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PETROCHEMICAL MICROCUMPUTER DATABASE.

C O N T E N T S :

1./INTRODUCTION.

Industrial databases are essential tools for analysis, forecast, trend definition, preparatory work in development policy and investment decision, industrial policy-making, and for many other purposes. Directories of possible process licensors, engineering-contracting firms and manufacturing companies provide also great help in orientation on the world scene. The list and characteristics of the processes available for a given manufacturing tasks are essential in actual project preparation. Especially the newcomers, and that means in most cases the developing countries who are not members of the usually very closed "club" of the established companies need such information. Unfortunately very few industrial sectors have such data bases available for the outsider. There are in many cases directories listing the manufacturing companies or the contractors of a given industrial sector, but even they are mostly for a limited geographical area only and updated quite infrequently. Statistical information is available in the SITC and ISIC systems, but the coverage is mostly not sufficient for the above scopes and the depth also is limited.

The creation of comprehensive and up-to-date databases therefore is a constant demand of the developing countries in most industrial fields. In a few cases, encouraging results were realised. So e.g. the FAO-WORLD BANK-UNIDO working group on fertilizers has set up a statistical database wich is updated every year and gives great help and satisfaction to the interested parties. Even here, the directory service is still missing. In most sectors, however, the lack of a reliable statistical database is felt.

In the petrochemical field, this situation is especially acute. Many developing countries are caught between availability of domestic raw materials and increasing demand for intermediates and end products of the petrochemical industry justifying development, but they encounter big difficulties in the elaboration of the corresponding policies and projects due to the lack of sufficient information. The close links of this sector with the energy supply, transport, agriculture and other vital sectors of the national economy give even more emphasis to the development of this sector. That was the reason behind the many requests coming from the developing countries to UNIDO asking for the creation of a petrochemical database, formulated among others at the Third Consultation of the Petrochemical Industry. The database created and handled manually over a period of a few years at the System of Consultations Division has given good results, but showed, that an efficient system can be created only in a computerised form.The experiences and informations contained in the manual database can form the starting point for the elaboration of such a microcomputer based database.

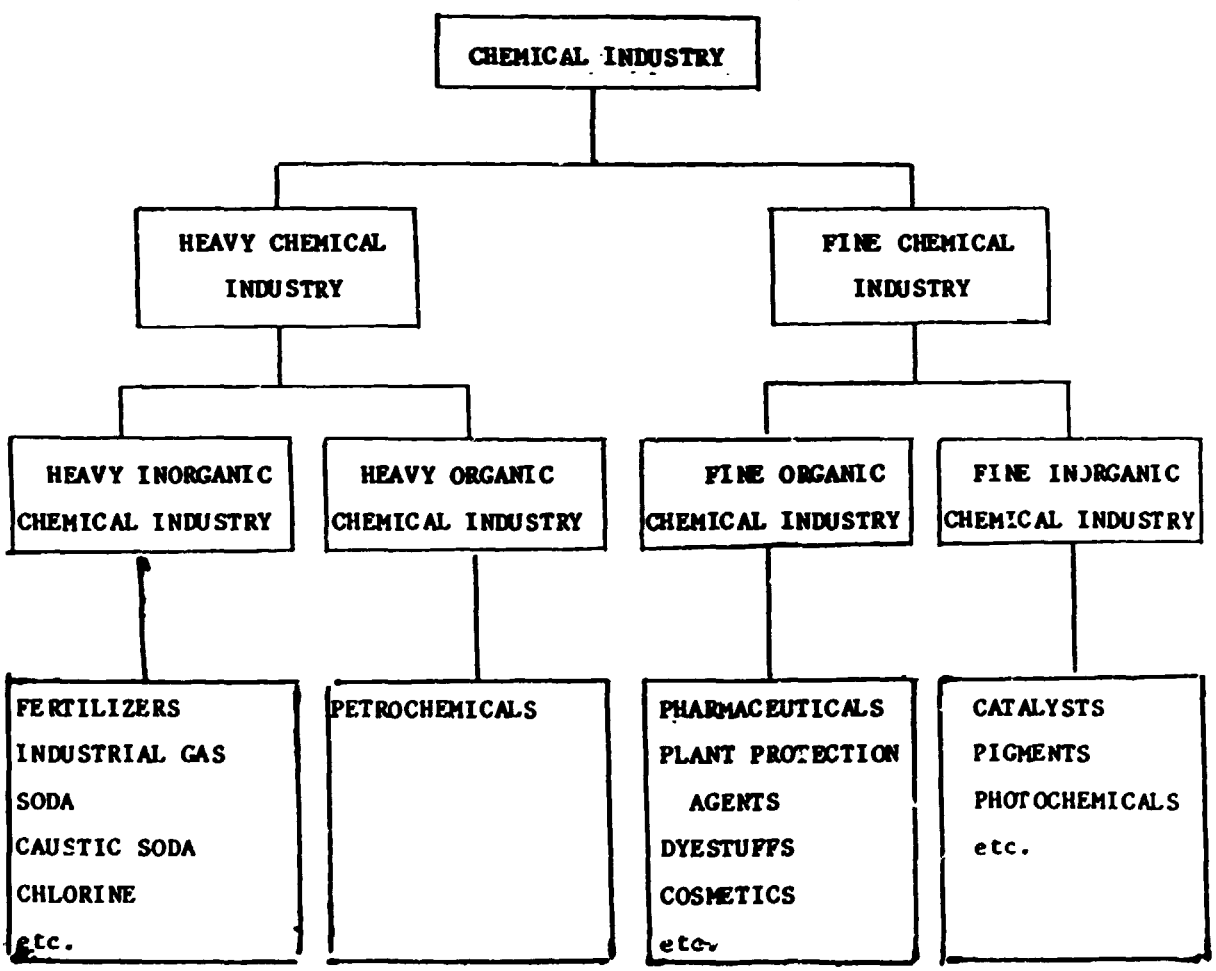
2./THE PETROCHEMICAL INDUSTRY.

2.1./Definition of the petrochemical industry.

There is no internationally accepted definition of this sector. The ISIC and SITC codes (see Annex No 1.) cover only partially the products belonging undoubtely to the pertrochemistry. By the definition given by "The Petrochemical Industry in Developing Countries: Prospects and Strategies" (UNIDO/IS.572), it comprises "...all chemical compounds which can be manufactured from natural hydrocarbons (crude oil, natural gas) by chemical processes and are intended for further processing either in the chemical or other industries."

The chemical industry is usually divided first in two branches: heavy and fine, both subdivided into organics and inorganics. The petrochemical industry can be identified with the heavy organic group. In this sense, ammonia, a product made mainly from hydrocarbons, but inorganic and serving mostly for fertilizer purposes is not included among the petrochemical products. The downstream industries processing the end products of the petrochemistry (e.g. rubber, plastics, fibres) to consumer goods or parts for other industrial uses are left also outside the scope of the petrochemical sector for the purpose of this database. Fig 1. shows the place of the petrochemistry in the whole of the chemical industry.

Fig.1. Structure of the chemical Industry.



2.2. Structure of the petrochemical industry.

In contrast with the other fields of the chemical industry, this heavy organic sector has a rather comlex, highly intervowen structure. The straight production lines leading from a given raw material through a series of consecutive manufacturing operations to an end product form rather exceptions. There are alternative raw materials and processes for the same product as well as alternative processing uses for the same product. In a single manufacturing process, several materials enter as inputs and also several leave as output, being simultaneous products from the same process. A very simplified schematic representation of the petrochemical field is given in Fig 2. showing the main relationships between the most important petrochemical products dealt with in this database. In order to give an impression on the quantitative realionships, Fig. 3. presents the material flow of this sector, a./ for the raw materials; b./ for the petrochemicals.

To cover the whole petrochemical field, the following groups have been formed:

- -raw materials
- -basic petrochemicals
- -intermediates
- -end products.

2.2.1./Raw materials.

This group includes the liquid and gaseous hydrocarbons only. Biomass and coal can be used in principle for the manufacturing of products belonging to this field. Actually coal was used extensively in the past for this purpose and biomass is also used in some countries as a petrochemical raw material (Brazil), but their role in the whole global heavy organic industry is rather insignificant. So there is no reason to include them in this database.

2.2.2./Basic petrochemicals.

The two main basic procesases transforming the raw materials into basic petrochemicals are the steam cracking for olefine production (aliphatics) and the catalytic reforming for aromatics.

Steam crackers use mostly naphta (more than 65%); ethane, liquid petroleum gases (LPG) (25%) and gas oil (less than 10 %). The main product is ethylene, but, depending on the feedstock, a whole series of important by-products are also formed (propylene, butylene and other aliphatic compounds). With naphta and heavier feedstocks aromatics are also produced, wich usually are processed further to basic products in the oil refineries.

The catalytic reformers process the heavier naphta fraction and give a product rich in aromatics. One part is used as high octane number blending component in the gasoline production, while the other yields the great bulk of aromatics (benzene, toluene, xylenes) used as basic petrochemicals.

2.2.4./Intermediates.

The number of intermediates derived from basic petrochemicals and used for manufacturing of end products or used in other industries is very great. For the purpose of this database it is sufficient to consider only the most common products which play a key role in the structure of the industry.

Annex 1./ lists the products proposed to be included in the datadase, among them the intermediates, grouped according to their chemical structure. Aliphatic, cyclic and aromatic compounds figure in this list, but a separate group is formed by the monomers, very important intermediates serving for the manufacturing of the plastics, rubbers, synthetic fibres and resins.

2.2.4./End products.

The most important subgroup is composed of the plastics, but the elastomers (rubbers), fibres and resins are also widely used. From the other end products only one more group seems worthwile to be included in the database, the surfactants. Here a subdivision will be possible but its structure will depend on the available information.

2.2.5./Downstream products.

Processing of plasics, rubber and others is not part of the petrochemical industry and differs fundamentally in all respects from it. So this group was not considered in the database.

Fig.2. Structure of the petrochemical industry.

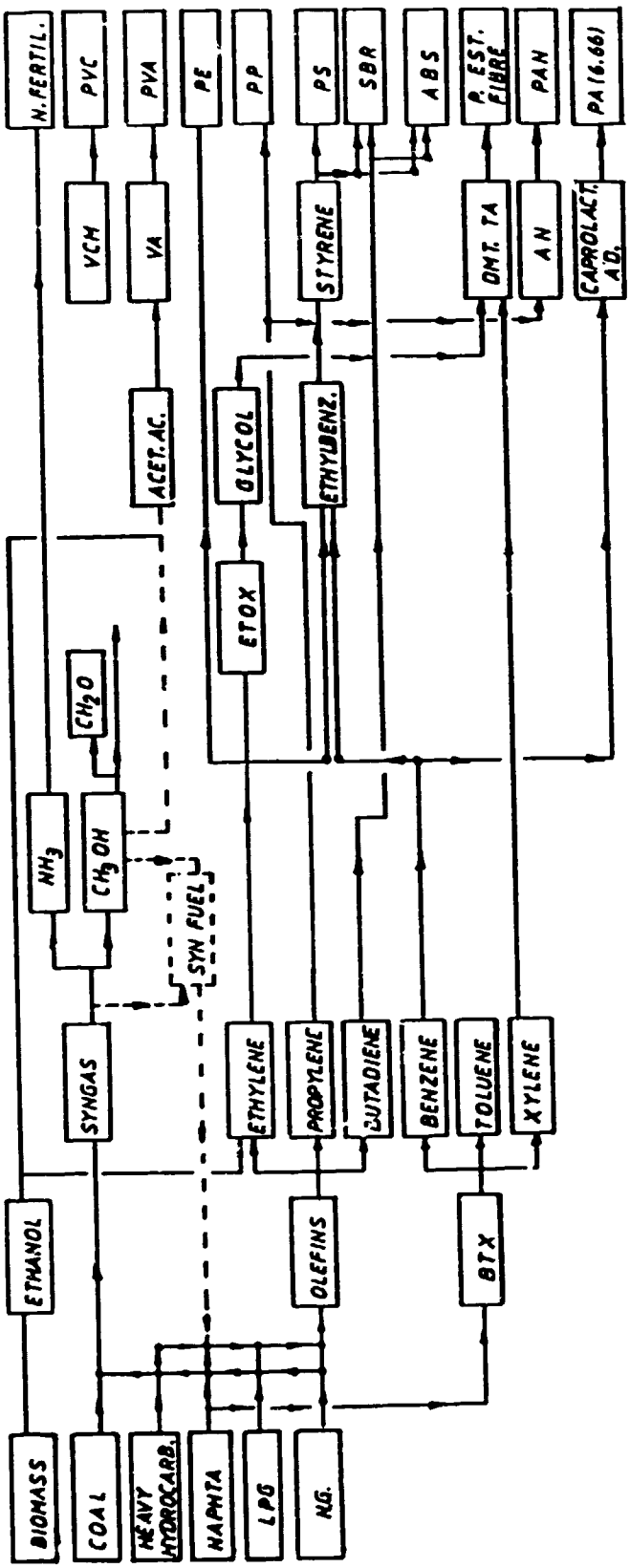


Fig 3(a) Material flow diagram-hydrocarbons (million tons/year)

