

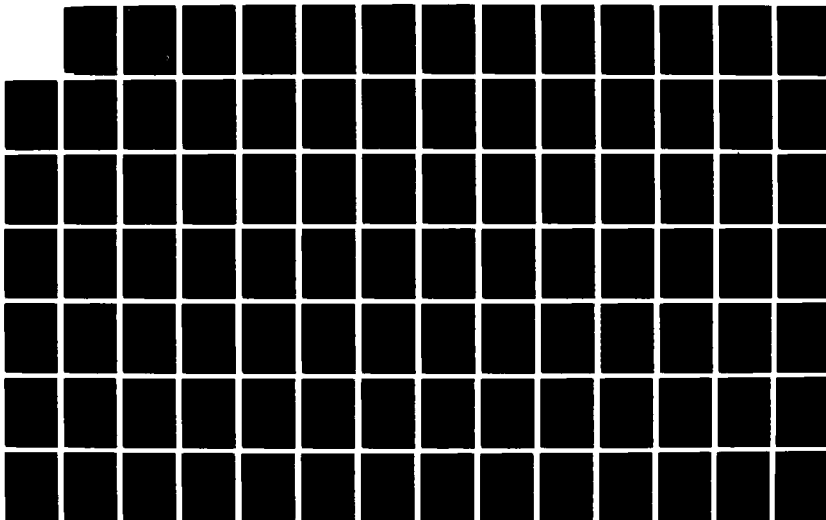
AD-A188 908

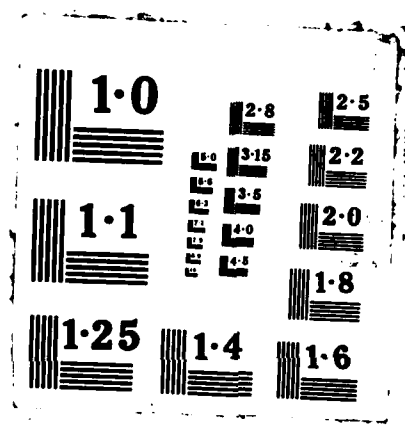
PROTOTYPE REPORT GENERATION FACILITY IN THE DATA
TRAFFIC MANAGEMENT SYSTE. (U) ILLINOIS UNIV AT URBANA
DEPT OF COMPUTER SCIENCE I ADIGUZEL ET AL. OCT 87
CERL-IR-P-88/02 DACH88-84-C-0011 F/G 5/1

1/2

UNCLASSIFIED

NL







US Army Corps
of Engineers
Construction Engineering
Research Laboratory

AD-A188 908

USA-CERL INTERIM REPORT P-88/02
October 1987
Responsiveness Analysis of Military Programs (RAMP)

DTIC FILE COPY



Prototype Report Generation Facility in the Data Traffic Management System

by
Ilker Adiguzel
Geneva G. Belford
Jane W-S. Liu

The Data Traffic Management System (DTMS) is being developed to support mutual data consistency among a large number of military construction automated systems and coherent access to information stored on the systems. A prototype Report Generation Facility (RGF), a subsystem of the DTMS, has been designed to provide the coherent access to data systems served by the DTMS. Implementation completed to date on the prototype RGF is described.

The RGF consists of three major components: a Data Dictionary/Directory System (DDS), a User Interface (UI), and a Data Systems Interface (DSI). Currently, the prototype RGF is linked to two data systems—Construction Appropriations, Programming, Control and Execution System (CAPCES), and Military and Civil Progress Reporting System (MCPRS)—and supports only standard report identification, retrieval, and execution.

DTIC
SELECTED
DEC 10 1987
S E D

Approved for public release; distribution is unlimited.

87 11 00 067

The computer program described herein is furnished by the Government and is accepted and used by the recipient with the express understanding that the United States Government makes no warranties, express or implied, concerning the accuracy, completeness, reliability, useability, or suitability for any particular purpose of the information and data contained in this program or furnished in connection therewith, and the United States shall be under no liability whatsoever to any person by reason of any use made thereof. The program belongs to the Government. Therefore, the recipient further agrees not to assert any proprietary rights therein or to represent this program to anyone as other than a Government program.

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

NORMAN C. HINTZ, AIA, PE
Colonel, Corps of Engineers
Commander and Director



REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704 0188
Exp Date Jun 30 1986

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b RESTRICTIVE MARKINGS	
2a SECURITY CLASSIFICATION AUTHORITY		3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.	
2b DECLASSIFICATION/DOWNGRADING SCHEDULE			
4 PERFORMING ORGANIZATION REPORT NUMBER(S) USA-CERL IR-P-88/02		5 MONITORING ORGANIZATION REPORT NUMBER(S)	
6a NAME OF PERFORMING ORGANIZATION U.S. Army Construction Engr Research Laboratory	6b OFFICE SYMBOL (If applicable)	7a NAME OF MONITORING ORGANIZATION	
6c ADDRESS (City, State, and ZIP Code) 20 Massachusetts Ave., N.W. Washington, D.C. 20314-1000		7b ADDRESS (City, State, and ZIP Code)	
8a NAME OF FUNDING/SPONSORING ORGANIZATION HQUSACE	8b OFFICE SYMBOL (If applicable) CEEC-P	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER OMA project Responsiveness Analysis of Military Programs (RAMP)	
8c ADDRESS (City, State, and ZIP Code) 20 Massachusetts Ave., N.W. Washington, D.C. 20314-1000		10 SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO	PROJECT NO
		TASK NO	WORK UNIT ACCESSION NO
11 TITLE (Include Security Classification) Prototype Report Generation Facility in the Data Traffic Management System (Unclassified)			
12 PERSONAL AUTHOR(S) Adiguzel, Ilker; Belford, Geneva G.; Liu, Jane W-S.			
13a TYPE OF REPORT Interim	13b TIME COVERED FROM TO	14 DATE OF REPORT (Year Month, Day) October 1987	15 PAGE COUNT 116
16 SUPPLEMENTARY NOTATION Copies are available from the National Technical Information Service Springfield, VA 22161			
17 COSATI CODES		18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	Data Traffic Management System military construction	
05	01	Report Generation Facility	
		management information systems	
19 ABSTRACT (Continue on reverse if necessary and identify by block number) The Data Traffic Management System (DTMS) is being developed to support mutual data consistency among a large number of military construction automated systems and coherent access to information stored on the systems. A prototype Report Generation Facility (RGF), a subsystem of the DTMS, has been designed to provide the coherent access to data systems served by the DTMS. Implementation completed to date on the prototype RGF is described. The RGF consists of three major components: a Data Dictionary/Directory System (DDS), a User Interface (UI), and a Data Systems Interface (DSI). The DDS maintains all location and access path information on data items stored in data systems served by the RGF. The UI is designed to accept an English-like query; one of its major functions is to determine if the user query can be answered by using one or more of the standard reports (Cont'd)			
20 DISTRIBUTION AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS		21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a NAME OF RESPONSIBLE INDIVIDUAL D.F. Finney		22b TELEPHONE (Include Area Code) (217) 352-6511 (x389)	22c OFFICE SYMBOL CECER-1MT

UNCLASSIFIED

BLOCK 19 (Cont'd)

provided by the individual data systems. When users request information contained in standard reports, the UI informs them of these reports' existence and allows them to select one or more of the reports. The keywords and qualifications provided in a user's query are passed to the DSI, which then links the RGF with each data system served by the DTMS.

When a standard report is requested, the DSI identifies and invokes the report generation routine for that report and produces a report. A nonstandard report generator will be provided in future RGF versions. The nonstandard report generator will be designed to assist the user in searching and accessing data systems and formatting the retrieved information. It will be invoked when no standard report is adequate to satisfy the user's query. Currently, the prototype RGF is linked to two data systems--Construction Appropriations, Programming, Control and Execution System (CAPCES), and Military and Civil Progress Reporting System (MCPRS)--and supports only standard report identification, retrieval, and execution.

UNCLASSIFIED

FOREWORD

This investigation was performed for the Directorate of Engineering and Construction, Headquarters, U.S. Army Corps of Engineers (HQUSACE), under the Operations and Maintenance, Army (OMA) project "Responsiveness Analysis of Military Programs (RAMP)." The HQUSACE Technical Monitor was John J. Sheehey III, CEEC-P.

The work was performed by the Facility Systems Division (FS) of the U.S. Army Construction Engineering Research Laboratory (USA-CERL) in conjunction with the University of Illinois (U of I), Department of Computer Science (Contract Number DACW88-84-C-0011). Other USA-CERL personnel involved in the study were Roger L. Lapp and Gregory L. Robinson. E. A. Lotz is Chief, FS. The technical editor was Dana Finney, USA-CERL Information Management Office.

Other members of the U of I staff contributing to the project included Steven C. Hwung, Kenneth A. Kaufman, Chong Kwon Kim, James Leo, Debora Neff, Sudha Ram, Kenneth Rossen, Yi-Ling Yan, Longxiang Zhang, and Nancy Zyer.

COL Norman C. Hintz is Commander and Director of USA-CERL, and Dr. L. R. Shaffer is Technical Director.

CONTENTS

	<u>Page</u>
DD FORM 1473	1
FOREWORD	3
LIST OF TABLES AND FIGURES	5
1 INTRODUCTION	7
Background	
Purpose	
Approach	
Scope	
2 RGF STRUCTURE AND FUNCTIONS	9
3 USER INTERFACE AND QUERY PROCESSING	11
Query Language	
Thesaurus of Search Keywords	
Dictionary of Data Definitions	
Query Parser	
Decision Maker	
4 DATA SYSTEMS INTERFACE	18
5 CURRENT IMPLEMENTATION	20
RGF Operations: Example	
Programs in the RGF	
6 CONCLUSION	23
Appendix A: Hash Table and Program Interface Data Structures	24
Appendix B: CAPCES Data in the Directory	26
Appendix C: Data Used to Identify Standard Reports	68
Appendix D: Sample Query Processing Session	70
Appendix E: Listing of Files	73
ACRONYMS	115
DISTRIBUTION	

TABLES

Number		Page
C1	Target Data Items and Qualifying Items for Two Reports	69
C2	Internal Keywords Corresponding to Data Items in Table C1	69
C3	Contents of the Current TSK	70

FIGURES

1	The RGF and Standard Report Generators	10
2	UI Configuration	12
3	Query Language Syntax	12
4	QP State Transition	16
5	Formats of Report File and Data Item File in RIF	16
6	RGF Flowchart	19
A1	Hashing Table Data Structures	25
A2	Target Data Items' Data Structures	26
A3	Qualifying Items' Data Structures	26

PROTOTYPE REPORT GENERATION FACILITY IN THE DATA TRAFFIC MANAGEMENT SYSTEM

1 INTRODUCTION

Background

Information on U.S. Army military construction (MILCON) projects is stored on a large number of different major data systems Army-wide. Each system serves a set of special needs for the Army branch using it; however, different hardware and software configurations often impede data transfer and consistency among systems, frustrating attempts to access all relevant information.

The U.S. Army Construction Engineering Research Laboratory (USA-CERL) is developing the Data Traffic Management System (DTMS) to support mutual data consistency among MILCON data systems and coherent access to information stored in these systems. The DTMS is a collection of software facilities currently residing on a McDonnell Douglas Information Support Group (formerly TYMSHARE) computer.

The DTMS consistency function involves automatically capturing data updates in one system and posting them to other systems (regardless of hardware and software configurations) with no human intervention.¹ The DTMS coherent access function solves two related problems--retrieval of standard reports and generation of ad hoc reports from multiple data systems. USA-CERL, in conjunction with the University of Illinois, is developing the Report Generation Facility (RGF), a DTMS subsystem to handle the coherent access function.

The RGF provides standardized ways to produce reports with minimum user expertise and supports location and retrieval of data from many sources to produce integrated reports. The RGF consists of three major components: a Data Dictionary/ Directory System (DDS), a User Interface (UI), and a Data Systems Interface (DSI). The DDS maintains all location and access path information on data items stored in data systems served by the RGF. The UI is designed to accept an English-like query. It processes the query to determine which data system(s) contains the information requested by the user. One of the UI's major functions is to determine if a user query can be answered by using one or more of the standard reports provided by the individual data systems. When the user requests information contained in standard reports, the UI announces the existence of these reports and allows the user to select one or more of them. The keywords and qualifications provided in the user's query are passed to the DSI, which then links the RGF with each of the data systems served by the DTMS. When a standard report is requested, the DSI identifies and invokes the report generation routine of that report and produces a report. A nonstandard report generator will be provided in future RGF versions. The nonstandard report generator will be designed to assist the user in searching and accessing the data systems and formatting the retrieved information. It will be invoked when no standard report can satisfy the user's query.

¹G. G. Belford, et al., "Mutual Consistency Maintenance in a Prototype Data Traffic Management System," *Proceedings of IEEE COMPDEC* (Institute of Electrical and Electronics Engineers, April 1984).

The RGF is a powerful, automatic system that can generate different types of reports containing data from the systems it serves. The prototype RGF is linked to two representative Army data systems, the Construction Appropriations, Programming, Control, and Execution System (CAPCES), and Military and Civil Progress Reporting System (MCPRS), and supports only standard report identification, retrieval, and execution. However, the prototype RGF can be easily expanded to link with the other data systems. In addition, the capability to generate nonstandard reports in the RGF will be included in the near future.

Purpose

The overall purpose of this work was to develop an automated system that will ensure mutual consistency among and coherent access to information stored in the Army's major data systems. The purpose of this interim report is to describe the RGF--the coherent access component of the overall system--in terms of structure, function, and implementation work to date.

Approach

Commercially available reports generation systems were investigated for applicability to the DTMS. The DDS selected is DATAMANAGER, from MSP, Inc.

The current RGF is designed to run under the IBM Conversational Monitoring System (CMS) environment and interface with the FOCUS data base management system. All major programs in the RGF are written in PL/1, making it easily portable in an IBM environment. (The Programming, Administration, and eXecution [PAX] System is the DTMS environment, currently using an IBM 370/3083 host computer. The PAX environment is expected to use IBM-type computers in the future.)

Scope

This report describes the RGF and implementation work completed to date. Future versions of the RGF will be described in reports that will supersede this one.

