No. 12

SURVEY REPORT ON THE ENERGY SUPPLY-DEMAND DATA BANK SYSTEM IN THE REPUBLIC OF INDONESIA

MARCH 1981

JAPAN INTERNATIONAL
COOPERATION AGENCY

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PREFACE

In response to the request of the Government of the Republic of Indonesia, the Japanese Government decided to conduct a survey on the project to establish an Energy Supply-Demand Data Bank System in Indonesia and entrusted the survey to the Japan International Cooperation Agency (JICA). The JICA sent to Indonesia a survey team three times headed by Mr. Takao Tomitate from September 18, 1980 to March 1, 1981.

The team exchanged views with the officials concerned of the Government of Indonesia in conducting the survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

March, 1981

Keisuke Arita

President
Japan International Cooperation Agency

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CONTENTS

SUMMARY OF TECHNICAL COOPERATION

1. Outline of Technical Cooperation 1
2. Field Study (1978) 3
2-1 Objective and Items of Field Study 3
2-2 Composition and Responsibilities of Survey Team 6
2-3 Schedule and Objects of Survey 11
3. Technical Cooperation Implemented in the 1st Year (1979) 15
3-1 Objective and Items of Cooperation 15
3-2 Content of Items which were Effected 15
3-3 Composition of Members involved in the Cooperative Operation 17
3-4 Operational Schedule and its Content 19
4. Technical Cooperation Implemented in the 2nd Year (1980) 23
4-1 Energy Supply-Demand Data Bank System 23
4-2 Energy Balance System 23
4-3 Energy Supply-Demand Forecast System 26
4-4 Sub-Data Bank System for Macro-Data 26

USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK I
— PREPARATION AND IMPLEMENTATION OF INPUT DATA —

1. Coding of Data 33
1-1 General Notice on Coding 33
1-2 Table Data 35
1-3 Input Data Format 35
1-4 Comments on each kind of Energy Resources 38
1-5 Estimation of Data Volume in E.D.B. System 46
2. Checking of Data 47
2-1 Check-1 47
2-2 Numbering 48
2-3 Punching 48
2-4 Check-2 51
3. Table Data 54
3-1 General Description 54
3-2 Table 54
3-3 Updation of Table Data 64
3-4 List of Table Data 65

4. Future Improvement of Data Coding 77

USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK II
– ENERGY SUPPLY-DEMAND DATA BANK SYSTEM –

1. Outline of the Data Bank System and it's Usage 81
1-1 Creation and Updating of the Information File 81
1-2 Extraction of Data from the Information File 91
1-3 Edition of Extracted Data 93
1-4 Printing of Information Files 104
1-5 Structure of the Data Deck 104
1-6 Error Message 107
1-7 Preparation of Macro-Energy Data 109
1-8 Back-Up Operation 123
1-9 Renumbering System 125
2. Future Improvement of Energy Supply-Demand Data Bank 129

SYSTEM MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK
– METHOD OF DATA PROCESSING –

1. Master Table 133
2. Name Energy Table 134
3. Element File 135
4. Flow of Data and Processing Method 140

USER'S MANUAL OF SUB-DATA BANK SYSTEM

1. Outline of the Sub-Data Bank System 177
2. Outline of the Sub-Data Bank System and its Usage 182
2-1 Creation and Updating of Information Files 182
2-2 Printing of Information File 188
2-3 Data Deck Configuration 188
2-4 Error Messages 190
3. Data Processing Method 191
3-1 INDEX TABLE 191
3-2 DATA FILE 192
3-3 Function and Processing Method of the Sub-Data Bank System 194

GENERAL MANUAL OF ENERGY BALANCE TABLE I
– CONFIGURATION OF ENERGY BALANCE TABLE –

1. Concept of Energy Balance Table 201
2. Configuration and Coding of Energy Balance Table 203
   - 2-1 Configuration and Coding of Rows 203
   - 2-2 Configuration and Coding of Columns 206
   - 2-3 Improvement of Row Configuration 210
   - 2-4 Configuration of Rows and Columns of Commodity Balance Table 211
   - 2-5 Configuration of Rows and Columns of Concise Energy Balance Table 212

GENERAL MANUAL OF ENERGY BALANCE TABLE II
– BASIC ENERGY STATISTICS –

1. Basic Statistics by Type of Energy 217
2. Thermal Quantity Scale Factor 245

GENERAL MANUAL OF ENERGY BALANCE TABLE III
– EQUATION SYSTEM –

1. Preparation Method of Energy Balance Equations 251
2. List of Energy Balance Equations 255
3. Preparing Method of Commodity Balance Equations 268
4. List of Commodity Balance Equations 269
5. Preparing Method of Concise Energy Balance Equations 277
6. List of Concise Energy Balance Equations 278

GENERAL MANUAL OF ENERGY BALANCE TABLE IV
– LIST OF ENERGY BALANCE TABLES –

1. List of Energy Balance Tables (1969–1979) 286
2. List of Commodity Balance Tables (1969–1979) 308
3. List of Concise Energy Balance Table (1969–1979) 330

USER'S MANUAL OF ENERGY BALANCE TABLE

1. Energy Balance System not connected with Sub-Data Bank 339
2. Energy Balance System connected with Sub-Data Bank 343

2-1 Program to Register Balance Data in Sub-Data Bank 343
2-2 Program to Print Out Balance Tables from Sub-Data Bank 346

SYSTEM MANUAL OF ENERGY BALANCE TABLE
– SOFTWARE FOR PREPARATION OF ENERGY BALANCE TABLE –

1. Basic Policy for Developing Software 353
2. Configuration of Program 354
3. List of Energy Balance Calculation Program 379
4. Modifications of Program to Prepare Commodity Balance and Concise Energy Balance Tables 396
5. Modifications of Program Attendent upon Connection with Sub-Data Bank 398

GENERAL MANUAL OF ENERGY SUPPLY-DEMAND FORECAST I
– CONSTRUCTION OF ENERGY SUPPLY-DEMAND FORECASTING MODEL –

1. Establishment of Energy Supply-Demand Forecast Method 407
2. Concept of Supply-Demand Forecasting Model 408
3. Preparation of Supply-Demand Forecasting Model 410
3-1 Outline of Macro-Economic Model 410
3-2 Outline of Energy Supply-Demand Model 416

GENERAL MANUAL OF ENERGY SUPPLY-DEMAND FORECAST II
– FORECAST RESULTS AND PROBLEMS –

1. Economic Forecast and Problems 435
1-1 Major Prior Conditions of Economic Forecast 435
1-2 Results and Problems of Economic Forecast 436
2. Energy Demand Forecast and Problems 437
2-1 Forecast on Total Demand for Primary Energies/Elasticity to GDP and Problems 437
2-2 Forecast on Energy Demand by Sectors and Problems 437
2-3 Forecast on Demands for Individual Energy Resources in Industry Sector and Problems 438
2-4 Forecast Demands for Individual Energy Resources in Transportation Sector and Problems 439
2-5 Forecast on Demands for Individual Energy Resources in Residencial and Commercial Sector and Problems 440
2-6 Forecast on Demands for Individual Energy Resources in Government Sector and Problems 441

2-7 Electric Power Supply-Demand Forecast and Problems 442
2-8 Changes in and Forecast on Oil Demand 443

3. List of Calculation Results 445

3-1 Actual Values 446
3-2 Forecast Values 457

GENERAL MANUAL OF ENERGY SUPPLY-DEMAND FORECAST III
– IMPROVEMENT OF ENERGY SYPPLY-DEMAND FORECASTING MODEL –

1. Regression Analysis 481

1-1 Relations in Macro-Economics 481
1-2 Relations among Final Consumption of Energies and Macro-Economics 498

2. Macro-Economic Model 509

3. Energy Supply-Demand Forecasting Model 512

4. List of Forecast Results 524

USER'S MANUAL OF ENERGY SUPPLY-DEMAND FORECAST
– FORECASTING MODEL SOFTWARE –

1. Regression Analysis 547

2. Forecasting Model Software 558

2-1 Convergence Calculation Using the Gauss-Seidel Iteration 558
2-2 Outline of Simulator 559

SUMMARY OF TECHNICAL COOPERATION

1. Outline of Technical Cooperation

The commencement of technical cooperation concerning the establishment of the energy supply-demand data bank in the Republic of Indonesia dates back to May 1977. A request for the said technical cooperation was submitted to the Japanese government by Mr. Piet Haryono, the President Director of the Indonesian State Oil and Gas Mining Enterprise (PERTAMINA).

The contents of the cooperation were confirmed between the Republic of Indonesia and Japan after submission of the request. However, there were various unclear points in connection with the Indonesian attitude and preparedness to receive the Japanese, as well as the scope of collection and filing of various data. Thus, the Japanese government dispatched a preliminary survey team to Indonesia from February 28 to March 12, 1978 in order to carry out investigations on technical cooperation concerning the project.

After their return to Japan, the team prepared the "Feasibility Study Report for Technical Cooperation on the Energy Data Bank System of the Republic of Indonesia." Meanwhile, the Indonesian side included the project in the List of Requests for Foreign Assistance (IGGI LIST) of the BAPPENAS, and at the same time submitted a formal request calling for technical cooperation to the Japanese government through the Technical Coordination Committee in the President's Office.

Upon receiving the formal request from the Indonesian government, the Japanese government examined the results obtained from the preliminary survey and studied the request. As a result, in late August 1978, the Japan International Cooperation Agency (JICA) requested that the Institute of Energy Economics in Japan conduct formal investigations on the area of cooperation concerning the establishment of the energy supply-demand data bank. The Institute of Energy Economics performed its field survey from October 15 to November 13.

The objective of the field survey was to determine actual conditions in Indonesia regarding the fields which required Japanese cooperation in establishing the data bank. Thus, it was aimed at obtaining information which would help the Japanese side decide on the forms of cooperation which could be offered to the Indonesian side.

Consequently, the team was to study the situation in Indonesia by conducting the survey primarily on the following items.

1) Data related to petroleum and gas
2) Energy supply-demand forecast, and balance table
3) Utilization of computers at oil refineries
4) Overall computer utilization system

5) Data on energy sources other than petroleum and gas, such as electric power, coal, etc.

After these five survey items had been further broken down into 33 sub-items, the survey was undertaken. The results from the extensive survey, lasting three weeks, were presented in its "Survey Report on the Energy Supply-Demand Data Bank System in the Republic of Indonesia." The basic conditions for the establishment of the Energy Supply-Demand Data Bank (EDB) system as delineated in the report may be summarized as follows.

(1) The EDB system shall fall under the control of the MIGAS of the Indonesian Ministry of Mines and Energy, and be utilized by MIGAS and PERTAMINA with the consent of the said Ministry and the Japanese government. The data to be processed at present shall be mainly related to oil and gas, and electronic computers and software at PERTAMINA shall also be employed.

(2) The results of the field survey show that MIGAS and PERTAMINA have sufficient data related to petroleum and gas, and in addition, the hardware, software, manpower, etc. to formulate a project to establish and EDB system and to execute it.

(3) Important factors in establishing the EDB system include: the type of system to be considered, established, maintained, and operated; and ideas and preparations for future improvement.

According to this basic concept, the types of technical cooperation had been classified into two steps: step 1 which was aimed at establishing a comparatively simple EDB system; and step 2, a more complicated large-scale EDB system. It was noted that technical cooperation should be restricted to step 1 for the present time.

A simple EDB system designed at the first step has the following basic functions: 1) preparation of a basic energy statistical table; 2) preparation of an energy balance table and 3) midium- and long-term energy supply-demand forecast.

Based on the basic policy described in the survey report, the Japanese government decided to offer and execute technical cooperation required for the establishment of an EDB system in Indonesia in fiscal year 1979, and entrusted the Institute of Energy Economics to undertake the actual activities.

The items for cooperation in 1979 are as described in the following section 3. These comprised of the establishment of energy data bases, formulation of the energy balance table, and development of a medium- and long-term energy supply-demand forecast model. For this purpose, JICA dispatched a team of experts three times and one professional to Indonesia, who stayed in the country for 8 months to render technical assistances. On the other hand, Indonesia, too, dispatched a total of twenty personnel including the four, whose expenses were shouldered by JICA, to Japan for training. As the result of such cooperative works based upon the mutual understanding of the two countries, the objectives as planned were achieved.

It is, however, pointed that the Indonesian members were not able to fully assimilate some of the works involved due to the training period being a little short. In the light of the situation, both government agreed to further conduct the technical cooperation in 1980.

In the technical cooperation of 1980, the follow-up was made on the data bank established in the previous year and the application system of it as well as the setting-up of the energy balance table and a sub-data bank for preparation of an energy balance table and a supply-demand forecast model. The function of the established sub-data bank is to intensify the micro-data obtained from enterprises into the macro-data of the national level. Thus, the establishment of this sub-data bank makes it possible to store the macro-statistics.

Through these 3-year surveys and technical cooperative works, the alignment of energy-related data in Indonesia will be further enhanced to a large degree. It can be said in this context that the cooperation for the energy supply-demand data bank system in Indonesia has completed its first stage. This report, therefore, is considered as the summary of achievements over the three-year period.

2. Field Study (1978)

2-1 Objective and Items of Field Study

2-1-1 Objective of Field Study

As stated in the preceding section, the field study with respect to this project was carried out in 1978, the summary of which is herein given.

The Field study was conducted in order to clearly ascertain the situation prevailing in Indonesia in respect of the items for cooperation listed below and required for establishing Energy Supply-Demand Data Bank, i.e. to collect information through the field study on which to base our judgement for determining the best manner in which Japan may extend its cooperation in regard to the various items for cooperation.

Discussion items listed below have been sorted out based on the detailed discussions exchanged between Japan and Indonesia during the preliminary investigations by the Japanese government conducted from February 28 to March 12, 1978.

Items for Cooperation in the Project for Indonesian Energy Supply-Demand Data Bank System.

(1) Design for Establishing Energy Supply-Demand Data Bank

a: Survey of Existing Energy Related Statistics in Indonesia

The most fundamental problem in establishing an energy supply-demand data bank in Indonesia is in what scope the energy related data may be utilized. To learn this point,

systems for data collection, actual accumulation and classification on the following statistics will be studied, the problems pointed out and guidance given: (i) supply-demand statistics broken down by energy resources such as oil, coal, natural gas, electric power, etc.; (ii) supply-demand statistics broken down by sectors such as industry, agriculture, forestry and fishery, transportation, energy, household sector, etc.; (iii) import-export statistics broken down by energy resources; (iv) price statistics broken down by energy resources.

b: Design for Computerization of Energy Statistics

In order to systematically collect, store, retrieve and utilize the considerable amount of energy supply-demand statistics, it naturally requires computer utilization. Possible technical assistance will be given for (1) method of data input (including preparation of input format), (2) programming for storage and retrieval of data, (3) preparation of output format for computer processing of data.

c: Preparation of Comprehensive Energy Statistics Table (Energy Balance Table) and Design for Computerization

In order to systematically prepare energy supply-demand plan, it is necessary to have energy statistic balance table summarized by and broken down by the energy resources and the supply-demand sectors. Accordingly, the transfer of know-how and technical guidance will be given for (1) designing optimum energy balance table for Indonesia, (2) statistical method of transfer from primary energy to secondary energy, (3) entery calory conversion, (4) statistical method of handling and correcting inventory, etc.

(2) Design for Establishing Energy Demand Forecasting Method

a: Survey and evaluation of existing demand forecasting method in Indonesia

Evaluation of existing demand forecast model techniques, review of various parameters used, analysis of input data precision, suitableness of forecast model and forecast object, and suitable guidance will be carried out.

b: Introduction and evaluation of major forecast techniques used in Japan and other countries of the world

Advantages and problems of forecast techniques used in major countries are pointed out as the examples of applications are introduced.

c: Review and design for demand forecast suited for Indonesia

In preparing the energy plan in Indonesia in the light of the above points a and b, the forecast method considered the most suitable will be reviewed and the guidance will be given for preparing forecast model.

d: Scope of Forecast Model

The demand forecast will be made in respect of (1) energy resources and of (2) sectors.

The feasibility in respect of (3) regional forecast will also be studied.

e: Review of Possibilities of Energy Conversion

One of the most critical points to be reviewed in the Energy Plan in Indonesia is to determine what energy resource is to be put to what kind of uses. Energy Balance Table will be utilized and the possibility of using some types of models (optimal conversion, allocation model) will be considered, and if they are found feasible, they will be put to practice.

(3) Survey of Specific Consumption for Energy in the Industrial Sector

In relation to the energy demand forecast mentioned in the above item (2), the importance for further detailing the forecast in the industrial sector is expected to increase, and the fundamental data in this sector is urgently needed. In particular, the methodology and the manners of operation for more precise forecast based on data collection in the medium and small scale industry sector will be reviewed.

For this purpose, the method for preparing specific consumption in Japan will be introduced, and the method of conducting the survey on the actual situation (the survey table format, optimum number of samples, selecting the survey objects, survey period, etc.) which is suitable for Indonesia will be reviewed and guidance will be given.

(4) Cooperation Concerning Systematization of Refinery Related Data and Application of the Data to Optimal Operation Model for Refineries

a: Survey and Evaluation of Existing Models in Indonesia

Among the refinery models, there are (1) macroscopic model for conforming the oil supply-demand of the whole nation and (2) optimal operation model at a refinery or an oil company.

These models will be introduced and the analysis by these models will be taught.

b: Review of Optimal Refinery Operation Model Suitable for Indonesia

(1) National Refinery Network Model

The nation is divided into 8 demand regions, and the optimal operation of refineries will be sought assuming optimal transportation system between the regions.

(2) Individual Refinery Model

Mainly to correspond to short term supply-demand variations, the operation plans for individual refineries will be prepared.

(3) Overall Model for National Refineries

Preparation of production plan on national basis, allotment and adjustment of production plans, based on each refinery will be reviewed.

2-1-2 Items for Survey

Based on the items for cooperation as above outlined, the items for on-the-spot survey were selected as shown in Table 2-1.

However, these items for survey were rearranged in order to facilitate efficient survey when it was actually conducted.

