(40)

```
 22 BENOA
 23 BIAK
 24 BALONGAN
 25 AMBON
 26 KUPANG
 27 JAYA PURA
 28 NERAK
 29 SIBOLGA
 30 SABANG
 31 P.BUKOM
 32 AMPENAN
 33 S. GERONG
 34 SORONG
 35 P. SUSU
 36 ****  36 ***
 37 ****  37 ***
END
F COUNTRY
01 AUSTRALIA
02 BAHAMAS
03 BAHRAIN
04 BANGLADESH
05 BURMA
06 FRANCE
07 W.GERMANY
08 HONG KONG
09 INDIA
10 ITALY
11 JAPAN
12 KUWAIT
13 MALAYSIA
14 NETHERLAND
15 PAKISTAN
16 P.NEWGUINIA
17 PHILIPPINES
18 SAUDI ARABIA
19 SINGAPORE
20 AER CHAHAN
21 P.BUKOM
22 JURONG
23 P.MERLINAU
24 SOUTH KOREA
25 SRILANKA
26 TAIWAN
27 THAILAND
28 TRINIDAD
29 USA
30 USSR
31 NEWZEALAND
32 IRAN
END
CATEGORY
P  PRODUCTION
H  OWN USE
L  LOSS
W  OPEN.STOCK
S  SUPPLY
E  EXPORT
EV EXPORT(VAL.)
I  IMPORT
IV IMPORT(VAL.)
T  TRANSFORM.
M  SALES BY MR.
C  CONSUMPTION
TN PLANNED T N.
PN PLANNED PRD.
A  AUTO GNRTN.
END
COMMODITY
TCO TOTAL COAL
CCO COKING COAL
SCO STEAM COAL
ACO ANTHRACITE
LCO LIGNITE
TCR TOTAL CR.OIL
OCR ORGNL CR.OIL
RCR REDCD CR.OIL
PET PETRL.PRODCT
BSH TL.DOM.F.OIL
TGS TL.GASOLINE
AGS AVIAT.GASLIN
SGS SUPER GASLIN
PGS PREMM GASLIN
JET JET FUEL
KER KEROSENE
TDO TL.DIESL OIL
ADO AUTMO.DL.OIL
IDO INDST.DL.OIL
HFO HEV.FUEL OIL
NAP  NAPHTHA
LSR L.SUL.R.RESD
LUB LUBRICANTS
SOL SOLVENTS
ASP ASPHALTS
GRE GREASE
WAX WAXES
PCK PETRL. COKE
RFG REF. GAS
LPG LPG
TNG TL.NATRL.GAS
CON CONDENSATES
LNG LNG
MOH METHANOL
THG TOWN GAS
COK COKE
CKG COK.OVEN GAS
```

```
BFG BLAST FR.GAS
BRQ BRIQUET
WOD WOOD
CHR CHARCOAL
EOH FUEL ETHANOL
AGW AGRCL.WASTES
TEL TL.ELECTRCTY
PEL TL.PUB.UTLTY
TPE PUB/THM-GEN.
HPE PUB/HYD-GEN.
PPE PUMP-UP USE
NPE PUB/NUC-GEN.
GPE PUB/GEO&OTHS
TOE TL.AUTO GEN.
TAE AUT/THM-GEN.
HAE AUT/HYD-GEN.
OAE AUT/OTHS GEN
FDS FEED STOCK
ABS ASPHALT BASE
LBS LUBRICT.BASE
MID MIDDLE DIST.
END
SORT
REF REFINERY
NGL LNG,CON.,LPG
MOH METYL F.ALCL
EOH ETHYL F.ALCL
PLG PETROCHE.LPG
PUB PUBLIC UTLTY
PUP PUMP-UP USE
AUT AUTO GEN.
TNG TOWN GAS
COK COKE
BRQ BRIQUET
CRF CR.OIL FIELD
NGF NAT.GAS FLD.
CMN COAL MINE
FAL FLARE&LOSSES
TIN TL.INDUSTRY
AGR AGRICULTURE
FRT FORESTRY
FIS FISHERY
MIN MINING
CON CONSTRUCTION
FOD FOODS
TXT TEXTILE
RUB RUBBER
PAP PAPER & PULP
FCH FUEL-USE/CH.
CAC CERAMICS&CMT
RIS R.NT-USE/I&S
FIS FUEL-USE-I&S
NFM N-FER. METAL
MAC METAL FABRC.
SMO S.WARES&OTHS
RAC TL.RES.&COM.
RES RESIDENTIAL
COM COMMERCIAL
TOR TL.TRANSPOR.
AIR AIR TRANSP.
ROD ROAD TRANSP.
RLW RAILWAYS
NAV INTERNAL NAV
IUL INTERNT.UPLT
GAF TL.GOV&FOR&O
GOV GOVERNMENT
FOR FORCES
RCH R.NT-USE/CH.
ASP N-ENGY-U/ASP
GRE N-ENGY-U/GRE
WAX N-ENGY-U/WAX
LUB N-ENGY-U/LUB
SOL N-ENGY-U/SOL
NOT N-ENGY-U/OTH
TCH TL.USE/CHEM.
WRF STOCK AT REF
GIN USE FOR INJ.
GSL USE FOR LIFT
FUL USE FOR FUEL
IAS TL. IRON&STL
TRP TRANSPRT. L.
PLS PLANTSITE L.
END
GAS FIELD
001 BINAS          07 01 51
002 PETANI         07 01 51
003 PEMATANG       07 01 51
004 SEKASAP        07 01 51
005 PUNGUT         07 01 51
006 N.MENGGALA     07 01 51
007 RANGAU         07 01 51
008 SO.SEKASAP     07 01 51
009 PEMATANG BDW   07 01 51
010 KOTASATAK      07 01 51
011 TANDUN         07 01 51
012 MINDAL         07 01 51
013 RUDU           07 01 51
014 BANGKO         07 01 51
015 SO.BALAM       07 01 51
016 PETAPAHAN      07 01 51
017 SURAM          07 01 51
018 SINTONG        07 01 51
019 PINGGIR        07 01 51
020 SO.MENGGALA    07 01 51
021 SO.PINGGIR     07 01 51
022 SE.BALAM       07 01 51
```

023	BETIAR	07	01	51
024	AMAN	07	01	51
025	SIKILADI	07	01	51
026	SE.SINTONG	07	01	51
027	SERUNI	07	01	51
028	CERAKAN	07	01	51
029	SE.LIBO	07	01	51
030	PAGER	07	01	51
031	PINANG	07	01	51
032	LIBO	07	01	51
033	MUTIARA	07	01	51
034	SINGA	07	01	51
035	**** 035 ***	07	01	51
036	KOPAR	07	01	51
037	PERKEBUNAN	07	01	51
038	TELINGA	07	01	51
039	PELITA	07	01	51
040	UBI	07	01	51
041	TOPAZ	07	01	51
042	INTAN	07	01	51
043	**** 043 ***	07	01	51
044	**** 044 ***	07	01	51
045	OBOR	07	01	51
046	**** 046 ***	07	01	51
047	**** 047 ***	07	01	51
048	SO.MENGGALA	09	01	51
049	LINDAI	09	01	51
050	BATANG	09	01	51
051	U.TANJUNG	09	01	51
052	**** 052 ***	09	01	51
053	**** 053 ***	09	01	51
054	**** 054 ***	09	01	51
055	DURI	07	01	51
056	KULIN	07	01	51
057	**** 057 ***	07	01	51
058	**** 058 ***	07	01	51
059	**** 059 ***	07	01	51
060	KASIKAN	09	01	51
061	TERANTAM	09	01	51
062	PEDADA	09	01	51
063	DAMAR	09	01	51
064	SASAK	09	01	51
065	LANGGAK	09	01	51
066	**** 066 ***	09	01	51
067	**** 067 ***	09	01	51
068	**** 068 ***	09	01	51
069	**** 069 ***	09	01	51
070	TALANG AKAR	10	01	51
071	PENDOPO	10	01	51
072	BENAKAT	10	01	51
073	SELO	10	01	51
074	JERAK	10	01	51
075	RAJA	10	01	51
076	SETUN	10	01	51
077	SE.SETUN	10	01	51
078	BERAS	10	01	51
079	ASAB	10	01	51
080	BULU	10	01	51
081	PAUNG	10	01	51
082	LOYAK	10	01	51
083	SE.IBUL	10	01	51
084	DEWA	10	01	51
085	IBUL	10	01	51
086	DEPATI	10	01	51
087	RAMBUTAN	10	01	52
088	SE.KAYA	10	01	52
089	TERAS	10	01	52
090	NE.TERAS	10	01	52
091	NAU	10	01	52
092	**** 092 ***	10	01	51
093	**** 093 ***	10	01	51
094	SAGO	10	01	51
095	LIRIK	10	01	51
096	UKUI	10	01	51
097	ANDAN	10	01	51
098	ND.PULAI	10	01	51
099	SO.PULAI	10	01	51
100	MOLEK	10	01	51
101	BINIO	10	01	51
102	BELIMBING	10	01	51
103	PEKAN	10	01	51
104	**** 104 ***	10	01	51
105	CINTA	11	02	51
106	KITTY	11	02	51
107	NORA	11	02	51
108	ZELDA	11	02	51
109	RANA	11	02	51
110	SELATAN'A'	11	02	51
111	GITA	11	02	51
112	**** 112 ***	11	02	51
113	**** 113 ***	11	02	51
114	**** 114 ***	11	02	51
115	**** 115 ***	11	02	51
116	**** 116 ***	11	02	51
117	**** 117 ***	11	02	51
118	**** 118 ***	11	02	51
119	**** 119 ***	11	02	51
120	**** 120 ***	11	02	51
121	**** 121 ***	11	02	51
122	**** 122 ***	11	02	51
123	**** 123 ***	11	02	51
124	**** 124 ***	11	02	51
125	ARJUNA	12	02	51
126	**** 126 ***	12	02	51
127	ARIMBI	12	02	51
128	**** 128 ***	12	02	51

129	SEMBAKUNG	12	02	51
130	**** 130 ***	12	02	51
131	**** 131 ***	12	02	51
132	ATTAKA	13	02	51
133	MELAHIN	13	02	51
134	KERINDINGAN	13	02	51
135	JAKIN	13	02	51
136	**** 136 ***	13	02	51
137	SEPINGGAN	13	02	51
138	**** 138 ***	13	02	51
139	**** 139 ***	13	02	51
140	BADAK	14	01	52
141	PAMAGUAN	14	01	51
142	SEMBERAH	14	01	51
143	**** 143 ***	14	01	51
144	**** 144 ***	14	01	51
145	HANDIL	15	02	51
146	**** 146 ***	15	02	51
147	BEKAPAI	15	02	51
148	**** 148 ***	15	02	51
149	**** 149 ***	15	02	51
150	JAYA	16	01	51
151	KASIM	16	01	51
152	KASIM UTARA	16	01	51
153	KASIM BARAT	16	01	51
154	WALIO	16	01	51
155	CENDRAWASIH	16	01	51
156	KASIM TENGAH	16	01	51
157	**** 157 ***	16	01	51
158	**** 158 ***	16	01	51
159	**** 159 ***	16	01	51
160	RANTAU	01	01	51
161	E.TABUHAN	01	01	51
162	W.TABUHAN	01	01	51
163	P.PANJANG	01	01	51
164	SERANG JAYA	01	01	52
165	PERLAK	01	01	51
166	SIMPANG	01	01	51
167	BATUMANDI	01	01	51
168	GEBANG	01	01	51
169	**** 169 ***	01	01	51
170	BESITANG	01	01	51
171	IEE TABUE	17	01	51
172	JULOK RAYEUK	17	01	51
173	GEUDONGDONG	17	01	51
174	ALUR CIMON	17	01	51
175	PEURELA	17	01	51
176	TUALANG	17	01	51
177	BAGO	17	01	51
178	PEUDAWA	17	01	51
179	MEURANTI	17	01	51
180	**** 180 ***	17	01	51
181	**** 181 ***	17	01	51
182	MANGUNJAYA	34	01	51
183	KLUANG	34	01	51
184	TEMPINO	34	01	51
185	**** 185 ***	34	01	51
186	TARAKAN	18	01	51
187	SANGA-SANGA	18	01	51
188	SAMBOJA	18	01	51
189	BONGKARAN	18	01	51
190	**** 190 ***	18	01	51
191	**** 191 ***	18	01	51
192	BULA	19	01	51
193	**** 193 ***	19	01	51
194	**** 194 ***	19	01	51
195	SALAHATI	20	01	51
196	**** 196 ***	20	01	51
197	**** 197 ***	20	01	51
198	UDANG	21	02	51
199	**** 199 ***	21	02	51
200	**** 200 ***	21	02	51
201	ARUN	22	01	52
202	**** 202 ***	22	01	51
203	**** 203 ***	22	01	51
204	TANJUNG TIGA	02	01	51
205	TALANG JINAR	02	01	51
206	T.JINAR TNG.	02	01	51
207	T.JINAR TIH.	02	01	51
208	PRABUMULIH B.	02	01	51
209	TG.NIRING B.	02	01	51
210	TG.NIRING T.	02	01	51
211	LIMAU	02	01	51
212	KARANGAN	02	01	51
213	GN.KEMALA	02	01	51
214	BELIMBING	02	01	51
215	KUANG	02	01	51
216	BENAKAT TIH.	02	01	51
217	OGAN	02	01	51
218	BENUANG	02	01	52
219	BETUNG	02	01	52
220	**** 220 ***	02	01	51
221	**** 221 ***	02	01	51
222	**** 222 ***	02	01	51
223	**** 223 ***	02	01	51
224	**** 224 ***	02	01	51
225	BAJUBANG	03	01	51
226	TEMPINO	03	01	51
227	KEMALI ASAM	03	01	51
228	S.GELAM	03	01	51
229	S.LILIN	03	01	51
230	SETITI	03	01	51
231	**** 231 ***	03	01	51
232	**** 232 ***	03	01	51
233	**** 233 ***	03	01	51
234	RANDEGAN	03	01	52

235	JATIBARANG	03	01 51
236	CEMERA	03	01 51
237	PARIGI	03	01 52
238	**** 238 ***	03	01 52
239	**** 239 ***	03	01 52
240	**** 240 ***	03	01 52
241	BUNYU	04	01 52
242	**** 242 ***	04	01 53
243	SANGATTA	04	01 51
244	**** 244 ***	04	01 51
245	TANJUNG	04	01 51
246	HARUKIN SEL.	04	01 51
247	TAPIAN TIMUR	04	01 51
248	**** 248 ***	04	01 51
249	KLAHONO	05	01 51
250	LINDA	05	01 51
251	**** 251 ***	05	01 51
252	**** 252 ***	05	01 51
253	LEDOK	06	01 51
254	NGLOBO	06	01 51
255	SEMANGGI	06	01 51
256	KAHENGAN	06	01 51
257	**** 257 ***	06	01 51
258	**** 258 ***	06	01 51
259	PULENG	06	01 51
260	**** 260 ***	06	01 51
261	**** 261 ***	06	01 51
262	**** 262 ***	06	01 51
263	**** 263 ***	06	01 51
264	**** 264 ***	06	01 51
265	**** 265 ***	06	01 51

END

COMPANY

01	PERT.EP I	01
02	PERT.EP II	01
03	PERT.EP III	01
04	PERT.EP IV	01
05	PERT.EP V	01
06	LEMIGAS	01
07	PT.CPI	02 29
08	CAT (P.S)	03 29
09	CAT (C.O.W)	02 29
10	PTSI	02 29
11	IAPCO	03 29
12	ARCO	03 29
13	UNION OIL	03 29
14	HUFFCO	03 29
15	TOTAL IND.	03 06
16	PETR.TRENG	03 29
17	ASAMERA N.S	03 29
18	TESORO	03 29
19	AAR	03 01
20	PHILIPS	03 29
21	CONOCO	03 29
22	MOBIL OIL	03 29
23	CITY SERV.	03 29
24	AGIP	03 10
25	**** 25 ***	
26	**** 26 ***	
27	BP.PETR.DEV.	03 34
28	GULF OIL	03 29
29	NAT.CON.ACT.	03
30	IND.SUN.OIL	03 29
31	KALTIM SHELL	03 14
32	N.SUM.OIL	03 29
33	**** 33 ***	
34	ASAMERA S.S.	03 29
35	**** 35 ***	
36	**** 36 ***	
37	ARCO KALTIM	03 29
38	PTSI	03 29
39	CONOCO	04 29
40	TOTAL IND.	04 06
41	TEIKOKU OIL	04 11
42	DEMINEX	04 07
43	JAPEX	04 11
44	TEXACO	04 29
45	MOBIL	04 29
46	ARCO	04 29
47	ESSO	04 29
48	JAPEX	03 11
49	REDCO	03 29
50	INCA	03 29
51	PAN OCEAN	03 29
52	LOUISIANA	03 29
53	ESSO	03 29
54	CITCO	03 29
55	MOIRIEF PEX.	03 29
56	JAMBI SHELL	03 14
57	SUMATRA GULF	03 29
58	MARATHON PET	03 29
59	HEMERANO S.	03 14
60	WHITESHIELD	03 29

END

SYSTEM

01	OWN OPERATE
02	C.O.W.
03	P.SH.C.
04	JOINT VENT.

END

LOADING PORT

01	PKL. SUSU
02	KUALA SEUKAH
03	DUMAI
04	PLJ/S.GERONG
05	PULAU SAMBU

05 BALONGAN	16 SUMTT TERM	26 BONTANG	KWH
07 CINTA TERM	17 KASIM TERM	27 BL LANCANG	US$
08 ARJUNA TERM	18 SORONG TERM	29 TANJUNG UBAN	MCM
09 SENIPAH TERM	19 POLENG TERM	END	END
10 SANTAN TERM	20 UMANG TERM	UNIT	
11 BEKAPAI TERM	21 BALIKPAPAN	BBL	
12 TARAKAN TERM	22 CILACAP	MT	
13 BUNYU TERM	23 BULA	KL	
14 SIBUKO TERM	24 SEI PAKNING	MCF	
15 LANT TERM	25 SANGATTA	M3	

4. Future Improvement of Data Coding

(1) After proceeded with the steps of task, that is implementation of input data, more than about 200,000 items have already been prepared. But it may not be said that implementation of the data is completely finished in the sense of checking the data and so forth.

Hereafter, obtaining many kinds of output tabulations and verifying the errors caused by the mol-definition and the lack of data, it would be necessary to make every effort for the data base to be most precise and reliable finally.

(2) At the present time, the kinds of data prepared are limited to the following ones, that is to say; the crude oil and the related products, the natural gas and the related products and the coal.

The data about the all kinds of commodities that would appear in the column of the Energy Balance Table except the data finally made sure that can not be collected should be prepared, so it is necessary to collect the data as soon as possible with the help of sections or organizations related and to make sure that the data base be complete.

(3) At present, the data is prepared for the period from January 1974 to June 1979 and the data after July 1979 must be prepared and inplemented continuously.

As the initialization phase, all the data for the period mentioned above was arranged at a time, but hereafter the data should be arranged and generated to the data base monthly in the routinized base.

All the data can not be necessarily obtained from MIGAS and Pertamina, it would be necessary to establish the procedure so as to be able to get the data related continuously and in the routinized base with the help of organizations related.

USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANKII

ENERGY SUPPLY-DEMAND DATA BANK SYSTEM

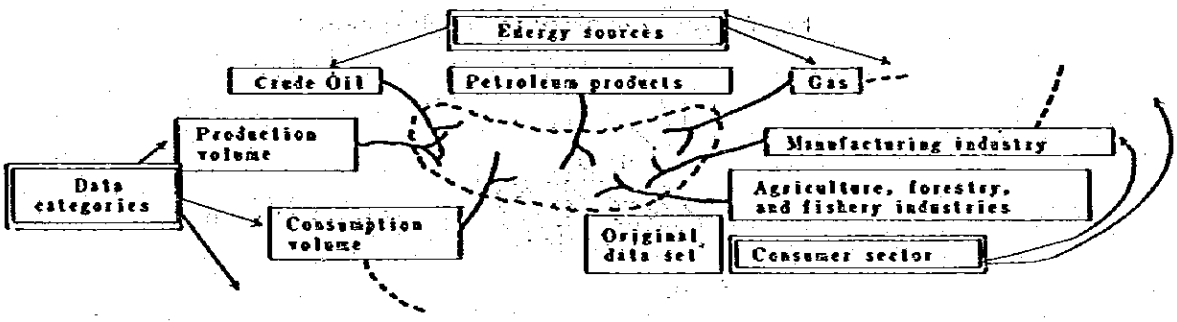
USER'S MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK II
– ENERGY SUPPLY-DEMAND DATA BANK SYSTEM –

1. Outline of the Data Bank System and Its Usage

The data bank system (hereinafter referred to as EDBS) provides for the creation and updating of energy-related information files, as well as extraction, editing, and printout of necessary information.

Since the EDBS handles diversified and massive data related to energy, it requires an efficient data access method. Therefore, the EDBS employes the concept of "list structure" which manages data in terms of energy types, or data categories such as production volume and consumption volume.

Fig. 1 Data Categories



Original data which is processed in an EDBS-type system is input in an encoded form. Since data is prepared based on a table which the actual names and codes, errors may possible occur in copying or punching. Thus, the EDBS provides a "Data Check System" (hereinafter referred to as DCS), a sub-system to prevent transmission of mistakes into the information file.

The DCS determines whether there is a code which is not registered in the corresponding table with the actual names, and whether the sum of values of the header data (Refer to 1-1) matches the sum of values of the original data (balance check).

1-1 Creation and Updating of the Information File

The EDBS provides three functions for creation and update of the information file.

- o Addition of new data
- o Correction of existing data
- o Deletion of existing data

Two types of data are required in order to utilize these functions. The first is the so-called directive data, specifying which of the functions will be used, and the second is a set for updating the information file depending on the selected function.

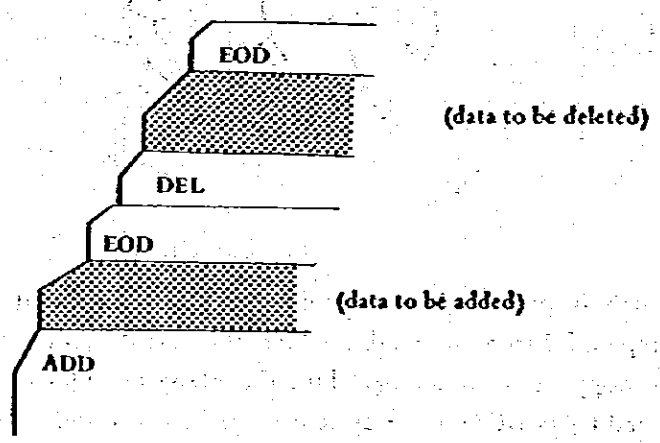
Directive data

There are three types of directive data indicating addition, correction, or deletion, and each type is paired with an end of data directive indicating the conclusion of the updating data set.

ADD	Addition of new data
CNG	Correction of existing data
DEL	Deletion of existing data
EOD	End of data

Thus, the data configuration may be one of ADD to EOD, CNG to EOD, or DEL to EOD.

Fig. 2 An Example of Data Configuration



Data updating the information file

Since the format for updating data differs according to the function, preparation of updating data for each case will be discussed below.

Addition of new data (ADD)

Data for addition is divided into several groups, each consisting of a group header, data to be added to the information file, and a group end (END).

The group header defines the period for which data following the header will remain in the file, along with other information. The value in the header is maintained until the group end is encountered (Refer to Page85).

– Frequency	M: Month Q: Quarter Y: Calendar year F: Fiscal year
– Year	Year
– Quarterly	If quarterly data, indicate one of 1 through 4.
– Monthly	If monthly data, indicate one of January(1) through December (12).
– Scale	A scaling factor for the value of additional data (the column of Amount) is indicated in terms of an exponent of 10. If Scale = 2 and the value of data is 100.0, the data will be processed as $100.0 * 10^2 = 10000$.
– Unit	A unit of the value of updating data (the column of Amount); the following table shows available seven units.

Table 1 Available Units

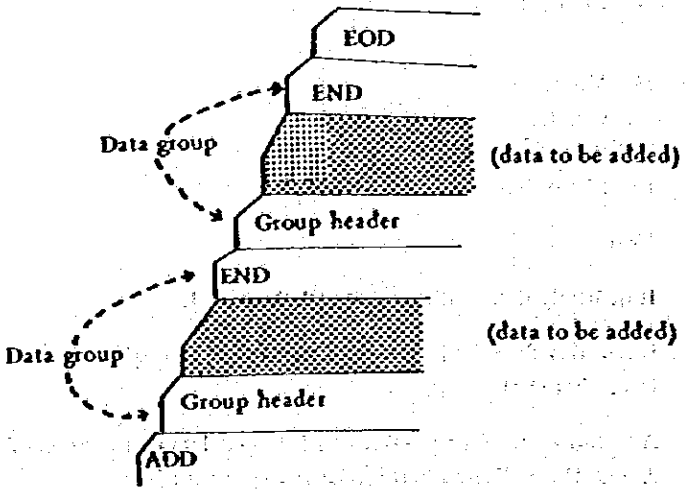
No.	Code	
1	BBL	Barrel
2	KL	Kilolitres
3	M3	Cubic metre (m^3)
4	MCF	10^3 Cubic feets
5	MT	Metric ton
6	BTU	British thermal units
7	KWH	Kilowatt hours

– Sub-Total Used for balance check of data

Data to be added to the information file, (Refer to Page86), are in encoded form. Although the example shown below is a configuration for oil-related data, the one for gas-related data is the same.

