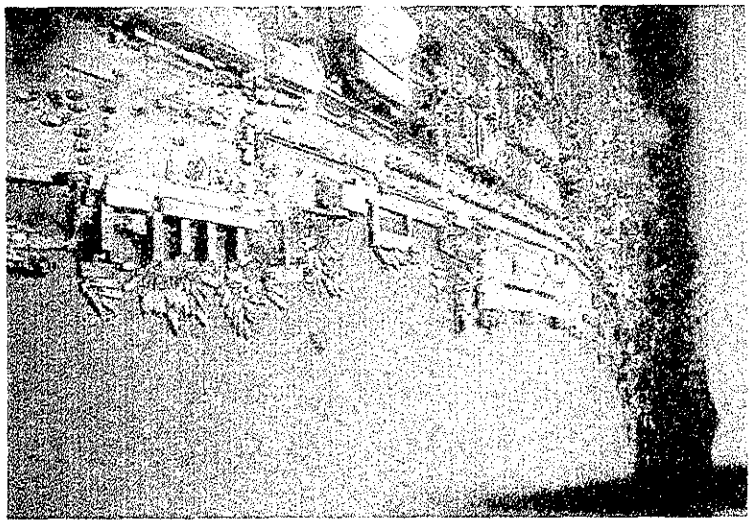
Ⅳ　今後の調査に当っての留意事項

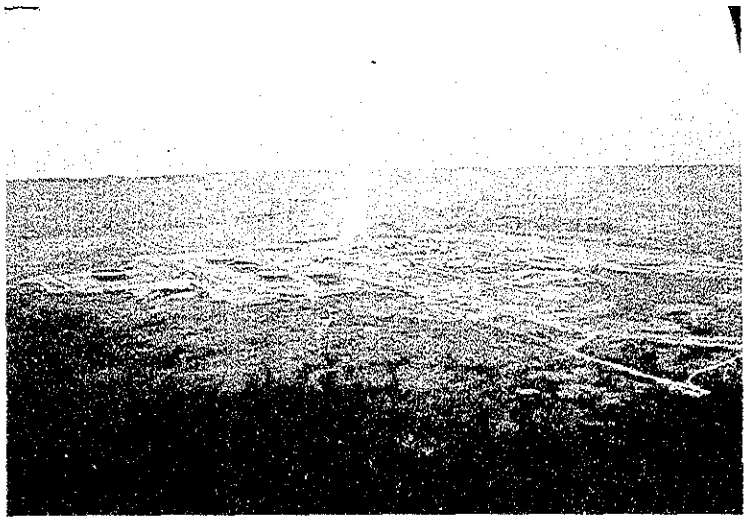
1. インドネシア経済は１９８４年に入り回復基調にあるものの恒に経済構造よりくる変動要素は多く、重工業計画としての鉄鋼業計画は慎重な吟味と検討の上になされるべきであり、F／Sの万全を、最大限の努力とベストな方法で平凡な表現になるが、はかるべきである。
2. 国内資源としての石油、天然ガスは外貨獲得資源として位置づけられており、国内消費をおさえて輸出に向ける努力がなされている。このために近年、国内賦存の石炭資源（例えばカリマンタン地域、埋蔵量５０億トン、可採埋蔵量３６億トン）がクローズアップされ、国内産業用としての利用に重点的志向がなされている。今後天然ガス価格はＵＳ３$／ＭＭになる動きにあり、国内主要産業へのガス供給時の価格補助も打切られる方向にある。

   この事は、鉄鋼業開発時の使用エネルギー源選択に一つの大きい視野を当えることになるが予断は誤解を招きやすいので、全てF／S結果をまっての上となるべきであろう。
3. サイト選択は今回の調査の目的ではないが、インドネシア側は一切の断定的、予断的志向は示していない。全て日本政府のF／Sにまつとしている。従って、天然ガス、石炭については原燃料立地の場合の重要なファクターとしてステップⅡ F／S に先だってステップⅠ時に予備的調査をおこなう必要が示唆できる。
4. ステップⅠについては需給分析はインドネシア側の意図する調査要望よりみて鋼材品種別になされる必要があり、そうなるとするとステップⅠは比較的多い専門家（セクター別分析として１０％近く）により構成し、詳細分析の要がある。
5. 三次にわたる調査（予備、事前）の経験よりみて、需要マーケット分析時，一種のフィールドサーベイも必要で、主要消費他（メダン、スラバヤ等）の視察が求められる。
6. ステップⅠについては事前にインドネシア側の関係官庁に対する調査協力を工業省に対し要請しておく必要がある。この場合、質問状の事前送付は不可欠であろう。
7. 日本政府外の協力による諸調査の供与は従来合意したGiven Condition の問題として、再度ステップⅠにそう問題項目について要請しておく必要がある。
8. 地方におけるステップⅠの需要調査についてはインドネシア語（又は現地語）の通訳の必要も考えられ、配慮すべき点となっている。