(1) Survey concerning data related to oil and gas.
(2) Survey concerning demand forecast and energy balance table.
(3) Survey concerning computer utilization in refineries.
(4) Overall survey concerning computer utilization system.
(5) Survey concerning data related to electric power and coal, other than oil and gas.

Accordingly, the items (1) to (5) are distributed to sub-items (1) – (33) in Table 2-1.

2-2 Composition and Responsibilities of Survey Team

The team comprised of nine experts in energy economics, demand forecast, oil refinery process, computer technology, system design and system analysis and one officer in charge of the present project from JICA.

The survey was conducted for the period of three weeks, various sections of the survey lasting respectively for 1 week, 10 days, 2 weeks and 3 weeks. Table 2-2 lists the members of the team and the subjects for which they were responsible.

Table 2-1 Survey Items for Indonesian Energy Supply-Demand Data Bank

Items for technical cooperation	Kind	Contents of survey	
		Item surveyed	Remarks
1-1-1 Survey of existing statistics related to energy in Indonesia	(demand)	1: Actual statistics of energy demand broken down by primary energy resources	oil, coal, natural gas, hydroelectric power, and other non-commercial energy
		2: Actual statistics of demand broken down by sectors and by primary energy resources	mining, agriculture, forestry and fishery, manufacturing, transportation, energy, household sectors
		3: Actual statistics broken down by regions	administrative regions, or economic regions of Indonesia, demand broken down by primary energy resources, and by sectors
		4: Actual statistics broken down by oil products, and by sectors	gasoline, kerosene, diesel oil, heavy fuel, and other products industry, household transportation, conversion sectors
		5: Actual statistics of power demand broken down by sectors	industry, transportation, household, energy sectors
	(supply)	6: Actual statistics of supply in Indonesia broken down by primary energy resources	oil, coal, natural gas, hydroelectric power, others
		7. Actual statistics of supply in Indonesia broken down by region	including those broken down by regions
		8: Actual statistics of domestic supply of electric power	including those broken down by regions
		9: Actual statistics of domestic supply broken down by oil products	including those broken down by regions
	(production)	10: Actual statistics of domestic production broken down by primary energy resources	including those broken down by regions

		11: Actual statistics of domestic production broken down by oil products	including those broken down by regions
	(import & export)	12: Actual statistics of import and export broken down by primary energy resources	broken down by countries of origin and by importing countries
		13: Actual statistics of import and export broken down by oil products	〃
	(prices)	14: Wholesale and retail prices broken down by primary energy resources	excepting hydroelectric power
		15: Wholesale and retail prices broken down by oil products	
		16: Rate of electricity	charge system classified by the types of clients
		17: Import & export prices broken down by primary energy resources	FOB (export) C&F (import)
		18: Import and export prices broken down by oil products	〃
1-2: Design for computerization of energy statistics	(collection)	19: Methodology for collecting energy statistics	structure and system for collection
		20: Methodology for storing energy statistics	filing system
	(retrieval)	21: Retrieval and use of energy statistics	method of retrieval, use system
1-3: Preparation of comprehensive energy statistics table (Energy Balance Table) and design for its computerization	(balance table) (data processing)	22: Scope and format of Energy Balance Table	optimum format of balance table
		23: Data processing accompanying energy conversion	how to treat energy loss ratio, calory, inventory, correction
2: Energy supply-demand forecast technique	(forecast model)	24: Evaluation of existing forecast models in Indonesia	structure of models, parameters, input data, results

Items for technical cooperation	Kind	Contents of survey	
		Item surveyed	Remarks
	(economic plan)	25: Energy supply-demand forecast and economic plan	GNP/IIP/energy consumption, economic development plan, energy consumption broken down by sectors, etc.
	(computer)	26: Utilization of computers	types of hardwares, capacity, kinds of software, etc.
	(manpower)	27: Level of programmers	numbers and capacity
3: Investigation of energy specific consumption in industrial sectors	(present situation)	28: Survey on actual situation of energy consumption in big scale manufacturing industry	conduct of actual field survey concerning energy demand control
		29: Survey on actual situation of energy consumption in medium & small scale manufacturing industry	〃
		30: Data collection system from end use	mechanism for data collection
4: Survey on existing refinery model in Indonesia	(model)	31: Evaluation of existing model in respect of content, utilization method and result	survey on both sides of input and output
	(refinery)	32: Survey of refinery related data broken down by such as capacities, utilities, manpower, cost, production pattern, etc. in existing refineries	
	(present status)	33: On-the-spot survey of refineries	

Table 2-2 Composition of Survey Team, Responsibilities, and schedule

Name	Specialist in	Responsibilities	Items of Survey responsible numbers	Survey Schedule 10/15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 11/1 2 3 4
1: Takao Tomitate Head	Energy economics System analysis	Supervision Report explanation on the spot		10/15 — 11/4
2: Kenichi Matsui	Supply-demand forecast, Statistical analysis	Supply-demand forecast, Energy Balance Table	22, 23, 24, 25	10/15 — 10/22
3. Yoshio Hara Secretary	Energy economics System analysis	Oil, gas statistics	1, 2, 3, 4, 6, 7, 9, 10, 11, 13, 18	10/15 — 11/4
4: Eizo Takai	Oil supply & demand, System design, Data bank	Oil refining, Computer	31, 32, 33, 26, 27	10/15 — 10/25
5: Shoichi Sakai	System analysis Oil supply-demand	Oil refining industrial statistics	32, 33, 28, 29, 30	10/15 — 11/4
6: Mototada Kikkawa	Economic development, Energy Supply-demand	Oil, gas statistics	12, 13, 14, 15, 17, 25	10/15 — 10/22
7: Toru Nishizutsumi	Data bank, Energy supply-demand forecast	Supply-demand forecast, Balance Table	19, 20, 21, 23	10/17 — 10/27
8: Fumio Arakawa	Electricity supply	Electricity, Coal statistics	1, 2, 3, 5, 6, 8, 10, 12, 16	10/22 — 11/14
9: Koichi Osada	System design and analysis	Computer	26, 27, 31	10/22 — 10/29
10: Isao Asai (JICA)	–	–	–	10/15 — 10/25

Note: Number for items of survey responsible by respective members indicate those in Table 2-1.

2-3 Schedule and Objects of Survey

On-the-spot survey was conducted for the total of 3 weeks, and the period was roughly classified into three. The first week was devoted to the general conference attended by the counterpart in Indonesia comprising of 9 members from MIGAS (including staff at LEMIGAS Oil & Gas Institute) and Pertamina. The general conference discussed primarily the concept of energy supply-demand data bank. That is, what scope of data should be fed to the data bank and what types of application system may be prepared by utilizing the data field in the bank. It was agreed on one hand to give priority to the processing of oil and gas supply-demand data for input, and on the other hand, it was determined to study the details and the scope of data presently available of other energy such as electricity and coal than oil and gas and the industrial statistics. The reason for conducting the survey on the other energy sources than oil and gas has to do with the establishing of data utilization system. It is considered that the utilization of fundamental data other than that of oil is indispensable in a case, for example, of oil products demand forecast which is most fundamental for the application system of the data bank and which has a high priority for Indonesia.

The second point discussed was the concrete method of survey. As discussed above, the survey team was divided into small groups of two or more experts, each group reviewing from time to time the items of survey. The third point discussed was selection of objects of survey other than MIGAS and Pertamina. The discussion concluded that necessary studies could be conducted by PLN for supply-demand of electricity, Coal Corporation (Batu Bara) for coal supply-demand, and the Investment Control Agency of Ministry of Industry and the Central Bureau of Statistics for general industrial statistics.

The surveys other than by Pertamina and MIGAS were conducted attended by the members of counterpart team comprising of MIGAS nad Pertamina for facilitating joint understanding of the investigation. The second week of the survey, or the second stage of the survey was conducted by discussing details the individual items by the five small groups and the corresponding groups on the counterpart. At the same time, at the break of surveys, the general conference was held in which the results of the individual surveys conducted by the groups were published, the groups mutually confirmed the facts. In the third week of the survey, or the third stage, the memorandum conclusively prepared by the survey team was studied and the details of the survey confirmed at the general conference.

Table 2-3 On-the-spot Survey Record (1)

Date	Participants	Discussions with	Discussions on
Oct. 16 (Mon)	Tomitate, Takai Kikkawa, Matsui, Hara, Sakai, Asai	Japanese embassy JICA office	Briefing on survey objects, Discussion of objects, content of survey
17 (Tue)	"	Mr. Wijarso (Director-General, MIGAS) Overall conference with Indonesian counterpart (Mr. R. Robot, Mr. Rohali Sani, Mr. Widartomo, Mr. Nyoman Sudibia, Mr. Djoko Widagdo, Mrs. Endang Lestari, Mr. Sumardi, Mrs. Soeparti)	Content of data bank, Content of survey items, Investigation of schedule
18 (Wed)	Tomitate, Takai Kikkawa, Matsui, Hara, Sakai, Asai	Overall conference with Indonesian counterpart (attended by the same members as previous day)	Discussion continued, Five discussion groups formed
19 (Thu)	Group 1, Tomitate, Kikawa, Hara	Mr. Rohali Sani, Mrs. Soeparti and others	Data related to oil and gas
	Group 2, Matsui, Nishizutsumi	Mr. Hendro, Mrs. Endang Lestari	Demand forecast, Balance table
	Group 3 & 5 Takai, Sakai	Mr. Robot, Mr. Nyoman, Mr. Sumardi, Mr. Maman, Mr. Djoko, Mr. Pramono	
20 (Fri)	All the members	All the members of Indonesian counterpart	General meeting, Schedule for the 2nd week and after. Visits to other governmental offices, Supply forecasting
	Group 2, Matsui, Nishizutsumi	Mr. Nyoman, Mr. Hendro Mrs. Endang	
21 (Sat)	Group 2, Matsui, Sakai	Mrs. Rohali Sani, Mr. Widartomo, Mr. Razif Razak, Mr. Umar Said	Demand forecast techniques, Method of Balance Table preparation
23 (Mon)	Group 1 & 2, Tomitate, Hara Nishizutsumi, Arakawa	Mr. Rohali Sani, Mrs. Soeparti, Mr. Razif Razak, Mr. Chaligir Djufri	Kinds of oil, gas data: scope, method of data collection
	Group 3 & 5, Takai, Osada, Sakai	Mr. Robot, Mr. Erwin, Mr. Djoko, Mr. Sumardi	Computer system, Utilization of computer in oil refining

Date	Participants	Discussions with	Discussions on
24 (Tue)	Groups 1 & 2, Tomitate, Hara, Arakawa, Nishizutsumi	(Industrial Ministry) Mr. Anwar Nawawi (MIGAS) Mr. Razif Razak	Discussion at Industrial Ministry (Agency of investment Control) on collection of industrial statistics and data types
	Groups 3 & 5 Takai, Osada, Sakai	Mr. Singgih Darsono, Mr. Soegihardi, Mr. Djoko, Mr. Sumardi, Mr. Agung Witono	Oil refinery model, etc.
	Group 4, Tomitate, Arakawa, Hara	(PLN: Electric Power Corporation) Mr. Margono, Mr. Sihonbing, (MIGAS) Mrs. Soeparti, Mr. Djoko	Visit to PLN, Hearing on the content of data on electric power
	All the members	Japanese embassy	Explanation of E.D.B. system
25 (Wed)	Groups 1 & 2 Hara, Arakawa, Nishizutsumi	Mr. Rohali Sani, Mrs. Soeparti, Mr. Razif Razak	MIGAS, Plan for eatablishing Data Base, Hearing
	Group 3 & 5, Sakai	Sumardi	Computer
26 (Thu)	Hara, Nishizutsumi Arakawa, Osada, Sakai	All the members of Indonesian counterparts	Agreements on various points at intermediate time during the survey
	Group 3, Sakai, Osada, Hara	Mr. Tanudjaja	Distribution data for oil products
27 (Fri)	Group 3, 5, Sakai	Mr. Nyoman	Computer
	Group 2, Hara,	Mr. Budi Sudarsono (MIGAS) Mr. Hendro, Mr. Razak also attended	Energy Balance Table
28 (Sat)	Group 4, Tomitate Osada, Sakai	(Ministry of Industry) Mr. Anwar Nawawi Mr. Razak (MIGAS also attended)	Industrial statistics, Data collection system, computer utilization plan
	Group 4, Arakawa,	(PLN) Mr. Margono, Mr. Sihonbing, Mr. Djoko (Pertamina) Mrs. Soeparti (MIGAS)	Statistics related to electric power

(14)

Date	Participants	Discussions with	Discussions on
30 (Mon)	Group 4, Tomitate Hara, Arakawa, Sakai	(P.N. Batu Bara) Mr. Adnan Kusama, Mr. Djoko (Pertamina), Mrs. Soeparti (MIGAS), Mr. Pramono	Coal statistics
	Group 4, Tomitate, Arakawa	(Central Bureau of Statistics) Mr. Sugito, Mr. Suprantó	Input-output Table, General statistics
	Groups 1 & 3, Hara Sakai	Mr. Sujana D.A.	Product sales statistics, Sales forecast
31 (Tue)	Tomitate, Hara, Arakawa, Sakai	Mr. Samaun Samadikun (Director General of Energy)	Concept of E.D.B. and explanation of Japanese cooperation
	Group 4, Arakawa, Hara	(PLN) Mr. Margono, Mr. Siponbing, (Pertamina & MIGAS) Mr. Djoko, Mrs. Soeparti	Electric power related data
Nov. 1 (Wed)	Tomitate, Hara Arakawa, Sakai	Mr. Trisulo	Explanation on E.D.B. system. Briefing on the content of survey
Nov. 2	Tomitate, Hara, Arakawa, Sakai	Counterpart: Mr. Robot, Mr. Nyoman, Mrs. Soeparti, Mr. Pramono, Mr. Sumardi	Final conference, adjustment made on the outline of survey results
	Tomitate, Hara, Arakawa, Sakai	(Japanese embassy) Mr. Kanda, Mr. Ohmura, secretary	Report on the findings of survey
		(JICA office) Mr. Miyamoto, president, Mr. Shinoura	〃
	〃	Mr. Wijarso, Mr. Warga Dalem, Mr. Robot, Mr. Qoyum	〃

3. Technical Cooperation Implemented in the 1st Year (1979)

3-1 Objective and Items of Cooperation

Actual cooperative works rendered to Indonesia for the establishment of the EDB system was put into effect from the end of July 1979. The objective was to assist in the establishment of an EDB system which had been necessary for the repletion of an Energy Supply and Demand Scheme, a part of the 4th 5-Year Economic Development Plan (REPERITA IV, FT 1984–1989) set forth by the Indonesian government. Therefore, the scope of the work related to the EDB System Project was agreed upon between the two countries prior to execution of the cooperation. In the resulting Scope of Work, the objective of cooperation is stated as follows:

> "The objective of the project is to enforce Japanese technical cooperation, through her experience and expertise, for the establishment of the data bank for supply and demand of energy, and its utilization system which would enable the formulation of appropriate plans on the supply and demand of energy."

After the results of the field survey of the previous year was studied and necessary adjustment of opinions made, concrete items which required cooperation were narrowed to three:

1) Establishment of an energy data base;
2) Preparation of energy balance tables; and
3) Development of a medium- and long-term energy supply-demand forecast model.

3-2 Content of Items which were Effected

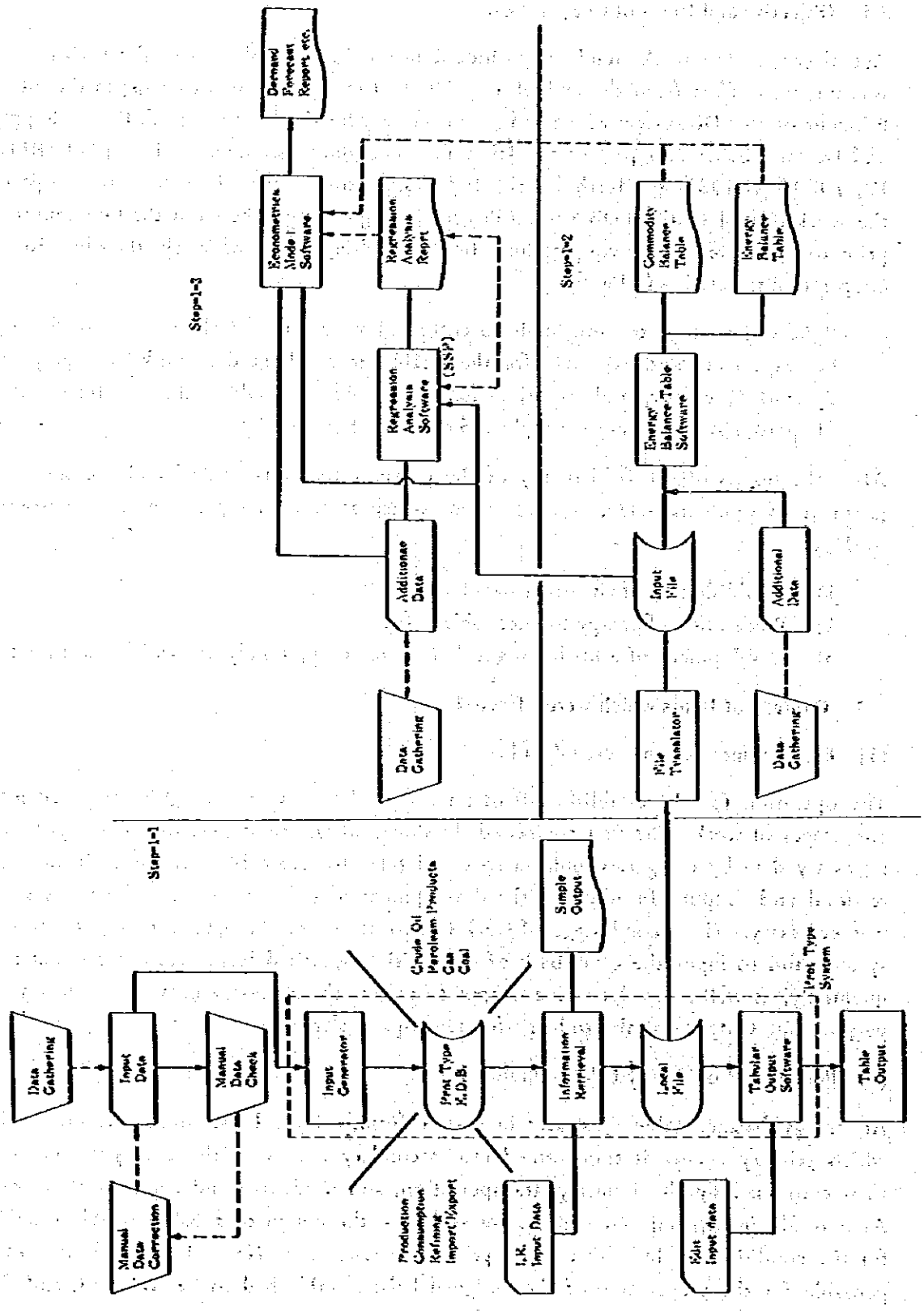
(1) Establishment of an energy data base

The operation for the establishment of an energy data base was roughly separated into two stages of work. The first comprised the design of an overall system which inputs the necessary data by categories under a specified form to create files, perform information retrieval and output. In addition, the development of software required for the system was necessary. The second stage of work was to determine the data to be input into the system, and to input the great bulk of data with a specified form into the computersequentially, as well as to determine output forms for the necessary data on a monthly or yearly basis. Output was also to be performed sequentially.