(4)

Fig. 3 An Example of an Additional Data Configuration



/ /   /

Group Header (ADD)

Frequency — Year — Quarterly — Monthly — Scale — Unit — Sub-total

	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
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20																																																																																
	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

/ / /

Addition Data to the Information File (ADD, CNG)

	Category	Sub-category	Commodity	Sort-1	Sort-2	Amount	Crude oil: Field	Crude oil: Type	Refinery	Marketing Region	Discharging Port	Foreign Country	Domestic Transport: From	Domestic Transport: To	Comments
	1 2	3	4 5	7 8 9	11 12 13	15–26	28 29 30	31 32	35 36	39 40	43 44 45	48 49	52–55	56–59	61–80
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

(Reference) A sample list of additional data

INDONESIAN ENERGY DATA BASE SYSTEM

--- INPUT DATA LIST ---

```
NO.          1         2         3         4         5         6         7         8
     ----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   INIT   (Refer to 1-5).
 2   ADD                          0         0
 3   M1979 01 OBBL
 4   P OCR          10528514.0  001
 5   P OCR            942807.00 004
 6   P OCR            122772.00 008
 7   P OCR            150771.00 005
 8   P OCR            924867.00 002
 9   P OCR            185503.00 025
10   P OCR            737559.00 003
11   P OCR             20946.00 009
12   P OCR             48854.00 011
13   P OCR             45023.00 007
14   P OCR              7703.00 012
15   P OCR            571476.00 010
16   P OCR             10722.00 026
17   P OCR            335610.00 018
18   P OCR            538912.00 015
19   P OCR           1639482.00 014
20   P OCR            245319.00 013
21   P OCR            358622.00 016
22   P OCR            431612.00 006
23   P OCR            306667.00 020
24   P OCR            480773.00 023
25   P OCR             46784.00 022
26   P OCR             29156.00 019
27   P OCR              9648.00 021
28   P OCR             19767.00 017
29   P OCR            345974.00 024
30   P OCR            382664.00 027
31   P OCR             24948.00 028
32   P OCR            201632.00 031
33   P OCR            621530.00 029
34   P OCR             46570.00 032
35   P OCR            636905.00 030
36   P OCR             31510.00 033
37   P OCR                0.0   034
38   P OCR             17558.00 038
39   P OCR            104825.00 036
40   P OCR             11318.00 037
41   P OCR             22407.00 039
42   P OCR            141072.00 040
43   P OCR             30222.00 042
44   P OCR              4141.00 035
45   P OCR            175633.00 041
46   P OCR             16126.00 045
47   END                  0.0

1726   M1979 01 OBBL
1727   W PGS            12891.00    11
1728   W NAP             5535.00    11
1729   W KER            57528.00    11
1730   W ADO             3454.00    11
1731   W IDO            16482.00    11
1732   W HFO            29071.00    11
1733   W LSR             3510.00    11
1734   END                  0.0
1735   M1979 01 OBBL
1736   W KER           551794.00    16
1737   W ADO          1162773.00    16
1738   END                  0.0
1739   EOD      0
1740   LST                      0      0
```

No. 2 Directive data
No. 3–No. 47 Data group
  No. 3 Group header
  No. 4–46 Additional data
  No. 47 Group end
No. 1726–No. 1734 Data group
No. 1735–No. 1738 Data group
No. 1739 End of data

(8)

Correction of existing data (CNG)

The EDBS handles correction of existing data as replacement of data. The data to be corrected is deleted from the file by giving its record number, and then the correct data is inserted in its place. The data configuration for CNG is similar to that of ADD.

The group header indicates the record number of data to be replaced (the column of Element No. on Page 89). The updating data follows the header (the same as shown on Page 86). Since the header and updating data are in pair, the group end required for ADD is not necessary for CNG.

Deletion of existing data (DEL)

Existing data is deleted from the file by giving the record number of the file to be deleted (Refer to Page 90).

/ /   /

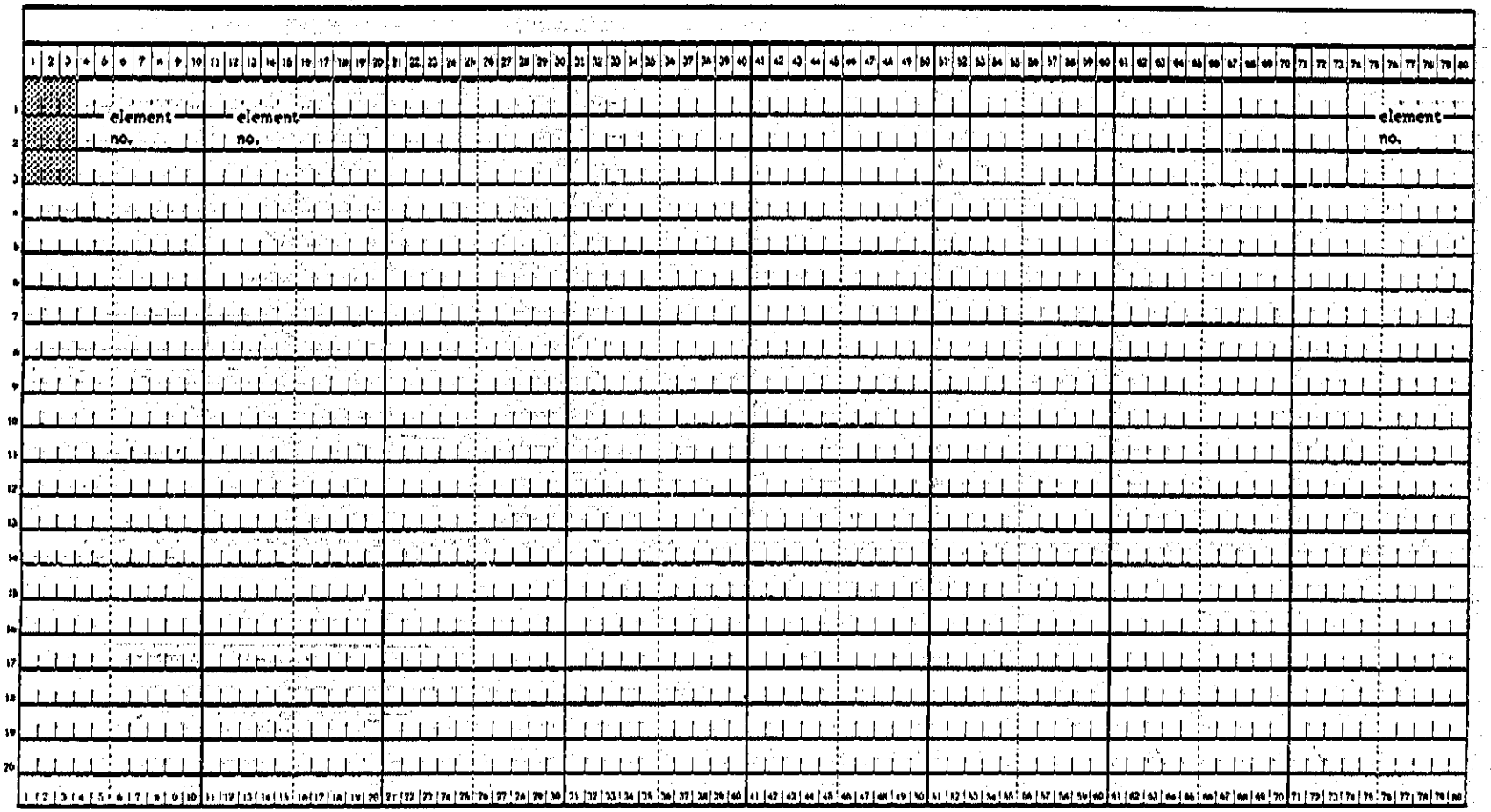
Correction of Existing Data

Header (CNG)

Row	Frequency	Year	Quarterly / Monthly	Scale	Unit	Element No.	Columns 33–80
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

/ / /

Deletion of Existing Data (DEL)



1-2 Extraction of Data from the Information File

A partial set of data is created by extracting data from the information file using a key code and/or sub-code. Then, the partial set is converted to a set of necessary information through logical operation of the key code.

Directive data and extraction indicating data require the utilization of this function of extraction, similar to the case of updating.

Directive data

RET	Directive data for extraction
EOD	End of data

Extraction indicating data (Refer to Page 92)

As mentioned earlier, this consists of a key code and sub-codes. However, there may be two cases: the first only uses a key code, and the other uses both a key code and a sub-code.

For example, if the entire information concerning crude oil is necessary, only an appropriate key code (=1) is used, whereas if information concerning specific crude oil is necessary, then a sub-code must also be used.

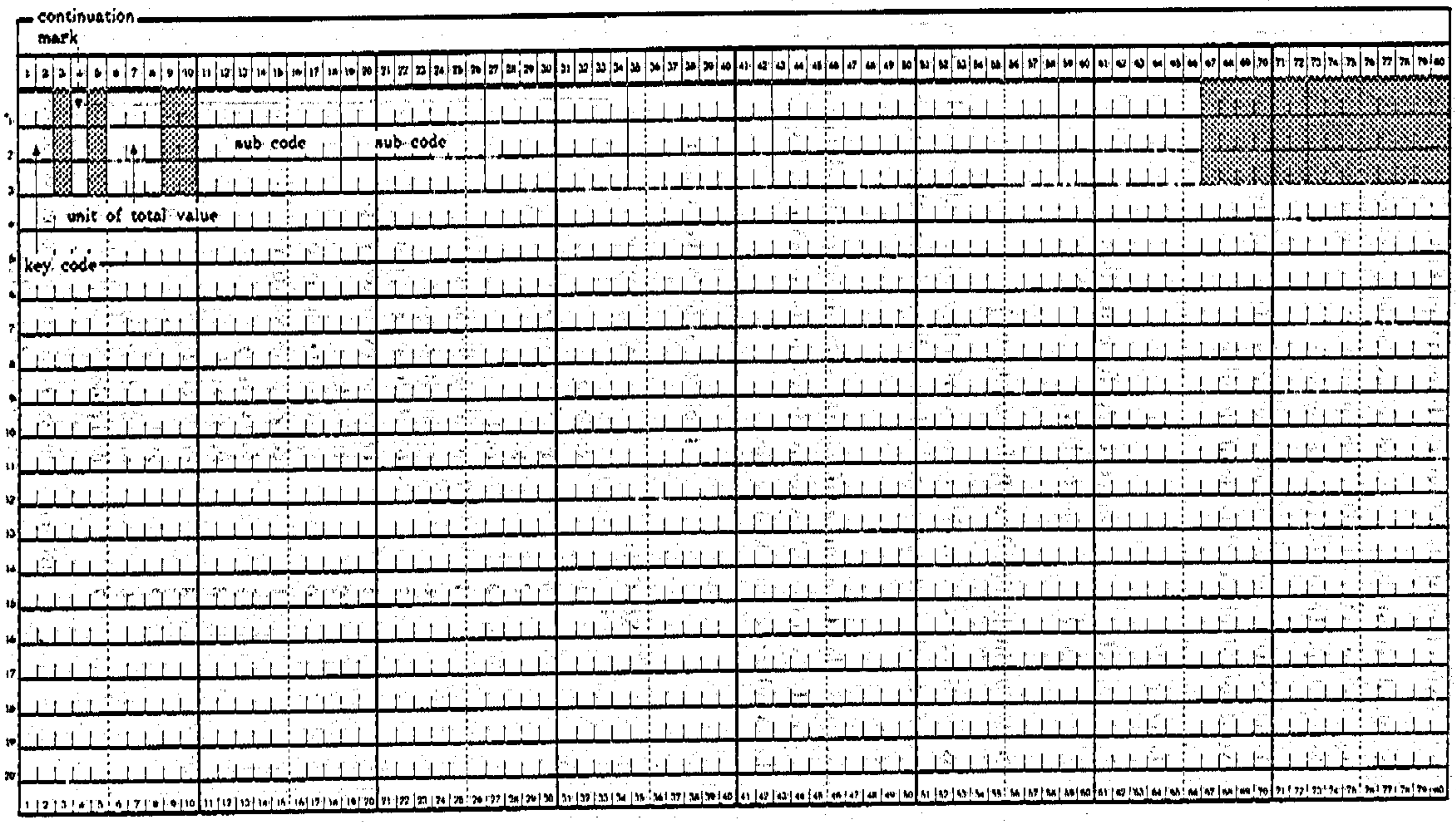
Table 2 Table of key Codes

Key Code	Classification
1	crude oil
2	petroleum products
3	gas
4	coal
5	other energy sources
6	consumption sector
7	oil refinery and gas plant
8	PERTAMINA marketing region
9	seafed depot
10	countries of transaction
11	domestic transportation
12	data category
13	sub-index 1
14	sub-index 2
15	year
16	month or quarter
17	data period

(Note) Sub-codes include names of individual crude oils and manufactured goods.

/ /   /

Extraction Indicating Data



If more than 8 sub-codes are used for one key code, the continuation column must be written in as shown in the example.

Fig. 4 The Case where More than Eight Sub-Codes are Used for One key Code

Co.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19.....
	R	E	T																
	0	1																	
	1	6			C						0	4							0 5
	1	6									1	1							1 2
	1	5									1	9	7	6					
	9	9									0	1	*	1	5	*	1	4	

There are two special types of key codes, "99" and "SV", which are used in the following cases.

"99" is used to write a logical expression of the key code to create a necessary set from a partial set (Refer to Fig. 4). When the sum of values of extracted data is desired, unit conversion of the individual values is performed by indicating a unit, such as BBL, in columns 6 through 8 of the "99" card so that the sum of the values will be printed out with a uniform unit. The built-in unit conversion table of the EDBS is shown on Page 94. If columns 6 through 8 are blank, no sum is printed. Furthermore, if a variable name included in the energy balance table is indicated in columns 73 through 80 of the "99" card, the sum, in addition to the variable name, will be transferred to an intermediate file. On the other hand, "SV" is used to transfer a set of extracted data to an intermediate file for editing purposes. A label, required to manage the extracted set for its transmission to the intermediate file, is indicated in columns 6 through 8 of the SV card.

1-3 Edition of Extracted Data

The EDBS edits extracted data, then prints out any number of tables from among the 111 shown on pages 98~100 specified by REPORT NO. and SUB NO. Data requiring use of this function consists of directive data and edition indicating data.

Directive data

OUT	Directive data for edition
EOD	End of data

(14)

Unit Conversion Table

	BBL	KL	M3	MCF	BTU	KWH
BBL	1.0	0.159	0.159	5.16E-3		
KL	6.29	1.0	1.0	35.31E-3		
M3	6.29	1.0	1.0	35.31E-3		
MCF	178.11	28.32	28.32	1.0		
BTU					1.0	2.93E-4
KWH					3412.14	1.0

(Reference) A sample list of Information extraction

```
INDONESIAN ENERGY DATA BASE SYSTEM
                                   --- INPUT DATA LIST ---
NO.          1         2         3         4         5         6         7         8
     ----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+

  1  REST    (Refer to 1-5)

INDONESIAN ENERGY DATA BASE SYSTEM
                                   --- INPUT DATA LIST ---
NO.          1         2         3         4         5         6         7         8
     ----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+

  1  RET                         0         0

INDONESIAN ENERGY DATA BASE SYSTEM
                                   --- INPUT DATA LIST ---
NO.          1         2         3         4         5         6         7         8
     ----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+

  1    01
  2    12        N
  3    14        1979
  4    99   BBL  01*12*14
*** END OF STEPM COUNTER X**
```

I N D O N E S I A N   E N E R G Y   D A T A   B A S E   S Y S T E M

--- LIST OPTION ---

NO	CATE GORY	SUB IDX	COMMODITY	CONSUM SECTOR	[illegible]	[illegible] STA [illegible]	FOREIGN COUNTRY	DOMESTIC TRANSPOR	DATE YEAR	C.M	AMOUNT	SCL	UNIT	COMMENT
193	W		OCR01						1979	01	1646326.0E	0	BBL	
194	W		OCR02						1979	01	1782623.0E	0	BBL	
195	W		OCR03						1979	01	263178.0E	0	BBL	
196	W		OCR04						1979	01	32199.0E	0	BBL	
197	W		OCR05						1979	01	222653.0E	0	BBL	
198	W		OCR06						1979	01	474825.0E	0	BBL	
199	W		OCR07						1979	01	610559.0E	0	BBL	
200	W		OCR08						1979	01	242266.0E	0	BBL	
201	W		OCR10						1979	01	469255.0E	0	BBL	
[illegible]	W		[illegible]						1979	01	89176.0E	0	BBL	
203	W		OCR12						1979	01	102770.0E	0	BBL	
204	W		OCR13						1979	01	700156.0E	0	BBL	
205	W		OCR14						1979	01	311269.0E	0	BBL	
206	W		OCR15						1979	01	479556.0E	0	BBL	
207	W		OCR16						1979	01	73807.0E	0	BBL	
208	W		OCR17						1979	01	11526.0E	0	BBL	
209	W		OCR18						1979	01	505920.0E	0	BBL	
210	W		OCR19						1979	01	40874.0E	0	BBL	
211	W		OCR20						1979	01	112160.0E	0	BBL	
212	W		OCR22						1979	01	171736.0E	0	BBL	
213	W		OCR16						1979	01	22259.0E	0	M3	
214	W		OCR23						1979	01	30241.0E	0	M3	
215	W		OCR24						1979	01	46677.0E	0	M3	
216	W		OCR25						1979	01	12010.0E	0	M3	
217	W		OCR28						1979	01	44104.0E	0	M3	
218	W		OCR26						1979	01	10351.0E	0	M3	
219	W		OCR27						1979	01	19020.0E	0	M3	
220	W		OCR29						1979	01	10716.0E	0	M3	
221	W		OCR30						1979	01	16711.0E	0	KL	
893	W		OCR40		01				1979	01	66309.0E	0	KL	
895	W		OCR40		02				1979	01	62704.0E	0	KL	
897	W		OCR40		03				1979	01	178631.0E	0	KL	
899	W		OCR40		04				1979	01	512343.0E	0	KL	
901	W		OCR40		05				1979	01	705244.0E	0	KL	
903	W		OCR40		06				1979	01	732606.0E	0	KL	
905	W		OCR40		07				1979	01	890022.0E	0	KL	
907	W		OCR40		08				1979	01	40470.0E	0	KL	
909	W		OCR40		21				1979	01	289851.0E	0	KL	
910	W		OCR40		22				1979	01	-81127.0E	0	KL	
911	W		OCR40		23				1979	01	256132.0E	0	KL	
1300	W		OCR32		15				1979	01	1046544.0E	0	BBL	
TOTAL											32730352.0		BBL	

(16)

Edition indicating data (Refer to page 97)

By writing in the label name (on the specified "SV" card) of the extracted information given for its transmission to an intermediate file at the input file columns, appropriate information is read from the intermediate file.

If a specified report edits information more than two years old (FORMAT on pages 98 ~ 100 is F1 or F2), the oldest year must be specified at the column of ADDITIONAL INFORMATION.

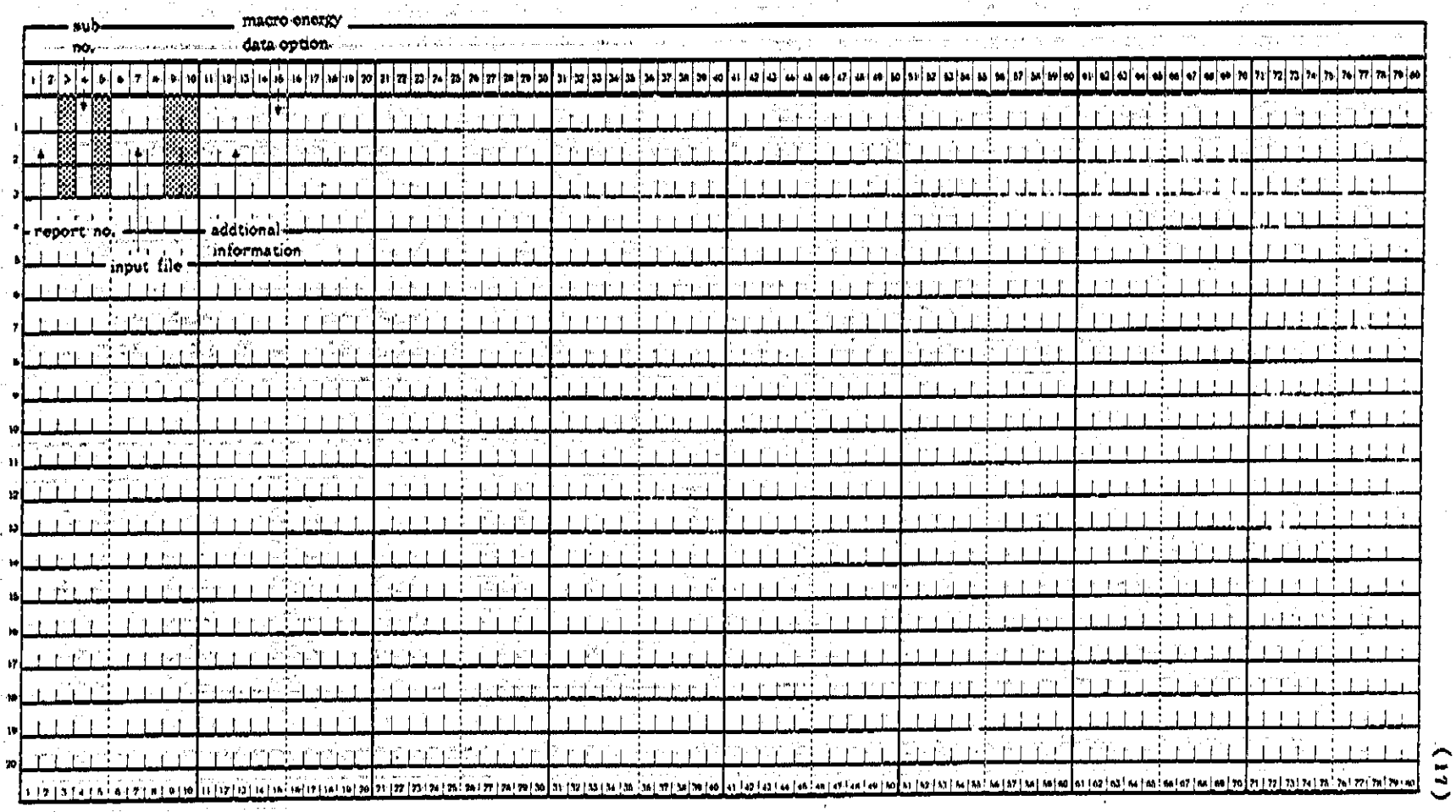
Data input into the EDBS is monthly-based data called micro data.

However, yearly data or quarterly data called macro data is mainly used for the energy demand forecasting model and the energy balance table. Therefore, sub-data bank system was developed, as will be described in "USER'S MANUAL OF SUB-DATA BANK SYSTEM", in order to handle macro data.

The function which produces macro energy data from micro energy data was added in the EDBS (Refer to 1-7). There are two ways to produce macro energy data. One of two ways is to produce macro energy data concurrently with the edition of EDBS. When " G " is encountered, in the MACRO ENERGY DATA OPTION column of the edition instruction data (OUT), this function is executed.