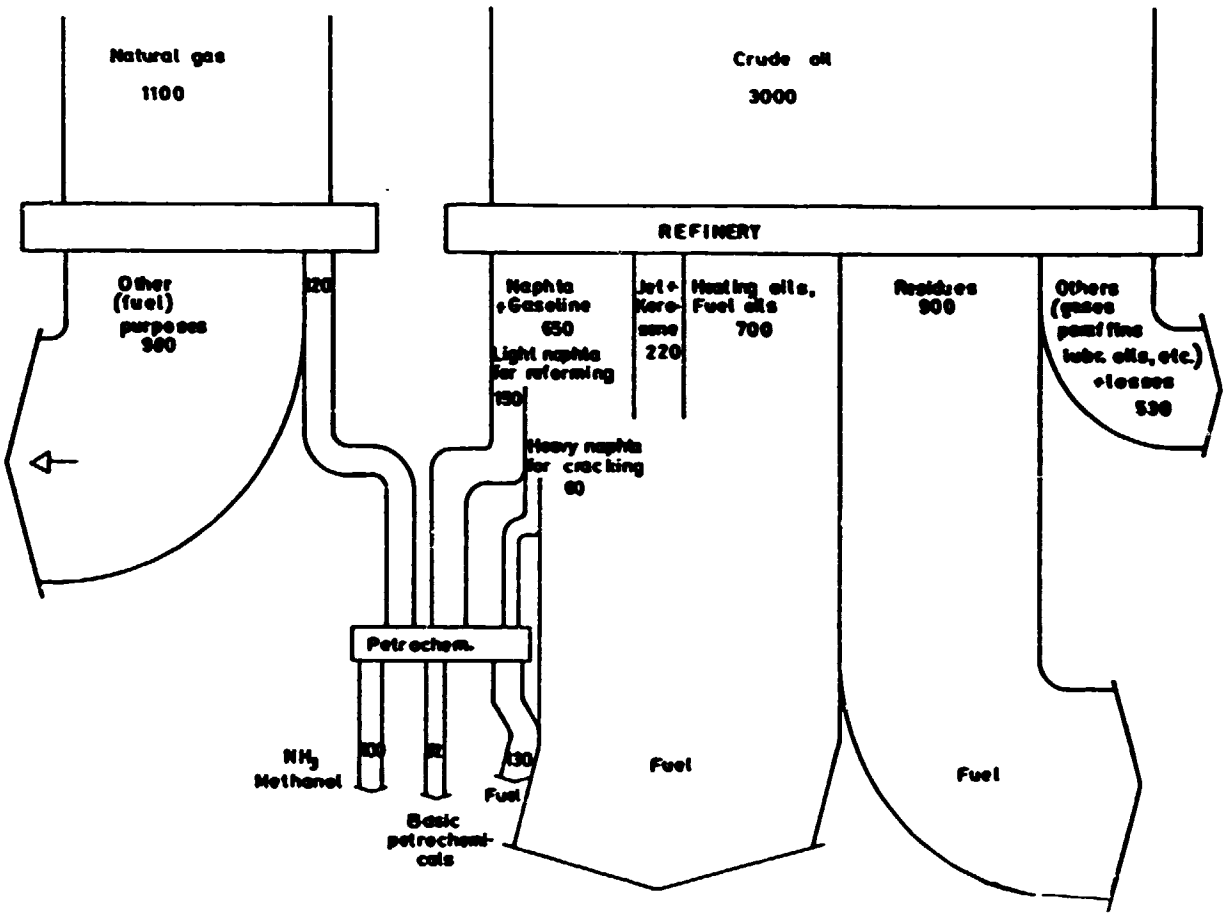
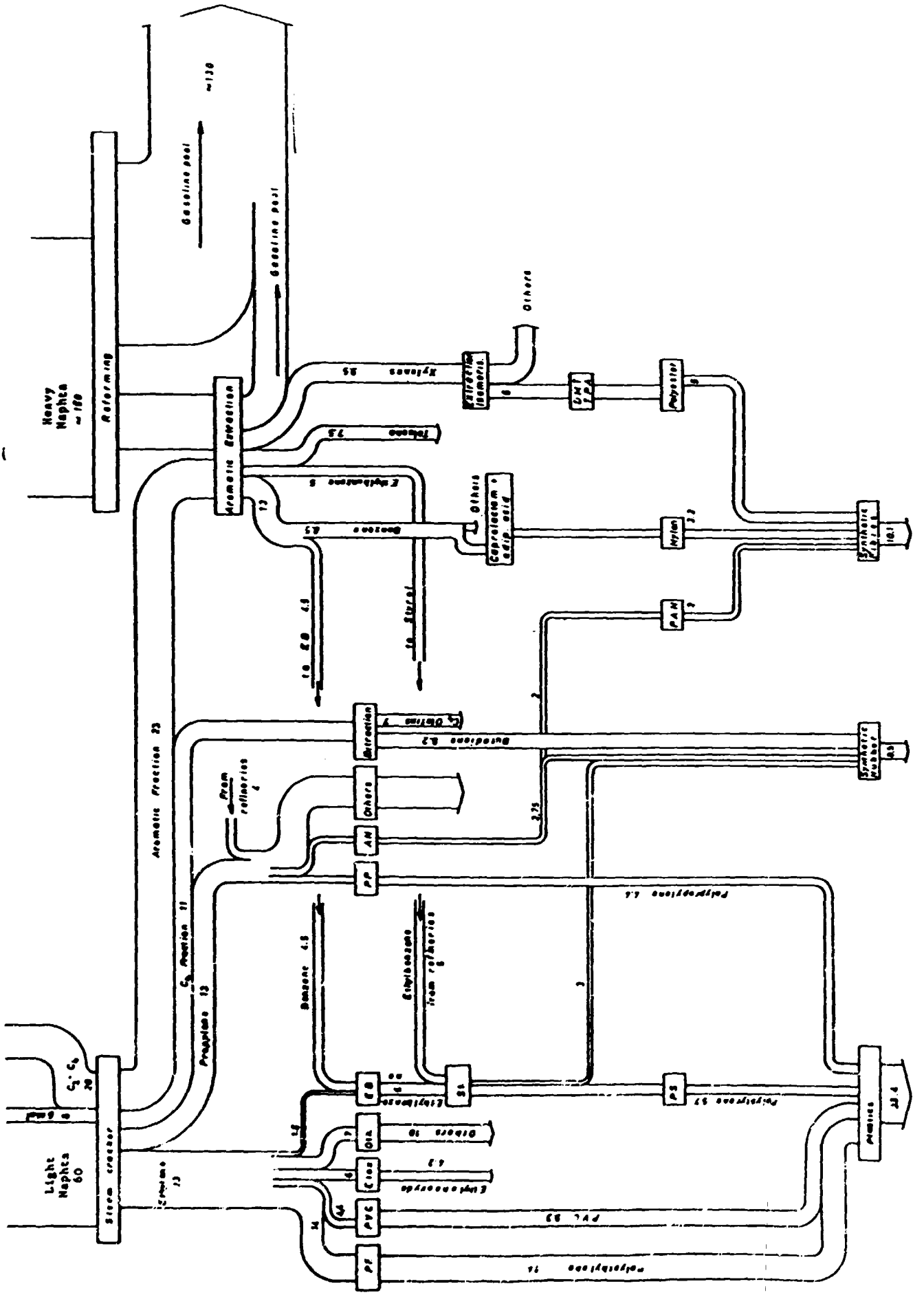


Fig. 3(b) Material flow diagram-petrochemicals (million tons/year)



2.3./Characteristics of the petrochemical industry.

In order to organise a database corresponding to the specific needs of the petrochemical industry, it is necessary to take into consideration its main characteristics.

The following main features were considered:

-denomination, thesaurus;
-type of processes used;
-type of plants ;
-hazards involved;
-economic parameters;
-trade ;
-companies involved.

2.3.1./Denomination.

The raw material and product names used in the petrochemical industry are simple, mainly chemical names. For the same product one or a few denominations are used and - except for a very few cases - commercial or fancy names are not encountered. So the risk of errors from this source wich is a major concern in many other sectors, here is negligible. The thesaurus composed and presented in Annex 2. is therefore relatively simple, easy to use, even for the non- initiated.

2.3.2./Processes.

Each of the processes used is nearly exclusively dedicated to the manufacturing of one or a few products, starting with a definite restricted choice of raw material. For the same purpose several processes are usually available, differing mainly in the process conditions and therefore in the economic parameters, but in some cases also in the choice of the raw materials, the quality of the product and the nature and composition of the by-products. The processes are developed mostly by the big manufacturing companies, but many of them are the intellectual property of the big engineering contracting companies. Licenses are generally commonly traded, easily available. Information on the processes (at a level sufficient for technical and economic evaluation) is generally easily available both from the literature and from the license owners.

It is therefore possible to build up a data base containing the relevent information on the main processes used in the petrochemical industry, task very difficult, if not impossible in many other sectors.

2.3.3./Plants.

The plants used in the production of the petrochemicals are mostly purpose built and cannot be converted to other production processes. Major capacity extension, revamping, etc. are usually arrived at only by major investments which are executed by contractors and reported in the relevant technical papers.

The plants are in most cases complex production facilities, composed of several units, each of them specific to one production task. These units are connected closely by material and energy flows; the end product (or by-product) of one is the raw material for the other, steam produced in one is used in another etc.

It is therefore possible to build up an information system which can give a fair picture of the plants without too much burden for the partners giving the information. Updating needs relatively little effort, since changes are occuring only at intervals. the production profil is basically stable. The information system should follow the structure of the plants, so for a plant only the general main parameters should be stored, the information on the units will contain the data for products, production and processes.

2.3.4./Hazards.

Practically all products and processes of the petrochemical industry present high fire and explosion hazards. Many of them are toxic and polluting when escaping from the equipment. The usually huge quantities involved in the processes raise these hazards to very high levels. So the work, health and environmental safety is one of the major concerns in the building, operation and maintenace of the plants. This is the reason, why this sector, in spite of the high level of hazards involved presents one of the best safety records of the whole industry.

The importance of this field and its close connections to the other safety and environmental problems justifies a separate information system for this purpose. This separate data system specifically constructed for the information on the industrial accidents, their causes and consequences should also be organised, but it is outside the scope of the present work.

2.3.5./Economic parameters.

The petrochemical processes use high level automatic control systems.Manpower is therefore not a major cost factor. Large quantities of energy carriers are involved in the material flow as raw materials and huge volumes of other forms of energy are also entering and/or coming out of the production systems. The most important cost factor is therefore the material-energy cost. The other major cost factor group is composed by the capital related costs. Depreciation, maintenance and the other costs can be derived from the investment costs. So the main cost factors in

the data base should be the material- , energy-, and investment costs.

2.3.6./Trade

Trade and especially international trade plays an interesting role in the petrochemical industry. Although only 10 % of the total production enters the channels of the international trade, and most of the product find captive use either in the plant itself or in a closed circle of plants, the market plays a very important role in this sector.

2.3.7./Companies.

In contrast to many other sectors, in the petrochemical industry the type of companies involved is rather restricted.

First there are the manufacturing companies. They are up to the size of the task; for the basic products and other big volume products as well as for the complex production facilities involving a rather intricate and great material flow, a few huge producers dominate. For the other end of the scale, for the relatively low volume specific products, where raw materials and products are equally commodities, a relatively greater number of companies is operating and a continuous transition can be observed between these two extremes.

Research and development is very costly, it involves huge investments in the pilot plants, since commercial processes cannot be developed otherwise. Pilot plants consume large amounts of raw materials and energy and produce equally large amounts of products, by-products and effluents to be treated. Therefore research is concentrated in the manufacturing companies and sometimes the engineering-contracting companies are also involved, but usually in cooperation with the manufacturers. Independent reasearch organisations exist, but seldom are owners of processes to be licensed.

Engineering-contracting activity is a specialised field. In view of the high hazards involved and the high skills needed in the design and construction of such plants, even the biggest multinational manufacturing companies use engineering-contracting specialist for the implementation of the processes developed by themselves for themselves and also for the licensing and marketing of these processes for others. Most engineering-contractors are specialised for certain fields of products and processes and even the biggest, who have broader fields, act by several specialised separate organisations for the different fields.

The engineering and contracting activity is usually carried out in the same organisation. Today there are practically no companies who would specialize only in one of these fields.

Trade is in the hands of the manufacturing companies. Trading houses or distributors play only minor role in local commerce. Internationally important trade companies practically do not exist.

In view of the above,

-manufacturing and
-engineering-contracting

will constitue the backbone of the information system. There is no need to create a group for the trade companies, but as activity R&D and licensing should be included in the system.

3./SCOPE, AIMS AND CONTENT OF THE PETROCHEMICAL DATABASE.

3.1./Scope and aims.

The database serves to collect, organise, handle, retrieve, process and deliver systematic and consistent information on :

a./the companies involved
  aa./in the manufacturing of petrochemical products;
  ab./in the R&D activity and licensing of petrochemica processes;
  ac./ in the engineering and construction of petrochemical plants;

b./the production, consumption, international trade and price of selected petrochemical products;

c./the raw material situation of the petrochemical industry;

d./the main economic data of the countries involved.

The database is not intended to deal with

A./the trade organisations, for reasons explained above.

3.2./Information types.

The system contains and handles two different types of information:

-directory

-statistical data.

Directory type of information serves for retrieval, listing and sorting of mainly text type of information and no statistical or economic operation have to be performed on them. The memory requirements are relatively low.

Statistical data have to be retrieved, sorted, assembled, presented in table and graphical forms and also processed by different mathematical operations in order to give new informations. This is the main task of the whole data system and requires most of the memory space and a good part of the programming work.

3.3./Information content.

The information content of the system will be the following:

3.3.1./Company information.

Since most petrochemical companies both in industrialised and developing countries are big enterprises with several plants at different sites and the plants themselves are composed from individual production units, a three-level approach is deemed necessary:

at

- -enterprise
- -plant
- -production unit (shop) level.

Many companies are engaged in several fields of activity, (manufacturing, R&D, licensing, etc.). Contracting and engineering is usually the field of specialised organisations. Nevertheless, there is also some overlapping. In order to simplify the information system, all the companies are grouped in one system and the activities are used to select the relevant companies for a given field.

Information on the companies is of two types: constant (relatively) and yearly. In the first group only one information is stored for each question. Updating means replacing old information by new one, where the obsolete is lost. The yearly information is stored for the last ten years. Every year the oldest data are eliminated from the live system, but not lost, they are saved in a background memory file.

Another background information system on paper files is also foreseen containig the detailed information coming from the companies,processes and projects (balance sheets, annual reports, literature information, etc.)

The information content on the companies stored on the computer is distributed in five data files (see Annex 3.).

Production unit data file (D5)

stores the information on the unit its process and its products. The identification codes of the unit (1..3), its name and the correspondent's data are given first. Process, licensor's, engineering's and contractor's code, define the process. Up to five products can be defined by their codes (the first being always the main product). Startup date, capacity and investment costs are the data on the process stored here.

Plant directory file(D6)

contains only the the adress type of information on the plant identified by code, name and acronyme.

The plant yearly information file(D7)

contains the main global finacial data for the plant: turnover, value added, and sales, this latter broken down to domestic and export sales, but the sales of own products is also separately given.

Enterprise directory file (D8)

identifies the enterprise by code, name and acronyme, and gives all the adress type of information. Data on staff by local and expatriate and also by managerial, technical, and manual categories; and on the ownership (state and private in %) and type (Ltd,etc) as well as on the capital complete the information.

Enterprise yearly information file(D9)

Turnover, gross profit, value added, R&D expenses, investment expenses and sales volume for the last ten years will be stored.

3.3.2./Statistical data.

Production data (D4).

For the selected products (see Annex No.1.) the last ten years production data will be stored by the individual production units. The consolidated data for plants, enterprises, countries, regions and others will be calculated by the programm. Quantities in tons, values in US$ will be stored. Conversion in the output tables to the most convenient units (1000 tons, or million tons; million US$ etc) will be done by the programm.

Raw material data.(D1)

Production for the last ten years and reserves of the most important raw materials by countries is an information frequently needed in the economic and technical analysis of the petrochemical industry. The list of the selected raw materials is in Annex No.1.

Price data (D2)

For all the products selected, ten market places will be chosen,wich can be considered as characteristic for the world as regional markets. The prices registered at these places called "price information centers" will be stored for the last ten years.

Impex data (D3)

Country by courtry the export and import of the selected products will be stored both in quantity and value for ten years. Quantities in tons, values in US$ will be stored. Conversion in the output tables to the most corvenient units (1000 tons, or million tons; million US$ etc) will be done by the programm.

Country data (D14).

The main economic and other data characteristic for the country and necessary for the economic analysis will be stored here for easy access.

3.3.3./Project data.(D10)

The investment activity will be dealt with in this file. For every project, the main data will be collected and stored here. The information will come from differenr sources; usually investor, contractor and licensor equally report in the literature on the same project. So confrontation and cross-checking is both possible and necessary. The file will contain all the incoming information, possibly several on the same project, defined each by the information source code. Comparison can be done by programm or by user. Besides the identification codes, only the investment cost, the capacity and the actual stade of the investment (planned, ccntracted, in construction) and the startup date (forecast) are registered.

3.3.4./Process data (D11).