(2) Preparation of energy balance tables

An energy balance table illustrates in matrix form, using calorific units, the process in which primary energy is transformed into secondary energy in the energy sector, and then consumed by the industry, transportation, and residential and commercial sectors. As a result, in carrying out cooperative activities, the design of a balance table suitable for the conditions in Indonesia was a primary requirement. Next, data which are indispensable for the preparation of the designed balance table had to be collected; and the

Fig. 3-1 Content and Mutual Relationship of the Cooperative Operation and Division of Labor



construction of an equation system for energy balances necessary for the compilation of the designed balance table was required. Finally, software capable of preparing the balance tables by inputing actual data into the equation system had to be developed. As a result, the energy balance tables for Indonesia covering the years from 1969 to 1978 were compiled in this manner.

(3) Development of a medium- and long-term energy supply-demand forecast model

Since medium- and long-term, here, refers to a period of five to ten years, process of the works will be: first, to design medium- and long-term forecast model; second, and most important, to collect time-series macroeconomic data from the past decade, and collect data related to energy which would not be input to the data bank -- indispensable elements for establishing the structural equations of the forecast model, and in deciding the values of exogenous variables; and third, to develop the medium- and long-term model and associated software. With regard to the cooperative operation in this fiscal year, various restrictions were imposed on the development of the model, primarily due to the lack of necessary time-series data. However, sufficient forecast results up to 1990 could be obtained.

The cooperative items were effected in accordance with the above described contents and procedures in Indonesia and Japan respectively, taking the form of a cooperative operation.

Figure 3-1 illustrates the content and mutual relationship of the cooperative operation and division of labor.

3-3 Composition of Members Involved in the Cooperative Operation

(1) Composition of the JICA Expert Team

The JICA Expert Team consists of nine members including energy economists, system engineers, and system analysts. A total of eleven members participated in the field survey taken three times. These experts plus one additional took part in the cooperative operation in Japan with the Indonesian members.

(2) Composition of Indonesian Counterpart

In undertaking the project, the Indonesian side formed a team consisting of experts in the related fields at MIGAS, LEMIGAS, and PERTAMINA in order to participate in the cooperative operation. The number of members in the team reached nearly 30, while the number of members who were dispatched to Japan as trainees exceeded 20, 4 of whom were received by the JICA.

Table 3-1 Members of the JICA Expert Team

Name	Distribution of Work
Takao Tomitate	Coordinator
Hitoshi Shozawa	Energy balance table
Kenichi Matsui	Energy supply-demand forecast model
Yoshio Hara	Assistant coordinator, energy statistics
Yoshiki Ogawa	Energy balance table, software for the balance table
Akio Sonobe	Data base, field coordinator
Koichi Osada	Software for the data bank
Shoji Yoshikoshi	Software for the data bank, software for the forecast model
Setsuo Takemoto	JICA
Toru Nishizutsumi (Domestic operation)	Energy supply-demand forecast model

Table 3-2 Members of the Indonesian Counterpart

Name	Bureau	Distribution of Work
A. Qoyum	MIGAS	Coordinator
R. S. Robot	PERTAMINA	Assistant Coordinator
Erwin Kasim	"	Designing of the data bank
Maman Widjaja	"	Software for data bank
Agung Witono	"	Software for data bank
Djoko Widagdo	"	Programming
Santoso Koerdi	"	Programming
Paido H.	"	Programming
Anton H.	"	Programming
Sumardi C. D.	"	Programming
Pramono	"	Supply-demand forecast model
Tanujaya	"	Supply-demand forecast model
Rohali Sani	MIGAS	Energy balance table
Mrs. Soeparti Soediro	"	Energy balance table
Mulyanto	"	Supply-demand forecast model
Widartomo	"	Supply-demand forecast model
Rasif Razak	"	Energy balance table
C. Djufri	"	Energy balance table
Mrs. Ratna	"	Supply-demand forecast model
Hendro Prawoto	LIMIGAS	Energy balance table
Mrs. Endang Lestari	"	Energy balance table
Bunyani	PERTAMINA	Software for the data bank

3-4 Operational Schedule and its Content

(1) Operational schedule and its content in Indonesia

The Japanese expert team was dispatched to Indonesia three times, and one professional was stationed in Indonesia throughout the operation of the project.

The first expert team was dispatched from July 28 to September 8, 1979. Immediately after determining the scope of the project for this fiscal year, they moved onto the execution of the operation. The first cooperative works included: 1) deciding on the types of data to be input, and the input form; 2) deciding on the forms of data output which could be obtained as statistical tables, and formulating a rough outline of the form; 3) determining the number of raws and columns in the balance tables, and confirming the availability of data; and 4) establishing sofrware for data input into the data bank, etc.

The second team was sent on December 4 and stayed in Indonesia until December 30, 1979. Their work included: 1) preparation of software related to the energy blance table; and 2) installation of software for data retrieval and output.

The third team was dispatched from March 5 to March 11, 1980, taking over the half-completed operation. During their short stay, the work covered; 1) clarification of the problems which had arisen during the course of the cooperative operation up to that stage; and 2) discussions on the direction which the expansion of the data bank should be led in the future, and methods of cooperation required for the expansion.

(2) Operational schedule in Japan and its content

The first domestic operation was undertaken from September 17 to November 20, 1979, succeeding the work carried out by the first dispatched team. The operation took the form of a joint operation between the Japanese and Indonesian members. The number of countermembers who had visited Japan during this period totalled 14, including 2 trainees received by the JICA.

The work of the first domestic operation consisted of: 1) construction of the equation system for energy balances; 2) input of actual data and experimental compilation of the 1978 balance table; and 3) preparation of software for data retrieval from the data bank and data output.

The major objective of the second domestic operation, undertaken from December 13, 1979 to February 17, 1980, was to develop a medium- and long-term energy supply-demand forecast model. As a result, the first half of the operational period was concentrated on the conceptual design of the forecast model. Based on the conceptual design, equation of the model and exogenous variables were set up. In the latter half, real data were input to obtain results, and software required for the operation of the model was also developed.

(20)

In order to determine the real situation of energy supply and demand in the Japanese major industries, four field trips were made during the course of the first and second domestic operations.

Table 3-3 Field Trips to Major Domestic Industries

Date		Name of Factory
First trip	Oct. 4-5, 1979	Kashima Plant of Mitsubishi Petrochemical Co., Ltd. Kashima Oil Refinery Kashima Ironworks of Sumitomo Metal Industries, Ltd.
Second trip	Oct. 18-19, 1979	Hamaoka nuclear power plant of Chubu Electric Power Co. Ltd. Toyota factory of Toyota Motor Co., Ltd.
Third trip	Nov. 7, 1979	Isogo steam power plant of Electric Power Development Co. (Coal) Minami-Yokohama steam power plant of Tokyo Electric Power Co., Inc. (LNG) Negishi factory of Tokyo Gas Co., Ltd.
Fourth trip	Feb. 4, 1980	Nagoya Ironworks of Nippon Steel Corporation LNG receiving station of Chubu Electric Power Co., Ltd.

WORK SCHEDULE BY ITEMS AND ASSIGNED PERSONS

WORK ITEM	NAME	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
COORDINATER	Takao TOMITATE	(28)	(10)							(5) (9)
DESIGN OF ENERGY BALANCE TABLE	Hitoshi SHOZAWA	(28)	(17)							
	Yoshio HARA	(28)	(17)				(4) (13)			
ESTABLISHMENT OF EQUATIONS AND SOFTWARES FOR E.B.T.	Yoshiki OGAWA						(4) (30)			
ESTABLISHMENT OF SOFTWARES FOR E.D.B. AND ENERGY SUPPLY-DEMAND FORECAST	Shoji YOSHIKOSHI	(28)	(8)				(4) (16)			
	Koichi OSADA									(5) (11)
ESTABLISHMENT OF ENERGY DATA BASE	Akio SONOBE	(28)								(22)
ESTABLISHMENT OF ENERGY FORECAST MODEL	Kenichi MATSUI (Toru NISHIZUTSUMI)								(5)	(11)
COORDINATER	Qoyum					(5)				
	R. S. Robot									
ESTABLISHMENT OF ENERGY BALANCE TABLE (DESIGN, EQUATIONS, AND SOFTWARES)	*Soeparti Soediro			(12)			(20)			
	*Hendro Prawoto			(12)			(20)			
	Rohali Sani			(14)						
	Razif Razak			(14)						
	C. Djufri				(10)					
	Endang Lestari				(10)					

WORK ITEM	NAME	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
DEVELOPMENT OF E.D.B. SYSTEM AND SOFTWARES	Erwin Kasim			(14) ⊢						
	Maman Widjaja									
	Agung Witono									
	Sumardi C.D.			(11) ⊢		⊣ (9)				
	Santoso			(11) ⊢						
	Paido			(11) ⊢						
	Anton				(11) ⊢					
	Bunyani				(10) ⊢					
ESTABLISHMENT OF ENERGY SUPPLY-DEMAND FORECAST MODEL	Mulyanto						(25) ⊢		⊣ (17)	
	Widartomo				(28) ⊢			(3) ⊢	⊣ (17)	
	Ratna								(6) ⊢	⊣
ESTABLISHMENT OF SOFTWARE FOR ENERGY SUPPLY-DEMAND FORECAST MODEL	☆Pramono						(25) ⊢		⊣ (17)	
	Tanujaya							(3) ⊢	⊣ (17)	
ESTABLISHMENT OF SOFTWARES FOR E.D.B. AND FORECAST MODEL	☆Djoko Widagdo						(13) ⊢		⊣ (17)	

Note: ——— Work in JAKARTA
⊢------⊣ Work in TOKYO
( ) Date
〈 〉 Expert for the domestic work
☆ Trainees accepted by JICA

4. Technical Cooperation Implemented in the 2nd Year (1980)

As stated in the preceding section, the established data bank system through the 1979 technical cooperation has a capacity of the data input of 200,000. But these are mostly the original micro-data. It is necessary to intensify these data into the macro-data each time that they be used for preparation of an energy balance table or an energy supply-demand forecast. By establishing a sub-data bank system wherein a monthly and a yearly compilation of data re made so that such compiled data for both micro- and macro-bases could be conveniently drawn out depending upon the purpose. Fig. 4-1 shows the relationship in this respect. The established data bank system in 1979 shall be used for the production analysis of oils by their oil-classifications and fields and the analysis of conversion process of natural gas. On the other hand, the newly established sub-data bank system (the energy data bank on a macro-scale) shall be used for preparation of an energy balance table and a development of a supply-demand forecast model.

The details of the 1980 works including the follow-up of the 1979 cooperation are as follows:

4-1 Energy Supply-Demand Data Bank System

1) Accumulation of the energy data excepting those of oil & gas, namely, coal & electric power, and correction of the system so as to be able to make statistical table of other energies.

2) Making of a sub-system for processing data for transfer from the main data bank to the sub-data bank of a macro-data.

3) Making of a sub-system for protection of data from destruction as well as the effective use of the magnetic disks for keeping data, since the main data bank handles a large amount of data.

4-2 Energy Balance System

1) Improvement of the system for calculating the commodity balance table in original units and the concise energy balance table manually made last year for the purpose of using energy supply-demand forecasting.

2) Development of a system for getting basic energy statistics from the sub-data bank for macro-data, computing the energy balance data, commodity balance data and concise energy balance data for a number of period and storing the results of such computations in the sub-data bank for macro-data.

Fig. 4-1 Concept of the Final Data Bank System

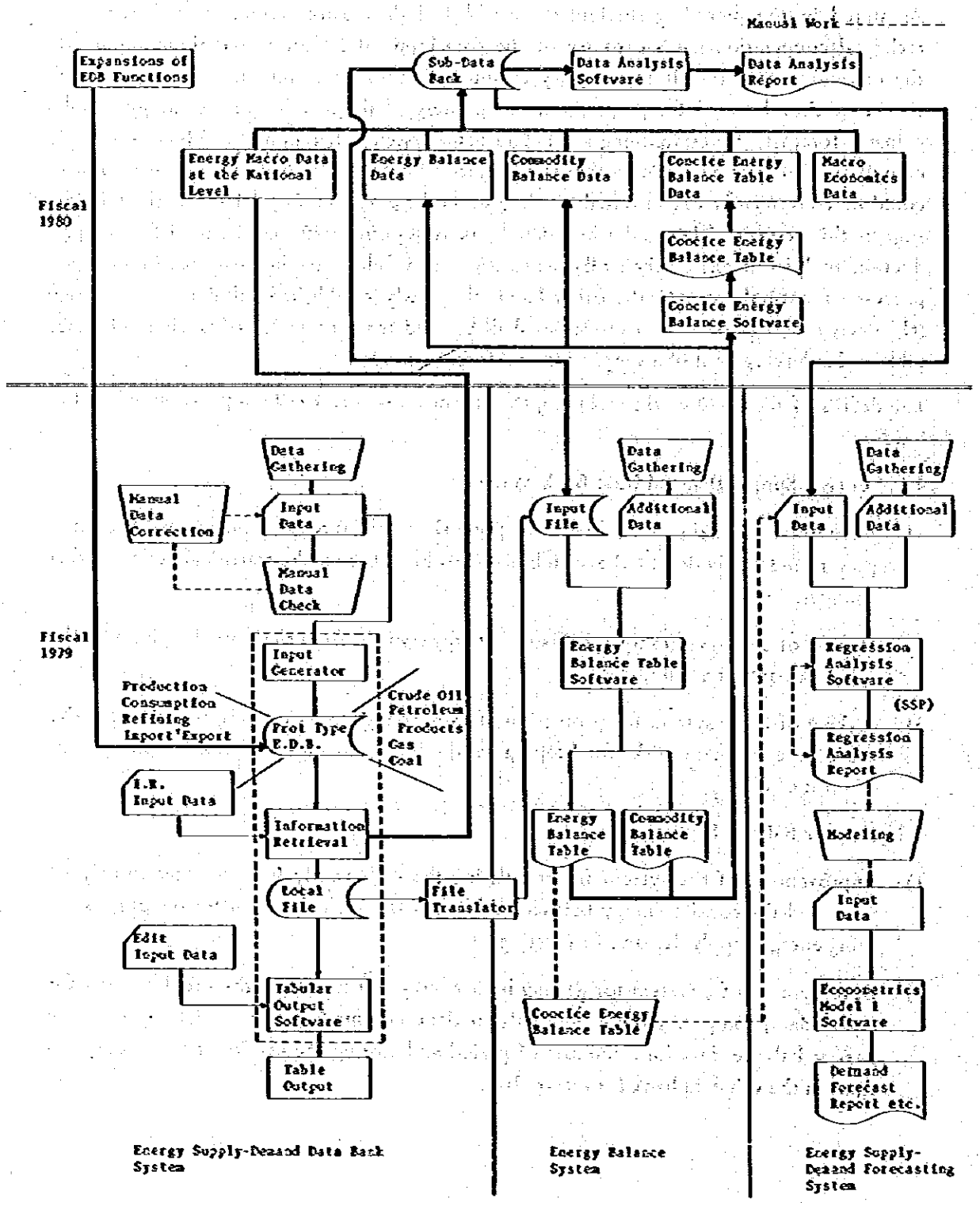


Table 4-1 Members of the JICA Expert Team

Name	Distribution of Work
Takao Tomitate	Coodinator
Hitoshi Shozawa	Energy Balance Table
Akio Sonobe	Sub-Data Bank, Energy Balance Table
Yoshio Hata	Energy Supply-Demand Forecast
Shoji Yoshikoshi	Operating System
Yoshiki Ogawa	Sub-Data Bank, Energy Balance Table
Naoki Tani	Data Analysis
Isao Asai	JICA, Coordinator
(Domestic Operation)	
Kazuya Fujime	Supply-Demand Forecast System
Koichi Osada	Data Bank System

Table 4-2 Numbers of the Indonesian Counterpart

Name	Bureau	Distribution of Work
Rohali Sani	MIGAS	Coordinator
Erwin Kasim	PERTAMINA	Deputy Coordinator
Mrs. Soeparti Soediro	MIGAS	Energy Balance Table
Widartomo	MIGAS	Supply-Demand Forecast Model
Mulyanto	MIGAS	"
Pramono	PERTAMINA	"
Kurtubi	MIGAS	"
Sauman Sri Basuki	MIGAS	"
Hendro Prawoto	LEMIGAS	"
Sumardi C.D.	PERTAMINA	Energy Data
C. Djufri	MIGAS	"
Razif Razak	MIGAS	"
Rivai Hamzah	MIGAS	"
Winaryanto	MIGAS	"
Joras P.	MIGAS	"
Amril K.	MIGAS	"
Ikunten G.	MIGAS	"
Maman Widaja	PERTAMINA	Softwate
Santoso Koerdi	PERTAMINA	"
Paido H.	PERTAMINA	"
Anton H.	PERTAMINA	"
Djoko Widagdo	PERTAMINA	"
Mrs. Ratna	MIGAS	"

3) Development of a system for getting energy balance data, commodity balance data, & concise energy balance data from the sub-data bank for macro-data and printing out the energy balance table, commodity balance table and concise energy balance table of an arbitrary period and in a desired number.