/ / /

Edition Indicating Data



(17)

Report no.	no.	Title	Y:cy F:fy M:month	Printing unit	no.	ROW	no.	COL	Matrix reduction	Format	Comments
02-1	1	crude oil production by company	Y	BBL	R1	company	C1	JAN to DEC	R	F1	
02-2			F				C2	APR to MAR			
02-3	2	crude oil production by field	Y	BBL	R2	crude oil field	C1		R	F1	
02-4			F				C2				
03-1	3	crude oil production by type of crude	Y	M.BBL	R3	type of crude	C3	5 years	R	F2	
03-2			F								
04-1	4	crude oil supply to refinery	Y	M.BBL	R4	type of crude	C4	Indonesia refinery & C.P. deal	R	F3	
04-2			F								
04-3			M	BBL							
04-4			Y	M.BBL			C3		R	F2	
04-5			F								
05-1	5	refinery through-put	Y	M.BBL	R4		C4		R	F3	
05-2			F								
05-3			M	BBL							
05-4			Y	M.BBL			C3		R	F2	
05-5			F								
06-1	6	refinery products	Y	M.BBL &	R5	trough-put & products	C4			F3	
06-2			F	10^{11}KT							
06-3			M	BBL & KT							
06-4	7	refinery products	Y	BBL & KT			C1			F1	
06-5			F				C2				
06-6			Y	M.BBL &			C3			F2	
06-7			F	10^{11}KT							
07-1	8	crude oil export by destination	Y	M.BBL	R4		C5	foreign country	R&C	F4	
07-2			F								
07-3	9	crude oil export	Y	BBL			C6	JAN to DEC	R	F5	
07-4			F				C7	APR to MAR			
07-5			Y	M.BBL			C3		R	F2	
07-6			F								
08-1	10	crude oil export value by destination	Y	M.US$	R4		C5		R&C	F4	
08-2			F								
08-3	11	crude oil export value	Y	US$			C6		R	F5	
08-4			F				C7				
08-5			Y	M.US$			C3		R	F2	
08-6			F								
09-1	12	crude oil import by origin	Y	M.BBL	R4		C5		R&C	F4	
09-2			F								
09-3	13	crude oil import	Y	BBL			C6		R	F5	
09-4			F				C7				
09-5			Y	M.BBL			C3		R	F2	
09-6			F								
10-1	14	crude oil import value by destination	Y	M.US$	R4		C5		R&C	F4	
10-2			F								
10-3	15	crude oil import value	Y	US$			C6		R	F5	
10-4			F				C7				
10-5			Y	M.US$			C3		R	F2	
10-6			F								
11-1	16	products export by destination	Y	M.BBL &	R6	PRODUCTS	C5		C	F4	
11-2			F	10^{11}KT							
11-3	17	products export	Y	BBL & KT			C6			F5	
11-4			F				C7				
11-5			Y	M.BBL &			C3			F2	
11-6			F	10^{11}KT							
12-1	18	products export value by destination	Y	M.US$	R6		C5		C	F4	
12-2			F								
12-3	19	products export value	Y	US$			C6			F5	
12-4			F				C7				
12-5			Y	M.US$			C3			F2	
12-6			F								
13-1	20	products import by origin	Y	M.BBL &	R6		C5		C	F4	
13-2			F	10^{11}KT							
13-3	21	products import	Y	BBL & KT			C6			F5	
13-4			F				C7				
13-5			Y	M.BBL &			C3			F2	
13-6			F	10^{11}KT							
14-1	22	products import value by origin	Y	M.US$	R6		C5		C	F4	
14-2			F								
14-3	23	products import value	Y	US$			C6			F5	
14-4			F				C7				
14-5			Y	M.US$			C3			F2	
14-6			F								

Report no.	no.	Title	Y:cy F:fy M:month	Printing unit	no.	ROW	no.	COL	Matrix reduction	Format	Comments
15-1	24	BBM consumption by sector	Y	M.BBL	R7	cosumption	C8	BBM		F4	
15-2			F								
15-3			M	BBL							
15-4	25	(name of BBM) consumption by sector	Y	BBL			C1			F1	
15-5			F				C2				
15-6	26	BBM consumption by sector	Y	M.BBL			C3			F2	
15-7			F								
15-8	27	BBM consumption	Y	M.BBL	R8	BBM	C3			F2	
15-9			F								
16-1	28	products supply by marketing region	Y	M.BBL	R8	BBM	C9	marketing region		F4	
16-2			F								
16-3			M	BBL							

Report no.	no.	Title	Y:cy F:fy M:month	Printing unit	no.	ROW	no.	COL	Matrix reduction	Format
17-1	29	gas production by company	Y	MCF	R1	company	C1	JAN to DEC	R	F1
17-2			F				C2	APR to MAR		
17-3	30	gas production by field	Y	MCF	R9	gas field	C1	JAN to DEC	R	F1
17-4			F				C2	APR to MAR		
18-1	31	gas plant through-put	Y	10**3MCF	R10	commodity	C10	gas plant	R&C	F4
18-2			F							
18-3			M	MCF						
18-4			Y	10**3MCF			C3	five years	R	F2
18-5			F							
19-1	32	gas summary report	Y	10**3MCF	R1	company	C11	production own use transformat. consumption loss&flare	R	F6
19-2			F							
19-3			M							

Report NO.	NO.	Title	Y: CY F: FY M: Month	Printing unit	NO.	ROW	NO.	COL	Matrix reduc-tion	Format
20-1	33	Coal production by field & type	Y	ton	R11	Field & type	C1	Jan-Dec		F1
20-2			F				C2	Apr-Mar		
20-3			Y				C3	5 years		F2
20-4			F							
21-1	34	Coal summary report	Y	ton	R12	Field, sector, etc.	C12	Type of coal		F4
21-2			F							
22-1	35	Coal Consumption	Y	ton	R13	Sector	C13	Type of coal		F7
22-2			F							
23-1	36	Electricity generation	Y	KWH	R14	Region & partial ratio	C14	Type of generation		F8
23-2			F							
24-1	37	Installed capacity	Y	KW	R14		C14			F8
24-2			F							
25-1	38	Electricity consumption	Y	KWH	R15	Region	C15	Sector		F4
25-2			F							
26-1	39	Electricity summary report	Y	KWH	R15		C16	Prod., Imp. Cons., etc.		F9
26-2			F							

(Reference) A sample list of edition and printing

```
INDONEDIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   REST   (Refer to 1-5)

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   RET                      0        0

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   02
 2   12       P
 3   14       1979
 4   99       02*12*14
*** END OF STEPM COUNTER X**

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   SV   F01

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   01
 2   12       T
 3   14       1979
 4   99       01*12*14
*** END OF STEPM COUNTER X**

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   SV   F01

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   EO

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   OUT

INDONESIAN ENERGY DATA BASE SYSTEM
                                --- INPUT DATA LIST ---
NO.          1        2        3        4        5        6        7        8
----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
 1   C6  1 F01
```

INDONESIAN ENERGY DATA BASE SYSTEM (1)

REPORT NO: 6-1
RUN DATE :

REFINERY PRODUCTS CY1979 IN M.BBL.1000 MT

INDONESIAN REFINERY

P. PRODUCTS	P.BRANDAN	DUMAI	SEI.PAKNING	SEI.SERONG	PLAJU	BALIKPAPAN	CILACAP	MONOKROMO	INDONESIA
THROUGH-PUT	157	2462	834	1546	1551	1239	2022	19	9831
AVIAT.GASOL.	0	0	0	0	0	0	0	0	0
SUPER GASOL.	0	0	0	0	0	0	0	0	0
PREMIUM GAS.	53	132	0	403	0	176	275	1	1042
JET FUEL	0	0	0	0	0	0	0	0	0
KEROSENE	38	418	175	149	0	306	432	0	1512
AUTOMOT.D.O	21	422	96	265	0	113	149	0	1066
INDUSTR.D.O	10	0	0	57	0	59	135	12	263
HEAVY FUEL O	3	30	3	67	0	128	732	4	967
BBM	115	1002	274	941	0	770	1723	17	4850
NAPHTHA	0	0	0	0	0	0	1	0	1
LOW SUL.W.R.	0	1287	478	647	0	529	0	0	3041
NON-BBM	0	1287	478	647	0	529	1	0	3042
LPG	0	0	0	0	0	0	0	0	0
LUBRICANTS	0	0	0	0	0	0	0	0	0
SOLVENTS	0	0	0	0	0	0	0	0	0
ASPHALTS	0	0	0	0	0	0	0	0	0
GREASE	0	0	0	0	0	0	0	0	0
WAXES	0	0	0	0	0	0	0	0	0
PETROL.COKE	0	0	0	0	0	0	0	0	0
POLITAM	0	0	0	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0	0	0	0
MIDDLE DIST.	32	35	77	110	0	-15	31	0	270
FEEDSTOCK	0	0	0	0	0	0	0	0	0
ASPH.BASE	0	0	0	0	0	0	0	0	0
LUB BASE	0	0	0	0	0	0	0	0	0
INTERMEDIATE	32	35	77	110	0	-15	31	0	270

INDONESIAN ENERGY DATA BASE SYSTEM

(2)

REPORT NO: 6-1
RUN DATE :

REFINERY PRODUCTS

CY1979

IN M.BBL.1CE3 MT

C.P. DEAL

P. PRODUCTS	AIR CHAWAN	JURONG	BUKOM	P.MERLIMAU	C.P.DEAL	TOTAL
THROUGH-PUT	445	1150	2238	0	3839	13670
AVIAT.GASOL.	0	0	0	0	0	0
SUPER GASOL.	0	0	34	0	34	34
PREMIUM GAS.	49	130	310	0	489	1531
JET FUEL	0	0	0	0	0	0
KEROSENE	0	486	414	0	900	2412
AUTOMOT.D.O	192	113	536	0	841	1907
INDUSTR.D.O	0	0	0	0	0	263
HEAVY FUEL O	0	290	0	0	290	1257
BBM	241	1019	1294	0	2554	7404
NAPHTHA	33	15	51	0	99	100
LOW SUL.W.R.	134	0	792	0	946	3987
NON-BBM	167	15	843	0	1045	4087
LPG	0	0	0	0	0	0
LUBRICANTS	0	0	0	0	0	0
SOLVENTS	0	0	0	0	0	0
ASPHALTS	0	0	0	0	0	0
GREASE	0	0	0	0	0	0
WAXES	0	0	0	0	0	0
PETROL.COKE	0	0	0	0	0	0
POLITAR	0	0	0	0	0	0
OTHERS	0	0	0	0	0	0
MIDDLE DIST.	0	0	0	0	0	270
FEEDSTOCK	0	0	0	0	0	0
ASPH.BASE	0	0	0	0	0	0
LUB BASE	0	0	0	0	0	0
INTERMEDIATE	0	0	0	0	0	270

1-4 Printing of Information Files (Refer to page 24)

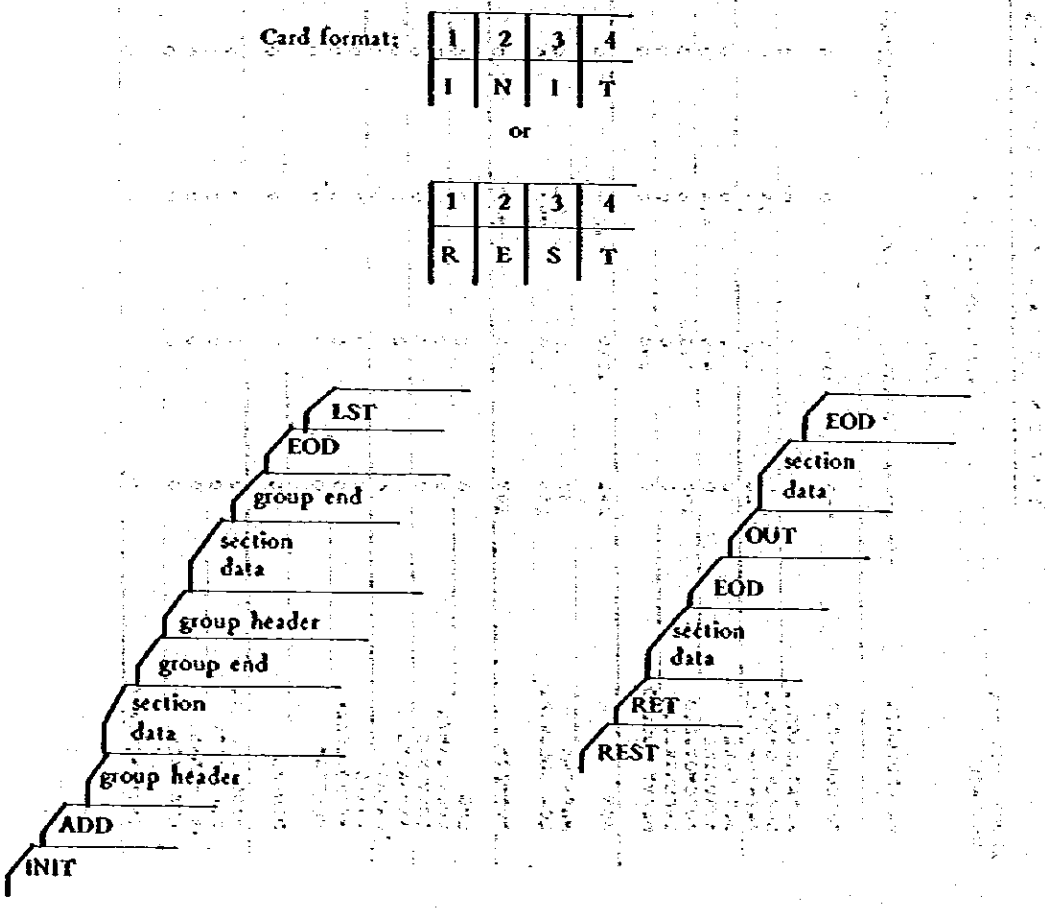
Any contents of the information file can be printed out. By specifying the record number of the information file, partial printing is also possible.

In addition, the EDBS provides a function to print major tables and LINK ADDRESSs of the ELEMENT FILE in order to check the system's list structure.

1-5 Structure of the Data Deck

The first card of the data deck must be either "INIT" or "REST". If INIT is placed at the beginning, an initial state where all of the tables, files, and counters have been cleared is established. If REST is used, a restart is initiated based on previously stored information (Refer to Fig. 5).

Fig. 5 An Example of the Data Deck Structure



客先名 ____________________

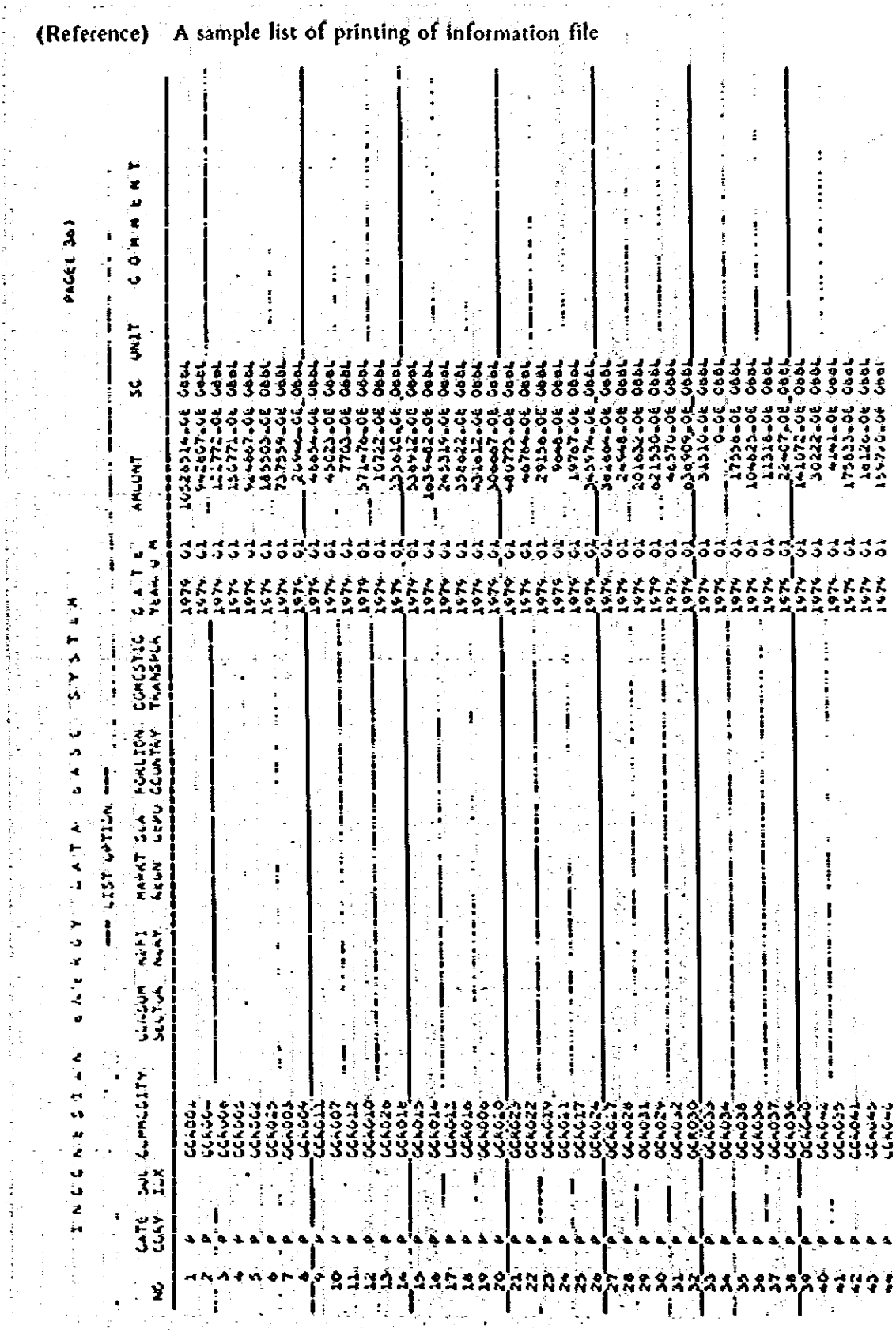
作業名 ____________________

作成者名 ____________________

日付 / / ページ /

Line	Columns 1–3	Columns 4–80
1		
2	LST	Printing of information file SNE LNE record number printed out SNE: start (if omitted, set 1)
3		LNE: end (if omitted, set maximum number of record)
4		
5		
6		
7		
8	DLT	Printing of table contents
9		
10	ELT	Printing of link address of each datum
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

(Reference) A sample list of printing of information file



1-6 Error Message

NO.	ERROR MESSAGE	EXPLANATION	TREATMENT	Printed at:
1	****** NO DATA INIT OR REST *****, CHECK DATA	the first card of data deck must be 'REST' or 'INIT'	treats as 'REST'	MAIN
2	***** THIS DATA READ AT (card no)+1 IS WRONG	detected wrong directive	skips to EOD	MAIN
3	WE CAN NOT ACCEPT THIS DATA, SO SKIP	commodity code is wrong	ignores the data	ADATAI CDATAI
4	EXCEEDED UNIT TABLE LIMIT = (length)	exceeded the limit of unit table in COMMON /UNTTBL/	stop	ADD
5	ILLEGAL MASTER IDENT NAME (name)	unmatched master name	stop (program error)	CHAIN
6	NEXT ADDRESS ISN'T ZERO ---- PROGRAM ERROR	if element is tail, the link address which points to next must be zero	stop (program error)	CHAIN
7	EXCEEDED NAME TABLE LIMIT=(length)	exceeded the limit of name entry table in COMMON/NAMTBL/	stop	CHAIN
8	*** ILLEGAL KEY CODE RDATAI ***	detected illegal key code in retrieval data	ignores the data	RDATAI
9	***** CORRECT 99 DATA RETVAL AT STEMP ****	on 99 card, operand must be number	operand is replaced by zero	STEPM
10	*** AT SUBROUTINE STEPM COUNTER NUMBER OF OPERAND AND OPERATOR = (number)> 60=DIMENSION OF ST1	exceeded the limit of working area in COMMON /STEP/	stop	STEPM
11	*** AT SUBROUTINE STEPM COUNTER NUMBER OF OP.DEC AND OPERATOR =(number)> 50=DIMENSION OF ST2	exceeded the limit of working area in COMMON /STEP/	stop	STEPM
12	*** EXCEEDED NAGITBL ***	exceeded the limit of aggregation file in COMMON/AGFIL/	stop	LOGOPE
13	EXCEEDED AGFID	exceeded the limit of aggregation file in COMMON/AGFIL/	stop	AGFILE
14	PROGRAM MISTAKE	unmatched master name	stop (program error)	AGFILE
15	SUB-EQUATN IS ILLEGAL, CHECK AGAIN	detected illegal expression on 99 card	stop	MSTEP

NO.	ERROR MESSAGE	EXPLANATION	TREATMENT	Printed at:
16	EXCEEDED MAXKEY	exceeded the limit of working area in COMMON /MAXKEY/	stop	MSTEP
17	EXCEEDED KOID	exceeded the limit of working area in COMMOM /OPETBL/	stop	MSTEP
18	EXCEEDED OUTPUT AREA	exceeded the limit of working area LETR in COMMON/OPETBL/	stop	REORDR
19	EXCEEDED INTERMEDIATE STACK	exceeded the limit of working area STACK	stop	REORDR
20	ILLEGAL UNIT CODE DETECTED: (code)	unit code on 99 card is not in conversion table	converting factor = 1.0	LIST
21	ILLEGAL UNIT CODE DETECTED: (code) NO ACCOUNT	unit code of retrieved data is not in conversion table	this value is not counted	LIST
22	ILLEGAL CHARACTER DETECTED (2 digits)	both 2 digits must be number	replaced by zero	DEC1
23	EXCEEDED FPTBL LIMIT=(length)	exceeded the limit of file position table in COMMON/FPTBL/	stop	SFILE
24	CHECK INPUT DATA: (header card)	it's not necessary for code, symbol VS. name table	caution message, skips to END	STRTBL
25	CHECK PRINT TYPE: (type)	type of read format must be 1 to 8	(program error)	TABLE
26	CHECK PRINT J= (table no.)	exceeded the limit of code, symbol VS. name table	stop	TABLE
27	MAXIMUM LENGTH EXCEEDED etc.	exceeded the limit of ROW or COL in COMMON /MAT/	stop	EXC
28	DETECTED WRONG CODE etc.	settled code of COMMON /ADINF/ is wrong	this code is not entered into ROW or COL	WRONG
29	NO CODE IN C.O.F. CODE= (code) NO=(element no.)	no code of crude oil field in COMMON/COF/	ignores the data	MATRIX
30	NO CODE IN ROW CODE=(code) NO=(element no.)	no code in ROW of COMMON/MAT/	ignores the data	MATRIX
31	NO CODE IN COL CODE=(code) NO=(element no.)	no code in COL of COMMON/MAT)	ignores the data	MATRIX

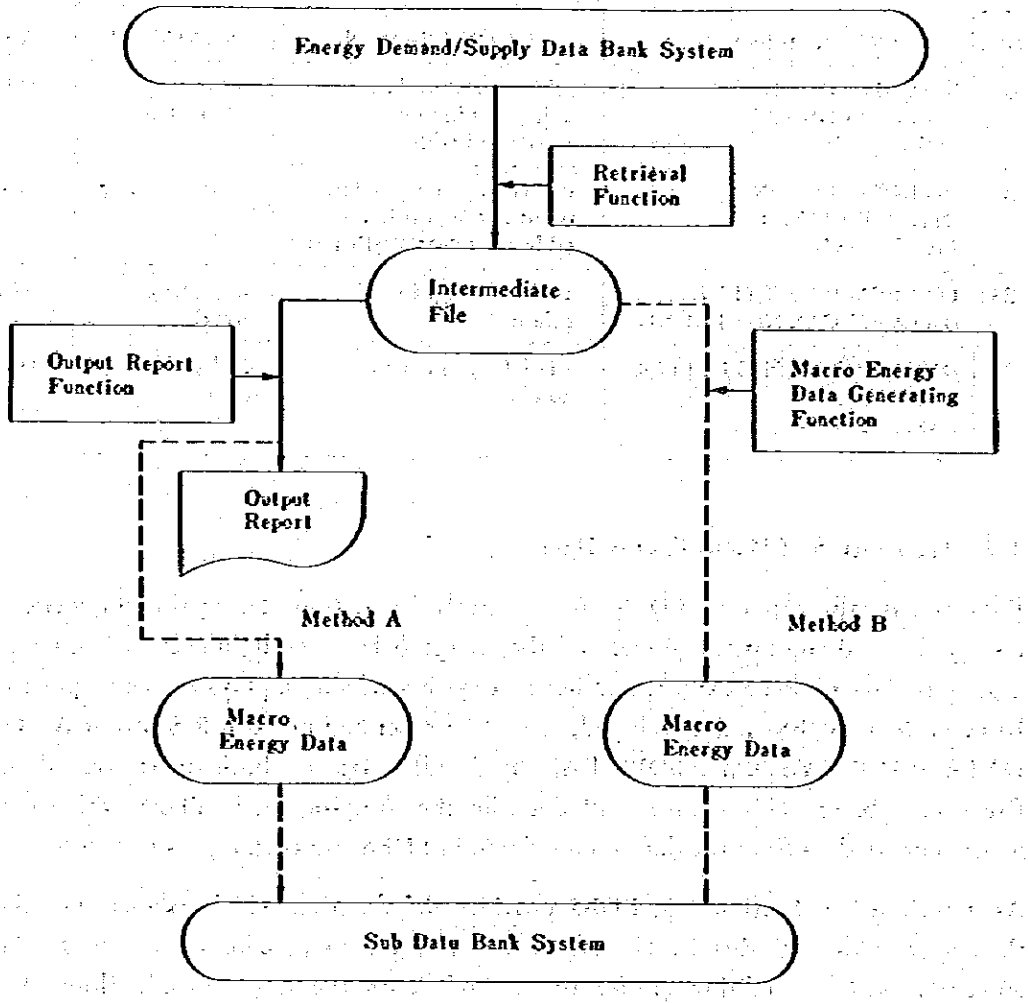
NO.	ERROR MESSAGE	EXPLANATION	TREATMENT	Printed at:
32	NO UNIT-CODE IN CONVERSION TABLE CODE=(code)	printing unit or data unit is not in unit conversion table	converting factor=1.0	MATRIX
33	NO INPUT FILE IN INTERMEDIATE FILE FILE=(file ident)	file name on output data is not in file position table of COMMON/FPTBL/	caution message	MATRIX
34	FOR ROW REDUCTION, DATA 999 CAN NOT FOUND	could not find a total column	stop (program error)	REDUCE
35	DETECTED WRONG LETTER IN DEC4 EXPR=(4 digits)	all of 4 digits must be number	replaced by zero	DEC4

1-7 Preparation of Macro Energy Data

Data is basically input to EDBS on a monthly basis. Considering the connection to the energy demand forecasting model and the energy balance table, however, it is necessary to aggregate data to some extent, and hence a system which employs the concept of sub-data bank system (SDBS) was developed, as will be described in "USER'S MANUAL OF SUB-DATA BANK SYSTEM". SDBS basically handles data on both quarterly, calendar and fiscal year bases. This section will describe the sub-program in EDBS which constructs macro energy data from the data accumulated in EDBS and then inputs to SDBS.

As mentioned in Section 1-3, EDBS provides the function which extracts raw data, and then aggregates and edits it. Therefore, it is possible to prepare macro energy data concurrently with the edition (Refer to Method A on the left-hand-side flow of Fig. 6). However, since the editing function cannot prepare data of certain items, some function generate separately macro data that cannot be handled by the editing function is required. This separate function extracts necessary data using the extraction function illustrated in Section 1-2, and then edits it in accordance with the SDBS rules (Refer to the right-hand-side flow of Fig. 6).

Fig. 6 Generation of Macro Energy Data



(1) Input format of the macro energy data

Since data is handled on a time-series basis in SDBS, variable names are given to individual data. A variable name includes information consisting of data period type, category, energy source (commodity), consumption sector, and crude oil type and so on. The maximum length of the variable name is 12 characters, and the variable name list is shown in Table 3. There are two types of input format applied to SDBS, as will be shown in "USER'S MANUAL OF SUB-DATA BANK SYSTEM". However, for the preparation of macro energy data from EDBS, type-1 is used. Therefore, macro energy data here will be generated in accordance with the type-1 format. The input format of the type-1 comprises header data and individual time-series data.