The same applies here also as in the previous case, but hte information is more detailed. The main technical parameters (specific values) and economic features (investment cost) are stored. The references (plants using the process) are also listed. Up to 50 references can be listed for one process.

3.3.5./Reference data (D12).

Specific to engineering and contracting companies. the plants designed and/or built by them are listed by their code and can be sorted by product and process too.

3.3.6./Currency exchange rate data (D13)

Although not specific to the petrochemical industry, the conversion of the national currencies to US$ is constantly used for both trade, price and production data. Great fluctuations occur over the years. Therefore a separate file is provided for the yearly average exchange rates of the national currencies covering all the countries figuring in the country list.

4./INFORMATION GATHERING.

4.1./Information sources.

For the purposes of the petrochemical database three types of information sources can be taken into account: public, accessible and proprietary informations.

4.1.1./ Public information.

For both the directory type and the statistical informations the bulk of them is available in commonly accessible public information forms, stored in most public libraries.

Directory type of information.

The following sources should be considered:

-directories (national, regional and international),
-technical literature,

Directories containing the manufactu ring, engineering, contracting and research organisations working in the field of the petrochemical industry on national, regional and international level can be found in most big libraries, among others in the UNIDO library. Missing ones can be procured from the editors. These directories when specific to the petrochemical field, can provide without further selection the information for the database, but when more general (chemical industry or industry in general, e.g." who makes what") a preselection is necessary to sort out the petrochemical companies.

Technical literature gives regular surveys (in most cases yearly) on the companies, projects and processes. Continuous reporting on the events completes this picture. All important changes in ownership, management, business activity and results are reported, as well as new projects, research activities, process developments. This source of information asks for a constant lecture and processing of the relevant periodics. The list of the publications recommended for regular survey is given in Annex No.4.

Statistical information.

Statistical dat on the world petrochemical industry are available from a number of sources. First of all the Unite Nations Statistical Office (UNSO) sources should be considered.

Production data can be found in the International Standard Industrial Classification (ISIC) system. However several problems arise from the use of this data. First, several countries do not report on the necessary six digit level. Second, addition of the selected petrochemical products wil give the bulk of the petrochemical production,

but not the whole. On the other hand, no such group exists as petrochemicals. Organic chemistry as a whole is more broad, including several other subsectors, like fine chemicals. Our proposition for matching these problems is the following:

-The missing data should be procured from the sources in the next paragraph;

-all data should be checked by confrontation with other sources, like those in the next paragraph:

-in principle it would be possible to form a total sum for all petrochemicals and collect all the non specified products in an "others" group with values calculated by substracting the sum of the specified products from this total. But since the specified products constitue about 80-90 % of the total and it would be very time consuming, difficult and would give anyway results with rather restricted accuracy, we propose to refrain from the use of the totals and restrict ourselves to the specified products. On the other hand, consolidated figures for subgroups, like fibres, plasics, etc are available and should be included in the statistical database.

Trade data are published by the Standard International Trade Classification (SITC). The data available however are mainly only at three or four digit level. Many countries do not report detailed data. Another difficulty is how to match the codes in order to give consistent production, export and import data for a particular petrochemical product. Only a systematic review of the literature, of the national and regional statistics and direct contact with and reporting of the individual countries can solve this problem.

Price data are regularly published by different sources. For the commodities several journals report weekly or monthly the prices. Most technical periodics give also valuable information on this topic. Regional reports are also published on the local resp. regional market situation.

Country data. UN statistics are available in the house which contain all the usual information on the economic structure and other basic data for all countries.

Currency exchange rate data are regularly published in the International Financial Statistics published by the IMF.

Technical literature is an important source of information for statistical data also. The leading periodics report regularly valuable data on production, trade, price and even company economic yearly results. So a regular survey of the journals (see Annex No.4. is necessary.

4.1.2/Accessible information.

Quite a number of sources cannot be found in the libraries, but are available or even mailed regularly on request. The following sources are worth mentionning and should be provided for the petrochemical database both for directov and statistic information:

Company publications.

Practically all petrochemical companies publish annual reports, balance sheets and other publications giving a rather deep insight in the company's work and results. The bigger ones publish journals also. All these are regularly mailed to the interested partners free of charge. It is therefore necessary, that UNIDO adresses all the petrochemical companies and asks tyo be put on their mailing list for the publications.

Petrochemical organisations

Many regional, international and even nationsl organisations exist, wich are either specific to the petrochemistry or have a petrochemical section. These organisations publish statistical and other informations wich are available on request respectiveiy are regularly sent to the partners on their lists. There is a non exhaustive list of such organisations, wich should be completed continuously based on the daily work contacts:

OPEC (VIENNA)
CEFIC (BRUSSELS)
APPE (BRUSSELS)
EEC (BRUSSELS)
OECD (PARIS)
AIDO (BAGDAD)
ECWA (BAGDAD)
ESCAP (BANGKOK)
ECA (ADIS ABABA)
ECLAC (BUENOS AIRES)
APLA (VINA DEL MAR)
GOIC (QATAR)
OAPEC (KUWAIT)
ECE (Geneva)

Regular contact and information exchange should be organised between UNIDO petrochemical database and the above organisations. An investigation on the possibilities offered by the various organisation should be made and regular contacts established with those who can give useful information. In the questionnaires sent to the companies, information should be asked for the organisations to which they belong. A list showing the utility for every such organisation should be drawn and used.

Questionnaires

The petrochemical database will collect information on the companies in developing countries through questionnaires. This is a direct and reliable information source if properly organised and maintained by regular correspondence. The details are exposed in Annex No.5.

Proprietary information.

Several consulting companies publish for a restricted circle detailed statistical information with economic evaluations and forecasts against payement of a fee. This information cannot be made public. Since in the petrochemical industry - in contrast to many sectors of the fine chemicals - secrecy is restricted to the proprietary process informations, while production and price data are mostly public, it seems that the database can work successfully without using proprietary data sources

4.2./Information gathering and processing.

The above information sources constitue a solid and safe basis for the petrochemical database, but only when a constant, reliable and expert information gathering and processing is provided. These two activities are intervowen and cannot be separated. The following tasks impose:

- Systematic exploration, survey and processing of the literature and company publications

- Systematic contact by correspondance with (and personel visits to) all companies, organisations, government agencies involved

- Regular dispatch of questionnaires, collection of answers, processing

All information collected must undergo expert checking by confrontation with information from other sources, previous information etc. The corroborated data should be transmitted by the expert in form ready for input to the computer.

This work is a continuous one throughout the year. Updating of the database however can be done periodically. For the statistical part, once yearly is sufficient, for the directory the nature of the data will decide on the urgency. Adress changes e.g. should be made immediately, while data changes e.g. on capital can wait until the next revision.

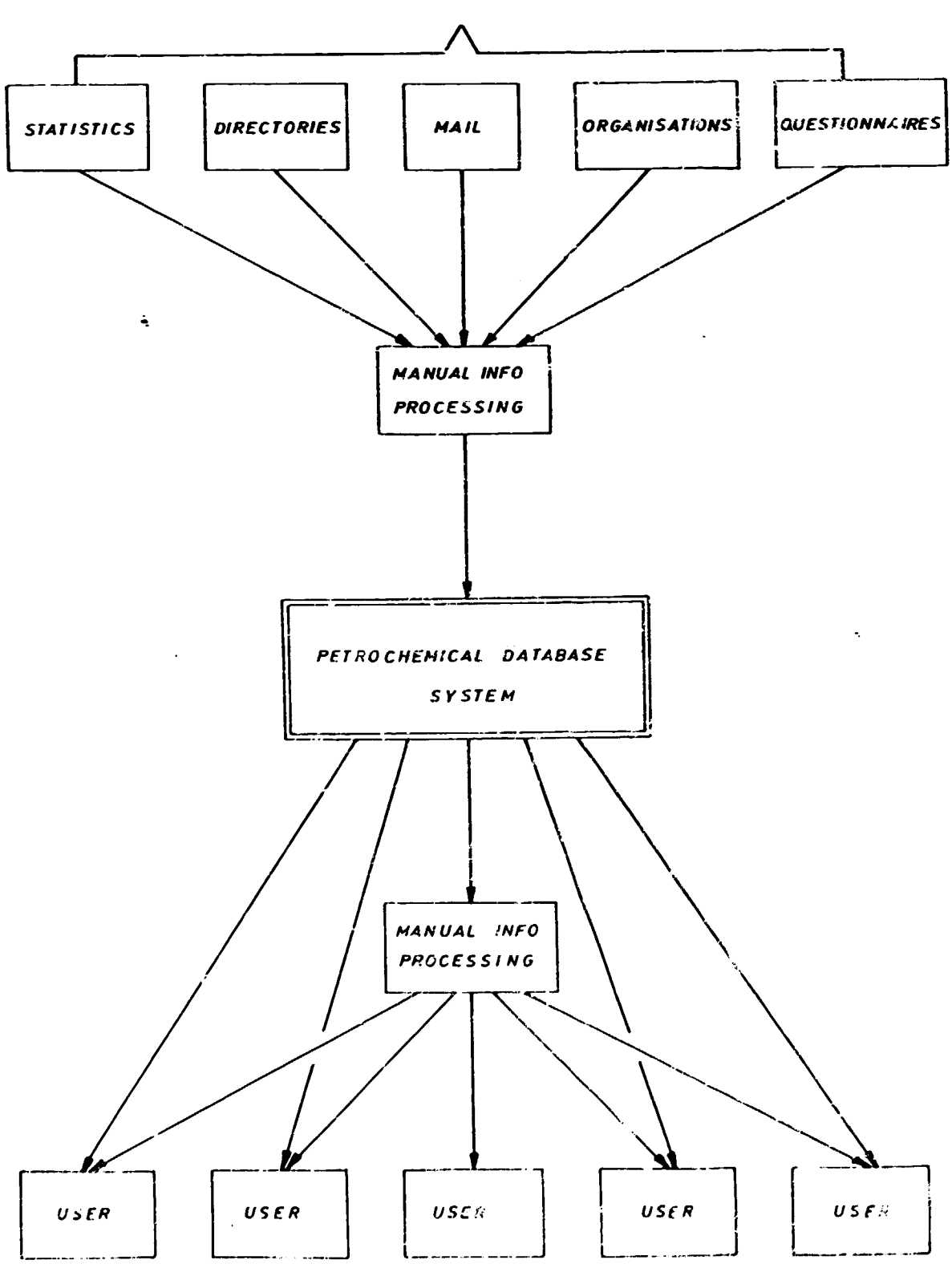
4.3./Human resources.

In view of the volume of information to be handled, taken into account the correspondance with the users too, once the system is installed, one expert and one operator who is doing the secretarial work for the whole correspondance would be needed. Another possibility is to use a petrochemical expert doing other jobs too for the correspondance and the daily routine work while the processing of the information thus collected and preprocessed should be definitively processed and put in computer usable form by a consultant hired for about six months for every year. The operator-secretary is needed for the whole year in both cases.

5./THE PETROCHEMICAL DATABASE SYSTEM.

5.2./System structure

Based on the requirements discussed in the previous paragraphs, the database system should adopt the following structure (Fig.5.)



the different information coming from the sources of information discussed above and presented in the upper line of the Fig.5. enter the manual processing stage. Here the petrochemical expert performs the necessary screening, selection, checking, cross-checking, coding and preparation for data entry. He must therefore have not only a thourough knowledge of the petrochemical industry, processes and companies, but also an adequat expertise in the database system.

The information thus processed by the expert is ready for data entry in the database system by the data entry operator, who can be a typist with a limited training in the database system.

The whole petrochemical database system once established and constantly updated serves two purposes.

First the expert and through him the different parts of the UNIDO Secretariat can have acces to the data contained in the system, can perform various analysises and studies leading to meanirgful conclusions and deductions on the petrocnemical industry, including forecasts and market estimations. He can also use the system to give information, advice and other services for those outside the UNIDO Secretariat, especially in the developing countries, who do not intend to have their own copy of the system.

Second, potential users ouside the Secretariat can acquire the system on diskettes or on other apuropriate information carriers and use directly by themselves for the same purposes. A constant regular updatino service is a precondition for this use.

5.2./Data entry.

In order to avoid any possibility to tampering with the data contained in the system and and secure its reliability, the following three basic principles should be adhered to:

-all data for entry should be checked and confirmed by the responsible petrochemical expert who prepares and signes the input data in form of records containing all the necessary information in a form directly readable by the computer;

-the computer prints a report on all data entry operations.The petrochemical expert must check and compare this report with the original data entry sheet The actual saving of the data in the appropriate files will be made only after his approval.

-only authorised person can make data entries.

The following type of inputs will be necessary:

-data file appending with new records;

-data record completion with new data;

-data record modification without saving the old data

-data file and record modification with shifting and saving the old data. This last operation is necessary every year for the yearly data files. The oldest year's data will be erased, the field names changed accordingly and for the newest data a new field created. The erased data will be saved on a background storage facility. This operation should be done by a programm named e.g."year change".

-name file append or modification

-data-index file append or modification

-code modification or new code allocation.

Three levels of authorisation are necessary:

data entry operator:
-has access to all data files for append, modify or complete records

data base administrator:
-has access to all name files and all data/index files
-initiates the "year change" programme;
-allocates and modifies passwords;
-allocates and modifies codes

Should any modification, interference or addition to the programme or file system become necessary, only the programmer is
authorised to intervene.

5.3./Outputs.

The system outputs serve for inquiries and data analysis purposes.

With the same safeguarding ideas in mind, the output system should work in the following manner:

-all the files are "read only" for the user;
-use begins with the creation of a workfile dedicated to the user who can if wishes so, make it inaccessible for others by attributing a password to the file. He can then copy any information from all the data files in his workfile, perform any operations on them, save and print it in tables or graphics.

Two types of workfiles can be created for the two different types of possible outputs: directory and data types. The first serve only searching and listing purposes (inquiry), while the second (data analysis) collects and displays data and can perform different operations in order to create new information.

All information transfer to the workfiles and all operation on them has to be completely user-friendly, menu-driven and simple to learn for non-computer people. This is made possible by the file and the programme system described below.

5.3.1./Directory type workfiles.

Data from the following datafiles can be listed,sorted and selected:

-enterprise directory (D8)
-plant directory (D6)
-unit (D5)
-process (D11)
-project (D10)
-references (D12)

Through the index files (see Fig 6. in the file system paragraph) the menus allow the selection of any or all data fields for transfer from the relevant data file. The records will be selected, sorted in the required sequence of parameters:

-activity
-country
-enterprise
-plant
-unit
-product
-process
-project

Not all parameters can be used for all data record sortings. The correspondence is presented in Table 1.

Table 1.

Correspondence of sorting parameters and data files.

parameter	D8	D6	D5	D11	D10	D12
activity	x	x	x	x	x	x
country	x	x	x	x	x	x
enterprise	x	x	x	x	x	x
plant			x	x	x	x
unit				x	x	
product	x	x	x	x	x	x
process	x	x	x		x	x
project	x	x	x	x		

No operation need to be performed on this type of workfiles. therefore further processing of the tables thus created is not foreseen. Normal editing facilities for these files as for all others should be provided.

5.3.2./Data type workfiles.