ボンタン付近の川

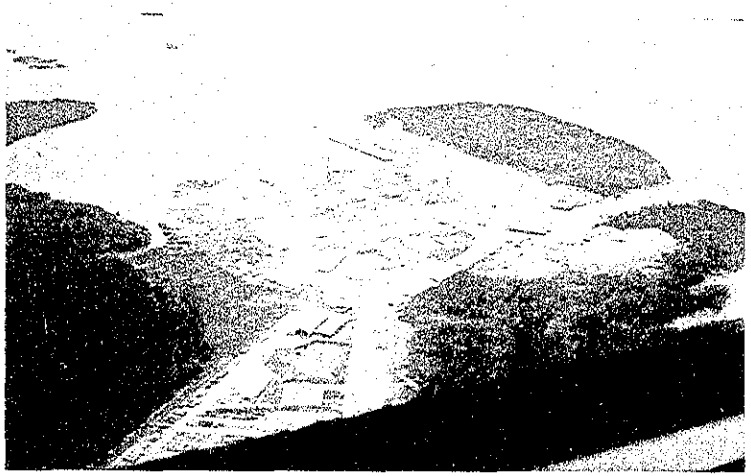


サマリング港湾施設

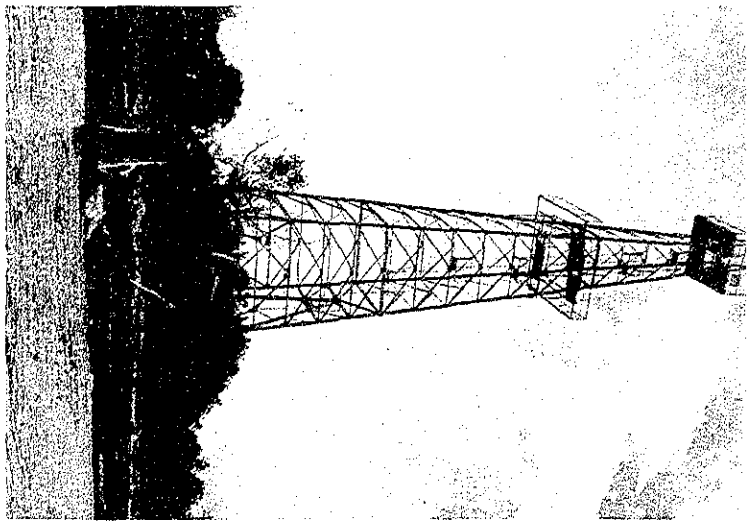


バダックＬＮＧプラント

ボンタンＬＮＧプラント

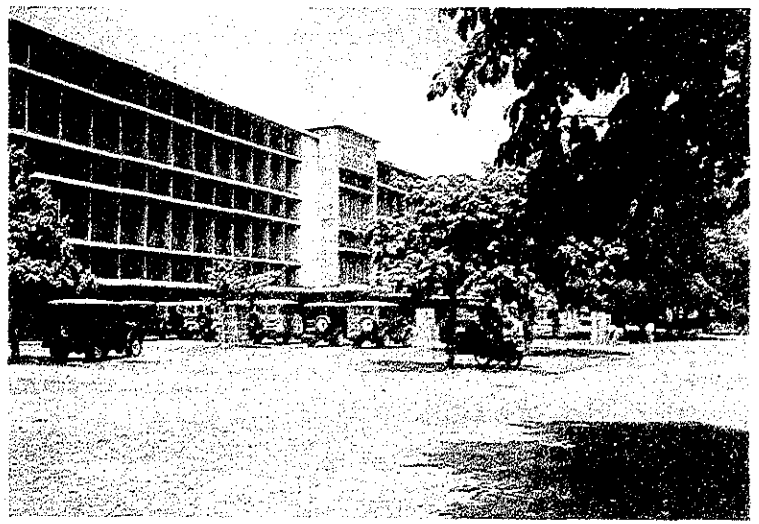


ボンタン肥料工場



マハカン河口近くオイルリグ

パレンバン→ブキットアッサム道路



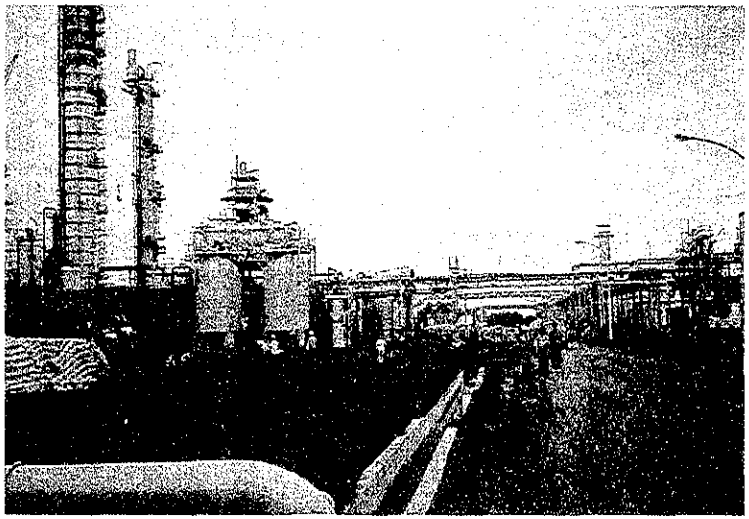