Table 3 List of Macro Energy Data

	№	Category	Classification	Variable Name	Scale	Unit	Yearly	Quarterly
Crude oil	1	Production	By company	pPOCR99****	3	BBL	A(2-1, 2-2)	A(2-1)
			By type of crude oil	pPOCR****99	3	BBL	A(2-3, 2-4)	A(2-3)
	2	Transformation	By type of crude oil	pTOCR****	3	BBL	A(5-1, 5-2)	
	3	Supply	By type of crude oil	pSOCR****	3	BBL	A(4-1, 4-2)	
	4	Export	By type of crude oil	pEOCR****99	3	BBL	A(7-3, 7-4)	A(7-3)
			By destination	pEOCR99****	3	BBL	A(7-1, 7-2)	
	5	Export Value	By type of crude oil	pEVOCR****99	3	US$	A(8-3, 8-4)	A(8-3)
			By destination	pEVOCR99****	3	US$	A(8-1, 8-2)	
	6	Import	By type of crude oil	pIOCR****99	3	BBL	A(9-3, 9-4)	A(9-3)
			By origin	pIOCR99****	3	BBL	A(9-1, 9-2)	
	7	Import Value	By type of crude oil	pIVOCR****99	3	US$	A(10-3, 10-4)	A(10-3)
			By origin	pIVOCR99****	3	US$	A(10-1, 10-2)	
	8	Own use	Total	pHOCR	3	BBL		
	9	Loss	Total	pLOCR	3	BBL		
	10	Stock	Total	pWOCR	3	BBL		
Petroleum products	1	Production	By product	pP****	3	BBL, MT	A(total-na) (6-4, 6-5)	A(total-na) (6-4)
	2	Supply	By product(BBM)	pS****	3	BBL	A(16-1, 16-2)	
			By product(non-BBM)	pS****	3	BBL, MT		
	3	Consumption	(By product)×(By sector)	pC******...	3	BBL	A(15-4, 15-5)	A(15-4)
			Remarks	****Product				
			By product:BBM By sector:all and total	....Sector				

Note A : Available data from EDBS Report ( ) : EDBS Report №

(continued)

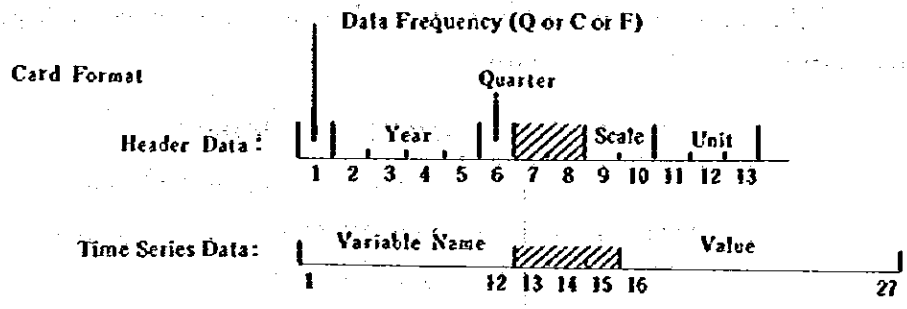
	No.	Category	Classification	Variable Name	Scale	Unit	Yearly	Quarterly
	4	Export	By product	pE××××99	3	BBL,MT	A(total:na) (11-3, 11-4)	A(total:na) (11-3)
			By destination	pEPET××		(BBL)		
	5	Export Value	By product	pEV××××99	3	US$	A(12-3, 12-4)	A(12-3)
			By destination	pEVPET××	3	US$	A(12-1, 12-2)	
	6	Import	By product	pI××××99	3	BBL,MT	A(total:na) (13-3, 13-4)	A(total:na) (13-3)
			By origin	pIPET××	3	(BBL)		
	7	Import Value	By product	pIV××××99	3	US$	A(14-3, 14-4)	A(14-3)
			By origin	pIVPET××	3	US$	A(14-1, 14-2)	
	8	Own use	By product	pH××××	3	BBL,MT		
	9	Loss	By product	pL××××	3	BBL,MT		
	10	Stock	By product	pW××××	3	BBL,MT		
	11	Marketing	By product	pM××××	3	BBL,MT		
	12	Auto generation	By sector	pAPET××××	3	BBL		
			By commodity	pA××××FEC	3	BBL		
Natural Gas	1	Production	By company	pPTNG××	3	MCF	A(17-1, 17-2)	A(17-1)
	2	Loss	Total	pLTNG	3	MCF	A(19-1, 19-2)	
	3	Own use	By purpose	pHTNG××××	3	MCF	A(19-1, 19-2)	
	4	Supply	to total industry(TIN)	pSTNGTIN	3	MCF	A(19-1, 19-2)	
	5	Transformation	By plant	pTTNG××	3	MCF	A(18-1, 18-2)	
	6	Stock	Total	pWTNG	3	MCF		
Gas products (LPG, LNG, CON and TWG)	1	Production	By product	pP××××99	3	MT	A (except TWG) (18-1, 18-2)	
			By plant	pPTGP××	3	MT		
	2	Loss	By product	pL××××	3	MT		

(continued)

	№	Category	Classification	Variable Name	Scale	Unit	Yearly	Quarterly
	3	Consumption	By product	pC××××FEC	3	MT		
			By sector	pCTGP××××	3	MT		
	4	Supply	By product	pS××××FEC	3	MT		
			By sector	pSTGP××××	3	MT		
	5	Stock	By product	pW××××	3	MT		
	6	Export	By product	pE××××99	3	MT		
			By destination	pETGP××	3	MT		
	7	Export Value	By destination	pEVTGP××	3	US$		
	8	Import	By product	pI××××99	3	MT		
			By origin	pITGP××	3	MT		
	9	Import Value	By origin	pIVTGP××	3	US$		
Coal	1	Production	By type of coal	pP××××999	3	MT	A(20-1, 20-2)	A(20-1)
			By field	pPTCO××××	3	MT	A(20-1, 20-2)	A(20-1)
	2	Stock	By type of coal	pW××××999	3	MT		
			By field	pWTCO××××	3	MT		
	3	Transformation	By type of coal	pT××××999	3	MT	A(22-1, 22-2)	
			By field	pTTCO××××	3	MT	A(22-1, 22-2)	
	4	Own use	By type of coal	pH××××999	3	MT	A(21-1, 21-2)	
			By field	pHTCO××××	3	MT		
	5	Consumption	By type of coal	pC××××FEC	3	MT	A(22-1, 22-2)	
			By sector(Major sector)	pCTCO××××	3	MT	A(22-1, 22-2)	
	6	Supply	By type of coal	pS××××	3	MT	A(21-1, 21-2)	

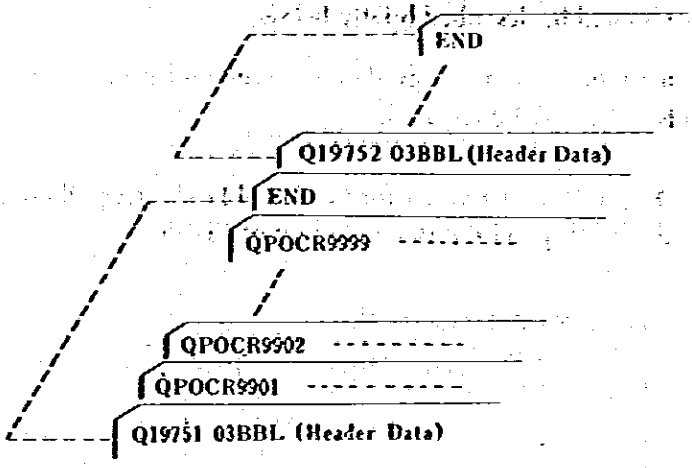
(continued)

	№	Category	Classification	Variable Name	Scale	Unit	Yearly	Quarterly
	7	Export	By type of coal	pE××××99	3	MT	A(21-1, 21-2)	
			By destination	pETCO××	3	MT		
	8	Export Value	By destination	pEVTCO××	3	US$		
	9	Import	By type of coal	pI××××99	3	MT	A(21-1, 21-2)	
			By origin	pITCO××	3	MT		
	10	Import Value	By origin	pIVTCO××	3	US$		
Electricity	1	Production	By generator	pP××××	3	KWH	A(23-1, 23-2)	
	2	Installed capacity	By generator	pPC××××	3	KW	A(24-1, 24-2)	
	3	Own use	Total	pHPEL	3	KWH	A(26-1, 26-2)	
	4	Loss	Total	pLPEL	3	KWH	A(26-1, 26-2)	
	5	Consumption	By sector(Major sector)	pCPEL××××	3	KWH	A(25-1, 25-2)	
	6	Export	By destination	pEPEL××	3	KWH	n.a[total:A] (26-1, 26-2)	
	7	Import	By origin	pIPEL××	3	KWH	n.a[total:A] (26-1, 26-2)	



An example of data configuration is shown in Fig. 7.

Fig. 7 Data Configuration Example of Type-1 Input Format to SDBS

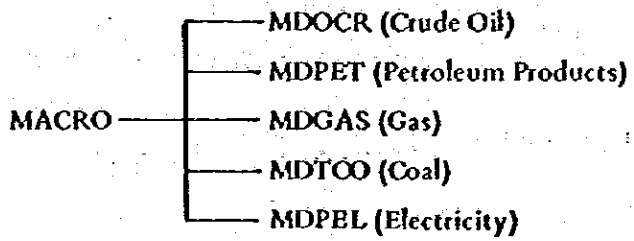


(2) Preparation of macro energy data (Method A)

Output reports generated by EDBS totals 111 tables as shown from p'98~100. Macro energy data is prepared using some of the tables. Information in the macro energy data includes those items shown in Table 3 for each energy source of crude oil, petroleum products, gas, coal and electricity. Among those items, in Table 3, only limited number of them can be included in the macro energy data. They include those indicated by "A".

Almost all necessary data can be obtained for crude oil, petroleum products and natural gas since there is a great number of reports generated regarding them, whereas quarterly data for coals cannot be prepared. As for the amount of data, about 70% of the total macro energy data is prepared using this method A. Subroutines required for the

preparation of the macro energy data are provided as before for crude oil, petroleum products, gas, coal and electricity respectively.



When "G" is encountered in the MACRO ENERGY DATA OPTION column of the edition instruction data (OUT), EDBS calls the MACRO subroutine, and then calls and processes subroutine ranked below the MACRO subroutine corresponding to the type of macro energy data. Here taking the macro energy data for crude oil production as an example, the corresponding program will be described briefly below.

For the preparation of the macro energy data for crude oil production shown at the top of Table 3, reports No. 2-1 and 2-2 are used.

Fig. 8 Output Report Format for Crude Oil Production Obtained by the Editing and Printing Function of EDBS

Report No. 2–1 (Calendar Year)

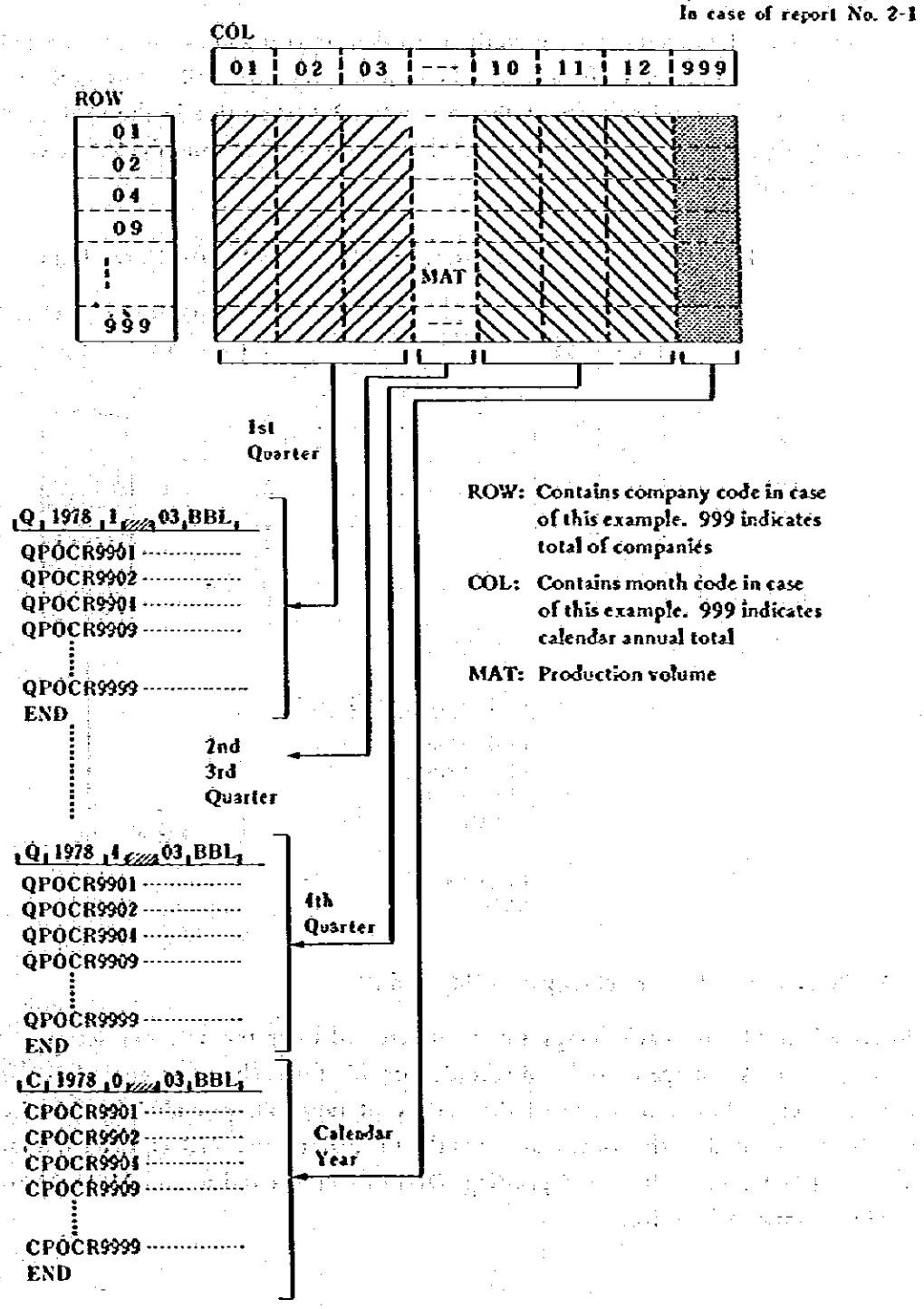
	Jan.	Feb.	Mar.	---	Dec.	CY Total
Company				---		
Total				---		

Report No.2–2 (Fiscal Year)

	Apr.	May.	Jun.	---	Mar.	FY Total
Company				---		
Total				---		

EDBS maintains the following information as shown in Fig. 9 in order to generate the table.

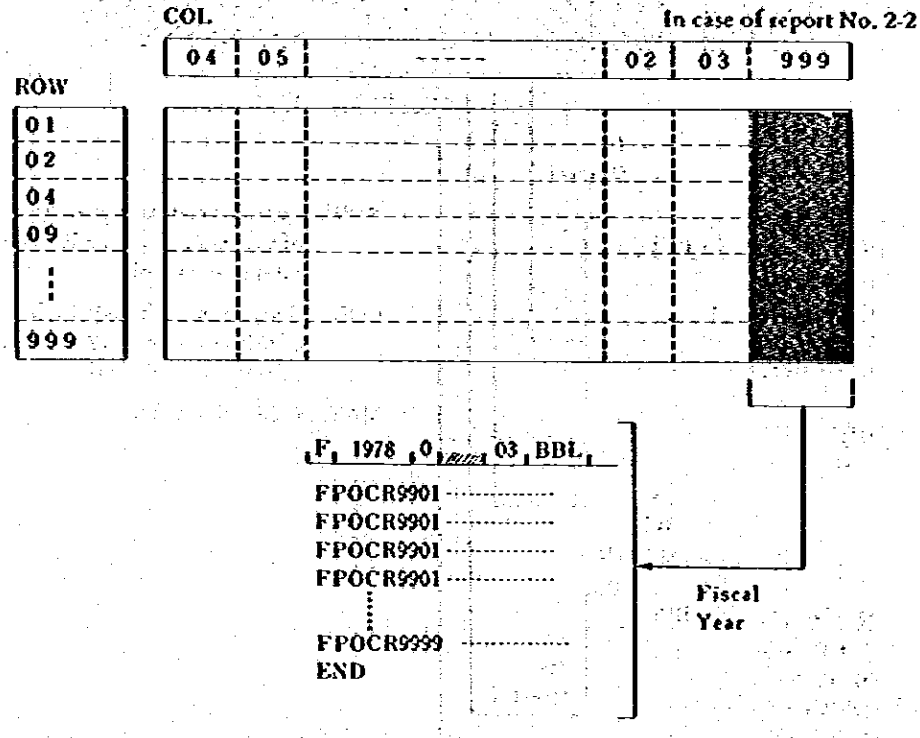
Fig. 9 Information Maintained by EDBS at the Times of Edition and Printing, and Preparation of Macro Energy Data



As shown in Fig. 9, header data and variable names are created using the information in the ROW and COL, and at the same time quarterly values are obtained by aggregating values of every three months in the matrix (MAT) and then recording them on file. When SDBS makes an access to the file, the macro energy data (crude oil production by companies in this example) can be catalogued in the sub-data bank.

Macro energy data containing quarterly and calendar year values can be prepared using the report No. 2-1, and that of fiscal year values can be prepared similarly using the information contained in the total column of the report No. 2-2 (the value in the COL is 999). Since quarterly data can be prepared concurrently with the preparation of calendar year data, it is not generated here.

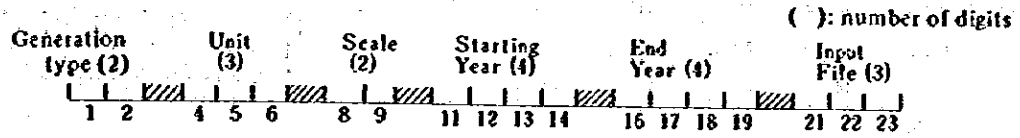
Fig. 10 Preparation of Fiscal Year Values of Macro Energy Data



(3) Preparation of macro energy data (Method B)

Intermediate files for each energy source are created using the data extraction function of EDBS, and they are aggregated and recorded on file for each macro energy data item. This data extraction function is one of the variety of functions provided by EDBS. In other words, it is treated in the same manner as the file maintenance (ADD, CNG and DEL), data retrieval (RET), and editing and printing (OUT) functions and it uses MED (Macro Energy Data Genetation) directive.

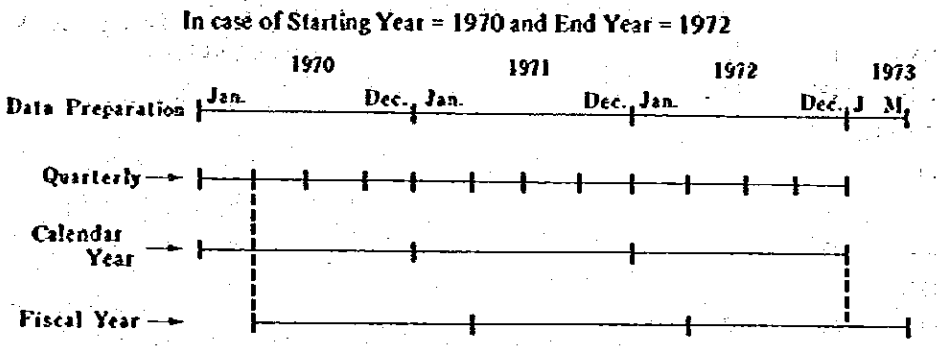
Data format for individual data is as follows.



Generation type:	01 = Crude Oil 02 = Petroleum Products 03 = Natural Gas 04 = Gas Products 05 = Coal 06 = Electricity
Unit, Scale:	Macro energy data is generated after conversion of data to the unit and scale specified here.
Starting Year, End Year:	Period of the macro energy data generated
Input File:	Specification of the intermediate file

Since quarterly, calendar year, as well as fiscal year data is created at the same time (with the exception of electricity), it is necessary to extract data for the period described below using the data extraction function. For instance, in the case of macro energy data for the period from 1970 to 1972, data for the period from January 1970 to March 1973 is required.

Fig. 11 Data Period for the Preparation of Macro Energy Data



The maximum period which can be handled by this function is 5 years (20 quarters).

The data extraction function used to prepare the macro energy data for petroleum products will be described below using examples of data and data input to the function.

(40)

```
RET
02C   AGS   SGS   PGS   JET   KER   ADO   IDO
02    HFO   NAP   LSR
12    S     H     L     W     M
15    1970  1971  1972
99    02×12×15
SV    FOA
02C   AGS   SGS   PGS   JET   KER   ADO   IDO
02    HFO   NAP   LSR
12    S     H     L     W     M
15    1973
16    01    02    03
99    02×12×15×16
SV    FOA
```

Code names of petroleum products used to prepare the macro data by BBL

Category for the preparation of macro data

Name used to store data into the intermediate file

Specify that the first quartely data of 1973 is extracted.

```
02    LUB   SOL   ASP   GRE   WAX   PCK   LPG
12    S     H     L     W     M
15    1970  1971  1972
99    02×12×15
SV    FOB
02    LUB   SOL   ASP   GRE   WAX   PCK   LPG
12    S     H     L     W     M
15    1973
16    01    02    03    04
99    02×12×15×16
SV    FOB
```

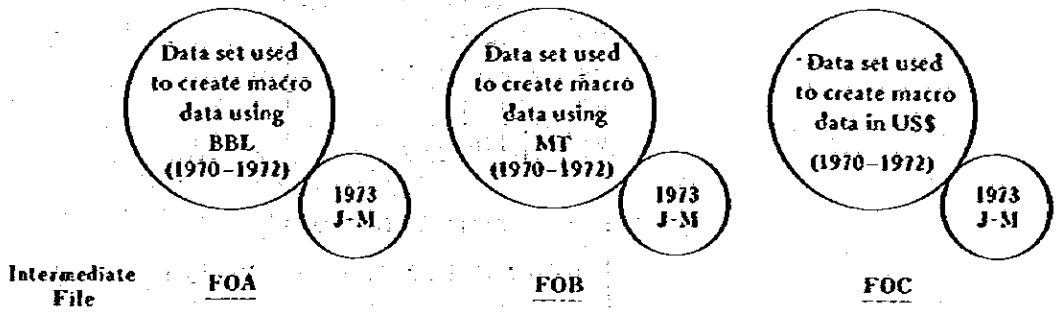
Code names of petroleum products used to prepare the macro data using MT.

```
02
12    EV    IV
15    1970  1971  1972
99    02×12×15
SV    FOC
02
12    EV    IV
15    1973
16    01    02    03
99    02×12×15×16
SV    FOC
EOD
```

Specify that the macro data of petroleum products of categories EV and IV is created on US$ basis.

From the above data, the following three types of intermediate files are created.
(The total of 6 data sets is created since each type has two sets.)

Fig. 12 Information Groups Prepared in the Intermediate Files for the Generation of the Macro Energy Data



After this data, data used to generate the macro energy data is obtained.

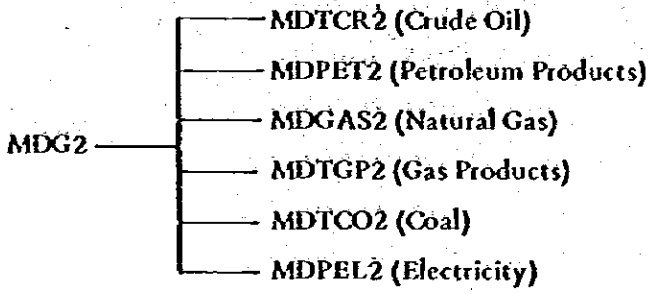
```
MED                                                    ---- 1
02    BBL   03    1970   1972   FOA                    ---- 2
02    MT    03    1970   1972   FOB                    ---- 3
02    US$   03    1970   1972   FOC                    ---- 4
EOD                                                    ---- 5
```

The above 1 and 5 indicate that data following 1 up to 5 is used by the function of macro energy data generation. The information contained in 2 indicates that the type of macro energy data generation is 02 (that is petroleum products: Refer to Table 4), and that the data is catalogued in SDBS in the unit of 1,000 barrels for the period from 1970 to 1972 (FY1970 – FY1972). In addition, it specifies that necessary data is read in from the intermediate file called FOA. The information in 3 and 4 indicates, similarly with 2 that macro energy data is created in the units of 1,000 MT and 1,000 US dollars respectively.

Using the above data, the header data and individual time series data is created as shown in Fig. 7. Subroutines used by this function are provided for each energy source including crude oil, petroleum products, natural gas, gas products, coal and electricity as shown below.

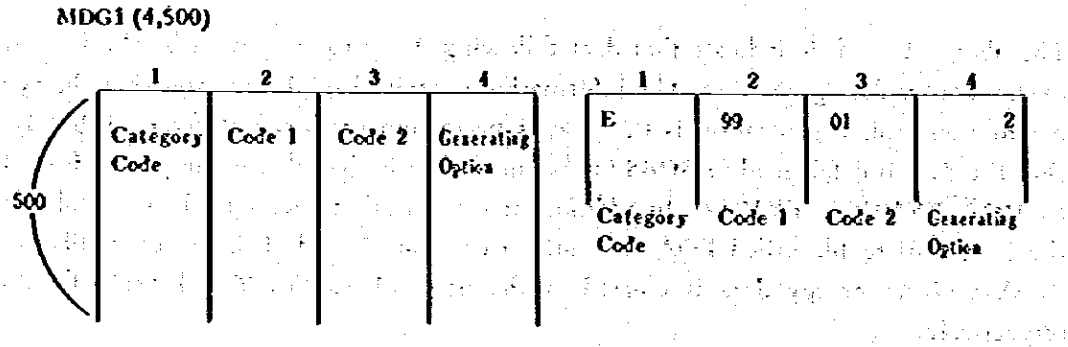
Table 4 Macro Energy Data Generation Types

Generation type	Macro Energy Data
01	Crude Oil
02	Petroleum Products
03	Natural Gas
04	Gas Products
05	Coal
06	Electricity



This program creates macro data using two types of working arrays. The first working array mainly maintains information required to create variable names. For instance when the macro energy data for the exports of crude oil by export destinations is to be generated, the following information is stored in the first working array (MDG1).

Fig. 13 Working Array Used for the Generation of Variable Names



In this case, a crude oil type is stored in Code 1, but here "99" is set to Code 1 to indicate that crude oil data is to be aggregated. In Code 2, an export destination code 01 in set. Based on this information, the variable names of the macro energy data for crude oil exports are created for each export destination.

Variable name of macro energy data

Q	E	OCR	99	01
Period type (quarter period in this example)	Category (export)	Commodity code: OCR is common for all crude oil types	Crude oil type code	Destination code

The working array (MDG1) also includes information indicating data period type of data. There are three period types as shown in Table 5: generation of yearly data (calendar and fiscal years), generation of quarterly data and generation of both yearly and quarterly data.

Table 5 Period Types for Data to be Generated

Option Code	Generating Option
1	Yearly data (Calendar & Fiscal))
2	Quarterly data
3	Yearly and Quarterly data

Taking the previous example of crude oil export, generation of only quarterly data is required since yearly data is generated at the time of EDBS's edition and printing (Method A) as shown in Table 3. Therefore, the option code is set to 2 in this case.