Three types of outputs are necessary:

-Simple display of the contents of one data file - complete or partial;
-Complete or partial display of the content of one file with operations performed on them
-Complete or partial display of the content of more than one data file with operations performed with them (combination of data)

The selection and sorting of the data records from the files should allow for all the possible combinations, as foreseen in the file record system by the index files (see File system, Fig.6.) The menu system should also follow the tree structure of the selection and sorting index files.

The operations to be performed on the data retrieved are discussed in the paragraph 5.5/ "Programme system."

The format of the Tables should be freely selected by the user. Graphic representation should be possible for all rows and columns of the tables with free choice among the different graph forms. For details, see paragraph 5.5./"Programme system".

5.4.File system.

The file system needed is described in Annex No.3. The structure is presented on Fig.6.

Four types of files are foreseen:

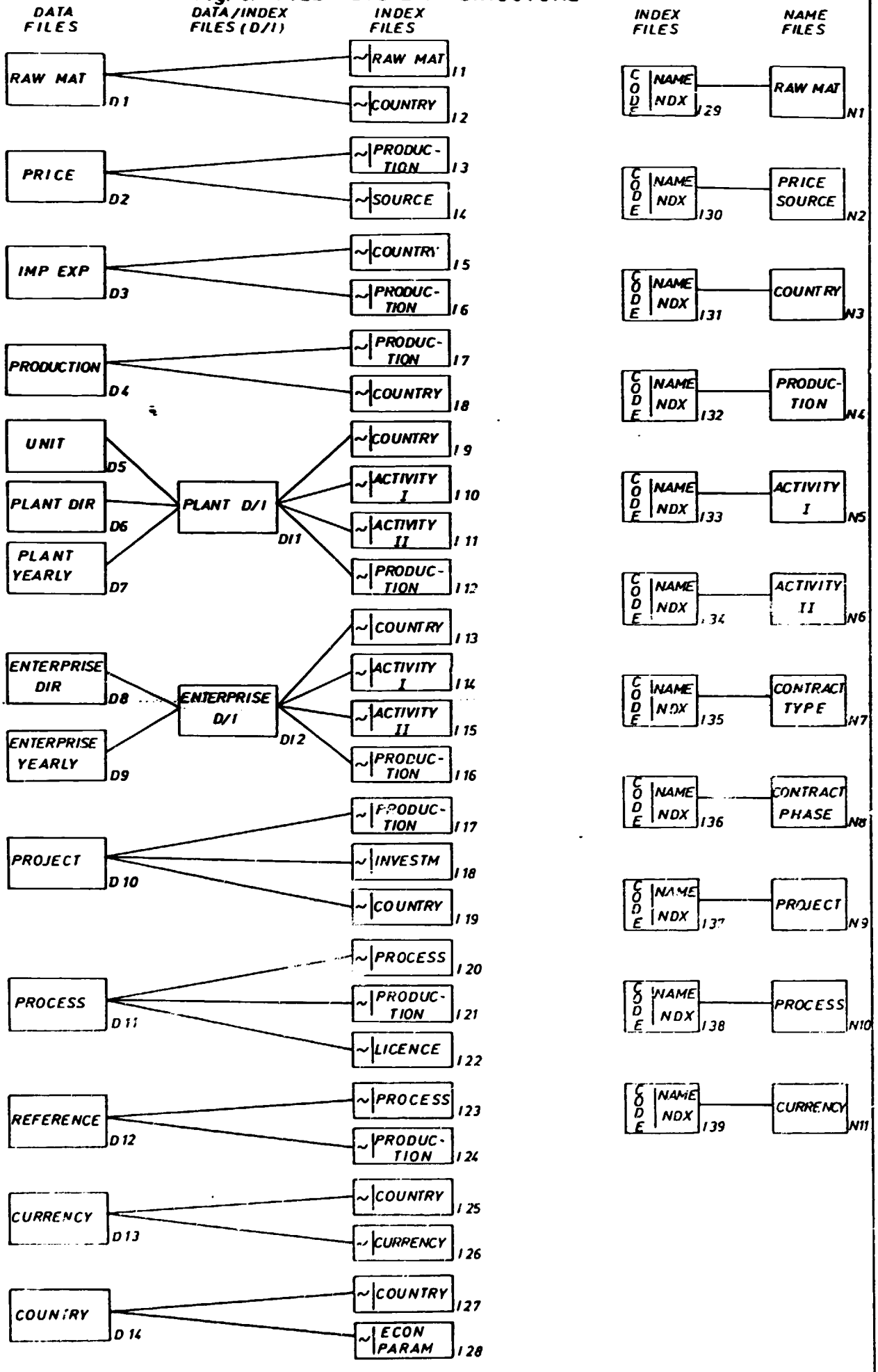
-data files;
-data-index files;
-name files
-index files

14 data files contain the information to be stored.

2 data-index files are provided in order to allow for quick retrieval of the most important data of the enterprises and swift link between enterprise-plant and unit data.

11 name files contain the codes and names used in the data and index files.

Fig. 6. FILE SYSTEM STRUCTURE



39 index files facilitate the quick access of the data file records according to the selection and sorting parameters chosen by the user. These files are automatically resorted by the programme after each imput operation performed. Most probably not all these index files will be necessary. The programmer should decide for every one of them whether the number of records justifies for quicker acces the creation of a separate index file.

The record structure is presented in Annex No.3.

5.5.Programme system.

The general structure of the programme system is represented in Fig.7. A short discussion will allow a better understanding of this structure and of its working.

After the start of the system, the main menu offers the choice between

-data entry, and database administration.
-inquiry, and
-data analysis

5.5.1.Data entry and data base administration.

This branch serves the updating, editing, completing the records in the files. Selection is offered for

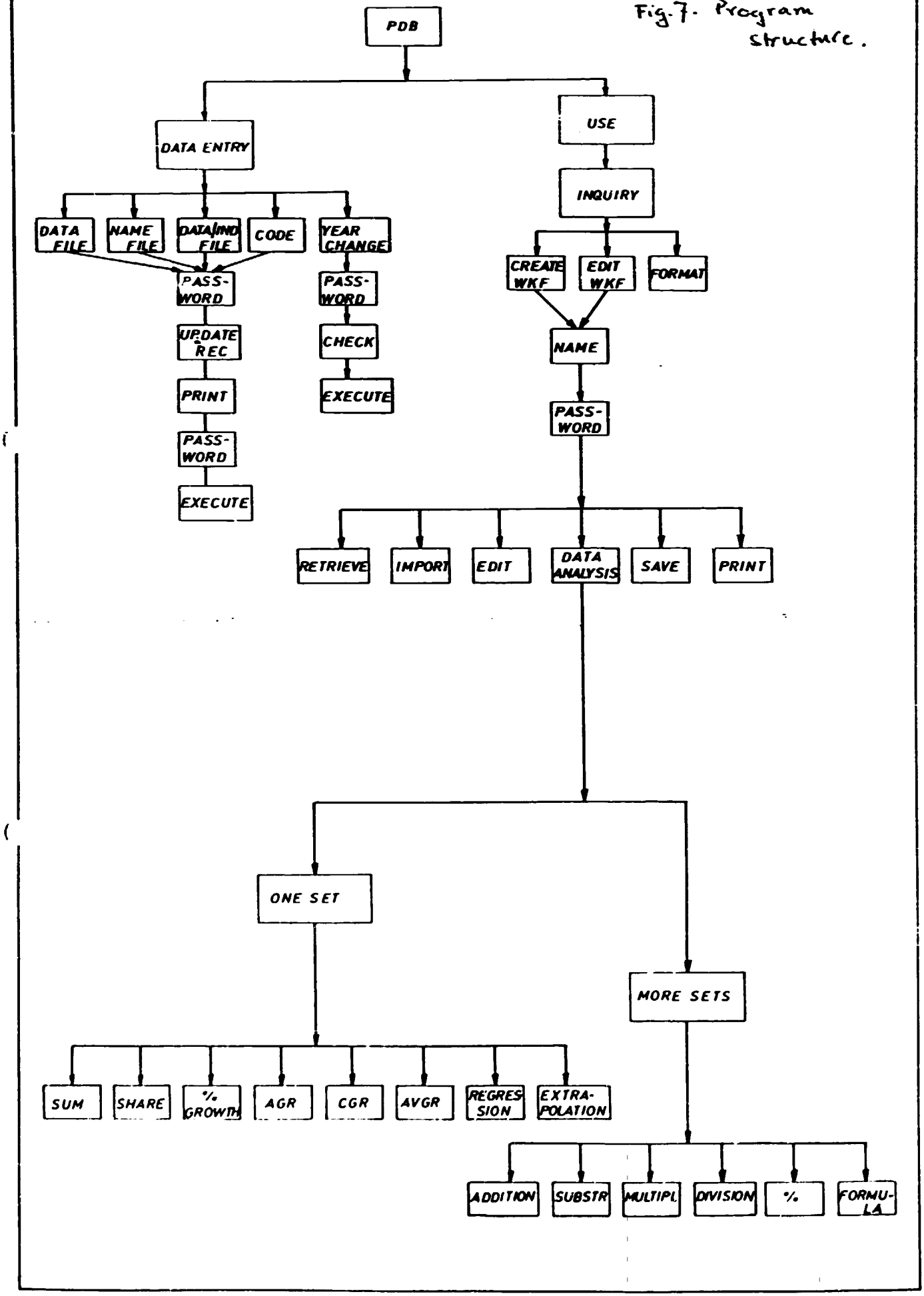
-datafiles;
-data-index files;
-name fields,
-codes, and
-"year change"

The password excludes unauthorised access to the input of the appropriate files.

For the first four cases, the following path is identical:
"create update records" retrieves the records sought. the operator introduces the necessary amendments.and the result update record constitues an interim file leaving the original files intact.
"print".The update interim file is printed. The printout is checked against the original update instructions, signed by the responsible expert and filed for documentation.
-"password" gives authorisation for the replacement of the original data by the updated ones , executed by the next instruction:
-"execute" The interim file is deleted at the same time.

For the "year change" the programme making yearly updating of all the file structures containing yearly data is activated. The column containing the oldest data is transferred to the background file and deleted from the active file. A new column is added for the new year, given appropriate title and left blank.

Fig. 7. Program structure.



The programme asks for the password, checks the presence of the relevant background memory device and if all right, executes the programme.

5.5.2./Use (Inquiry and data analysis).

The two functions follow the same path at the beginning.
The first step is the creation of a workfile with a name and -if requested - a password. Then choice is offered among creation of a new file, editing an old file and defining or modifying of the file structure and format.

The two first cases follow then the same path. The difference is only in the retrieval, wich is always necessary when an old file is edited, optional only with a new file (when additional data are required). Import from other databases is also an option for both cases. Retrieval can be partial by selection according to a series of successive parameters.

When all available data from the databases are introduced in the workfile new options open.

The inquiry path uses only the editing and format functions Normal editing allows any processing of the data by the user as one option. The file structure and format facility can be used here also to put the file in the desired shape.

On the data analysis path, new possibilities are offered. In order to facilitate the most current operations, special programmes could be developed which at a few keystrokes execute complex calculations. This can however be a later perfectionnement of the programme system.

The following operations are foreseen:

-Sum. Addition of the specified rows or columns. Subtotals up to 5 levels could be possible with placement of the results to specified fields.

-Share. Percentage of elements in the totals or subtotals, both for specified columns or rows.

-Trends. Four type of trend functions are foreseen:
  -percentage. All values in specified columns or rows are expressed in percentage of the basis value (also specified.
  -Gbk=annual growth rate
  -Gbk=compound growth rate for a specified period
  -Mbk= average growth rate for a specified period

-Regression. Linear regression for a specified period.

-Extrapolation of the regression function for the future period specified

The above operations are performed on one data set. It is often necessary to combine two - or more - different data sets in order to create a meaningful new data set.The following operations serve this purpose. The operations are conceived to perform on matrices, wich of ccurse can be reduced in the simplest case to one element. Addition, substraction, multipiication, division and percentage are the operations selected. For those, who can construct formulas corresponding to the desired relationship, a last facility is foreseen wich allows the use of any formula given by the user.

The programme system must be completed by all the usual facilities:

-Print
-Help
-Error message
-Save
-Export

For the graphics, it seems unnecessary and expensive to develop a proprietary system. The best solution would be to include a conversion program, which transforms the PDB file to a Lotus file and uses the Lotus graphic system.

The dialogue, menu and other textes used in the programm should be placed in separate text files. This will allow easy and simple adaptation of the system to different languages and character sets. So an edition of the system in different languages (e.g. spanish, french, russian, chinese or arabic) will be possible withouth any modification to the programmme system, exchanging only the corresponding text files and character sets (fonts).

ANNEX NO. I.

LIST OF PRODUCTS

LIST OF PRODUCTS.

1./RAW MATERIALS.

- crude oil
- naphta and gasoline
- lpg
- fuel oil
- natural gas
  - associated
  - non-associated
- ethane
- coal
- others

No enterprise level, only country level statistics from standard statistical sources.

2./PETROCHEMICAL PRODUCTS.

2.1.BASIC PETROCHEMICALS

2.1.1./Aliphatics.

Olefins

- ethylene
- propylene
- butadiene
- butenes
- other alkenes

Others

- methanol
- others

2.1.2./cyclics

- cyclohexane
- other cyclics

2.1.3./Aromatics

- benzene
- toluene
- xylenes
  - o
  - p
  - mixtes
- ethylbenzene
- naphtalene
- others

2.2./INTERMEDIATES.

2.2.1./Aliphatic compounds.

2.2.1.1./C1 compounds

formaldehide
formic acide
others

2.2.1.2./C2 compounds.

ethylalcohol
acetic acide/anhydride
acetic
acetale (acetic aldehyde)
ethylene oxide (etox)
ethylene glycol
others

2.2.1.3./C3 compounds.

propylene oxide
C3 alcohols
aceton
propylene glycol
others

2.2.1.4./C4 compounds.

maleic acid/anhydride
others

2.2.1.5./C5+ compounds.

alkanes
alkenes
oxoalcohols
polyols
fatty alcohols
fatty acids
others

2.2.1.6./ others

aliphatic alcohols
(except fatty alcohols)
aliphatic amines
chlorinated aliph.hydro-
carbons
others

2.2.2./ Cyclic

cyclohexanol
others

2.2.3./Aromatic compounds

phenole
cresole
aniline
stvrene
phtalic anhydride
terephtalic acid
chlorinated aromatics
nitro-aromatics
others

2.2.4./ Monomers

acrylonitril
VCM
VAcM
caprolactam
acrylates and
metacrviates
adipic acid
isocyanates
others

2.2.5./Others.

2.3./End products.

2.3.1./Plasics

2.3.1.1./Thermoplastics.

polyethylene HD
LD
LLD
polypropylene
PVC
PVAc
polystyrene
acrylics
polyurethans
others

2.3.1.2./Thermosetting

phenole-cresole-formalde-
hyde resins (PF)
urea-formaldehyde
resins(UF)
melamine resins
others

2.3.1.3./Non plastic resins.

epoxy
alkyds
esters
others

2.3.2./Elastomers

- polybutadiene
- polyisoprene
- SBR
- ABS
- others
- natural rubber

2.3.3./Fibres

- PAN (polyacrylonitril)
- nylon 6
- nylon 66
- polyester
- polypropylene
- others

2.3.4./Surfactants

2.3.5./Others

THESAURUS

THESAURUS.

