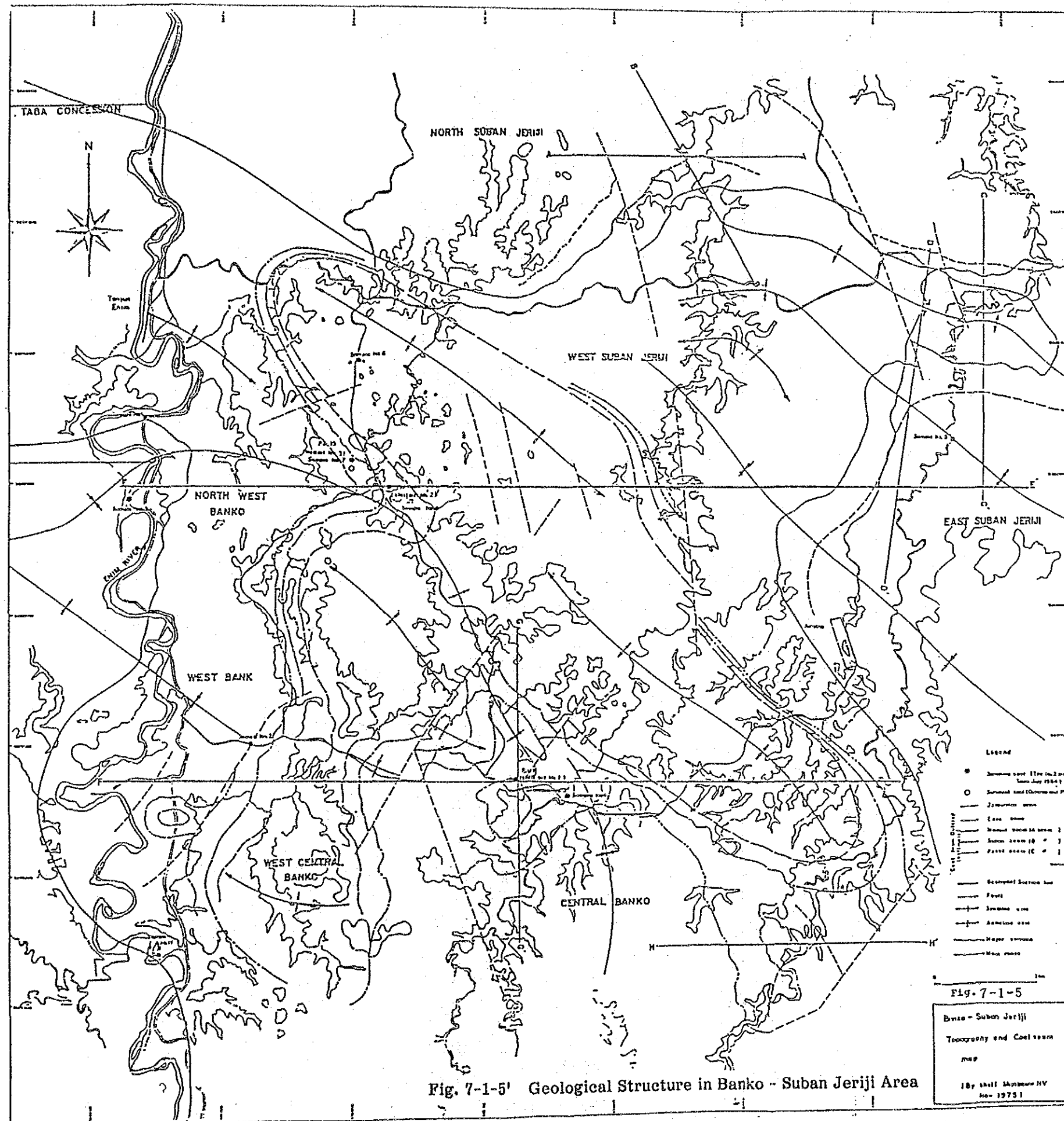


Fig. 7-1-5' Geological Structure in Banko - Suban Jeriji Area

Fig. 7-1-5  
 Banko - Suban Jeriji  
 Topography and Geology  
 map  
 1:50,000 Scale  
 Nov. 1975



ATTACHMENT 7-2

1. **Figures of Section 7-2-1**

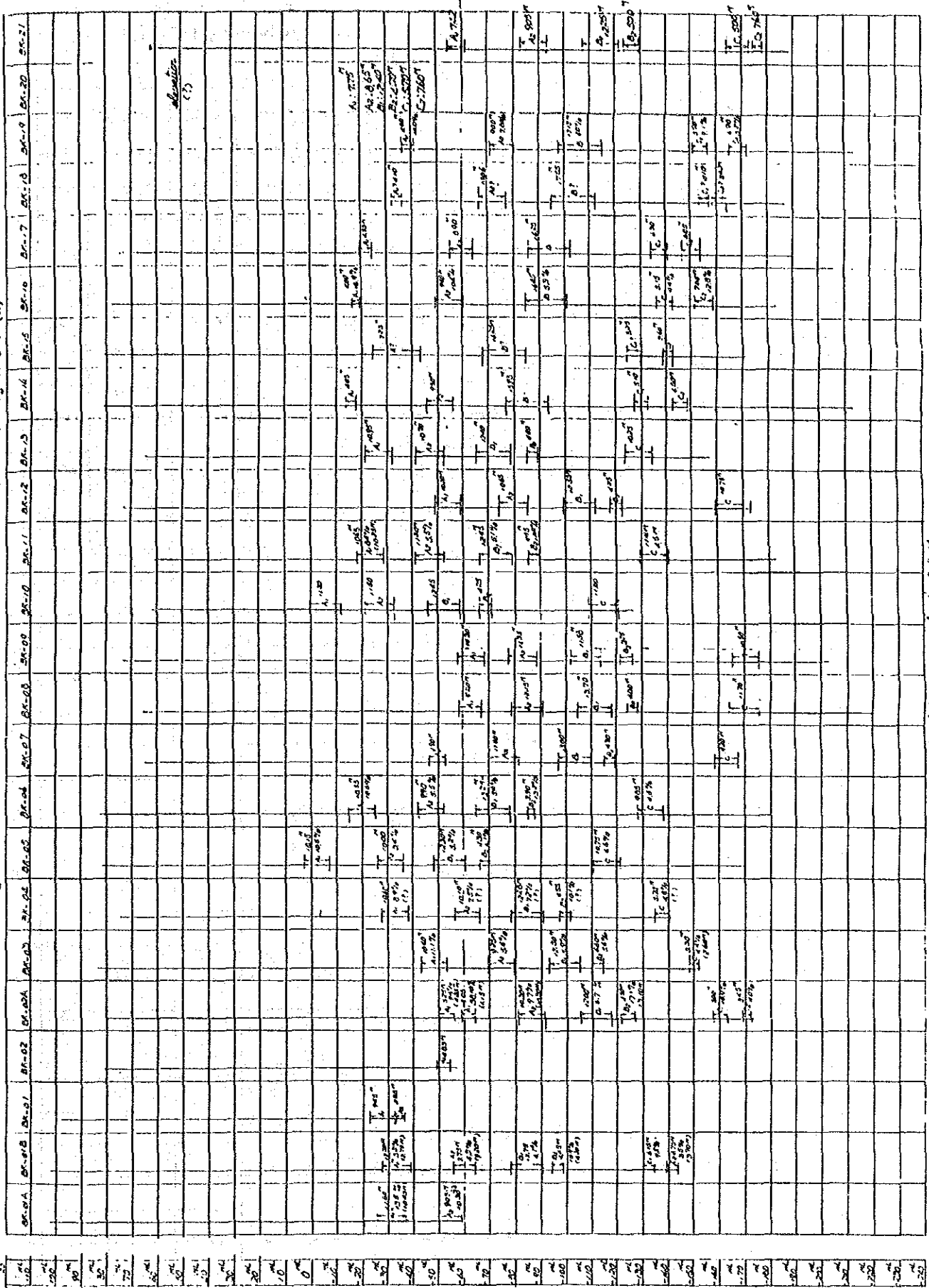
**Fig. 7-2-1' Columnner Sections of Boreholes driven by DOC (1)**

**Fig. 7-2-2' Columnner Sections of Boreholes driven by DOC (2)**





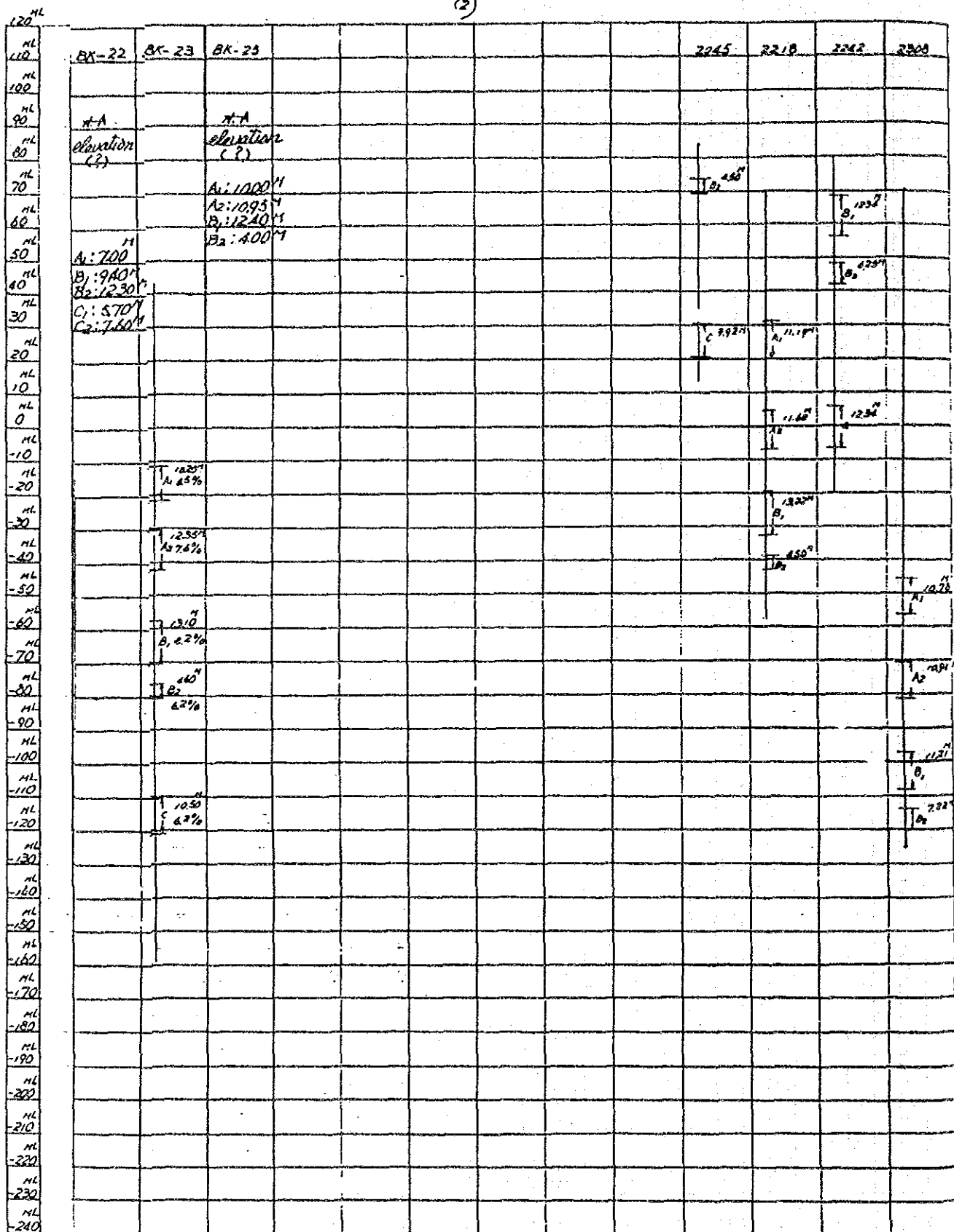
Fig. 7-2-1' Columner Sections of Boreholes driven by DOC (1)



(note) see boundary section of the Shell  
 10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000

Fig. 7-2-2' Columner Sections of Boreholes driven by DOC (2)

(2)



ATTACHMENT 7-3

1. Figures of Section 7-3-3

- Fig. 7-3-1' Combined Map (Topographical, Geological and Outcrop/  
Sub-outcrop Map) showing Location of Coal Sampling,  
North West Banko
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on the Line 1, North West Banko
- Fig. 7-3-3' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 2, North West Banko
- Fig. 7-3-4' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 3, North West Banko
- Fig. 7-3-5' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 4, North West Banko
- Fig. 7-3-6' Reconnaissance Route Map and Estimated Vertical Section  
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- Fig. 7-3-7' Reconnaissance Route Map and Estimated Vertical Section  
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- Fig. 7-3-9' Reconnaissance Route Map and Estimated Vertical Section  
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- Fig. 7-3-11' Reconnaissance Route Map and Estimated Vertical Section  
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- Fig. 7-3-12' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 11, North West Banko
- Fig. 7-3-13' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 12, North West Banko
- Fig. 7-3-14' Estimated Vertical Section, North West Banko (1)
- Fig. 7-3-15' Estimated Vertical Section, North West Banko (2)
- Fig. 7-3-16' Estimated Vertical Section, North West Banko (3)
- Fig. 7-3-17' Estimated Vertical Section, North West Banko (4)
- Fig. 7-3-18' Estimated Vertical Section, North West Banko (5)
- Fig. 7-3-19' Geological Survey Map, Western Part of Central Banko Area (1)
- Fig. 7-3-20' Geological Survey Map, Western Part of Central Banko Area (2)
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- Fig. 7-3-22' Geological Survey Map, Central Part of Central Banko Area
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- Fig. 7-3-24' Geological Survey Map, Eastern Part of Central Banko Area (1)
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- Fig. 7-3-26' An Example of Columner Sections Prepared by DOC
- Fig. 7-3-27' Coal Seam Distribution Map North Suban Jeriji Area
- Fig. 7-3-28' Cross Sections A, B and C, North Suban Jeriji Area
- Fig. 7-3-29' Cross Sections D and E, North Suban Jeriji Area

Fig. 7-3-1' Combined Map (Topographical, Geological and Outcrop/Sub-outcrop Map) showing Location of Coal Sampling, North West Banko

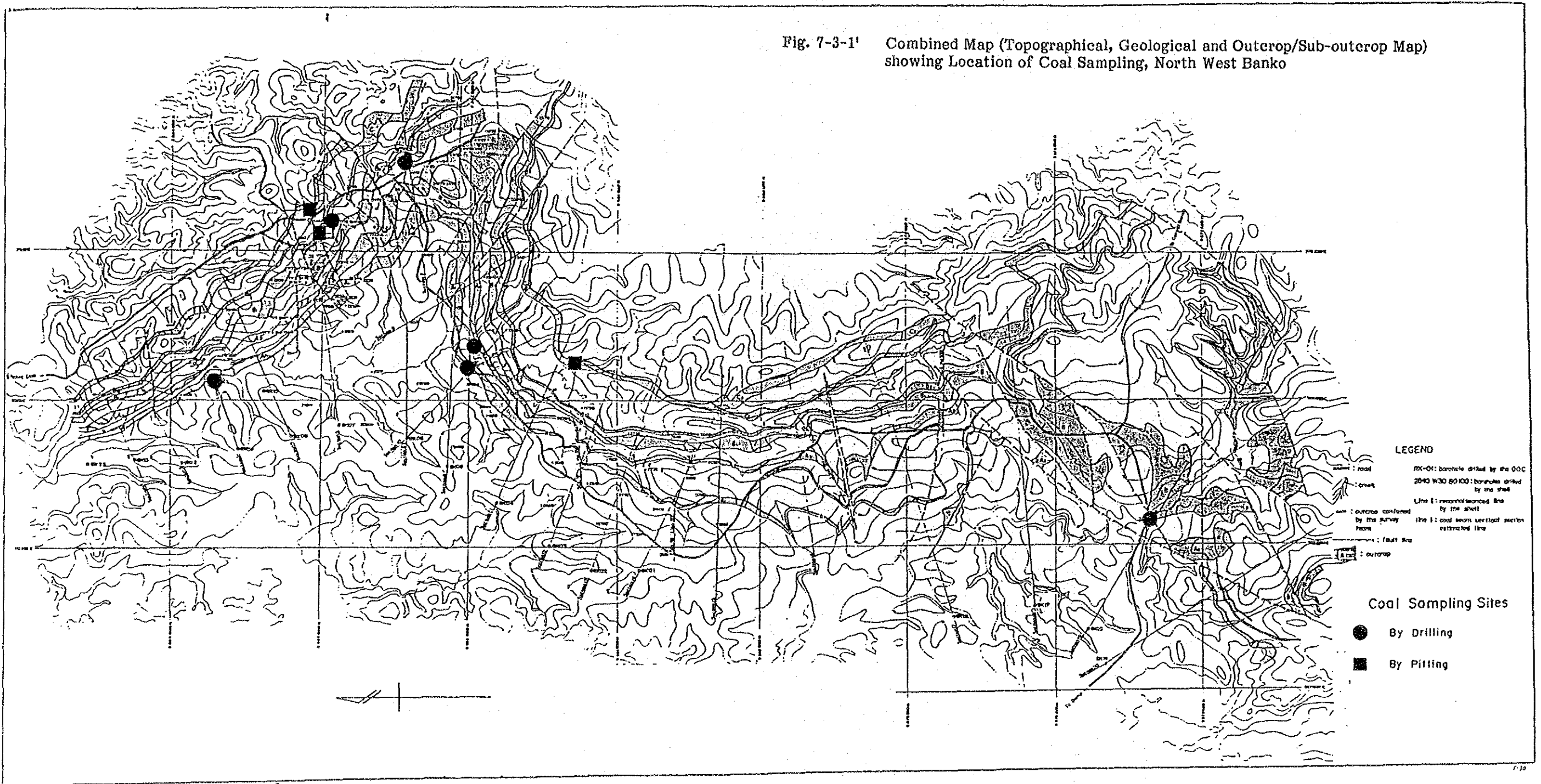
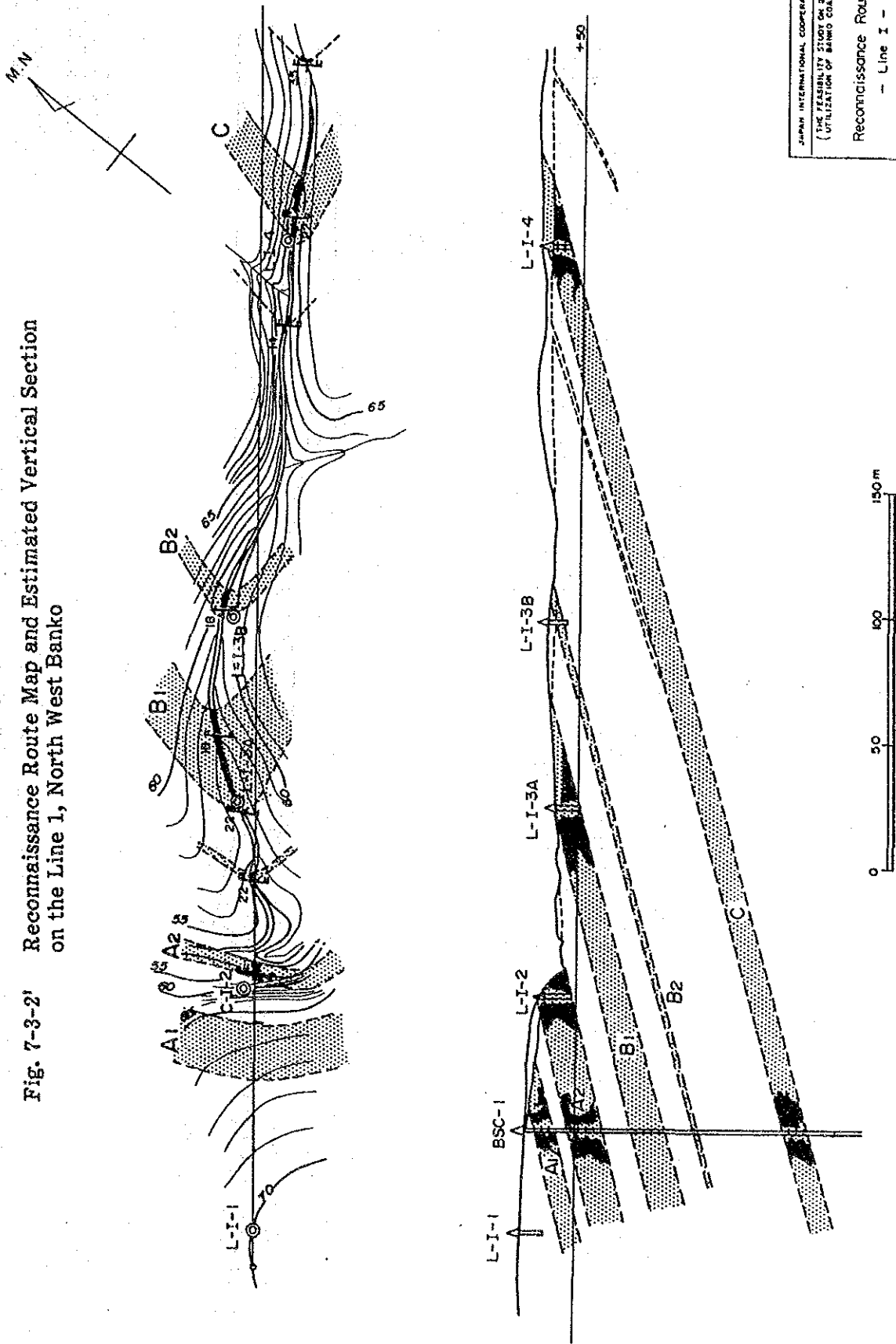




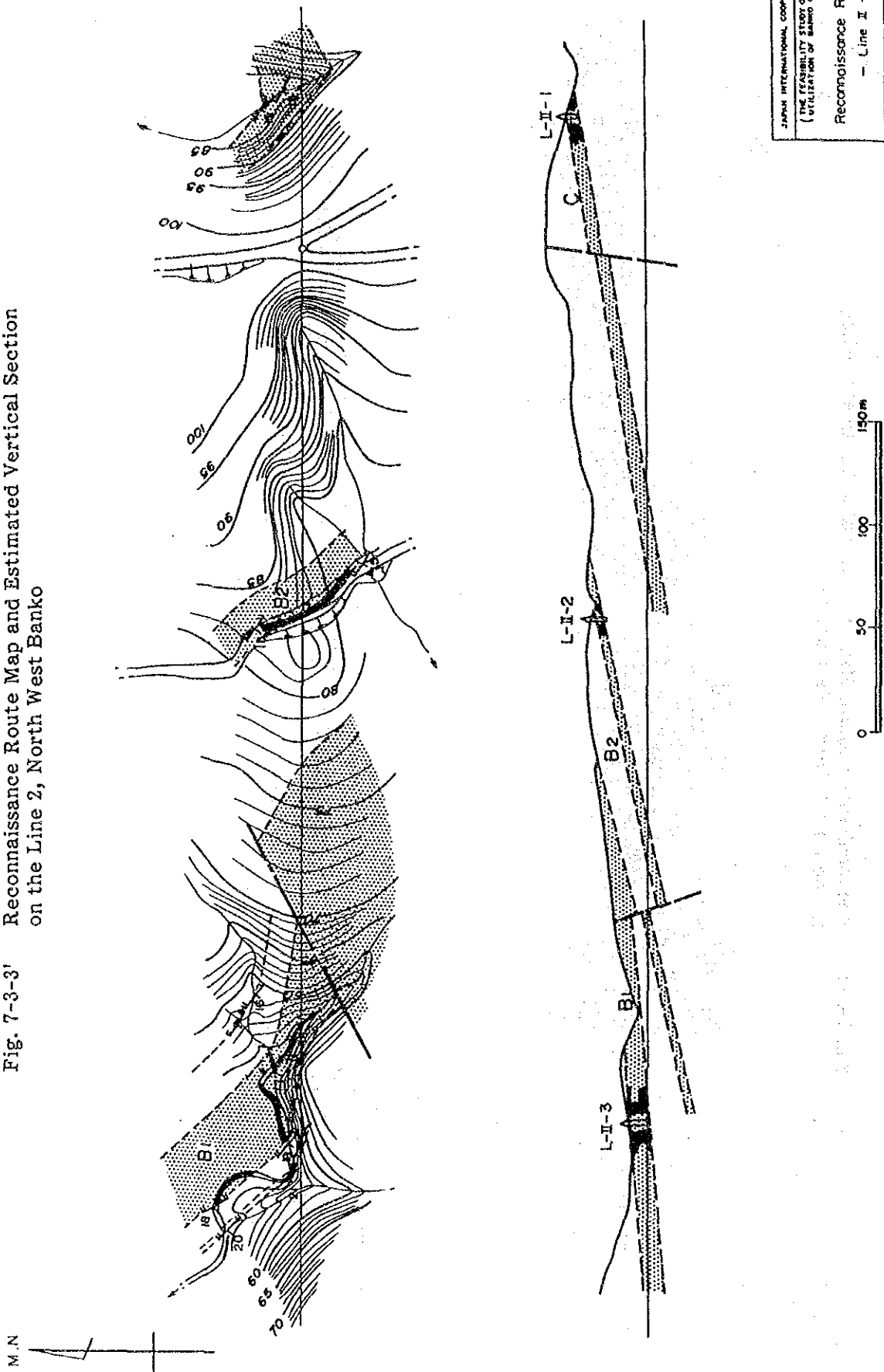
Fig. 7-3-2' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 1, North West Banko