ブキットアッサム石炭公社

ブキットアッサム鉱山方面

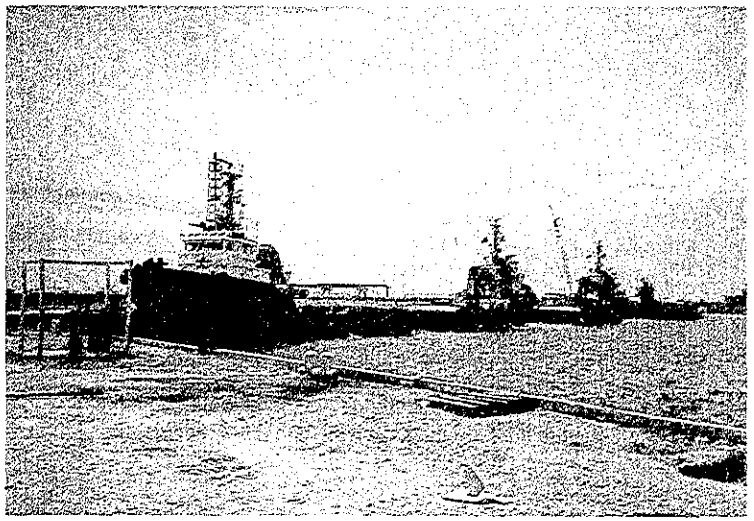
ブキットアッサム　ゲストハウス

PT. グロウススマトラ（メダン）

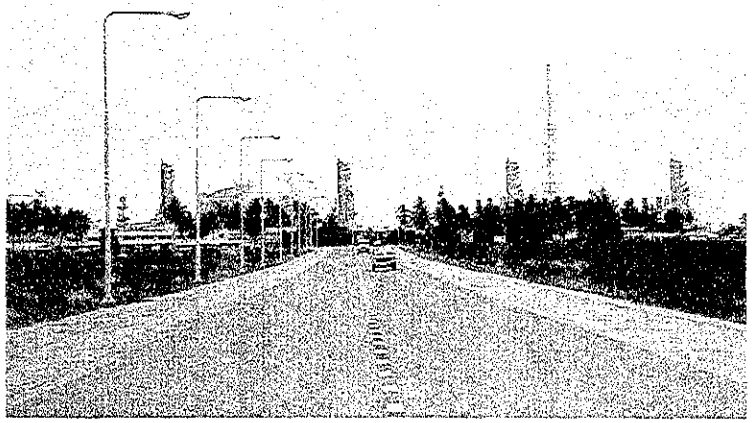
メダン→ロスマウエ　ガス田



PT.イスカンダルムダ



PT.アルン専用バース



PT. アルン

PT. アセアンアテェファティライザー(肥料工場)