This thesaurus of the petrochemical database is very simple, since the names used for the product are well established expressions, mostly the chemical name is used all over and no brand names or fancy denominations occur. For the other expressions, like company-, process-, country and other names, only one name is encountered without any chance for misunderstanding. So here we give the explanations where necessary, and alternatives where exist for the products enumerated in Annex No.1.

ACETALE = ACETIC ALDEHYDE = CH_3CHO

ACETIC ACID = CH_3COOH

ACETIC ALDEHYDE see ACETALE

ACETONE = C_3 KETONE

ALIPHATICS= Hydrocarbons and derivatives with open carbon chains.

ALKANES = Saturated aliphatic compounds

ALKENES = Aliphatic compounds with one double bond.

ANHYDRIDE ACETIC = $(CH_3CO)_2O$.

ANILINE = $C_6H_5NH_2$

ASSOCIATED NATURAL GAS= The natural gas extracted from the oil wells toghether with the crude oil.

BENZENE = C_6H_6

BUTADIENE = $CH_2=CH-CH=CH_2$.

BUTENES = C_4 olefins with one double bond.

COAL= All carbon containing solid fuel of all ages.

CRESOLS = Methylphenoles.

CRUDE OIL. Sometimes called improperly simply oil, the liquid hydrocarbon mixture extracted from the oil wells.

CYCLICS = Organic compounds with closed rings.

CYCLOHEXANE = Saturated ring formed by six carbon atoms.

CYCLOHEXANOL = Cyclohexane with one alcohol function.

DIESEL OIL = see FUEL OIL

DIMETHYLBENZENES = see XYLENES

ETHANE= C_2H_6

ETHANEDIOL see ETHYLENEGLYCOLE

ETHANOL see ETHYLALCOHOL

ETHENE= see ETHYLENE.

ETHYLALCOHOL = ETHANOL = CH_3CH_2OH

ETHYLBENZENE =$C_2H_5C_6H_5$

ETHYLENE = ethene= $CH_2=CH_2$

ETHYLENE GLYCOLE = ETHANEDIOL= CH_2OHCH_2OH

ETHYLENE OXIDE = ETOX = CH_2CH_2O

ETOX see ETHYLENE OXIDE

FATTY ACIDS= Linear aliphatic acids with long chains

FATTY ALCOHOLS = Linear aliphatic alcohols with long chains.

FORMALDEHYDE = METHANAL = CH_2O

FORMIC ACID = HCOOH

FUEL OIL=diesel oil. For our purposes, the fraction used for domestic heating and/or for diesel engines is belonging here.

GASOLINE= see NAPHTA

LPG= LIQUID PETROLEUM GASES. The fraction containing mainly propan and butan, separated either from natural gas or coming from refining.

METHANAL see FORMALDEHYDE.

METHANOL = METHYLALCOHOL = CH_3OH

METHYLALCOHOL see METHANOL

METHYLBENZENE = see TOLUENE.

METHYLPHENOLES see CRESOLS.

NAPHTA.=gasoline=petrol. For our purposes, the light liquid hydrocarbon fraction, whether separated from natural gas, or product of crude refining is included in this expression.

NAPHTALENE = Basic aromatic compound $C_{10}H_8$.

NATURAL GAS= the gas extracted from the wells containing mainly methan. Since in most cases other components are also present, the name sometimes used :METHAN is improper.

NON-ASSOCIATED NATURAL GAS= the natural gas coming from "dry" wells without crude oil production.

OLEFINS= Organic compounds with one or more double bond.

OXOALCOHOLS = All aliphatic saturated alcohols wich can be produced by oxo-synthesis.

PETROL=see NAPHTA

PHENOLE = C_6H_5OH

POLYOLS = Polyvalent alcohols.

PROPANE DIOL see PROPYLENE GLYCOLE

PROPENE= see PROPYLENE

PROPOX see PROPYLENE OXIDE

PROPYLENE= propene= $CH_3-CH=CH_2$.

PROPYLENE GLYCOLE =PROPANEDIOL

PROPYLENE OXIDE = PROPOX = C_3H_6O.

TOLUENE = methylbenzene $CH_3C_6H_5$

VAcM = VINYLACETATE MONOMER

VCM = VINYLCHLORIDE MONOMER

VINYLACETATE MONOMER = VAcM

VINYLCHLORIDE MONOMER = VCM

XYLENES = Dimethylbenzenes.

ANNEX No.3.

FILE SYSTEM

FILE SYSTEM.

The detailed description of the file system of the petrochemical database consists of

- the verbal description of the field names used
and
-the description of the file structures with the other characteristics of the fields.

1.VERBAL DESCRIPTION.

ACRONYM
Internationally used short name.

ACTIVITY I.
A code number characterising the activity type of a company. The same company may have several activities. The activity types are: manufacturing; R&D; engineering; contracting; training and other.

ACTIVITY II.
A code number characterising the activity field of a company. The same company may have several activities. The fields are as follows: basic aliphatics; basic aromatics; basic others; intermediate aliphatics; intermediate aromatics; intermediate monomers; intermediate others; plastics; elastomers; fibers; resins; surfactants; other end products.

ADRESS
The full postal adress used in correspondance.

ADRESSING
The form and content used in adressing the interested person

CAPACITY
The nominal capacity of a unit expressed in metric tons of main product per year. Always stored in tons/year.

CAPACITY LIMIT
The lower and upper limits, between which the process is industrially used and commercially profitable. expressed in metric tons/year of the main product.

CAPITAL
The nominal capital of the enterprise in millions of USD.

CODE
"xx CODE" denotes an internal integer number, derived by the programmer. It is used by the system to refer to one specific member of the xx set. Example:"Raw material code" for "natural gas":3.2.4 defines this material from the other raw materials.

CONTACT PERSON
The person charged with the contact with UNIDO.

CONTRACT TYPE
An integer number characterising the contract type as follows;
1=turnkey
2=semi-turnkey
3=cost reimbursable
4=lump sum
5=other

CONTRACTOR COMPANY
Enterprise engaged in building and constracting petrochemical plants.

COUNTRY
The countries selected from the UNIDO list of countries

CURRENCY
The name of the national currency of a given country.

ENGINEERING COMPANY
Enterprise engaged in in the design and engineering of petrochemical plants.

ENTERPRISE
A legal person engaged in petrochemical activity. Independent companies fully or partially owned by multinationals are considered as separate enterprises. Different plants of the same enterprise having no independent legal personality are grouped toghether within the same enterprise, but under the subgroups of "plants".

ENTERPRISE TYPE.
One of the followings: private co; limited liability co; unlimited partnership co; union; joint enterprise; company by shares.

EXCHANGE RATE
The yearly average exchange rate of a given national currency against the USD.

EXPORT IN TONS
The total quantity of the product exported by the given country in the given year, stored in metric tons.

EXPORT IN VALUE
The total value of the product exported by the given country in the given year, stored in million USD.

GROSS PROFIT
The sum from the corresponding heading in the account of the company. Value is stored in million USD.

IMPORT IN TONS
The total quantity of the product imported by the given country in the given year, stored in metric tons.

IMPORT IN VALUE
The total value of the product imported by the given country in the given year, stored in million USD.

INFORMATION DATE
Year and month of the information: yy.mm,

INFORMATION SOURCE CODE
An integer value as follows:
1=investor co
2=licensor co
3=engineering co
4=contractor co
5=literature

INVESTMENT COST
The total capital used for the project implementation (battery limits only).

INVESTMENT EXPENSES
The total sum of all the expenses occured either for own or subcontracted ~~research~~ and development work in investment
million USD.

LICENSOR
An enterprise having the legal right to licence a process.

MANAGEMENT
Chief executive. The person in charge of the direction at the highest level.

NAME OF A PERSON
The full name of the person as used in correspondance.

NAMES OF
-COUNTRY
-ENTERPRISE
-PLANT
-UNIT
PRICE REFERENCE POINT
The full name used internationaly to define the owner of the name.

NAMES OF
RAW MATERIALS
-PRODUCTS
The names listed in annex No.1.

PHASE CODE

An integer number as follows:

1=in preparation
2=in design
3=under construction
4=under comissionning
5=ready (operating)

PLANT

A locally defined part of the enterprise. It is composed of one or more production units.

PLANT SUBCODES

Integer number identifying one plant among those belonging to one enterprise.

POINTER

An internal software data defined and used by the computer program in order to find quickly the appropriate record from the system files.The user never meets these pointers.

PRICE

The international market price of a given product as published by the corresponding price reference point.

PRICE REFERENCE POINT

One of the maximum ten selected world market places publishing regular price information on petrochemical products.

PROCESS

A chemical process used in the petrochemical industry for manufacturing one product or a given set of products under given conditions and using specific equipment.

PRODUCT

Selected chemical compounds listed in Annex No.1.

PRODUCTION IN TONS

"Production of X":the quantity of X produced in the year in question. The numeric value is always stored in metric tons/year irrespectively of the input and output formats, defined by the program.

PRODUCTION IN VALUE

"Production of X":the value of X produced in the year in question. The numeric value is always stored in million ECU, irrespectively of the input and output formats, defined by the program.

PROJECT

An investment for the realisation of a petrochemical manufacturing unit.

RAW MATERIAL
The basic materials entering the petrochemical industry. enumerated in Annex No.1.

R&D EXPENSES
The total sum of all the expenses occured either for own or subcontracted research and development work in million USD.

REFERENCES
The code numbers of the manufacturing units given by the :
-contractor
-licensor
-engineering co
for his work for a given process.

RESERVES.
The quantity of the given raw material figuring under "proven reserves" in the international statistics, expressed in million tons.

SALES
The sum from the corresponding heading in the accounts of the company. Value is stored in million USD.

SPECIFIC VALUES
The quantities of byproducts; raw materials; and utilities produced. respectively consumed per ton of main product. Units are tons for the materials and utility units for the utilities, both per ton of main product

STAFF
Number of persons employed.

STANDARD CAPACITY
The typical and mostly used capacity for a given process. The investment costs and specific values refer to this capacity.

START-UP DATE
The year in which the unit started commercial production.

TELECOMMUNICATION
Telephon, telefax, telex, cable and electronic mail numbers. The full numbers are stored.

TURNOVER
The sum from the corresponding heading in the accounts of the company. Value is stored in million USD.

UNIT
A petrochemical production line serving for the manufacturing of a given product or of a given set of products.

UNIT SUBCODES

An integer number identifying one unit among those belonging to one plant.

VALUE ADDED

The sum from the corresponding heading in the accounts of the company. Value is stored in million USD.

2./FILE STRUCTURE.

While in the previous paragraph we defined the short names of the fields which are in our case identic with the field names and arranged them in alphabetical order for easy finding, the other characteristics of the individual files and fields are specified in form of tables in this paragraph. The field name is the link to the definitions.

The tables below are given for each data file. The name and index files are very simple and - for the latter - in most cases it seems that they will not be necessary. So for them only the structure was given.

The tables contain seven columns:

1./Number of the field
2./Name (data elements and data items)
3./L = lenght (storage ,number of bytes)
4./R = repeatability (number of repetitions)
5./MO = mandatory or optional
6./T = type , where : I = integer ; R = real;
A = text (alphanumeric);D = date
7./V = validation. For all data an identical validation process is applied, as described in the data entry.

2./ DATA FILES.

D1.Raw material data file:

Sequential, fix record length, variable file length, binary.

REC:		L	R	M	I	V
1./Raw material code		2	1	M	I	V
2./Country code		2	1	M	I	V
3./Production :	array(1..10)	4	10	0	R	V
4./Reserves :		4	1	0	R	V
END;						
		48				

10raw materials*100countries= 1000 records ---> 30000 bytes.

D2./Price data file.

Sequential, fix record length, variable file length, binary.

REC:						
1./Product code		2	1	M	I	V
2./Source code		2	1	M	I	V
3./Price code		2	1	M	I	V
4./Price	:array(1..10)	4	10	A	R	V
END;						
		46				

100products*10sources = 1000 records ----> 50000 bytes

D3./Impex data file.

Sequential, fix record length, variable file length, binary.

REC:						
1./Country code		2	1	M	I	V
2./Product code		2	1	M	I	V
3./export,ton/y	:array(1..10)	4	10	0	R	V
4./export,$/y	:array(1..10)	4	10	0	R	V
5./import,ton/y	:array(1..10)	4	10	0	R	V
6./import,$/y	:array(1..10)	4	10	0	R	V
END;						
		164				

100countries*100products = 10000 records ---> 1760000 bytes=1,7 Mbytes.

D4./Production data file.

Sequential, fix record lenoth, variable file lenoth, binary.

REC:

1./Unit code		4	1	M	I	V
2./Product code		2	1	M	I	V
3./production,ton/y	:array(1..10)	4	10	O	R	V
3./production,$/y	:array(1..10)	4	10	O	R	V
END;						
		86				

Average number of units/product=500
500units*100products = 50000 records ----> 5 Mbytes

D5./Production unit data file.

Sequential, fix record length, variable file length, binary.

REC:

Unit identification						
1./Enterprise code		2	1	M	I	V
2./Plant code		1	1	M	I	V
3./Unit code		1	1	M	I	V
4./Unit name		25	1	M	I	V
5./Unit acronyme		1	10	O	I	V
Contact person						
6./Correspondent name		30	1	M	I	V
7./	title	15	1	M	I	V
8./	tel.	12	1	O	I	V
Unit data						
9./Process code		2	1	M	I	V
10./Product codes	:array(1..5)	2	5	A	I	V
11./Licensor's code		2	1	M	I	V
12./Eng.Co. code		2	1	M	I	V
13./Contractor Co. code		2	1	M	I	V
14./Startup date		1	1	M	I	V
15./Investment cost		4	1	M	R	V
16./Capacity t/y		4	1	M	R	V
END;						
		111				

2000units = 2000 records ---> 200000 bytes = 0.2 Mbytes

D6./Plant directory file.

Sequential, fix record length, variable file length, binary.

REC:

	1./Plant code(including enterprise code)	4	1	M	I	V
	2./Plant name	40	1	M	I	V
	3./Acronyme	15	1	O	I	V
	Plant adress					
	4./street	20	1	O	T	V
	5./No	5	1	O	T	V
	6./City	20	1	O	T	V
	7./County	30	1	O	T	V
	8./Country	25	1	O	T	V
	9./P.O.Box	6	1	O	T	V
*	10./Area code	4	1	O	T	V
	11./Telex	4	1	O	T	V
	Telcommunication					
	12./Telephone	4	1	O	T	V
	13./Telefax	4	1	O	T	V
	Management					
	14./Management	30	1	O	T	V
	15./Title	15	1	O	T	V
	16./Telephone	4	1	O	T	V
	17./Correspondent	30	1	O	T	V
	18./Title	15	1	O	T	V
	19./Telephone	4	1	O	I	V
END;		277				

1000plants =1000 records ---->300000 bytes = 0.3 Mbytes

D7./Plant yearly information file.

Sequential, fix record length, variable file length, binary.