JAPAN INTERNATIONAL COOPERATION AGENCY			
( FOR FEASIBILITY STUDY ON EFFECTIVE )			
( UTILIZATION OF BANHO COAL )			
Reconnaissance Route Map			
- Line 1 -			
Proj. No.	Scale	Date	Prepared by
		1955	K. ITO



Fig. 7-3-3' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 2, North West Banko



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 UTILIZATION OF BANHO COAL)  
 Reconnaissance Route Map  
 - Line II -  
 Date: 1965  
 Series:  
 Project No.: 122

Fig. 7-3-4' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 3, North West Banko

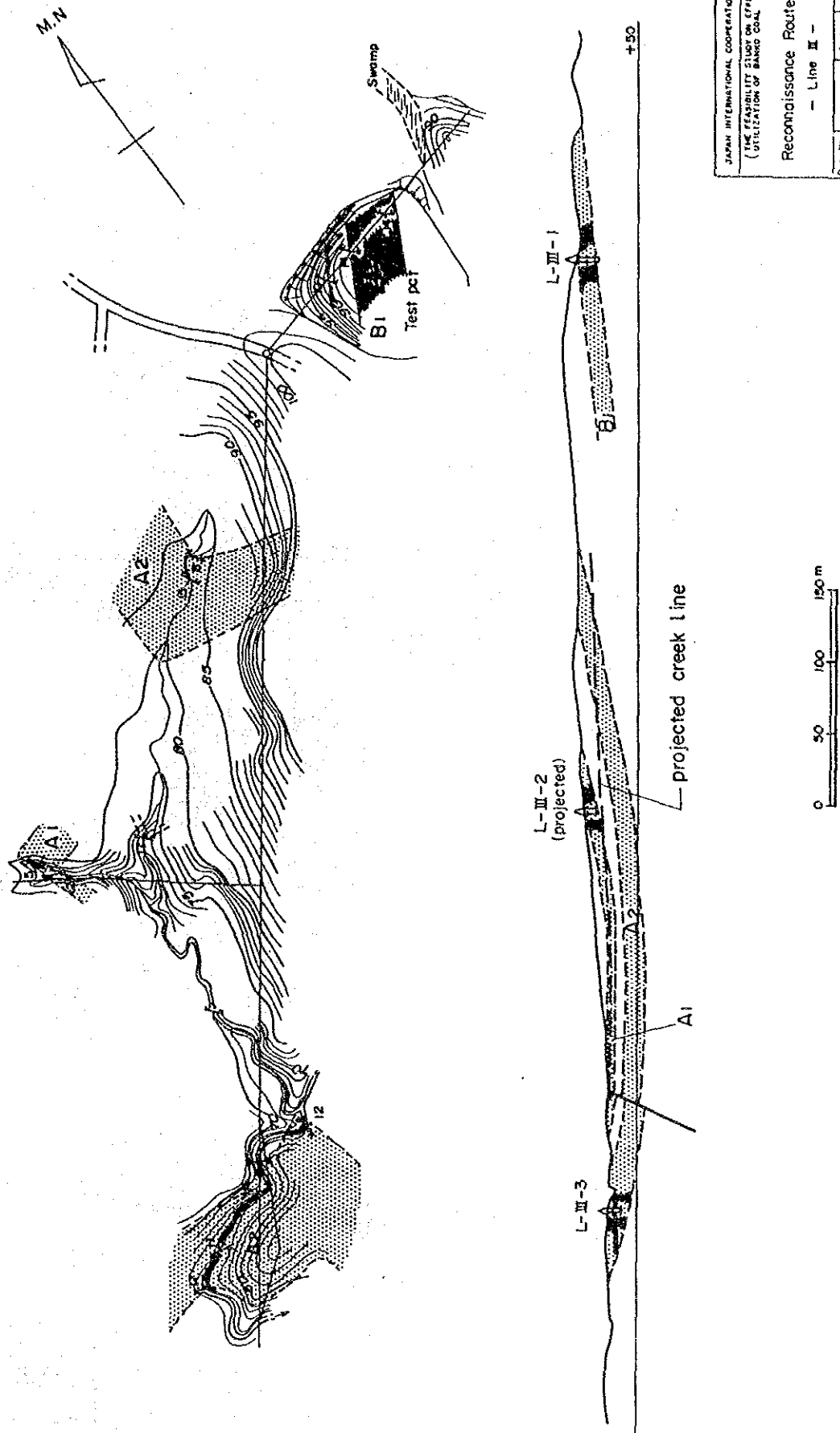
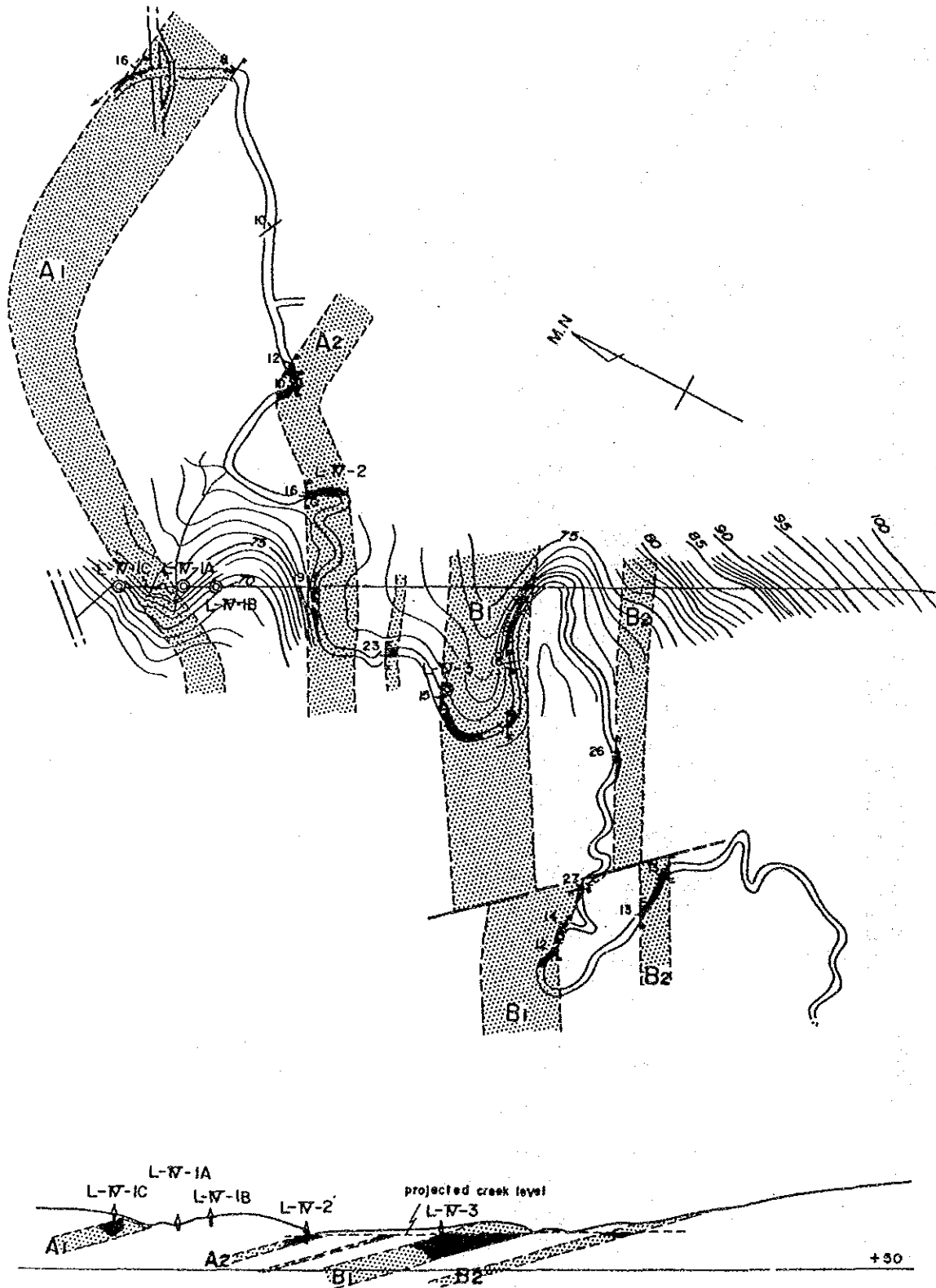
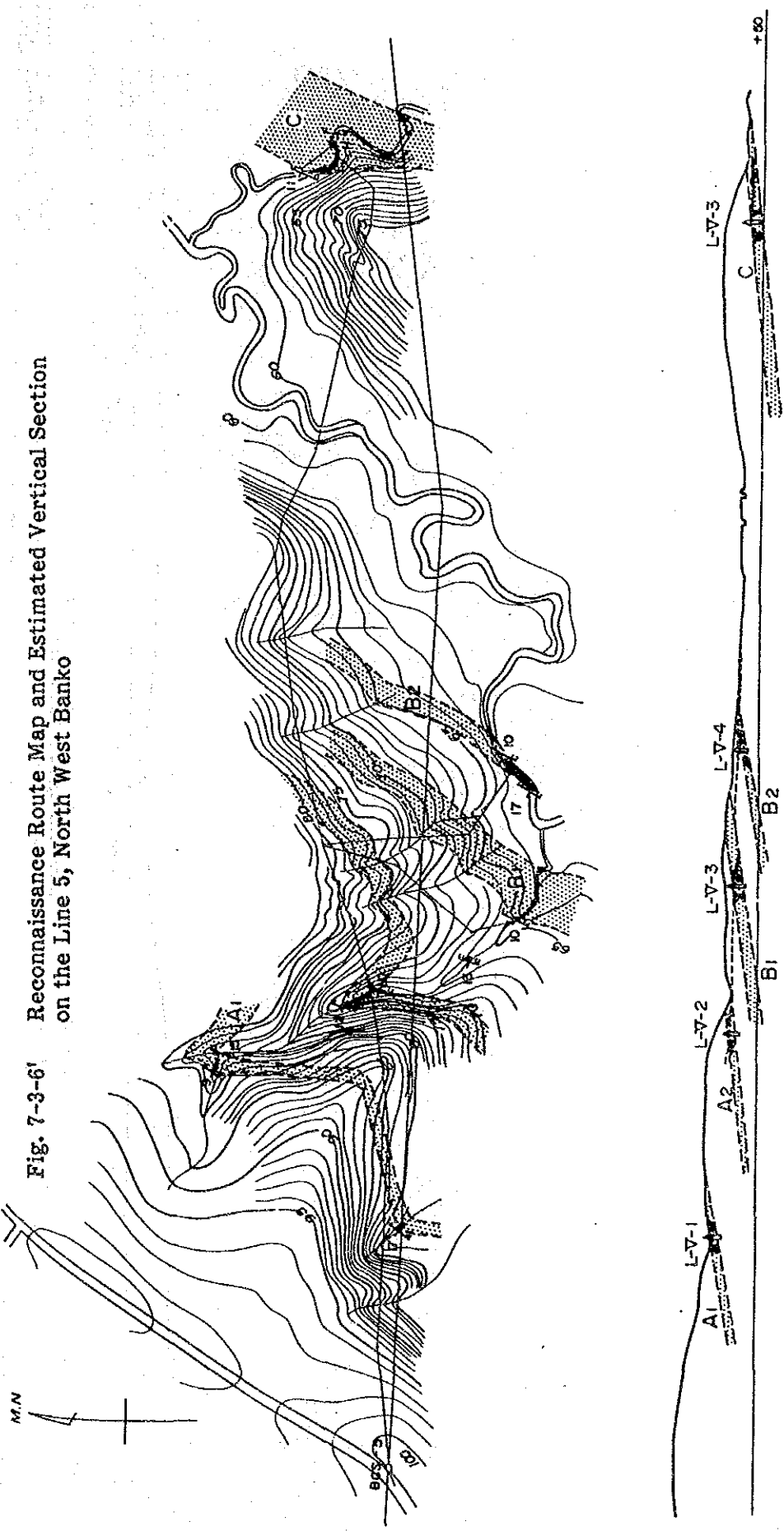


Fig. 7-3-5' Reconnaissance Route Map and Estimated Vertical Section on the Line 4, North West Banko



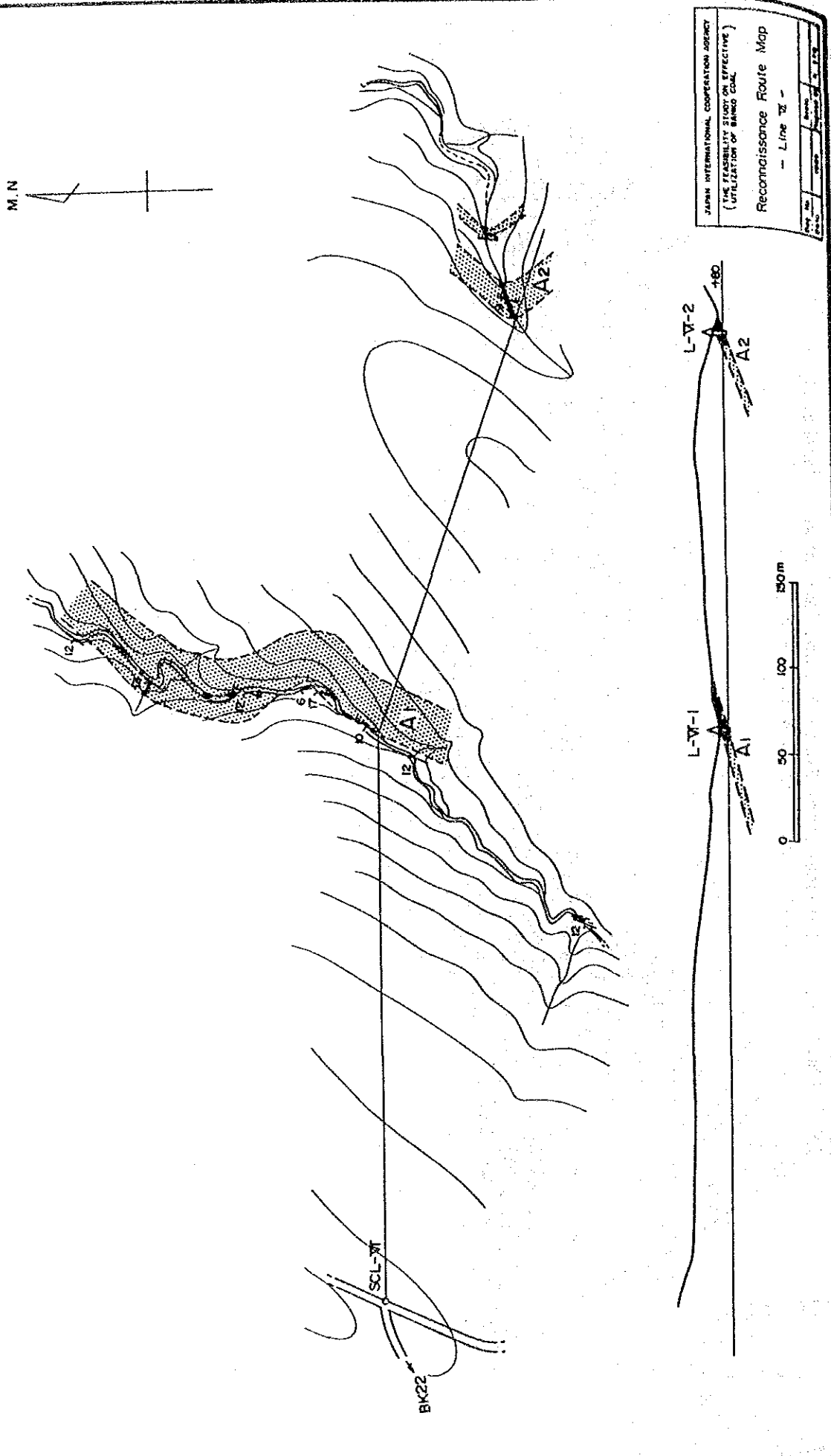
JAPAN INTERNATIONAL COOPERATION AGENCY			
(THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANKO COAL)			
Reconnaissance Route Map			
- Line V -			
Orig. No.		Scale	
Date	1983	Prepared by	K. ITO

Fig. 7-3-6' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 5, North West Banko



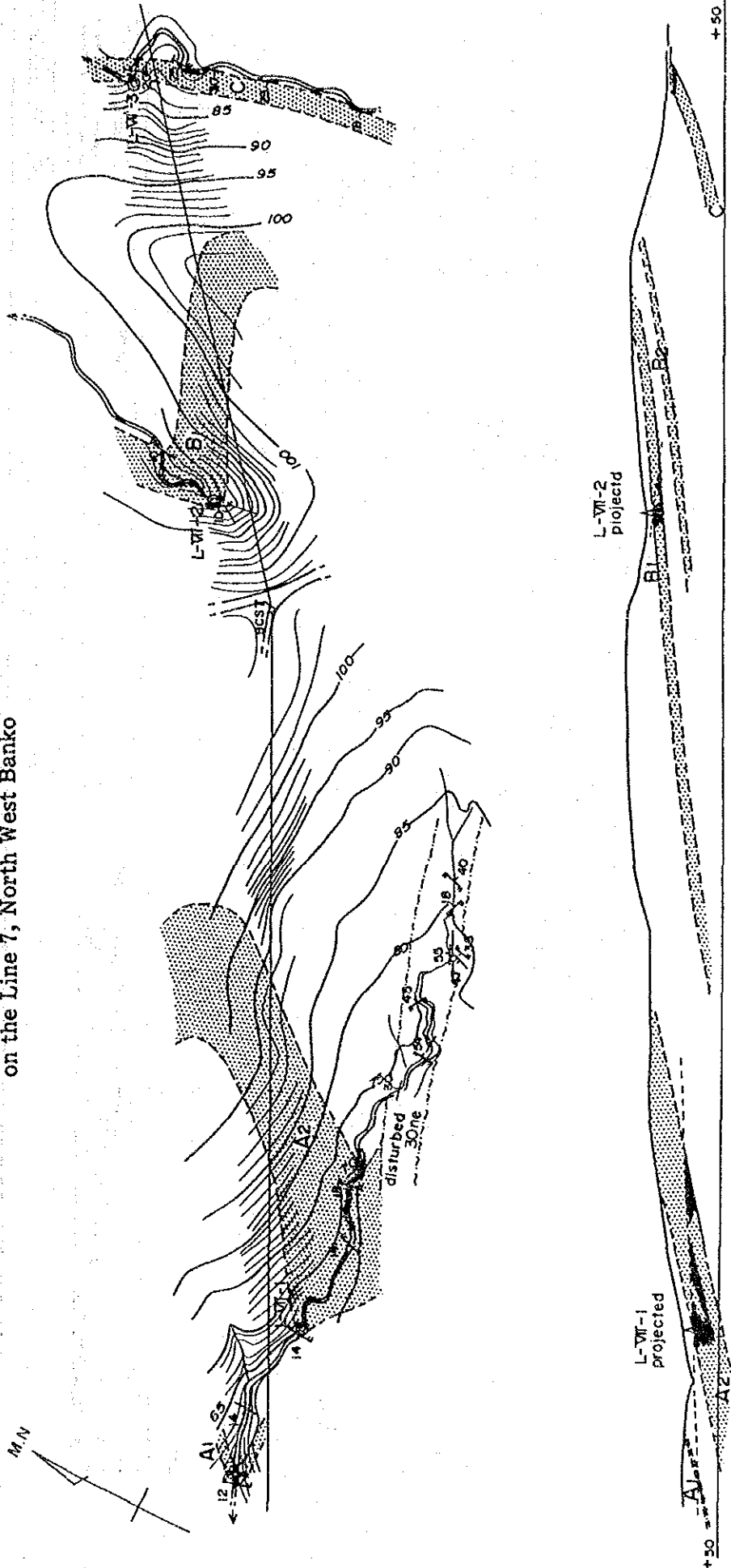
JAPAN INTERNATIONAL COOPERATION AGENCY	
( THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANHO COAL )	
Reconnaissance Route Map	
- Line V -	
Dep. No.	2408
Date	1983
Prepared by	K. ITO

Fig. 7-3-7' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 6, North West Banko



JAPAN INTERNATIONAL COOPERATION AGENCY  
 (LINE FEASIBILITY STUDY ON EFFECTIVE  
 UTILIZATION OF BANHO COAL)  
 Reconnaissance Route Map  
 -- Line 6 --  
 Date: 1978  
 Scale: 1:50,000

Fig. 7-3-8' Reconnaissance Route Map and Estimated Vertical Section  
on the Line 7, North West Banko



JAPAN INTERNATIONAL COOPERATION AGENCY  
(THE FEASIBILITY STUDY ON EFFECTIVE  
UTILIZATION OF BANHO COAL)