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY

ON

THE NATIONAL IRON AND STEEL DEVELOPMENT

FOR THE SECOND GENERATION

IN

THE REPUBLIC OF INDONESIA

Jakarta, July 31, 1984

Takao SUZUKI
Team Leader
Preliminary Survey Team
JICA

EMAN YOGASARA
Director General of Machinery
and Basic Metal Industry
Ministry of Industry

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to conduct a feasibility study on the National Iron and Steel Development for the Second Generation (hereinafter referred to as "the Study") in accordance with laws and regulations in force in Japan. Accordingly the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study, in close cooperation with the authorities concerned of the Government of the Republic of Indonesia.

The present documents sets forth the scope of work with regard to the above-mentioned the Study.

II. OBJECTIVE OF THE STUDY

The objective of the Study is to examine the technical, economic and financial feasibility of the estabishment of the second generation of steel plant in the Republic of Indonesia and to prepare the reports.

III. PRECONDITION

The present and future capacity of existing steel mills including Krakatau as well as the base data for the demand forecast shall be provided by the Directorate General of Machinery and Basic Metal Industry, Ministry of Industry (hereinafter referred to as "DGMBMI"), on its responsibility to JICA and such data and information shall be regarded as the given condition for the Study.

IV. SCOPE OF THE STUDY

The study shall be carried out in the following three (3) steps :

Step 1 : Demand and supply study

Step 2 : Site survey

Step 3 : Feasibility study

Step 1 is to analyse the market demand of steel products and to figure out a gap between the demand forecast and supply estimate.
Step 2 is to carry out site survey on the six proposed sites / locations and to recommend suitable sites.
Step 3 is to propose the possibility of establishing a new steel plant viewed from market demand and technical, financial and economic point of view.

In order to achieve the above objective, the Study shall cover the following items :

1. The background and relevant conditions of the project
   - 1.1 General Economic Situation of Indonesia
   - 1.2 Present situation of and policies on Industrial development
   - 1.3 Present situation of and policies on iron and steel industry
   - 1.4 Relevant laws and regulations

2. The market of steel products

2.1. The present situation and trend of supply of iron and steel in Indonesia

(1) Current and future situation of the world steel market

(2) Supply by the existing mills, i.e. number and geographical distribution of mills, their products and volumes

(3) Import (volume, type of products and their source)

2.2. The present situation and trend of iron and steel consumption in Indonesia i.e. type of products, geographical distribution, sectoral consumption pattern and their volumes

2.3. Distribution channel

2.4. Forecast of iron and steel demand

(1) The past and present economic situation and development plan with special emphasis on industrialization

(2) Projection of future demand of iron and steel up to the year 1990

3. The raw materials and Energy

3.1. Availability of iron ore or pellet including analysis of components

3.2. Availability of other materials including ferro alloys, pig iron, scrap, burnt lime and others

3.3. The price of raw materials

4. The project locations and sites

4.1. The natural conditions of the sites

(1) Meteorology

(2) Geology and topography

4.2. The socio-economic conditions

(1) Population, labour force, wages and etc.

(2) Supporting industries

(3) Regional administration

4.3 Availability of natural gas, coal or iron sand

4.4 Utilities and infrastructure such as electricity, water, transportation (road, port and railway) and communication

4.5 Site selection

5. Preparation of the conceptional design of the plant

5.1 Study on the type of products and their optimum production scale

5.2 Determination of the process

5.3 The design standards and process flow sheet including material balance of the proposed plant

5.4 Layout of the proposed plant

5.5 Drawings of the plant

5.6 Plant construction plan

5.7 Operation program including organization and man power plan

6. Environmental control measure

7. Financial analysis

7.1 Overall investment costs

7.2 Expenditure schedule of investment costs

7.3 Procurement of investment costs

7.4 Production cost

7.5 Projected balance sheet

7.6 Projected income statement

7.7 Projected cash flow statement

7.8 Financial internal rate of return

7.9 Sensitivity analysis based on possible variation

8. Economic and social evaluation

9. Conclusion and recommendation

V. STUDY SCHEDULE

Total period required for the Study will be about two (2) years, and is divided into three (3) steps.