The second working array is used to aggregate monthly data to created quarterly and yearly data. Since the maximum period that can be handled by this function is 5 years as stated earlier, the size of the working array is determined as follows.

AMDG2 (21,500) ——— For quarterly data (4 period x 5 years + 1 period)
AMDG3 (5,500) ——— For calendar year data
AMDG4 (5,500) ——— For fiscal year data

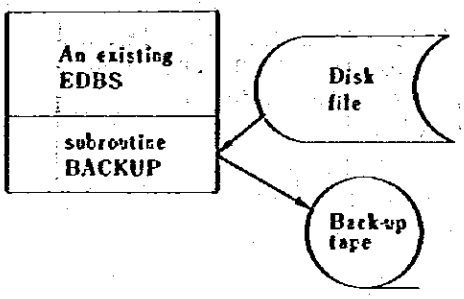
1-8 Back-Up Operation

For the operation of EDBS, it is necessary to establish a back-up system for maintaining information files created from raw data. That is, even if computer trouble or EDBS trouble occurs during update processing of a file, smooth restart must be assured.

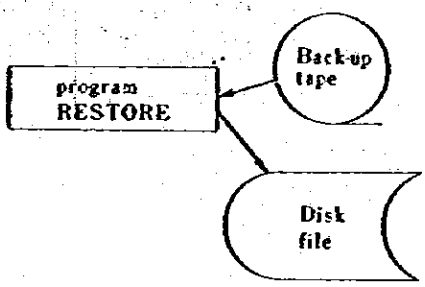
For this reason, the three files shown in Fig. 14 are copied from a disk to a tape (back-up tape) after maintenance of the information files. When some trouble occurs, the back-up tape is loaded on the disk and restarted.

Fig. 14 Back-Up System

1. Disk file to tape



2. Tape to disk file



After every update, EDBS requires a back-up tape to keep the following three files.

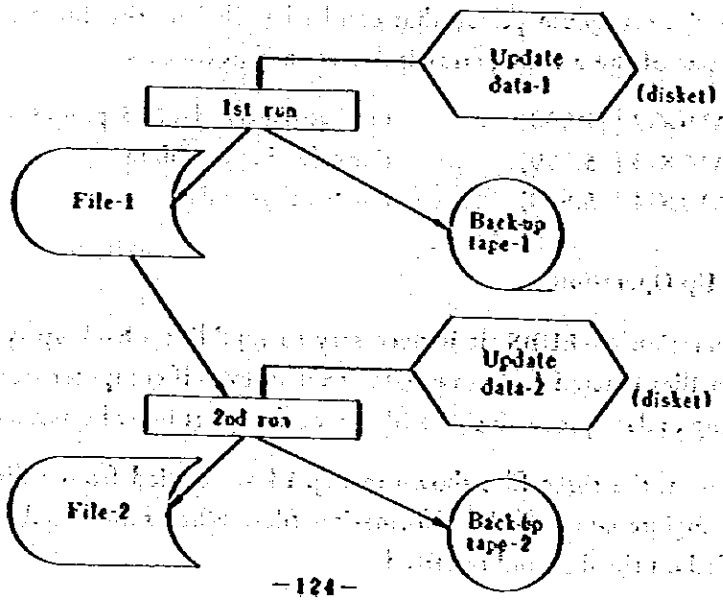
1) SAVE file
2) ELEMENT file
3) COMMENT file

An example of back-up process is illustrated below. During the first run, information file-1 and back-up tape 1 are created using update data-1, and during the second run information file-2 and back-up tape-2 are created using the information file-1 and update data-2.

(1) If some kind of trouble occurs in information file-2, back-up tape-2 is loaded in order to created information file-2 again.

(2) If the second run is terminated abnormally, information file-1 is recreated using back-up tape-1 since information file-1 is not a complete one, and then it is reexecuted.

Fig. 15 Back-Up Process



1-9 Renumbering System

Data catalogued in EDBS is maintained in a file called ELEMENT FILE. In order to speed up processing of information retrieval and file maintenance, this raw data is maintained with chains applying the concept of list structure. For chain management, MASTER TABLE and NAME ENTRY TABLE have been introudced. The capacity of ELEMENT FILE is designed in such a way as to enable maintenance of five-year data. Therefore, deletion of old data will be required in the future when new data is to be catalogued. Deletion of the data can be done using the existing deletion function (DEL) of EDBS. In this case, the chain linking the record whose data has been deleted from the file and other records are severed, and the record of deleted data becomes empty but that record remains on the file.

Fig. 16 Deletion of Data from the Information File

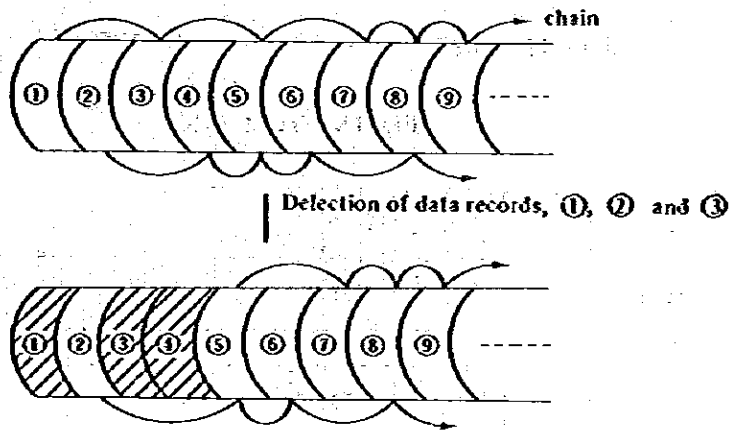
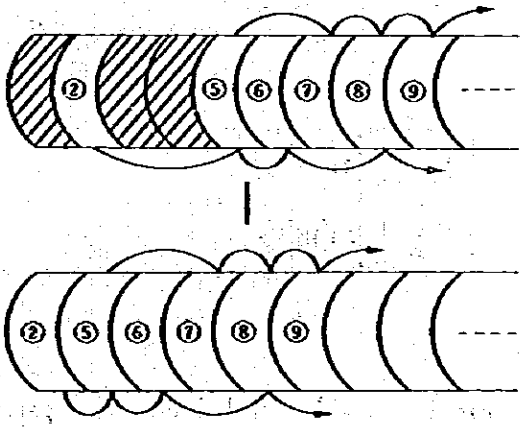


Fig. 17 Transfer of Data-Stored Record



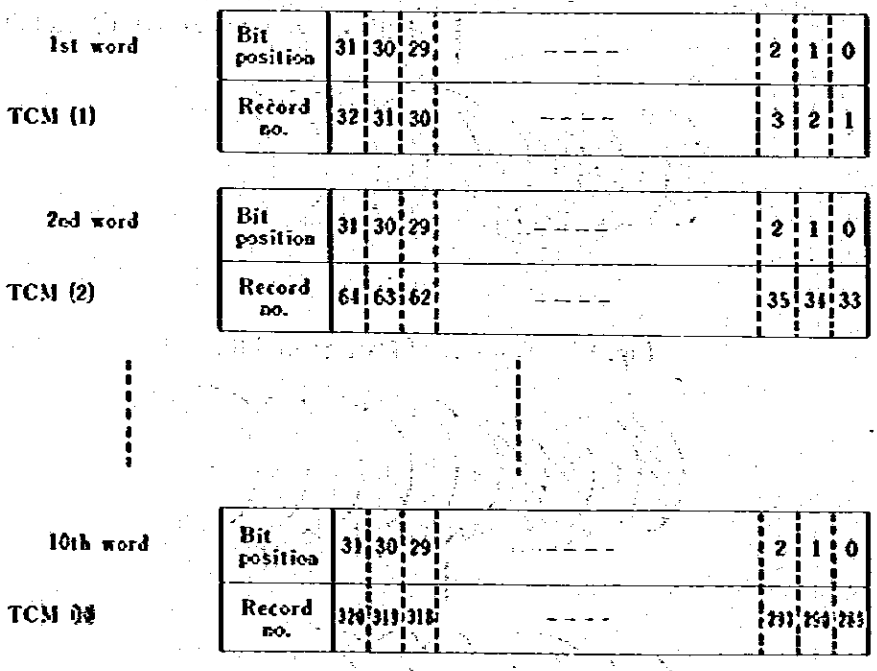
(46)

Therefore, it is necessary to move effective data records to empty spaces in order to use a disk file efficiently. Moreover, since data chains are formed using record numbers (addresses) where data is stored, it is also necessary to modify link addresses comprising a chain when data is transferred to empty spaces in order to eliminate idle records. In order to handle this situation, a system called renumbering system was developed to transfer data stored records.

This renumbering system creates a table (TCM) which indicates status of all the records in the ELEMENT FILE (effective data record or empty record whose data have been deleted) and proceeds with the renumbering process in reference to this table. The format of TCM is shown below and one record in the ELEMENT FILE corresponds to one bit in the table. If the corresponding bit has the value of 1, effective data is being stored in the record. If it is 0, the record is empty. EDBS is designed to handle approximately 200,000 data and one word (32 bits) can indicate status of 32 records. Hence, the size of the table must be about 6,300 words obtained from the following equation.

200,000 data/32 = 6,250

Fig. 18 TCM Table



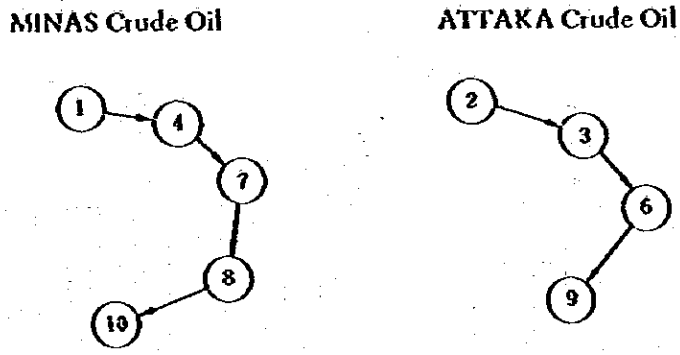
The renumbering system can be roughly divided into two parts. The first part checks the state of ELEMENT FILE and creates the TCM table. The second part transfers data to empty record spaces using TCM. The transfer of data is processed in accordance with chains since data is based on the list structure. Since all data has energy resource information,

the energy resource chain is used for the transfer of data.

The transfer method will be outlined below using a simple example (Refer to the next diagram in p.128).

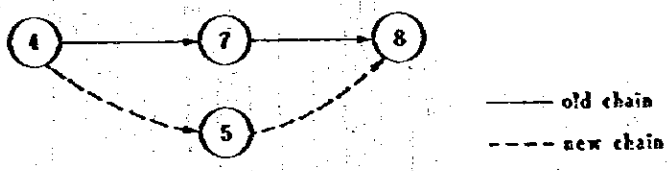
Data is transferred based on crude oil chains using MASTER TABLE and NAME ENTRY TABLE. Since the crude oil chain is structured as shown in Fig. 19, data of MINAS crude oil is checked first and then ATTAKA crude oil data is checked.

Fig. 19 Crude Oil Chains



The top of the MINAS crude oil chain is the first record and the data following this is the 4th record. Hence, the existence or otherwise of empty records between the 1st and 4th records is checked using the TCM table. In this particular example, since all the records have effective data stored in them, it is checked using TCM if there are empty records up to the 7th record which the next chain of MINAS crude oil indicates. Consequently, TCM tells that the 5th record is empty. Then, data stored in the 7th record is transferred to the 5th record and then 7th record is set to empty and at the same time the link addresses are changed as shown in Fig. 20.

Fig. 20 Change of Link Addresses



In addition, the contents of the TCM table are also changed in the manner shown in Fig. 21.

MASTER TABLE

NO.	Items	Head	Tail
1	Crude oil	1	4
2	Petroleum P.	0	0
3	Gas	0	0
4	Coal	0	0
5	Other Energy	0	0
6	Consumption		
7			

NAME ENTRY TABLE

	NAME	Link Addrs P	Link Addrs N	Pointer R	Pointer T
1	MINAS	0	3	1	10
2	1970	0	5	1	2
3	ATTAKA	1	4	2	9
4	ANTON	3	0	0	0
5	1971	2	6	3	4
6	1972	5	7	6	7
7	1973	6	8	8	9
8	1974	7	0	10	10
9					
10					

CONTROL TABLE

TCM

31 30 ..... 9 8 7 6 5 4 3 2 1 0 bit position

1	1	1	1	1	1	0	1	1	1	1

--------- 10 9 8 7 6 5 4 3 2 1 record NO.

ELEMEN DATA FILE

Link Address ---- (Energy / Year)

Address of Name Entry Table --- (Energy / Year)

①		MINAS 1970
0	4	
0	2	
	1	
	2	

②		ATTAKA 1970
0	3	
1	0	
	3	
	2	

③		ATTAKA 1971
2	6	
0	4	
	3	
	5	

④		MINAS 1971
1	7	
3	0	
	1	
	5	

⑤		

⑥		ATTAKA 1972
3	9	
0	7	
	3	
	6	

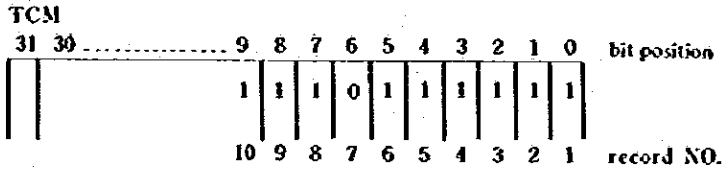
⑦		MINAS 1972
4	8	
6	0	
	1	
	6	

⑧		MINAS 1973
7	10	
0	9	
	1	
	7	

⑨		ATTAKA 1973
6	0	
8	0	
	3	
	7	

⑩		MINAS 1974
8	0	
0	0	
	1	
	8	

Fig. 21 Changes in TCM Table



The next chain points the 8th record and hence it is checked if there are empty records before the 8th record. The TCM then tells that the 7th record is empty. So, following the same procedure as before, data in the 8th record is transferred to the 7th record and the link addressed and TCM are modified accordingly. Such checking procedure is repeated until the last record in the MINAS crude oil is reached and then moves into the ATTAKA crude oil chains.

2. Future Improvement of Energy Supply-Demand Data Bank

The EDBS employs the concept of "list structure" to extensively process diversified and massive data related to energy in order to attain high utilization efficiency. However, the volume of input data turned out to be more than three times greater than both the Indonesian and Japanese sides had expected, totaling 200,000 cases. Thus, provisional modification of the system was performed to enable the acceptance the 200,000 cases of data. It is clear that the relationship between computer processing time and volume of data is described by an exponential increase rather than a linear one. As a result, it is difficult to attain efficient operation of the present system when handling such a volume of massive data. Moreover, the system requires an enormous capacity of disks to maintain the massive data.

Although drastic modification of the present system's basic concept is not required for efficient operation of the EDBS, the file structure, method of maintaining the original data, and other aspects must be reviewed. This may result in the necessity of implementing measures, such as the introduction of auxiliary files.

Timeliness of data

The EDBS provides functions for retrieval of necessary information from the information file, edition, and printout. These functions are required for immediate response.

The present system was designed to operate on a batch basis. By considering a possible shift to an interactive system, timeliness of the information could be strengthened so as to markedly improve the effective utilization of information.

SYSTEM MANUAL OF ENERGY SUPPLY-DEMAND DATA BANK

METHOD OF DATA PROCESSING

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

Since the EDBS handles diversified and massive data related to energy, an efficient data access method is necessary. To this end, the system introduces the concept of "list structure" to create the information file.

To create an information file with a list structure, the system basically uses two tables which control original data, and one file in which the original data is stored. The concept of the data structure employed by the system is as follows.

1. Master Table

This master tables is ranked at the top in the information file structure and consists of the following three elements.

– MASTER NAME
– HEAD POINTER
– TAIL POINTER

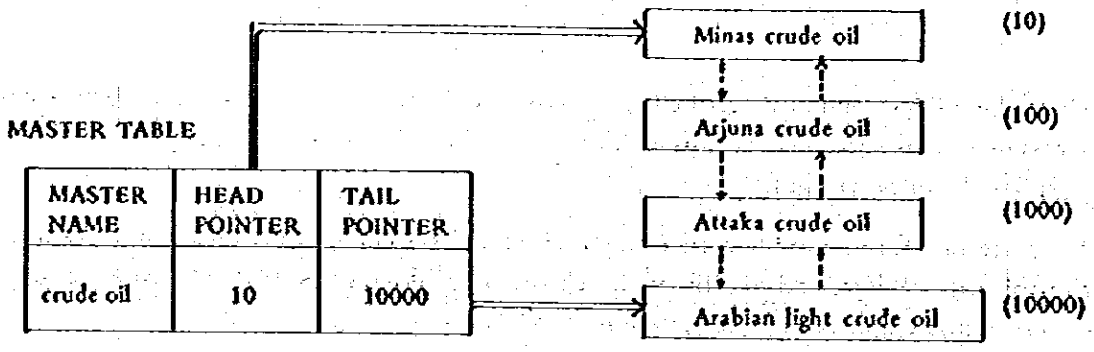
There are 17 categories for the MASTER NAME as shown in the table below, and each category has both a HEAD POINTER and a TAIL POINTER.

Table 1 Categories of the MASTER FILE

No.		No.	
1	crude oil	10	country of transaction
2	petroleum products	11	domestic transportation
3	gas	12	data category
4	coal	13	sub-index 1
5	other energy sources	14	sub-index 2
6	consumption sector	15	year
7	oil refinery and gas plant	16	month or quarter
8	PERTAMINA Marketing region	17	data period
9	seafed DEPOT		

The two pointers indicate addresses of the NAME ENTRY TABLE. If there are four crude oil, the master table will become as shown in Fig. 1. It manages crude oil data by retaining and beginning and the end of the chain of the four crude oils. Mutual linkage of the four crude oils are maintained in the NAME ENTRY TABLE.

Fig. 1



Figures in the parentheses indicate addresses of individual crude oil registered in the NAME ENTRY TABLE.

2. Name Entry Table

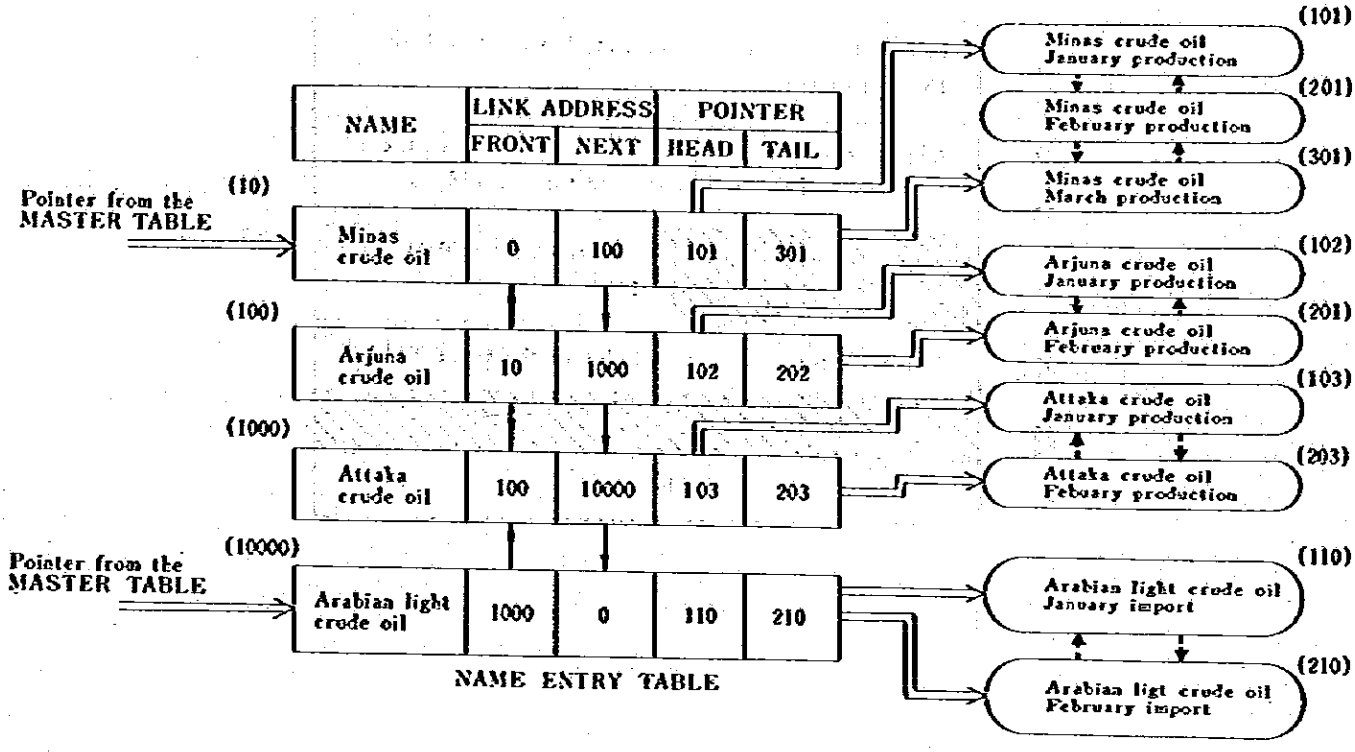
This table is ranked next to the MASTER TABLE, and each entry consists of the following five elements.

- NAME (CODE)
- LINK ADDRESS (FRONT)
- LINK ADDRESS (NEXT)
- HEAD POINTER
- TAIL POINTER

Any name or code used in original data is registered in this table. LINK ADDRESS is used to maintain mutual relationships of names or codes in the form of a chain. The two pointers function as those of the MASTER TABLE with the exception that they indicate record numbers of the ELEMENT FILE which will be described later.

The previous example of the four crude oils is also used here to discuss the structure of the NAME ELEMENT TABLE. The two LINK ADDRESSES maintain the mutual linkage of crude oil names, Minas crude oil points to Arjuna crude oil, and Arguna crude oil points to Minas crude oil. The 0's specified at the FRONT of Minas crude oil and in the NEXT of Arabian light crude oil indicate the beginning and the end of the crude oil chain respectively.

Fig. 2 NAME ENTRY TABLE



Figures in parentheses indicate addresses of the ELEMENT FILE in which original data are placed.

The two POINTERs are used to manage the original data by maintaining the beginning and the end of the chain consisting of all mutually related original data in the ELEMENT FILE. Mutual linkages of related original data are maintained in the ELEMENT FILE by the LINK ADDRESSes similar to those of the NAME ENTRY TABLE.

3. Element File

Entire original data is placed in this ELEMENT FILE, and this file is ranked at the lowest in the list structure.

One record is assigned to one original datum. Its record format, as shown in Fig. 3, consists of paired LINK ADDRESSes for each of the 13 categories similar to that of the MASTER TABLE, addresses of the NAME ENTRY TABLE for each category, and others.

The only difference in the 13 categories with the categories of the MASTER TABLE is that all of the energy sources are included in one category. Taking the previous example of the crude oils, LINK ADDRESS and addresses of the NAME ENTRY TABLE for the first category of energy sources will result as shown in Fig. 4.