Reconnaissance Route Map  
- Line 7 -

Orig. No.	Scale
Date	Prepared by
1982	K. TTD



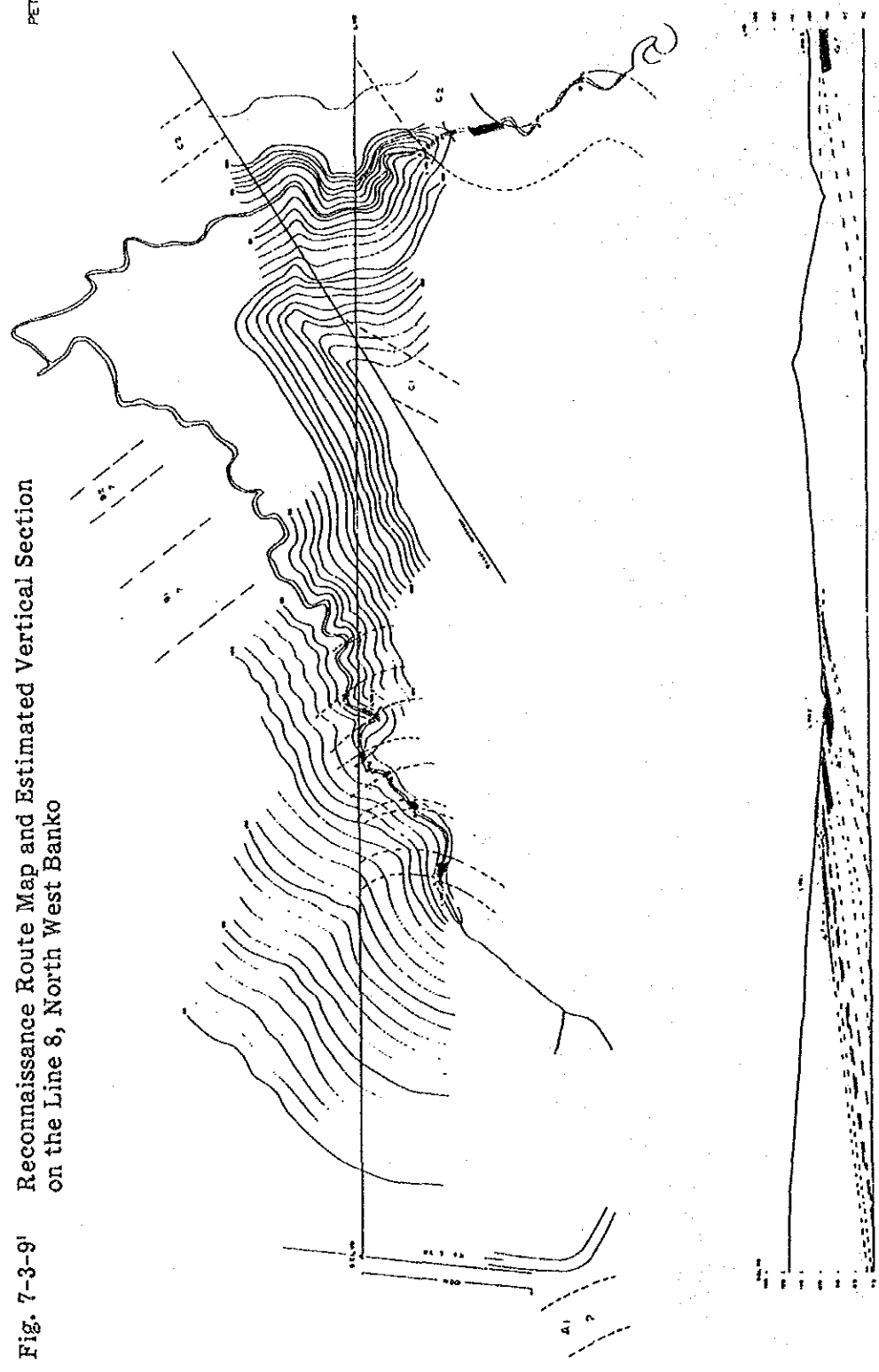
Fig. 7-3-9' Reconnaissance Route Map and Estimated Vertical Section on the Line 8, North West Banko

PETA GEOLOGI PENDAHULUAN LINTASAN L.V.B  
 DATARAN BANJO ANDAH TERAKSI DAN SAKAT LAUT  
 KABUPATEN BANDA ACEH  
 PROPINSI SUMATRA SELATAN



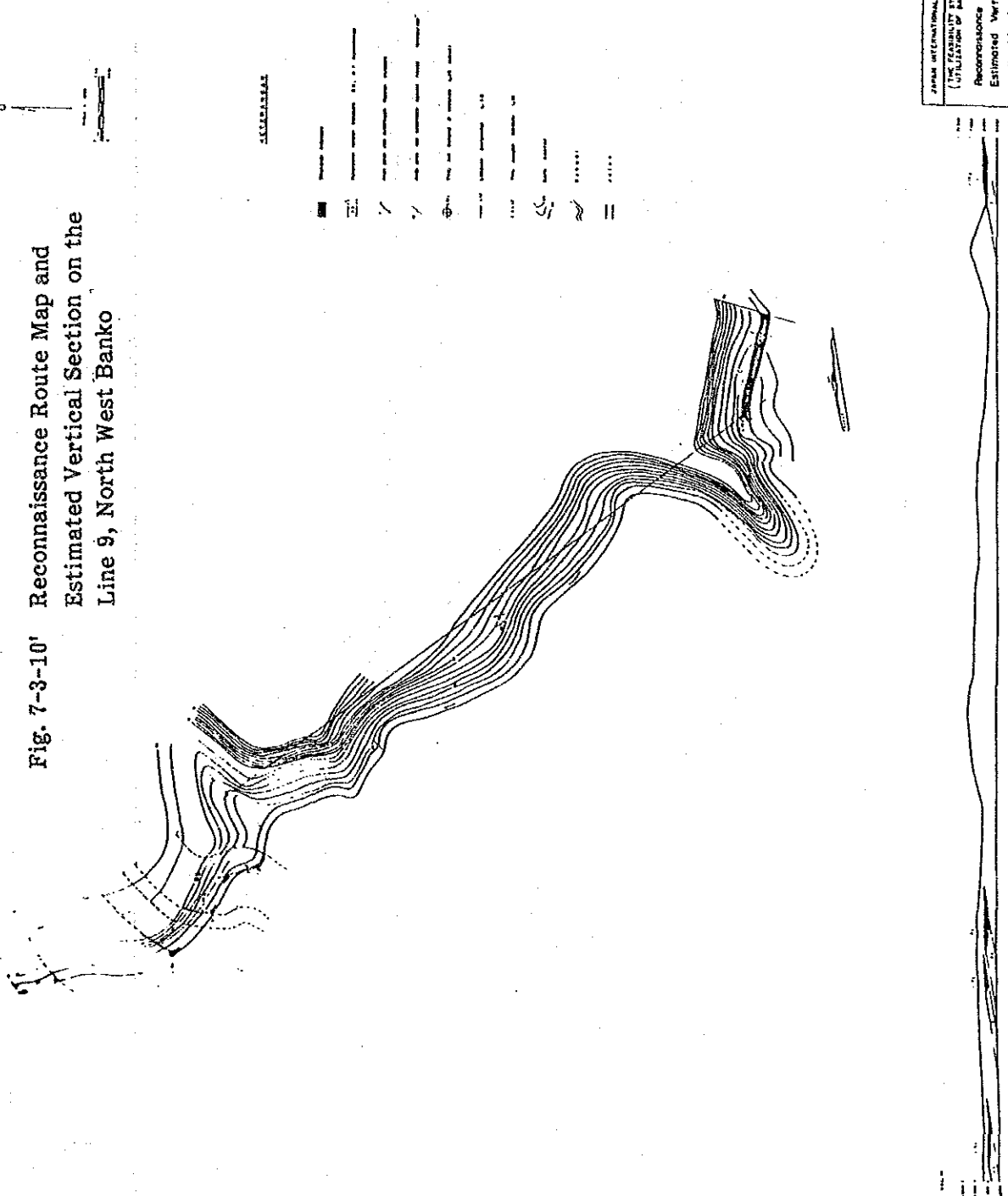
KETERANGAN

- Jalan
- Jalan Desa
- Jalan Kiri
- Jalan Kanan
- Jalan Kiri dan Kanan
- Jalan Kiri dan Kanan (L.V.B. 100')
- Jalan Kiri dan Kanan (L.V.B. 200')
- Jalan Kiri dan Kanan (L.V.B. 300')
- Jalan Kiri dan Kanan (L.V.B. 400')
- Jalan Kiri dan Kanan (L.V.B. 500')
- Jalan Kiri dan Kanan (L.V.B. 600')
- Jalan Kiri dan Kanan (L.V.B. 700')
- Jalan Kiri dan Kanan (L.V.B. 800')
- Jalan Kiri dan Kanan (L.V.B. 900')
- Jalan Kiri dan Kanan (L.V.B. 1000')
- Jalan Kiri dan Kanan (L.V.B. 1100')
- Jalan Kiri dan Kanan (L.V.B. 1200')
- Jalan Kiri dan Kanan (L.V.B. 1300')
- Jalan Kiri dan Kanan (L.V.B. 1400')
- Jalan Kiri dan Kanan (L.V.B. 1500')
- Jalan Kiri dan Kanan (L.V.B. 1600')
- Jalan Kiri dan Kanan (L.V.B. 1700')
- Jalan Kiri dan Kanan (L.V.B. 1800')
- Jalan Kiri dan Kanan (L.V.B. 1900')
- Jalan Kiri dan Kanan (L.V.B. 2000')



JAWA BARU		SUMATERA SELATAN	
(UTILIZATION OF LANDS DATA)			
Reconnaissance Route Map and Estimated Vertical Section on the Line 8			
Scale	1:500	Date	1972
Sheet No.	1002	Project No.	1072

Fig. 7-3-10' Reconnaissance Route Map and  
 Estimated Vertical Section on the  
 Line 9, North West Banko

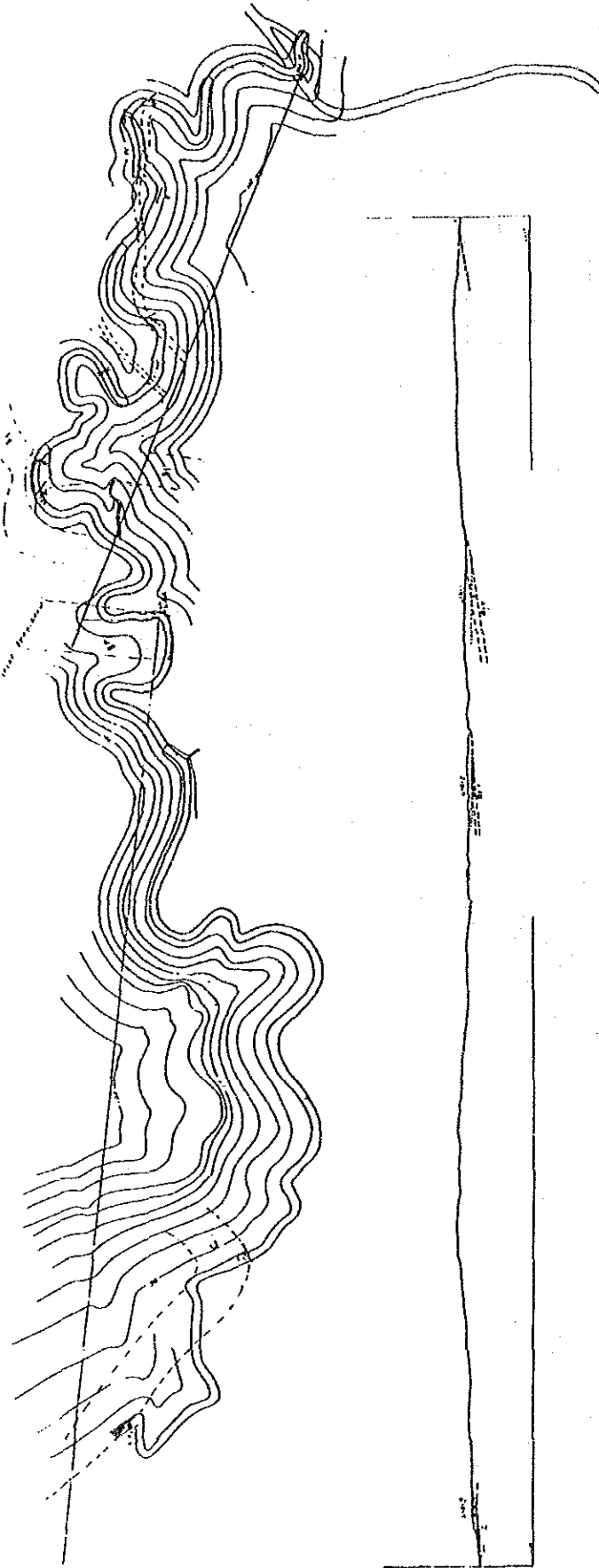


JAPANESE INTERNATIONAL COOPERATION AGENCY  
 (THE FEASIBILITY STUDY ON EFFECTIVE  
 UTILIZATION OF LAND CON.)  
 Reconnaissance Route Map and  
 Estimated Vertical Section  
 on the Line 9

Date	1963	Scale	1:50,000
Drawn by		Checked by	



Fig. 7-3-11' Reconnaissance Route Map and Estimated Vertical Section  
 on the Line 10, North West Banko



Scale: 1:50,000	
Date: 1952	
Sheet No. 10	
Project No. 10	
Drawing No. 10	
Reconnaissance Route Map and Estimated Vertical Section on the Line 10	



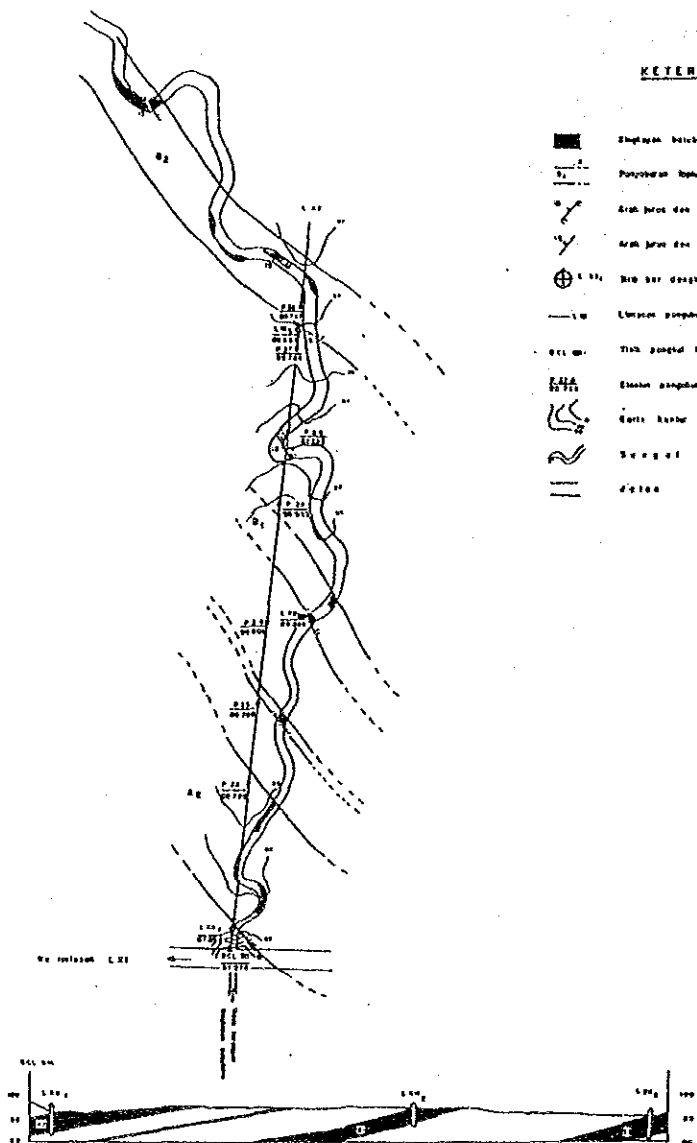
Fig. 7-3-13' Reconnaissance Route Map and Estimated Vertical Section on the Line 12, North West Banko

PETA GEOLOGI PENDAHULUAN LINTASAN L.XII  
DAERAH BANKO BAGIAN TENGAH DAN BARAT LAUT  
KABUPATEN BAJARA ENIM  
PROVINSI SUMATRA SELATAN



KETERANGAN

- Daerah Bekas
- Perbatasan Daerah Banko St. & C. SIKILIMAN
- Arak jalan dan kerangka topografi Banko
- Arak jalan dan kerangka topografi dengan "terestrisasi"
- Titik terestrisasi di lintasan L.XII nomor 1
- Lintasan pengaliran L.XII
- Titik pengaliran Lintasan L.XII
- Lintasan pengaliran No. 32 dengan nomor 02 764 A
- Garis kontur
- Sungai
- Jalan



SKALA LATERAL 1:1000  
SKALA VERTIKAL 1:1000

JAPAN INTERNATIONAL COOPERATION AGENCY  
(THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANGKO COAL)

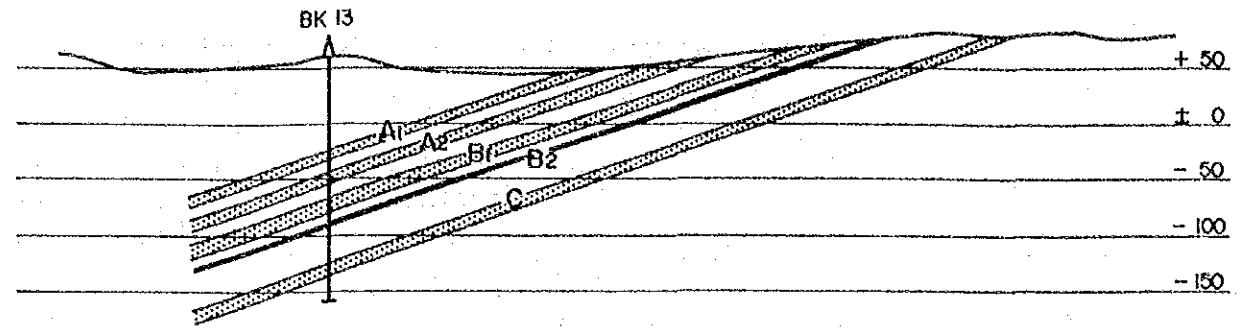
Reconnaissance Route Map and Estimated Vertical Section on the Line 12

Doc. No.	Scale
Date	Prepared by
1963	SPIM

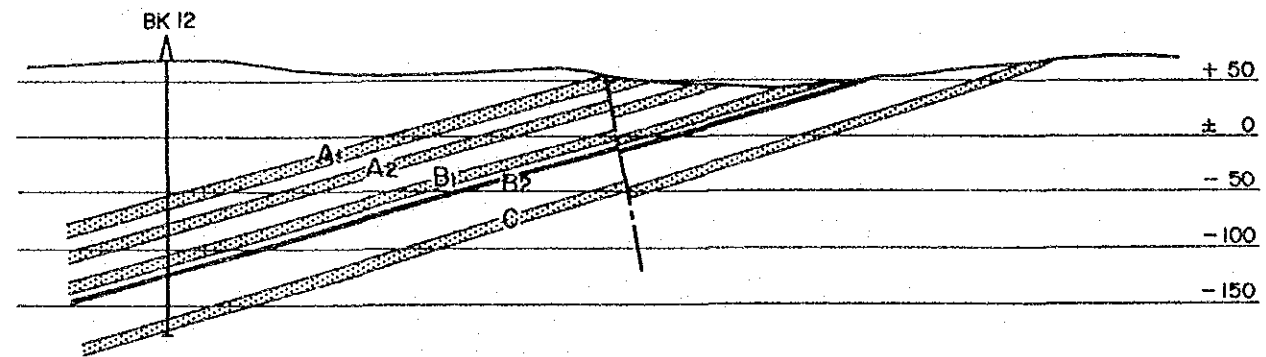
Fig. 7-3-14'

Estimated Vertical Section, North West Banko (1)

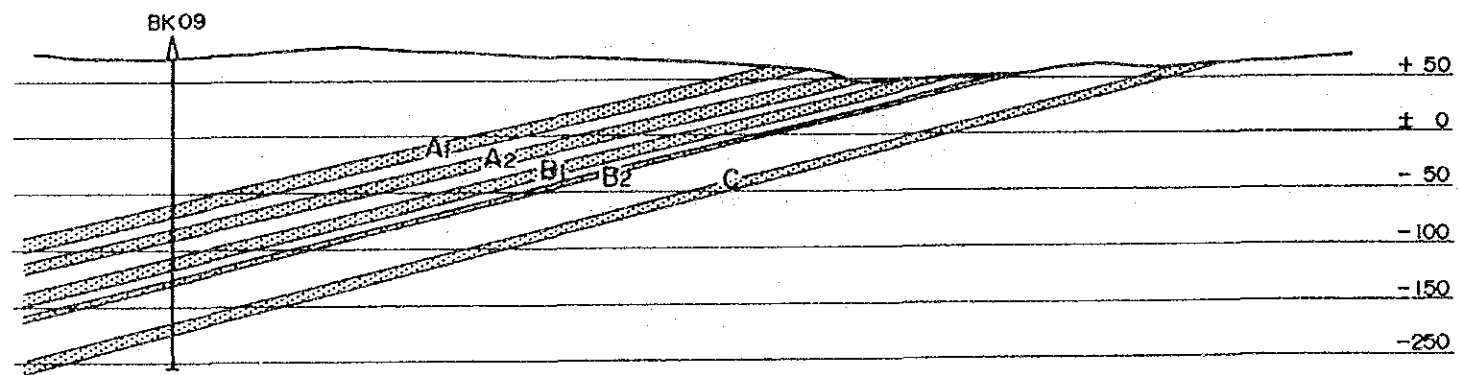
Section 1



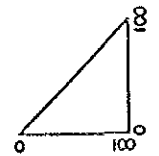
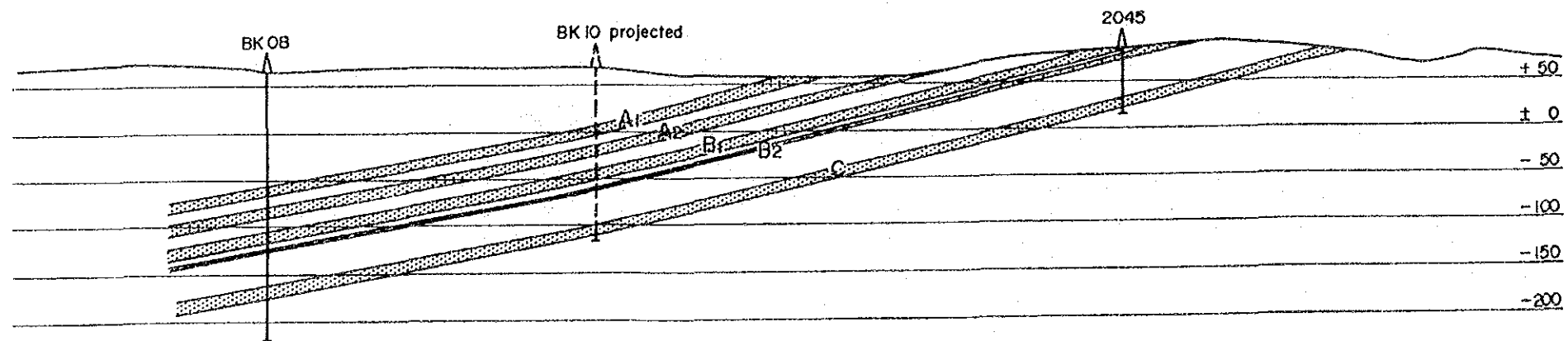
Section 2