REC:

	1./Company code	2	1	M	I	V
	2./Plant code	2	1	M	I	V
	Data					
	3./Turnover :array(1..10)	40	10	O	R	V
	4./Value added :array(1..10)	40	10	O	R	V
	5./Sales	40	10	O	R	V
	6./Export :array(1..10)	40	10	O	R	V
END;		204				

1000 plants = 1000 records ---->200000 bytes = 0.2 Mbytes

D8./Enterprise directory file.

Sequential, fix record length, variable file length, binary.

REC:

	1./Company code	2	1	H	I	V
	2./Company name	40	1	H	T	V
	3./Acronyme	15	1	0	T	V
	Company adress					
	4./street	20	1	0	T	V
	5./No	5	1	0	T	V
	6./City	20	1	0	T	V
	7./County	30	1	0	T	V
	8./Country	25	1	0	T	V
	9./P.O.Box	6	1	0	T	V
*	10./Area code	4	1	0	T	V
	11./Telex	4	1	0	T	V
	Telcommunication					
	12./Telephone	4	1	0	T	V
	13./Telefax	4	1	0	T	V
	Management					
	14./Management	30	1	0	T	V
	15./Title	15	1	0	T	V
	16./Telephone	4	1	0	T	V
	17./Correspondent	30	1	0	T	V
	18./Title	15	1	0	T	V
	19./Telephone	4	1	0	T	V
	Staff					
	managerial					
	20./ local	4	1	0	I	V
	21./ expatriate	4	1	0	I	V
	technical					
	22./ local	4	1	0	I	V
	23./ expatriate	4	1	0	I	V
	clerical					
	24./ local	4	1	0	I	V
	25./ expatriate	4	1	0	I	V
	worker					
	26./ local	4	1	0	I	V
	27./ expatriate	4	1	0	I	V
	Finance-commerce	1	1	0	I	V
	28./Type and ownership	4	1	0	R	V
	29./Capital	4	1	0	I	V
	30./Activity					
END;		318				

500 enterprises =500 records ---->200000 bytes = 0.2 Mbytes

D9./Enterprise yearly information file.

Sequential, fix record length, variable file length. binary.

REC:

1./Company code		2	1	M	I	V
Data						
2./Turnover	:arrayAi..100	4	10	U	R	V
3./Value added	:arrayAi..100	4	10	U	R	V
4./Sales		4	10	U	R	V
5./Export	:arrayAi..100	4	10	U	R	V
END;		322				

500 enterprises = 500 records ---> 200000 bytes = 0.2 Mbytes

D10./Project data file.

Sequential, fix record length, variable file length. binary.

REC:

1./Project code		2	1	M	I	V
2./Info.source code		2	1	M	I	V
3./Date		2	1	M	D	V
4./Project name		20	1	M	T	V
5./Investor's code		2	1	M	I	V
6./Site code (plant)		3	1	M	I	V
7./Process code		2	1	M	I	V
8./Product code	:arrayAi..50	2	5	U	I	V
9./Capacity t/y		4	1	U	R	V
10./Investment cost (Millions US$)		4	1	U	R	V
11./Licensor's code		2	1	M	I	V
12./Eng.Co.'s code		2	1	M	I	V
13./Contractor's code		2	1	M	I	V
14./Contract type code		1	1	U	I	V
15./Stage code		1	1	U	I	V
16./Startup date		1	1	U	D	V
END;		50				

500projects = 500 records ---> 25000 bytes = 0.25 Mbytes

D11./Process data file.

Sequential, fix record length, variable file length, binary.

REC:

1./Process code		4	1	U	I
2./Info.source code		2	1	U	I
3./Date		4	1	U	D
4./Process name		20	1	U	I
5./Licensor's code		2	1	U	I
6./Product code (main)		2	1	U	I
7./Capacity range (t/y)	:array(1..2)	4	2	U	R
8./Standard capacity(t/y)		4	1	U	R
9./Investment cost (Millions US$)		4	1	U	R
Specific values					
Byproducts					
10./code	:array(1..4)	2	4	U	I
11./t/t	:array(1..4)	4	4	U	R
Raw mat. cons.					
12./code	:array(1..4)	2	4	U	I
13./t/t	:array(1..4)	4	4	U	R
Utilities					
14./Power, kwh/t		4	1	U	R
15./Steam,t/t		4	1	U	R
16./Process water m3/t		4	1	U	R
17./Cooling water m3/t		4	1	U	R
18./References	:array(1..50)	4	50	U	I
END;			304		

500 processes = 500 records ----> 300000 bytes =0.3 Mbytes

D12./Reference data file.

Sequential, fix record length, variable file length, binary.

REC:

1./Enterprise code		4	1	U	I
2./Plant code		2	1	U	I
3./Product code		4	1	U	I
4./Process code		2	1	U	I
5./References	:array(1..50)	4	50	U	I
END;			204		

100(enterprise-plants)*20processes (average) = 2000 records =>
0.4 Mbytes

D.13/Currency exchange rate file.

Sequential, fix record length, variable file length. binary.

REC:						
1./Currency code		2	1	M	I	V
2./currency/US$ exch rate :						
	array(1..10)	4	10	M	R	V
END:						
		42				

100currencies*42=4200 bytes

D14./Country data file.

Sequential, fix record length, variable file length, binary.

REC:						
1./Country code		2	1	M	I	V
2./GDP	array(1..10)	4	10	M	R	V
3./Population		4	1	M	R	V
4./Total exports	array (1..10)	4	10	M	R	V
5./Total imports	array (1..10)	4	10	M	R	V
		126				

100 countries*126 ----------> 15 kbytes

Di1./Enterprise data/index file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Enterprise code	2
2./Acronyme	16
3./Plant subcodes :array(1..32)	32
4./Index to plant data/index records :array(1..32)	32
5./Index to enterprise directory data file record	4
6./Index to enterprise yearly data file record	4
END:	90

500enterprises*90---->45000 bytes

Di2./Plant data/index file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Enterprise code	2
2./Plant code	1
3./Acronyme	16
4./Unit subcodes :array(1..20)	20
5./Index to unit data/index records :array(1..20)	20
6./Index to plant directory data file record	4
7./Index to plant yearly data file record	4
END:	67

1000plants*67---------->67000 bytes

III.NAME FILES.

N1./Raw material name file.

Sequential, fix record length, variable file length, binary.

	bytes
REC:	
1./Raw material code	2
2./Raw material name	23
END;	25

10raw materials*25=250 bytes

N2./Source name file.

Sequential, fix record length, variable file length, binary.

	bytes
REC:	
1./Price source code	2
2./Price source name	23
END;	25

10sources*25=250 bytes

N3./Country name file.

Sequential, fix record length, variable file length, binary.

	bytes
REC:	
1./Country code	2
2./Country name	23
END;	25

100countries*25=2500 bytes.

N4./Product name file.

Sequential, fix record length, variable file length, binary.

	bytes
REC:	
1./product code	2
2./product name	23
END;	25

100product*25=2500 bytes

N5./Activity I name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Activity I code	1
2./Activity I name	14
END:	15

5activityI*15=90 bytes

N6./Activity II name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Activity II code	1
2./Activity II name	14
END;	15

15activityI*15=225 bytes

N7./Contract type name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Contract type code	1
2./Contract type name	14
END;	15

10contract type*15=150bytes

N8./Project stage name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Project stage code	1
2./Project stage name	14
END;	15

10project stage*15=150bytes

N9./Project name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Project code	1
2./Project name	14
END;	15

300project names*15=4500bytes

N10./Process name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Process code	1
2./Process name	14
END;	15

500process names*15=7500bytes

N11./Currency name file.

Sequential, fix record length, variable file length, binary.

REC:	bytes
1./Currency code	1
2./Currency name	14
END;	15

100currencies*15=1500bytes

I1./Raw material record sort by countries Index file.

Sequential, fixed record length, variable length file.

		bytes
REC:		
1./Country code	SORT!	2
2./Raw material code		2
3./Index to raw mat.data record		4
END;		8

100countries*10raw materials=1000 records

I2./Raw material record sort by raw materials Index file.

Sequential, fixed record length, variable length file.

		bytes
REC:		
1./Raw mat. code	SORT!	2
2./Country code		2
3./Index to raw mat.data record		4
END;		8

100countries*10raw materials=1000 records

I3./Price data record sort by price sources Index file.

Sequential, fixed record length, variable length file.

		bytes
REC:		
1./Price source code	SORT!	2
2./Product code		2
3./Index to price data record		4
END;		8

10price sources*100products=1000 records

I4./Price data record sort by products Index file.

Sequential, fixed record length, variable length file.

		bytes
REC:		
1./Product code	SORT!	2
2./Price source code		2
3./Index to price data record		4
END;		8

10price sources*100products=1000 records

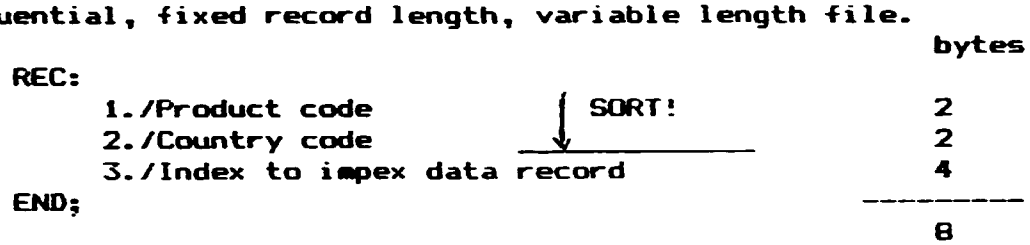
I5./Impex data record sort by countries Index file.

Sequential, fixed record length, variable length file.

100countries*100products=10000 records

I6./Impex data record sort by products Index file.

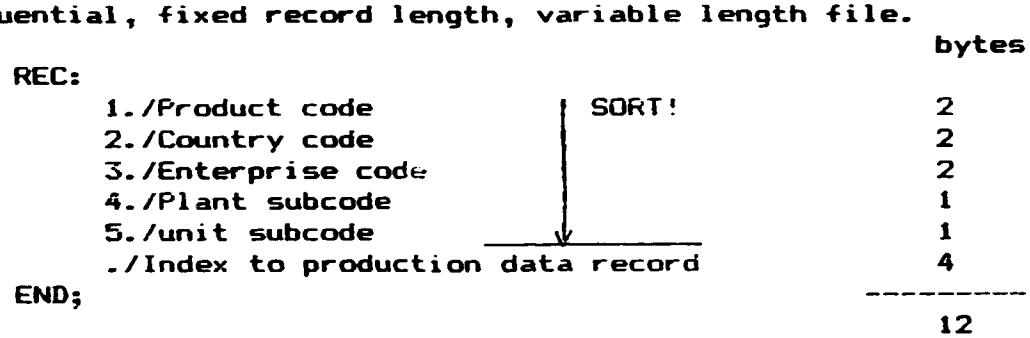
Sequential, fixed record length, variable length file.



100countries*100products=10000 records

I7./Production records sort by products Index file.

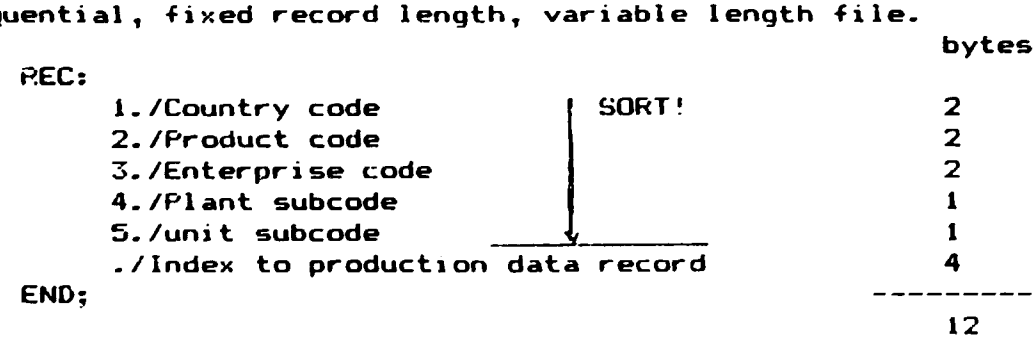
Sequential, fixed record length, variable length file.



100products*500 units=5000 records------ ß 60000 bytes

I8./Production records sort by countries Index file.

Sequential, fixed record length, variable length file.



100products*500 units=5000 records------> 60000 bytes

I13./Enterprise data/index records sort by countries Index file.

Sequential, fixed record length, variable length file.

```
                                                          bytes
    REC:
         1./Country code            | SORT!                2
         2./Enterprise code         |                      2
         3./Index to enterprise data/index record          4
    END;                                                  ---------
                                                              8

500units*---------------------------->  4000 bytes
```

I14./Enterprise data/index records sort by activities (I) index file.

Sequential, fixed record length, variable length file.

```
                                                          bytes
    REC:
         1./Activity I code         | SORT!                2
         2./country code            |                      2
         3./Enterprise code         |                      2
         4./Index to enterprise data/index record          4
    END;                                                  ---------
                                                              10

500units*2=1000 records-------------->  10000 bytes
```

I15./Enterprise data/index records sort by activities (II) index file.

Sequential, fixed record length, variable length file.

```
                                                          bytes
    REC:
         1./Activity II code        | SORT!                2
         2./country code            |                      2
         3./Enterprise code         |                      2
         4./Index to enterprise data/index record          4
    END;                                                  ---------
                                                              10

500enterprises*4=2000 records-------------->  20000 bytes
```

I16./Enterprise data/index record. sort by products Index file.

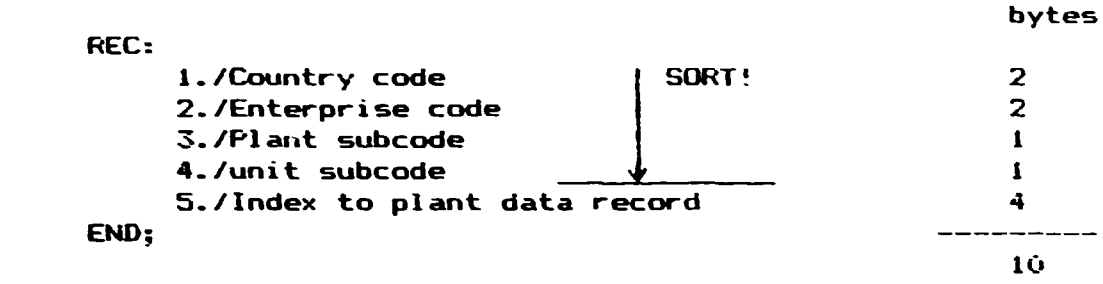
Sequential, fixed record length, variable length file.

```
                                                          bytes
    REC:
         1./Product code            | SORT!                2
         2./country code            |                      2
         3./Enterprise code         |                      2
         4./Index to enterprise data/index records         4
    END;                                                  ---------
                                                              10

500enterprises*20=10000records-------->  100000 bytes
```

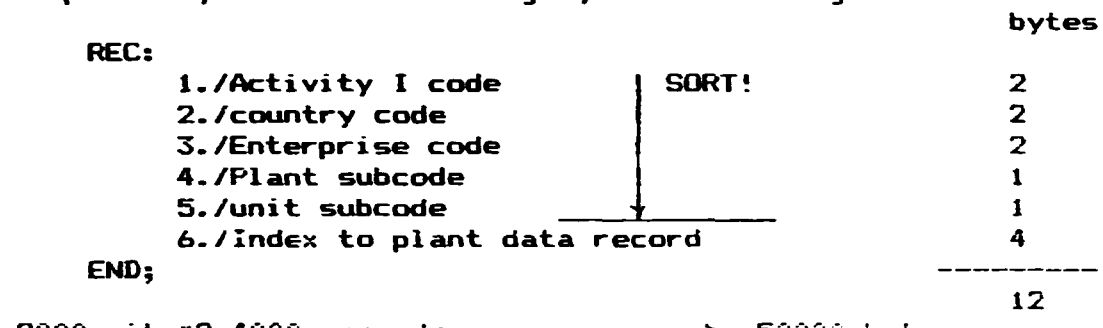
I9./Plant data /index index record sort by countries index file.