4-3 Energy Supply-Demand Forecast System

1) Since the supply-demand forecast model system developed in 1979 is incapable of coping with the change of models, a simulator shall be developed for application of models constructed by the general econometric method.

2) Connection of the simulator and the sub-data bank for drawing from such energy data bank the data necessary for the model application.

3) Improvement and test-simulation of the equation system of the energy supply-demand forecast model including the 1979 data.

4) Expansion of reporting functions for obtaining the result of energy supply-demand forecasts in an output form of a concise energy balance table.

4-4 Sub-Data Bank System for Macro-Data

1) Development of a system capable of accumulating the macroeconomic and macro-energy data by applying the concept of the energy supply-demand data bank and of maintaining such data bank simultaneously.

2) Since it seems likely that a great deal of time is still necessary to be able to transfer basic energy statistics from the energy supply-demand bank to the sub-data bank for macro-data, manual inputs shall be made of basic energy statistics on annual basis into the data bank for obtaining the energy balance table and supply-demand forecast.

3) Manual input of macroeconomic data into the data bank for obtaining the energy supply-demand forecast.

Table 4-3 Contents of Technical Cooperation

Project	Work Item
I. Establishment of Sub-Data Bank for macro energy data at the national level	① Design of input output format ② Softwares ③ Data Analyzing Functions ④ Data Storing
II. Connection of Sub-Data Bank to Energy Balance System	⑤ Expansion of Softwares ⑥ Making of Energy Balance Table and Storing to Sub-Data Bank
III. Connection of Sub-Data bank to Energy Supply-Demand Forecasting System	⑦ Expansion of Softwares ⑧ Improvements of Energy Supply-Demand Forecasting Model
IV. Connection between Energy Balance and Energy Supply-Demand Forecasting Systems	⑨ Expansion of softwares to make Concise Energy Balance Tables ⑩ Making of Concise Energy Balance Tables and Storing to Sub-Data Bank
V. Improvement and expansion of Energy Supply-Demand Data Bank System	⑪ same as Project Item
VI. Operation	⑫ same as Project Item
VII. Final Manual	⑬ same as Project Item

WORK SCHEDULE AND ASSIGNED PERSONS & ITEMS

NAME	ITEMS	'80 SEP	OCT	NOV	DEC	'81 JAN	FEB	MAR
T. Tomitate	Coordinate ①	(18)——(24)					(16)——(22)	·····
H. Shozawa	①⑥⑨⑩⑪						(16)——(22)	·····
A. Sonobe	①④⑩	(18)——(8)						·····
Y. Hara	Coordinate ⑦⑧⑩					(5)——(11)		·····
S. Yoshikoshi	①②③④⑤⑦ ⑨⑩⑪	(18)——(8)		·····	·····	(5)——(18)	(16) (1)	·····
Y. Ogawa	①②④⑤⑥⑧ ⑨⑩⑪	(18)——(8)		·····	·····	(5)——(25)	(16)——(22)	·····
N. Tani	②③⑦⑩			·····	·····	(5)——(20)		
K. Fujime	⑩							·····
K. Osada	⑩							·····
I. Asai	Coordinate (JICA)	(18)——	(24)					
Rohali Sani	Coordinate ⑧⑩			(23)·····(6)				
Erwin Kasim	Coordinate			(9)·····(24)				
Mrs. Soeparti	①⑤⑥⑨⑩⑪		(27)·····(23)					
Widartomo	①⑧⑩			(28)·····(23)				
☆ Mulyanto	②③④⑦⑧⑩ ⑪			(13)·····(27)				
Pramono	⑧			(23)·····(8)				
☆ Kurtubi	④⑧				(16)·····(28)			

NAME	ITEMS	'80 SEP	OCT	NOV	DEC	'81 JAN	FEB	MAR
☆ Sauman S.B.	⑥⑧				(10)·····(28)			
Hendro P.	⑤⑧⑩				(10)·····(23)			
Sumardi C.D.	⑬			(9)·····(24)				
C. Djufri	⑭							
☆ Razif Razak	⑩⑮				(16)·····(28)			
Rivai Hamzah	⑩		(27)·····(9)					
Winaryanto	⑬			(25)·····(8)				
Toras P.	⑦							
Amril K.	⑭							
Ikunten G.	⑦							
Maman W.	⑤⑫		(27)·····(2)					
Santoso K.	⑥⑨⑩⑫		(27)·····(23)					
Paido H.	⑨⑫⑭⑮⑯			(25)·····(23)				
Anton H.	⑦⑮⑩⑫		(27)·····(23)					
Djoko W.	⑨⑩⑰			(23)·····(23)				
Mrs. Ratna	⑨⑮⑰			(25)·····(23)				

Note: ——— Work in JAKARTA ( ) Date Numbers for items indicate those in Table 4-3.
····· Work in TOKYO ☆ Trainees accepted by JICA

USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK I

PREPARATION AND IMPLEMENTATION OF INPUT DATA

USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK I
– PREPARATION AND IMPLEMENTATION OF INPUT DATA –

1. Coding of Data

1-1 General Notice on Coding

(1) Data is important and required to be exact, because these data will make the basis of Energy Data base, Energy Balance Table and Energy Supply Demand Forecasting of the Republic of Indonesia.
Input data sheets should be filled as carefully as possible.

(2) While coding, latest Table Data*, coding format*, coding example* and comments* on each kind of energy sources should be referred.

(3) Especially errors caused by mis-transformation from the real name to code no. are difficult to be found hereafter, so should be very careful to get code no..

(4) In case of the sub-total is not given in the raw documents, calculate and get the value to code in input data sheets.

(5) Make sure that a group of data is consisted of three kinds of card, that is to say:

a Header card
stack of Data cards
a End card

(6) Be careful not so as to make the additional line excessing 27 lines in a input data sheet, even if it's a END card.
In many cases, it would be skip-punched.

(7) After having code once re-check by sight, especially if data is filled in the correct columns respectively.
This will be done easily with the Column Field Plate.

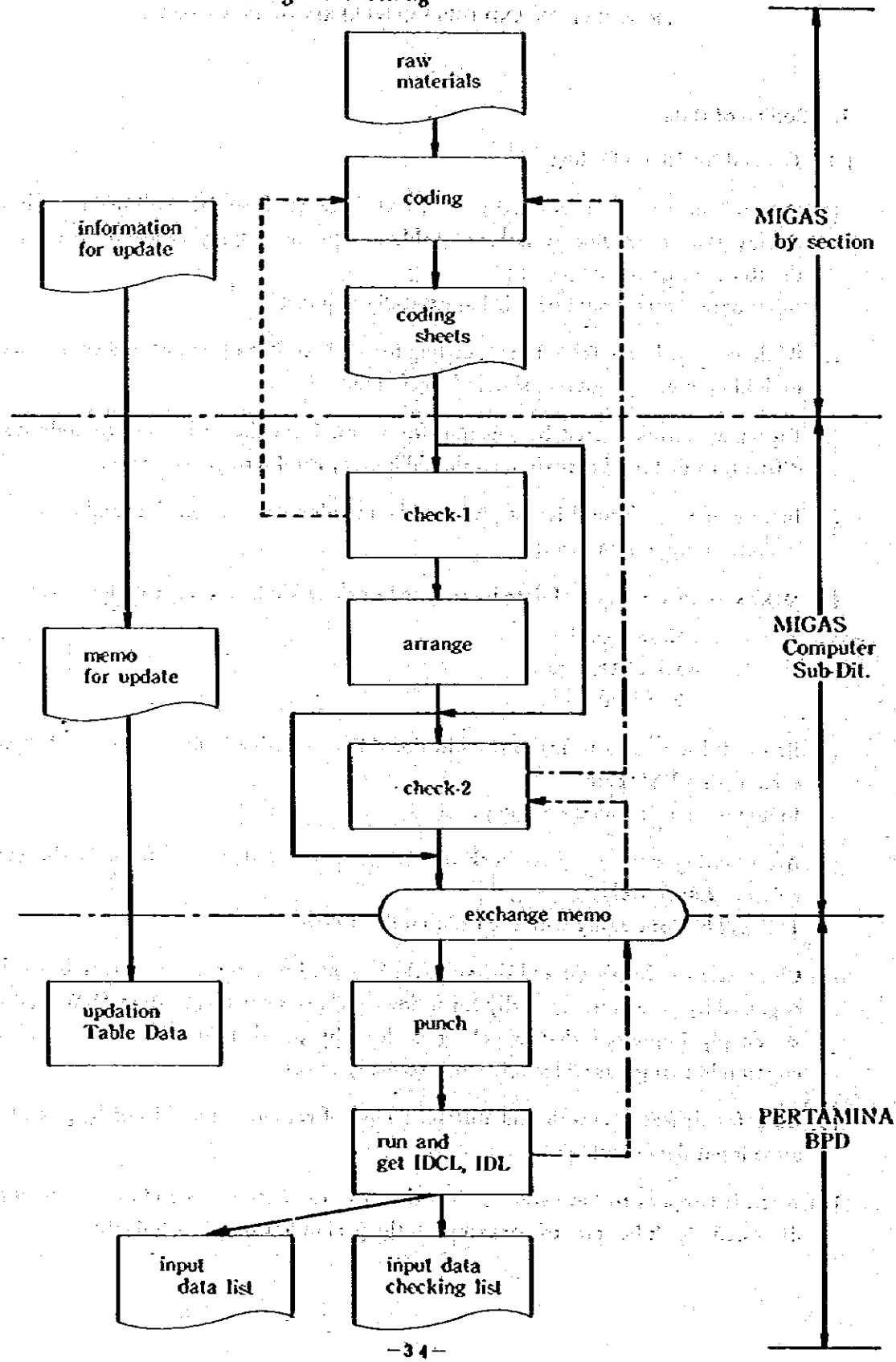
(8) Characters of alphabetic and digit should be coded in print hand so as to be easily recognized by punchers, especially for following characters: I, 1; O, 0; M, H; W, N; P, D;.
Be deeply impressed that punching is done by punchers not by coders, and unrecognizable characters will surely come to many errors.

(9) Data for different month and different kind of resources should not be given in the same input data sheet.

(10) When it happens to have some points that you can not understand or new items to be discussed, don't hesitate to contact with the person of Computer Sub-Dit..

(2)

Fig. 1 Procedures in Date Coding and Checking



1-2 Table Data

(1) The kinds of Table Data are as follows:

A.	crude field	(300)*
B.	crude type	(100)
C.	refinery	(100)
D.	marketing region	(20)
E.	seafed depot	(200)
F.	upcountry depot	(100)
G.	distribution station	(100)
H.	discharging	(50)
I.	foreign country	(50)
J.	category	(50)
K.	commodity	(100)
L.	sort	(100)
M.	gas field	(300)
N.	company	(100)
O.	system	(10)
P.	loading port	(100)
Q.	unit	(20)

*max. size

(2) These Table Data should be carefully referred, while transforming the real name to code no. or symbol.

(3) If the code no. or symbol is not found a necessary to be added to Table Data, it should be informed to Computer Sub-Dit. to be registered newly.

(4) In Table Data, specific values or other information regarding to each item are given in addition to correspondence of the real name and code no. or symbol.
So, while registered newly, these additional information should be submitted to Computer Sub-Dit. at the same time.

1-3 Input Data Format

(1) Same format could be commonly used for Crude Oil, Gas, Coal and so forth.

(2) The column field for three kinds of card are as follows:

A. Header card

name	position	no. of column	contents
a) frequency	col. 1	1	kinds of frequency*1
b) year	col. 2 ~ 5	4	figure of the year
c) quarter	col. 6	1	figure of the quarter*2
d) month	col. 7 ~ 8	2	figure of the month

(4)

name	position	no. of column	contents
e) scale	col. 9 ~ 10	2	multiplier to the amount
f) unit	col. 11 ~ 13	3	kinds of unit*4
g) sub-total	col. 14 ~ 28	15	sum of the amount in data cards
h) sheet ID	col. 70 ~ 76	7	sheet identification no. *5
i) section ID	col. 77 ~ 80	6	section identification symbol*6

*1 Y (year), Q (quarter), M (month)
if Y is given, col. 2 ~ 5 must be given
if Q is given, col. 2 ~ 6 must be given
if M is given, col. 2 ~ 5 & col. 7 ~ 8 must be given

*2 1 : January to March
2 : April to June
3 : July to September
4 : October to December

*3 given in the figure of power of 10^n ($-9 \leqslant n \leqslant 9$) and multiplied by the amount to get the real amount

*4 BBL : barrel
MT : metric ton
KL : kilo litter
MCF : cubic feet (10^3)
M3 : cubic meter
KWH : kilo watt per hour
US$: U.S. dollar
MCM : cubic meter (10^3)

*5 given hereafter by Computer Sub-Dit.

*6 indicates the section responsible for preparation of the data
EPTP : Seksi Penambangan
EPKM : Seksi Pemasaran
PERT : Research and Development, Pertamina

B. Data card

name	position	no. of column	contents	reference
a) category	col. 1 ~ 2	2	refer to Table Data	2. (1)–J
b) commodity	col. 3 ~ 5	3	refer to Table Data	2. (1)–K
c) sort – 1	col. 7 ~ 9	3*1	refer to Table Data	2. (1)–L
d) sort – 2	col. 11 ~ 13	3		
e) amount	col. 15 ~ 26	12	given in right-shift*2	
f) field	col. 28 ~ 30	3	refer to Table Data	2. (1)–A, M
g) type	col. 31 ~ 32	2	refer to Table Data	2. (1)–B*3

	name	position	no. of column	contents	reference
h)	refinery	col. 35 ~ 36	2	refer to Table Data	2. (1)–C*3
i)	marketing	col. 39 ~ 40	2	refer to Table Data	2. (1)–D*3
j)	discharging	col. 43 ~ 45	3	refer to Table Data	2. (1)–H*4
k)	foreign country	col. 48 ~ 49	2	refer to Table Data	2. (1)–I
l)	domestic transportation	col. 52 ~ 59	8	refer to Table Data	2. (1)–C,B, F,G*5
m)	comments	col. 62 ~ 66	5	comments	
n)	sheet ID	col. 70 ~ 76	7	same as	2. (2)–A–i)
o)	section ID	col. 77 ~ 80	6	same as	2. (2)–A–j)

*1 '&' should be filled in col. 6 or col. 6 and col. 10 if sort – 1 or sort – 1 and sort – 2 is used respectively.

*2 should be given in right-shift, without point (.)

*3

	kinds of data			
field name	Oil	Gas	Coal	others
field	Table Data-A (001 ~ 270)	Table Data-M (001 ~ 272)	Table Data-A (271 ~ 272)	
type	B (01 ~ 30)	B (51 ~ 55)	———	
refinery	C (01 ~ 30)	C		
market	D (01 ~ 08)	———	———	

Transformation table of the real name – code no. in Table Data A and M is just the same, but additional information are different.
Refer to 3 in detail.

*4 'discharging' means 'discharging port of import goods' in case of Oil and Gas data, but 'loading port for export' in case of Coal data.

*5

col. 52	the kind of origin	} from
col. 53 ~ 55	code no.	
col. 56	the kind of destination	} to
col. 59 ~ 59	code no.	

kinds of origin and destination are as follows:

R : refinery
M : market region
F : seafed depot
U : upcountry depot
D : distribution station

Refer to 3 in detail.

C. End card

name	position	no. of column	contents
a) end	col. 1 ~ 3	3	END
b) sheet ID	col. 70 ~ 76	7	same as A–h)
c) section ID	col. 77 ~ 80	4	same as A–i)

1-4 Comments on Each Kind of Energy Resources

(1) Oil

A. To manage the Intermediate Products such as
- ó Middle Distillates
- ó Feed Stock
- ó Asphalt Base
- o Lubricant Base,

We set the commodity names MID, FDS, ABS and LBS respectively. These are only used in Transformation (Category T) and excluded from the Energy Balance Table.

B. The same product happens to be input and output in refinery. To distinguish the commodity is used as input or product, category T and P is used.
category T – in case of 'input'
category P – in case of 'product'

C. There are three types of 'stock' as follows.
WRF – at the refinery yard especially for materials before transformation
REF – at the refinery yard for products
CRF – at the crude oil field

D. There are two types of 'Loss' as follows.
REF – at the refinery yard
CRF – at the crude oil field

Be sure that the amount of "Own Use' at the refinery yard should not be counted in that of 'Loss'.

E. The code no. of foreign country should be given for the data EV, IV. The value of EV, IV is desiarably given in integer.