Fig. 3 Record Format of the ELEMENT FILE
(shaded areas are not currently used)

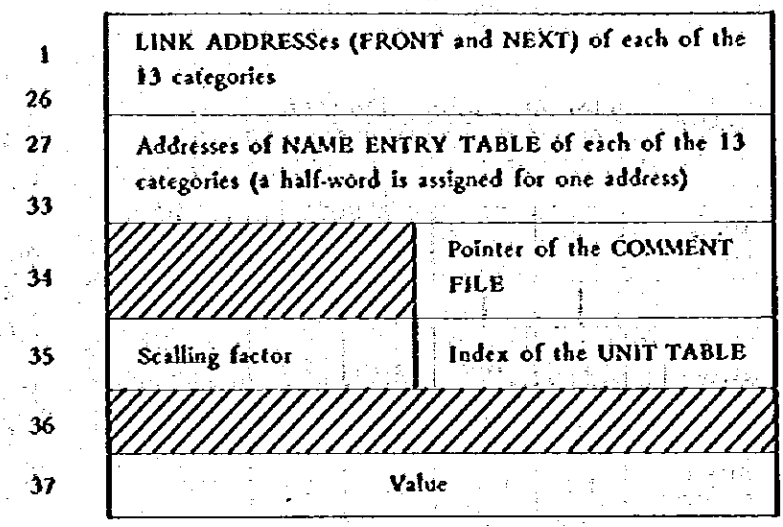
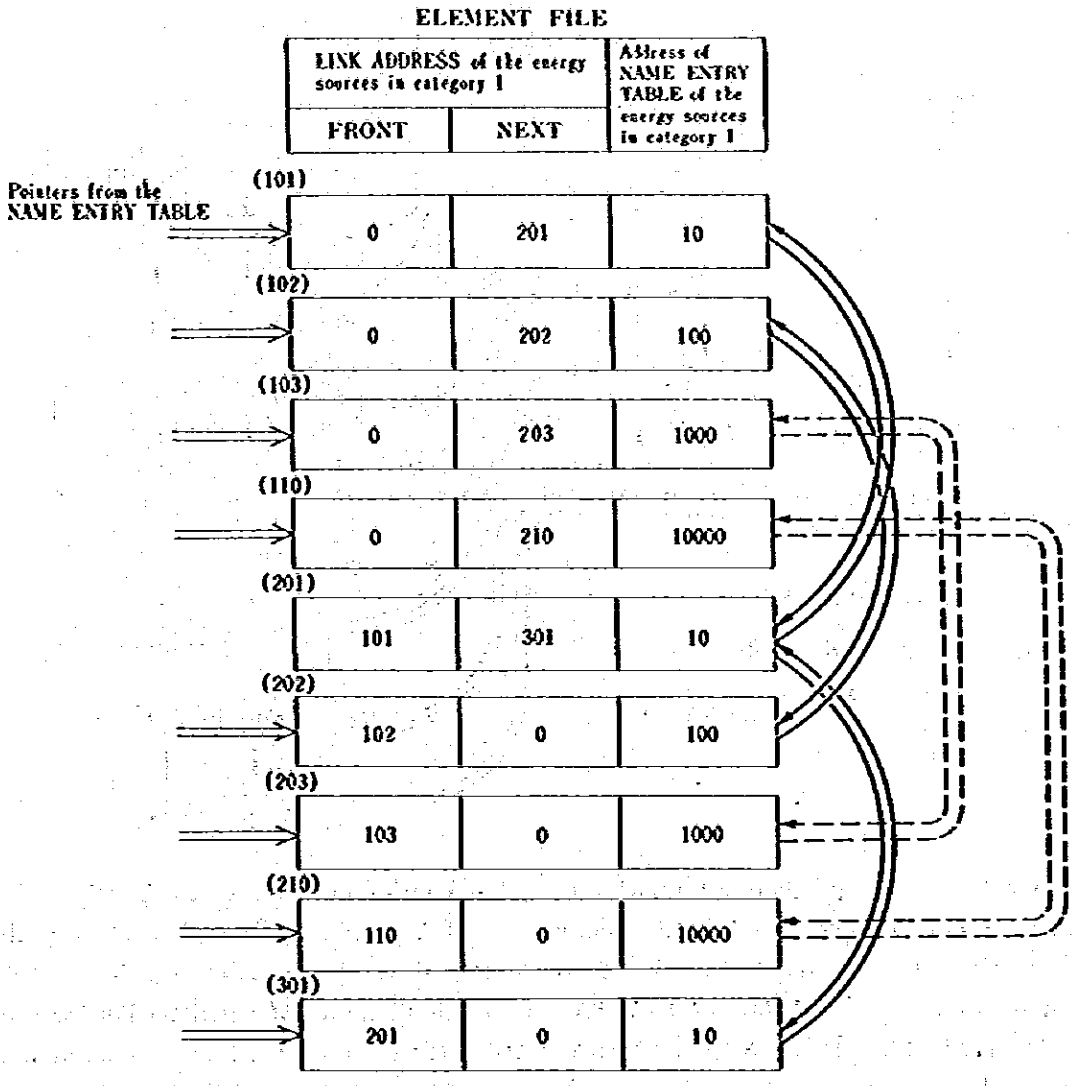


Table 2 13 Categories

No.		No.	
1.	Energy sources	8	Data category
2.	Consumption sector	9	Sub-index 1
3	Oil refinery and gas plant	10	Sub-index 2
4	PERTAMINA marketing region	11	Year
5	SEAFED DEPOT	12	Month or quarter
6	Country of transaction	13	Data period
7	Domestic transportation		

Fig. 4 ELEMENT FILE



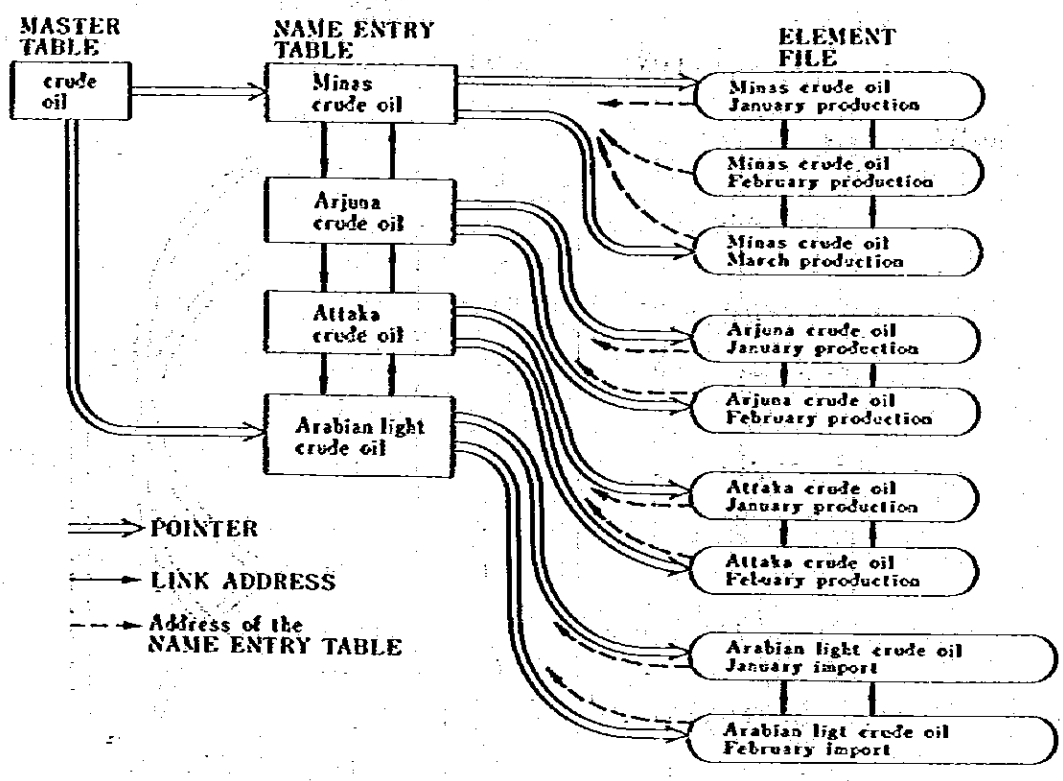
(Note) * Solid and dotted lines are the same in nature, and are distinguished for the sake for readability.

* Figures in the parentheses indicate record numbers of original data.

(6)

A simple description of the relationships among the data, including the above MASTER TABLE, NAME ENTRY TABLE, and ELEMENT FILE, is illustrated in Fig. 5.

Fig. 5



The mechanism to update an information file created with such a structure is briefly outlined below. For example, March production volume of Arjuna crude oil will be added to the information file as illustrated in Fig. 5. Since the name, Arjuna crude oil, has already been registered in the NAME ENTRY TABLE, no modification of LINK ADDRESSes of the MASTER TABLE and NAME ENTRY TABLE is necessary. However, since one new datum relating to the Arjuna crude oil is added, the TAIL POINTER of the NAME ENTRY TABLE must be changed to point to the new data, and the LINK ADDRESS of the ELEMENT FILE must also be changed as follows. The terminal record of the previous chain of Arjuna crude oil was February production volume (e.g., the NEXT of the LINK ADDRESS was 0). In order to add March production, the NEXT of the February's LINK ADDRESS must be changed to the record number of the March data. Meanwhile, by setting the FRONT of the March data's LINK ADDRESS to the record number of the February data, the relationship between the February and March data can be maintained (Refer to Fig. 6 and 7).

Fig. 6

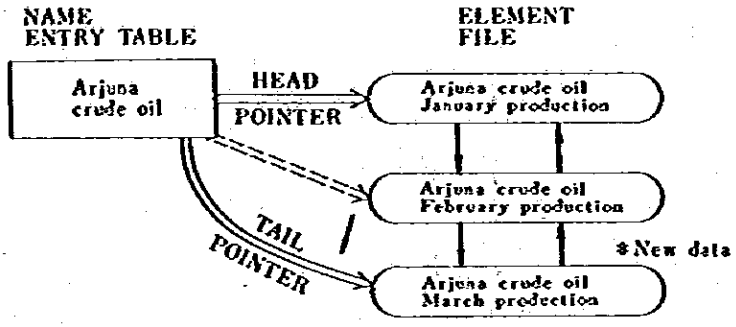
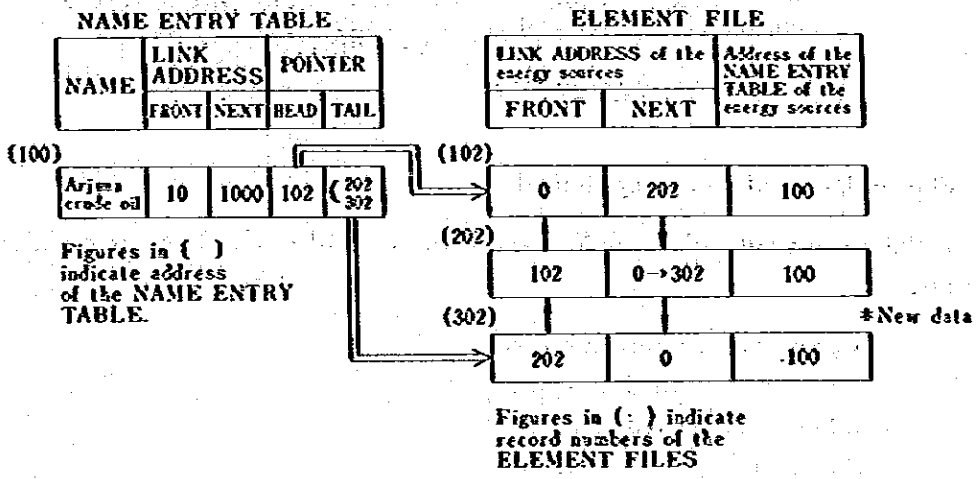
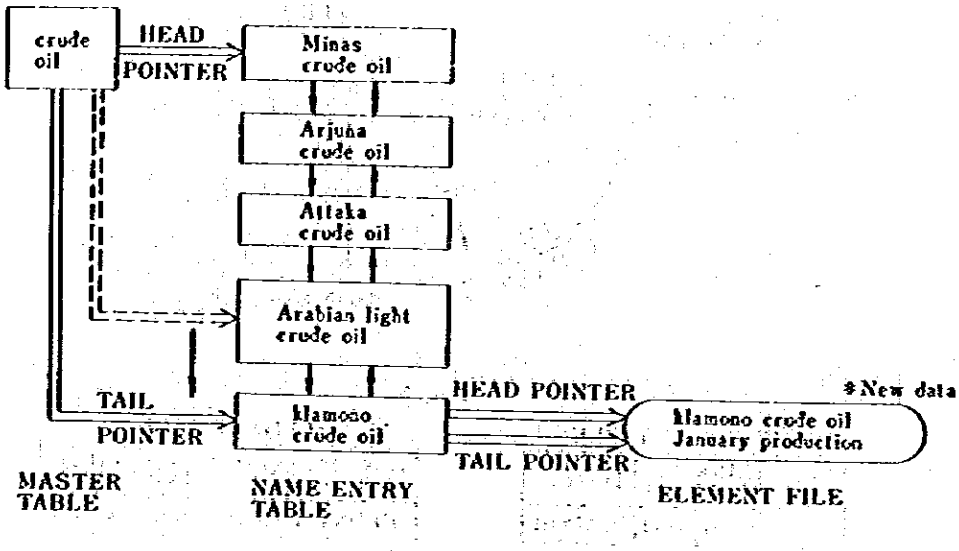


Fig. 7



The next example is a case of addition of Klamono crude oil data. Since the name of Klamono crude oil has not been registered in the NAME ENTRY TABLE, the name must be registered first. Then, to keep its relationship with the other crude oils, the LINK ADDRESS of the NAME ENTRY TABLE, and the TAIL POINTER of the MASTER TABLE must be changed. The two POINTERs of klamono crude oil in the NAME ENTRY TABLE are the same (Refer to Fig. 8).

Fig. 8



4. Flow of Data and Processing Method

The EDBS is equipped with the following functions regarding the above-mentioned information file.

- Update of the information file
- Retrieval from the information file
- Edition of retrieved data
- Printing of the information file

For the sake of maintaining programs, the method of data processing for each of the above functions will be discussed in accordance with its program.

Fig. 9 Conceptional Schematic Diagram of the System

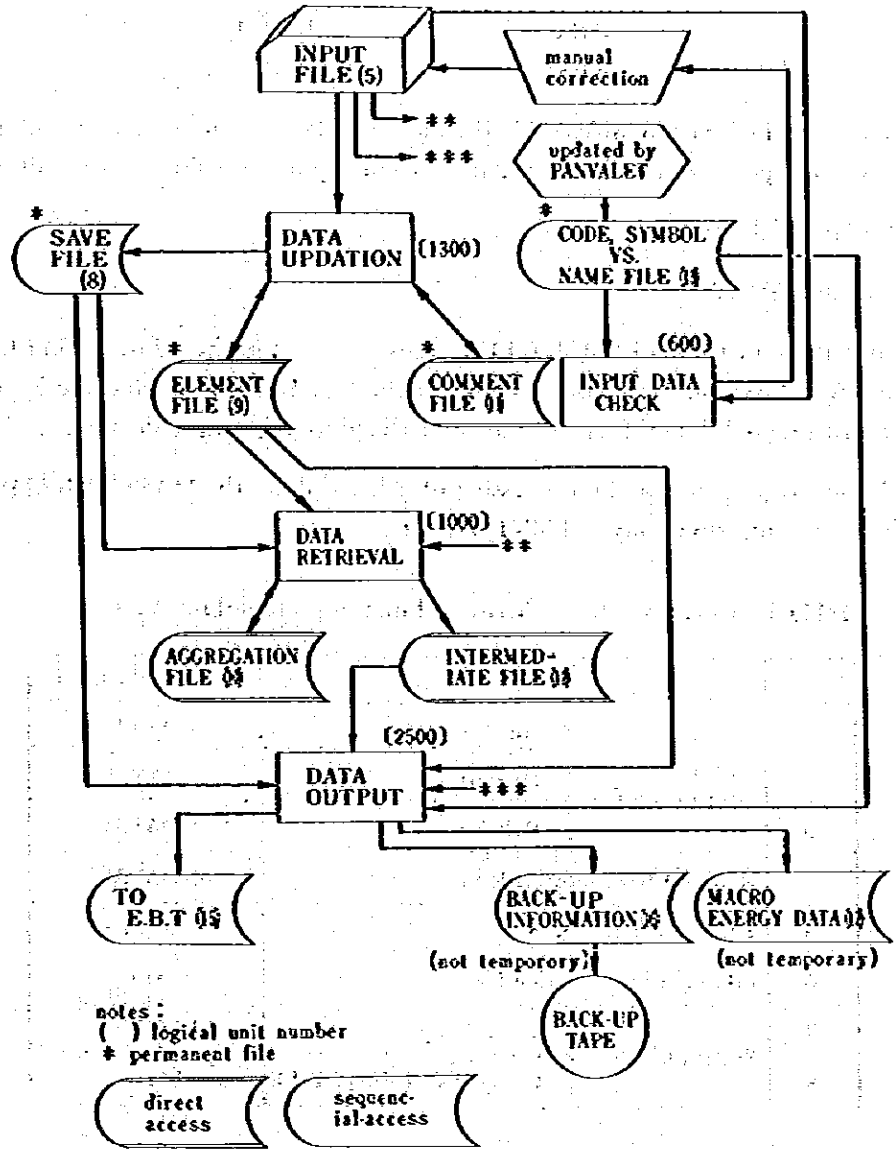


Figure in [ ] indicate the approximate number of steps for FORTRAN.

(1) Main Program

For execution of the EDBS, the first card of input data must either be "INIT" or "REST", regardless of which function is used. If INIT is the first card, the MASTER TABLE, NAME ENTRY TABLE, ELEMENT FILE, etc. making up the information file are initiated. If REST is used, the two TABLEs are set to the state indicated by the final information of the previous run which is read in from the SAVE FILE (Refer to Fig. 9 of the conceptual schematic diagiam of the system).

Card image	Subroutine name
INIT	INITIL
REST	RESTOR

As mentioned in USER'S MANUAL II., directive data are necessary in order to use any function. In response to the directive data, the corresponding subroutine is called.

(2) Update of the Information File

– Subroutine ADATAI

Since one record of the ELEMENT FILE, ranked lowest in the information file, is assigned to one original datum, the record counter of the file, EFL, is incremented by 1 with every addition of original data (hereinafter an underlined item is a variable name in the program).

In addition, to prepare for the processing of original data, the MASTER NAME (IDMASo) and the communication array (ELMNT) are set.

Table 3 Correspondence between functions and subroutines

No.	Function		Sub-routine name
1	Update of information file	Addition	ADATAI
2		Correction	CDATAI
3		Deletion	DDATAI
4	Retrieval from information file		RDATAI
5	Edition of retrieved data		ODATAI
6	Printing of information file		WLIST
7	System Check	Table dump	DLIST
8		Dump of ELEMENT FILE	ELIST

Table 4 MASTER NAME of the Energy Sources

Energy sources	MASTER NAME
Crude oil	CRUDE OIL
Petroleum Products	PRODUCTS
Gas	GAS

Fig. 10 The Data Communication Array (ELMNT)

No.	Contents	
1	energy	Note 1
2	sources	
3	consumption sector	Note 2
4	oil refinery and gas plant	
5	PERTAMINA marketing region	
6	SEAFED DEPOT	
7	country of transaction	
8	domestic transportation	
9		
10	data category	
11	sub-index 1	
12	sub-index 2	Note 3
13	year	
14	month or quarter	
15	data period	header data are set here
16		
17	scaling factor	
18	unit	
19		
20		
21	value	
22	comment	
23		
24		
25		

Note 1: Code numbers of crude oil and natural gas are entered here together with the symbols for the energy sources (OCR for crude oil; TNG for natural gas). If the code number of an oil field is 001, OCR001 is entered. Names are compounded by the subroutine called CRNAME.

Note 2: For petroleum products and natural gas, if the category is either consumption or consumption plan (category code is C or CN), the information specified in the SORT1 of original data is entered here.

Note 3: For crude oil and natural gas, if category is transformation, transformation plan, own use or own use plan (category code T, TN, H, or HN), the information specified in SORT1 and SORT2 is entered.
For petroleum products, LNG, and condensates, if the category is production, transformation, own use, or their plans (category code P, PN, T, TN, H, or HN), the information written in SORT1 and SORT2 is entered.

– Subroutine ADD

In order to create a chain with data which are already in the information file, the 13 categories ranging from the energy sources to data period in ELMN are processed.

The first step to add data to the information file is to check the MASTER TABLE which is ranked at the top in the list structure. The MASTER TABLE, as stated earlier, consists of 17 categories including crude oil, petroleum products, and data period. Comparison of the categories of the MASTER TABLE with those of the ELEMENT FILE's record and those of the communication array, ELMNT, shows that they are equivalent with the exception of those for energy sources.

Therefore, for the processing of the energy sources, an appropriate energy source in the MASTER TABLE is referenced using IDMASo which was created by the subroutine ADATAI. A record of the ELEMENT FILE corresponds to the NELM in this subroutine. The LINK ADDRESS and address of the NAME ENTRY TABLE (Refer to the record format of Fig. 3) are obtained through the subroutine CHAIN.

Since original data is designed to have a five-character comment, and the EDBS employs the COMMENT FILE (Refer to Fig. 9), individual data maintains a pointer to FILE. Similarly, there is a UNIT TABLE for a unit of individual value; and the individual data has its index. The scaling factor and value are transferred directly from the communication array, ELMNT.

– Subroutine CHAIN

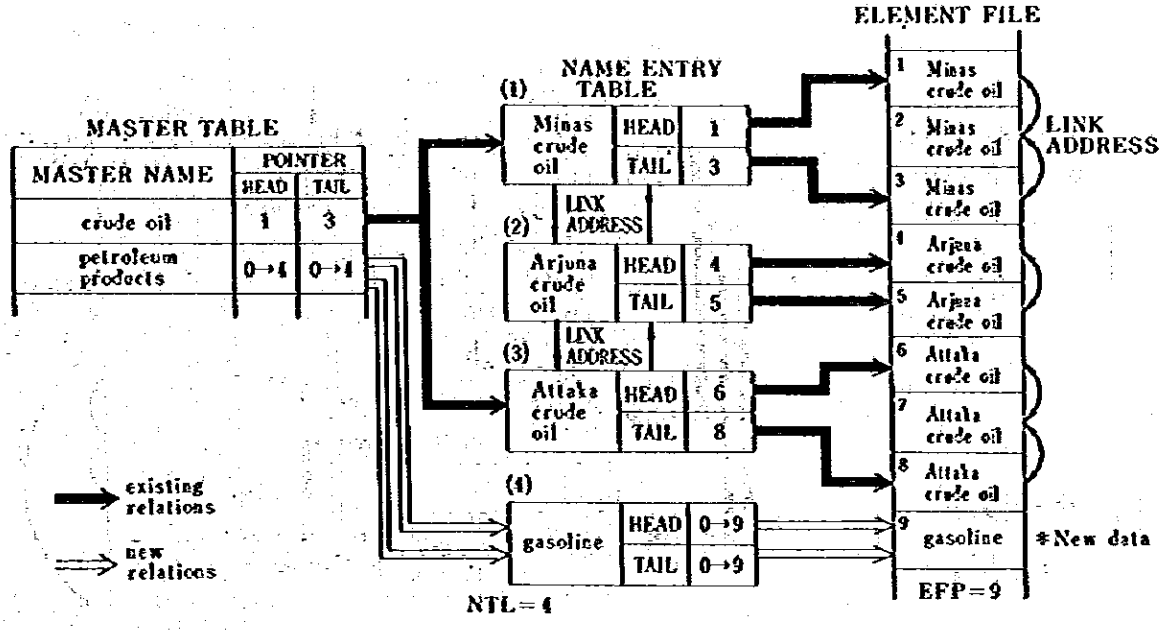
Linkage with the existing information file is performed utilizing the appropriate HEAD POINTER (HEDMT) and TAIL POINTER (TALMT) of the MASTER TABLE as follows.

When HEDMT = 0:

This indicates that data of the corresponding category is added to the information file for the first time. In view of the list structure, this indicates that the corresponding category of the MASTER TABLE is created in relation with the NAME ENTRY TABLE for the first time.

The counter (NTL) of the NAME ENTRY TABLE is incremented, and the name of the new data is registered in the table. Meanwhile, the value of the NTL is entered into the HEAD and TAIL POINTERs of the corresponding category in the MASTER TABLE establishing a linkage between the two tables. Then, the record counter of the ELEMENT FILE, EFP, (the counter EFP has already been incremented in the subroutine DATAI) is entered into the HEAD and TAIL POINTERs for the name registered in the NAME ENTRY TABLE establishing a relation between the table and the file.

Fig. 11



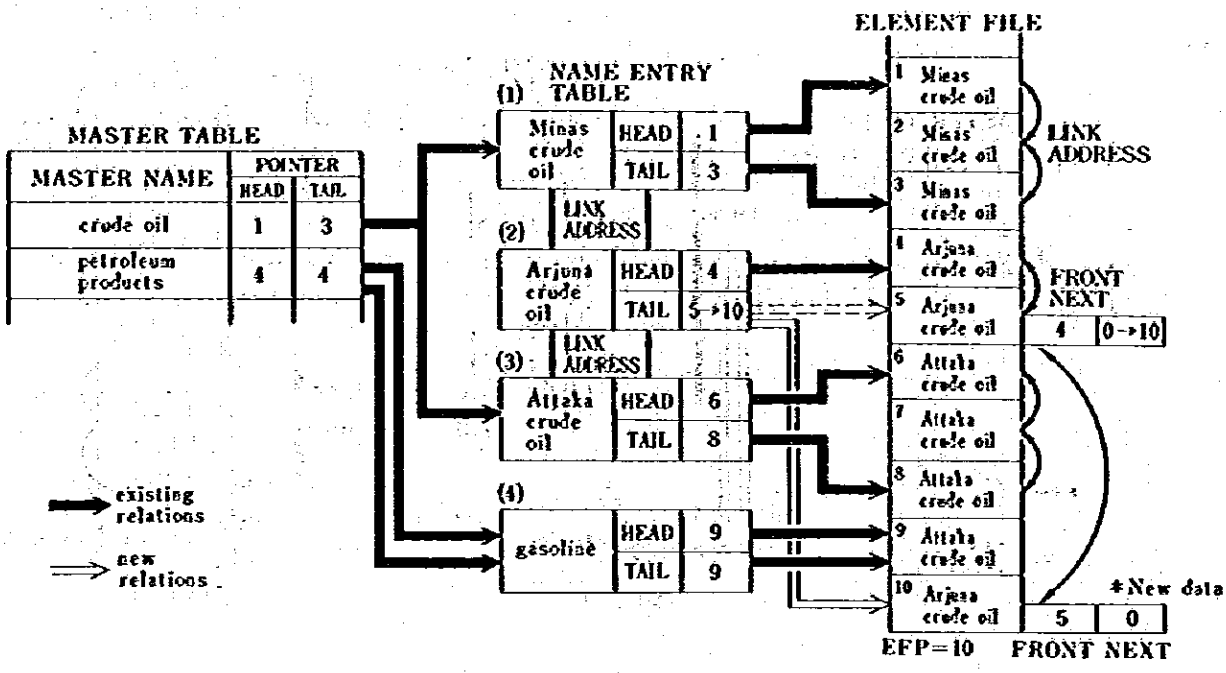
In addition, the corresponding address of the NAME ENTRY TABLE is maintained in the ELEMENT FILE for the sake of printing information files at a later time. As shown in Fig. 3, since a half-word is reserved for this address, it is handled by the subroutine PACK. In the example shown in Figure 11, the address of "gasoline" in the NAME ENTRY TABLE (4) is entered into the appropriate place in category 1 of the energy sources.

When HEDMT $\neq$ 0:

Using HEDMT and the LINK ADDRESS of the NAME ENTRY TABLE, it is determined whether the name which coincides with the ELMNT of the communication array (replaced with IDNAM in this subroutine) has been registered in the NAME ENTRY TABLE.

If it has already been registered, the record counter, EFP, of the ELEMENT FILE is entered into the TAIL POINTER of the NAME ENTRY TABLE so that the pointer will indicate the newest record. Furthermore, in order to form a chain in ELEMENT FILE, the EFP is entered into the NEXT of the LINK ADDRESS of the old last chain, and the previous TAIL POINTER of the NAME ENTRY TABLE is entered into the FRONT of the newest record becoming the new last chain.