Each period is estimated as follows :

Step 1 : Ten (10) months

Step 2 : Five (5) months

Step 3 : Nine (9) months

The overall schedule of the Study is detailed in the APPENDIX.

VI. REPORTS

The following reports shall be prepared in English and submitted to DGMEMI within the time periods indicated below :

1. Inception Reports

   Inception Reports (15 copies) shall be submitted at the beginning of each step.

2. Progress Reports

   The Progress Reports (15 copies) shall be submitted at the end of each field survey.

3. Interim Reports

   The Interim Reports (15 copies) with summary of the studies done at the each step shall be submitted at the end of the step 1 and step 2.

4. Draft Final Report

   The Draft Final Report (15 copies) shall be submitted within nine (9) months after the commencement of step 3.

5. Final Report

The Final Report (50 copies) shall be submitted within three (3) months after the discussion and amendment of the Draft Final Report between DGMEMI and JICA.

VII. UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. The Government of the Republic of Indonesia shall take following necessary measures to facilitate the smooth implementation of the Study :

   (1) to secure the safety of the Japanese study team (hereinafter referred to as "the Team")

   (2) to permit the members of the Team to enter, leave and sojourn in Indonesia for the duration of thier assignment therein, and exempt them from alien registration requirements.

   (3) to exempt the members of the Team from taxes, duties, and other charges on equipment, instrument and other materials brought into Indonesia for the implementation of the Study.

   (4) to exempt the members of the Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.

   (5) to provide the necessary facilities to the Team for the remittance as well as of fund introduced in Indonesia from Japan in connection with the implementation of the Study.

(6) to provide medical services as needed and its expenses will be chargeable on the members of the Team.

(7) to secure permission to take all data and documents related to the Study (including photographs) out of Indonesia to Japan by the Team.

2. DGMBMI shall act as counterpart agency to the Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the study.

3. The Government of the Republic of Indonesia shall, at its own expense, provide the Team with the following, in cooperation with other agencies concerned, if necessary.

(1) counterpart personnel

(2) suitable office space with necessary equipment including telephone in Jakarta, Pare-pare, Badak, Arun, Bukit Asam, Yogyakarta and Cilegon

(3) credentials or identification cards

(4) necessary vehicles with driver, fuel and spare parts in the project areas

(5) necessary personnel for the Study

4. The Government of the Republic of Indonesia shall bear claims, if any arises against the members of the Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the team.

VIII. UNDERTAKING OF THE GOVERNMENT OF JAPAN

For the implementation of the Study, JICA shall take following measures :

1. To dispatch, at its own expense, study teams to Indonesia.
2. To pursue technology transfer to the Indonesia counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and DGMBMI shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX

Tentative Schedule of the Study

Item \ Year & Month	1984				1985												1986												1987						
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Step 1. Demand and supply study																																			
Step2. Site survey																																			
Step 3. Feasibility study																																			
Preparatory Office Work																																			
Field Work																																			
Home Office Work																																			
Presentation of Interim Report																																			
Field Work (Site survey)																																			
Home Office Work																																			
Presentation of Interim Report																																			
Field Work																																			
Home Office Work																																			
Presentation of Draft Final Report																																			
Submission of Final Report																																			

In Indonesia In Japan

MINUTES OF MEETING

The Japanese preliminary Survey Team (the Team) sent by the Japan International Cooperation Agency (JICA) and the Directorate General of Machinery and Basic Metal Industry (DGMBMI) had a series of discussions and field observations during the period from 24 to 31 July 1984 on the "Scope of Work" for the Feasibility Study on the National Iron and Steel Development for the Second Generation in the Republic of Indonesia signed on 31 July 1984.

As a result of discussion, the Team and DGMBMI hereto agreed upon the Following.

1. With reference to the "Scope of Work" the Team explained that Precondition of item III is based on the agreement between the Preparatory Study Team and DGMBMI in March - 1984.
DGMBMI understood the situation and promised to bear any claims, if arised by a third party against the data and related reports provided by the DGMBMI.

2. The DGMBMI requested to the Team that Ombilin-Sawahlunto, West Sumatera, would also be included in the study as one of the locations of the Second Generation of the Steel Plant.