Section 3



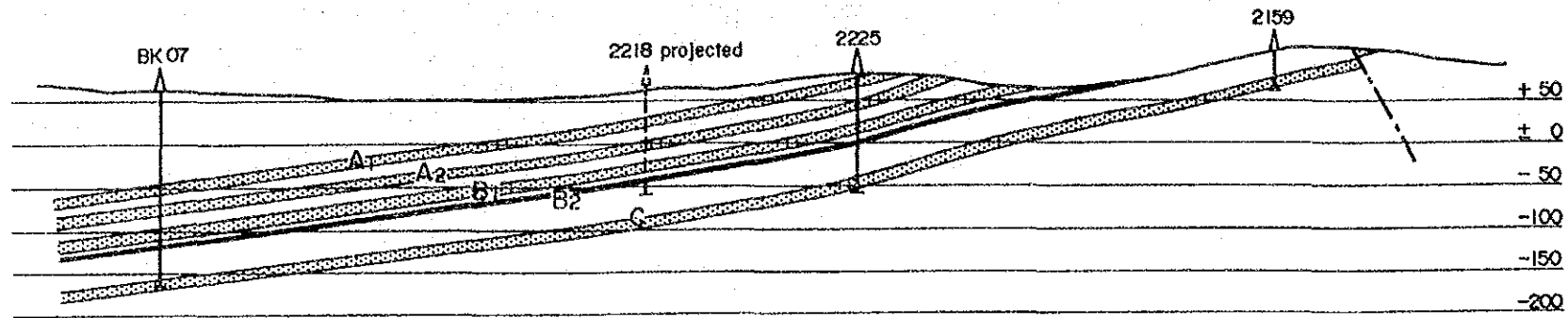
Section 4



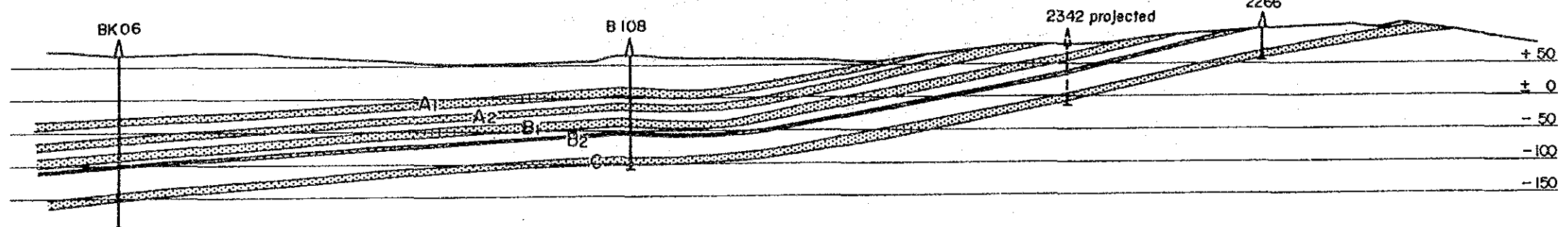
JAPAN INTERNATIONAL COOPERATION AGENCY		
(THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANKO COAL)		
Cross Section		
- 1 ~ 4 -		
Dwg No.	Scale	
Date	1985	Prepared by K. ITO

Fig. 7-3-15' Estimated Vertical Section, North West Banko (2)

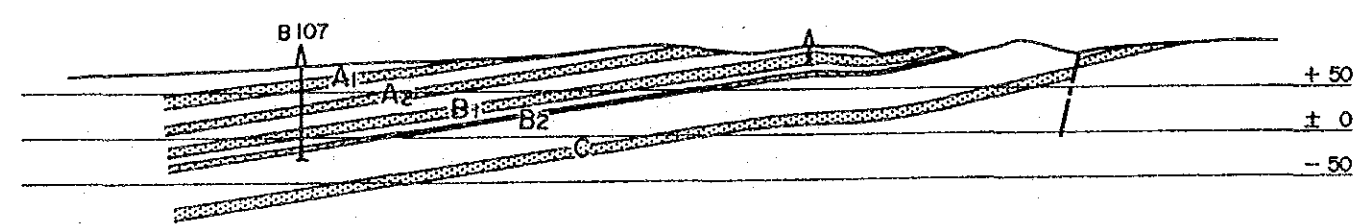
Section 5



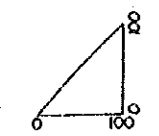
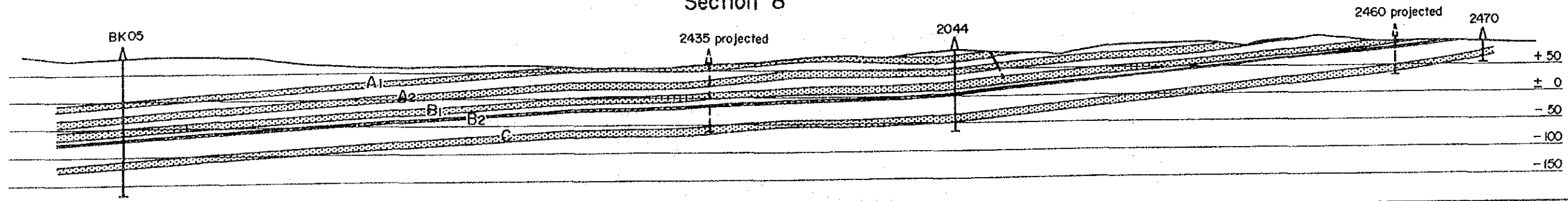
Section 6



Section 7



Section 8



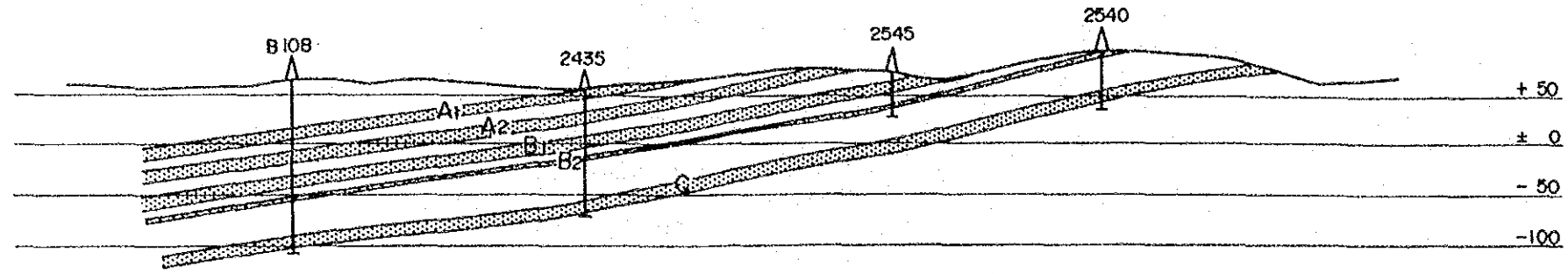
JAPAN INTERNATIONAL COOPERATION AGENCY  
 (THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANKO COAL)

Cross Section  
 - 5 ~ 8 -

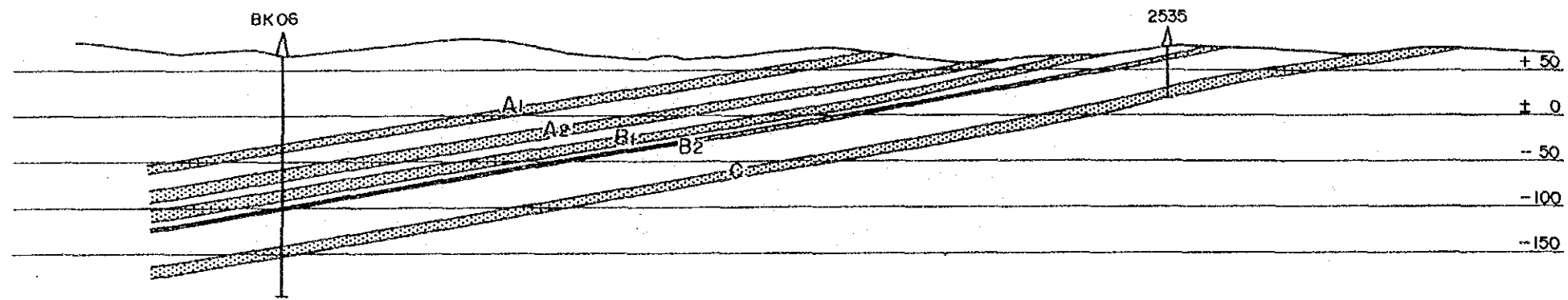
Dwg No.		Scale	
Date	1985	Prepared by	K. ITO

Fig. 7-3-16' Estimated Vertical Section, North West Banko (3)

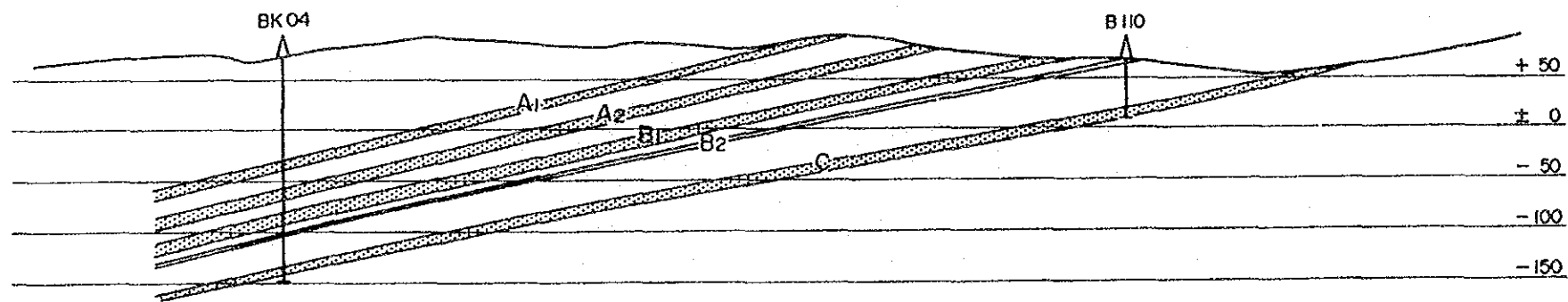
Section 9



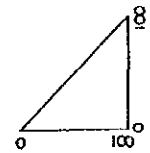
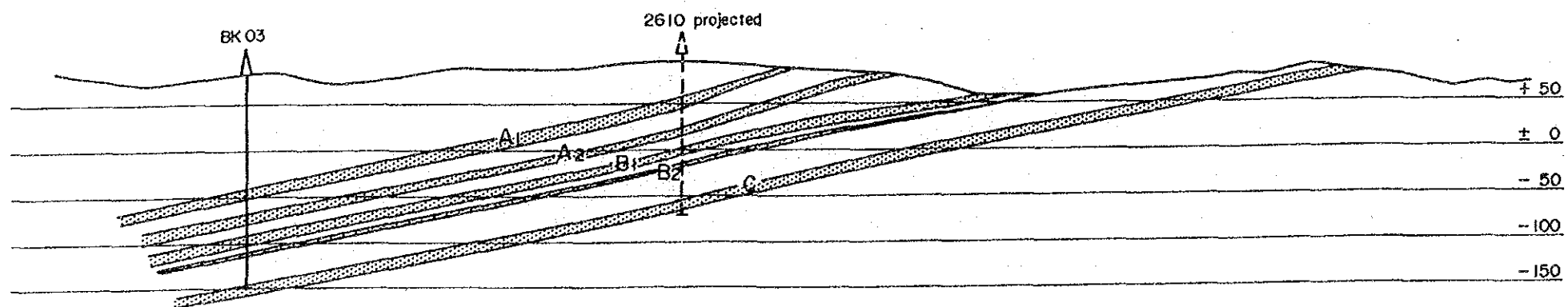
Section 10



Section 11



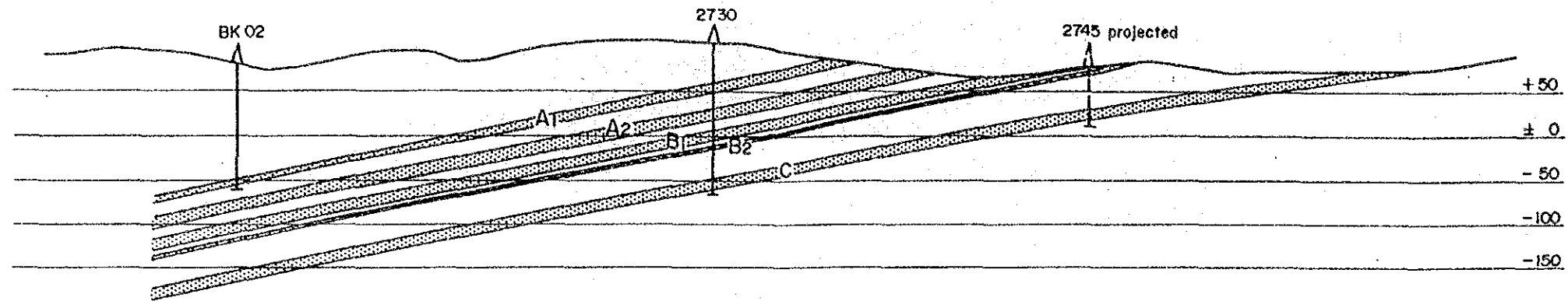
Section 12



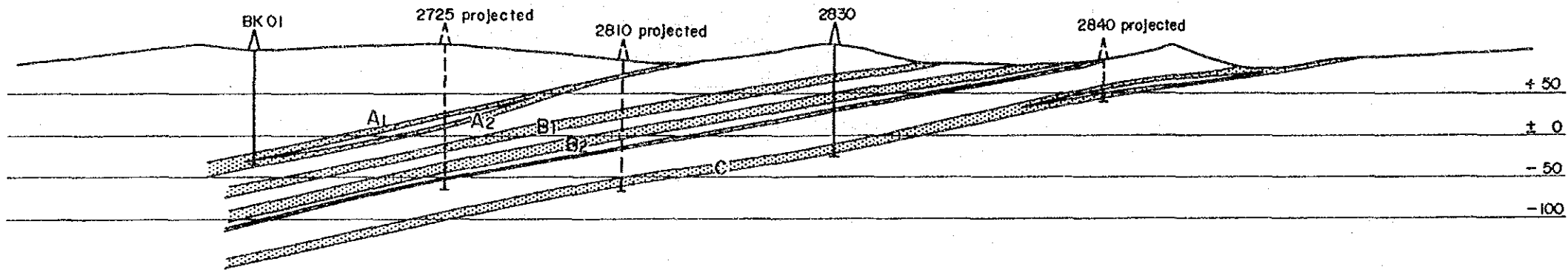
JAPAN INTERNATIONAL COOPERATION AGENCY			
(THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANKO COAL)			
Cross Section			
- 9 ~ 12 -			
Dwg No.		Scale	
Date	1985	Prepared by	K. ITO

Fig. 7-3-17' Estimated Vertical Section, North West Banko (4)

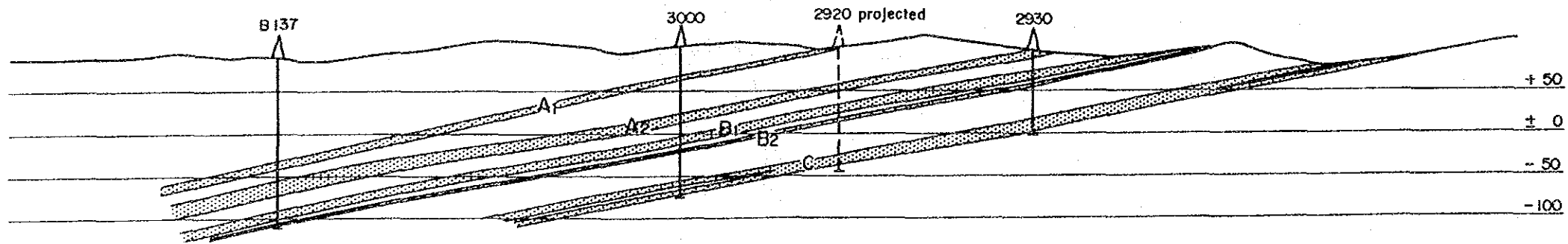
Section 13



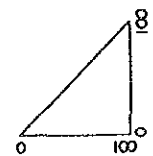
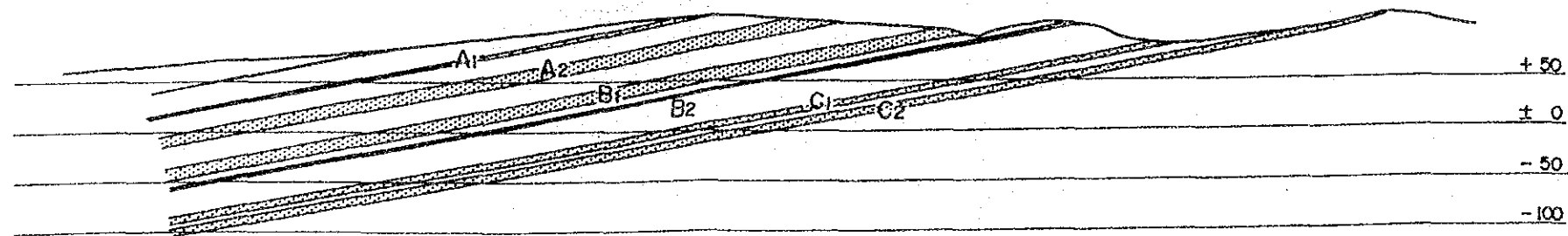
Section 14



Section 15



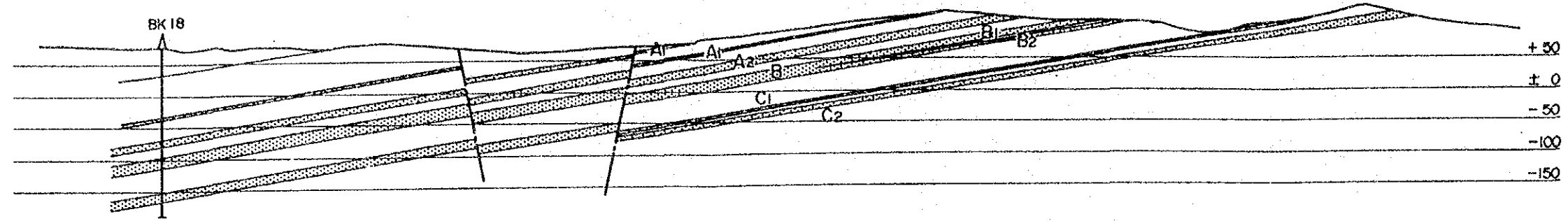
Section 16



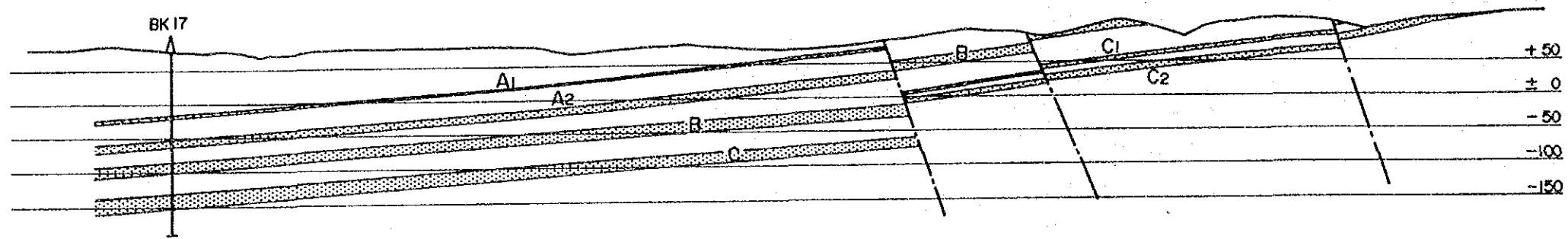
JAPAN INTERNATIONAL COOPERATION AGENCY		
( THE FEASIBILITY STUDY ON EFFECTIVE ) UTILIZATION OF BANKO COAL		
Cross Section - 13 ~ 16 -		
Dwg No.	Scale	
Date	1985	Prepared by K. ITO

Fig. 7-3-18' Estimated Vertical Section, North West Banko (5)

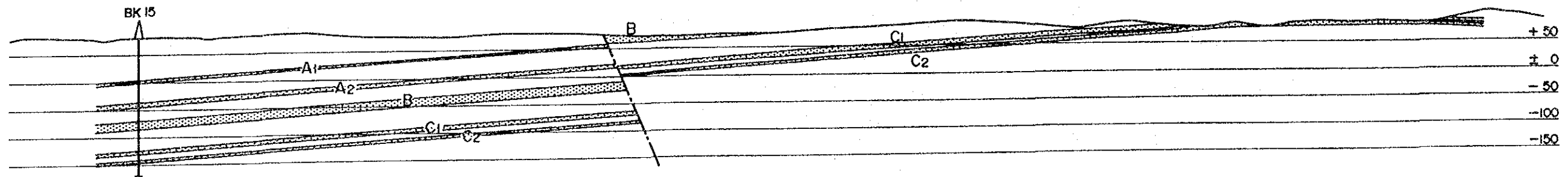
Section 17



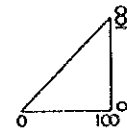
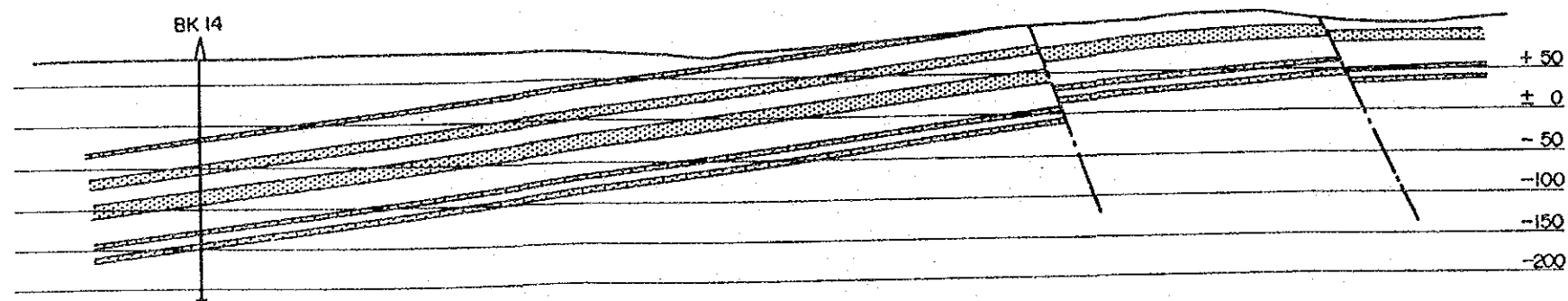
Section 18



Section 19



Section 20



JAPAN INTERNATIONAL COOPERATION AGENCY  
 (THE FEASIBILITY STUDY ON EFFECTIVE)  
 UTILIZATION OF BANKO COAL

Cross Section  
 - 17 ~ 20 -

Dwg No.		Scale	
Date	1985	Prepared by	K. ITO





Fig. 7-3-19'  
Geological Survey Map, Western Part of Central Banko Area (1)

LEGEND

- |  |                           |  |                     |
|--|---------------------------|--|---------------------|
|  | Old Quarry                |  | Road                |
|  | Contour (50m interval)    |  | Road (Dashed)       |
|  | Contour (100m interval)   |  | Road (Dotted)       |
|  | Contour (200m interval)   |  | Road (Dash-dot)     |
|  | Contour (500m interval)   |  | Road (Long Dash)    |
|  | Contour (1000m interval)  |  | Road (Short Dash)   |
|  | Contour (2000m interval)  |  | Road (Wavy)         |
|  | Contour (5000m interval)  |  | Road (Solid)        |
|  | Contour (10000m interval) |  | Road (Double Solid) |