Sequential, fixed record length, variable length file.



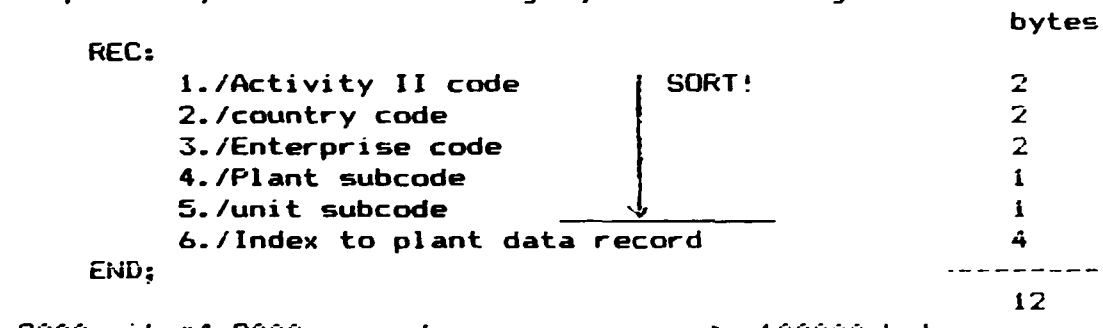
I10./Plant data/index records sort by activities (I) index file.

Sequential, fixed record length, variable length file.



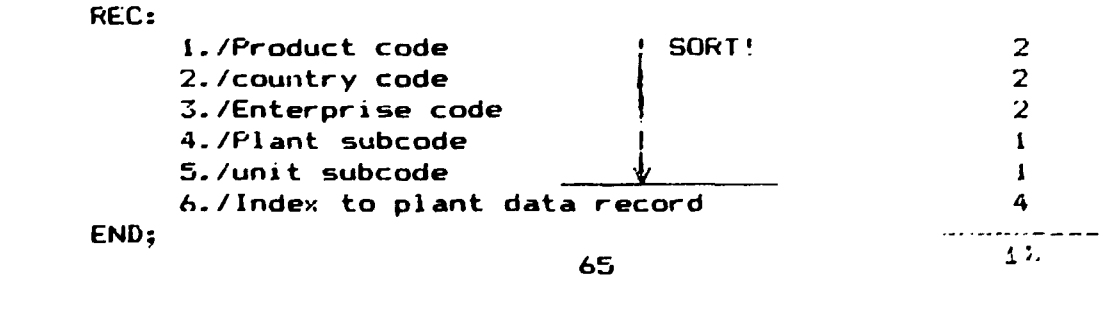
I11./Plant data/index records sort by activities (II) Index file.

Sequential, fixed record length, variable length file.



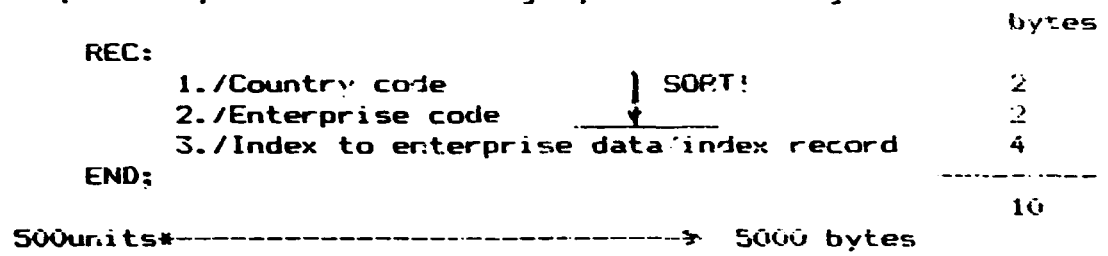
I12./Plant data/index records sort by products Index file.

Sequential, fixed record length, variable length file.



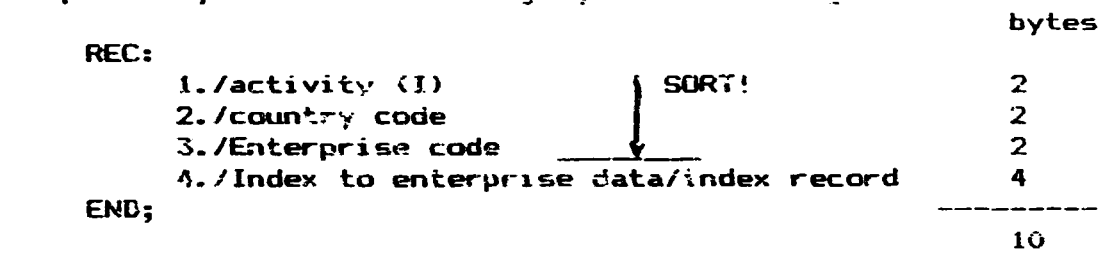
I13./Enterprise data /index record sort by countries index file.

Sequential, fixed record length, variable length file.



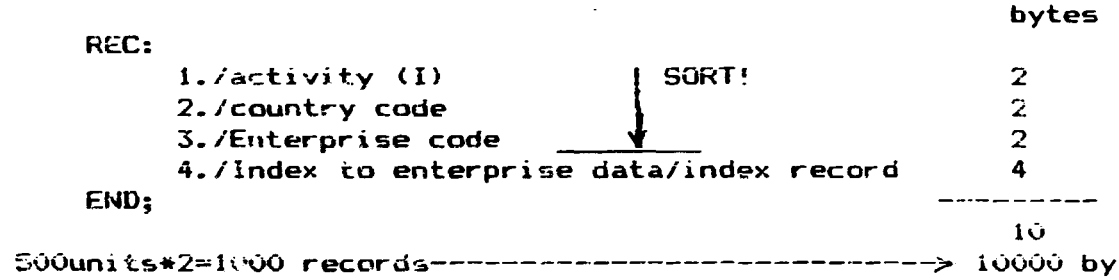
I14./Enterprise data /index record sort by activities (I) index file.

Sequential, fixed record length, variable length file.



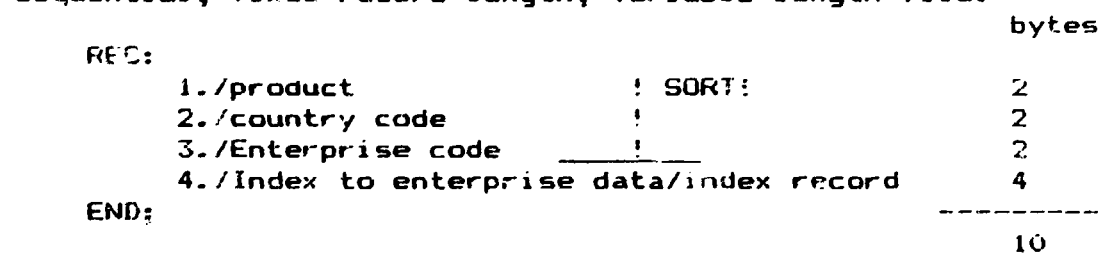
I15./Enterprise data /index record sort by activities (II) index file.

Sequential, fixed record length, variable length file.



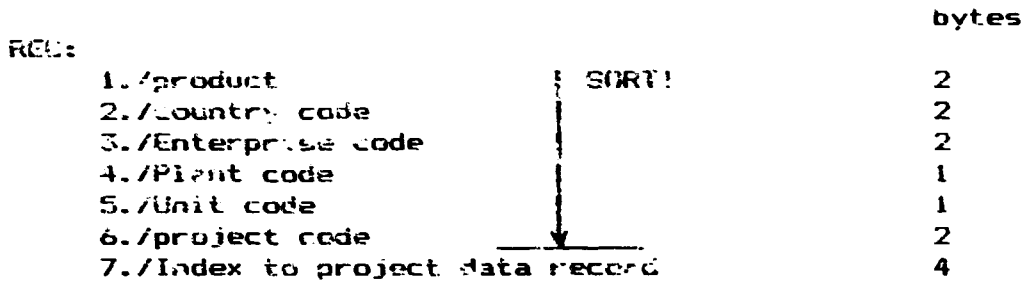
I16./Enterprise data/index record sort by products index file.

Sequential, fixed record length, variable length file.



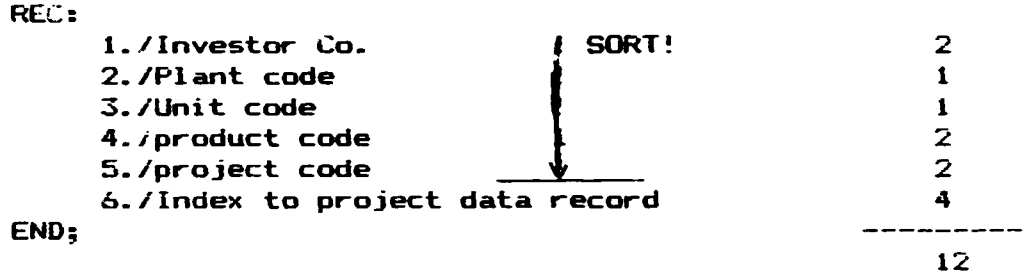
I17./Project data record sort by products index file.

Sequential, fixed record length, variable length file.



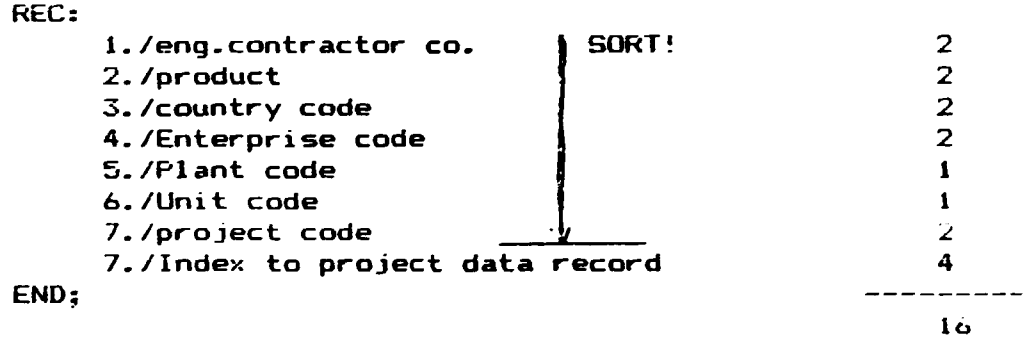
I18./Project data record sort by investor index file.

Sequential, fixed record length, variable length file.



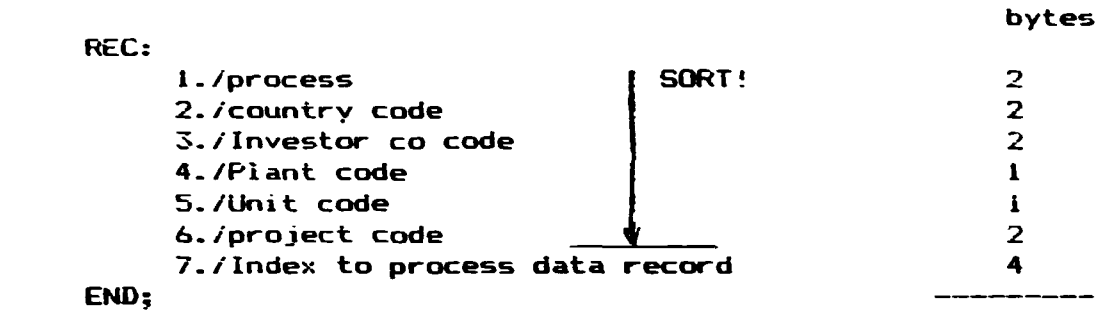
I19./Project data record sort by eng.contractor index file.

Sequential, fixed record length, variable length file.



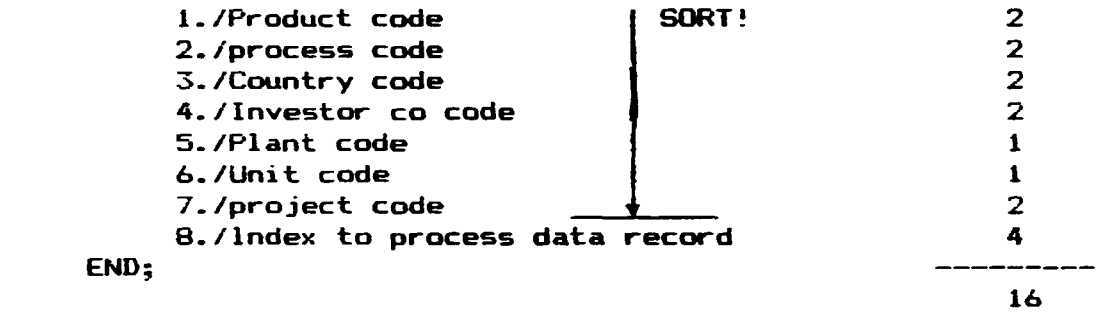
I20./Process data record sort by process index file.

Sequential, fixed record length, variable length file.



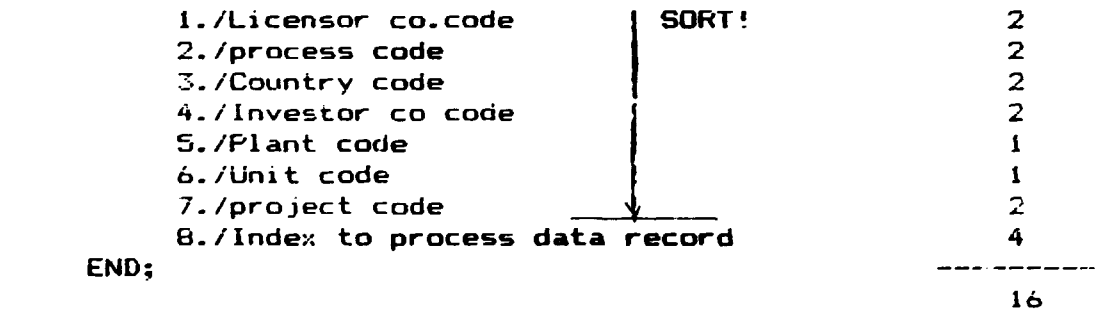
I21./Process data record sort by product index file.

Sequential, fixed record length, variable length file.



I22./Process data record sort by licensor index file.

Sequential, fixed record length, variable length file.



I23./Reference data record.sort by processes Index file.

Sequential, fixed record length, variable length file.