F. Make sure some alternations in definition of data are correctly done.

1) T $\left\{\begin{matrix}\text{ADO}\\\text{IDO}\\\text{HFO}\end{matrix}\right\}$ & AUT $\longrightarrow$ A $\left\{\begin{matrix}\text{ADO}\\\text{IDO}\\\text{HFO}\end{matrix}\right\}$ & RAC

A : Category of 'Auto Generation'

Coding example of oil

	1	2	3	4	5	6	7	8	9	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

Coding example of oil (continued)

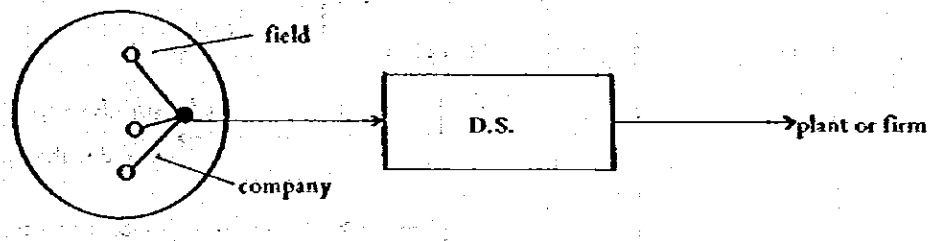
	category	commodity	sort-1	sort-2	amount	field type	refinery	marketing reg.	discharging	foreign country	from	to	domestic transportation	comments	sheet ID	section ID	
21.	W	O	C	R	R	E	F	4	0	0	3						P E R T
22.	W	R	D	S	R	E	F			0	3						P E R T
23.	L	O	C	R	W	R	F	4	0	0	1						P E R T
24.	L	P	D	S	W	R	F			0	1						E P K M
25.	M	A	G	S								0	1				E P K M
26.	S	K	E	R								R	0 1 U 0 0 6				E P K M
27.	S	K	E	R								R	0 2 F 0 0 2				E P K M
28.	C	A	D	O	&	N	A	V		0	2						E P K M
29.	H	K	E	R						0	2						E P K M
30.	S	K	E	R								R	0 3 R 1 1				E P K M
31.	C	P	G	S	&	G	A	F						0	5		P E R T
32.	T	A	D	O	&	P	U	B						0	1		P E R T
33.	A	A	D	O	&	R	A	C						0	1		P E R T

(2) Gas

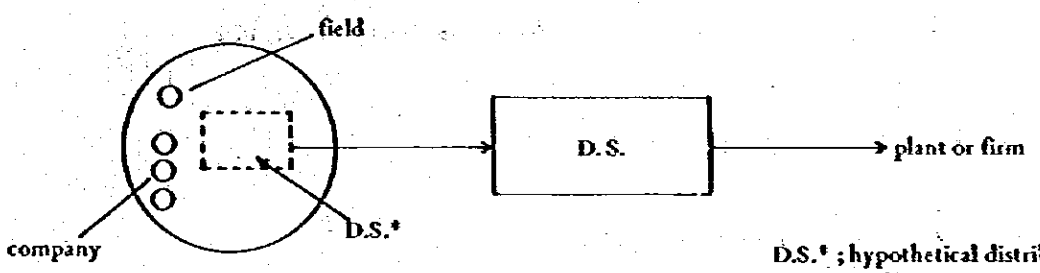
A. There are three types of 'Own Use' as follows.

GIN – for gas injection
GSL – for gas lift
FUL – for fuel

B. General supply flow of Gas is as follows.



Distribution station is actually pumping station.
To utilize or apply 'Domestic Transportation' column field system to Gas supply flow, 'Hypothetical' distribution station is set as following figure.
This station is named same as company (refer to 3-2-14)

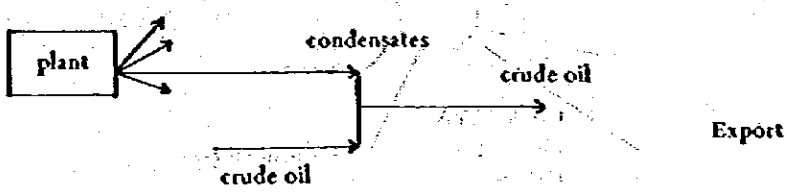


D.S.* ; hypothetical distribution station

C. All cases of distribution of Gas are as follows.

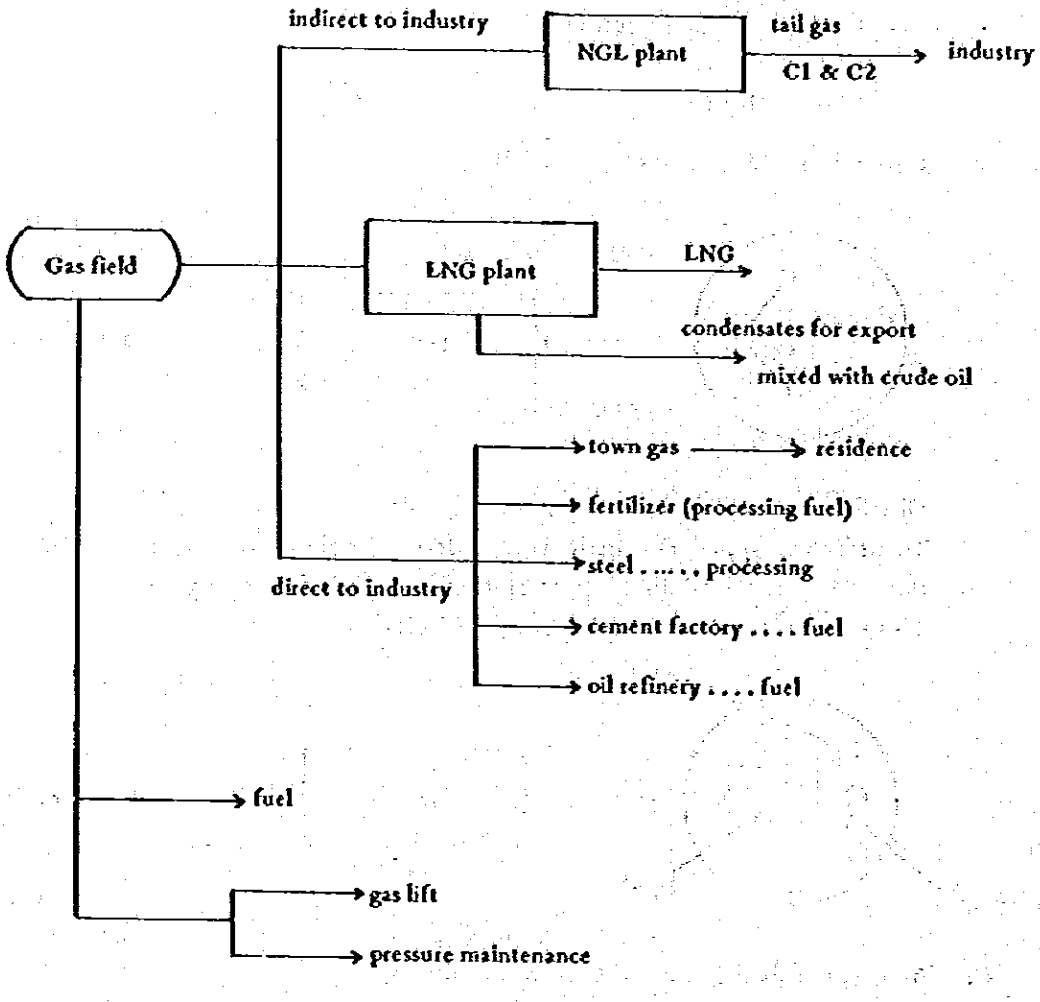
from		to
: D.S.* (D)	→	LNG plant (R)
· D.S.* (D)	→	D.S. (D)
· D.S.* (D)	→	industry (R)
· D.S. (D)	→	industry (R)
· LPG plant (R)	→	D.S. (D)

D. Condensates from LNG plant is mixed with some crude oil to make another crude oil for export.

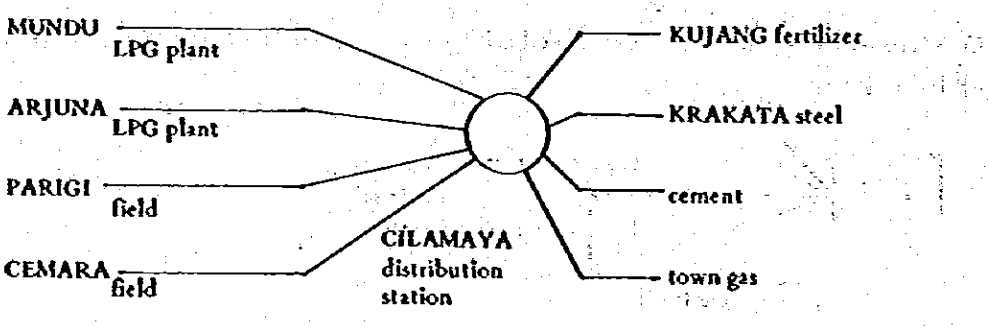


(10)

B. Flow of natural Gas in Indonesia is as follows.



F. An example of distribution station is as follows.



(11)

Coding example of natural gas

	category	commodity	sort-1	sort-2	account	field	type	refinery	marketing reg.	discharging	foreign country	domestic transportation from	domestic transportation to	comments	sheet ID	section ID
1.P	TNC					001									EPTP	
2.L	TNG					001									EPTP	
3.H	TNG	&CRF	&FUL									D|0|2|1			EPTP	
4.L	TNG	&CRF										D|0|2|2			EPTP	
5.C	TNG	&CAC							01						EPTP	
6.S	TNG											D|0|3|2	D|0|1		EPTP	
7.H	TNG							01							EPTP	
8.L	TNG											D|0|2|1			EPTP	
9.T	TNG	&REF						36							EPTP	
10.P	LNG	&REF						36							EPTP	
11.W	LPG							32							PERT	
12.T	LPG	&REF						32							PERT	
13.S	LPG								01			R|0|3|2			PERT	
14.H	LPG							32							PERT	
15.S	CON											R|0|3|2	D|0|2|1		PERT	
16.L	LPG							32							PERT	

(12)

(3) Coal

A. Field name

The 'Crude Oil Field' column field (col. 28 ~ 30) should be used to indicate the coal field.

ex. 271 Bukit Asam
272 Ombilin

B. Stock data

There are two kinds of 'stock'.

a) stock at coal field
b) stock at seafed depot (ex. Kertapati)

C. Supply data

At this moment, Supply and Consumption data is just the same. Firms of related industries should be registered in Refinery Table.

ex.	86	UPTB BANGKA	Tin mining
	87	PELTIM MUNTOK	
	91	POMALA	Nickel mining

D. Loss data

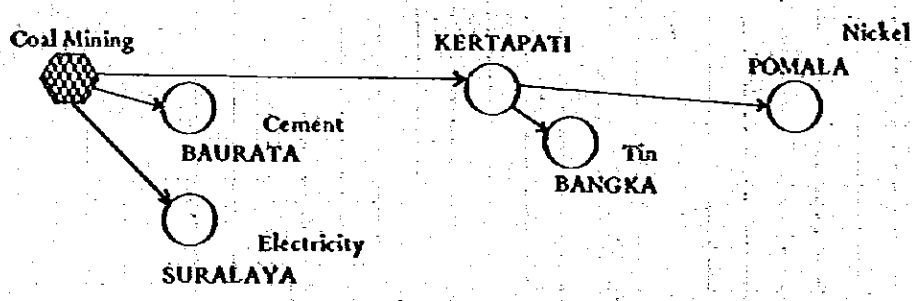
There are two types of 'loss'.

TRP – transportation
PLS – plant site

These TRP, PLS symbols are used in Sort – 1 column field.

E. Others

a) Distribution of the coal in R.I. is as follows:



b) At this moment, only data from Bukit Asam, Ombilin field are considered.

Coding example of coal

	category	commodity	sort-1	sort-2	amount	field type	refinery	marketing reg.	discharging	foreign country	from to	domestic transportation	comments	sheet ID	section ID	D M B P
1.P	S	C O K	C	M	N	2	7	1								D M B P
2.W	S	C O N	C	M	N	2	7	2								D M B P
3.T	S	C O N	C	M	N	2	7	2								D M B P
4.H	S	C O K	C	M	N	2	7	1								D M B P
5.C	S	C O N	C	A	C	2	7	2								D M B P
6.S	S	C O N	C	A	C	2	7	2								D M B P
7.E	A	C O N	E	N		2	7	1		1 3						

1-5 Estimation of Data Volume in E.D.B. System

Data volume as a whole should roughly be estimated to use for the design of E.D.B. system.

A. Conditions in estimation

1) The period covered is from Jan. 1978 to Dec. 1979.
2) Actual data of Jan. 1979 is used as basis data.
   For coal, data of Dec. 1978 is used.
3) Actual data volume mentioned above 2) is the figure for the time being, so the final figure could be increased.

B. Actual data volume in detail by kinds of data

1) Oil

cagetory	volume	%
P (production)	258	14
H (own use)	23	1
L (loss)	43	2
W (stock)	175	10
E (export)	88	5
I (import)	36	2
T (transportation)	49	3
S	450	23
M (marketing)	143	8
C (consumption)	593	32
total	1,843	100%

2) Gas

category	volume	%
P	166	57
L	59	20
H	33	12
C	6	2
S	17	6
T	6	2
W	3	1
total	290	100%

3) Coal

category	volume	%
P	3	14
W	1	5

category	volume	%
T	2	9
H	2	9
G	6	27
S	6	27
E	2	9
total	22	100%

Data volume in the aggregate

1) monthly data volume by kinds of energy resources

	volume (item)
o oil	2,000*
o gas	300*
o coal	30*
o others	?
total	2,500

*roughly rounded figure a little bigger than counted in B

2) data volume as a whole

6 (year) x 12 (month) x 2,500 (items/month)
= 180,000 (items)

king of data

eck–1 (for coded sheets before punching)

sure the following items on coded sheets:

a group of data be consisted of three kinds of card in following order:
a Header card
a stack of Data cards
a End card

all of the column fields necessary for each kind of data definition be filled

data be filled in exact column fields
It would easily be done with Column Field Plate.

'sub-total' column field be filled

'End' card be not given in the line excessing 27th printed line
In that case, it is desirable to prepare an additional sheet for it.

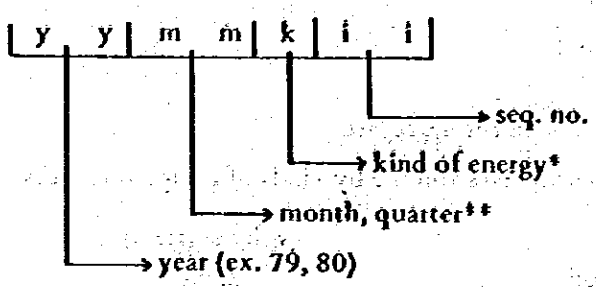
Category, Commodity and Sort be correctly coded referring to '1-4 Comments on each kind of energy resources'

2-2 Numbering

The unique number is assigned to each coded sheet so as to be identified easily hereafter.

This number is punched in col. 70 ~ 76 of Header card, Data card and End card.

A. Rule of numbering is as follows.



(*) 1 ~ 2 – Oil
3 – Gas
4 – Coal
5 – Electricity
6 – Others

(**) 01 ~ 12 – month
51 ~ 54 – quarter

B. After having numbered the I.D. no. as mentioned above by numbering machine at the upper part in the right-hand side of each coded sheet, give the number at col. 70 ~ 76 of each sheet so as to be easily punched by punchers.

2-3 Punching

Having been checked, the coded sheets can be submitted to BPD of PERTAMINA with 'Memo on Data Punching', and be punched in diskette. Comments on data punching job are as follows.

(1) Information of punching job asked by MIGAS Computer Sub-Dit. (abbreviates M, afterwards) should be transmitted to PERTAMINA, BPD (abbreviates P, afterwards) with 'Memo on Data Punching'.

(2) Persons of P, M must make sure the data sheets (coding sheets or input data list) and contents of the Memo be matched.

(3) The person of P or M should sign when he exchanges the Memo, sheets or output list each other.

(4) A. The person of M must give the additional information to the Memo as follows:

a) Note '0 = zero, Ø = O' on the first page of sheets in every group of coding sheets or input data list (in case of both Job 1 and Job 2).

b) Give the 'diskette No.' on the first page of every group of input data list in which the data concerned punched (in case of Job 2).

B. The person of P must send back No. of the diskette in which the data punched. This information should be given in 'Memo' (in case of Job 1).

(18)

MEMO ON DATA PUNCHING

date received : _____ – _____, 1980

sign : BPD of PERTAMINA

_____

date submitted : _____ – _____, 1980

sign : Computer, Sub Dit. MIGAS

_____

O Job

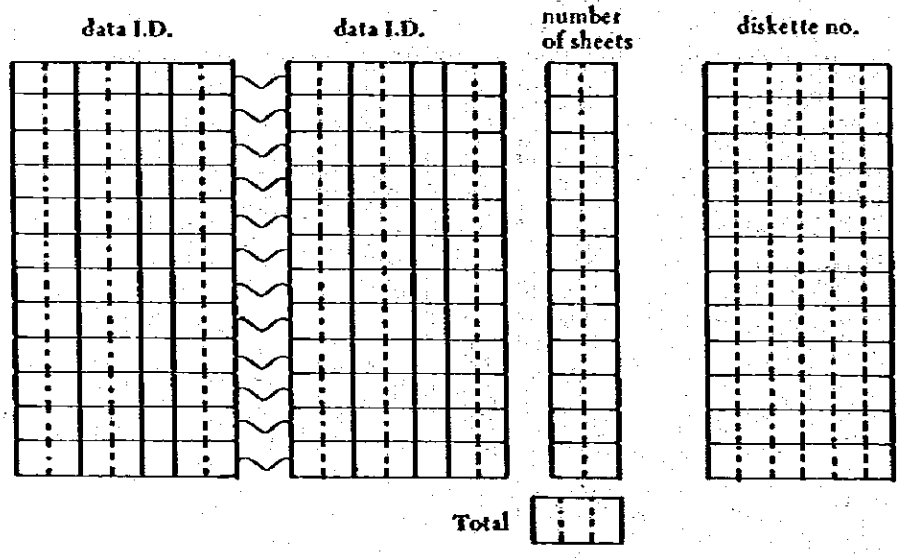
☐ punch to diskette (Job 1)

☐ revise data in diskette (Job 2)

☐ list input data

☐ list input data checking by program I

O Data



Date finished : _____ – _____, 1980

sign : BPD PERTAMINA

_____

Date received : _____ – _____ , 1980

sign : Computer, Sub Dit. MIGAS

_____

2-4 Check--2 (after punching))

Finishing punched and having Input Data checking Program run, following materials will be submitted from BPD of PERTAMINA.

- o input data list (IDL)
- o input data checking (IDCL)

In IDCL, error messages would be given.
Procedures of checking would be as follows (refer to Fig. 2).

(1) Identification of errors

Referring to IDCL, the list of error messages and explanation (refer to page 53), and Table Data, errors will be identified as caused by one of there items mentioned below.

A. punch miss
This can be found by comparing the coded sheet and IDL.

B. coding miss

C. corresponding data not given in Table Data

(2) Getting the correct data

A. in case of punch miss
The correct data can be got easily from the coded sheet.

B. in case of coding miss
The correct data should be got through being checked by the person of each section in charge of in MIGAS.

C. in case of corresponding data not given in Table Data
The correct data should be given by the person of each section in charge of MIGAS.