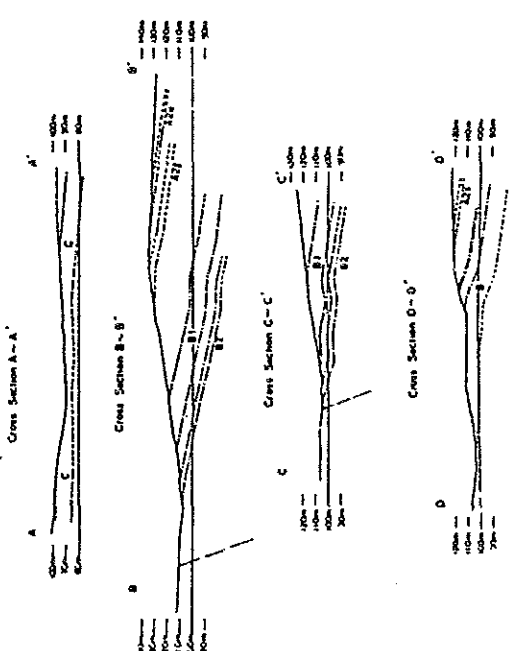
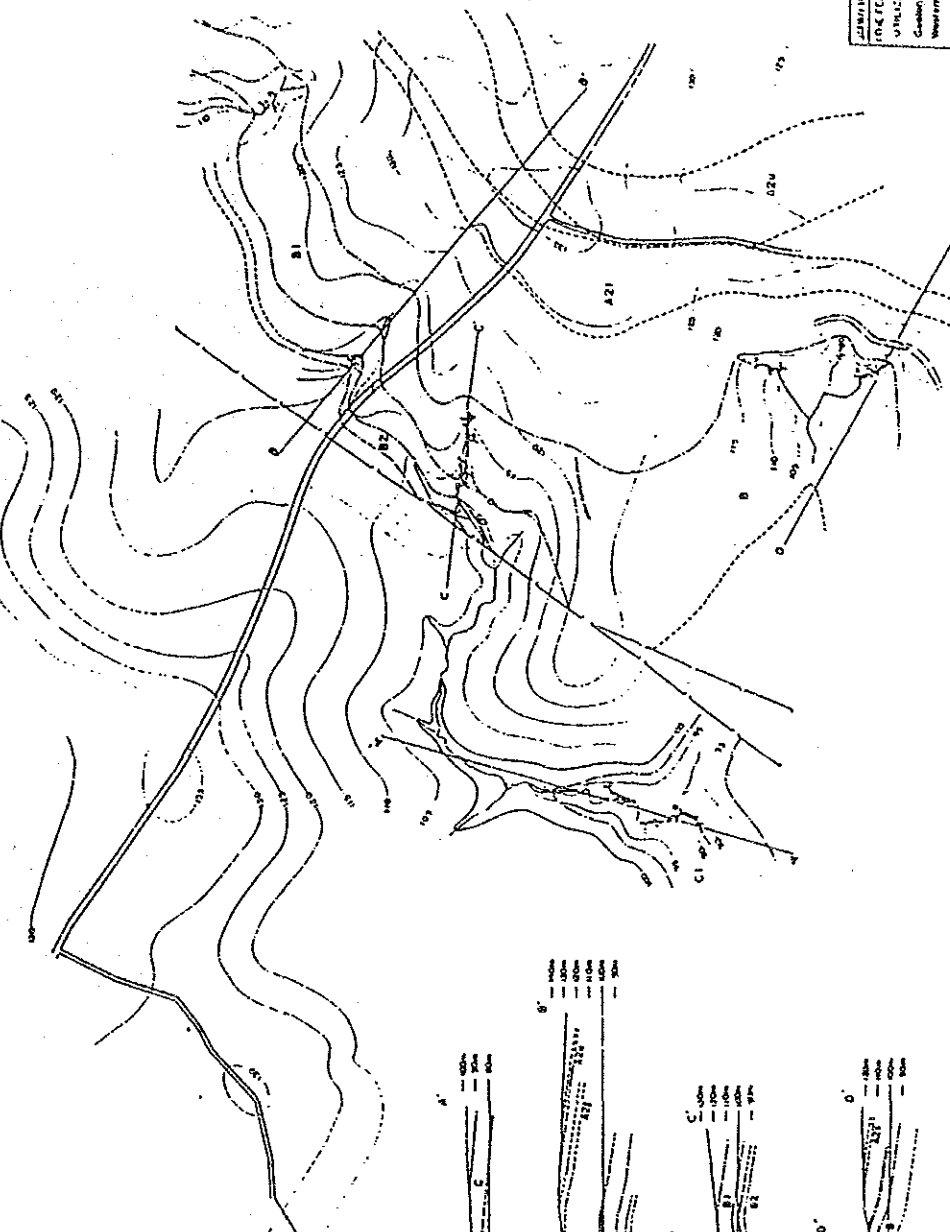
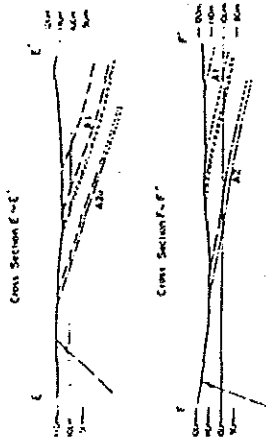
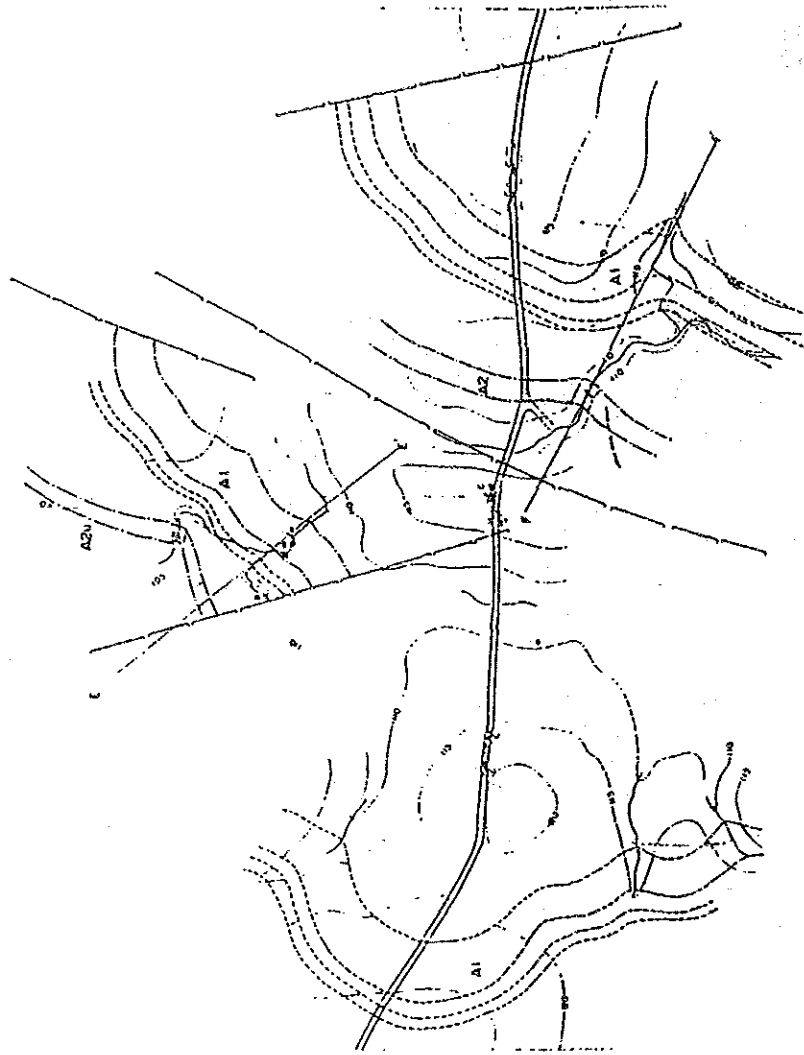


Fig. 7-3-20' Geological Survey Map, Western Part of Central Banko Area (2)

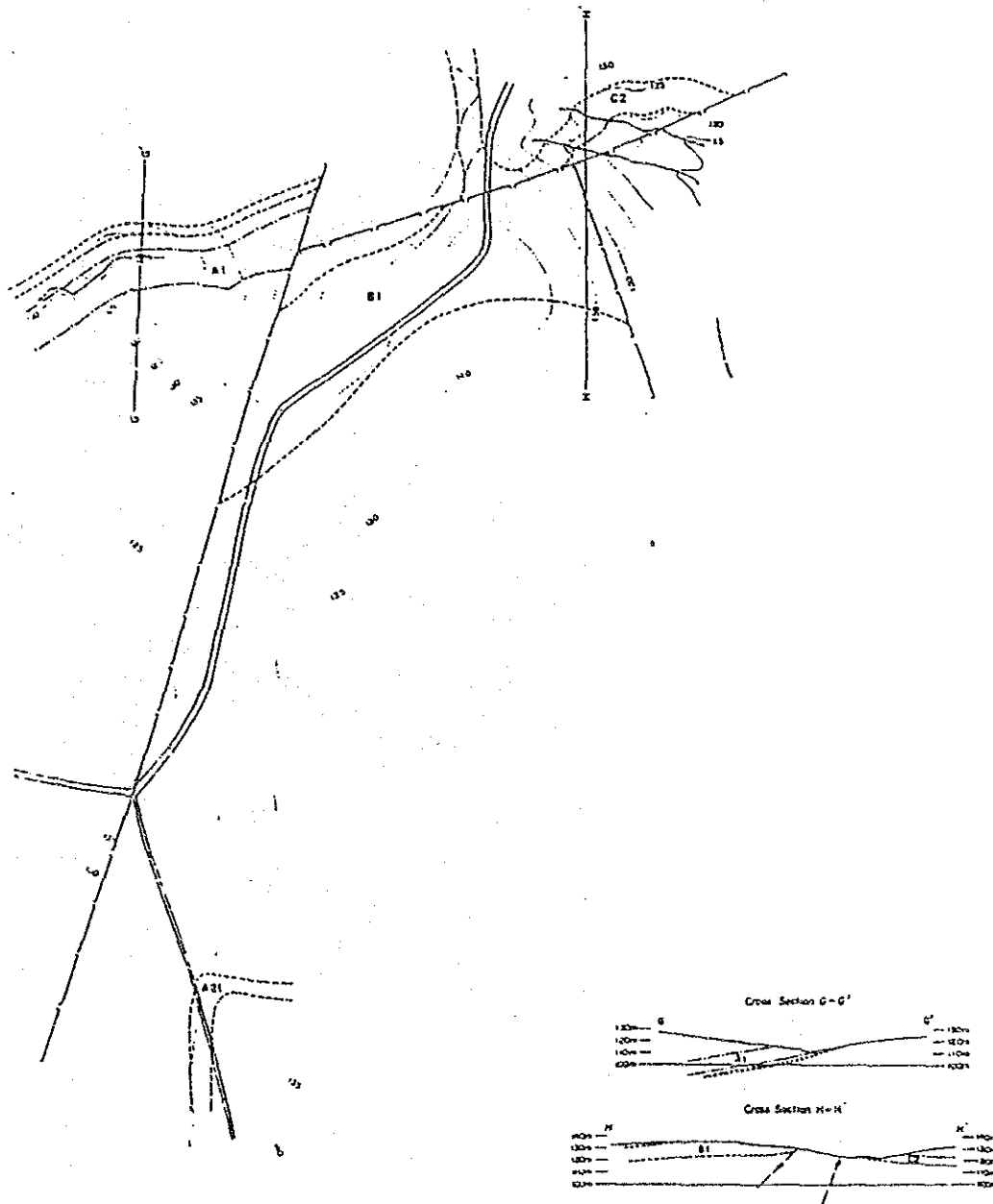


- LEGEND**
- □ □ □ □ Coal Deposits
  - ▨ ▨ ▨ ▨ ▨ Coal (Heterogeneous)
  - ▩ ▩ ▩ ▩ ▩ Coal (Homogeneous)
  - ▧ ▧ ▧ ▧ ▧ Coal (Heterogeneous)
  - ▦ ▦ ▦ ▦ ▦ Coal (Homogeneous)
  - ▥ ▥ ▥ ▥ ▥ Coal (Heterogeneous)
  - ▤ ▤ ▤ ▤ ▤ Coal (Homogeneous)
  - ▣ ▣ ▣ ▣ ▣ Coal (Heterogeneous)
  - ▢ ▢ ▢ ▢ ▢ Coal (Homogeneous)
  - □ □ □ □ Coal (Heterogeneous)
  - ■ ■ ■ ■ Coal (Homogeneous)
  - ▟ ▟ ▟ ▟ ▟ Coal (Heterogeneous)
  - ▞ ▞ ▞ ▞ ▞ Coal (Homogeneous)
  - ▝ ▝ ▝ ▝ ▝ Coal (Heterogeneous)
  - ▜ ▜ ▜ ▜ ▜ Coal (Homogeneous)
  - ▛ ▛ ▛ ▛ ▛ Coal (Heterogeneous)
  - ▚ ▚ ▚ ▚ ▚ Coal (Homogeneous)
  - ▙ ▙ ▙ ▙ ▙ Coal (Heterogeneous)
  - ▘ ▘ ▘ ▘ ▘ Coal (Homogeneous)
  - ▗ ▗ ▗ ▗ ▗ Coal (Heterogeneous)
  - ▖ ▖ ▖ ▖ ▖ Coal (Homogeneous)
  - ▕ ▕ ▕ ▕ ▕ Coal (Heterogeneous)
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  - ▍ ▍ ▍ ▍ ▍ Coal (Heterogeneous)
  - ▌ ▌ ▌ ▌ ▌ Coal (Homogeneous)
  - ▋ ▋ ▋ ▋ ▋ Coal (Heterogeneous)
  - ▊ ▊ ▊ ▊ ▊ Coal (Homogeneous)
  - ▉ ▉ ▉ ▉ ▉ Coal (Heterogeneous)
  - █ █ █ █ █ Coal (Homogeneous)
  - ▇ ▇ ▇ ▇ ▇ Coal (Heterogeneous)
  - ▆ ▆ ▆ ▆ ▆ Coal (Homogeneous)
  - ▅ ▅ ▅ ▅ ▅ Coal (Heterogeneous)
  - ▄ ▄ ▄ ▄ ▄ Coal (Homogeneous)
  - ▃ ▃ ▃ ▃ ▃ Coal (Heterogeneous)
  - ▂ ▂ ▂ ▂ ▂ Coal (Homogeneous)
  - ▁ ▁ ▁ ▁ ▁ Coal (Heterogeneous)
  - ▀ ▀ ▀ ▀ ▀ Coal (Homogeneous)

MINISTER OF MINES, FEDERAL GOVERNMENT  
 THE GEOLOGICAL SURVEY OF CANADA  
 Geological Survey Map  
 Western Part of Central Banko Area (2)

Fig. 7-3-21'

Geological Survey Map, Western Part of Central Banko Area (3)



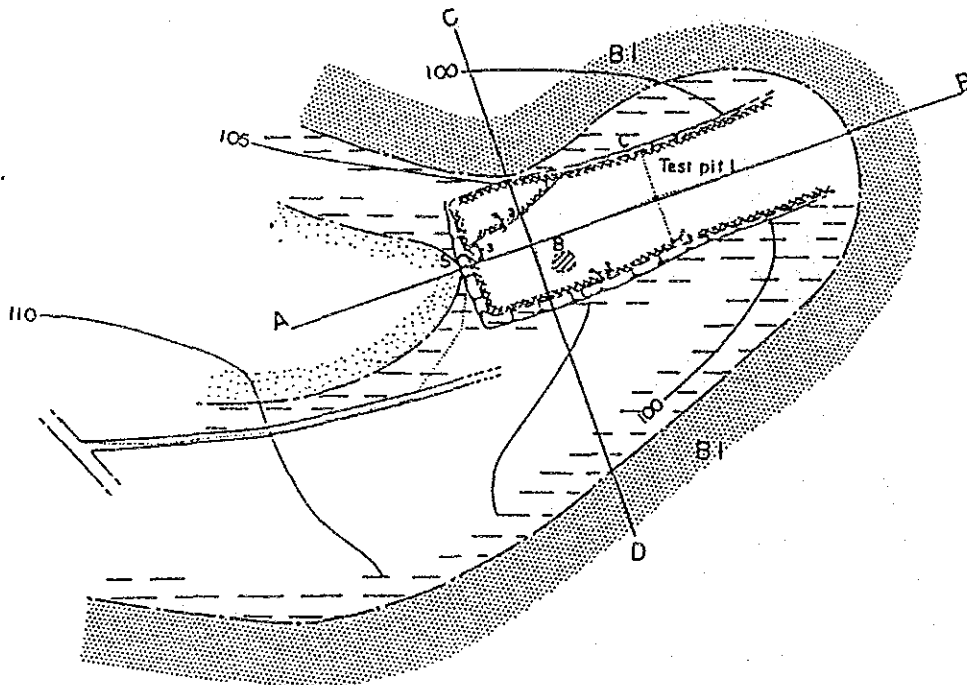
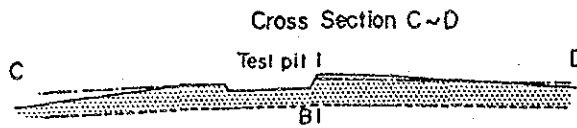
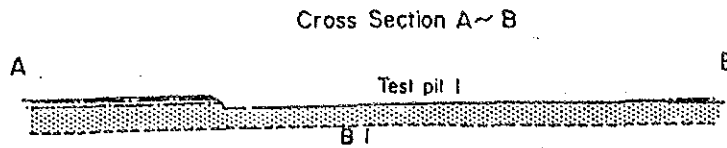
LEGEND

- |  |                     |  |                         |
|--|---------------------|--|-------------------------|
|  | Outcrop             |  | Contact line (see text) |
|  | Horizontal fault    |  | Dike                    |
|  | Normal fault        |  | Cross section           |
|  | Reverse fault       |  | Contour line            |
|  | Fault (unspecified) |  | Alluvial deposit        |
|  | Road                |  | Sandstone               |
|  | Water area          |  | Claystone               |

MINISTRY OF MINERAL RESOURCES AND TECHNICAL SURVEY OF INDIA		
GEOLOGICAL SURVEY OF INDIA		
Geological Survey Map		
Western Part of Central Banko Area (3)		
Scale	Sheet	
Date	Author	Drawn by

Fig. 7-3-22'

Geological Survey Map, Central Part of Central Banko Area



LEGEND

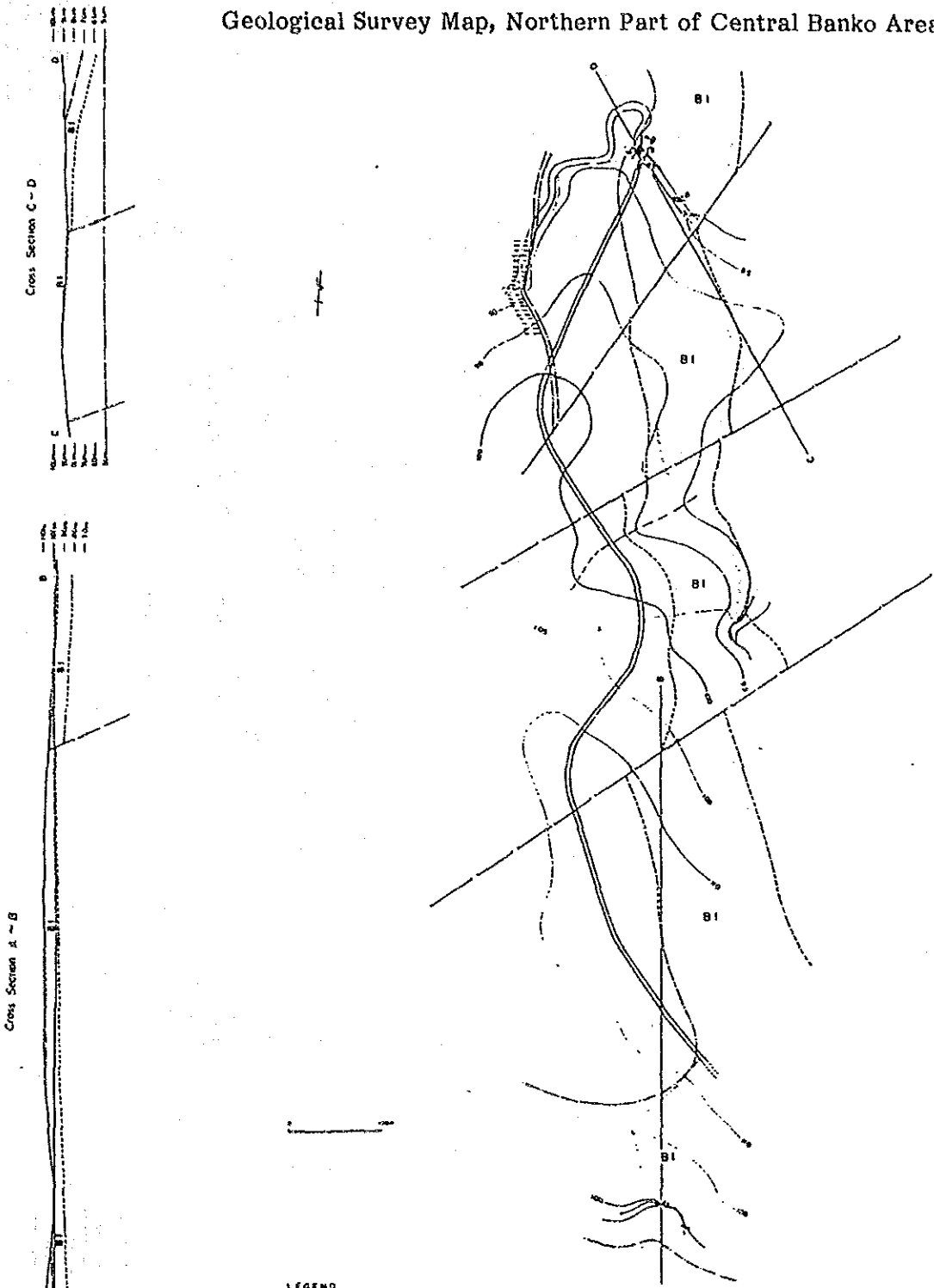
- |  |                                  |  |                             |
|--|----------------------------------|--|-----------------------------|
|  | Coal in Test Pit                 |  | Road                        |
|  | Carbonaceous Shale (B: Outcrop.) |  | Contour Line (5m Intervals) |
|  | Claystone (C: Outcrop)           |  | Survey Route                |
|  | Sandstone (S: Outcrop)           |  | Cross Section               |
|  | Bedding (Coal)                   |  | Coal Seam                   |
|  | Bedding (Other Rocks)            |  | B (Sub) Seam                |
|  | Boundary (Indicated)             |  |                             |
|  | Boundary (Inferred)              |  |                             |

JAPAN INTERNATIONAL COOPERATION AGENCY  
 (THE FEASIBILITY STUDY ON EFFECTIVE  
 UTILIZATION OF BANKO COAL)  
 Geological Survey Map  
 Central Part of Central Banko Area

Drawing No.		Scale	
Date	November, 1986	Prepared by	H. NOZAKI

Fig. 7-3-23'

Geological Survey Map, Northern Part of Central Banko Area



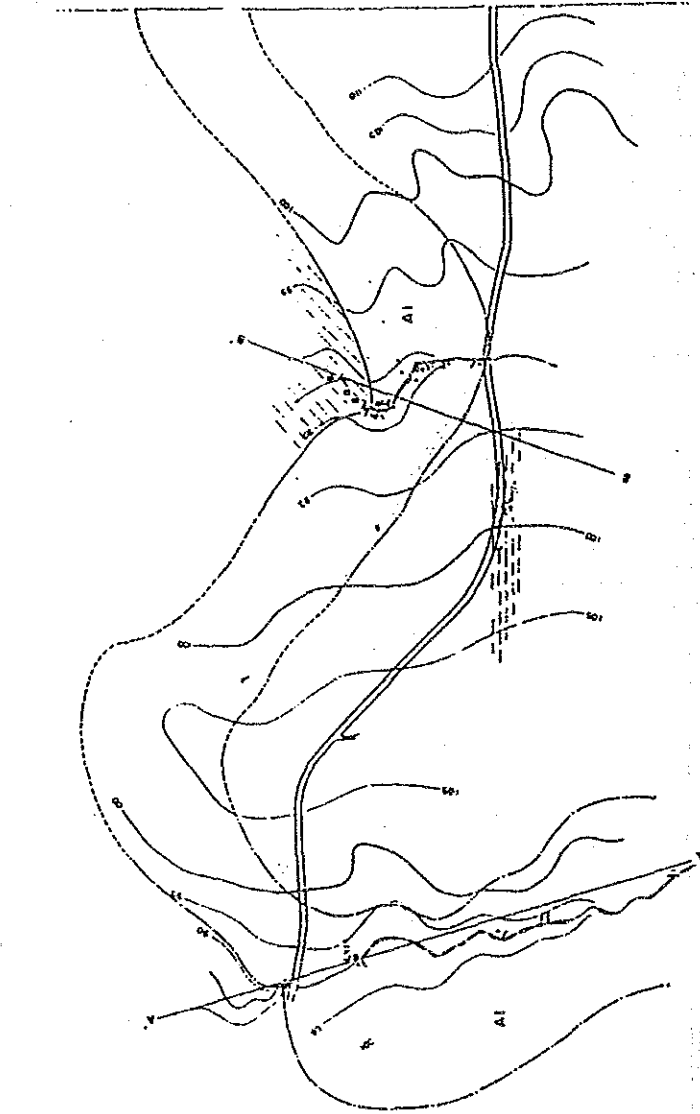
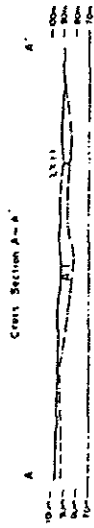
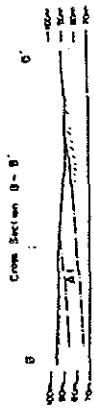
**LEGEND**