3. The DGMBMI requested to the Team to consider the availability of coal in East Kalimantan as one of the decision factors in choosing the location of the Second Generation of the Steel Plant in addition to the availability of natural gas in that area.

4. The Team and DGMBMI agreed the study will be carried out in a period of about two years.

5. The DGMBMI.....

5. The DGMBMI will make best effort as far as possible to provide and or to arrange the needed items stated in VII, 3 (2) and 3 (4) of Scope of Work.

6. DGMBMI requested to the Team to accept the counterpart personnel to Japan for training.
The Team promised to visualize it in the Fiscal Year 1984.

Dated : 31 July, 1984

Takao SUZUKI
Team Leader
Preliminary Survey Team
J I C A

H. Mohammad Toyib
Director General of
Machinery and Basic Metal
Industry
Ministry of Industry

(3) エネルギー関連統計

附－1表　エネルギー源別消費実績及び見通し

(単位：石油換算1,000バーレル，（ ）内 b/d)

	石油	構成比	天然ガス	構成比	石炭	構成比	水力発電	構成比	地熱	構成比	合計	構成比
1980	149,160	84%	23,300	13%	950	1%	4,430	2%	—	—%	(487) 177,840	100%
1981	163,600	79	36,700	17	1,000	1	6,100	3	—	—	(568) 207,400	100
1982	166,183	79	35,524	17	995	1	6,735	3	63	—	(574) 209,500	100
1983	164,893	79	35,524	17	995	1	6,860	3	63	—	(571) 208,355	100
1984	159,032	72	40,805	19	5,201	2	15,829	7	367	—	(606) 221,234	100
1985	160,806	68	46,176	20	11,297	5	16,498	7	367	—	(644) 235,144	100
1986	164,694	66	52,682	21	13,602	5	20,014	8	858	—	(690) 251,850	100
1987	172,253	63	54,794	20	20,372	8	22,662	8	1,712	1	(745) 271,793	100
1988	182,403	62	55,246	19	28,244	9	26,597	9	2,461	1	(808) 294,956	100

（出所）「アメリカ大使館レポート」1983年版，MIGAS，インドネシア通信，日本石油公団

附－2表　インドネシア天然ガス生産量

(単位：100万 CFD)

区域	会社	1975	1976	1977	1978	1979	1980	1981	1982
スマトラ	Pertamina U-I	61	64	70	82	86	84	87	102
	Pertamina U-II	106	110	142	146	151	165	166	166
	Caltex	46	56	71	77	78	88	97	69
	Stanvac	84	94	122	136	135	123	123	122
	Asamera	46	40	27	24	19	18	13	7
	Mobil			105	537	1,014	971	1,193	1,234
	(小計)	(343)	(364)	(537)	(1,002)	(1,484)	(1,449)	(1,634)	(1,700)
ジャワ	Pertamina U-III	13	13	24	35	40	59	88	189
	Arco	71	108	119	106	165	220	223	127
	Cities Service	—	18	27	19	—	—	—	—
	Iiapco	11	42	96	84	66	65	65	77
	(小計)	(95)	(181)	(266)	(244)	(271)	(344)	(376)	(393)
東カリマンタン	Pertamina U-IV	41	40	46	53	57	53	47	46
	Total/Inpex	13	69	224	203	233	215	184	139
	Union/Inpex	68	80	105	115	120	153	138	129
	Union	—	27	28	32	19	28	26	21
	Huffco	47	73	260	576	514	575	576	555
	(小計)	(169)	(239)	(663)	(979)	(943)	(1,024)	(971)	(910)
	その他	2	19	21	21	37	40	48	43
	合計	609	853	1,487	2,246	2,735	2,857	3,079	3,046