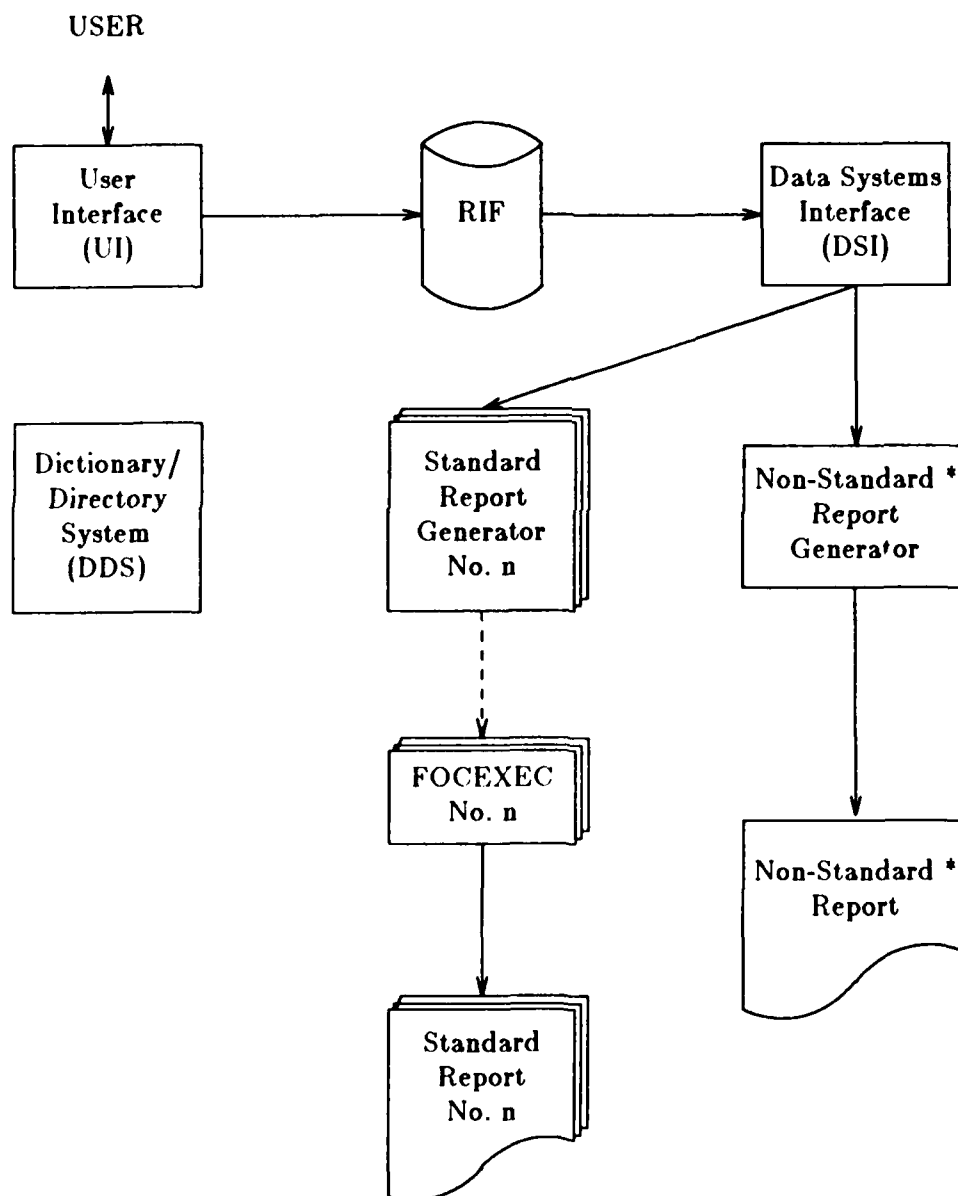
2 RGF STRUCTURE AND FUNCTIONS

Figure 1 is a schematic diagram of the RGF. Metadata (i.e., information on data stored in the data systems served by the RGF) are kept in the DDS (DATAMANAGER). Specifically, the DDS provides location and access path information and lends support to the DSI for access to individual data systems. In addition, the DDS supports keyword searches and maintains descriptive information on standard report generators linked to the DSI.

The UI is designed to accept an English-like query. To allow the user to phrase a query using familiar terms, the UI maintains a Thesaurus of Search Keywords and Internal Keywords (TSK). The TSK maps user-defined keywords to official internal keywords maintained in the DDS. The UI analyzes the query, captures the search keywords by consulting the TSK, and accesses the DDS to retrieve the necessary information on target data items, such as the item names, format, and location. The data item names and qualifications thus obtained by the UI are placed in the Report Information File (RIF). Based on information in the RIF, the UI identifies the data system(s) containing the data requested by the user. Another major function of the UI is to determine if the user query can be answered by one or more standard reports provided by the individual data systems or by the RGF. As mentioned in Chapter 1, when the user requests information contained in one or more standard reports, the UI announces the existence of these reports and allows the user to select one of them. Should this report not completely satisfy the user, a second report can be chosen, and so forth.

The DSI links the RGF with each data system served by the DTMS. The DSI interacts with the UI via the RIF. When a standard report is requested, the DSI identifies and invokes the report generation routine that produces it. This routine identifies target data items and qualifications of that report. (A target data item is an item accessed by the report generation routine. It forms a part of the report contents. A qualification is not used directly to generate the report; rather, it narrows the range of search by the report generation routine. For example, it might limit the report to data for a particular year or project.) If the user does not provide some qualifications needed for the report in the initial query, the selected report generation routine obtains them by prompting the user. After all qualifications are obtained, the data access and formatting routines are invoked to produce the report. When a standard report generation routine is already provided in the data system, the RGF makes use of that routine rather than duplicating it in the facility.

In the next RGF version, when no standard report can satisfy the query, the UI will allow the user to select the nonstandard report generator that will be provided. In this case, the nonstandard report generator will help the user to: determine which data systems hold the needed data, access those systems to retrieve the data, and format the retrieved information.



* not implemented yet

Figure 1. The RGF and standard report generators.

3 USER INTERFACE AND QUERY PROCESSING

The UI is being implemented in the prototype RGF. Figure 2 shows the UI configuration. The UI is supported by the DDS, under which a Dictionary of Data Definitions (DDD) is maintained. The UI consists of two major components--the Query Parser (QP) and the Decision Maker (DM). The QP and the DM use the TSK and DDD. Information obtained when the UI processes the query is placed in the RIF. The RIF provides input to the DSI (described in Chapter 4). Important features to understand in query processing are the query language supported by the UI, the UI's two components, and the contents and structures of the TSK and DDD.

Query Language

The UI accepts from the user a wide range of queries phrased in something like natural language. In particular, the query language allows the user to phrase queries in terms of familiar search words and qualifications. At the same time, the language is easy to parse.

The important components in any query are search keywords (names of target data items) and qualifications (used to narrow the scope of the search). The qualifications are optional. (Later in the session with the RGF, if the user selects a standard report as the response, the RGF will prompt for all necessary qualifications if they have not been entered in the initial query.) The search terms and qualifications may be separated by spaces, special symbols, and meaningless words.

The syntax of the query language is defined formally in Figure 3. In this figure, REPORT, IS, ARE, AND, =, WITH, WHERE, FOR, and ',' are terminal symbols. A <special string> refers to a term recognizable by the QP. This term can be a search keyword. Here, an "internal keyword" is defined as a term stored in the DDD that may be used to search the data dictionary for names, locations, and similar information on actual data items in the data systems served by the RGF. Alternatively, the <special string> may be an unofficial term defined earlier by the user. The corresponding internal keywords would then be stored in the TSK. A term defined in the TSK is called a "search keyword." Blank <space>, literal <string>, and integer <digit number> have their usual meanings. <Junk> refers to any string that is neither a terminal symbol nor a term defined in the TSK.

Three examples of legal queries are:

TELL ME SOMETHING ABOUT PROJECT COST

SHOW THE PROJECT COST FOR PROJECT=B12 AND FISCAL YEAR=81

REPORT PROGRAM COST WITH PROJECT=B12 AND YEAR=81.

In each of these queries, the recognized search keywords are "project" and "cost." In the first query, everything else is parsed as <junk>. In the second query, the search keyword "cost" is followed by a qualification beginning with the qualifier "FOR" and specifying values for "PROJECT" and "FISCAL YEAR." The third query is similar to the second one.

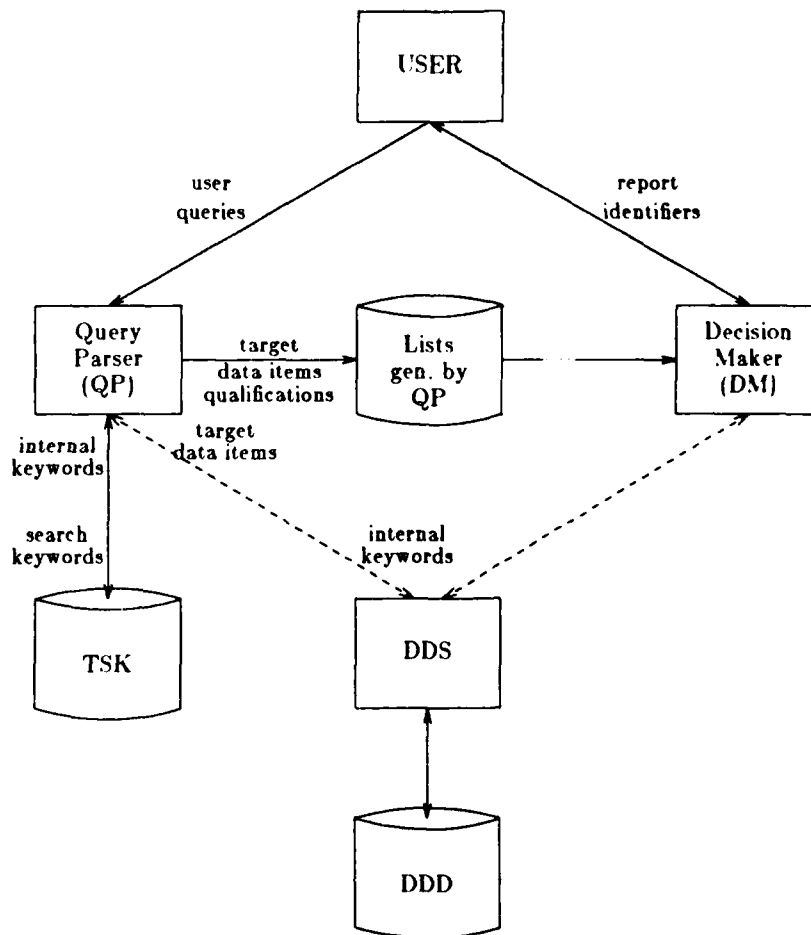


Figure 2. UI configuration.

```

<query statement>::=[REPORT]<target items>[<qualifier><qualification>]
<target items>::=<item><delim><target items>|<item>
<qualification>::=<item><equal><value>|
    <qualification><conjunction><item><equal><value>
<item>::=[<junk>]<item>[<junk>]<search keyword>[<junk>]]
    <search keyword>
<junk>::=<non-search keyword>|<junk><non-search keyword>
<qualifier>::=WITH|WHERE|FOR
<delim>::=,|AND
<conjunction>::=,<space>|AND
<equal>::=IS|ARE|=
<value>::=<string>|<digit number>
<search keyword>::=<special string>
<non-search keyword>::=<string>
    
```

Figure 3. Query language syntax.

Thesaurus of Search Keywords (TSK)

To use a familiar term, the user first must define this term by entering the term's definition in the TSK. (When the term is not defined in the TSK, it is parsed as <junk>; i.e., it is not recognized by the QP.) Specifically, the definition of a term in the TSK is a mapping of it into a list of all corresponding "official" internal keywords and qualifying item names. Again, terms defined by the user in the TSK are search keywords; the TSK is designed to allow for natural expansion of the set of search keywords.

The TSK is implemented as a hash table that maps each search keyword to all corresponding internal keywords. The hash table consists of two parts: (1) a primary table implemented with a separate chaining and bucket-hashing scheme, and (2) an overflow table used to hold additional search keywords hashed to the same address. The overflow table has the same structure as the primary table, but the access method is different. Appendix A shows the hash table data structure.

For each term in the query, a hash address is generated using the hash function defined below where a term W of length k is represented as:

$$W = C_{k-1}C_{k-2}C_{k-3}\cdots C_2C_1C_0 \quad [\text{Eq 1}]$$

Let S_i denote the converted internal bit-string for C_i . Then,

$$H(W) = (S_{k-1} * r^{k-1} + S_{k-2} * r^{k-2} + \dots + S_1 * r^1 + S_0 * r^0) \bmod p \quad [\text{Eq 2}]$$

In this implementation, $p = 1013$ and $r = 7$ (Appendix A explains p).

To locate the internal keyword list (if any exists) for a given term, the hash address is used as an index into the primary table. The term is then compared with the contents of the bucket entries. If the term is found in one of the records within the bucket, it is regarded as a search keyword and the corresponding internal keyword list comprises the mapped internal keywords for this search keyword. Otherwise, the overflow pointer is followed to find an overflow entry and the process is continued until either the term is found or no more entries exist. If the given term is not found in the hash table, it is not a search keyword; that is, it is not a term recognized by the QP.

Dictionary of Data Definitions (DDD)

The DDD is a facility managed by the DDS. It contains metadata about each item stored in the data system. That is, it contains item names, descriptions, formats, locations, and similar information. In addition, the DDD keeps descriptive information on all standard reports linked via the DSI to the RGF. That is, it contains information such as the report identifier, description, number and names of target data items, number of qualifications and the qualifying item names for each standard report.

The DDD is created and maintained under the DDS. It has a hierarchical structure with the following entities:

FOCUS-DATABASE

FOCUS-FILE

FILE

GROUP

ITEM.

Currently, the DDD contains metadata for the CAPCES and MCPRS data systems. Appendix B lists the CAPCES data elements as contained in the DDD.

The FOCUS-DATABASE entity (or record type) is at the top of the hierarchy. A data base, e.g., the CAPCES data base, can be a member of FOCUS-DATABASE. That is, any particular data base is an instance of the type FOCUS-DATABASE, and its descriptor would be entered as one of these top records in the hierarchy. Each FOCUS-DATABASE contains one or more FOCUS-FILES. An example is the CAPCES PMMFILE. Its descriptor would therefore be entered as a FOCUS-FILE record under the CAPCES FOCUS-DATABASE record. In general, a FOCUS-FILE is a logically independent file unit in the FOCUS data base; it is the unit referred to in an OPEN or a CLOSE command, and contains one or more FILES that correspond to the SEGMENTS in the FOCUS data base system. A GROUP in the FOCUS data base is described by the member type GROUP. An ITEM is an atomic entity in the DDD that describes a FIELD in the FOCUS data base system.