REC:		bytes
1./Licensor(engcontr)code	SORT!	2
2./process code		2
3./Country code		2
4./Investor co code		2
5./Plant code		1
6./Unit code		1
7./project code		2
8./Index to reference data record		4
END;		16

500processes*4=2000records----------> 32000 bytes

I24./Reference data record.sort by products Index file.

Sequential, fixed record length, variable length file.

REC:		bytes
1./Product code	SORT!	2
2./Process code		2
3./Country code		2
4./Investor co code		2
5./Plant code		1
6./Unit code		1
7./project code		2
8./Index to reference data record		4
END;		16

500processes*4=2000records----------> 32000 bytes

I25./Currency exchange data record sort by countries Index file.

Sequential, fixed record length, variable length file.

REC:		bytes
1./Country code	SORT!	2
2./Currency code		2
3./Index to currency data record		4
END;		8

100currencies----------> 800bytes

I26./Currency exchange data record sort by currencies Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Currency code !SORT!	2
2./Country code	2
3./Index to currency data record	4
END;	8

100currencies ----------> 800bytes

I27./Raw material name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Raw material code !SORT!	2
2./Index to raw material name record	4
END;	6

100currencies----------> 600bytes

I28./Price souce name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Price source code !SORT!	2
2./Index to price source name record	4
END;	6

10price sources----------> 60bytes

I29./Country name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Country code !SORT!	2
2./Index to country name record	4
END;	6

100countries ----------> 600bytes

I30./Product name record sort index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Product code ↓SORT!	2
2./Index to product name record	4
END;	6

100products ------->3600bytes

I31./Activity(I) name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Activity(I)code ↓SORT!	2
2./Index to activity(I) name record	4
END;	6

6activities ----------->336bytes

I32./Activity(II) name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Activity(II)code ↓SORT!	2
2./Index to activity(II) name record	4
END;	6

13activities ----------->3100bytes

I33./Contract type record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Contract type code ↓SORT!	2
2./Index to contract type name record	4
END;	6

10contract types ------->360bytes

I34./Contract stade name record sort index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Contract stade code ↓SORT!	2
2./Index to contract stade name record	4
END;	6

10contract types --------→660bytes

I35./Project name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Project code ↓SORT!	2
2./Index to project name record	4
END;	6

500projects --------→3000bytes

I36./Process name record sort index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Process code ↓SORT!	2
2./Index to process name record	4
END;	6

500processes --------→3000bytes

I37./Currency name record sort Index file.

Sequential, fixed record length, variable length file.

	bytes
REC:	
1./Currency code ↓SORT!	2
2./Index to currency name record	4
END;	6

100currecies --------→600bytes

LIST OF PETROCHEMICAL PERIODICS

LIST OF PETROCHEMICAL PERIODICS.

The following list contains the most important periodics from the point of view of our petrochemical database. It is not exhaustive. The work can be started with these periodics and gradually extended, if and where necessary, to other periodics.

CHEMICAL AND ENGINEERING NEWS	USA
THE CHEMICAL ENGINEER	UK
CHEMICAL ENGINEERING	USA
CHEMICAL ENGINEERING PROGRESS	USA
CHEMICAL MARKETING REPORTER	USA
CHEMIE ANLAGEN UND VERFAHREN	GFR
CHEMIE INGENIEUR TECHNIK	GFR
CHEMISCHE INDUSTRIE	GFR
CHEMISCHE TECHNIK	GDR
ENGINEERING COSTS AND PRODUCTION ECONOMICS	HOLL
ERDOHL UND KOHLE ERDGAS-PETROCHEMIE	GFR
EUROPA CHEMIE	GFR
EUROPEAN CHEMICAL NEWS	UK
EUROPEAN PLASTICS NEWS	UK
HIMITCHESKAYA PROMYSLENNOST	USSR
HIMITCHESKAYA I NEFTYANOYE MASINOSTROENIE	USSR
HYDROCARBON PROCESSING	USA
MANUFACTURING CHEMIST	UK
MODERN PLASTICS INTERNATIONAL	USA
MULL UND ABFALL	GFR

NITROGEN	UK
PETROCHEMICAL NEWS	USA
PETROLEUM ECONOMIST	UK
PLASTE UND KAUTSCHUK	GDR
PLASTICS AND RUBBER WEEKLY	UK
PLASTICS INDUSTRY NEWS	JAP
PLASTICS TECHNOLOGY	USA
PLASTICS WORLD	USA
PLASTITCHESKIE MASSY	USSR
PROCESS ENGINEERING	UK

QUESTIONNAIRES

GENERAL REMARKS.

For the information collecting from the developing countries, the use of questionnaires is foreseen. In order to cover the whole field of the necessary information and facilitate the work of the people involved both in the filling in and in the processing, five separate questionnaires were prepared. All of them have in common the following features:

Three different kind of information is distinguished:

-intern information,
-constant information,
-yearly information.

Intern information is filled in and used exclusively by UNIDO. The partner has nothing to do with them. They are mainly codes for the data processing in the microcomputer. On the questionnaires they are placed in a box limited by double lines.

Constant information is relatively constant, changing only occasionally. They will be stored in the computer only with their last updated value, the former ones will be lost at every updating. These are mainly directory data (adress etc.). The questionnaires will contain, when sended to the partners, the latest data in the database for checking and eventual correction, and place is reserved for these corrective entries.

Yearly data contain the statistical information. Here the previous data will be maintained in the computer for ten years. The older data will not be discarded but stored on a background memory (archive, e.g.tape). The partner will receive on the questionnaire the data for th last five years filled in for cheking and evenual correction, while the current year will be blank for filling in.

The following questionnaires will be used:

-No.1. :General information on the enterprise;
-No.2. :Information on the plant;
-No.3. :information on the production unit;
-No.4. :Project information;
-No.5. :Process information.

Questionnaire No.1. deals with the general information on the enterprise as a whole without any details on the individual plants, offices, and research centers belonging to the company. A list of all these plants etc. serves for checking the completness of the information. It is intended for all enterprises of the petrochemical industry, in manufacturing, engineering, consulting, R&D, licensing or other activity.

Questionnaire No.2. It is intended for all separate plants, offices, and research centers of the enterprises. The information content is very similar to the previous one.

Questionnaire No.3. In order do deal simply and efficiently with the information on the production characteristics and statistical data, a separate questionnaire was set up for the individual production units. It concerns only the manufacturing units.

Questionnaire No.4. This is intended for all companies and gives information on the investments going on in the industry. Information will come from the engineering-contactors for one side and from the investors for the other. This will allow for cross-checking. In order to avoid duplication in the work of the partners, the grass-root investment projects will be reported by the headquarters, the new production units by the plants and the revampings and major capacity extensions by the production units. Minor investments will be excluded. Appropriate instructions will be included in the explanations given with the questionnaires.

Questionnaire No.5. This is intended first of all for the licensors. Later on it can be extended to the production unit in order to collect actual industrial data wich can be confronted with the guaranted data of the licensor.

INSTRUCTIONS FOR USE.

Questionnaire No.1.

1./Please leave blanc.

2./Please check for correctness, if not correct or complete, give the right information on the lines immediately below, left for this purpose.

3./Means also district, department or other geographic-administrative entity in the country.

4./ The person in charge of the direction of the whole enterprise: e.g. Director General; President-Directeur Generale (French) etc.

5./Please, place a cross where appropriate.

6./Type:

M for a manufacturing plant
R for a R&D center
T for a tecnical office
C for a commercial office
O for an other kind of organisation

7./Indicate the appropriate figures.

Questionnaire No.2.

1./Please leave blanc

2./Please check for correctness, if not correct or complete, give the right information on the lines immediately below, left for this purpose.

3./Means also district, department or other geographic-administrative entity in the country.

4./ The person in charge of the direction of the whole enterprise: e.g. Director General; President-Directeur Generale (French) etc.

5./Please, place a cross where appropriate.

6./Indicate the number of employes for each category.

7./Indicate the appropriate figures.

Questionnaire No.3.

1./Please leave blanc

2./Please check for correctness, if not correct or complete, give the right information on the lines immediately below, left for this purpose.

3./Value in 1000 US$.

4./Quantity in 1000 metric tons .

Questionnaire No.4.

1./Please leave blanc

2./ Headquarters arte asked to report grass-root investment projects.

Plants are asked to report new production units on their site.

Production units are asked to report revampings, capacity extensions or major modifications. Minor investments without marked effect on the main parameters should be omitted.

Questionnaire No.5.

1./Please leave blanc.

2./Give the range, where the process is industrially used and commercially profitable.

3./The capacity mostly used and for wich the typical investment cost can be given.

4 /Specify the main by-products and raw materials. hose having minor influence on the economics of the process should be omitted.

UNIDO	QUESTIONNAIRE NO.1.	PDB

GENERAL INFORMATION ON THE ENTERPRISE

CODES:[1]
Company:.... Plant:..... Country:..... Activity:..... Date:....

1./CONSTANT INFORMATION[2]

1.1./General Information. (Directory)

COMPANY name: _____

.....

acronyme: _____

.....

Headquarter adress:

Street: _____ No: _____

....

City: _____ P.O.B.: _____

....

County:[3] _____ Telex: _____

....

Area code: _____ Telef: _____

....

Telefax: _____ E.mail: _____

....

Chief executive officer[4]:

Name: _____

.....

title: _____ Telef: _____

Contact person:

name: _____

.....

title: _____ Telef: _____

....

Please list the professional-,national-,regional-,international- and other organisations, where your company is a member or has any connection with them:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Please list the manufacturing plants, R&D centers, technical offices,and commercial offices belonging to your enterprise:

NAME	ADRESS	TYPE[4]
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

1.2. Main characteristics.

Capital:.....Millions USD

Enterprise type: Private co. Limited liabilty co. Unlimited partnership co.
Union Joint enterprise Company by shares
(Please underline the corresponding definition)

Ownership: (percentage participation)

1./private.....% state.....%

2./national.....% foreign.....%

Staff composition	Number of empoyees: nationals	expatriates	total
Managerial	_____	_____	_____
	.....	.....	.....
Clerical	_____	_____	_____
	.....	.....	.....
Technical	_____	_____	_____
	.....	.....	.....
Manual	_____	_____	_____
	.....	.....	.....
Total	_____	_____	_____
	.....	.....	.....

1.3./Activity.[3]

Product group	Manufact.	R&D	Eng.	Contr.	Trains.	Mgm.
1./Basic aliphatics						
2./Basic aromatics						
3./Basic others						
4./Intermediates aliph.						
5./Intermediates arom.						
6./Intermediates monomeres						
7./Intermediates others						
8./Plastics						
9./Elastomeres						
10./Fibres						
11./Resins						
12./Surfactants						
13./Other end products						

3./Yearly information (statistics)
(in millions of USD)

	Past years					Current year
	-5	-4	-3	-2	-1	
	18..	19..	18..	19..	19..	19..
Turnover						
Gross profit						
Added value						
R&D expenditure						
Investment expenditure						
Sales						
Exports						

UNIDO | QUESTIONNAIRE NO.2. | PDB

GENERAL INFORMATION ON THE PLANT.

CODES: [1]
Company:.... Plant:..... Country:..... Activity:..... Date:....

1./CONSTANT INFORMATION[2]

1.1./General Information. (Directory).

COMPANY name: _____

PLANT name: _____

acronyme: _____

Plant adress:

Street: _____ No: _____

City: _____ P.O.B.: _____

County: [3] _____ Telex: _____

area code: Telef:

Telefax: _____ E.mail: _____

Chief executive officer[4]:

Name: _____

.....

title: _____ Telef: _____

Contact person:

name: _____

.....

title: _____ Telef: _____

.....

Please list the manufacturing units of your plant:

Name	Code
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Staff composition.

	Number of empoyees: nationals	expatriates	total
Managerial	.....	.....	.....
Clerical	.....	.....	.....
Technical	.....	.....	.....
Manual	.....	.....	.....
Total	.....	.....	.....

1.3./Activity.[5]

Product group	Manufact.	R&D	Eng.	Contr.	Train.	Oth.
1./Basic aliphatics						
2./Basic aromatics						
3./Basic others						
4./Intermediates aliph.						
5./Intermediates arom.						
6./Intermediates monomeres						
7./Intermediates others						
8./Plastics						
9./Elastomeres						
10./Fibres						
11./Resins						
12./Surfactants						
13./Other end products						

3./Yearly information (statistics)
(in millions of USD)

	Past years					Current
	-5	-4	-3	-2	-1	year
	18..	19..	18..	19..	19..	19..
Turnover						
Gross profit						
Added value						
R&D expenditure						
Investment expendirure						
Sales						
Exports						

UNIDO	QUESTIONNAIRE NO.3.	PDi

INFORMATION ON THE PRODUCTION UNIT

CODES:

Company:.... Plant:..... Country:..... Activity:..... Date:....

1./CONSTANT INFORMATION

1.1./General Information. (Directory).

COMPANY name: _____
.....

Plant name: _____
.....

UNIT name: _____
.....

acronyme: _____
.....

Contact person:

Name: _____
.....

Title: _____
.....

1.2./Technical information.

Products:	Name	CODE
Main product		
Byproduct No.1.		
Byproduct No.2		
Byproduct No.3		
Byproduct No.4.		
Byproduct No.5.		

Capacity (expressed in main product tons/year):

Start-up date (year)

1.3./Investment information.

Investment cost (battery limits, Millions of USD: _____

Process name: _____

	NAME	CODE
Contributors:		
Licensor:	_____	_____
Engineering:	_____	_____
Contractor:	_____	_____

3./Yearly information (statistics)
(in tons/year)

Production.

	Past years					Current
	-5	-4	-3	-2	-1	year
	18..	19..	18..	19..	19..	19..
Main product						
Byproduct No 1.						
Byproduct No.2.						
Byproduct No.3.						
Byproduct No.4.						
Byproduct No.5.						

UNIDO | QUESTIONNAIRE NO.4. | PDB

PROJECT INFORMATION.

CODES:

Project code:_____ Information source code:_____ Date:_____

Please fill in a separate sheet for each ongoing project !

	NAME	CODE
Investor		
Process		
Product		
Licensor		
Engineering co		
Contractor co		

Capacity (in metric tons/year of main product): _____

Investment cost (in millions of USD): _____

Site name and adress: _____

Type of project:
- capacity extension
- revamping
- new investment on exising site
- grass root project

Phase of the project:
- in preparation
- in design
- under construction
- start-up
- completed

UNIDO | QUESTIONNAIRE NO.5. | PDB

PROCESS INFORMATION.

CODES:
Process code:_____ Information source code:_____ Date:_____

Please fill in a separate sheet for each process!

1.1./General information.

	NAME	CODE
Process	_____	_____
Licensor	_____	_____
Main product	_____	_____

Capacity range: from_____tons/year to_____tons/year

Standard capacity: _____tons/year

Investment cost for standard capacity: _____ Million USD

.2./Specific values. (for 1 ton of main product).

Byproducts:	NAME	TON/TON
No.1.		
No.2.		
No.3.		
No.4.		
No.5.		
Raw materials:		
No.1.		
No.2.		
No.3.		
No.4.		

Power	kwh/ton
Steam	ton/ton
Process water	m3/ton
Cooling water	m3/ton
Other energy	Mcoule/ton

Please attach all public information on the process: flow-sheets, process description, reference lists, etc.