（出所）MIGAS生産月報，日本石油公団

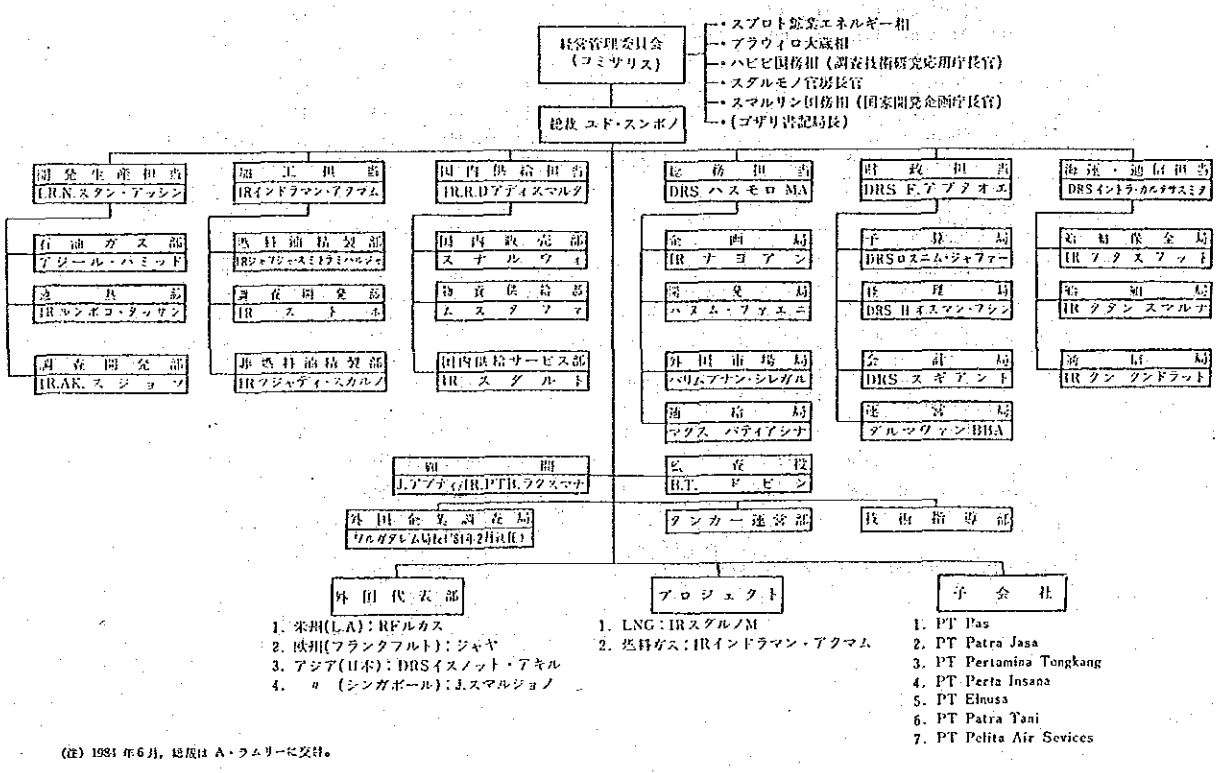
附－３表　天然ガスの消費実績内訳

（単位：MMCF/年）

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
生産量	150,767	186,137	202,335	222,256	312,368	542,784	820,130	998,457	1,045,748	1,123,720	1,111,928
(%)	(71.8)	(71.4)	(64.3)	(62.6)	(59.5)	(47.9)	(27.3)	(22.7)	(22.5)	(19.8)	(16.7)
損失量	108,228	132,841	130,150	139,579	185,943	259,883	223,580	226,643	234,969	222,444	185,778
(%)	(28.2)	(28.6)	(35.7)	(37.2)	(40.5)	(52.1)	(72.7)	(77.3)	(77.5)	(80.2)	(83.3)
利用量	42,539	53,296	72,185	82,677	126,425	282,901	596,550	771,814	810,779	901,276	926,150
石油産業の燃料					NA			(6) 47,443	(6) 48,010	(6) 54,221	(5) 51,117
ガス注入他					NA			(28) 214,669	(20) 156,999	(24) 222,350	(25) 232,674
製油所					NA			(1) 8,238	(1) 10,584	(1) 10,637	(2) 15,563
プスリ(肥料工場)					NA			(6) 47,840	(6) 51,070	(6) 50,498	(6) 51,302
チラマヤ(肥料、鉄鋼他)					NA			(4) 30,757	(6) 47,076	(6) 55,692	(6) 54,018
チレボン都市ガス					NA			1,298	1,127	1,032	1,797
ジャカルタ都市ガス					NA			174	445	477	457
LPG					NA			(5) 38,092	(3) 23,193	(3) 23,526	(2) 19,860
LNG					NA			(50) 383,303	(58) 472,275	(54) 482,843	(54) 499,362