(3) Informing the correct data

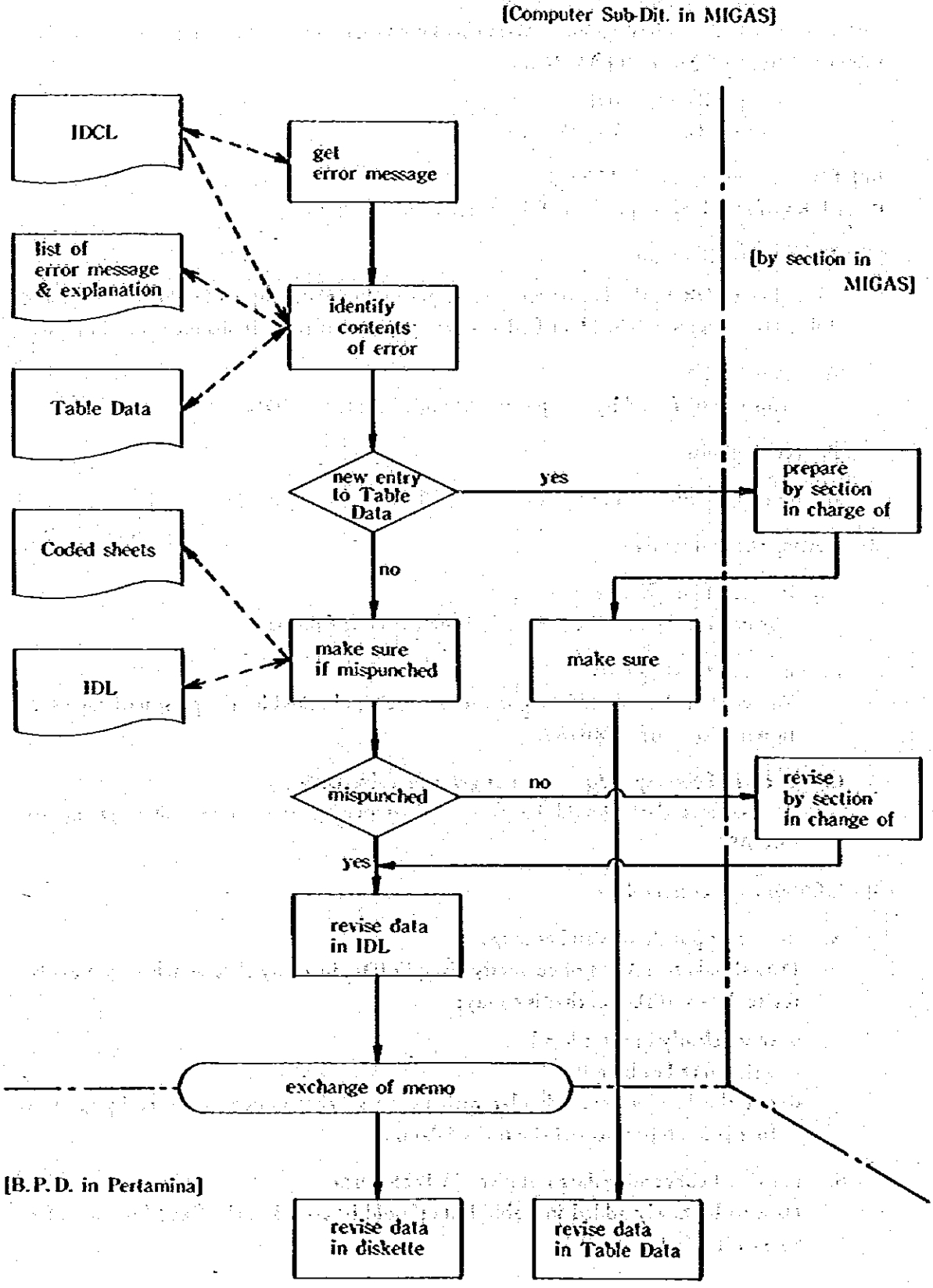
A. in case of punch miss and coding miss
Data should be revised or correctly given in IDL, in a way that punchers can easily revise data in diskette, that is to say;

- o write clearly in print hand
- o write in red or blue
- o put the line in perpendicular with pencil so that punchers can easily get the first column position of the revised data.

B. in case of concerning data not given in Table Data
Data to be newly added in Table Data should be coded in the fixed format (refer to 3-2 Tables).

(20)

Fig. 2 General Flow of Data Error Check



(4) Delivering the information

The information about revision of the data should be submitted to BPD of PERTAMINA with 'Memo or Data Punching' mentioned at '2-3. Punching'.

This procedure mentioned above would be repeated if necessary.

list of error message & explanation

Header card

1) 'WRONG FREQUENCY'
symbol other than Y, Q, M found in col. 1

2) 'WRONG YEAR'
figure other than 1970 ~ 2100 found in col. 2 ~ 5

3) 'WRONG QUARTER'
figure other than 1 ~ 4 found in col. 6

4) 'WRONG MONTH'
figure other than 1 ~ 12 found in col. 7 ~ 8

5) 'WRONG SCALE'
figure more than 9 found in col. 9 ~ 10

6) 'WRONG UNIT'
symbol other than registered in Table Data found in col. 11 ~ 13

Data card

1) 'WRONG CODE OR SYMBOL { CATEGORY / COMMODITY / SORT / CRUDE FIELD } '
symbol other than registered in Table Data found in { col. 1 ~ 2 / col. 3 ~ 5 / col. 7 ~ 9 or 11 ~ 13 / col. 28 ~ 30 }
respectively

2) 'WRONG FACILITY CODE FOR DOMESTIC TRANSP.
– { FROM / TO } – { REFINERY / SEAFED DEPOT / DISTRIBUTION / UP COUNTRY DEP. } '

(22)

figure other than registered in Table Data found in col. 53 ~ 55 (FROM) or col. 57 ~ 59 (TO) respectively

3) 'WRONG CODE OF DOMESTIC TRANSP. FROM '
TO

symbol other than R, U, F, D found in col. 52 (FROM) or col. 56 (TO) respectively

4) 'SUB-TOTAL NOT BALANCE SELSIN _ _ _ _ _ _ _ . _ _ '
sub-total given in col. 14 ~ 28 of Header card and the sum of amount given in col. 15 ~ 26 of all Data card not balanced
difference figure given as _ _ _ _ _ _ _ . _ _

3. Table Data

3-1 General Description

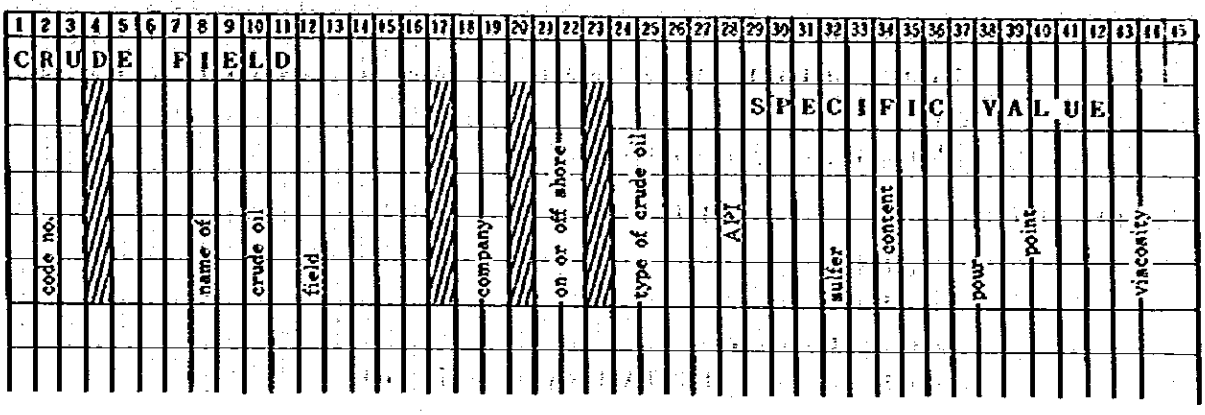
There are 17 kinds of table.
These Table Data being used for giving the name to be printed in output lists and giving information for mutual relation of data and the specific values, maintenance should carefully be done.

3-2 Table

(1) crude field < 300 >* * max. size

o items concerned
- code no.
- name of crude oil field
- code no. of company concerned
- code no. for 'on shore' or 'off shore'
- code no. for type of crude oil
- specific value
  - API
  - sulfer contents
  - pour point
  - viscosity

o format



o comment

a) Code no. 271 and 272 are used for Coal data.

b) Code no. for 'on shore' or 'off shore' are as follows.

01 : on shore

02 : off shore

(2) crude type < 100 >

o items concerned

- code no.
- name for type of crude oil
- code no. of loading port concerned
- specific value

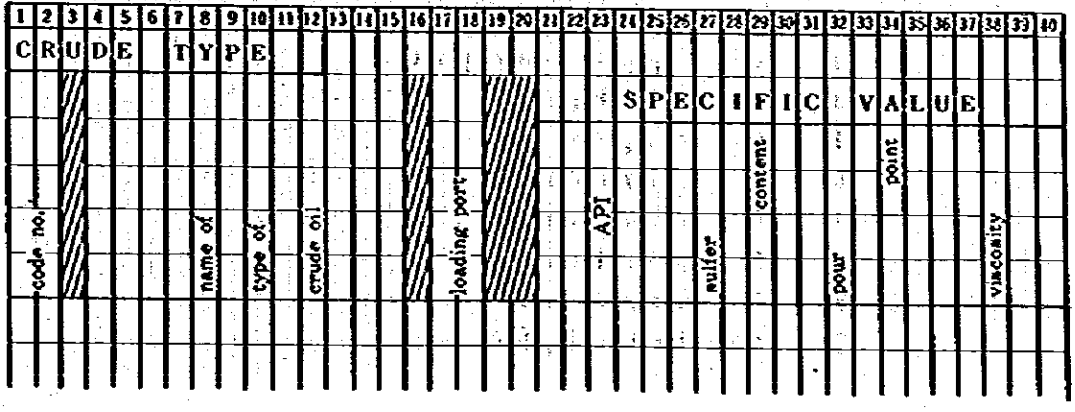
API

sulfer contents

pour point

viscosity

o format



o comment

a) Relation table between type of crude oil and loading port is used to output tabulation of E.D.B. by loading port, not giving raw data directly by loading port.

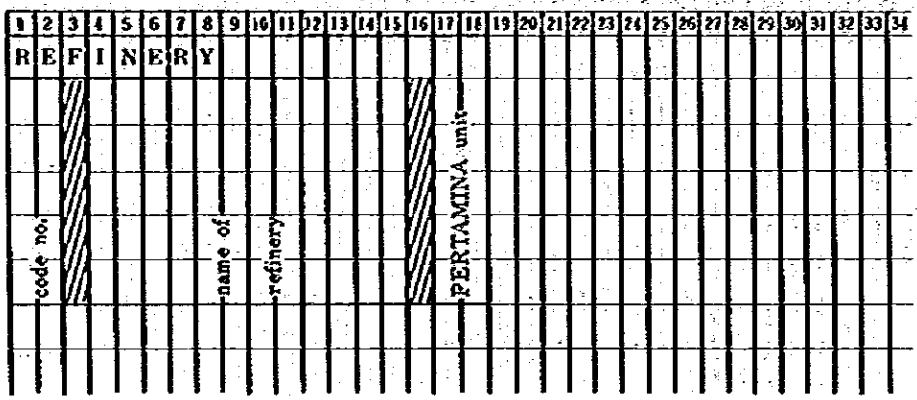
b) Code no. 51 and 52 is used for Gas data.

(3) refinery < 100 >

o items concerned

- code no.
- name of refinery
- code no. showing PERTAMINA production unit

o format



o comment

a) This table contains other plants or firms than refineries as follows.

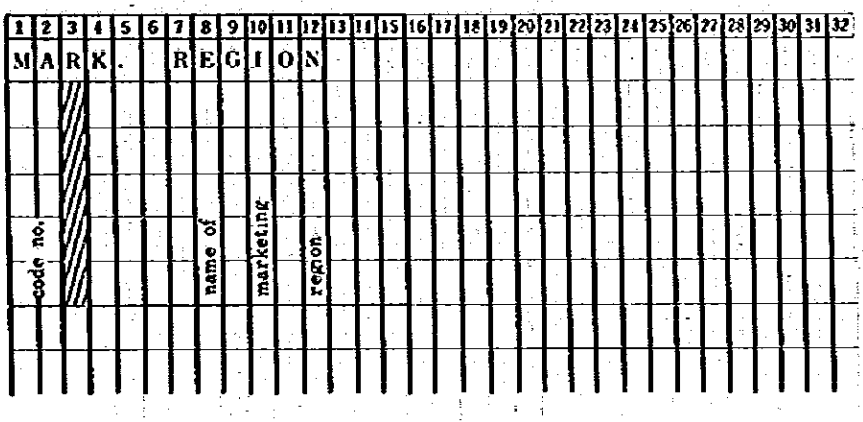
code no. 01 ~ 14 ; refinery
15 ~ 20 ; floating storage
21 ~ 30 ; Singapore refinery plant
31 ~ 40 ; LNG, LPG plant
41 ~ 60 ; town gas plant
61 ~ 70 ; fertilizer plant
71 ~ 80 ; cement plant
81 ~ 85 ; steel and iron firm
86 ~ 90 ; tin mining firm
91 ~ 95 ; nickel mining firm

(4) marketing region < 20 >

o items concerned

- code no.
- no. of marketing region

o format

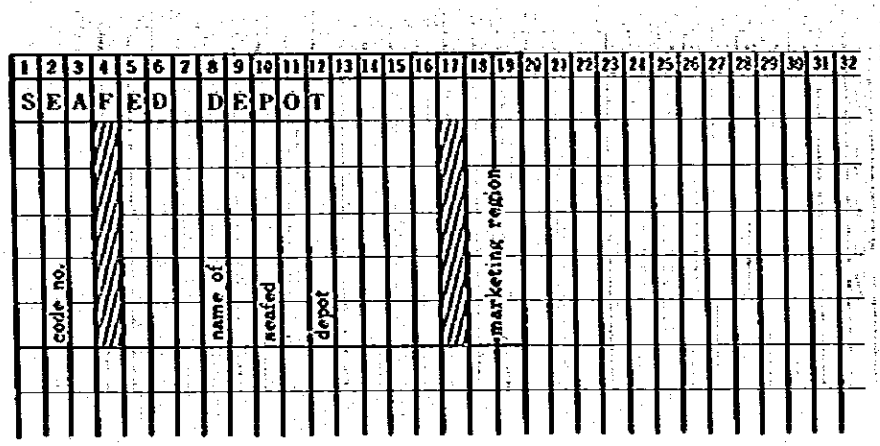


(5) seafed depot < 200 >

o items concerned

- code no.
- name of seafed depot
- code no. of marketing region

o format

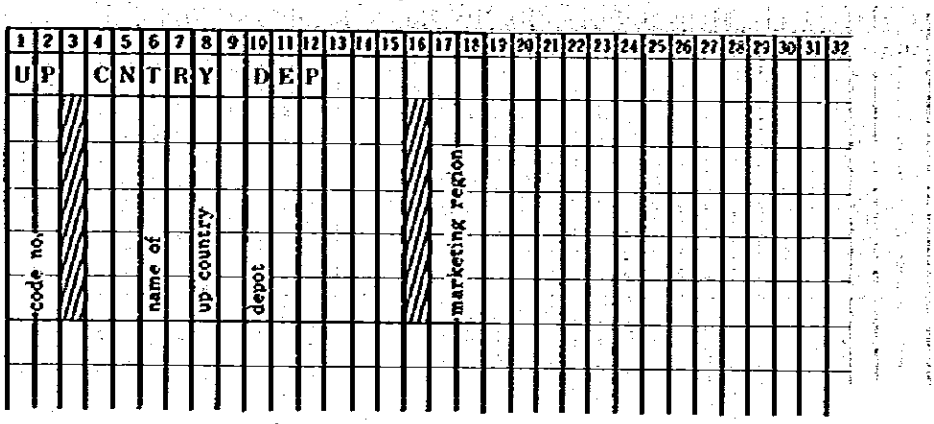


(6) up country depot < 100 >

o items concerned

- code no.
- name of up country depot
- code no. of marketing region

o format

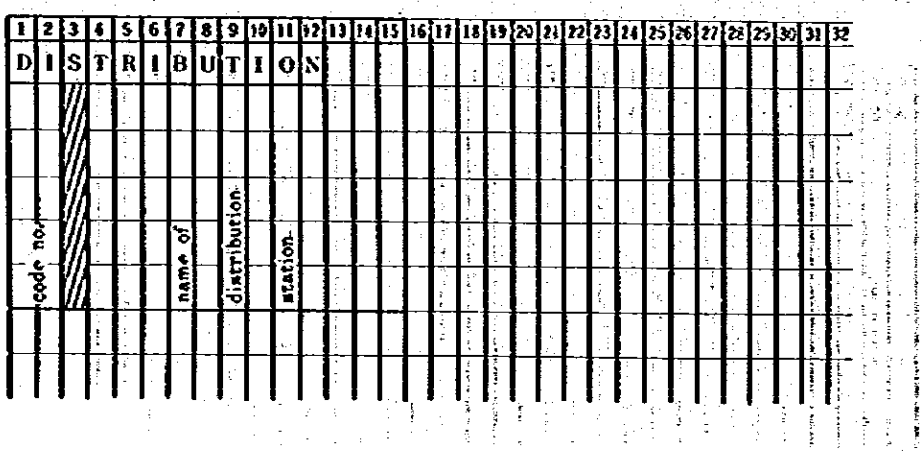


(7) distribution < 100 >

o items concerned

- code no.
- name of distribution station

o format



o comment

a) This table mainly concerns with distribution of Gas, and consists of several gas

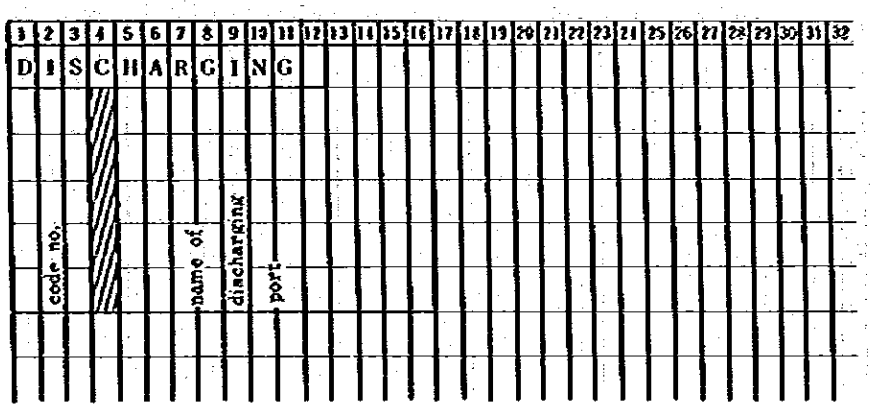
distribution stations (code no. 01 ~ 03) and hypothetical station (actually company names as same as Table (14).
Refer to 3-4 in detail.