	Ore Quaternary		Fault (Surface)
	Crystalline Strata (Gneiss)		Spring
	Crystalline Strata (Schist)		River and Creek
	Conglomerate		General Land Use (Arable)
	Sandstone		Buried River
	Shale		Cross Section
	Sandstone (intermediate)		Coal Seam
	Sandstone (thin bedded)		B (Quaternary)
	Sandstone (massive)		
	Sandstone (intermediate)		

JAPAN INTERNATIONAL COOPERATION AGENCY  
 (THE FEASIBILITY STUDY ON EFFECTIVE  
 UTILIZATION OF BANDO COAL)  
 Geological Survey Map  
 Northern Part of Central Banko Area

Drawing No.	Scale
Date	Prepared and Issued by

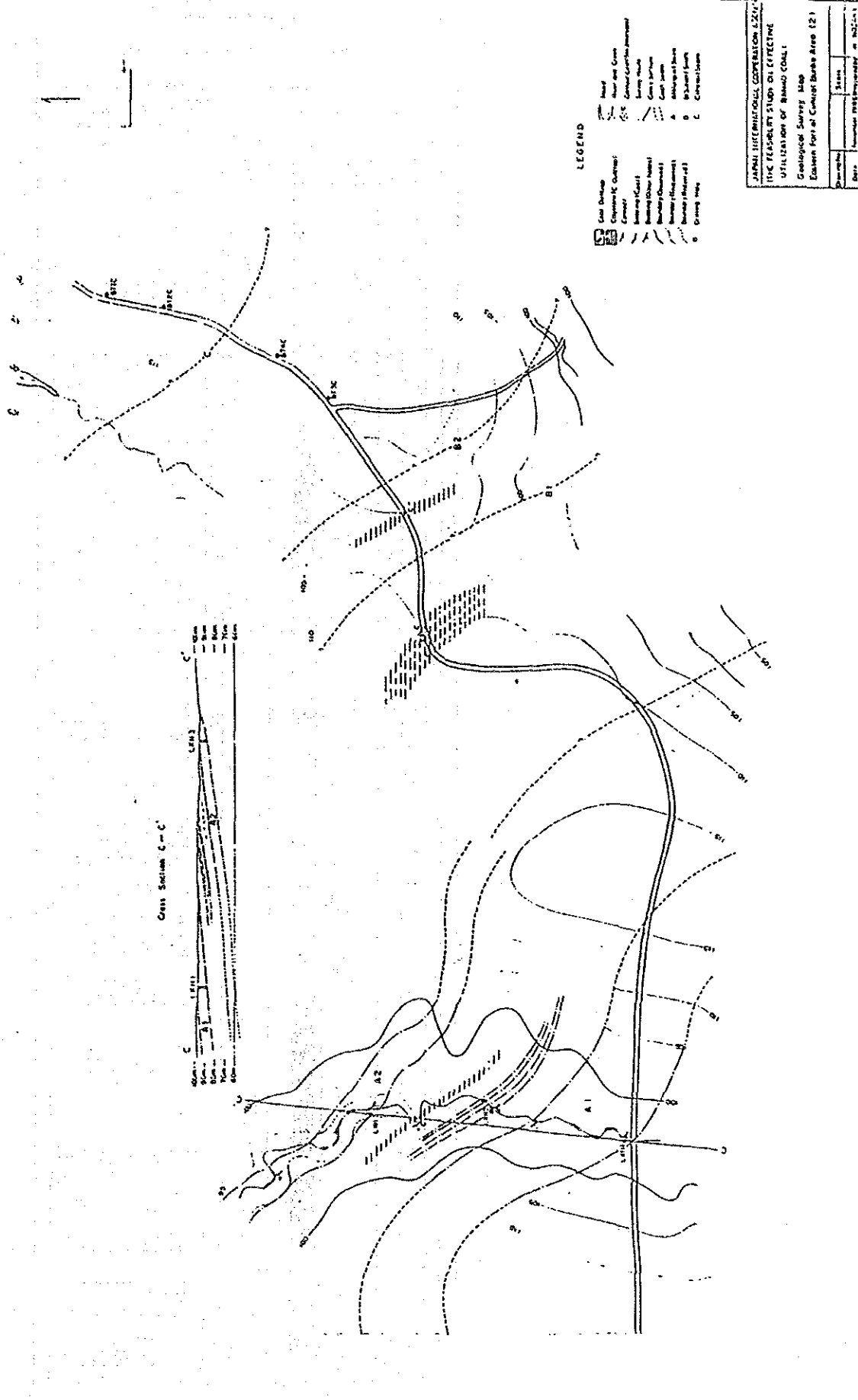
Fig. 7-3-24' Geological Survey Map, Eastern Part of Central Banko Area (1)



- LEGEND**
- Shaded Area
  - Contour Line
  - Road
  - Railway
  - Canal
  - Stream
  - Drainage
  - Boundary
  - Section Line
  - Well
  - Mine
  - Quarry
  - Hut
  - Village
  - Temple
  - Pagoda
  - Monument
  - Tower
  - Bridge
  - Ferry
  - Boat
  - Fish
  - Pig
  - Cow
  - Sheep
  - Horse
  - Ox
  - Donkey
  - Mule
  - Camel
  - Elephant
  - Tiger
  - Lion
  - Bear
  - Wolf
  - Dog
  - Cat
  - Pig
  - Sheep
  - Cow
  - Horse
  - Ox
  - Donkey
  - Mule
  - Camel
  - Elephant
  - Tiger
  - Lion
  - Bear
  - Wolf
  - Dog
  - Cat

JAPAN INTERNATIONAL COOPERATION AGENCY  
 THE FEASIBILITY STUDY ON EFFECTIVE  
 UTILIZATION OF BANAO COAL  
 Geological Survey Map  
 Eastern Part of Central Banko Area (1)

Fig. 7-3-25' Geological Survey Map, Eastern Part of Central Banko Area (2)





DIRECTORATE GENERAL OF MINES  
COAL BORE DEVELOPMENT PROJECT  
**BORE HOLE SUMMARY OF BUKIT ASAM COAL AREA**

BORE HOLE	EN 82	COORDINATE	ESTABLISHED	EXPLORED	MINER VERIFICATION
DATE PAID	SOUTH SURVEY	ELEVATION	1978	DRILLED BY	AGONG BANG
LOCATION	SEKAM BUKIT	TOTAL DEPTH	4570.4	STARTED	JANUARY 1978
SCALE	1:500	DEPTH RESOLUTION	100.00	COMPLETED	JANUARY 1978

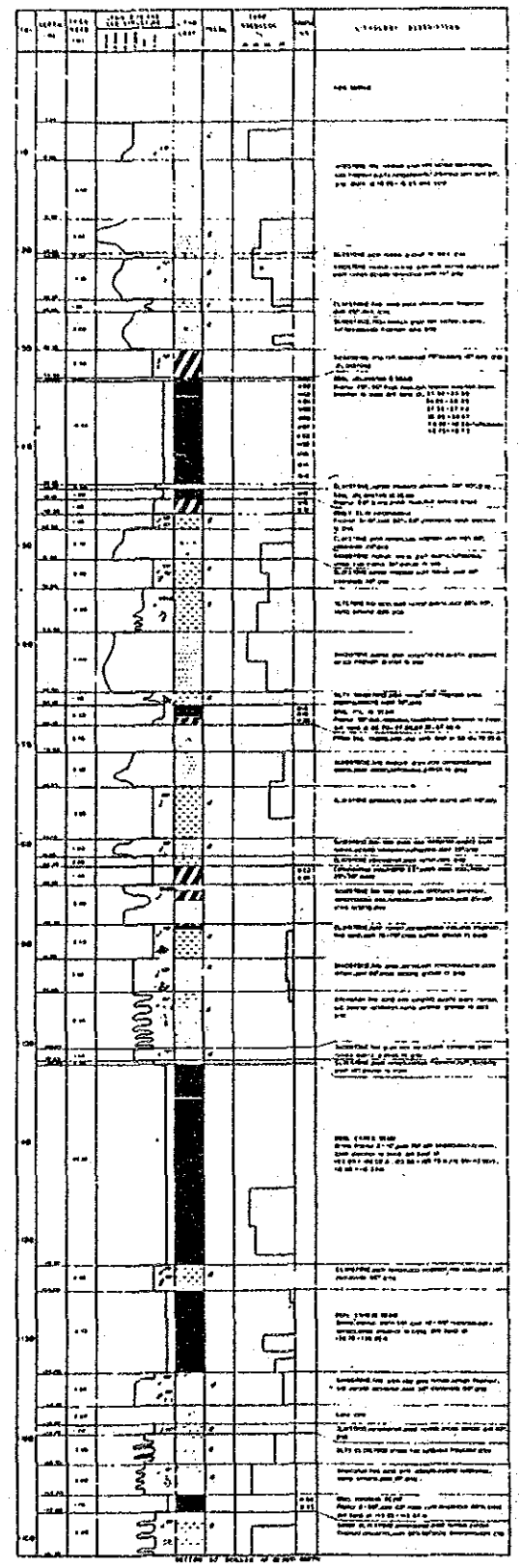


Fig. 7-3-26'  
An Example of Columnar  
Sections Prepared by DOC

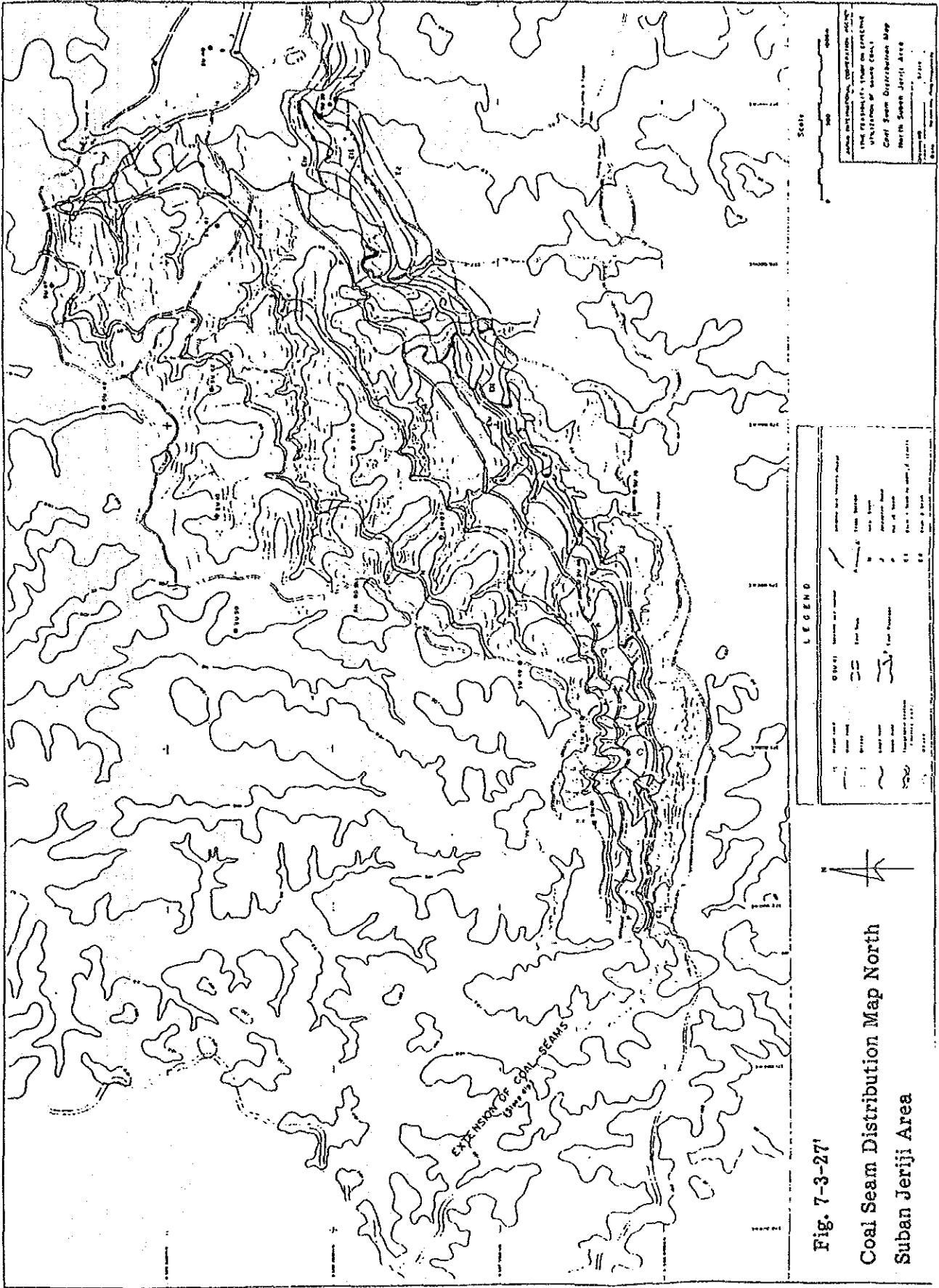
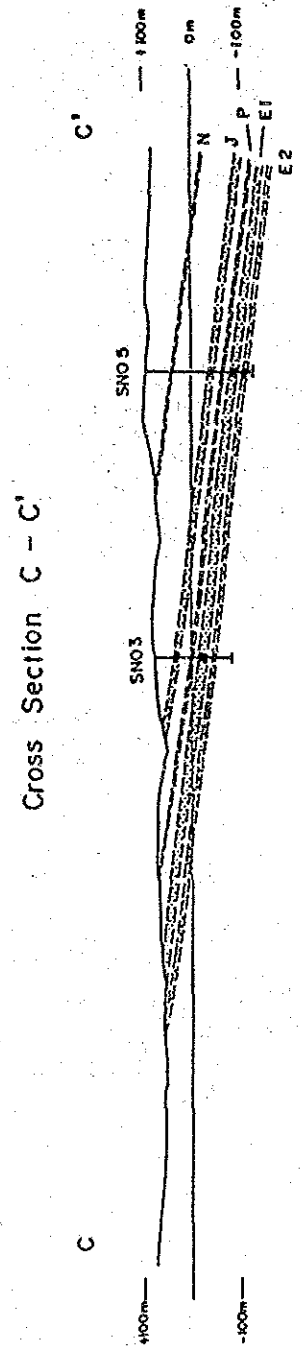
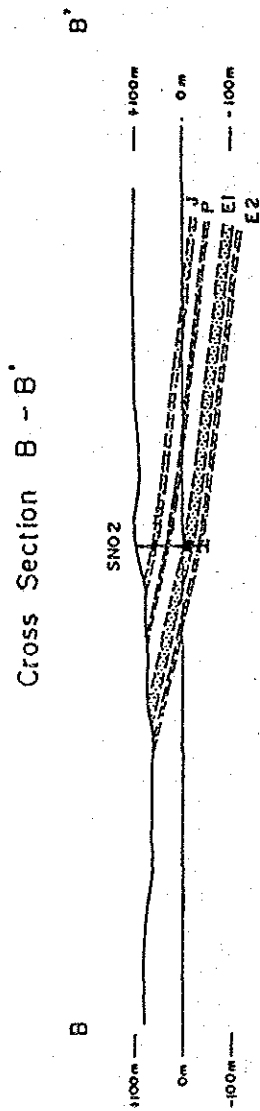
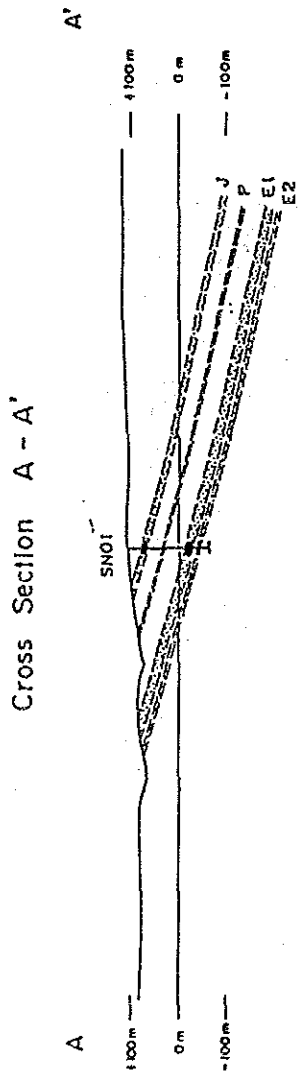


Fig. 7-3-27'

Coal Seam Distribution Map North  
Suban Jeriji Area

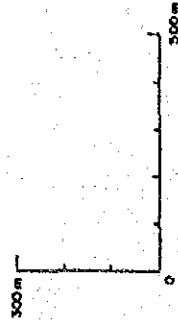
Fig. 7-3-28' Cross Sections A, B and C, North Suban Jeriji Area



LEGEND

- Coal Seam
- N Niru Seam
- J Jelawatan Seam
- P Pal 10 Seam
- E1 Enim 1 Seam (u: upper, l: lower)
- E2 Enim 2 Seam
- Borehole and Coal Seam Confirmed

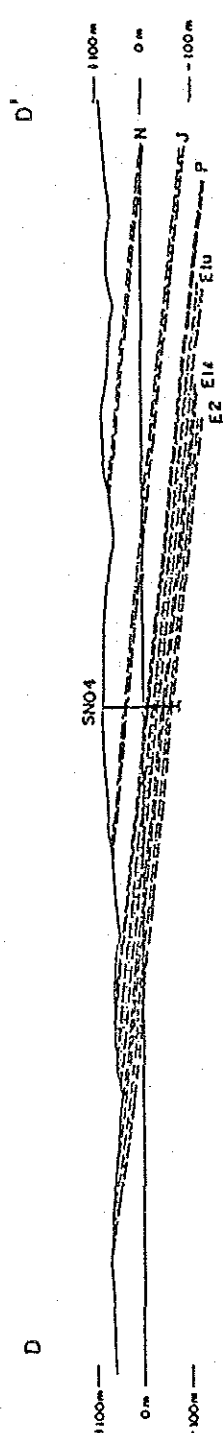
Scale



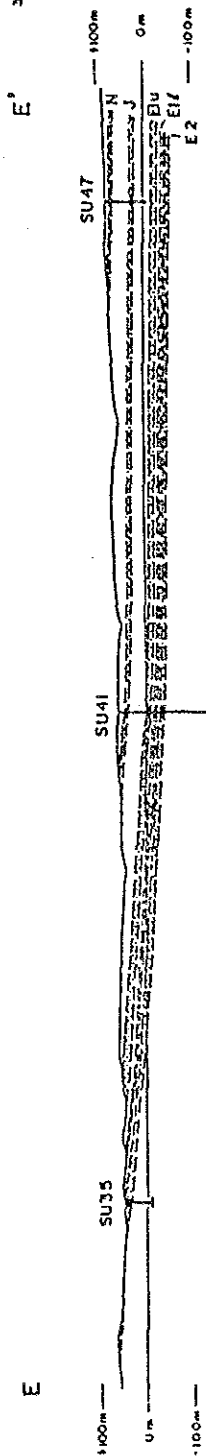
Japan International Cooperation Agency  
 THE FEASIBILITY STUDY ON  
 EFFECTIVE UTILIZATION OF  
 BANKO COAL  
 Cross Sections A, B and C  
 North Suban Jeriji Area

Fig. 7-3-29' Cross Sections D and E, North Suban Jeriji Area

Cross Section D - D'



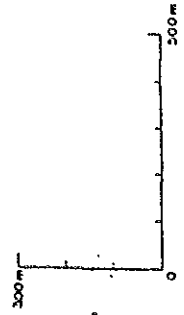
Cross Section E - E'



LEGEND

- Coal Seam
- N Niru Seam
- J Jelawatan Seam
- P Pat 10 Seam
- E1 Enim 1 Seam (upper, /: lower)
- E2 Enim 2 Seam
- Borehole and Coal Seam Confirmed

Scale



Japan International Cooperation Agency	
THE FEASIBILITY STUDY ON EFFECTIVE UTILIZATION OF BANKO COAL I	
Cross Sections D and E	
North Suban Jeriji Area	
Working No.	Scale
Date	Prepared by
Nov. 1986	H. NOZAKI



**ATTACHMENT 8-1**

	<b>Page</b>
<b>1. Technical Specification for Erection Work</b>	<b>47</b>
<b>2. Request for Quotation</b>	<b>59</b>



## **1. Technical Specification for Erection Work**





## Technical Specification for Erection Work

### 1. Mechanical Work

#### (1) General

- 1) The Contractor shall install the plant always bearing in mind that the plant after completed will function most satisfactorily.
- 2) The Contractor shall always use his best expertise in carrying out the installation work.
- 3) The installation process, installation procedure, welding procedure, piping procedure, painting procedure, inspection standard and so on, which are necessary for the erection work will be informed by the Consultant with drawing or documents principally.
- 4) The Contractor shall give a notice to the Consultant immediately after occurrence of any unexpected trouble while performing the works.
- 5) The Contractor shall ensure that the tools and measuring instruments shall be handled by skilled workers well acquainted with the mechanism and function of such tools and instruments.
- 6) All tools and measuring instruments for the installation work shall function properly and shall be checked at regular intervals and maintained in good condition.
- 7) Existing overhead crane in the building shall be available for the erection of the plant.
- 8) Temporary facilities and services (electrical power, air and water, etc.) necessary for erection of the plant shall be available at the battery limit.

#### (2) Preparing for Installation

- 1) The Contractor shall visually examine to see if the floor is sufficiently dry and free from cracks.  
Moreover, the Contractor shall visually inspect all anchor bolt holes to ensure absence of foreign matters which, if found, shall be removed.

- 2) The contractor shall confirm, together with the Consultant's and Supplier's, datum line and datum levels, for deciding to the levels, positions and direction of the plant to be installed.
- 3) Temporary bench marks shall be fixed by the Contractor on the floor surface for the identification of the accurate level of equipment to be installed.
- 4) Permanent bench marks and permanent center marks shall be fixed by the Contractor.  
The Permissible tolerances in levels of bench marks shall be +1.0 mm from the datum levels.

(3) Installation of Machines

1) Alignment of Machines

- a) Prior to the installation of machines, the lower part of machines and the top surface of the floor shall be thoroughly cleaned so as to be free from rust preventive paint, oil grease, dust, etc., and covers of anchor holes and foreign materials in the anchor bolt holes shall be removed.
- b) Positioning of machines shall be determined using bench marks and center marks.  
The Contractor shall carry out the alignment.
- c) Grouting for the anchor bolt hole shall be carried out always after temporary alignment of machines.
- d) After the grout in the anchor bolt holes has completely hardened, the anchor bolts shall be tightened and the final alignment shall be made.
- e) The final inspection of alignment shall be made generally in presence of the Consultant's and Supplier's Supervisor, the results of which shall be submitted to the Consultant for his approval.