In the future, a REPORT entity will be added into the DDD. This entity will describe standard reports accessible via the RGF. Its attributes will include the report identifier, full report name, content description, number of target data items and their names, the number of qualifying items and their names, and similar information needed to complete the RIF. Currently, descriptive information on the standard reports is stored in the Standard Report Definition (SRDEF) File.

Internal keywords are contained in the CATALOGUE attribute for each ITEM member. The DDD can be accessed via the DATAMANAGER User Interface facility. The following two DATAMANAGER commands can be used to retrieve data in the SRDEF:

WHAT USES <item>

REPORT <item>.

The first command finds the access path for the item; the second one gets all attributes of the item.

Query Parser (QP)

The QP accepts user queries, picks up the search keywords by consulting the TSK, classifies each search keyword as either a target data item or a qualifying item, and associates each qualifying item with its value. It also finds the internal keywords corresponding to each search keyword in the query. The QP then accesses the DDD to get information about the real data items for target data and qualifying items.

In parsing a query, the QP first locates tokens in the query. A token can be a legal word, a '=', a ',', or a reserved word. A legal word in a query contains only letters, digits, and '. The reserved words in this query language include WITH, WHERE, FOR, IS, ARE, and AND. Figure 4 shows state transition for the QP.

The QP prompts the user to enter a query and parses the query according to the state transition diagram in Figure 4. It generates two lists--one containing the target data items and one containing the qualifying items found in the query. For each target data or qualifying item, more than one internal keyword may correspond to the search keyword used to name the item. The corresponding internal keyword list is retrieved from the TSK. After the QP translates the search keywords into internal keywords, it consults the DDD to get information about the real data item(s). This procedure helps detect nonexistent data items and reduces reporting errors.

The target items and qualifying items lists are organized as shown in Figures A2 and A3 in Appendix A. The DM uses these lists later.

Decision Maker (DM)

The DM accepts as inputs the lists of target data items and qualifying items generated by the QP. The DM consults the DDD to get relevant information regarding each item in these lists. (The UI facility of DATAMANAGER is used for this purpose.) This information is written into the RIF. The RIF consists of two subfiles--the report file and the data item file. Figure 5 shows their formats and contents. The RIF is the interface between the UI and DSI.

To determine how well each standard report matches the query, the following process is carried out: let the set of target data items in the query be $Q = \{q_1, q_2, \dots, q_m\}$. Let R be the number of standard reports linked to the RGF. Each standard report i is characterized by the set $S_i = \{3_1, 3_2, \dots, 3_n\}$ of target data items contained in it, where $n = f(i)$ is the number of target data items in the standard report i . The decision making process is then:

1. For $i=1$ to R , determine the degree of the match between the query and standard report i . Compare each target data item in Q with each target data item in S_i .

- If $Q = S_i$, then standard report i satisfies the query exactly. The match factor is assigned the value 1.
- If $Q \cap S_i = \emptyset$, then standard report i does not satisfy the query. The match factor is assigned the value 3.
- If $Q \cap S_i \neq \emptyset$ and Q is contained in the set S_i , then standard report i satisfies the query but provides extraneous information. The match factor is assigned the value 1.
- If $Q \cap S_i \neq \emptyset$ and Q contains S_i , then standard report i meets the query in part. The match factor is assigned the value 2.

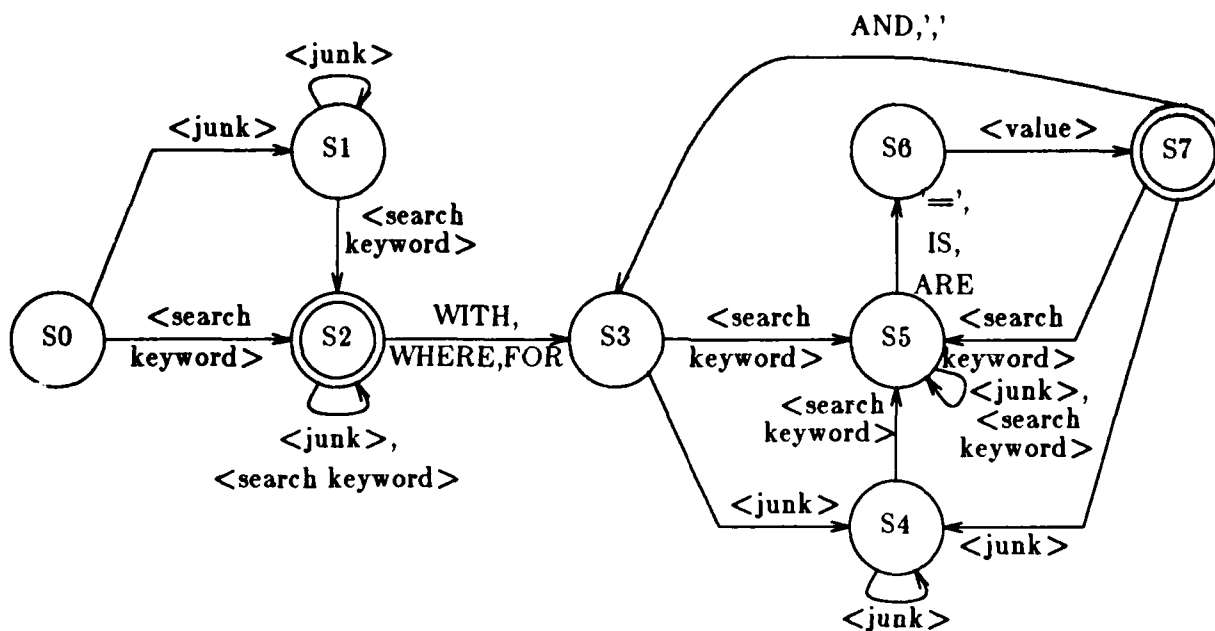


Figure 4. QP state transition.

Report File (RIFR)

Record 1	Report Identifier	Number of qualifications	Qualification				Qualification				...
			Name	Value	Index	Flag	Name	Value	Index	Flag	...
Format	I2	I2	X12	X12	I3	I1	X12	X12	I3	I1	...
Record 2	Number of target items	Index	Index	Index	Index						
											
Format	I2	I3	I3	I3	I3						

Data Item File (RIFD)

Record	Item Name	Format	Data- base	Logon ID	Passwd	Full Name	Item Description	Height	Access Path			
									seg	seg	seg	...
Format	X12	X10	X8	X8	X8	X32	X72	I2	X8	X8	X8	...

Figure 5. Formats of report file and data item file in RIF.

2. Count the number of reports with the same factor and store the count in the array pn of three components, one for each value of the match factor:

$$R = pn(1) + pn(2) + pn(3) \quad [Eq\ 3]$$

where $pn(j)$ is the number of reports that have match factors equal to j .

3. If $pn(1) > 0$, list the report identifiers and full names of the standard reports with match factors equal to 1 and ask the user if he or she wishes to select one of these reports. If the user finds one of the standard reports acceptable and selects it, set the SR flag and go to step 6.

4. If $pn(2) > 0$, list the report identifiers and full names of standard reports with match factors equal to 2; i.e., the ones that partly satisfy the query. If the user chooses one of them, set the SR flag and go to step 6. If the user finds none of these reports acceptable, he or she will be asked if a nonstandard report is required. If the answer is yes, set the NON_SR flag, and go to step 6. Otherwise, go back to the beginning and prompt the user for another query.

5. If $pn(1) = pn(2) = 0$, display the message: "no standard reports meet query requirements." Then ask the user whether a nonstandard report is desired. If the answer is yes, set the NON_SR flag and go to step 6.

6. Depending on whether the SR flag or the NON_SR flag has been set, write the query information to the RIF file.

After report identifiers and full names are shown on the screen, the user may enter "?" to request that descriptions for the standard reports be displayed. The descriptions allow a user to make an intelligent decision as to whether a given report fulfills all the requirements. When the user responds with a valid standard report identifier, the UI displays the selected report identifier and prompts the user to verify it. If the user enters "yes," the RIF file will be written and the report generation continues. Otherwise, the UI asks the user to reenter the report identifier.

4 DATA SYSTEMS INTERFACE

As mentioned earlier, DSI links the RGF to individual data systems served by the DTMS. The section of the DSI linking the RGF to a particular standard report generator is partitioned into two parts. The first part checks the RIF to determine if the user has provided all necessary qualifications in the initial query; if more qualifications are needed, it prompts the user to enter them. The second part invokes the data access and report generation routines to actually generate the report; these routines are executed by calling their names.

A PL/1 program named QUAL handles the first part. This program reads the two RIF files (RIFR and RIFD) (Figures 5 and 6) prepared by the UI.

The RIFR contains the report generation routine identifier along with target data and qualifying data items required by the routine. For each qualifying data item, two spaces are reserved in case a range of values is to be specified for the data item. Each data item has an associated flag that indicates whether a value has been specified for it. When the user has specified a value in the initial query, the flag is set to 1; otherwise, it is set to 0.

The RIFD contains detailed information about target data and qualifying data items of the chosen report generator routine. Specifically, it includes the format, location, full name, and description of each target data item and qualifying data item. This detailed information is displayed when the system prompts the user to specify values for the qualifications.

The program QUAL reads the flag for each qualifying data item sequentially. If a flag is 1, it passes to the next qualifying data item, provided there is one. If the flag is 0, the program prints the following message on the screen:

TO COMPLETE THE QUERY, YOU MUST SPECIFY
THE VALUES OF FOLLOWING DATA ITEMS:

CFY IN PMMFILE FORMAT=A2
DESC:FISCAL YEAR.

The first two lines are printed only once--at the beginning of the procedure. The next two lines are repeated for each qualifying data item for which a value is as yet unspecified. Note that in the above message, information extracted from the RIF data file gives the user a more detailed explanation of the qualifying data items.

When a user replies to a prompt with a qualification value, the program accepts the value and inserts it into the corresponding position in the RIF. This process is repeated until all qualifications are specified. If all qualifications have been specified in the initial query phase, the user will not see the above message.

As mentioned earlier, the report generation routines already provided in the data systems are used when possible. Thus, new routines with the same function need not be written for the DSI. However, some modifications had to be made to the standard routines before including these routines in the DSI; this is because most of these routines interactively prompt the user to specify the qualifications needed to delineate a report

(but they do not help the user by giving detailed information such as the item's full name and description). The standard routines have been modified to read qualification values from the filled-in fields in the RIF files.

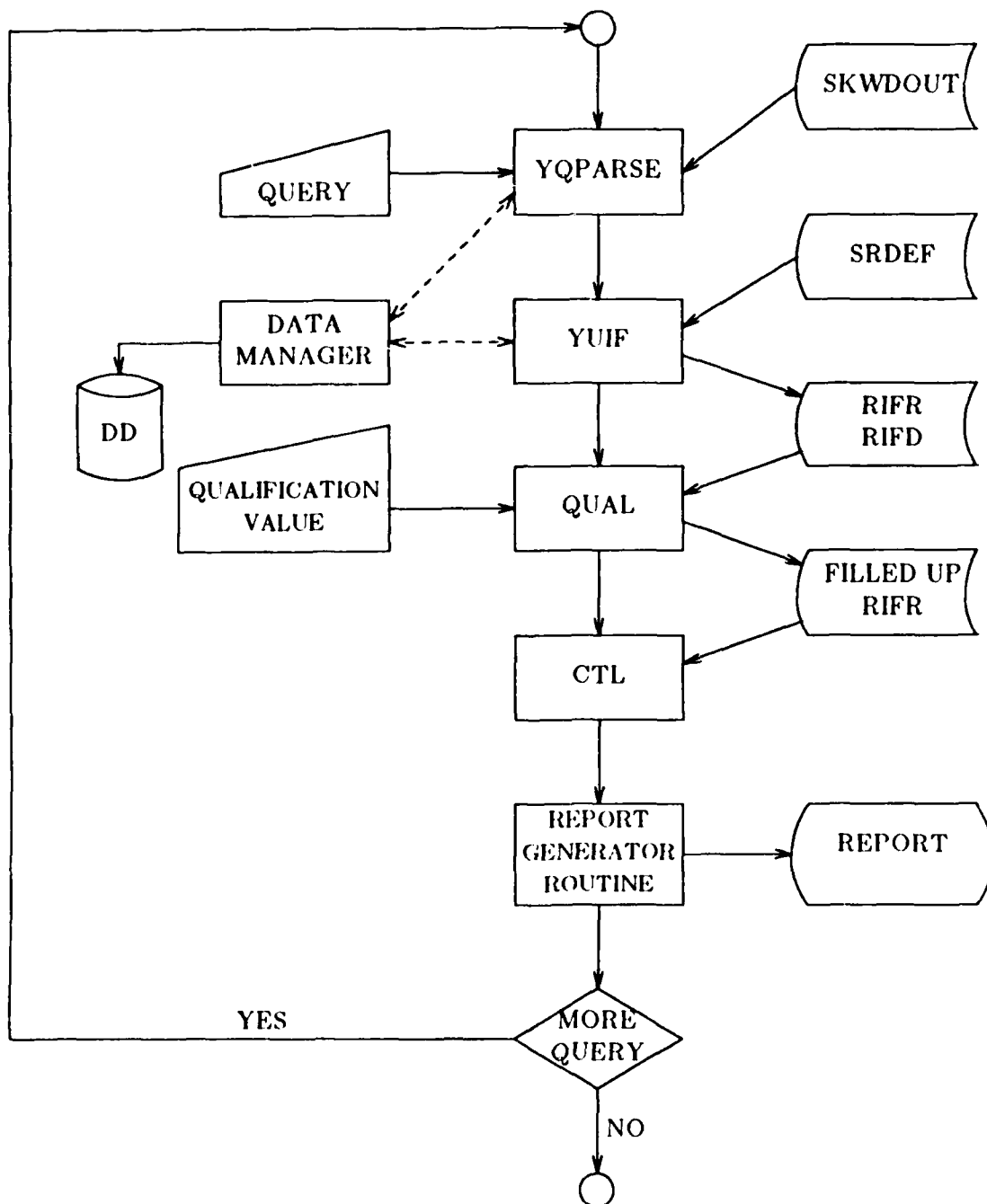


Figure 6. RGF flowchart.