（出所）MIGAS，日本石油公団

附－４表　プルクミナの組織図（1983年５月現在）



（注）1984年6月，総裁はA・ラムリーに交替。

附－5表　産業別天然ガス利用計画

(単位：MMCF/年)

業種	所在地及び工場名	地域	1984/85	1985/86	1986/87	1987/88	1988/89
製鉄	KRAKATAU	西部ジャワ	46,580	60,555	60,555	60,555	60,555
製紙	PAB KERTAS	アチェ	—	—	—	7,300	7,300
肥料	ASEAN	〃	21,900	21,900	21,900	21,900	21,900
	ACEH	〃	—	21,900	21,900	21,900	21,900
	PUSRI	南スマトラ	60,042	60,042	60,042	60,042	60,042
	KUJANG	西部ジャワ	21,900	25,590	25,590	25,590	25,590
	KALTIM I	東カリマンタン	32,850	32,850	32,850	32,850	32,850
	〃 II	〃	—	32,850	32,850	32,850	32,850
セメント	BOHOROK	北スマトラ	—	—	4,380	4,380	4,380
	INDOCEMENT	西部ジャワ	6,570	6,780	7,081	7,081	7,081
	CIBINONG I	〃	4,220	6,780	6,780	7,081	7,081
	〃 II	〃	5,550	5,550	5,550	5,550	5,550
	CIREBON	〃	—	3,102	6,205	6,205	6,205
	MADURA	東部ジャワ	—	—	2,190	4,380	4,380
都市ガス	MEDAN	北スマトラ	7,689	7,689	7,689	7,689	7,689
	JAKARTA/BOGOR	西部ジャワ	2,391	3,467	3,467	3,467	3,467
	CIREBON	〃	1,382	1,825	1,825	1,825	1,825
電力	PALEMBANG	南スマトラ	—	—	2,117	2,117	2,117
メタノール	BUNYU	東カリマンタン	12,410	12,410	12,410	12,410	12,410
LPG	RANTAU	北スマトラ	7,300	7,300	7,300	7,300	7,300
	MUNDU	西部ジャワ	9,675	9,675	9,675	9,675	9,675
	ARCO (ARJUNA)	〃	12,775	12,775	12,775	12,775	12,775
	UNION	東カリマンタン	10,950	10,950	10,950	10,950	10,950
LNG*	ARUN	アチェ	628,351	628,351	754,221	754,221	754,221
	BONTANG	東カリマンタン	477,858	477,858	477,858	477,858	477,858
製油所	S.GERONG/PLAJU	南スマトラ	8,600	8,600	8,600	8,600	8,600
	BALIKPAPAN	東カリマンタン	4,380	4,380	4,380	4,380	4,380

* ガス使用量が LNG 輸出量に比べ大きいのはコンデンセートの生産用ガスも含まれるためと思われる。

(出所) MIGAS，日本石油公団

附－6表　天然ガス利用計画産業別構成比

(単位：MMCF/年)

	%	1984/85	%	1985/86	%	1986/87	%	1987/88	%	1988/89
製鉄	3	46,580	4	60,555	4	60,555	4	60,555	4	60,555
製紙	—	—	—	—	—	—	1	7,300	1	7,300
肥料	10	136,692	13	195,132	12	195,132	12	195,132	12	195,132
セメント	1	16,340	2	22,212	2	32,186	2	34,677	2	34,677
都市ガス	1	11,462	1	12,981	1	12,981	1	12,981	1	12,981
電力	—	—	—	—	—	2,117	—	2,117	—	2,117
メタノール	1	12,410	1	12,410	1	12,410	1	12,410	1	12,410
LPG	3	40,700	3	40,700	2	40,700	2	40,700	2	40,700
(輸出量)		(1,410)万トン		(1,500)万トン		(1,620)万トン		(1,700)万トン		(1,720)万トン
LNG	80	1,106,209	75	1,106,209	77	1,232,079	76	1,232,079	76	1,232,079
製油所	1	12,980	1	12,980	1	12,980	1	12,980	1	12,980
合計	100	1,383,373	100	1,463,179	100	1,601,140	100	1,610,931	100	1,610,931

(出所) MIGAS，日本石油公団