## 2) Assembling of Machine Parts

- a) Each machine shall be assembled in compliance with drawings and documents.
- b) Where required, rust preventive paint and/or oil coated at the shop must be thoroughly washed of, prior to be the assembling at the site, and any rust, foreign matter, etc., if found, must be removed.
- c) During the site assembling of the machine, special attention must be paid to the matchmarks.
- d) Seals, gasket and the like shall be set at the correct positions and shall be tightened uniformly.
- e) Wood, synthetic resin, copper hammer, etc. shall be used for insertion of parts in assembling.
- f) In the handling of parts during assembling, care shall be taken for the following:
  - In the lifting of temporary storage of heavy and long items, no strain must be generated.
  - In temporary storage of parts, suitable blocks shall be provided.Precision parts in particular must be protected with a cover provided.

## (4) Field Bolting

Unless stipulated otherwise in the drawing, the tightening of bolts at the site shall be performed as stated below. Field connection of other materials if required shall also be in accordance with the drawings or the Consultant's specific instruction.

- 1) Tools used shall be suitable for the dimensions of bolts and nuts and the tightening work.
- 2) The tightening force shall be determined by the Contractor referring to appropriate standards and a most suitable method shall be selected such as torque wrench, turn-of-nut or bolt elongation, etc.
- 3) The Contractor shall submit to the Consultant for prior approval a proposal for the method and operating procedure of such tightening work.

4) Flushing work for piping shall be performed by the Contractor according to the provisions Japanese Standards, drawings and documents.

Prior to flushing work, instruments and control valves, etc. shall be removed and short pipes and/or hoses shall be installed for the portion of instruments and control valves, etc.

Short pipes and/or hoses and other necessary equipment and materials for flushing work shall be provided by the Contractor according to the provisions of the drawings and documents.

(2) General Precautions

In carrying out piping work the Contractor shall be fully aware of piping systems, pressure, flow amount, temperature, fluid characteristics in order to prevent any accidents which may result from defective work.

(3) Pipe Work

1) Pipes shall, as a rule, be cut mechanically by means of pipe cutters, pipe gas cutters, high-speed cutters or the like.

2) Bevels for welding shall be cut as accurately as possible in accordance with the drawings.

3) Cut faces and bevel faces shall be free from cracks, flaws or slags.

4) Welding

Prior to welding, surfaces to be welded shall be completely cleaned to be free from such detrimental objects as rust, oil grease, etc.

Welding shall be in accordance with JIS standards.

Pipe jointing except by welding:

a) Threads shall be cut by threading machines which shall be provided by the Contractor.

b) Compounds or Teflon seal tapes shall be used for screwing and rejoining, except when a seal weld is specified, and these materials shall be provided. Packing such as hemp, jute, etc. shall not be used for

(5) Inspection

- 1) Upon completion of the alignment work of each equipment and before grouting, the Contractor shall carry out an alignment inspection which shall generally be witnessed by consistent with drawings and documents.

The Contractor shall not proceed to further work without the said inspection.

- 2) After inspection of equipment, the Contractor shall carry out the final inspection, generally in presence of the Consultant's or Supplier's Supervisor.

In the final inspection, the Contractor shall inspect and measure main parts of equipment and ensure that the equipment has been correctly assembled and installed with satisfactory accuracy.

Due care of the following in particular shall be taken.

- a) Condition of bolts as tightened particularly those subjected to vibration.
- b) Lubrication of where friction and rotating motions take place.
- c) Should any defects be detected during the final inspection, the Contractor shall repair the defects so that they will not pose any hindrance to the subsequent tests and testing, etc.
- d) The Contractor shall submit without delay a written report on the final inspection results to the Consultant for approval.

2. Piping Work

(1) General

- 1) This specification covers the general requirements for installation of all piping and piping system at the site.
- 2) Piping system covered herein are for fluids such as oxygen, nitrogen, LPG, compressed air, cooling water, oil and pulverized coal, etc.
- 3) Piping materials shall be prefabricated by the Client prior to shipment.

screwing.

Projection of seal tape to internal pipe shall be avoided.

- c) After pipes have been screwed in screw type flange, pipe edges shall be flush with the flange surface.

If pipe edges project from the flange surface such edges shall be finished by a grinder or file without damaging flange surfaces.

In all cases, screwing less than the specified length of thread engagement shall be avoided.

### 5) Flushing for Piping

#### General:

The flushing work shall be to clean the inside of pipes by removing rust and other foreign matters.

All equipments and materials necessary for flushing work shall be provided by the Contractor.

Flushing oil, if required, shall be disposed most carefully.

The used oil shall be disposed in an appropriate manner off the site.

### 6) Inspection & Testing at the Site

All pipe works installed at the site prior to flushing shall be air pressure tested by the Contractor.

The test pressure shall be maintained for more than one hour.

## 3. Electrical Work

The electrical installation shall be complete in all respects and any item not included in the specification but essential for proper installation and functioning of the electrical system shall be deemed to be included in the scope of the specification whether specifically mentioned in this specifications or not.

(1) Conduit

- 1) Exposed conduit shall be installed either parallel with or perpendicular to structural members, unless impractical, and grouped wherever possible.

Conduits shall have a sufficient number of supports to structure framework by means of approved pipe straps, brackets, racks or other approved means.

- 2) Where all thread nipples are used between boxes and electrical equipment, they shall be installed so that no treads are exposed.

- 3) Conduit attachment to all electrical equipment including junction boxes, pull boxes, switches, push button stations, starters, etc., shall be made by the use of double steel locknuts.

Threaded insulated bushing shall be used on the end of each conduit terminating in such equipment.

- 4) Conduit will be cut square and reamed.

Joint will be coated with an electrical conductive sealant, and screwed tight to a shoulder in fittings and bushings to complete a continuity bond.

- 5) At the switchboard end, threaded insulated bushings for power and control conduits shall be installed.

For power conduit 1 1/2" and larger, an installed washer drilled with the correct size holes for the individual power conductors shall be installed.

- 6) Conduit shall be protected immediately after installation by means of installing flat non-corrosive metallic discs and steel bushings at each end.

Discs shall not be removed until it is necessary to clean conduit and pull cable or wire.

- 7) Prior to pulling in cables, each conduit shall be thoroughly cleaned inside by pulling a wire brush cleaner and then a swab through the conduit to remove all sand and particles of concrete.

- 8) No more than the equivalent of three 90 degree bends will be placed in any one conduit run.

Field bent, with approved tools, or factory bent elbows may be used on circuits 1000 volts and below.



- 9) Heating of conduit to facilitate bending is prohibited.
- (2) Pullboxes, Junction Boxes and Supports
- 1) Pullbox shall be provided on all conduit runs exceeding 200-ft. and at a maximum of 200-ft. intervals.
  - 2) All pullboxes, junction boxes, cabinets, switches and other electrical equipment shall be solidly supported prior to installation of conduit.
  - 3) Holes for necessary conduit shall be made in each pullbox, junction box, cabinet, switch or other enclosure.
  - 4) Pullboxes, junction boxes and enclosures shall be surface mounted, set true and plumb and shall be secured rigidly to the building or supporting steel or masonry walls.
- (3) Cable Racks
- 1) Cable racks shall be installed either parallel with or perpendicular to structure members and shall be rigidly secured to structure steel, supporting steel, concrete slabs or masonry walls.
  - 2) Cable rack supports shall be installed at 0'0" centers or less.
  - 3) All cables or wire shall be lashed to the rungs of the cable trays on all vertical runs and at all points of taken-off or entry.
  - 4) All cables or wires placed in cable racks shall be aligned to make a neat looking installation.
  - 5) All cable or wire take-offs from cable racks shall be supported in such a manner as to make a neat rigid installation.
- (4) Wiring
- 1) Once a cable having paper or V.C. insulation is opened preparatory to splicing or terminating, the splicing or terminating shall proceed immediately and continue uninterrupted until completed.
  - 2) All cable or wire take-offs from cable racks to conduit shall be supported in a manner so they will not rub the sides of the rack.

3) All equipment requiring control wiring must be wired with multiconductor color coded control cable.

4) Control cable through five conductor will be installed in 1" conduit.

Control cable of six conductor and above will be installed 1 1/4" conduit.

Control cable shall be run separate to power cables.

5) Circuits of different voltage shall not be included in one conduit or cable.

All lighting circuits shall be run in conduit separate from equipment and control circuits.

6) When cables are laid at the high temperature places, trays, duct and racks shall be protected by sheet steel covers, asbestos and so on.

7) Where there is a possibility of mechanical damage, cable trays, ducts, racks shall be protected by sheet steel covers.

8) In general, wires and cables for instruments except instrument panel shall be as follows:

USE	WIRES and/or CABLES
Instrument signal	600 V grade PVC insulated and sheathe control cables with copper shield tape. 2.0 mm <sup>2</sup> or above
Control signal	600 V grade PVC insulated and sheathed control cables. 2.0 mm <sup>2</sup> or above
Thermocouple line	Compensating lead wires

#### (5) Instrument Piping

1) Tap hole for pressure and/or differential pressure of Vena-contracta tapes orifice, in general, shall be 12 mm diameter, and tape tubing to be welded to tap hole shall generally be 100 mm long and 21.7 mm outer diameter.

2) Tap tubing from tap tubing with process isolation valve to instrument such as pressure and/or differential pressure transmitter shall be 21.7 mm outer diameter.

3) Tubing for pressure and/or differential pressure shall generally be carbon steel pipes.

Material of tubing shall be selected in accordance with process requirements.

4) Pneumatic control lines shall be 6 mm inside diameter and 8 mm outside diameter, copper tubing.

(6) Grounding

1) Grounding conditions shall have the following sizes:

EQUIPMENT	CONDUCTOR SIZE
Motor below 3.7 kw	5.5 mm <sup>2</sup> or above
7.5 kw	8.0 mm <sup>2</sup> or above
15.0 kw	14.0 mm <sup>2</sup> or above
37.0 kw	22.0 mm <sup>2</sup> or above
above 37.0 kw	38.0 mm <sup>2</sup> or above
High voltage	38.0 mm <sup>2</sup> or above
Main line of grounding	100.0 mm <sup>2</sup> or above
Low voltage panel	5.5 mm <sup>2</sup> or above

2) Grounding conductors shall be laid in such a manner as not to touch other cable and conductors.

3) The earthing electrodes for the following equipment shall be installed separately from the ones for motors and motor control to avoid malfunction of the equipment.

EQUIPMENT	EARTHING RESISTANCE
PLC	less than 10 ohm
Thyristor unit (Induction heater)	less than 10 ohm

(7) Tests

1) Contractor shall perform test to insure the workmanship, methods, inspection and materials used in the erection and installation of the equipment.

He shall provide all necessary test equipment and provide reasonable cooperation to manufacturer's representatives who will witness the test.

2) All test shall be scheduled by the Contractor and cleared by the Owner's engineer.

No testing shall be performed without this clearance.

- 3) The Owner will approve final acceptance of the power wiring when all wiring considered as a complete system functions to operate all connected electrical equipment in the proper manner.
- 4) Upon completing wiring works, the following tests and inspections shall be made before energizing cables and wires.
  - a) Measurement of earth resistance
  - b) Measurement of insulation resistance
  - c) Check of phase rotation
  - d) Check of cable connection
  - e) Others
- 5) After completing the above tests and inspections, the Contractor shall furnish four copies of all test data. If, in the opinion of Engineers, test results shown improper performance and such deficiencies are due to negligence or unsatisfactory installation by the Contractor, the Contractor shall furnish all labor and materials required to remedy the situation to the satisfaction of the engineer.
- 6) During no load and load test, the Contractor shall keep several reliable men on duty to repair, adjust or modify.



## **2. Request for Quotation**



REQUEST for QUOTATION

Date Issued: th June 1986

Inquiry No. MP6-002

Dear Sirs.

We, Japan International Cooperation Agency INDONESIA Office (hereinafter called JICA), request you (hereinafter called Bidder) to quote in accordance with the applicable documents hereunder specified (hereinafter called Basic Documents), the fixed lump sum price (hereinafter called Price) in ten (10) copies valid for 90 days for the following construction of the Coal Gasification Test Facilities, to be installed in SERPONG OF INDONESIA provided that, it will be understood that unless exceptions, deviations or alternatives are clearly defined and listed separately, the Basic Documents will be deemed to be accepted by Bidder.

1. Scope of Work

Construction of the coal gasification test facilities in the existing pilot plant building at SERPONG OF INDONESIA.

Please refer the attached Requisition No. MP6-002.

2. Basic Document

Requisition No. MP6-002.

Project Specification No. MP6-002.

3. Schedule

Supply of equipment and materials — the end of September, 1986

Mechanical completion — the end of January, 1987



#### 4. Supervisory Services

Not required.

#### 5. Payment Term

The payment will be carried out in Rupiah in cash within 1 (one) month after JICA receives the Bill which will be issued by the Contractor on or after the date of Completion of Construction.

The date of Completion of Construction shall be regarded as that on which the work has passed the mechanical test.

#### 6. Closing Date

12:00 Noon on 15th July 1986.

#### 7. Others

Quotation shall be written by English and submitted with one original and ten copies.

#### 8. Note

1) This is not an order.

2) The inquiry number must be clearly indicated in quotation and documents attached hereto.

3) JICA reserves the right to accept other than the lowest quotation and to accept or reject any quotation in whole or in part.  
Unless otherwise described herein, the cost of preparation for quotation shall be borne by Bidder.

4) Bidder who declines submitting a quotation or unsuccessful bidder shall return all the documents for inquiry purpose issued by JICA.

5) Quotation and any correspondence thereof shall be addressed to  
JICA, INDONESIA.

JICA, INDONESIA  
Assistant Resident Representative  
Mr. SUMIO AOKI

Japanese Embassy Compound  
Jl. Thamrin 24, Jakarta

TELEX : 44198 JICA IA  
TELEPHONE: 326818, 322387, 324247, 321394

Yours very truly,

JICA, INDONESIA

Hideo Endo  
Resident Representative of Japan  
International Cooperation Agency  
Indonesia Office

## Contents of Technical Specification for Erection Work

- I Order Number            No.
- II Project Name            BANKO PROJECT , Plant Installation Work
- III Quantity                One Complete Set
- IV Date of delivery        Work completed : Jan.31th, 1987  
Test work completed : Mar.25th,1987
- V Place of delivery        The pilot plant Building Stage 1 in  
PUSPIPTEK, Serpong, Jakarta,  
The Republic of Indonesia

### VI Specifications

1. General Outline
  - (1) Weight for Erection work
  - (2) Work schedule
2. Plant outline
  - (1) Location
  - (2) Climate data
  - (3) Seismic design
3. Applied codes and standards
4. Scope of Estimation
  - (1) Main Work
    - A. Foundation Work
    - B. Installation work for each facility
      - a. Outline of all works
      - b. Work for each facility
        - (a) Main facilities
        - (b) Spare parts, and others
    - C. Utility Work
      - a. Outline of all works
      - b. Pipe work specification for each fluid
      - c. Valve list

D. Electrical and Instrument Work

- a. Scope of Work
- b. Battery limit of electrical instrument work
- c. Electrical equipment list (supplied)
- d. Instrument equipment list (supplied)
- e. Electric wiring materials list
- f. Instrument " "

(2) Temporary Work and others

(3) Materials for erection works

(4) Machines and tools for erection works

(5) Transportation

(6) Construction Insurance

(7) Test run

(8) Document presentation

A. Document presentation at the estimation

B. Document presentation during works

C. Document presentation after completion

5. Out of scope

6. System of work responsibility

7. Responsibility, Guarantee

8. Technical regulations

(1) Order of Installation

(2) Outline of Welding

A. Outline of Welding

B. Recommendation of welding rod

C. Cautions

- (3) Outline of Painting
  - A. Necessary place of painting
  - B. Unnecessary place of painting
  - C. Outline of painting and coloring
- (4) Inspection and passing standard
  - A. Assignment of Work
  - B. Items of Inspection
- 9. Outline of test works
  - (1) Outline
  - (2) Organization of Test run
  - (3) Preparation for test run
  - (4) No-load test run
  - (5) Individual load tests
  - (6) Synthetic load test run
- 10. General matters
- 11. Construction acceptance
- 12. Accompanying documents

Specification for Election Work

I Order Number                      No.

II Project Name                      BANKO PROEJECT, Plant Installation Work

III Quantity                          One Complete Set

IV Date of delivery                  Work completed : Jan. 31th, 1987  
 Test work completed : Mar. 25th, 1987

V Place of delivery                  The pilot plant Building Stage 1 in  
 PUSPIPTEK, Serpong, Jakarta,  
 The Republic of Indonesia.

VI Specifications

1. Outline

This work is an installation work of BANKO Coal Gasfication Test Facilities that is constructed in PUSPIPTEK, Serpong, The Republic of Indonesia.

This contractor's works are opening of the packed facilities which had been transported there, arrangements, supplementation of acceptance, transportation in site, temporary laying, indoor foundation work, painting (only touch up), no-load test run, attendance of individual load test, attendance of synthetic load test run, cleaning, and so forth.

Detail informations are given afterwards.

(1) Weight for Erection work

	(ton)	(ton)	(ton)
	Main facilities	Spare Parts	Total
Packed Weight	abt 110	abt 24.7	abt 134.7
Installation Weight	abt 91.6	abt 22.3	abt 113.9

(2) Work schedule

Installation starts                  : Beginning of Oct., 1986  
 Installation completes              : End of Dec., 1986  
 Test run starts                      : Middle of Jan., 1987  
 Test run completes                  : Middle of Mar., 1987

2. Site information

(1) Location

The plant will be constructed in the pilot plant Building Stage 1 in PUSPIPTEK, Serperg, Jakarta, The Republic of Indonesia.

(2) Climate data (Indonesian data)

1) Ambient temperature

Daily maximum temperature	33°C
Yearly maximum temperature	31.5°C
Daily minimum temperature	21°C
Yearly minimum temperature	22.5°C
Daily normal/average temperature	24°C(at 07:00)
Daily normal/average temperature	30°C(at 13:00)
Daily normal/average temperature	26.5°C(at 18:00)

2) Relative humidity

Daily maximum humidity	96% (24°C at 07:00)
Daily minimum humidity	47%(32°C at 13:00)
Daily normal humidity	92%(at 07:00)
Daily normal humidity	62%(at13:00)
Daily normal humidity	79%(at18:00)

(3) Seismic design

$$F_e = kw$$

where,  $F_e$  = horizontal shear force  
 $k$  = seismic coefficient  
 $w$  = weight of the components

The "k" value is 0.2, as all the equipments are smaller than 16m and their specific period are shorter than 0.4 second.

3. Applied codes and standards

JIS, JEC, new JEM, Japanese code and standards

4. Scope of Estimation  
 (1) Main work  
 A. Foundation work

No.	Items	Qty. (set)	charge		Note
			Contractor	Indonesia	
1	Making holes for chemical anchor	one	o		Indoor foundation is concrete  already worked Including centering work
2	Mortar work	"	o		
3	Setting of base plate and chemical anchor	"	o		
4	Ground concrete	"		o	Including centering work
5	Making anchor holes for anchor bolts	"		o	
6	Mortar work	"	o		
7	Setting of base plate and anchor bolts	"	o		

Refer to accompanying documents (10) ANCHOR PLAN

B. Installation work for each facility

a. Outline of all works

No.	Item	Qty (set)	Contractor's charge	Note
1	Planning	one	o	Including rust remove        only touch up
2	Opening package & Checking, Keeping	"	o	
3	Liner adjustment	"	o	
4	Arrangement, fitting & finishing	"	o	
5	Cleaning	"	o	
6	Oiling	"	o	
7	Putting in order	"	o	
8	Miscellaneous works	"	o	
9	Painting	"	o	
10	Refractory lining work	"	o	
11	Air-conditioning work of central operation room	"	o	



b. Work for each facility

Installation of each facility should be referred to "installation outline chart". Details of installation should be followed by "handling notes" or "installation point book" supplied afterwards.

Installation outline chart

No.	Device	Installation position / method		Level adjustment	installation class
1	Flare stack	GL	direct hole (anchor flame)	straight liner	A
2	Indoor rotation device	GL	chemical anchor	straight liner	B
3	Structure, dust collector	GL	chemical anchor	Pad (non-shrink mortar) or straight liner	C
4	other GL installation	GL	hole in anchor	straight liner	D
5	Facilities needs accurate level adjustment like Lance elevator etc.	On the structure	Setting bolts	liner + shim	E
6	Bolting fastening besides Item 5	"	Setting bolts	straight liner	F
7	Weld fastening facilities	"	Welding	-	G
8	Fireproof material lining facilities	-	-	-	H
9	Others	-	direct setting	-	I

(Note)

- ° The number of straight liner should be arranged minimum, tap welding should be done for slipping prevention.
- ° Refer to accompanying documents (2)-(4)

## (a) Main facilities

No.	Machine Name	Q'ty (set)	Weight (ton)		Class	Welding	Painting	Note
			packed	naked				
1	Coal dryer	one	2.0	1.5	I	-	-	
2	Coal pulverizer	"	0.77	0.5	F	-	-	
3	Blow Tank	"	1.32	0.75	F	-	-	
4	Valve station & piping	"	1.78	1.17	F	o	o	For No.2 & 3
5	Transformer for Gasifier	"	1.42	1.12	C	-	-	
6	Pure water cooling unit	"	0.6	0.5	C	-	-	
7	Gasifier	"	3.36	3.05	E,H	-	-	
8	Melting furnace	"	2.0	1.5	F,H	-	-	
9	Oil unit	"	0.4	0.3	C	-	-	
10	Lining materials	"	2.0	1.8	-	-	-	For No.10 & 11
11	Accessaries	"	0.65	0.5	-	-	-	
12	Slag pot	"		1.38	-	-	-	set on No.13
13	Slag pot car	"	3.2	1.27	C,H	-	-	
14	Emergency pot	"	1.1	0.89	H,I	-	-	set on 1st floor "
15	Runner for pig iron	"	0.8	0.65	H,I	-	-	w/caster
16	Main lance	1		0.2	-	-	-	set on No.18
17	Sub-lance	1	0.5	0.02	-	-	-	set on No.19
18	Main lance elevator	"	2.4	1.9	E	-	-	
19	Sub-lance elevator	"	1.7	1.3	E	-	-	
20	Skirt hood	"	6.7	5.2	E,H	-	-	Oil unit included
21	Duct with water cooling jacket	"	3.5	2.7	F	o	o	
22	Dust chamber	2	0.15	0.11	I	-	-	
23	Dust collector & Cyclone	"	0.75	0.55	F	-	-	
24	Induced draft fan	"	0.6	0.46	B	-	-	
25	Flare stack	"	3.6	2.75	A	o	o	outdoor
26	Burner, Fan	"	0.39	0.3	B,G	o	o	
27	Hood & Duct	"	6.0	4.65	G	o	o	

Total 47.69 37.02

No.	Machine Name	Q'ty (set)	Weight (ton)		Class	Welding	Painting	Note
			packed	naked				
28	Dust collector & Fan	one	2.6	2.05	B,C	-	-	
29	Main lance deck	"	1.4	1.1	F	o	o	
30	Structure, Control room , etc.	"	40	35	C,G	o	o	
31	Cylinder coll- ected equipment	"	1.3	1.0	D	-	-	Outdoor
32	Air conditioner & cooling tower	"	1.3	1.0	D	-	-	"
33	Castable refractories	"	2.1	1.9	-	-	-	For No.16, 17,18,19
34	Electrical & instrument items	"	12.3	11.05	-	-	-	
35	Engine pump & pipes	"	2	1.5	D,I	o	o	

Total 63 54.6

Grand total 110.7 91.6

## (b) Spare parts, and others

No.	Facility Name	Q'ty (set)	Weight (ton)		Class	Welding	Painting	Note
			packed	naked				
1	Fork lift	one	7.2	7.2	I	-	-	no packing
2	Auxiliary(No.1)	"	2.1	1.6	I	-	-	lance, slag pot
3	" (No.2)	"	1.1	0.9	I	-	-	lance chip
4	Tools	"	1.3	1.0	I	-	-	
5	Fireproof materials for Gasifire (spare)	"	11	10	I	-	-	
6	Fireproof materials for M.F. (spare)	"	2.0	1.6	I			no opening