5 CURRENT IMPLEMENTATION

The current prototype RGF is linked only to the CAPCES and MCPRS data systems. Six standard reports can be recognized and generated via the RGF. Appendix C shows the current contents of the system tables in the SRDEF that permit recognition of the first two reports. Additional standard reports can be integrated into the RGF by expanding these tables and modifying the DSI as indicated in Chapter 4. More data systems can be linked to the RGF by expanding the DDD, TSK, and tables in the SRDEF file.

RGF Operations: Example

Appendix D depicts a typical session of query processing. To illustrate the prototype RGF's operations, consider the query below:

TELL ME ABOUT COST SUMMARIZED BY PROJECT ELEMENT.

At the start of the session with the RGF, the SRDEF and TSK file are read into the RGF work area. The following steps are then carried out after the user types in the query:

1. The QP determines that COST, PROJECT, and ELEMENT are search keywords, since they are defined in the TSK (Table C3 in Appendix C).
2. From the TSK, the search keywords COST and ELEMENT are mapped into internal keywords AMOUNT and ELEMENT, respectively. The search keyword PROJECT is mapped into two internal keywords, PROJECT and PROGRAM.
3. The following two commands are issued to access DATAMANAGER and get the data item name, PROGELE:

WHAT FORMS'AMOUNT','PROJECT','ELEMENT'

WHAT FORMS'AMOUNT','PROGRAM','ELEMENT'

(Table C2 in Appendix C lists the data stored under DATAMANAGER. Only the data item PROGELE is indicated by internal keywords AMOUNT, PROGRAM, and ELEMENT.)

4. The data item name PROGELE is compared with the target data item names of the available standard reports. Using the DM procedure, standard report 1 is chosen. Finally, standard report 1 is generated by calling SUMELEM FOCEXEC.

Programs in the RGF

Figure 6 is a flowchart for the RGF. The functions of programs shown in this flowchart or listed in Appendix E are described below:

The program YSIMAP performs the following functions:

1. Maintains the TSK
2. Reads the data file SKWDIN
3. Generates the output file SKWDOUT.

The file SKWDOUT is used later in the program YQINIT for generating the hash table already described.

The program ZSRDEF has been designed to generate descriptive information on any standard report to be linked with the RGF and to enter the information in the SRDEF. Currently, this program prompts the user to enter the information needed to generate the standard report and records this information in the SRDEF. The information on a standard report contained in the SRDEF might also be generated by accessing that part of the DDD containing the descriptive information on the report. This part of ZSRDEF will be developed in the future.

The module YUSINTNEW implements the UI in the prototype RGF. It consists of seven programs:

1. YUSINIT integrates five programs, YQINIT, YAINIT, YUINIT, YQPARSE, and YUIF. YUSINIT calls YQINIT, YAINIT, and YUINIT to carry out the initializations. When the user enters a query, YUSINIT calls YQPARSE to phrase the query. It then calls YUIF to perform the decision procedure in the DM.

2. YQINIT initializes the program YQPARSE. Specifically, it reads the data file SKWDOUT to establish the hash table.

3. YAINIT initializes the program YACSD. It opens the DDD so it is ready for use.

4. YUINIT initializes the program YUIF. It reads the data file SRDEF and writes it to the local workspace in the module YUSINTNEW.

5. YQPARSE implements the query parser. To generate the lists of target data items and qualifying items, this program calls the program YACSD to access the DDD. The DATAMANAGER command WHAT FORMS is used to get the real data items.

6. YUIF implements the DM. It identifies the standard reports that match the user query and prompts the user to choose one of them. Then YUIF generates the RIF data files RIFR and RIFD, which are used later to generate the selected report.

7. YACSD accesses the DDD by calling the procedure DMRUS, which interfaces between the user's program and the DDS. YACSC issues the command WHAT FORMS with the parameters passed by YQPARSE and gets a list of real data items returned via the interface program DMRUS.

The QUAL program is responsible for completing the qualifications needed to generate the selected standard report. If there are qualifying data items with no values assigned in the RIF report file, the QUAL program prompts the user to specify values for them.

All the programs just mentioned are called from the CMS EXEC program STDREP. When the UI processes terminate and the user chooses a standard report, the STDREP calls the FOCUS EXEC program CTL, which invokes the needed report generation routine. After the selected standard report is generated, STDREP asks the user if

he or she wants to continue, that is, to type another query. Specifically, the following message is displayed:

SELECT ACTION TO BE TAKEN

1. EXECUTE A DIFFERENT QUERY.
2. EXIT FROM THE REPORT GENERATOR.

Appendix E includes all the PL/1 programs and the EXEC and DATA files used to implement report generation.

6 CONCLUSION

A prototype RGF has been developed to provide coherent access to all DTMS-served data systems Army-wide. It identifies standard reports that might satisfy the user query and, if the user wishes to have a standard report, automatically invokes the standard report generator to generate it. The prototype user interface provided in the RGF should enable the user to generate reports containing data retrieved from any number of data systems easily. The user need not have any technical knowledge about the data systems; queries can be issued using familiar terms with no concern for the location and method of data storage.

The DDS plays an important role in the UI, maintaining metadata about data in the data systems and thus allowing any data item queries by the user to be located and accessed readily. Supported by a well designed, powerful, commercially available dictionary/directory system, DATAMANAGER, the prototype RGF is readily expandable to link multiple data systems and numerous standard reports.

Future effort will be directed toward implementing the following enhancements:

1. More than one standard report may meet the user's requirements at any one time. A user will normally select one of them. After the selected report is generated, the user may want to generate one or more of the other reports that also match the query. A loop will be implemented to allow the user to request these additional standard reports.

2. The REPORT entity will be added into the directory so that the SRDEF file can be eliminated.

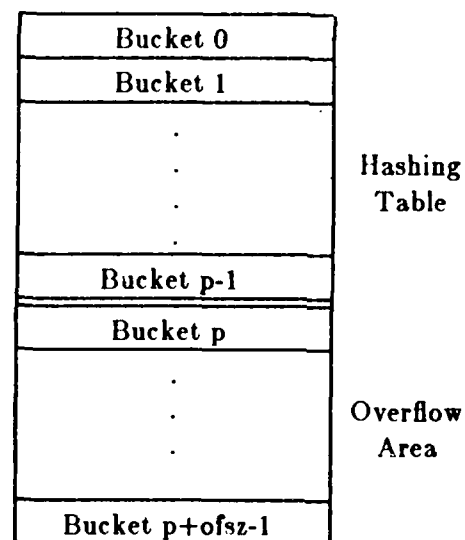
3. For every data system linked to the RGF, the contents of the CATALOGUE attribute in the DDD should be captured automatically from the data base definition. A program will be implemented in the DSI to scan the data base definition stored in any data system and load the DDD automatically. Thus, some aspects of the tedious loading task may be avoided.

4. The nonstandard report generator should be designed and a prototype nonstandard report generator implemented.

APPENDIX A:

HASH TABLE AND PROGRAM INTERFACE DATA STRUCTURES

The hash table is configured as follows:



where $p = 1013$ and $ofsz$ (overflow table size) = 200 in this implementation.

Each bucket contains the information shown in Figure A1.

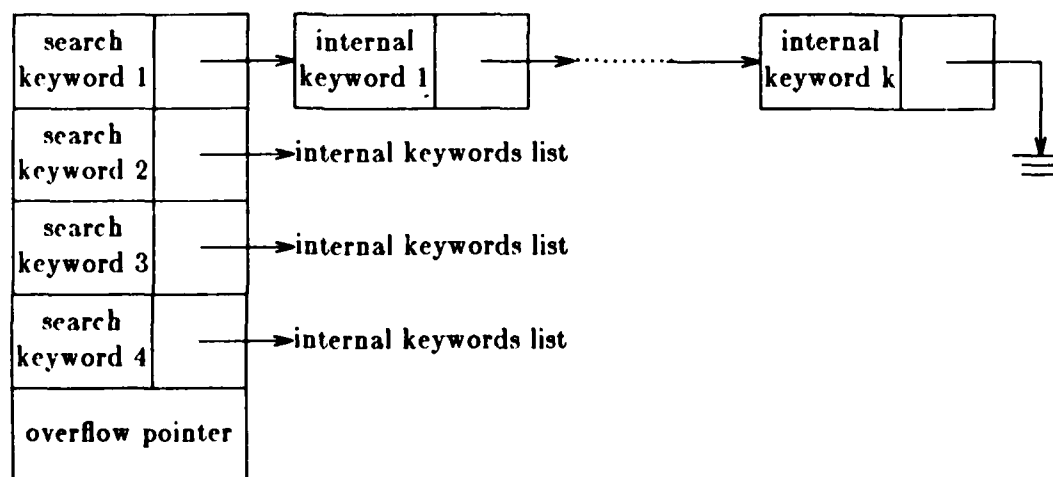


Figure A1. Data structure for the hash table.

The data structures used in the UI between the QP and DM for target data items and qualifying items are shown in Figures A2 and A3.

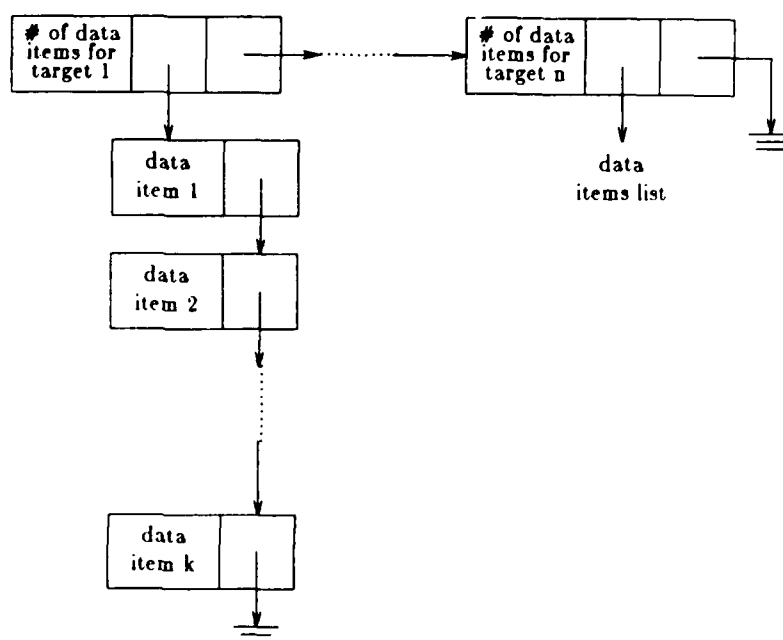


Figure A2. Data structures for target data items.

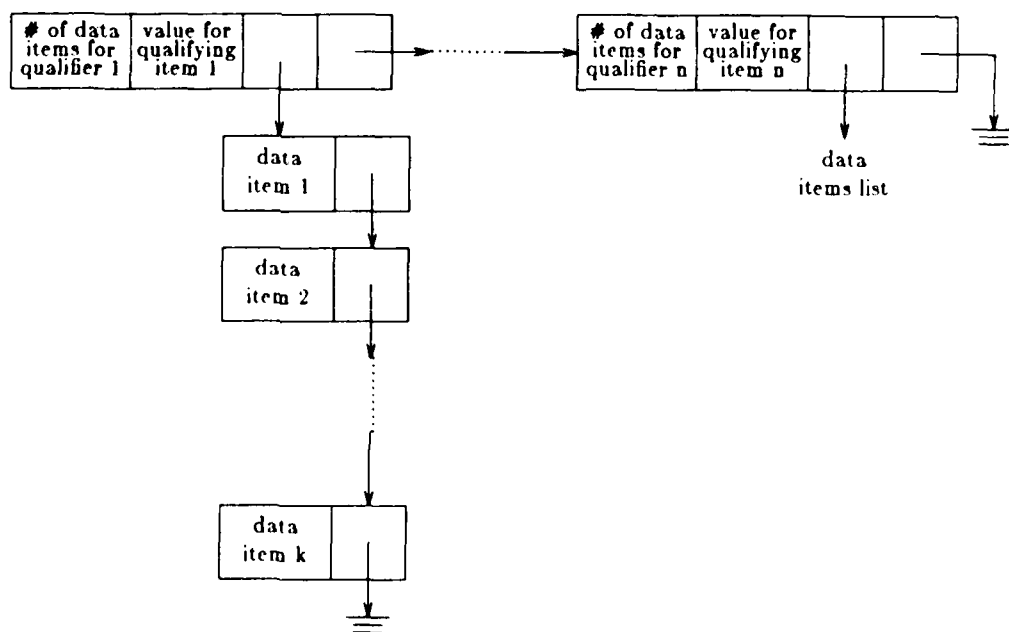


Figure A3. Data structures for qualifying items.