Fig. 12

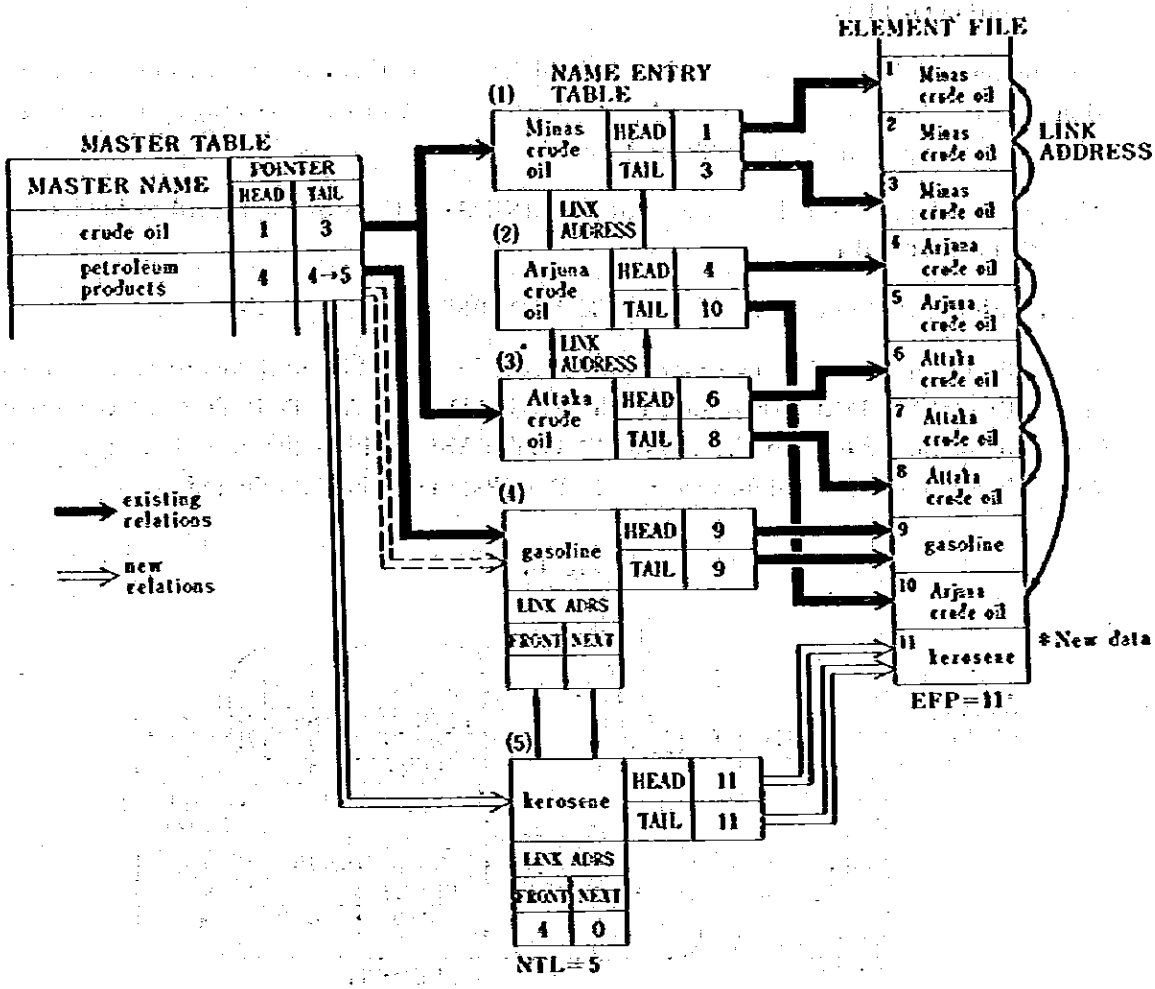


However, if the name has not been registered, a name for the new data is registered in the NAME ENTRY TABLE after incrementing its counter, NTL. Moreover, the NTL is entered into the TAIL POINTER of the MASTER TABLE's corresponding category. To create a chain with the related name which has already been registered, the LINK ADDRESS of the NAME ENTRY TABLE is modified as follows.

The NEXT of the LINK ADDRESS of the old last chain (the name which was previously specified by the TAIL POINTER of the MASTER TABLE) is set to NTL, and the FRONT of the newly registered name is set to TALMT.

A similar method as the case of HEDMT = 0 is employed to establish a relationship between the newly registered NAME ENTRY TABLE and ELEMENT FILE.

Fig. 13



– Subroutine CDATAI

The function of this subroutine is similar to that of the previously mentioned subroutine ADATAI. However, CDATAI specifies the record number (EFN) of the ELEMENT FILE to be modified in the header data, and processing of the record counter is not required as in the case of ADATAI.

The EDBS employs a simple method to modify a specified record. First, the specified record is deleted (using subroutine DELETE).

The new datum is then written in the deleted record, and the list structure is created based on the number of the specified record (using subroutines such as ADD).

– Subroutine DDATAI

A specific record on the ELEMENT FILE is deleted by specifying its record number. The subroutine DDATAI reads in data of the record to be deleted, and then initiates subroutine DELETE to eliminate the chain in the information file.

(16)

– Subroutine DELETE

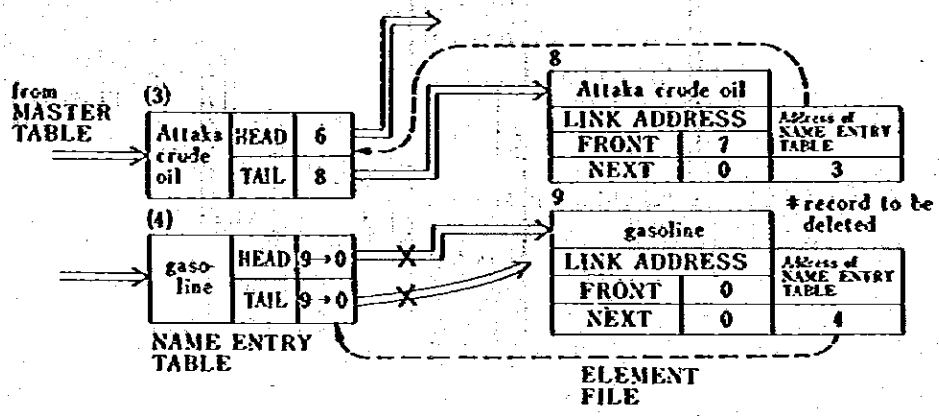
To eliminate a chain between the data to be deleted and other data already in the information file, the following process is taken for each of the 13 categories ranging from energy sources to data period (Refer to Table 2 and Fig. 3).

The process depends on the contents of the LINK ADDRESS of the record to be deleted from ELEMENT FILE.

When both FRONT and NEXT of the LINK ADDRESS are 0:

This indicates that the given category of the data to be deleted is not linked to other records in the ELEMENT FILE. Therefore, both the HEAD and TAIL POINTERs of the name indicated by the address of the NAME ENTRY TABLE within the record are the same. Thus, when a zero is entered into the two POINTERs, the chain is eliminated.

Fig. 14

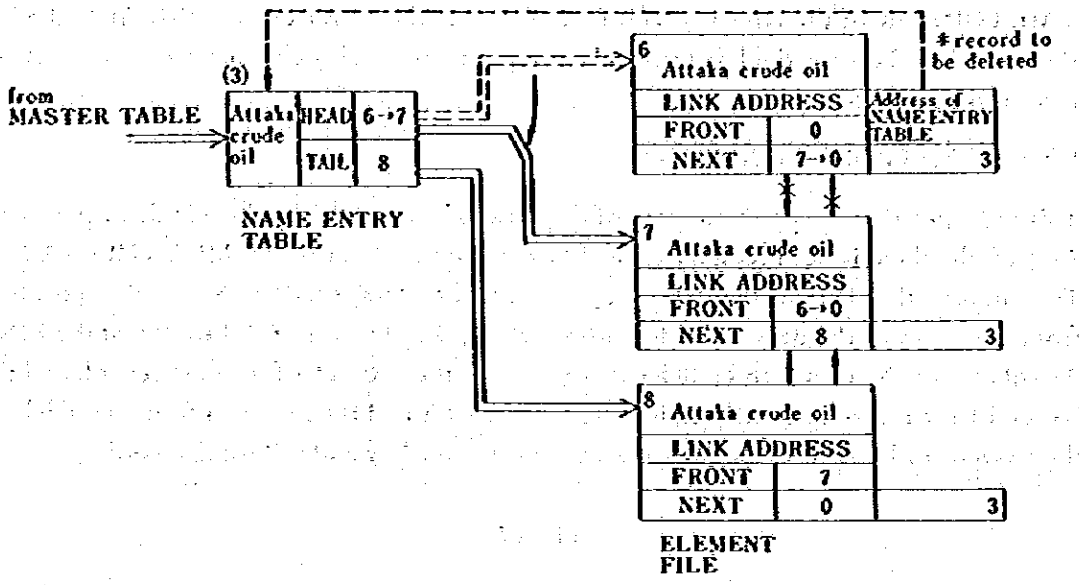


When the FRONT of the LINK ADDRESS is 0:

This indicates that the given category of the data to be deleted is linked to another record, but is the first record of the chain, and the HEAD POINTER of the NAME ENTRY TABLE points the record to be deleted.

The NEXT of the LINK ADDRESS of the record to be deleted indicates the number of the record which will become the first record of the chain. Thus, the record number is entered into the HEAD POINTER of the NAME ENTRY TABLE, and the FRONT of the LINK ADDRESS of the record to become the first in the chain is set to zero. This eliminates the link of the record to be deleted with the other record.

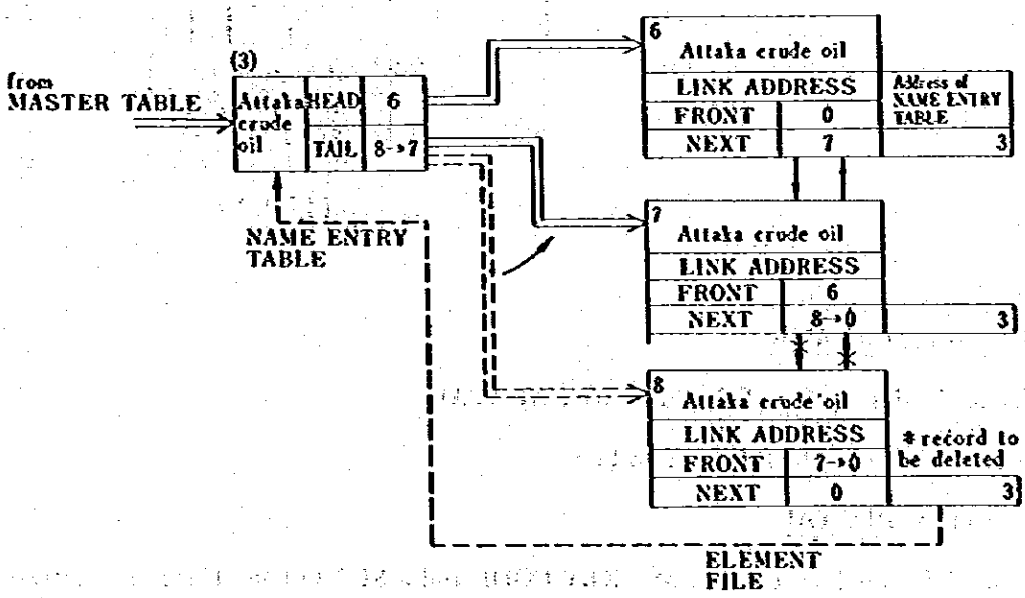
Fig. 15



When the NEXT of the LINK ADDRESS is 0:

This indicates that the given category of the data to be deleted is linked to another record, but is the last record in the chain, and the TAIL POINTER of the NAME ENTRY TABLE points the record to be deleted.

Fig. 16



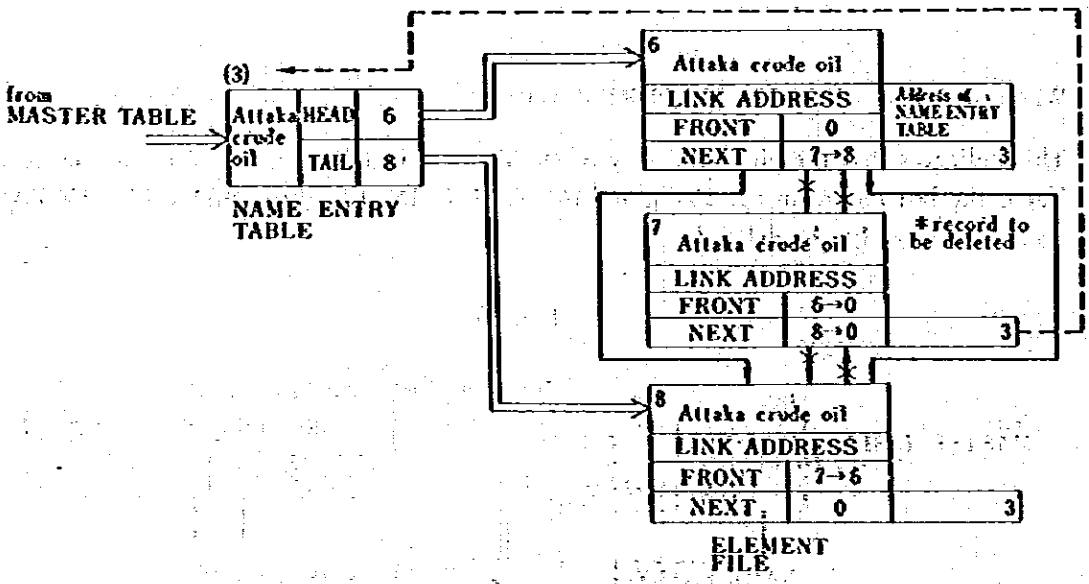
(18)

The FRONT of the LINK ADDRESS of the record to be deleted specifies the number of the record which will be the last in the chain. Thus, the record number is entered into the TAIL POINTER of the NAME ENTRY TABLE, and the NEXT of the LINK ADDRESS of the record to become the last in the chain is set to zero. This eliminates the chain of the record to be deleted.

When neither FRONT nor NEXT is 0:

This indicates that the given category of the data to be deleted is in the middle of the chain. As a result, there is not necessary to modify the POINTERs of the NAME ENTRY TABLE. To eliminate the chain of the data to be deleted, the LINK ADDRESSes of the records in front and next of the data to be deleted are changed as follows. The FRONT of the LINK ADDRESS of the record to be deleted is moved to the FRONT of the next record, and the NEXT of the record to be deleted is moved to the NEXT of the record in front. This deletes the given record and creates a linkage between the preceding and following records.

Fig. 17



– Subroutine CRNAME

Refer to the description of the Subroutine ADATAI.

(3) Retrieval from the Information File

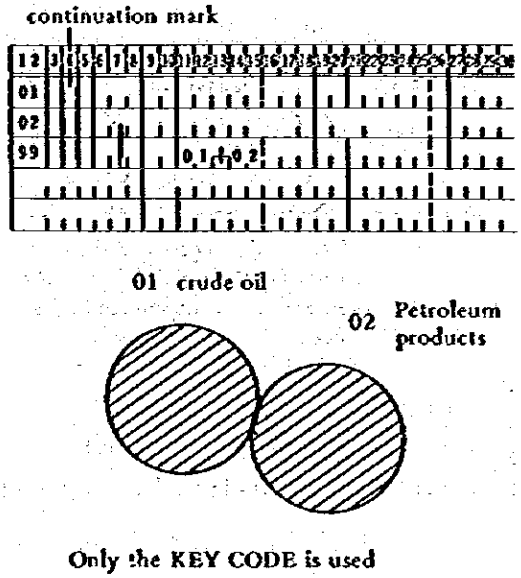
– Subroutine RDATAI

Data used for retrieval consists of a KEY CODE and a SUB CODE. There are two ways of using the data: one uses only the KEY CODE, and the other uses both the KEY and SUB CODEs. This is distinguished by the RANK is this subroutine RDATAI.

When only the KEY CODE is used, all data which belong to the MASTER TABLE corresponding to the code are retrieved. When both the KEY CODE and SUB CODE are used, only the specified name is retrieved. A multiple number of codes can be specified in the SUB CODE, but are processed after they are logically added.

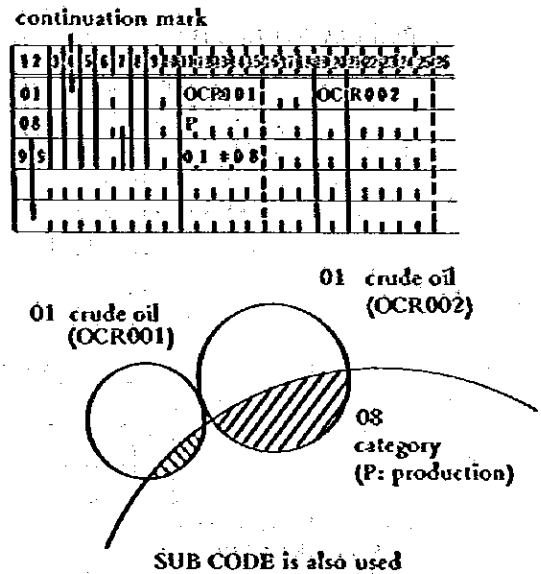
An individual set is created by the subroutine AGFILE.

Fig. 18



Only the KEY CODE is used

Fig. 19



SUB CODE is also used

The KEY CODEs correspond to the 17 categories of the MASTER NAME. However, "99" and "SV" are special KEY CODEs which are used in the following cases.

When "99" is specified in the KEY CODE field, the columns where the SUB CODEs should be entered (Refer to the data format on Figs. 18 and 19) are considered to have a logical equation for the set of KEY CODEs. Then, a series of subroutines, including STEPM and REORDR, is initiated to process this equation.

When "SV" is specified, the subroutine SFILE is called to store the set of retrieved data in the INTERMEDIATE FILE (Refer to the Conceptual Diagram of the System in Fig. 9) for later use for edition.

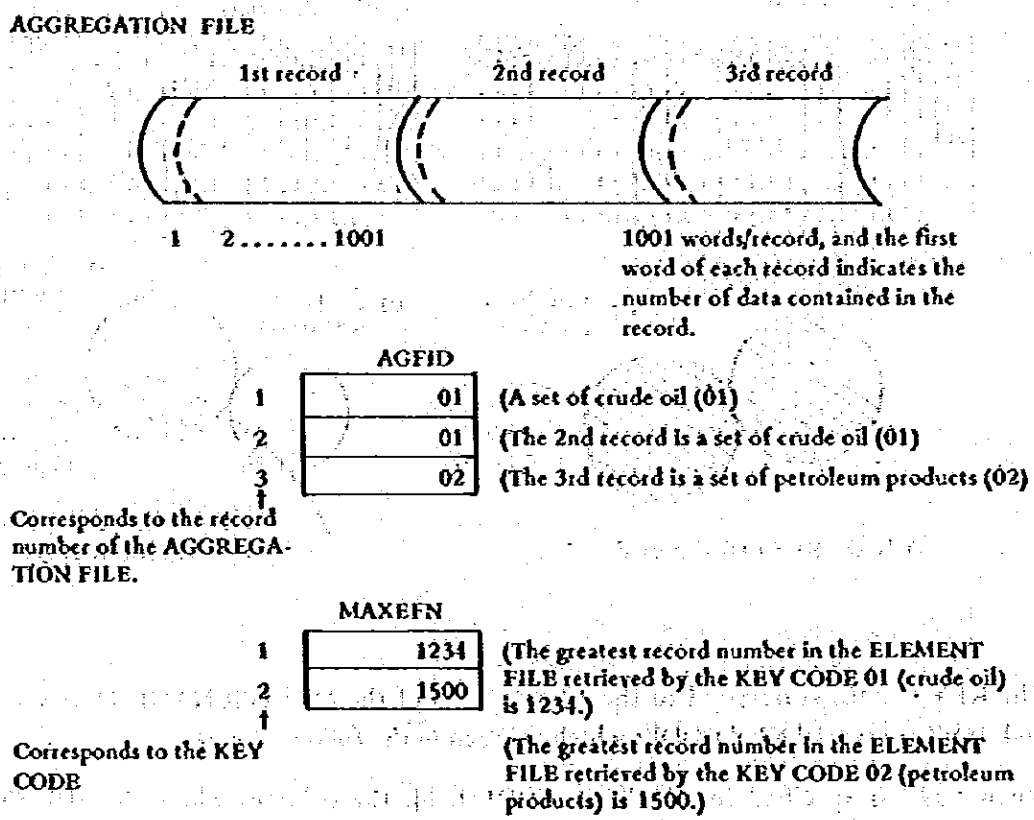
— Subroutine AGFILE

When only the KEY CODE is used (RANK = 1), using the HEAD/TAIL POINTERs and the LINK ADDRESS, all names in the NAME ENTRY TABLE which belong to the specified KEY CODE, and all data in the ELEMENT FILE which belong to the names are then written in the work file (Refer to the AGGREGATION FILE in the Fig. 9). However, the data written in the work file are the set of record numbers in the ELEMENT FILE.

(20)
When the SUB CODE is also used (RANK ≠ 1), the name which corresponds is chosen, and the data in the ELEMENT FILE which belong to the name are retrieved and written in the work file as in the previous case.

The AGGREGATION FILE is a direct access file, and tables (AGFID and MAXEFN) which correspond to each record in the file are created to manage the file.

Fig. 20



In addition, the EDBS uses a buffer (AGTBL) to write the data in the AGGREGATION FILE in order to save time. The size of the buffer is determined to correspond to the record size of the file.

– Subroutine STEPM

This subroutine resolves the logical operation specified on the data of KEY CODE '99' into the KEY CODE and logical operators, and transmits them to a temporary array, ST2. The program function, DEC1, which is used here, converts 2-digit character-type information to integers.

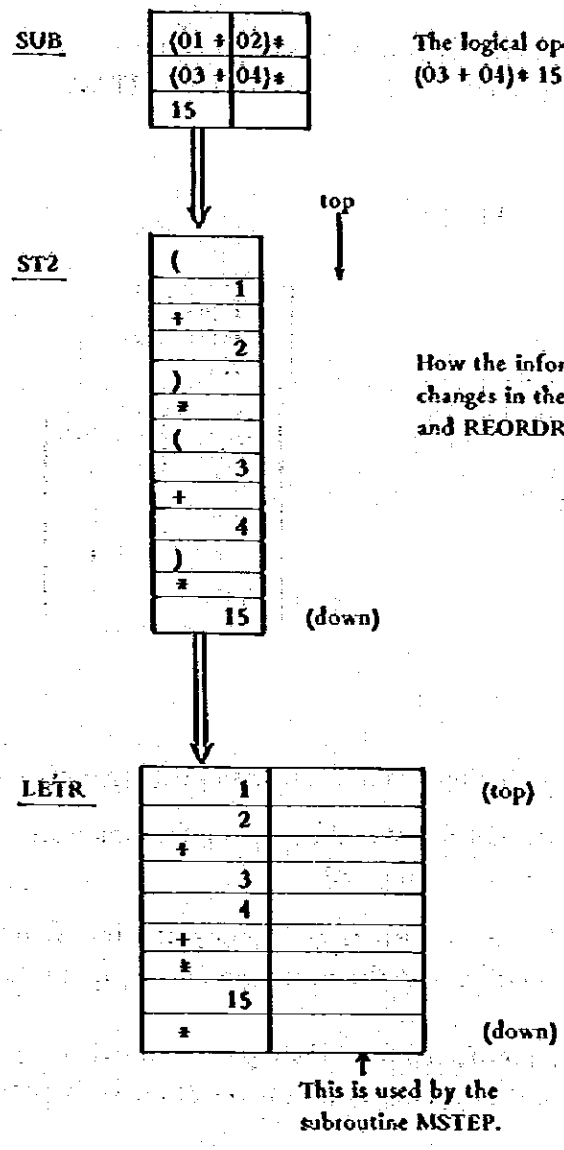
– Subroutine REORDR

This subroutine reorders operators in order to resolve a complex logical operation into several

steps in considering priorities of operators and parentheses. The inverse Poland method is employed for the reordering.

The input for this subroutine is ST2 and the output is LETR.

Fig. 21



After creating the information shown at LETR of Fig. 21, the LETR is scanned from the top until an operator is encountered. The two KEY CODEs stored above the operator are then used to perform the operation. This process is repeated until the last operator is processed. This results in the following calculation steps.

(22)

1 + 2 = 18
3 + 4 = 19
18 * 19 = 20
20 * 15 = 21

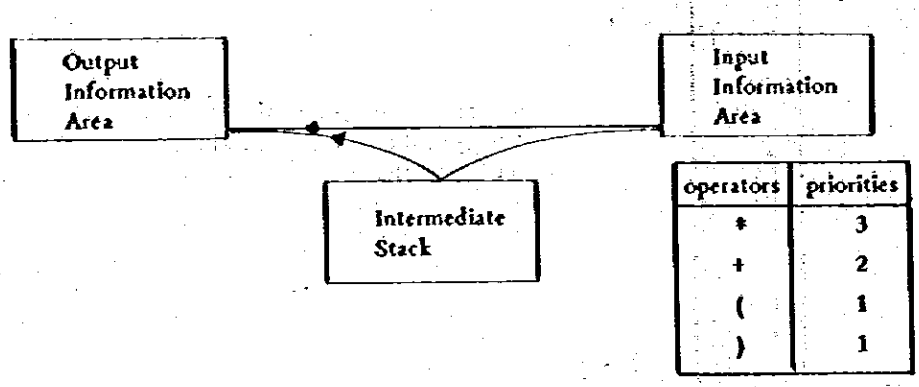
The numbers 18 through 21 are temporary numbers created automatically by the EDBS, and 21 is the last set.

The details of creating calculation steps will be given in subroutine MSTEP. The method of reordering operators from ST2 to LETR is described below.

(The Method of Reordering)

The method operates in accordance with the following rules based on the input information area (ST2), output information area (LETR), an intermediate stack (STACK), as well as priorities of operators.

Fig. 22



(1) A logical operation in the input information area is scanned using the top-down method.

(1)-1 If it is a KEY CODE, it is directly transferred to the output information area, and the next item in the input information area is scanned.

(1)-2 o If the operator is a "(", or the intermediate stack is empty, it is transferred to the intermediate stack unconditionally, and the next item in the input information area is scanned.

o The priority of the operator transferred from the input information area (P1) is compared with the priority of the operator in the surface of the stack (P2).

If P1 ≤ P2,
the operator on the surface of the stack is transferred to the output information area at this point. The operator on the surface is changed. Comparison of the priorities will continue. However, if the operator transferred from the input area is ")", and the one subject to the comparison with the stack is "(", the pair of parentheses is eliminated.

If P1 > P2,
the operator transferred from the input information area as pushed on the stack, and the next item is scanned.