Total            24.7    22.3

C. Utility Work

Piping works for each facility (O<sub>2</sub>, N<sub>2</sub>, Compressed air line, cooling water, LPG)

a. Outline of all works

No.	Item	Q'ty (set)	Charge		Note
			Contractor	Indonesia	
1	Planning	one	o		
2	Opening, supplementa- tion of acceptance	"	o		
3	Measuring of plant site	"	o		
4	Processing of pipes, finishing	"	o		Only dimension line adjustment
5	Welding of pipes	"	o		
6	Setting of piping support	"	o		
7	Repairing of pipes	"	o		
8	Flashing, Blowing	"	o		
9	Pickle, degrease	"	o		
10	Airtight test	"	o		
11	Ventilation, turning on fluid turning on electricity	"	o		
12	Setting of Valves	"	o		Oiling of cylinder valve's oiler included
13	Wiring & Installation of Electrical Equipments	"	o		
14	Cleaning	"	o		
15	Putting in order	"	o		
16	Miscellaneous works	"	o		
17	Painting	"	o		touch up & processing parts in site only
18	Remodeling of Flow detector	"	o		
19	Primary piping & Wiring work	"	o	o	Flow detector
20	Building of gas cylinders' house	"		o	Refer to 5. Out of scope
21	Piping around the engine pump	"	o		For emergency
22	Setting of N <sub>2</sub> , O <sub>2</sub> , LPG Cylinders	"		o	
23	Installation of Oil unit accumulator	"	o		
24	Oiling	"	o		supplied by Indonesia

(Note 1) Fluid name of pipes and flow signs for piping should be charge of Contractor.

b. Piping work specification for each fluid

No.	Fluid name	Pressure (MAX) kg/cm <sup>2</sup> G	Bore (A)		Materials	Connection		Blow	in*m
			Max	Min		in BL	on BL		
1	O <sub>2</sub>	9.9	20	15	SUS304 <sup>TPS</sup> (sch40)	socket weld	flange	N <sub>2</sub> blow after cleaning with CCl <sub>4</sub>	200
2	Pulverized coal + N <sub>2</sub>	9.9	20	10	SUS304 <sup>TPS</sup> (sch80)	flange	flange	N <sub>2</sub>	25
3	N <sub>2</sub>	9.9	25	15	SGP	union	union	N <sub>2</sub>	200
4	LPG	2.0	20	20	SGP	union	union	N <sub>2</sub>	140
5	Air for combustion	600mmAq	80	32	SGP	weld- ing	over 65A =flange under 50A =union	Air	180
6	Make up water for air conditioner	2.3	32	20	SGPW	union	union	water	100
7	Cooling water	10	100	15	SGP	weld- ing	over 65A =flange under 50A =union	water	650
8	Compressed air	6	25	8	SGPW	union	union	air	200
9	Oil	70 80	20	10	STPG38 &SUS304 <sup>TPS</sup> (sch80)	socket weld	union	air	95

- (Note)
- ° Pipes inside of the structure area is only connection work in accordance with domestic prefabrication. Dimension adjustment parts and so forth should be worked in accordance with piping diagram which is supplied afterwards.
  - ° Dimension adjustment parts & proceed parts in site are not painted yet, so contractor should painted there after piping work.
  - ° Piping supports should be made in accordance with piping chart which is supplied afterwards.
  - ° Refer to accompanying documents (5).
  - ° Pipes outside of the structure area are handed as materials not processed.
  - ° Flushing should be done for each pipe.

c. Valve list  
 (Except Instrument valve and fitting valve in devices)  
 Bore and numbers of valve may be slightly changed later.

Valve name	pressure (JIS)	Bore	Fluid name											
			O <sub>2</sub>	*1	N <sub>2</sub>	LPG	*2	*3	*4	*5	*6	oil		
Safety valve	10K	20A	1	1										
		25A			1									
		8A									1			
		10A									2			
		15A				13	2				1	1	1	
Globe valve	10K	20A	1		11	7							8	
		25A			3									
		32A					2							
		40A								2				
		50A												
		100A										1		
		15A												6
Ball valve	210K	15A												
	10K	10A		4										
Needle valve	10K	15A			3									
		20A			1	2								
		32A					2							
		40A			1			1						
Check valve	10K	10A			4									
		15K			2									
		20A			1									
		15A			2	2						2		
Valve driven by Aircylinder	10K	20A	1		1	1								
		40A			1									
		100A			1						4			
Direct drive solenoid valve	10K	15A			1									
		40A									2			
		50A									1			
Pressure reducing valve	10K	15A			1								1	
		20A			1	1								
		25A			1									
Grand total			3	8	48	14	4	4		30	12	6		

- \*1 N<sub>2</sub> + Pulverized Coal
- \*2 Air for Combusion
- \*3 Make up water for Air conditioner
- \*4 Cooling water
- \*5 Compressed Air

D. Electrical and instrument work

a. Scope of work

All installation work for electrical and instrumentation equipment shown in the following table, lists and drawings shall be included in the scope of work.

No	Item	Qty (set)	Contractor's scope	Note
1	Erection of Electrical & Instrumentation equipment	one	o	Refer to the list of Electrical & Instrumentation equipment
2	Erection & wiring of Lighting, Receptacles and MCB boxes of welders for repair use.	"	o	
3	Erection of cable trays and racks	"	o	
4	Erection of conduit	"	o	
5	Piping	"	o	
6	Wiring	"	o	
7	Connection of cables and wires	"	o	
8	Grounding work including measurement of earth resistance	"	o	(Note 1)
9	Painting	"	o	
10	Measurement of insulation resistance	"	o	
11	Check of wire & cable connection	"	o	
12	No load test	"	o	
13	Sequence check	"	o	Attendance
14	Individual load test	"	o	"
15	Synthetic load test run	"	o	"

(Note 1) : The installation work for the independent earthing electrode for the following equipment shall be included in the scope of work.

- (1) For electrical equipment --- Earthing Resistance less than 10 ohm
- (2) For instrumentation-----"
- (3) For SCR Cubicle -----"
- (4) For Slag Analyzer-----"
- (5) For Iron Analyzer-----"



b. Battery limit of Electrical and instrument work

(a) Electric Power

The 380V 3 phase power is supplied from the power distributing panel PP-1B in the electric room at site. The Contractor shall include wiring work from the secondary terminals of MCB (630AF) in PP-1B to the test plant.

(b) Instrument Air

All wiring and all piping erection shall be included from outside of air compressor. Air compressor will be installed by Indonesia counterpart.

c. Electrical equipment list (supplies)

No.	Symbol	Name	Q'ty	estimate weight(kg)	note
1	CPI-1	Control panel	1 (one) set	300	
2	" -2	"	"	200	
3	OP 1	Operating console	"	150	
4	" 2	Local operating panel of lance	"	50	
5	" 3	Mimic panel	"	70	
6	" 11	Local operating box for Crusher & S.C.	"	3	
7	" 12	Local operating box for Rotary feeder	"	3	
8	" 13	Local operating box for Coil cooling valve	"	3	
9	" 14	Local operating box for Induced draft fan	"	3	
10	" 16	Local operating box for air fan	"	2	
11	" 17	Local operating box for Dust collector	"	2	
12	" 18	Local operating box for Slag pot car	"	3	
13	DP 1	380V power distributing panel	"	120	
14	" 2	200V "	"	50	
15	" 3	100V "	"	50	
16	TR 1	Transformer 100kVA 3 $\phi$ 380/210	"(pcs)	500	
17	" 2	" 10kVA 1 $\phi$ 380/105	"	50	
18	ENG	Engine generator 18kVA 380V	"	850	
19		Control panel for Flare stuck	1(one)set	100	
20		Power trans cubicle(Gasifier)	"	2,000	
21		SCR converter ( : " )	"	1,500	
22		Matching panel ( " )	"	1,000	
23		Control panel ( " )	"	200	
24		Control panel for Dust Collector	"	5	
25		" (Cyclone)	"	5	
26		Control Panel for coal dryer	"	10	
27		Interphone	1 complete set		
28		Lighting	"		
29		MCB boxes of welder for repair use	"		
30		Control Panel for engine pump	2 set	150	
31	OP-19	Local Operating Box for Gasifier Cooling Valve	1	3	
32		Control Panel for Cooling Tower	1	10	
33		MCB Box for Air Conditioner	1	3	

total (1)

abt 7,500kg

d. Instrument list (supplies) -1

No	Symbol	Name	Q'ty	estimate weight (kg)	Note
1		Instrument Panel	one	900	+ 40 <sup>l</sup> constructed in plant site
2		Gascromatgraph analyzer	"	120	
3		Standard gas bombe	three(pc)	63kg/pcs	
4		Gas Analyzer (O <sub>2</sub> /H <sub>2</sub> /CO <sub>2</sub> /CO)	one	600	
5		Air Dryer	one	500	
6		Water heater for Gascromatograph	one	140	
		total(2)		2,449kg	

d. Instrument list (supplies)-2

No.	symbol	Name	Q'ty (pcs)	estimate weight (kg)	Note
7		Field Transmitter			
		Pressure transmitter	6		
		Differential-pressure transmitter	6		
		Orifice plates	2		
		Vortex Flowmeter	4		
		Thermocouples	7		
		Resistance Thermometer	6		
		Load Cell	3		
		Local type pressure meter	6		
		" " temperature meter	3		
		Local type flow meter	7		
8		Control valve	3		
9		Personal computer	1 (set)		PC-9801 with Floppy desk and printer
10		Gas detector	6		Indicator: Instrument Panel included
11		Slag Analyzer JSX-60PX Shaking mill Water circulation pump			Step down Tr (with constructor)
12		Iron Analyzer EMIA-220 Compressor	1 (set)		Step down Tr (with constructor)
13		Attachment of off-line analyzer, Jaw crusher Mill, Automatic Mortar, shiver, oven	1 (set)		Details are referred to chart
Total				abt 1,200kg	
Grand total				abt 11,050kg	

e. Electric wiring material list

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLER	REMARKS
-	CABLE	600V CV	2sq x 3C			500 M	
-	"	"	3.5sq x 3C			200 M	
-	"	"	5.5sq x 3C			35 M	
-	"	"	8sq x 3C			170 M	
-	"	"	50sq x 3C			50 M	
-	"	"	60sq x 3C			15 M	
-	"	"	100sq x 3C			65 M	
-	"	"	200sq x 3C			40 M	
-	"	"	3.5sq x 2C			140 M	
-	"	"	5.5sq x 2C			155 M	
-	"	"	14sq x 2C			60 M	
-	"	"	38sq x 2C			10 M	
-	"	600 <sup>V</sup> CVV	2sq x 2C			500 M	
-	"	"	2sq x 3C			90 M	
-	"	"	2sq x 4C			300 M	
-	"	"	2sq x 6C			300 M	
-	"	"	2sq x 7C			80 M	
-	"	"	2sq x 10C			500 M	
-	"	"	2sq x 15C			50 M	
-	"	"	2sq x 20C			120 M	
-	"	"	2sq x 30C			400 M	
-	"	600V CVV-S	2sq x 3C			80 M	
-	"	"	2sq x 4C			50 M	
-	"	"	2sq x 5C			100 M	
-	"	"	2sq x 6C			60 M	

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLIER	REMARKS
-	"	600V CVV-S	2sq x 10C		20	M	
-	"	"	2sq x 20C		50	M	
-	"	600V CV	100sq x 1C		170	M	
-	"	2PNCT	2sq x 3C		10	M	
-	"	LKGB	2sq x 2C		165	M	
-	"	VCTF	0.75sq x 2C		70	M	
-	WIRE	IV(G)	100sq		300	M	E1 x 2 E3 x 1
-	"	"	38sq		100	M	
-	"	"	14sq		100	M	
-	"	"	8sq		100	M	
-	"	"	5.5sq		300	M	
-	"	"	1.25sq		300	M	
-	"	IV(RED)	2sq		300	M	
-	"	IV(WHITE)	2sq		300	M	
-	CABLE	LKGB	3.5sq x 2C		100	M	
-	CABLE TERMINALS						1 Complete set
-	CABLE TERMINAL INSULATION TREAT- ING MATERIAL						1 Complete set
-	CONDUIT		C19		75	PCS	
-	"		C25		100	"	
-	"		C31		80	"	
-	"		C39		30	"	
-	"		C51		10	"	
-	"		C63		10	"	
-	"		C75		10	"	

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLER	REMARKS
-	ACCESSORIES FOR CONDUIT						1 Complete set
	CONDUIT SUPPORT MATERIAL						1 Complete set
-	COPPER SHEET (for Grounding)		900sq x 1.5t				4 set
-	PIPE STANTION	S.S.	1500				9 PCS
-	STEEL ANGLE	"	L6x50x50				25 " L= 5.5 M/PC
-	STEEL SHEET FOR LEVEL ADJUST	"					1 Complete set
-	MCB BOX						1 "
-	CABLE RACK	S.S.	SR-60				18 PCS Straight shape
-	"	"	SR-40				10 " "
-	"	"	SRLA-60				2 " L shape
-	"	"	SRLA-40				2 " "
-	"	"	SRT-60				3 " T shape
-	"	"	SRI-60				2 " "
-	ACCESSORIES FOR CABLE RACK						1 Complete set
-	CABLE RACK SUPPORT MATERIAL						1 Complete set
-	STEEL SHEET FOR CABLE PROTECTION						1 Complete set
-	ASBESTO SHEET (for Cable Protection)						1 Complete set

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLIER	REMARKS
-	RECEPTACLES		WN318		10	"	
-	"		WN3710		10	"	
-	PLUG		WF7002		10	"	
-	INTERPHONE		VK-413A		1	SET	
-	" HAND SET		VK-508C		4	"	
-	LIGHTING FACILITY	S.S.	FA42275K		16	SET	40WX2 AC100V
-	LAMP		40W		32	PCS	40W AC100V
-	INSULATING TAPE				1		Complete set
-	BOLT, NUT				1	"	
-	CABLE	600V MLFC	150sq x 1C		30	M	(AJAX)
-	"	1500V	150sq x 1C	4M x 4	16	M	(AJAX)
-	"	"	2sq x 1C	4M x 2	8	M	(AJAX)
-	"	600V CVV	2sq x 2C		50	M	(AJAX)
-	"	"	2sq x 6C		10	M	(AJAX)
-	"	600V IV	8sq x 1C		20	M	(AJAX)
-	WATER COOLED CABLE	1500V	52o	6.2M x 2	12.4M		(AJAX)
-	"		52o	14.5Mx2	29	M	AJAX(for Gasifier)
-	CABLE TERMINALS				1	SET	AJAX



f. Instrument material list

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLIER	REMARKS
-	CABLE	600V CVV-S	2sq x 2C			960 M	
-	"	"	2sq x 3C			275 M	
-	"	"	2sq x 6C			60 M	
-	"	"	2sq x 8C			65 M	
-	"	"	2sq x 10C			20 M	
-	"	"	2sq x 30C			50 M	
-	CABLE	600V CVV	2sq x 2C			320 M	
-	"	"	2sq x 4C			240 M	
-	"	"	2sq x 8C			65 M	
-	COMPENSATED WIRE	RX-H	2sq x 1P			95 M	
-	"	"	2sq x 2P			45 M	
-	"	VX-G	2sq x 5P			55 M	
-	WIRE	IV(G)	1.25sq			300 M	
-	"	"	5.5sq			300 M	
-	"	"	14sq			100 M	
-	CONDUIT		C19			60 PCS	
-	"		C25			35 "	
-	"		C31			20 "	
-	ACCESSORIES FOR CONDUIT					1 SET	
-	PIPING SUPPORT					1 "	

NO	DESCRIPTION	MATERIAL	SIZE	RATING	QUANT	SUPPLIER	REMARKS
-	COPPER SHEET FOR GRADING		900sq x 1.5t		2	PCS	
-	ACCESSORIES FOR GRADING				1	SET	
-	PIPE STANTION		L=1500		12	PCS	
-	STEEL ANGLE	S.S.	6tx50x50 L=5500		25	"	
-	STEEL SHEET FOR LEVEL ADJUST	"			1	SET	
-	TERMINAL BOX				3	PCS	
-	CABLE TERMINALS				1	SET	
-	BOLT, NUT	S.S.			1	SET	
-	PIPE	SGP(W)	15A L=5500		10	SETS	
-	"	STPT(Sch40)	15A		2	"	
-	"	SGP(B)	25A		2	"	
-	TUBE	SUS304	8/6 L=4000		2	"	
-	"	"	10/8o		2	"	
-	COPPER TUBE	Cut(PVC)	6/4o		10	"	
-	"	"	8/6o		10	"	
-	ACCESSORIES FOR PIPING				1	SET	
-	UNISARM (Pipe with heater)	Cu	8/6o		10 M		2200- 41M10
-	"	SUS316	10/8o		10 M		2201- 40M41

(2) Temporary work and others

No.	Item	Q'ty (set)	charge		Note
			Contractor	Indonesia	
1	All materials for temporary work	one	o		Scaffolding etc.                Cap. 5t
2	Office	"	o		
3	Lavatory	"		o	
4	Accomodation for workers	"	o		
5	Materials yard	"		o	
6	Meals for workers	"	o		
7	Telephone	"	o		
8	Facsimile	"	o		
9	Lighting apparatus	"	o		
10	Work of 7),8),9)	"	o		
11	Security of office	"	o		
12	Electric source	"		o	
13	Industrial Water	"		o	
14	Beverages	"		o	
15	Compressed air for work	"		o	
16	Overhead crane	"		o	
17	Lighting equipments in the building	"		o	

(Note) ° Fork lift (Cap., 5 tons) besides above-mentioned is lended free.  
But fuel is contractor's scope.

° Items 2),7),8),9),10) is happened to lended from Indonesia, but it should be estimated on this condition that these items should be distinguished from other ones.

## (3) Materials for erection work

No	Item	Q'ty (set)	charge		content (*1)	Note
			Contractor	Indonesia		
1	O <sub>2</sub> for construction	one	o			
2	Acetylene "	"	o			
3	Welding rod	"	o			
4	Fuel for machinery	"		o		engine pump
5	Oil "	"		o		Hydraulical- ly-operated oil, grease
6	Flushing Oil	"	o			
7	Oil cleaning	"	o			
8	Non-shrink mortar	"	o			
9	Cement	"	o			
10	Sand	"	o			
11	Gravels	"	o			
12	Base plate	"			o	w/flare stack anchor flame
13	Liner for installation	"	o			
14	Foundation B.N.	"	o			chemical anchor
15	Structure B.N.	"	o			
16	Support for pipes	"	o			
17	U bolts, bands	"	o			
18	B.N. without item, No. 14,15,17	"			o	
19	Gasket for flange	"			o	
20	Seal tape for pipes	"	o			
21	Gland packing	"			o	
22	Seats against rain	"	o			
23	Pipes	"			o	w/Valve, joints
24	Wires	"			o	
25	Bench mark	"	o			
26	Weskit	"	o			
27	Joints processed in site	"	o			
28	Miscellaneous materials not mentioned	"	o			
29	Materials of remodeling of flow detector	"	o			
30	Step down Tr.	"	o			for off- line analyzer

(\*1) Included in transported machineries

(4) Machines and tools for erection works

Contractor should prepare all machines and tools for installation of this Gasification Test Facilities.

Still more, as regards installation it is desirable that contractor can prepare

A. Turning roller for welding 2 sets

B. Wrecking car 1 set (Cap. 10 ton) x 3 days  
Wrecking car with gondola 1 set x 1 day

(5) Transportation

No.	Item	Maker	JICA	Contractor	BPPT
1	Transportation in Japan	Maker → Yokohama	o		
2	Loading	Yokohama port	o		
3	Marine transportation	Yokohama → Jakarta	o		
4	Cutwater	Jakarta	o		
5	Land transportation	Jakarta → plant site			o
6	Unloading	Plant site			o
7	Opening			o	

All tools and machines (as to No.1-7) arranged by the contractor lies on the contractor's charges.

(6) Construction Insurance

No.	Kind of Insurance	Q'ty (set)	JICA	Contractor
1	Marine Cargo Insurance	one	o	
2	Construction Insurance	"		o
3	Workmen's Compensation Insurance	"		o
4	Employers' Liability Insurance	"		o
5	Overseas Travel Accident Insurance	"		o
6	Automobile Insurance	"		o
7	Tax	"	o	
8	Other Insurance which contractor needs	"		o

(7) Test run

No.	Item	Q'ty (set)	IEE	Contractor	Note
1	No-load test run	one		o	
2	Individual load test	"	o	o	
3	Synthetic load test run	"	(operate)	(attend)	
4	Repairing	"	"	"	Period of 2 months
5	Gathering data of test run	"		o	

(Note) As regards details of test run, see " 9. Outline of test works."

(8) Document presentation

A. Document presentation at the estimation

Time limit S61 / /

No.	Item	Number of Issues	
		Japanese	English
1	Estimation sheet		
2	Estimation specification sheet		
3	Time schedule sheet for erection work		
4	Organization chart of erection work		
5	Planning of utilities's consumption		
6	Man-hour chart		
7	List of machine & material prepared by the contractor		
8	Personal history of person in charge		

B. Document presentation during work

No.	Item	Number of Issues	
		Japanese	English
1	Minutes		
2	Daily report		
3	Inspection work report		

C. Document presentation after completion

No.	Item	Number of Issues	
		Japanese	English
1	Construction record		
2	Test run report		
3			

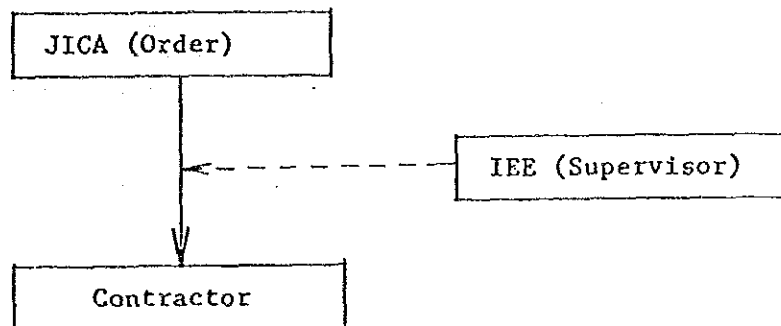
- (Note) Contents of construction record should include
- A. Minutes during construction
  - B. Inspection record, Test run record
  - C. Actual time schedule & man-hour chart
  - D. Daily report etc.

5. Out of scope

No.	Item	Q'ty (set)	Note
1	Outdoor foundation work	one	Refer to 4.(1)A
2	Construction of utilities cylinders' house	"	
3	Indoor wiring pit work	"	
4	Indoor lighting work	"	Lighting around facilities within scope of estimate
5	Primary utilities' work	"	(*1)
6	Sanitary plumbing	"	
7	Land transportation of installation facilities	"	
8	Power distribution facilities	"	
9	Heat insulation work	"	

(\*1) Engine pump work for emergency and cable building work upto power distributing panel (AC 380V, 3 $\phi$ ) should be included.

6. System of work responsibility





7. Responsibility, Guarantee

No.	Situation	Contractor's	
		Scope	Out of scope
1	Damage of facilities at the opening	o	
2	Rust of facilities at the opening		o
3	Robbery of facilities during work	o	
4	Damage of facilities caused by miswork	o	
5	Lack of materials " "	o	
6	Function error " "	o	
7	Accidents of workers	o	
8	Delay of working term	o	

Contractor should pay compensation regarding the contractor's responsibility above mentioned.  
 Also, contractor should pay all cost if reconstruction work on item No. 4, 6 occurs.