APPENDIX B:

CAPCES DATA IN THE DIRECTORY

```

C>yacsdmi terminal terminal
SET LDRTBLS 07
FILEDEF DMIN TERMINAL ( BLKSIZE 89 )
FILEDEF DMOUT TERMINAL ( BLKSIZE 89 )
FILEDEF DDTMS DISK CERL1 INDEX A ( XTENT 1000 )
FILEDEF DDTMSD DISK CERL1 DATA A ( XTENT 1000 )
FILEDEF DDTMSS DISK CERL1 SOURCE A ( XTENT 1000 )
FILEDEF DDTMSE DISK CERL1 RECOVER A ( XTENT 1000 )
FILEDEF DDTMSJ DISK CERL1 LOG A ( XTENT 1000 )
DM00
  PRODUCT DATAMANAGER      RELEASE 4.1.1      RELEASE DATE      20MAY83
  MACHINE IBM              MODEL 360          OPERATING SYSTEM CMS
  RELEASE TAPE M63476      PRODUCED 14NOV83
  INSTALLATION
  UNIVERSITY OF ILLINOIS
>dictionary ddtms update;
DM010231      DDTMS      DICTIONARY OPEN
>authority 'uiucdcs';
DM010601      AUTHORITY RECOGNISED
>report pmmfile hierarchy;
REPORT OF FOCUS-FILE PMMFILE
  EDITION 1 ENCODED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO 0 TIMES
  THIS MEMBER CONTAINS 38 DIRECT REFERENCES
  FOCUS-FILE PMMFILE
  FORM DEFAULTED-AS
  CONTAINS
    FILE MAIN
    FILE ZCPPFILE
    FILE ZCP2FILE
    FILE ZCP3FILE
    FILE AMPERS1
    FILE ACEFILE
    FILE MPCAFILE
    FILE MPESFILE
    FILE MPENFILE
    FILE SIGFILE
    FILE REPRFILE
    FILE SUBPFILE
    FILE MACOMSEG
    FILE HISTZCP1
    FILE HISTZCP2
    FILE HISTZCP3
    FILE HISTZCP4
    FILE HISTZCP5
    FILE HISTACE1
    FILE HISTMPES
    FILE HISTMPE1
    FILE HISTMPC1
    FILE HISTMPC2
    FILE HISTLVL
    FILE HISTCFY
    FILE COM2SEG
    FILE SITESEG
    FILE CATSEG
    FILE CAT3DESC
    FILE DESCRSEG
    FILE DIVSEG
    FILE INSTSEG
    FILE MACMSEG
    FILE ZBDICSEG
    FILE AUTHSEG
    FILE NOTEAUTH
    FILE APPRSEG
    FILE NOTESEG
  REPORT OF FILE MAIN
    EDITION 1 ENCODED BY MASTER AT 19.23.18 ON 27 NOV 1984
    THIS MEMBER IS DIRECTLY REFERRED TO ONCE
    THIS MEMBER CONTAINS 28 DIRECT REFERENCES
    FILE MAIN
    SEGTYPE S
    SORT-KEY
    ITEM KEYNR
    FORM DEFAULTED-AS

```

CONTAINS

- ITEM KEYNR
- ITEM KN_UPD
- ITEM KN_SDT
- ITEM INST
- ITEM PFT
- ITEM FY
- ITEM DATECFY
- ITEM PCFY
- ITEM OFY
- ITEM CMDG
- ITEM PRCD
- ITEM ORIG_USVC
- ITEM SITE_CODE
- ITEM CATCDs
- ITEM CMD_PRI
- ITEM DD_SORT_CD
- ITEM PROG_ELE
- ITEM PROJECT_DESC
- ITEM CURR_SCOPE
- ITEM ORI_SCOPE
- ITEM TYPE_FUNDS
- ITEM MISSION
- ITEM TEMP_PN
- ITEM PERM_PN
- ITEM MAIN_FILLER
- ITEM RKEY
- ITEM MOB_GROUP

REPORT OF ITEM KEYNR
 EDITION 1 ENCODED BY MASTER AT 19.22.58 ON 27 NOV 1984
 ALIAS
 KN
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM KEYNR
 DEFAULTED-AS
 CHARACTERS 13

REPORT OF ITEM KN_UPD
 EDITION 1 ENCODED BY MASTER AT 19.23.00 ON 27 NOV 1984
 ALIAS
 KNU
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM KN_UPD
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM KN_SDT
 EDITION 1 ENCODED BY MASTER AT 19.23.01 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM KN_SDT
 DEFAULTED-AS
 CHARACTERS 12

REPORT OF ITEM INST
 EDITION 1 ENCODED BY MASTER AT 19.23.01 ON 27 NOV 1984
 ALIAS
 STA_CD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM INST
 DEFAULTED-AS
 CHARACTERS 8

REPORT OF ITEM PFT
 EDITION 1 ENCODED BY MASTER AT 19.23.02 ON 27 NOV 1984
 ALIAS
 PM_FILETYPE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PFT
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM FY
 EDITION 2 ENCODED BY MASTER AT 18.00.38 ON 05 DEC 1984
 ALIAS
 CFY
 CATALOGUED AS
 CURRENT
 YEAR
 CONGRESS
 FISCAL
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM DATECFY
 EDITION 1 ENCODED BY MASTER AT 19.23.04 ON 27 NOV 1984
 ALIAS
 DT_CFY_CHG
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DATECFY
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PCFY
 EDITION 1 ENCODED BY MASTER AT 19.23.05 ON 27 NOV 1984
 ALIAS
 PREVIOUS_CFY
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PCFY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM OFY
 EDITION 1 ENCODED BY MASTER AT 19.23.05 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM OFY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM CMDG
 EDITION 1 ENCODED BY MASTER AT 19.23.06 ON 27 NOV 1984
 ALIAS
 CMD_CD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CMDG
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM PRCD
 EDITION 1 ENCODED BY MASTER AT 19.23.07 ON 27 NOV 1984
 ALIAS
 PROG_CD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PRCD
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM ORIG_USVC
 EDITION 1 ENCODED BY MASTER AT 19.23.07 ON 27 NOV 1984
 ALIAS
 ORUSVC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ORIG_USVC
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM SITE_CODE
 EDITION 1 ENCODED BY MASTER AT 19.23.08 ON 27 NOV 1984
 ALIAS
 INCODE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SITE_CODE
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM CATCD6
 EDITION 1 ENCODED BY MASTER AT 19.23.09 ON 27 NOV 1984
 ALIAS
 CAT6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CATCD6
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM CMD_PRI
 EDITION 1 ENCODED BY MASTER AT 19.23.09 ON 27 NOV 1984
 ALIAS
 CMDP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CMD_PRI

DEFAULTED-AS
 CHARACTERS 8
 REPORT OF ITEM DD_SORT_CD
 EDITION 1 ENCODED BY MASTER AT 19.23.10 ON 27 NOV 1984
 ALIAS
 DDSC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DD_SORT_CD
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM PROG_ELE
 EDITION 2 ENCODED BY MASTER AT 14.07.44 ON 05 DEC 1984
 ALIAS
 PE
 CATALOGUED AS
 AMOUNT
 ELEMENT
 PROGRAM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROG_ELE
 DEFAULTED-AS
 CHARACTERS 8
 REPORT OF ITEM PROJECT_DESC
 EDITION 1 ENCODED BY MASTER AT 19.23.11 ON 27 NOV 1984
 ALIAS
 PDES
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROJECT_DESC
 DEFAULTED-AS
 CHARACTERS 26
 REPORT OF ITEM CURR_SCOPE
 EDITION 1 ENCODED BY MASTER AT 19.23.12 ON 27 NOV 1984
 ALIAS
 SCOPE_C
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CURR_SCOPE
 DEFAULTED-AS
 NUMERIC-CHARACTER 9
 REPORT OF ITEM ORI_SCOPE
 EDITION 1 ENCODED BY MASTER AT 19.23.13 ON 27 NOV 1984
 ALIAS
 SCOPE_O
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ORI_SCOPE
 DEFAULTED-AS
 NUMERIC-CHARACTER 9
 REPORT OF ITEM TYPE_FUNDS
 EDITION 1 ENCODED BY MASTER AT 19.23.13 ON 27 NOV 1984
 ALIAS
 TF
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM TYPE_FUNDS
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MISSION
 EDITION 1 ENCODED BY MASTER AT 19.23.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MISSION
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM TEMP_PN
 EDITION 1 ENCODED BY MASTER AT 19.23.15 ON 27 NOV 1984
 ALIAS
 TPN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM TEMP_PN
 DEFAULTED-AS
 CHARACTERS 7
 REPORT OF ITEM PERM_PN
 EDITION 1 ENCODED BY MASTER AT 19.23.15 ON 27 NOV 1984
 ALIAS
 PPN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PERM_PN
 DEFAULTED-AS
 CHARACTERS 7
 REPORT OF ITEM MAIN_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.23.16 ON 27 NOV 1984
 ALIAS
 FILL1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MAIN_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM RKEY
 EDITION 1 ENCODED BY MASTER AT 19.23.17 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM RKEY
 DEFAULTED-AS
 CHARACTERS 8
 REPORT OF ITEM MOB_GROUP
 EDITION 1 ENCODED BY MASTER AT 19.23.18 ON 27 NOV 1984
 ALIAS
 MOB_GP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MOB_GROUP
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF FILE ZCPFFILE
 EDITION 1 ENCODED BY MASTER AT 19.24.01 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 82 DIRECT REFERENCES
 FILE ZCPFFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM PROGRAM_YEAR
 ITEM AUTH_YR
 ITEM AUS
 ITEM CAPY
 ITEM APS
 ITEM PHYR
 ITEM BUDGET_ACT
 ITEM MPRO_RCD_DT
 ITEM MPRO_APD_BY
 ITEM MPRO_APD_DT
 ITEM SUB
 ITEM UM
 ITEM REMARK_2
 ITEM REMARK_4
 ITEM PROG_AMT
 ITEM DATEPA
 ITEM AUTH_AMT
 ITEM APPROP_AMT
 ITEM PUB_LAW_CD
 ITEM CON_DIR_AMT
 ITEM CON_STD
 ITEM REPLACE_CODE
 ITEM 2807C
 ITEM 2807O
 ITEM 2807RQ
 ITEM DES_DIR_AMT
 ITEM DES_DISTR_CD
 ITEM EXEC_STATUS
 ITEM CMD_PN
 ITEM AR526_CODE
 ITEM SORT1
 ITEM SORT2
 ITEM ZCP_X1
 ITEM ZCP_X2
 ITEM ZCP_X3
 ITEM ZCP_X4
 ITEM FN1
 ITEM FN2
 ITEM FN3
 ITEM SPN
 ITEM PAGE1391
 ITEM INDXPAGE
 ITEM SPT

ITEM REMARKA
 ITEM REMARKB
 ITEM REMARKC
 ITEM PCA
 ITEM CACTION
 ITEM DRCN
 ITEM DRCN2
 ITEM CHGSW
 ITEM ZCPP_FILLER
 REPORT OF ITEM PROGRAM_YEAR
 EDITION 1 ENCODED BY MASTER AT 19.23.21 ON 27 NOV 1984
 ALIAS
 APYR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROGRAM_YEAR
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM AUTH_YR
 EDITION 1 ENCODED BY MASTER AT 19.23.22 ON 27 NOV 1984
 ALIAS
 AUVR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AUTH_YR
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM AUS
 EDITION 1 ENCODED BY MASTER AT 19.23.23 ON 27 NOV 1984
 ALIAS
 AUTH_SUP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AUS
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM CAPY
 EDITION 1 ENCODED BY MASTER AT 19.23.24 ON 27 NOV 1984
 ALIAS
 CONG_APRV_YR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CAPY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM APS
 EDITION 1 ENCODED BY MASTER AT 19.23.24 ON 27 NOV 1984
 ALIAS
 APPROP_SUP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM APS
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM PEYR
 EDITION 1 ENCODED BY MASTER AT 19.23.25 ON 27 NOV 1984
 ALIAS
 PROG_EXEC_YR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PEYR
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM BUDGET_ACT
 EDITION 1 ENCODED BY MASTER AT 19.23.26 ON 27 NOV 1984
 ALIAS
 BA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM BUDGET_ACT
 DEFAULTED-AS
 CHARACTERS 13
 REPORT OF ITEM MPRO_RCD_DT
 EDITION 1 ENCODED BY MASTER AT 19.23.27 ON 27 NOV 1984
 ALIAS
 MPRO_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRO_RCD_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6

REPORT OF ITEM MPRO_APD_BY
 EDITION 1 ENCODED BY MASTER AT 19.23.27 ON 27 NOV 1984
 ALIAS
 MPRO_AB
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRO_APD_BY
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MPRO_APD_DT
 EDITION 1 ENCODED BY MASTER AT 19.23.28 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRO_APD_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUB
 EDITION 1 ENCODED BY MASTER AT 19.23.29 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUB
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM UM
 EDITION 1 ENCODED BY MASTER AT 19.23.30 ON 27 NOV 1984
 ALIAS
 UNIT_OF_MEA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM UM
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM REMARK_2
 EDITION 1 ENCODED BY MASTER AT 19.23.31 ON 27 NOV 1984
 ALIAS
 ZCPP_REM2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_2
 DEFAULTED-AS
 CHARACTERS 60
 REPORT OF ITEM REMARK_4
 EDITION 1 ENCODED BY MASTER AT 19.23.31 ON 27 NOV 1984
 ALIAS
 ZCPP_REM4
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_4
 DEFAULTED-AS
 CHARACTERS 30
 REPORT OF ITEM PROG_AMT
 EDITION 2 ENCODED BY MASTER AT 14.10.24 ON 05 DEC 1984
 ALIAS
 PA
 CATALOGUED AS
 AMOUNT
 PROGRAM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROG_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM DATEPA
 EDITION 1 ENCODED BY MASTER AT 19.23.33 ON 27 NOV 1984
 ALIAS
 DT_PA_CHG
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DATEPA
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM AUTH_AMT
 EDITION 2 ENCODED BY MASTER AT 14.09.09 ON 05 DEC 1984
 ALIAS
 AA
 CATALOGUED AS
 AMOUNT
 AUTHORIZED
 AUTHORITY
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES

ITEM AUTH_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM APPROP_AMT
 EDITION 1 ENCODED BY MASTER AT 19.23.35 ON 27 NOV 1984
 ALIAS
 APPA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM APPROP_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PUB_LAW_CD
 EDITION 1 ENCODED BY MASTER AT 19.23.36 ON 27 NOV 1984
 ALIAS
 PLCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PUB_LAW_CD
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM CON_DIR_AMT
 EDITION 1 ENCODED BY MASTER AT 19.23.36 ON 27 NOV 1984
 ALIAS
 CON_AMT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CON_DIR_AMT
 DEFAULTED-AS
 PACKED-DECIMAL 13.2
 REPORT OF ITEM CON_STD
 EDITION 1 ENCODED BY MASTER AT 19.23.37 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CON_STD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM REPLACE_CODE
 EDITION 1 ENCODED BY MASTER AT 19.23.38 ON 27 NOV 1984
 ALIAS
 RC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REPLACE_CODE
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM 2807C
 EDITION 1 ENCODED BY MASTER AT 19.23.39 ON 27 NOV 1984
 ALIAS
 2807_CONG_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM 2807C
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM 2807O
 EDITION 1 ENCODED BY MASTER AT 19.23.39 ON 27 NOV 1984
 ALIAS
 2807_OSD_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM 2807O
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM 2807RQ
 EDITION 1 ENCODED BY MASTER AT 19.23.40 ON 27 NOV 1984
 ALIAS
 2807_RQ
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM 2807RQ
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM DES_DIR_AMT
 EDITION 1 ENCODED BY MASTER AT 19.23.41 ON 27 NOV 1984
 ALIAS
 DES_AMT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DES_DIR_AMT
 CONTAINS NO ENTRIES

REPORT OF ITEM DES_DISTR_CD
 EDITION 1 ENCODED BY MASTER AT 19.23.42 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DES_DISTR_CD
 DEFAULTED-AS
 CHARACTERS 2

REPORT OF ITEM EXEC_STATUS
 EDITION 1 ENCODED BY MASTER AT 19.23.42 ON 27 NOV 1984
 ALIAS
 EXSTS
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM EXEC_STATUS
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM CMD_PN
 EDITION 1 ENCODED BY MASTER AT 19.23.43 ON 27 NOV 1984
 ALIAS
 CPN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CMD_PN
 DEFAULTED-AS
 CHARACTERS 15