(8) discharging < 50 >

o items concerned

- code no.
- name of discharging port

o format



o comment

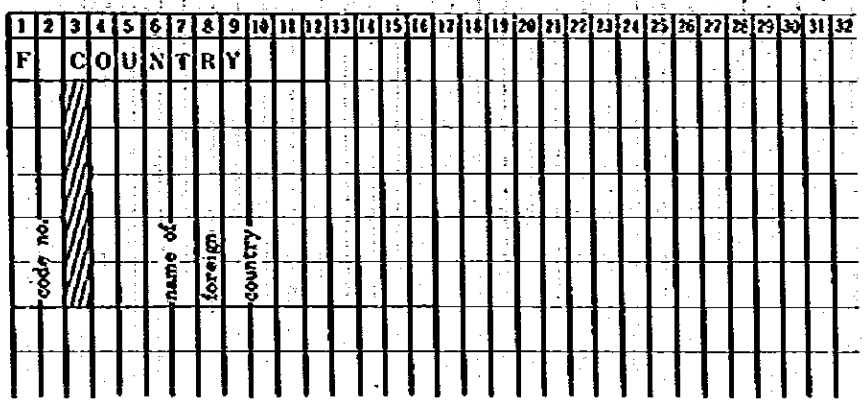
a) This table concerns with the discharging port of import goods for Oil and Gas data and the loading port for export in case of Coal data.

(9) foreign country < 50 >

o items concerned

- code no.
- name of foreign country

o format



o comment

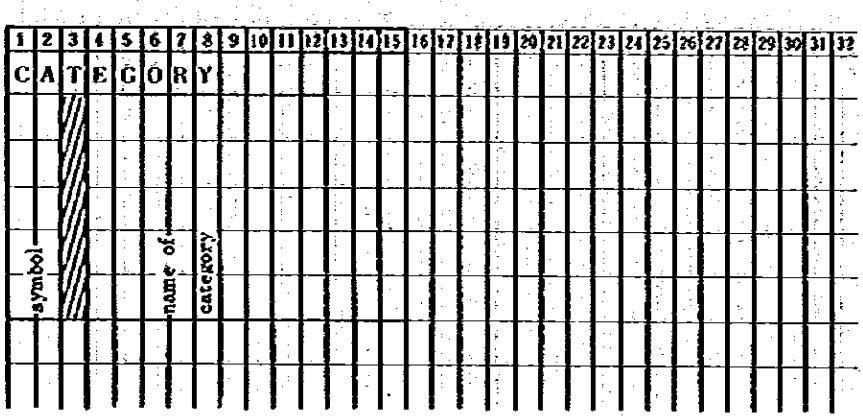
a) Singapore refinery plants are treated as foreign countries (code no. 20 ~ 23).

(10) category

o items concerned < 50 >

- symbol indicating category
- name of category

o format

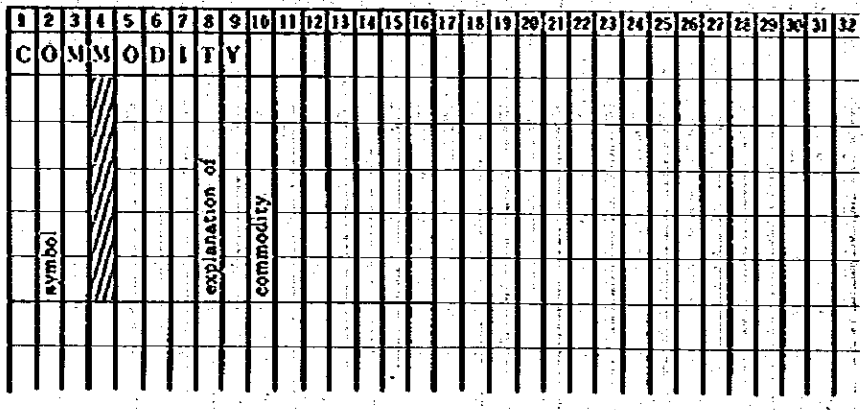


(11) commodity < 100 >

o items concerned

- symbol
- explanation of commodity

o format



o comment

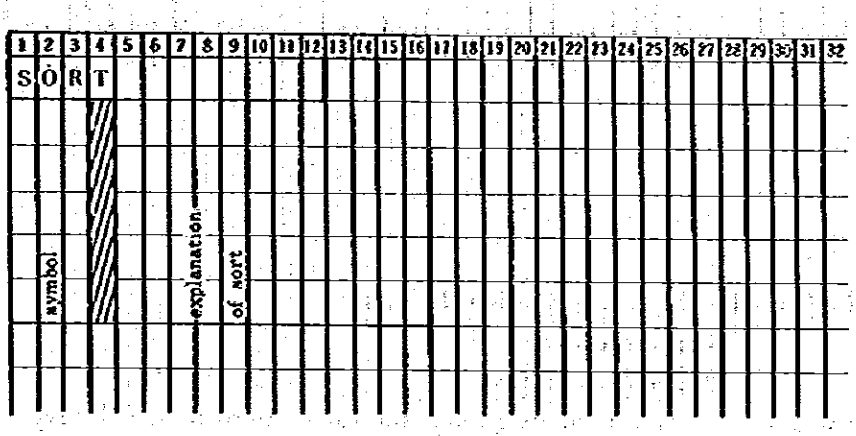
a) This table prepares the column name for E.B.T..

(12) sort < 100 >

o items concerned

- symbol
- explanation of sort

o format



o comment

a) These data are used at column field 'sort–1' (col. 7 ~ 9) and 'sort–2' (col. 11 ~ 13) in Data card.

b) All of these data registered will not necessarily appear as row names in E.B.T.. Because some of them are used only on the step of E.D.B. system.

(13) gas field < 300 >

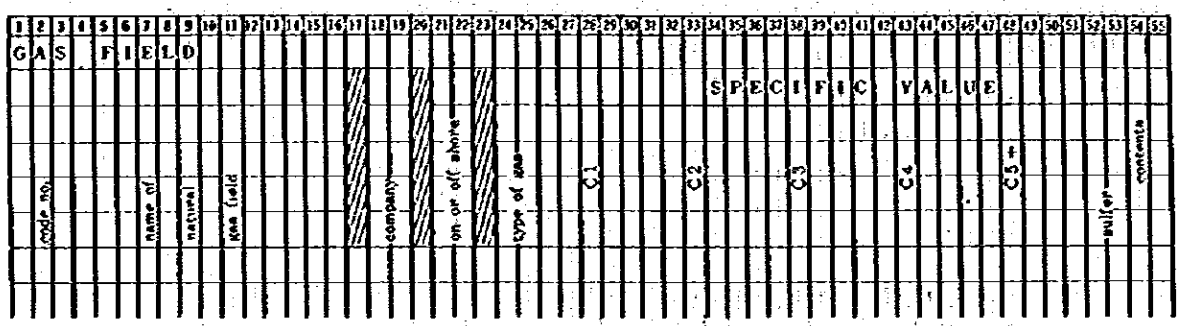
o items concerned

- code no.
- name of natural gas field
- code no. for 'on shore' or 'off shore'
- code no. for type of natural gas
- specific value

C1	contents
C2	contents
C3	contents
C4	contents
C5+	contents
sulfer	contents

(30)

o format



o comment

a) Code no. for the type of Gas is as follows:

51 ; associated

52 ; non-associated

b) Same data as crude field are given in the Table. All of these fields registered are not necessarily actual gas fields.

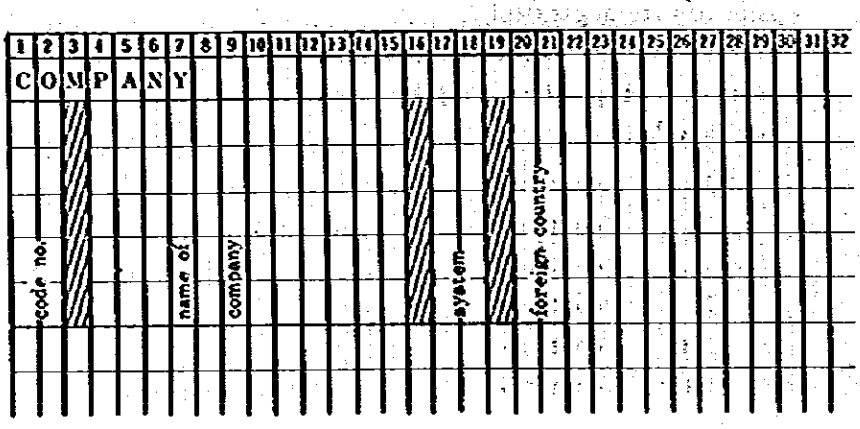
c) Code no. for 'on shore' or 'off shore' is just the same as that of crude field (Table (1)).

(14) company < 100 >

o items concerned

- code no.
- name of company
- code no. for the type of system
- code no. of foreign country to which the company belongs

o format

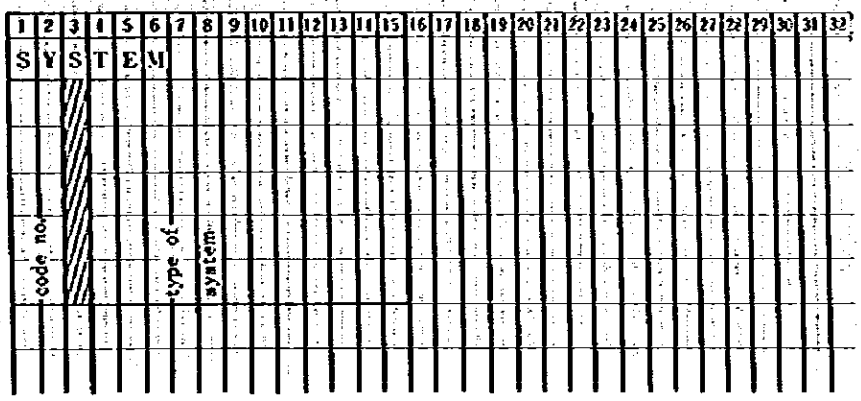


(15) system < 10 >

o items concerned

- code no.
- type of system

o format

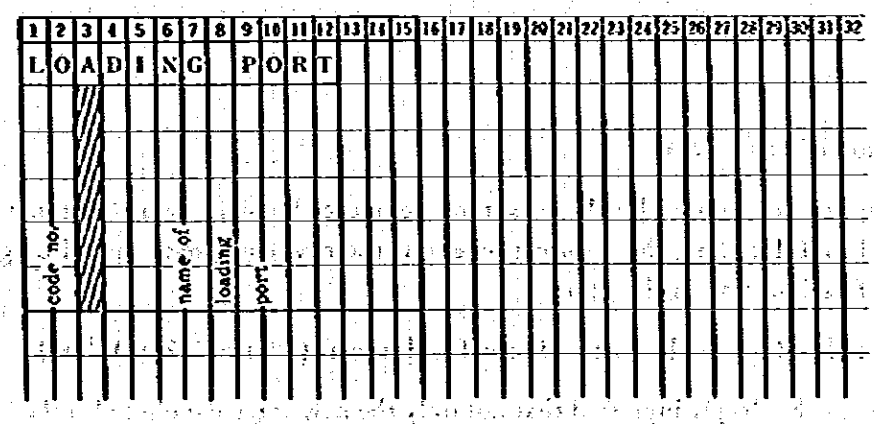


(16) loading port < 100 >

o items concerned

- code no.
- name of loading port

o format

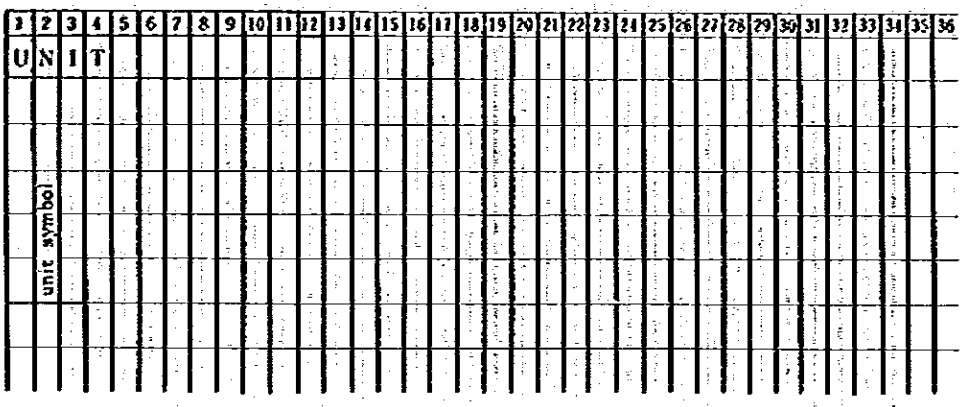


(17) unit < 20 >

o items concerned

- unit symbol

o format



o comment

a) The type of unit prepared is as follows.

BBL ; barrel
␣MT ; metric ton
␣KL ; kilo litter
MCF ; cubic feet
␣M3 ; cubic meter
KWH ; kilo watt per hour
US$; U.S. dollars

3-3 Updation of Table Data

After having been recognized by the person of Computer Sub-Dit. data that some data be newly added in Table Data, the information about the new entry data should be given by the person of each section in charge of.

Data to be newly added can be written in the fixed format (refer to 3-2 in Tables).

At this moment, be deeply inpressed that not only the new entry data but also the information attached to the each kind of Table Data should be given correctly.

The coded information should be submitted to BPD of PERTAMINA.

3-4 List of Table Data

CRUDE FIELD

001	MINAS	07	01	01
002	PETANI	07	01	01
003	PEMATANG	07	01	01
004	BEKASAP	07	01	01
005	DUNGUT	07	01	01
006	N.MENGGALA	07	01	01
007	RANGAU	07	01	01
008	SO.BEKASAP	07	01	01
009	PEMATANG BDW	07	01	01
010	KOTABATAK	07	01	01
011	TANDUN	07	01	01
012	MINDAL	07	01	01
013	PUDU	07	01	01
014	BANGKO	07	01	01
015	SO.BALAM	07	01	01
016	PETAPAHAN	07	01	01
017	SURAH	07	01	01
018	SINTONG	07	01	01
019	PINGGIR	07	01	01
020	SO.MENGGALA	07	01	01
021	SO.PINGGIR	07	01	01
022	SE.BALAM	07	01	01
023	PENAR	07	01	01
024	AMAN	07	01	01
025	SIKLADI	07	01	01
026	SE.SINTONG	07	01	01
027	SERUNI	07	01	01
028	CEBAKAN	07	01	01
029	SE.LIBO	07	01	01
030	PAGER	07	01	01
031	PINANG	07	01	01
032	LIBO	07	01	01
033	MUTIARA	07	01	01
034	SINGA	07	01	01
035	PATANG	07	01	01
036	KOPAR	07	01	01
037	PERKEBUNAN	07	01	01
038	TELINGA	07	01	01
039	PELITA	07	01	01
040	UBI	07	01	01
041	TOPAZ	07	01	01
042	INTAN	07	01	01
043	AMTARA	07	01	01
044	ARAK	07	01	01
045	OOOR	07	01	01
046	KELLA	07	01	01
047	**** 047 ***	07	01	01
048	SO.MENGGALA	09	01	01
049	LINDAI	09	01	01
050	BATANG	09	01	01
051	U.TANJUNG	09	01	01
052	**** 052 ***	09	01	01
053	**** 053 ***	09	01	01
054	**** 054 ***	09	01	01
055	DURI	07	01	02
056	KULIN	07	01	02
057	**** 057 ***	07	01	02
058	**** 058 ***	07	01	02
059	**** 059 ***	07	01	02
060	KASIKAN	09	01	03
061	TERANTAM	09	01	03
062	PEDADA	09	01	03
063	DANAR	09	01	03
064	SARAK	09	01	03
065	LANGGAK	09	01	03
066	**** 066 ***	09	01	03
067	**** 067 ***	09	01	03
068	**** 068 ***	09	01	03
069	**** 069 ***	09	01	03
070	TALANG AKAR	10	01	04
071	PENDOPO	10	01	04
072	BENAKAT	10	01	04
073	SELO	10	01	04
074	JIRAK	10	01	04
075	RAJA	10	01	04
076	BETUN	10	01	04
077	SE.BETUN	10	01	04
078	DERAS	10	01	04
079	ABAB	10	01	04
080	SULU	10	01	04
081	BAUNG	10	01	04
082	LOYAK	10	01	04
083	SE.IBUL	10	01	04
084	DEHA	10	01	04
085	IBUL	10	01	04
086	DEPATI	10	01	04
087	PAMBUTAN	10	01	04
088	SE.KAYA	10	01	04
089	TERAS	10	01	04
090	NE.TERAS	10	01	04
091	NAU	10	01	04
092	**** 092 ***	10	01	04
093	**** 093 ***	10	01	04
094	SAGO	10	01	05
095	LIRIK	10	01	05
096	UKUI	10	01	05
097	ANDAN	10	01	05
098	NI.PULAI	10	01	05