(2) After completing checks of the logical operation in the input information area, the intermediate stack is checked. If there still remain operators in the stack, they are transferred to the output information areas by performing the surface data first

Table 5 An Example of Reordering Employing the inverse Poland method

Output Information Area	Intermediate Stack	Information Transferred from the Input information Area	Input Information Area
			(01 + 02) * (03 + 04) * 15
	(	(	01 + 02) * (03 + 04) * 15
01	(	01	+ 02) * (03 + 04) * 15
01	+	+	02) * (03 + 04) * 15
	(		
01, 02	+ (	02	) * (03 + 04) * 15
01, 02, +		)	* (03 + 04) * 15
01, 02, +	*	*	(03 + 04) * 15
01, 02, +	(*	(	03 + 04) * 15
01, 02, +, 03	(*	03	+ 04) * 15
01, 02, +, 03	+ (*	+	04) * 15
01, 02, +, 03, 04	+ (*	04	) * 15
01, 02, +, 03, 04, *	*	)	* 15
01, 02, +, 03, 04, +, *	*	*	15
01, 02, +, 03, 04, +, *, 15	*	15	
01, 02, +, 03, 04, +, *, 15, *			

– Subroutine MSTEP

The information created by the subroutine REORDR (LETR, but this subroutine calls it ST3) is to used to create the calculation steps (KOID) previously mentioned. The ST3 consists of the information of the logical operation and the work area used for creation of the calculation steps (Refer to Fig. 23).

The ST3 is scanned from top to down in order to find an operator (corresponding work area has 999). If it is found, a back search is conducted upward from the place where it is stored

(24)

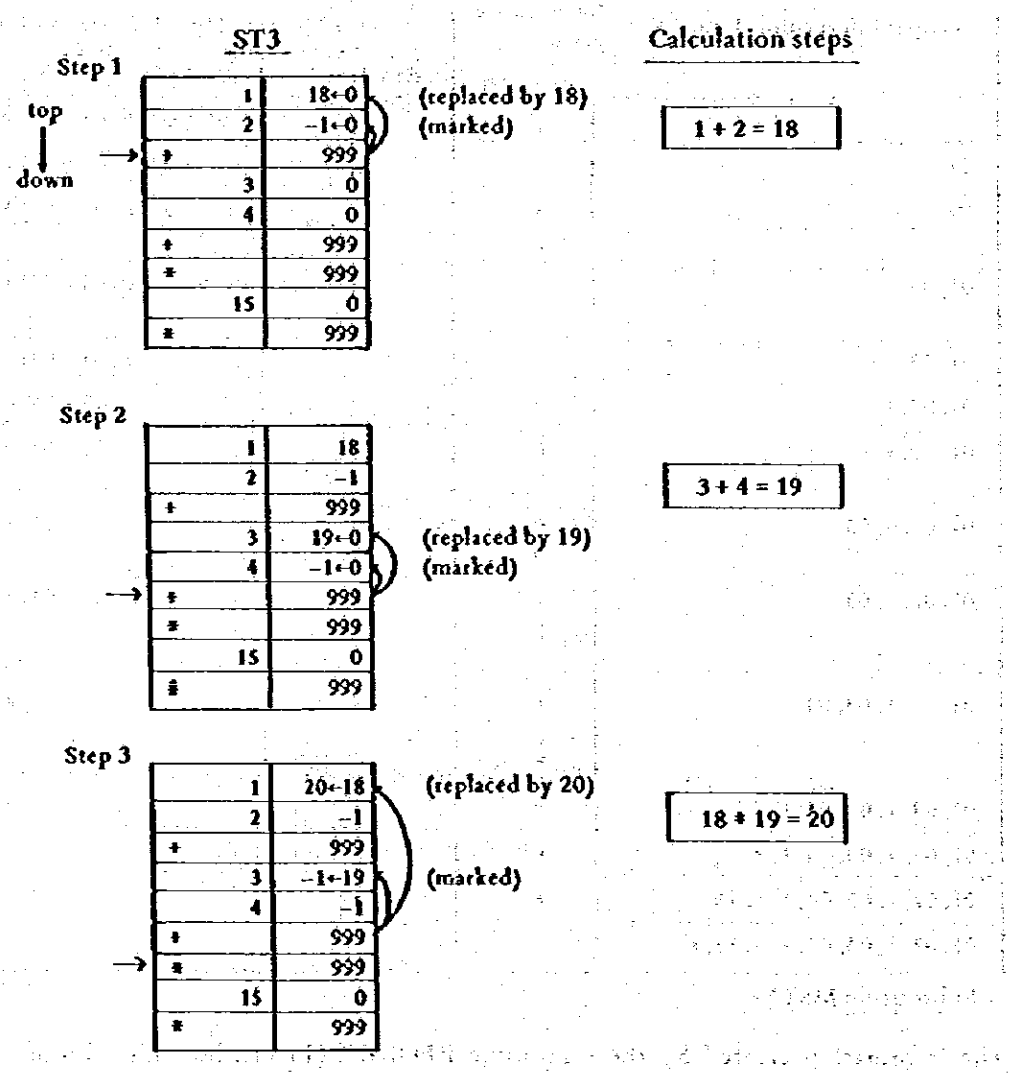
to find two KEY CODEs which are not marked (corresponding work area of a marked KEY CODE has the value of –1.) After performing the following calculation using the operator and the two KEY CODEs, the result is stored in the KOID.

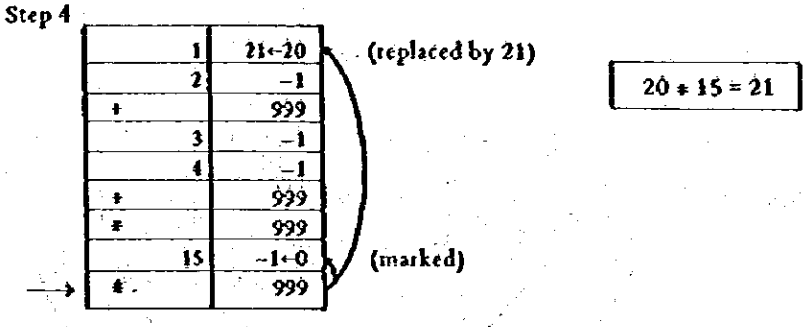
A * B = C

A: KEY CODE
B: KEY CODE

The right hand side of the equation is a new variable (MAXK) created within the program.

Fig. 23 Example of Creating Calculation Steps



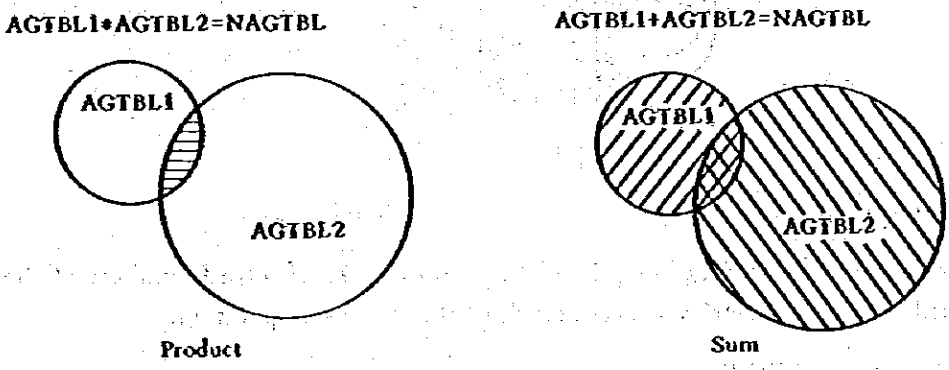


— Subroutine LOGOPE

This subroutine produces a sum and a product using the set of retrieved record numbers of the ELEMENT FILE (on the AGGREGATION FILE) which was created by the subroutine AGFILE, and the calculation steps for a logical equation, with the KEY CODEs as operators, is created by the subroutine MSTEP.

The following process is performed for each of the calculation steps within the KOID. KEY CODEs to be used for an operation are taken out, and their corresponding sets are read from the AGGREGATION FILE and stored in the work areas (AGTBL1 and AGTBL2). A set operation is then performed using the operator as shown in Fig. 24.

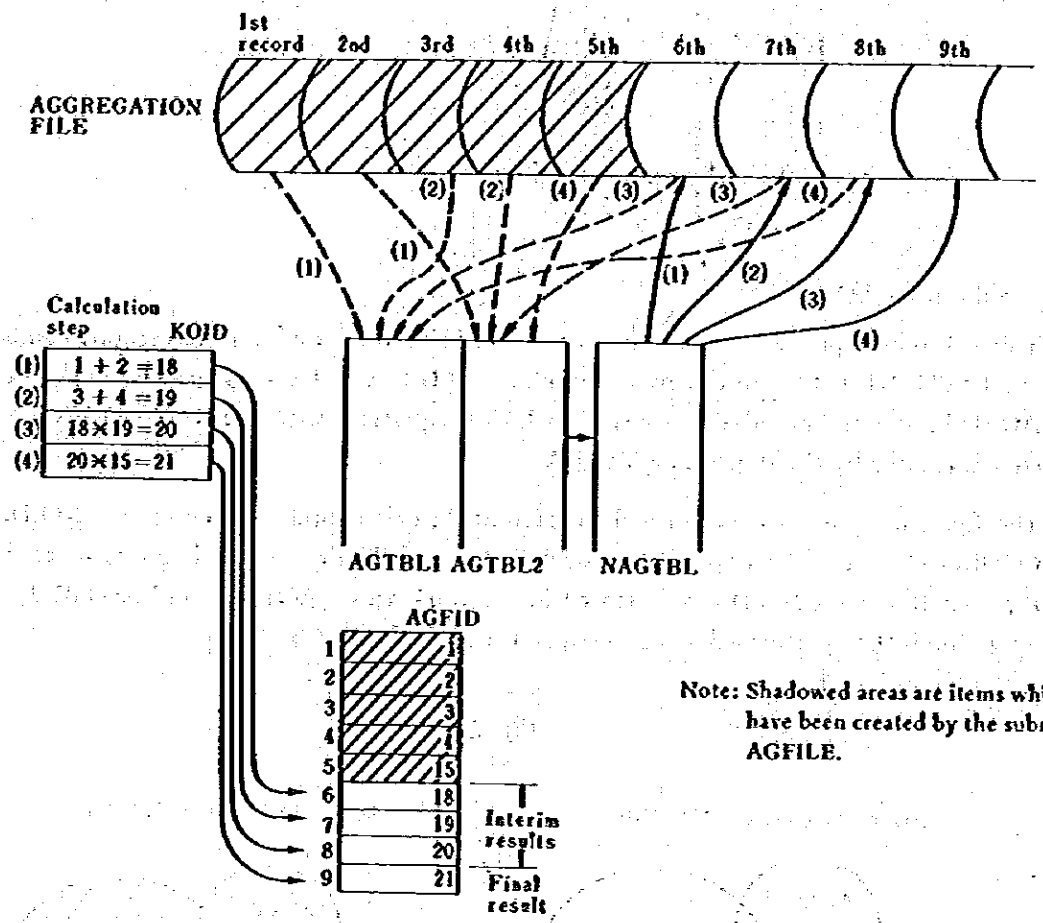
Fig. 24



Note: NAGTBL is a work area name used in the program.

The new set (NAGTBL) obtained through the operation is written in the AGGREGATION FILE in the same manner as that written into the file by the subroutine AGFILE. The size of the work area used here is 1000. This has no relation with the record size of the AGGREGATION FILE, but is set at 1000 since the set operation of record numbers of the ELEMENT FILE is done every 1000 numbers (1 – 1000, 1001 – 2000, ...). The number of repeated processes for every 1000 numbers is determined by the MAXEFN of the two KEY CODEs (Refer to Fig. 20).

Fig. 25



Note: Shadowed areas are items which have been created by the subroutine AGFILE.

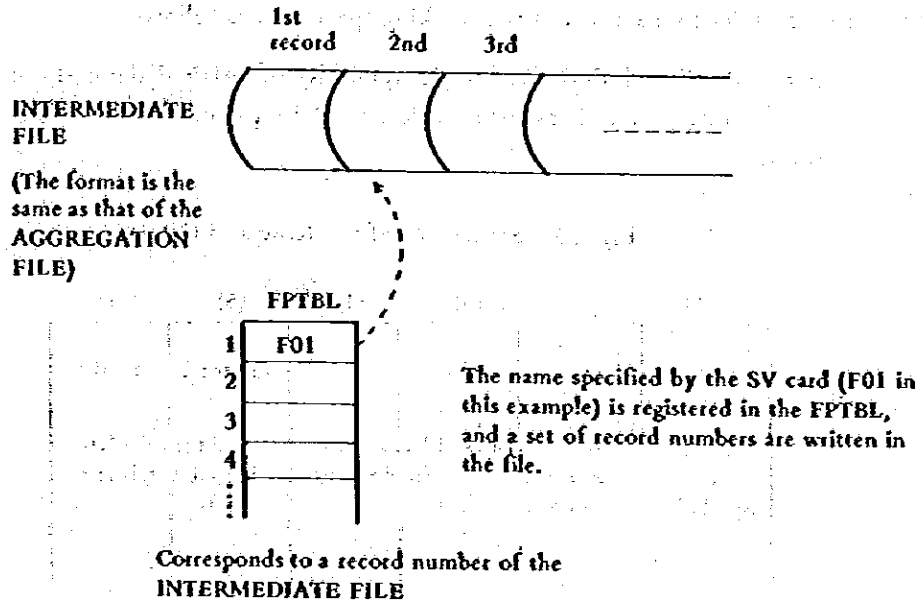
– Subroutine LIST

Retrieved original data are printed based on the set of record numbers of the ELEMENT FILE which were retrieved as the result of the above set operation.

– Subroutine SFILE

This is the subroutine which is initiated when the KEY CODE is "SV." It transfers a set of retrieved record numbers of the ELEMENT FILE (in the example of Fig. 25, it is the ninth record of the AGGREGATION FILE) to the INTERMEDIATE FILE (Refer to Fig. 9).

Fig. 26



(4) Edition of Retrieved Information

– Subroutine ODATAI

This subroutine reads a set of record numbers of the ELEMENT FILE retrieved from the information file into the INTERMEDIATE FILE, and produces various types of reports using the edition indicating data.

This subroutine reads in the edition indicating data. and then calls the following subroutines to create reports.

– CMAT
– FRAME
– RAC
– MATRIX
– REDUCE
– REPORT
– (YDATA)

When a report number is 15-4 or 15-5 (consumption by sectors for each BBM), the above-listed subroutines are called in the number of fuel oil types (8 at present) since the report is made for each fuel oil (BBM), such as gasoline and kerosene. The second parameter, ISW, for calling the subroutine MATRIX is used to check whether an error is present when the INTERMEDIATE FILE is being read. If an error is detected, subroutines REDUCE, REPORT, and YDATA would not be initiated.

(28)

– Subroutine CMAT

This subroutine initializes the working spaces (ROW, COL, and MAT) which are used in preparing reports. The structures of the working spaces are as follows.

- In the ROW and COL, codes (or symbols) of original data, the corresponding actual names, as well as information used to calculate subtotals and totals are stored.

Fig. 27 Structures of the Row and COL

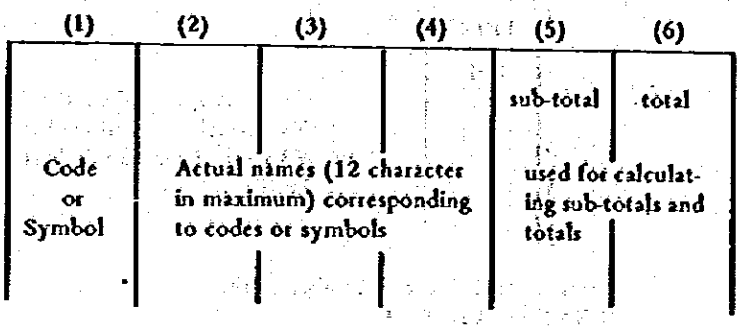
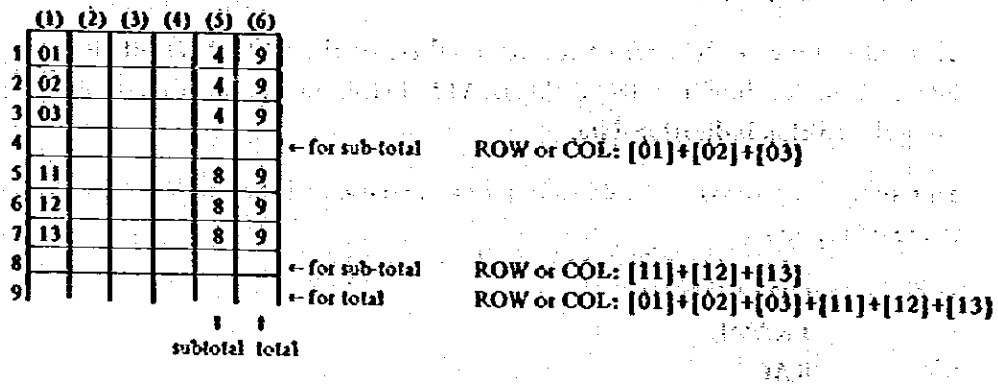
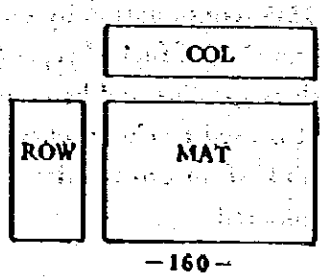


Fig. 28 An Example Using the Working Space for Calculation of Subtotals and Totals. (indicate values corresponding to code numbers)



- MAT is used to store corresponding values of original data within the framework of reports defined by ROW and COL.

Fig. 29 Correspondence between MAT, and ROW and COL



– Subroutine FRAME

This subroutine sets the following information using a report number and sub number of edition indicating data.

IOT: Title number

IOR: Row number of a report

IOC: Column number of a report

IFRQ: Period of a report
= 1 Calender year
= 2 Fiscal year
= 3 Monthly

RED: Optional matrix reduction
= 1 no reduction
= 2 column reduction
= 3 row reduction
= 4 row and column reduction

UNIT1: Unit of values printed in a report

UNIT2: (Actual name of a unit)

SCL: Scaling factor for values printed in a report (exponential of 10)

FMT: Category number of printing format for a report

– Subroutine RAC

This subroutine enters codes, symbols, and actual names of original data into rows and columns of a report based on the information determined by the subroutine FRAME, including IOR (row number of a report) and IOC (column no.).

< ROW >

IOR = 1
Drilling companies are output by their contract systems:

Contract systems and company names are read into the COMMON blocks of /SYS/ and /CPY/ from the CODE, SYMBOL VS. NAME FILE (Refer to Fig. 9) by the subroutine STRTBL.

System
/SYS/ SYS (4,10), MSYS, SYSL

1. Code No.
2. Name of system
3. Same as above
4. Same as above

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Company
/CPY/ CPY (6, 50), MCPY, CPYL

1. Code No.
2. Name of company
3. Same as above
4. Same as above
5. Code No. of system

---

6. Code No. of foreign country

Since the information concerning each drilling company's contract system is maintained in the COMMON /CPY/, companies are categorized by contract systems, and are stored into the ROW together with the code of the contract system and actual name. Since a row of the contract system in the ROW corresponds to a subtotal, the place where the code should be entered (ROW (1, I)) is set to 888 indicating a subtotal, and 999 is set for row for the total.

Fig. 30

COMMON/CPY/			ROW		
COMPANY			COMPANY	TOTAL	
01	PERT. EP. 1	01			
02	PERT. EP. 2	01	PERT. EP. 1	562727	
03	PERT. EP. 3	01	PERT. EP. 2	602402	
04	PERT. EP. 4	01	PERT. EP. 3	597979	
05	PERT. EP. 5	01	PERT. EP. 4	440563	
06	LEMIGAS	01	LEMIGAS	200	
07	PT. CPI	02			
08	C&T	02	OWN OPERATE	2203871	subtotal
09	C&T	02			
10	PTSI	02	PT. CPI	21555108	
11	HAPCO	03	C&T	789859	
12	ARCO	03	PTSI	875973	
13	UNION OIL	03			
14	HUFFCO	03	C. O. W.	23220140	subtotal
15	TOTAL IND.	03			
16	PETR. TREND	03	HAPCO	3164778	
17	ASAMERA N.S.	03	ARCO	6787348	
18	TESORU	03	UNION OIL	639026	
19	AAR	04	HUFFCO	618373	
20	PHILLIPS	04	TOTAL IND.	6633219	
21	CONOCO	04	PETR. TREND	2062877	
22	MOBIL OIL	04	ASAMERA N.S.	7705	
23	CITY SERV.	04	TESORO	275096	
24	AGIP	04	ASAMERA S. S.	11315	
25	AMOSEAS	94			
26	AQUITAINE	04	P. SH. C.	20199737	subtotal

COMPANY			COMPANY	TOTAL	
27	BP. PETR. DEV.	04			
28	GULF OIL	04	AAR	29219	
29	NAT. CON. ACT.	04	PHILLIPS	334266	
30	IND. SUN. OIL	04	MOBIL OIL	1591721	
31	KALTIM SHELL	03			
32	N. SUM. OIL	04	JOINT VENT.	1955206	subtotal
33	PEXAMIN PAC.	04			
34	ASAMERA S.S.	03			
35	SUNMARK IND.	04	TOTAL	47578954	Total
36	SUMATRA REX	04			
37	ARCO KALTIM	03			
↑		↑			
Company Code		Code No. of Contact System			

IOR = 2

Crude oil fields for crude oil are categorized by drilling companies:

The ROW is constructed from the previously mentioned COMMON /CPY/, and the COMMON /COF/ where crude oil field information is stored.

Crude oil field
/COF/ COF (11,300), MCOF, COFL

1. Code No.
2. Name of crude oil field
3. Same as above
4. Same as above
5. Code No. of company
6. Code No. of on shore or off shore
7. Code No. of type of crude oil
8. Specification API
9. Sulfer contents
10. Pour point
11. Viscosity

IOR = 3

Crude oils categorized by types of oil are summarized by drilling companies:

The smallest unit in categorizing crude oil is a drilling field; and for each type of oil, homogeneous crude oil are grouped among the crude oil fields. Although crude oil fields and drilling companies are in one-to-one correspondence, there is no correspondence between types of oil and drilling companies. Therefore, the correspondence between the two are formed

(32)

from the relationship: (1) crude oil fields and companies; and (2) the fields and types of oil.

Type of crude oil
/TCO/ TCO (9,100), MTCO, TCOL

1. Code No.
2. Name of type of crude oil
3. Same as above
4. Same as above
5. Code No. of loading port
6. Specification API
7. Sulfer contents
8. Pour point
9. Viscosity

IOR = 4

This is similar to the case of IOR = 3, with the exception that they are not categorized in terms of drilling companies. Hence, the ROW is constructed with the COMMON/TCO/.

IOR = 5

A report is used to clarify the volume of oil refined at oil factories. Volumes of crude oil processing and volumes of refined oil in terms of products are output.

Fig. 31

P. PRODUCTS	P. BRANDAN	DUMAI
THROUGH-PUT	157157	2463023
AVIAT. GASOL.	0	0
SUPER GASOL.	0	0
PREMIUM GAS.	52774	132273
JET FUEL	0	0
KEROSENE	37779	418149
AUTOMOT. D. O.	21045	421516
INDUSTR. D. O.	0	0
HEAVY FUEL O	2840	30205
BBM	114438	1002143
NAPHTHA	0	0
LOW SUL. W. R.	0	1387430
NON-BBM	0	1387430
LPG	0	0
LUBRICANTS	0	0
SOLVENTS	0	0
ASPHALTS	0	0
GREASE	0	0

P. PRODUCTS	P. BRANDAN	DUMAI
WAXES	0	0
PETROL. COKE	0	0
POLITAM	0	0
OTHERS	0	0
MIDDLE DIST.	31687	34693
FEEDSTOCK	0	0
ASPH. BASE	0	0
LUB BASE	0	0
INTERMEDIATE	31687	34693

At the beginning of the ROW, information concerning volumes of crude oil processing (place where the code is stored is entered by 888; refers to the variable name THROU) is stored.

For petroleum products, the ROW is constructed based on the codes and actual names (CPP) as defined by a DATA STATEMENT. In order to verify the definition of the DATA STATEMENT, the CPP and the Symbol of the COMMON/COM/ which was read in from the CODE, SYMBOL VS. NAME FILE are compared.

Commodity
/COM/ COM (4,150), MCOM, COML

1. Symbol
2. Name of commodity
3. Same as above
4. Same as above

Petroleum products are categorized into the following four groups: fuel oils (BBM); non-fuel oils such as naphtha; LPG, lubricants, solvents, etc.; and intermediate products.

Information necessary for calculating subtotals of the four groups is also set in the ROW. However, since each group employs a unique unit, a total for the petroleum products is not obtained.

IOR = 6
This is same as the case of IOR = 5, with the exception that only petroleum products are considered here, omitting volumes of crude oil processing.

IOR = 7
This is used to prepare a report showing consumptions of petroleum products by sectors.

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The ROW is constructed based on the code and actual names (CFU) as defined by a DATA STATEMENT. The Symbol of the COMMON /SRT/ and the CFU are compared to verify the definition of the DATA STATEMENT.

Sort
/SRT/ SRT (4,100), MSRT, SRTL

1. Symbol
2. Name of sort
3. Same as above
4. Same as above

There are 7 consumption categories including the industrial, consumer, and transportation sectors, in addition to four other sectors.

IOR = 8

This is the case in which natural gas fields are categorized by drilling companies. The COMMON /CPY/, and the COMMON /GAF/ which stores the information of natural gas fields are used to construct the ROW.

Natural gas field :
/GAF/ GAF (13,300), MGAF, GAFL

1. Code No.
2. Name of natural gas field
3. Same as above
4. Same as above
5. Code No. of company
6. Code No. of on shore or off shore
7. Code No. of type of crude oil
8. Specification C1
9. C2
10. C3
11. C4
12. C5+
13. Sulfer contents

IOR = 9

This is the same as the case of IOR = 8, with the exception that subtotals by drilling companies are not obtained. The ROW is constructed based on the COMMON /GAF/.

< COL >

IOC = 1

This indicates an annual report for a calendar year; and monthly values from January to December, yearly total, previous year's total, and a growth rate within the year are set to the COL. Codes and actual names for each month are obtained from the CMON as defined