099	SG.PULAI	10	01	05
100	MOLEK	10	01	05
101	BINTO	10	01	05
102	BELIMBING	10	01	05
103	PEKAN	10	01	05
104	MERBAU	10	01	05
105	CINTA	11	02	06
106	KITTY	11	02	06
107	NORA	11	02	06
108	ZELDA	11	02	06
109	RAHA	11	02	06
110	SELATAN 'A'	11	02	06
111	GITA	11	02	06
112	**** 112 ***	11	02	06
113	**** 113 ***	11	02	06
114	**** 114 ***	11	02	06
115	**** 115 ***	11	02	06
116	**** 116 ***	11	02	06
117	**** 117 ***	11	02	06
118	**** 118 ***	11	02	06
119	**** 119 ***	11	02	06
120	**** 120 ***	11	02	06
121	**** 121 ***	11	02	06
122	**** 122 ***	11	02	06
123	**** 123 ***	11	02	06
124	**** 124 ***	11	02	06
125	ARJUNA	12	02	07
126	**** 126 ***	12	02	07
127	ARIMBI	12	02	08
128	**** 128 ***	12	02	08
129	SEMBAKUNG	12	02	09
130	**** 130 ***	12	02	09
131	**** 131 ***	12	02	09
132	ATTAKA	13	02	10
133	MELAHIN	13	02	10
134	KERINDINGAN	13	02	10
135	JAKIN	13	02	10
136	**** 136 ***	13	02	10
137	SEPINGGAN	13	02	11
138	**** 138 ***	13	02	11
139	**** 139 ***	13	02	11
140	PADAK	14	01	12
141	PAHAGUAN	14	01	12
142	SEMBERAH	14	01	12
143	NILAM	14	01	12
144	**** 144 ***	14	01	12
145	HANDIL	15	02	13
146	**** 146 ***	15	02	13
147	BEKAPAI	15	02	14
148	**** 148 ***	15	02	14
149	**** 149 ***	15	02	14
150	JAYA	16	01	15
151	KASIH	16	01	15
152	KASIM UTARA	16	01	15
153	KASIM BARAT	16	01	15
154	WALIO	16	01	15
155	CENDRAHASIH	16	01	15
156	KASIM TENGAH	16	01	15
157	MOI	16	01	15
158	**** 158 ***	16	01	15
159	**** 159 ***	16	01	15
160	RANTAU	01	01	16
161	E.TABUHAN	01	01	16
162	W.TABUHAN	01	01	16
163	P.PANJANG	01	01	16
164	SERANG JAYA	01	01	16
165	PERLAK	01	01	16
166	SIMPANG	01	01	16
167	BATUHANDI	01	01	16
168	GEBANG	01	01	16
169	ARUBAI	01	01	16
170	BESITANG	01	01	16
171	ISE TABUE	17	01	35
172	JULOK RA EUK	17	01	35
173	GEUDONGDONG	17	01	35
174	ALUR CIMON	17	01	35
175	PEUREULA	17	01	35
176	TUALANG	17	01	35
177	BAGO	17	01	35
178	PEUDAWA	17	01	35
179	MEURANTI	17	01	35
180	**** 180 ***	17	01	35
181	**** 181 ***	17	01	35
182	MANGUNJAYA	34	01	17
183	XLUANG	34	01	17
184	TEMPINO	34	01	17
185	**** 185 ***	34	01	17
186	TARAKAN	18	01	18
187	SANGA-SANGA	18	01	18
188	SANBOJA	18	01	18
189	BONGKARAN	18	01	18
190	**** 190 ***	18	01	18
191	**** 191 ***	18	01	18
192	SULA	19	01	19
193	**** 193 ***	19	01	19
194	**** 194 ***	19	01	19
195	SALAWATI	20	01	20
196	**** 196 ***	20	01	20
197	**** 197 ***	20	01	20
198	UDANG	21	02	21
199	**** 199 ***	21	02	21
200	**** 200 ***	21	02	21
201	ARUN	22	01	22
202	**** 202 ***	22	01	22
203	**** 203 ***	22	01	22
204	TANJUNG TIGA	02	01	23

205	TALANG JIMAR	02	01	23
206	T.JIMAR TNG.	02	01	23
207	T.JIMAR TIM.	02	01	23
208	PRABUMULIH B.	02	01	23
209	TG.NIRING B.	02	01	23
210	TG.NIRING T.	02	01	23
211	LIHAU	02	01	23
212	KARANGAN	02	01	23
213	GN.KEMALA	02	01	23
214	SELIMBING	02	01	23
215	KUANG	02	01	23
216	BENAKAT TIM.	02	01	23
217	OGAN	02	01	23
218	BENUANG	02	01	23
219	BETUNG	02	01	23
220	**** 220 ***	02	01	23
221	**** 221 ***	02	01	23
222	**** 222 ***	02	01	23
223	**** 223 ***	02	01	23
224	**** 224 ***	02	01	23
225	BAJUBANG	03	01	24
226	TEMPINO	03	01	24
227	KENALI ASAM	03	01	24
228	S.GELAH	03	01	24
229	S.LILIN	03	01	24
230	SETITI	03	01	24
231	SENGETI	03	01	24
232	**** 232 ***	03	01	24
233	**** 233 ***	03	01	24
234	RANDEGAN	03	01	25
235	JATIBARANG	03	01	25
236	CEMERA	03	01	25
237	PARIGI	03	01	25
238	TUGU BARAT	03	01	25
239	CEMARA BRT	03	01	25
240	KANDANG H.T	03	01	25
241	BUNYU	04	01	26
242	**** 242 ***	04	01	26
243	SANGATTA	04	01	27
244	**** 244 ***	04	01	27
245	TANJUNG	04	01	28
246	WARUKIN SEL.	04	01	28
247	TAPIAN TIMUR	04	01	28
248	**** 248 ***	04	01	28
249	KLAHONO	05	01	29
250	LINDA	05	01	15
251	**** 251 ***	05	01	15
252	**** 252 ***	05	01	15
253	LEOOK	06	01	30
254	NGLOBO	06	01	30
255	SEMANGGI	06	01	30
256	KAKENGAN	06	01	30
257	**** 257 ***	06	01	30
258	**** 258 ***	06	01	30
259	**** 259 ***			
260	CTR PURAI	10	01	05
261	**** 261 ***			
262	**** 262 ***			
263	**** 263 ***			
264	**** 264 ***			
265	**** 265 ***			
266	**** 266 ***			
267	**** 267 ***			
268	**** 268 ***			
269	**** 269 ***			
270	**** 270 ***			
271	BUKIT ASAM			
272	CIBILIN			
END				

CRUDE TYPE		
01	MINAS/SLC	03
02	DURI	03
03	PEDADA	03
04	S.SUMATRA	04
05	LIRIK	04
06	CINTA	07
07	ARJUNA	03
08	ARIMBI	06
09	SEMBAKUNG	14
10	ATTAKA	10
11	SEPINGGAN	15
12	BADAK	26
13	HANDIL	09
14	BEKAPAI	09
15	WALIO	17
16	KATAPA/NSC-P	01
17	CORRIDOR	04
18	TARAKAN	12
19	BULA	23
20	SALAWATI	16
21	UDANG	20
22	ARUN	22
23	S.PALEMBANG	04
24	JAMBI	04
25	JATIBARANG	06
26	BUNYU	13
27	SANGATTA	25
28	TANJUNG	21
29	KLAHONO	18
30	CEPU	
31	POLENG	19
32	ARASIAN L.C.	
33	ASPHALT BASE	22
34	LUBE BASE	22
35	KATAPA/NSC-A	02
36	KRUKA	

37 CONDENSATE	
38 **** 38 ***	
39 **** 39 ***	
40 MIXED	
41 **** 41 ***	
42 **** 42 ***	
43 **** 43 ***	
44 **** 44 ***	
45 **** 45 ***	
46 **** 46 ***	
47 **** 47 ***	
48 **** 48 ***	
49 **** 49 ***	
50 **** 50 ***	
51 ASSOCIATED	
52 NON-ASSCIATD	
53 MIXED-GAS	
54 **** 54 ***	
55 **** 55 ***	
END	
REFINERY	
01 P.BRANDAN	01
02 DUMAI	02
03 SEI PAKNING	02
04 SEI GERONG	03
05 PLAJU	03
06 BALIKPAPAN	05
07 CILACAP	04
08 WONOKROMO	04
09 CEPU	09
10 PKL.SUSU	01
11 TG.UBAN	
12 P.SAMBU	
13 **** 13 ***	
14 **** 14 ***	
15 T.SEMANGKA	
16 T.JAKARTA	
17 **** 17 ***	
18 **** 18 ***	
19 **** 19 ***	
20 KLAMONO	
21 ESSO	11
22 MOBIL OIL	11
23 SIPCO/SHELL	11
24 SPC	11
25 KUD OIL	11
26 KFRN	11
27 AMORIENT	
28 **** 28 ***	
29 **** 29 ***	
30 **** 30 ***	
31 ARUN	
32 RANTAU	

33 ARJUNA	
34 MUNDU	
35 SANTAN	
36 BONTANG	
37 **** 37 ***	
38 **** 38 ***	
39 **** 39 ***	
40 **** 40 ***	
41 TGP.MEDAN	
42 TGP.PADANG	
43 TGP.PALEMBANG	
44 TGP.JAKARTA	
45 TGP.BOGOR	
46 TGP.BANDUNG	
47 TGP.CIREBON	
48 TGP.SEMARANG	
49 TGP.SURABAYA	
50 TGP.U.PANDANG	
51 **** 51 ***	
52 **** 52 ***	
53 **** 53 ***	
54 **** 54 ***	
55 **** 55 ***	
56 **** 56 ***	
57 **** 57 ***	
58 **** 58 ***	
59 **** 59 ***	
60 **** 60 ***	
61 PUSRI	
62 KUJANG	
63 ASEAN	
64 KALTIM	
65 GRESIK	
66 **** 66 ***	
67 **** 67 ***	
68 **** 68 ***	
69 **** 69 ***	
70 **** 70 ***	
71 INDOCEMENT	
72 CIBINONG	
73 **** 73 ***	
74 **** 74 ***	
75 **** 75 ***	
76 **** 76 ***	
77 **** 77 ***	
78 **** 78 ***	
79 **** 79 ***	
80 **** 80 ***	
81 KRAKATAU ST.	
82 **** 82 ***	
83 **** 83 ***	
84 **** 84 ***	
85 **** 85 ***	

```
85 UPTB BANGKA
87/PITIK HUNTOK
88 ****  88 ***
89 ****  89 ***
90 ****  90 ***
91 POHALA
END
MARK. REGION
01 M.R. I
02 M.R. II
03 M.R. III
04 M.R. IV
05 M.R. V
06 M.R. VI
07 M.R. VII
08 M.R. VIII
END
SEAFED DEPOT          01
001 LABUAN DELI       01
002 BELAWAN           01
003 SIBOLGA           01
004 SABANG            01
005 PADANG            01
006 PAKAN BARU        01
007 UHOH SUMAWE       01
008 ULE-ULE           01
009 TG.BALAI          01
010 PANJANG           02
011 JAMBI             02
012 PK.BALAM          02
013 KERTAPATI         02
014 BOOM BARU         02
015 MANGGAR           02
016 TUNGKAL           02
017 BELINYU           02
018 LIRIK             02
019 MENTOK            02
020 TJG.PRIOK         03
021 PALONGAN          03
022 CIREBON           03
023 MERAK             03
024 PONTIANAK         03
025 KOTA BERAU        03
026 **** 026 *** 03
027 **** 027 *** 03
028 **** 029 *** 03
029 **** 029 *** 03
030 SEMARANG          04
031 CILACAP           04
032 **** 032 *** 04
033 **** 033 *** 04
034 **** 034 *** 04
035 **** 035 *** 04
036 **** 036 *** 04
037 **** 037 *** 04
038 **** 038 *** 04
039 **** 039 *** 04
040 SURABAYA          05
041 BENOA             05
042 AMPENAN           05
043 TARAKAN           05
044 KUPANG            05
045 MENENG            05
046 BANJARMASIN       05
047 SAMARINDA         05
048 BALIKPAPAN        05
049 SUMBAWA BSR       05
050 BIMA              05
051 MAUMERE           05
052 ENDE              05
053 ATAPUPU           05
054 WAINGAPU          05
055 REA               05
056 KALABAHI          05
057 LARANTUKA         05
058 ALAS              05
059 BADAS             05
060 GRESIK            05
061 DILLY             05
062 MUARA PADAK       05
063 SANGA-SANGA       05
064 TJ. SANTAN        05
065 SEL. LOMBOK       05
066 KOTA BARU         05
067 BATU LICIN        05
068 SOTEK             05
069 LONGIKIS          05
070 UJUNGPANDANG      06
071 AMBON             06
072 PARE-PARE         06
073 KENDARI           06
074 PALU              06
075 TOMASA            06
076 SALAYAR           06
077 POHALA            06
078 MANTUNG           06
079 BELITUNG          06
080 BITUNG            07
081 GONGGALA          07
082 POSO              07
083 LUKUK             07
084 TOLI-TOLI         07
085 PARIGI            07
086 BONGGAI           07
087 BAOL              07
088 KOLONODALE        07
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089	OGOSUA	07
090	MONTANG	07
091	AMPANA	07
092	BUNTA	07
093	PALU	07
094	TALRUNA	07
095	KENDARI	07
096	KOLAKA	07
097	BAU-BAU	07
098	RAHA	07
099	LAHATA	07
100	GORONTALO	07
101	*** 101 ***	07
102	BIRINGKASIH	07
103	PENAJAM	07
104	**** 104 ***	07
105	**** 105 ***	07
106	**** 106 ***	07
107	**** 107 ***	07
108	**** 108 ***	07
109	**** 109 ***	07
110	JAYAPURA	08
111	BIAK	08
112	SORONG	08
113	MERAUKE	08
114	MANOKWARI	08
115	NABIRE	08
116	KAIMANA	08
117	FAK-FAK	08
118	SERUI	08
119	TERNATE	08
120	TUAL	08
121	MASOKI	08
122	TOBALO	08
123	TOPA	08
124	SENAMA	08
125	DOBO	08
126	SAUMLAKI	08
127	NULA	08
128	TABUHA	08
129	NAMLEA	08
130	OTALO	08
131	TAU	08
132	**** 132 ***	08
133	**** 133 ***	08
134	**** 134 ***	08
135	**** 135 ***	08
136	**** 136 ***	08
137	**** 137 ***	08
138	**** 138 ***	08
139	**** 139 ***	08
140	TG.PANDAN	09
141	BEKAPAI	
142	TG. PINANG	
143	BATU RUSA	
144	**** 144 ***	
145	PAMUGUAN	
146	PANGKALANBO	
147	**** 147 ***	
148	M.PEGATAN	
149	TEL. APAR	
150	TOBOALI	
151	P. TUJUH	
152	P. PINANG	
153	K. ENOK	
154	SANGATA	
155	**** 155 ***	
156	TEMPILANG	
157	BANGKA	
158	KARIMUN	
159	SAMPIT	
160	SEL. URIRANG	
161	PAMUKAAN	
162	KENANGAN	
163	**** 163 ***	
164	****164 ***	
165	**** 165 ***	
END		

UP	CNTRY	DEP
01	**** 01 ***	01
02	**** 02 ***	01
03	PNT.SIANTAR	01
04	KISARAN	01
05	BUKITTINGGI	01
06	MEDAN	01
07	DUMAI	01
08	**** 08 ***	01
09	**** 09 ***	01
10	**** 10 ***	01
11	LAHAT	02
12	BATURAJA	02
13	LBK LENGGAU	02
14	**** 14 ***	02
15	**** 15 ***	02
16	**** 16 ***	02
17	**** 17 ***	02
18	**** 18 ***	02
19	**** 19 ***	02
20	PLUMPANG	03
21	BANDUNG	03
22	GARUT	03
23	PURWAKARTA	03
24	SUKABUMI	03
25	TASIKMALAYA	03
26	BOGOR	03
27	PADALARANG	03

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28 CIKUDAPATEUH      03
29 CIROYOM           03
30 CEPU              04
31 JOGYAKARTA        04
32 REMULU            04
33 MADS              04
34 TEGAL             04
35 LOMANIS           04
36 ****  36 ***      04
37 ****  37 ***      04
38 ****  38 ***      04
39 ****  39 ***      04
40 MALANG            05
41 KEDIRI            05
42 MADIUN            05
43 ROGO JAMPI        05
44 JEMBER            05
45 ****  45 ***      05
46 ****  46 ***      05
47 ****  47 ***      05
END
DISTRIBUTION
01 CILAMAYA
02 CAMBEY
03 SANTAN
04 ****  04 ***
05 ****  05 ***
06 ****  06 ***
07 ****  07 ***
08 ****  08 ***
09 ****  09 ***
10 ****  10 ***
11 ****  11 ***
12 ****  12 ***
13 ****  13 ***
14 ****  14 ***
15 ****  15 ***
16 ****  16 ***
17 ****  17 ***
18 ****  18 ***
19 ****  19 ***
20 ****  20 ***
21 PERT.EP.I
22 PERT.EP.II
23 PERT.EP.III
24 PERT.EP.IV
25 PERT.EP.V
26 LEMIGAS
27 PT.CPI
28 CATI(P.S.)
29 CATI(C.O.W.)
30 PTSI
31 IIAPCO
32 ARCO
33 UNION OIL
34 HUFFCO
35 TOTAL IND.
36 PETR.TREND
37 ASMERA N.S.
38 TESORO
39 AIR
40 PHILLIPS
41 CONOCO
42 MOBIL OIL
43 CITY SERV.
44 AGIP
45 AMOSEAS
46 AQUITAINE
47 BP.PETR.DEV.
48 GULF OIL
49 NAT.CON.ACT.
50 IND.SUN.OIL
51 KALTIM SHELL
52 N.SUM.OIL
53 PEXAMIN PAC.
54 ASMERA S.S.
55 SUNMARK IND.
56 SUMATRA REX
57 ARCO KALT M
58 JAPEX
59 ****  59 ***
60 ****  60 ***
61 ****  61 ***
END
DISCHARGING
01 BELAWAN
02 PLJ/S.GERONG
03 P.SAMSU
04 SURABAYA
05 JAKARTA
06 SEMARANG
07 BALIKPAPAN
08 UJUNGPANDANG
09 BITUNG
10 T.SEMANGKA
11 CILACAP
12 DUMAI P.T.
13 TANJUNG USAN
14 F.S.JAKARTA
15 BANJARMASIN
16 PANJANG
17 CIREBON
18 JURONG
19 AIR CHAWAN
20 PADANG
21 SEI PAKNING
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