REPORT OF ITEM AR525_CODE
 EDITION 1 ENCODED BY MASTER AT 19.23.44 ON 27 NOV 1984
 ALIAS
 CMTY_CD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AR525_CODE
 DEFAULTED-AS
 CHARACTERS 5

REPORT OF ITEM SORT1
 EDITION 1 ENCODED BY MASTER AT 19.23.45 ON 27 NOV 1984
 ALIAS
 S1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SORT1
 DEFAULTED-AS
 CHARACTERS 3

REPORT OF ITEM SORT2
 EDITION 1 ENCODED BY MASTER AT 19.23.45 ON 27 NOV 1984
 ALIAS
 S2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SORT2
 DEFAULTED-AS
 CHARACTERS 3

REPORT OF ITEM ZCP_X1
 EDITION 1 ENCODED BY MASTER AT 19.23.46 ON 27 NOV 1984
 ALIAS
 ZX1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP_X1
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM ZCP_X2
 EDITION 1 ENCODED BY MASTER AT 19.23.47 ON 27 NOV 1984
 ALIAS
 ZX2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP_X2
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM ZCP_X3
 EDITION 1 ENCODED BY MASTER AT 19.23.48 ON 27 NOV 1984
 ALIAS
 ZX3
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP_X3
 DEFAULTED-AS
 CHARACTERS 2

REPORT OF ITEM ZCP_X4
 EDITION 1 ENCODED BY MASTER AT 19.23.49 ON 27 NOV 1984

ALIAS
 ZX4
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP_X4
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM FN1
 EDITION 1 ENCODED BY MASTER AT 19.23.49 ON 27 NOV 1984
 ALIAS
 FOOTNOTE1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FN1
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM FN2
 EDITION 1 ENCODED BY MASTER AT 19.23.50 ON 27 NOV 1984
 ALIAS
 EA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FN2
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM FN3
 EDITION 1 ENCODED BY MASTER AT 19.23.51 ON 27 NOV 1984
 ALIAS
 FOOTNOTE3
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FN3
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM SPN
 EDITION 1 ENCODED BY MASTER AT 19.23.52 ON 27 NOV 1984
 ALIAS
 SHORTPN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SPN
 DEFAULTED-AS
 CHARACTERS 0
 REPORT OF ITEM PAGE1391
 EDITION 1 ENCODED BY MASTER AT 19.23.52 ON 27 NOV 1984
 ALIAS
 GRBK_1391PG
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PAGE1391
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM INDXPAGE
 EDITION 1 ENCODED BY MASTER AT 19.23.53 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM INDXPAGE
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM SFT
 EDITION 1 ENCODED BY MASTER AT 19.23.54 ON 27 NOV 1984
 ALIAS
 SUBFUNDTYPE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SFT
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM REMARKA
 EDITION 1 ENCODED BY MASTER AT 19.23.55 ON 27 NOV 1984
 ALIAS
 RMKA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARKA
 DEFAULTED-AS
 CHARACTERS 10
 REPORT OF ITEM REMARKB
 EDITION 1 ENCODED BY MASTER AT 19.23.55 ON 27 NOV 1984
 ALIAS
 RMKB

THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARKB
 DEFAULTED-AS
 CHARACTERS 10
 REPORT OF ITEM REMARKC
 EDITION 1 ENCODED BY MASTER AT 19.23.56 ON 27 NOV 1984
 ALIAS
 RMKC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARKC
 DEFAULTED-AS
 CHARACTERS 10
 REPORT OF ITEM PCA
 EDITION 1 ENCODED BY MASTER AT 19.23.57 ON 27 NOV 1984
 ALIAS
 PREVCONGAUTH
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PCA
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM CACTION
 EDITION 1 ENCODED BY MASTER AT 19.23.58 ON 27 NOV 1984
 ALIAS
 CONGACATION
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CACTION
 DEFAULTED-AS
 CHARACTERS 60
 REPORT OF ITEM DRCN
 EDITION 1 ENCODED BY MASTER AT 19.23.58 ON 27 NOV 1984
 ALIAS
 DES_CN_NO1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DRCN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM DRCN2
 EDITION 1 ENCODED BY MASTER AT 19.23.59 ON 27 NOV 1984
 ALIAS
 DES_CN_NO2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DRCN2
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM CHGSW
 EDITION 1 ENCODED BY MASTER AT 19.24.00 ON 27 NOV 1984
 ALIAS
 CHANGE_SW
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CHGSW
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM ZCPP_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.24.01 ON 27 NOV 1984
 ALIAS
 FILL2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCPP_FILLER
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF FILE ZCP2FILE
 EDITION 1 ENCODED BY MASTER AT 19.24.18 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 18 DIRECT REFERENCES
 FILE ZCP2FILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM ZRD
 ITEM CURR1391_DT
 ITEM 1391_DT_DIST
 ITEM 1391_OK

ITEM FORMNO
 ITEM PROCPA
 ITEM CONTROL_CODE
 ITEM PROCFY
 ITEM COMPONENT
 ITEM ZCP2_FILLER
 ITEM MOBPR1
 ITEM MOB_DIST
 ITEM LSD
 ITEM ROD
 ITEM FILL11
 REPORT OF ITEM ZRD
 EDITION 1 ENCODED BY MASTER AT 19.24.07 ON 27 NOV 1984
 ALIAS
 ZCP2_REF_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZRD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CURR1391_DT
 EDITION 1 ENCODED BY MASTER AT 19.24.07 ON 27 NOV 1984
 ALIAS
 1391_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CURR1391_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM 1391_DT_DIST
 EDITION 1 ENCODED BY MASTER AT 19.24.08 ON 27 NOV 1984
 ALIAS
 1391_DIST
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM 1391_DT_DIST
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM 1391_OK
 EDITION 1 ENCODED BY MASTER AT 19.24.09 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM 1391_OK
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM FORMNO
 EDITION 1 ENCODED BY MASTER AT 19.24.09 ON 27 NOV 1984
 ALIAS
 FNO
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FORMNO
 DEFAULTED-AS
 CHARACTERS 7
 REPORT OF ITEM PROCPA
 EDITION 1 ENCODED BY MASTER AT 19.24.10 ON 27 NOV 1984
 ALIAS
 PROCESS_COST
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROCPA
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM CONTROL_CODE
 EDITION 1 ENCODED BY MASTER AT 19.24.11 ON 27 NOV 1984
 ALIAS
 CNTRC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CONTROL_CODE
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM PROCFY
 EDITION 1 ENCODED BY MASTER AT 19.24.12 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROCFY
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM COMPONENT
 EDITION 1 ENCODED BY MASTER AT 19.24.12 ON 27 NOV 1984

ALIAS
 COMPT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM COMPONENT
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM ZCP2_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.24.13 ON 27 NOV 1984
 ALIAS
 FILL3
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP2_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM MOBPRI
 EDITION 1 ENCODED BY MASTER AT 19.24.14 ON 27 NOV 1984
 ALIAS
 DA_PRI
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MOBPRI
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF ITEM MOB_DIST
 EDITION 1 ENCODED BY MASTER AT 19.24.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MOB_DIST
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM LSD
 EDITION 1 ENCODED BY MASTER AT 19.24.15 ON 27 NOV 1984
 ALIAS
 LATE_ST_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM LSD
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF ITEM ROD
 EDITION 1 ENCODED BY MASTER AT 19.24.16 ON 27 NOV 1984
 ALIAS
 RQD_OCP_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ROD
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF ITEM FILL11
 EDITION 1 ENCODED BY MASTER AT 19.24.17 ON 27 NOV 1984
 ALIAS
 MOB_FILLER
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FILL11
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF FILE ZCP3FILE
 EDITION 1 ENCODED BY MASTER AT 19.24.33 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 18 DIRECT REFERENCES
 FILE ZCP3FILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM LONG_DESC
 ITEM AUTH_REQ
 ITEM APPR_REQ
 ITEM AUTH_CODE
 ITEM APPR_CODE
 ITEM OSD_NOTE
 ITEM ARMY_REQ
 ITEM SASCAUTH
 ITEM HASCAUTH
 ITEM SAC_APPR
 ITEM HAC_APPR
 ITEM CONGAUTH
 ITEM CONFAPPR

ITEM AMT1
 ITEM AMT2
 ITEM AMT3
 ITEM AMT4
 ITEM ZCP3_FILLER
 REPORT OF ITEM LONG_DESC
 EDITION 1 ENCODED BY MASTER AT 19.24.20 ON 27 NOV 1984
 ALIAS
 LDESC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM LONG_DESC
 DEFAULTED-AS
 CHARACTERS 42
 REPORT OF ITEM AUTH_REQ
 EDITION 1 ENCODED BY MASTER AT 19.24.21 ON 27 NOV 1984
 ALIAS
 REQAUTH
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AUTH_REQ
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM APPR_REQ
 EDITION 1 ENCODED BY MASTER AT 19.24.22 ON 27 NOV 1984
 ALIAS
 REQAPPR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM APPR_REQ
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM AUTH_CODE
 EDITION 1 ENCODED BY MASTER AT 19.24.22 ON 27 NOV 1984
 ALIAS
 AUTHCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AUTH_CODE
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM APPR_CODE
 EDITION 1 ENCODED BY MASTER AT 19.24.23 ON 27 NOV 1984
 ALIAS
 APPRCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM APPR_CODE
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM OSD_NOTE
 EDITION 1 ENCODED BY MASTER AT 19.24.24 ON 27 NOV 1984
 ALIAS
 OSDN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM OSD_NOTE
 DEFAULTED-AS
 CHARACTERS 25
 REPORT OF ITEM ARMY_REQ
 EDITION 1 ENCODED BY MASTER AT 19.24.24 ON 27 NOV 1984
 ALIAS
 ARMQ
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ARMY_REQ
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SASCAUTH
 EDITION 1 ENCODED BY MASTER AT 19.24.25 ON 27 NOV 1984
 ALIAS
 SAUTH
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SASCAUTH
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM HASCAUTH
 EDITION 1 ENCODED BY MASTER AT 19.24.26 ON 27 NOV 1984
 ALIAS
 HAUTH

THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HASCAUTH
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SAC_APPR
 EDITION 1 ENCODED BY MASTER AT 19.24.27 ON 27 NOV 1984
 ALIAS
 SAPP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SAC_APPR
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM HAC_APPR
 EDITION 1 ENCODED BY MASTER AT 19.24.27 ON 27 NOV 1984
 ALIAS
 HAPPR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HAC_APPR
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM CONGAUTH
 EDITION 1 ENCODED BY MASTER AT 19.24.28 ON 27 NOV 1984
 ALIAS
 CAUTH
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CONGAUTH
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM CONFAPPR
 EDITION 1 ENCODED BY MASTER AT 19.24.29 ON 27 NOV 1984
 ALIAS
 CAPPR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CONFAPPR
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM AMT1
 EDITION 1 ENCODED BY MASTER AT 19.24.30 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AMT1
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM AMT2
 EDITION 1 ENCODED BY MASTER AT 19.24.30 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AMT2
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM AMT3
 EDITION 1 ENCODED BY MASTER AT 19.24.31 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AMT3
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM AMT4
 EDITION 1 ENCODED BY MASTER AT 19.24.32 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AMT4
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM ZCP3_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.24.32 ON 27 NOV 1984
 ALIAS
 FILL4
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP3_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE AMPERS1
 EDITION 1 ENCODED BY MASTER AT 19.24.41 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 6 DIRECT REFERENCES
FILE AMPERSI
PARENT MAIN
SEGTYPE U
FORM DEFAULTED-AS
CONTAINS
ITEM DES_PERCENT
ITEM CWE_AMT
ITEM CONCOM_DT
ITEM DES_COMP_DT
ITEM DES_ST_DT
ITEM AMPER_FILLER
REPORT OF ITEM DES_PERCENT
EDITION 2 ENCODED BY MASTER AT 14.13.09 ON 05 DEC 1984
ALIAS
DES_%
CATALOGUED AS
PROGRESS
DESIGN
COMPLETION
PERCENT
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM DES_PERCENT
DEFAULTED-AS
CHARACTERS 3
REPORT OF ITEM CWE_AMT
EDITION 2 ENCODED BY MASTER AT 14.12.26 ON 05 DEC 1984
ALIAS
CWE
CATALOGUED AS
CURRENT
ESTIMATE
AMOUNT
PROJECT
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM CWE_AMT
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM CONCOM_DT
EDITION 1 ENCODED BY MASTER AT 19.24.38 ON 27 NOV 1984
ALIAS
CONCEPT
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM CONCOM_DT
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM DES_COMP_DT
EDITION 2 ENCODED BY MASTER AT 14.14.59 ON 05 DEC 1984
CATALOGUED AS
DESIGN
COMPLETION
DATE
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM DES_COMP_DT
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM DES_ST_DT
EDITION 2 ENCODED BY MASTER AT 14.13.45 ON 05 DEC 1984
ALIAS
DES_SD
CATALOGUED AS
DESIGN
START
DATE
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM DES_ST_DT
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM AMPER_FILLER
EDITION 1 ENCODED BY MASTER AT 19.24.40 ON 27 NOV 1984
ALIAS
FILL6
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM AMPER_FILLER
DEFAULTED-AS

CHARACTERS 1
 REPORT OF FILE ACEFILE
 EDITION 1 ENCODED BY MASTER AT 19.25.06 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 26 DIRECT REFERENCES
 FILE ACEFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM CRRC
 ITEM LEVEL
 ITEM ACE_PA
 ITEM PA_DATE
 ITEM PROP
 ITEM REMARK_1
 ITEM ACEWORK1
 ITEM ACEWORK2
 ITEM ACEWORK3
 ITEM ACEPRB_PRI
 ITEM ZB
 ITEM CRRC_DATE
 ITEM ACE_PY
 ITEM PY_DATE
 ITEM ACE_CMD_PRI
 ITEM ACE_D_REL
 ITEM ACE_DCD
 ITEM ZDTCD1
 ITEM ZDTCD2
 ITEM ZDTCD4
 ITEM ZDTCD6
 ITEM ZDTCD8
 ITEM ZDTCD9
 ITEM PROP_PRIOR
 ITEM CRRC_PRIOR
 REPORT OF ITEM CRRC
 EDITION 1 ENCODED BY MASTER AT 19.24.43 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CRRC
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM LEVEL
 EDITION 1 ENCODED BY MASTER AT 19.24.44 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM LEVEL
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM ACE_PA
 EDITION 1 ENCODED BY MASTER AT 19.24.44 ON 27 NOV 1984
 ALIAS
 APROJA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACE_PA
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PA_DATE
 EDITION 1 ENCODED BY MASTER AT 19.24.45 ON 27 NOV 1984
 ALIAS
 DATE_PA_CHGE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PA_DATE
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PROP
 EDITION 1 ENCODED BY MASTER AT 19.24.46 ON 27 NOV 1984
 ALIAS
 PROPONENT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROP
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM REMARK_1
 EDITION 1 ENCODED BY MASTER AT 19.24.47 ON 27 NOV 1984
 ALIAS
 ACE_REM

THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_1
 DEFAULTED-AS
 CHARACTERS 80
 REPORT OF ITEM ACEWORK1
 EDITION 1 ENCODED BY MASTER AT 19.24.48 ON 27 NOV 1984
 ALIAS
 AWK1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACEWORK1
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM ACEWORK2
 EDITION 1 ENCODED BY MASTER AT 19.24.49 ON 27 NOV 1984
 ALIAS
 AWK2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACEWORK2
 DEFAULTED-AS
 CHARACTERS 8
 REPORT OF ITEM ACEWORK3
 EDITION 1 ENCODED BY MASTER AT 19.24.50 ON 27 NOV 1984
 ALIAS
 AWK3
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACEWORK3
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM ACEPRB_PRI
 EDITION 1 ENCODED BY MASTER AT 19.24.51 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACEPRB_PRI
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM ZB
 EDITION 1 ENCODED BY MASTER AT 19.24.51 ON 27 NOV 1984
 ALIAS
 ZERO_BUDG
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZB
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM CRRG_DATE
 EDITION 1 ENCODED BY MASTER AT 19.24.52 ON 27 NOV 1984
 ALIAS
 CRD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CRRG_DATE
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ACE_PY
 EDITION 1 ENCODED BY MASTER AT 19.24.54 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACE_PY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM PY_DATE
 EDITION 1 ENCODED BY MASTER AT 19.24.55 ON 27 NOV 1984
 ALIAS
 DATE_PY_CHG
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PY_DATE
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ACE_CMD_PRI
 EDITION 1 ENCODED BY MASTER AT 19.24.56 ON 27 NOV 1984
 ALIAS
 ACMDF
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACE_CMD_PRI
 DEFAULTED-AS

CHARACTERS 5
 REPORT OF ITEM ACE_D_REL
 EDITION 1 ENCODED BY MASTER AT 19.24.57 ON 27 NOV 1984
 ALIAS
 ACEDR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACE_D_REL
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ACE_DCD
 EDITION 1 ENCODED BY MASTER AT 19.24.57 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ACE_DCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM ZDTCD1
 EDITION 1 ENCODED BY MASTER AT 19.24.58 ON 27 NOV 1984
 ALIAS
 ZCD1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD1
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD2
 EDITION 1 ENCODED BY MASTER AT 19.24.59 ON 27 NOV 1984
 ALIAS
 ZCD2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD2
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD4
 EDITION 1 ENCODED BY MASTER AT 19.25.00 ON 27 NOV 1984
 ALIAS
 ZCD4
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD4
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD5
 EDITION 1 ENCODED BY MASTER AT 19.25.01 ON 27 NOV 1984
 ALIAS
 ZCD5
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD5
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD6
 EDITION 1 ENCODED BY MASTER AT 19.25.02 ON 27 NOV 1984
 ALIAS
 ZCD6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD6
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD8
 EDITION 1 ENCODED BY MASTER AT 19.25.02 ON 27 NOV 1984
 ALIAS
 ZCD8
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD8
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM ZDTCD9
 EDITION 1 ENCODED BY MASTER AT 19.25.03 ON 27 NOV 1984
 ALIAS
 ZCD9
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZDTCD9
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PROP_PRIOR

EDITION 1 ENCODED BY MASTER AT 19.25.04 ON 27 NOV 1984
 ALIAS
 P_PRI
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROP_PRIOR
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM CRRC_PRIOR
 EDITION 1 ENCODED BY MASTER AT 19.25.05 ON 27 NOV 1984
 ALIAS
 CRRC_PRI
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CRRC_PRIOR
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF FILE MPCAFILE
 EDITION 1 ENCODED BY MASTER AT 19.25.31 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 26 DIRECT REFERENCES
 FILE MPCAFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM EX_AWARD_DT
 ITEM EXEC_CODE
 ITEM MPCA_REM
 ITEM REMARK_6A
 ITEM REMARK_6
 ITEM CDTCD1
 ITEM CDTCD2
 ITEM CDTCD4
 ITEM CDTCD6
 ITEM CDTCD8
 ITEM CDTCD8
 ITEM CDTCD9
 ITEM BIDOD
 ITEM NOBID
 ITEM GOVT_EST
 ITEM LBID
 ITEM HBID
 ITEM DIRCD
 ITEM HL_DES
 ITEM MPC_DCD
 ITEM CONS_COMP_DT
 ITEM BOD
 ITEM DES_DIR_DT
 ITEM FORECAST
 ITEM AWD_CWE
 REPORT OF ITEM EX_AWARD_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.09 ON 27 NOV 1984
 ALIAS
 CONST_AW_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM EX_AWARD_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM EXEC_CODE
 EDITION 1 ENCODED BY MASTER AT 19.25.10 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM EXEC_CODE
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MPCA_REM
 EDITION 1 ENCODED BY MASTER AT 19.25.11 ON 27 NOV 1984
 ALIAS
 REMARK_6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPCA_REM
 DEFAULTED-AS
 CHARACTERS 30
 REPORT OF ITEM REMARK_6A
 EDITION 1 ENCODED BY MASTER AT 19.25.12 ON 27 NOV 1984
 ALIAS
 RMK6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_5A
 DEFAULTED-AS
 CHARACTERS 30
 REPORT OF ITEM REMARK_6
 EDITION 1 ENCODED BY MASTER AT 19 25 12 ON 27 NOV 1984
 ALIAS
 RMK6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_6
 DEFAULTED-AS
 CHARACTERS 60
 REPORT OF ITEM CDTCD1
 EDITION 1 ENCODED BY MASTER AT 19 25 13 ON 27 NOV 1984
 ALIAS
 CD1
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD1
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD2
 EDITION 1 ENCODED BY MASTER AT 19 25 14 ON 27 NOV 1984
 ALIAS
 CD2
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD2
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD4
 EDITION 1 ENCODED BY MASTER AT 19 25 15 ON 27 NOV 1984
 ALIAS
 CD4
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD4
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD5
 EDITION 1 ENCODED BY MASTER AT 19 25 16 ON 27 NOV 1984
 ALIAS
 CD5
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD5
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD6
 EDITION 1 ENCODED BY MASTER AT 19 25 17 ON 27 NOV 1984
 ALIAS
 CD6
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD6
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD8
 EDITION 1 ENCODED BY MASTER AT 19 25 18 ON 27 NOV 1984
 ALIAS
 CD8
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD8
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM CDTCD9
 EDITION 1 ENCODED BY MASTER AT 19 25 18 ON 27 NOV 1984
 ALIAS
 CD9
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CDTCD9
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM BID0D
 EDITION 1 ENCODED BY MASTER AT 19 25 19 ON 27 NOV 1984
 ALIAS
 BID_OPEN_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM BIDOD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM NOBID
 EDITION 1 ENCODED BY MASTER AT 19.25.20 ON 27 NOV 1984
 ALIAS
 NO_BIDDERS
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM NOBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 4
 REPORT OF ITEM GOVT_EST
 EDITION 1 ENCODED BY MASTER AT 19.25.21 ON 27 NOV 1984
 ALIAS
 GEST
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM GOVT_EST
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM LBID
 EDITION 1 ENCODED BY MASTER AT 19.25.22 ON 27 NOV 1984
 ALIAS
 LOW_BID
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM LBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM HBID
 EDITION 1 ENCODED BY MASTER AT 19.25.23 ON 27 NOV 1984
 ALIAS
 HIGH_BID
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM DIRCD
 EDITION 1 ENCODED BY MASTER AT 19.25.23 ON 27 NOV 1984
 ALIAS
 ZCPP_DCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DIRCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HL_DES
 EDITION 1 ENCODED BY MASTER AT 19.25.24 ON 27 NOV 1984
 ALIAS
 IH_DES
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HL_DES
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MPC_DCD
 EDITION 1 ENCODED BY MASTER AT 19.25.25 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPC_DCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM CONS_COMP_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.26 ON 27 NOV 1984
 ALIAS
 CNCND
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CONS_COMP_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM BOD
 EDITION 1 ENCODED BY MASTER AT 19.25.27 ON 27 NOV 1984
 ALIAS
 BEN_OCC_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM BOD

DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM DES_DIR_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.28 ON 27 NOV 1984
 ALIAS
 DES_DR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DES_DIR_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM FORECAST
 EDITION 1 ENCODED BY MASTER AT 19.25.29 ON 27 NOV 1984
 ALIAS
 FCST_AWD_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM FORECAST
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM AWD_CWE
 EDITION 1 ENCODED BY MASTER AT 19.25.30 ON 27 NOV 1984
 ALIAS
 AWD_CWE_AMT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AWD_CWE
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF FILE MPESFILE
 EDITION 1 ENCODED BY MASTER AT 19.25.47 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 16 DIRECT REFERENCES
 FILE MPESFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM EST_COST
 ITEM SUPER_ADMIN
 ITEM PER_CONT
 ITEM EST_DT
 ITEM PER_SA
 ITEM PROJ_COST_DT
 ITEM PROJ_COST
 ITEM PROJ_COST_CD
 ITEM SOLAR
 ITEM PDB_DT
 ITEM PDB_RDQ
 ITEM CAT_E_EQ
 ITEM CONT
 ITEM PER_DSGN
 ITEM MPES_COMMENT
 ITEM MPES_FILLER
 REPORT OF ITEM EST_COST
 EDITION 1 ENCODED BY MASTER AT 19.25.34 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM EST_COST
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SUPER_ADMIN
 EDITION 1 ENCODED BY MASTER AT 19.25.35 ON 27 NOV 1984
 ALIAS
 SA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUPER_ADMIN
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PER_CONT
 EDITION 1 ENCODED BY MASTER AT 19.25.37 ON 27 NOV 1984
 ALIAS
 PCONT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PER_CONT
 DEFAULTED-AS
 PACKED-DECIMAL 4.1
 REPORT OF ITEM EST_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.37 ON 27 NOV 1984

THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM EST_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PER_SA
 EDITION 1 ENCODED BY MASTER AT 19.25.38 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PER_SA
 DEFAULTED-AS
 PACKED-DECIMAL 3.1
 REPORT OF ITEM PROJ_COST_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.39 ON 27 NOV 1984
 ALIAS
 PCDT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROJ_COST_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PROJ_COST
 EDITION 1 ENCODED BY MASTER AT 19.25.40 ON 27 NOV 1984
 ALIAS
 PC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROJ_COST
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PROJ_COST_CD
 EDITION 1 ENCODED BY MASTER AT 19.25.40 ON 27 NOV 1984
 ALIAS
 PCCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PROJ_COST_CD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM SOLAR
 EDITION 1 ENCODED BY MASTER AT 19.25.41 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SOLAR
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PDB_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.42 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PDB_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM PDB_RDQ
 EDITION 1 ENCODED BY MASTER AT 19.25.43 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PDB_RDQ
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM CAT_E_EQ
 EDITION 1 ENCODED BY MASTER AT 19.25.43 ON 27 NOV 1984
 ALIAS
 CAT_E
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CAT_E_EQ
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM CONT
 EDITION 1 ENCODED BY MASTER AT 19.25.44 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM CONT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM PER_DSGN
 EDITION 1 ENCODED BY MASTER AT 19.25.45 ON 27 NOV 1984
 ALIAS
 PDSN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM PER_DSGN
 DEFAULTED-AS
 PACKED-DECIMAL 5.1
 REPORT OF ITEM MPES_COMMENT
 EDITION 1 ENCODED BY MASTER AT 19.25.46 ON 27 NOV 1984
 ALIAS
 MCOM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPES_COMMENT
 DEFAULTED-AS
 CHARACTERS 20
 REPORT OF ITEM MPES_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.25.47 ON 27 NOV 1984
 ALIAS
 FILL7
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPES_FILLER
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF FILE MPENFILE
 EDITION 1 ENCODED BY MASTER AT 19.25.57 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 10 DIRECT REFERENCES
 FILE MPENFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM REMARK_3
 ITEM DT_REL_CD1
 ITEM DT_REL_CD2
 ITEM DEI_DT
 ITEM MPEN_IND
 ITEM DEI_RQ
 ITEM MPEN_DCD
 ITEM ENREVD
 ITEM ENRN
 ITEM MPEN_FILLER
 REPORT OF ITEM REMARK_3
 EDITION 1 ENCODED BY MASTER AT 19.25.50 ON 27 NOV 1984
 ALIAS
 MPEN_REM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REMARK_3
 DEFAULTED-AS
 CHARACTERS 60
 REPORT OF ITEM DT_REL_CD1
 EDITION 1 ENCODED BY MASTER AT 19.25.51 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DT_REL_CD1
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM DT_REL_CD2
 EDITION 1 ENCODED BY MASTER AT 19.25.51 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DT_REL_CD2
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM DEI_DT
 EDITION 1 ENCODED BY MASTER AT 19.25.52 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DEI_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM MPEN_IND
 EDITION 1 ENCODED BY MASTER AT 19.25.53 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPEN_IND
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM DEI_RQ
 EDITION 1 ENCODED BY MASTER AT 19.25.53 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE

THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM DEI_RQ
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MPEN_DCD
 EDITION 1 ENCODED BY MASTER AT 19 26 54 ON 27 NOV 1984
 ALIAS
 MPED
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPEN_DCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM ENREVD
 EDITION 1 ENCODED BY MASTER AT 19 26 55 ON 27 NOV 1984
 ALIAS
 DT_REL_REV
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ENREVD
 DEFAULTED-AS
 NUMERIC-CHARACTER 0
 REPORT OF ITEM ENRN
 EDITION 1 ENCODED BY MASTER AT 19 26 56 ON 27 NOV 1984
 ALIAS
 ENG_REV_NUM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ENRN
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM MPEN_FILLER
 EDITION 1 ENCODED BY MASTER AT 19 26 56 ON 27 NOV 1984
 ALIAS
 FILLER
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPEN_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE SIGFILE
 EDITION 1 ENCODED BY MASTER AT 19 26 03 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 5 DIRECT REFERENCES
 FILE SIGFILE
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM COM_COST
 ITEM COM_STAT
 ITEM COM_DATE
 ITEM TELER_NO
 ITEM SIG_FILLER
 REPORT OF ITEM COM_COST
 EDITION 1 ENCODED BY MASTER AT 19 26 59 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM COM_COST
 DEFAULTED-AS
 NUMERIC-CHARACTER 9
 REPORT OF ITEM COM_STAT
 EDITION 1 ENCODED BY MASTER AT 19 26 00 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM COM_STAT
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM COM_DATE
 EDITION 1 ENCODED BY MASTER AT 19 26 01 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM COM_DATE
 DEFAULTED-AS
 NUMERIC-CHARACTER 0
 REPORT OF ITEM TELER_NO
 EDITION 1 ENCODED BY MASTER AT 19 26 01 ON 27 NOV 1984
 ALIAS
 TNO
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES

ITEM TELER_NO
 DEFAULTED-AS
 CHARACTERS 16
 REPORT OF ITEM SIG_FILLER
 EDITION 1 ENCODED BY MASTER AT 19 26 02 ON 27 NOV 1984
 ALIAS
 FILL9
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SIG_FILLER
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF FILE REPRFILE
 EDITION 1 ENCODED BY MASTER AT 19 26 11 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 8 DIRECT REFERENCES
 FILE REPRFILE
 PARENT MAIN
 SEGTYPE S1
 SORT-KEY
 ITEM ZCP_PA_SPN
 FORM DEFAULTED-AS
 CONTAINS
 ITEM ZCP_PA_SPN
 ITEM ZS_SDT
 ITEM ZS_REM
 ITEM ZS_PROG_AMT
 ITEM ZS_AUTH_AMT
 ITEM ZS_APPR_AMT
 ITEM REPR_FILLER
 REPORT OF ITEM ZCP_PA_SPN
 EDITION 1 ENCODED BY MASTER AT 19 26 05 ON 27 NOV 1984
 ALIAS
 ZSPN
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZCP_PA_SPN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM ZS_SDT
 EDITION 1 ENCODED BY MASTER AT 19 26 05 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZS_SDT
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM ZS_REM
 EDITION 1 ENCODED BY MASTER AT 19 26 06 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZS_REM
 DEFAULTED-AS
 CHARACTERS 26
 REPORT OF ITEM ZS_PROG_AMT
 EDITION 1 ENCODED BY MASTER AT 19 26 07 ON 27 NOV 1984
 ALIAS
 ZSPA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZS_PROG_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM ZS_AUTH_AMT
 EDITION 1 ENCODED BY MASTER AT 19 26 08 ON 27 NOV 1984
 ALIAS
 ZSAUA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZS_AUTH_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM ZS_APPR_AMT
 EDITION 1 ENCODED BY MASTER AT 19 26 08 ON 27 NOV 1984
 ALIAS
 ZSAPA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM ZS_APPR_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM REPR_FILLER

EDITION 1 ENCODED BY MASTER AT 19.26.10 ON 27 NOV 1984
 ALIAS
 FILL10
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM REPR_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE SUBPFILE
 EDITION 1 ENCODED BY MASTER AT 19.26.31 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 19 DIRECT REFERENCES
 FILE SUBPFILE
 PARENT MAIN
 SEGTYPE S1
 SORT-KEY
 ITEM AMPRS_SPN
 FORM DEFAULTED-AS
 CONTAINS
 ITEM AMPRS_SPN
 ITEM SUBAMT
 ITEM SUBEXYR
 ITEM SUB_UNIT_MEA
 ITEM SUBSCOPE
 ITEM SUBITEM_DESC
 ITEM SUB_CONTR
 ITEM SUB_REM
 ITEM SCH_AWARD_DT
 ITEM SUB_AWARD_DT
 ITEM SUBCAD
 ITEM SUBBOD
 ITEM SUBBIDOD
 ITEM SUBNOBID
 ITEM SUBGEST
 ITEM SUBLBID
 ITEM SUBHBID
 ITEM SAWD_CWE
 REPORT OF ITEM AMPRS_SPN
 EDITION 1 ENCODED BY MASTER AT 19.26.13 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM AMPRS_SPN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM SUBAMT
 EDITION 1 ENCODED BY MASTER AT 19.26.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBAMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SUBEXYR
 EDITION 1 ENCODED BY MASTER AT 19.26.15 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBEXYR
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM SUB_UNIT_MEA
 EDITION 1 ENCODED BY MASTER AT 19.26.16 ON 27 NOV 1984
 ALIAS
 SUB_UM
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUB_UNIT_MEA
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM SUBSCOPE
 EDITION 1 ENCODED BY MASTER AT 19.26.16 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBSCOPE
 DEFAULTED-AS
 NUMERIC-CHARACTER 7
 REPORT OF ITEM SUBITEM_DESC
 EDITION 1 ENCODED BY MASTER AT 19.26.17 ON 27 NOV 1984
 ALIAS
 SDESC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBITEM_DESC

DEFAULTED-AS
 CHARACTERS 26
 REPORT OF ITEM SUB_CONTR
 EDITION 1 ENCODED BY MASTER AT 19.26.18 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUB_CONTR
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM SUB_REM
 EDITION 1 ENCODED BY MASTER AT 19.26.19 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUB_REM
 DEFAULTED-AS
 CHARACTERS 20
 REPORT OF ITEM SCH_AWARD_DT
 EDITION 1 ENCODED BY MASTER AT 19.26.20 ON 27 NOV 1984
 ALIAS
 SUBAWD_DTSCH
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SCH_AWARD_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUB_AWARD_DT
 EDITION 1 ENCODED BY MASTER AT 19.26.21 ON 27 NOV 1984
 ALIAS
 SUBAWD_DTACT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUB_AWARD_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUBCAD
 EDITION 1 ENCODED BY MASTER AT 19.26.22 ON 27 NOV 1984
 ALIAS
 SCON_AW_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBCAD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUBBOD
 EDITION 1 ENCODED BY MASTER AT 19.26.23 ON 27 NOV 1984
 ALIAS
 SBEN_OCC_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBBOD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUBBIDOD
 EDITION 1 ENCODED BY MASTER AT 19.26.24 ON 27 NOV 1984
 ALIAS
 SBID_OP_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBBIDOD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM SUBNOBID
 EDITION 1 ENCODED BY MASTER AT 19.26.25 ON 27 NOV 1984
 ALIAS
 SNO_BIDDERS
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBNOBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 4
 REPORT OF ITEM SUBGEST
 EDITION 1 ENCODED BY MASTER AT 19.26.26 ON 27 NOV 1984
 ALIAS
 SGOVT_EST
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBGEST
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SUBLBID
 EDITION 1 ENCODED BY MASTER AT 19.26.27 ON 27 NOV 1984

ALIAS
 SLOW_BID
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBLBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SUBHBID
 EDITION 1 ENCODED BY MASTER AT 19 26 29 ON 27 NOV 1984
 ALIAS
 SUB_HIGH_BID
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SUBHBID
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM SAWD_CWE
 EDITION 1 ENCODED BY MASTER AT 19 26 30 ON 27 NOV 1984
 ALIAS
 SUBAWD_CWE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM SAWD_CWE
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF FILE MACOMSEG
 EDITION 1 ENCODED BY MASTER AT 19 27 01 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 30 DIRECT REFERENCES
 FILE MACOMSEG
 PARENT MAIN
 SEGTYPE U
 FORM DEFAULTED-AS
 CONTAINS
 ITEM MTPN
 ITEM MPDES
 ITEM MPY
 ITEM MOUS
 ITEM MCATCD5
 ITEM MPRI
 ITEM MDDSORT
 ITEM MPE
 ITEM MSCOPE
 ITEM MTF
 ITEM MMISSION
 ITEM MPA
 ITEM MCONS
 ITEM MRC
 ITEM MINCODE
 ITEM MPDIP
 ITEM MPDIPNAME
 ITEM MPRCD
 ITEM MRMKI
 ITEM MSDTG
 ITEM MPRISDTG
 ITEM MPASDTG
 ITEM MFNO
 ITEM MMOBGP
 ITEM MMPRI
 ITEM MOBPRISDTG
 ITEM MLSD
 ITEM MROD
 ITEM MTIER
 ITEM OMPRI
 REPORT OF ITEM MTPN
 EDITION 1 ENCODED BY MASTER AT 19 26 33 ON 27 NOV 1984
 ALIAS
 M_TEMP_PN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MTPN
 DEFAULTED-AS
 CHARACTERS 7
 REPORT OF ITEM MPDES
 EDITION 1 ENCODED BY MASTER AT 19 26 34 ON 27 NOV 1984
 ALIAS
 M_PROJ_DESC
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPDES
 DEFAULTED-AS

CHARACTERS 26
 REPORT OF ITEM MPY
 EDITION 1 ENCODED BY MASTER AT 19.26.36 ON 27 NOV 1984
 ALIAS
 M_FISCAL_YEA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM MOUS
 EDITION 1 ENCODED BY MASTER AT 19.26.36 ON 27 NOV 1984
 ALIAS
 M_ORIG_US_SV
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MOUS
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM MCATCD6
 EDITION 1 ENCODED BY MASTER AT 19.26.37 ON 27 NOV 1984
 ALIAS
 M_CATCODE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MCATCD6
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF ITEM MPRI
 EDITION 1 ENCODED BY MASTER AT 19.26.38 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRI
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF ITEM MDDSORT
 EDITION 1 ENCODED BY MASTER AT 19.26.39 ON 27 NOV 1984
 ALIAS
 M_SORT_CODE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MDDSORT
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM MPE
 EDITION 1 ENCODED BY MASTER AT 19.26.40 ON 27 NOV 1984
 ALIAS
 M_PROG_ELE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPE
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MSCOPE
 EDITION 1 ENCODED BY MASTER AT 19.26.40 ON 27 NOV 1984
 ALIAS
 M_SCOPE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MSCOPE
 DEFAULTED-AS
 NUMERIC-CHARACTER 9
 REPORT OF ITEM MTF
 EDITION 1 ENCODED BY MASTER AT 19.26.41 ON 27 NOV 1984
 ALIAS
 M_TYPE_FUNDS
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MTF
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MMISSION
 EDITION 1 ENCODED BY MASTER AT 19.26.42 ON 27 NOV 1984
 ALIAS
 M_MISSION
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MMISSION
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MPA

EDITION 1 ENCODED BY MASTER AT 19.26.43 ON 27 NOV 1984
 ALIAS
 M_PROG_AMT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPA
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM MCONS
 EDITION 1 ENCODED BY MASTER AT 19.26.44 ON 27 NOV 1984
 ALIAS
 M_CONS_TYPE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MCONS
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MRC
 EDITION 1 ENCODED BY MASTER AT 19.26.46 ON 27 NOV 1984
 ALIAS
 M_REPLACE_CD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MRC
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MINCODE
 EDITION 1 ENCODED BY MASTER AT 19.26.47 ON 27 NOV 1984
 ALIAS
 M_INCODE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MINCODE
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MPDIP
 EDITION 1 ENCODED BY MASTER AT 19.26.48 ON 27 NOV 1984
 ALIAS
 M_PDIP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPDIP
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF ITEM MPDIPNAME
 EDITION 1 ENCODED BY MASTER AT 19.26.48 ON 27 NOV 1984
 ALIAS
 MNAME
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPDIPNAME
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MPRCD
 EDITION 1 ENCODED BY MASTER AT 19.26.49 ON 27 NOV 1984
 ALIAS
 M_PR_CODE
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRCD
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM MRMKI
 EDITION 1 ENCODED BY MASTER AT 19.26.50 ON 27 NOV 1984
 ALIAS
 M_REMARK
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MRMKI
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM MSDTG
 EDITION 1 ENCODED BY MASTER AT 19.26.51 ON 27 NOV 1984
 ALIAS
 MSYS_DT_TIME
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MSDTG
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM MPRISDTG

EDITION 1 ENCODED BY MASTER AT 19.26.62 ON 27 NOV 1984
 ALIAS
 MPRISYSDT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPRISDTG
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM MPASDTG
 EDITION 1 ENCODED BY MASTER AT 19.26.62 ON 27 NOV 1984
 ALIAS
 MPASYSYDT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MPASDTG
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM MFNO
 EDITION 1 ENCODED BY MASTER AT 19.26.63 ON 27 NOV 1984
 ALIAS
 MFORMNO
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MFNO
 DEFAULTED-AS
 CHARACTERS 7
 REPORT OF ITEM MMOBGP
 EDITION 1 ENCODED BY MASTER AT 19.26.64 ON 27 NOV 1984
 ALIAS
 MMOB_GROUP
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MMOBGP
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM MMPRI
 EDITION 1 ENCODED BY MASTER AT 19.26.65 ON 27 NOV 1984
 ALIAS
 MMOBPRI
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MMPRI
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MOBPRISDTG
 EDITION 1 ENCODED BY MASTER AT 19.26.66 ON 27 NOV 1984
 ALIAS
 MOBSDT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MOBPRISDTG
 DEFAULTED-AS
 CHARACTERS 12
 REPORT OF ITEM MLSD
 EDITION 1 ENCODED BY MASTER AT 19.26.67 ON 27 NOV 1984
 ALIAS
 MLATE_ST_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MLSD
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MROD
 EDITION 1 ENCODED BY MASTER AT 19.26.68 ON 27 NOV 1984
 ALIAS
 MRQD_OCP_DT
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MROD
 DEFAULTED-AS
 CHARACTERS 6
 REPORT OF ITEM MTIER
 EDITION 1 ENCODED BY MASTER AT 19.26.69 ON 27 NOV 1984
 ALIAS
 MACOMTIER
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM MTIER
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM OMPRI

EDITION 1 ENCODED BY MASTER AT 19.27.00 ON 27 NOV 1984
 ALIAS
 OTHERMPRI
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM OMPRI
 DEFAULTED-AS
 CHARACTERS 5
 REPORT OF FILE HISTZCP1
 EDITION 1 ENCODED BY MASTER AT 19.27.07 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 3 DIRECT REFERENCES
 FILE HISTZCP1
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_ZCP1_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_ZCP1_DT
 ITEM HIS_PROG_MAT
 REPORT OF ITEM HIS_ZCP1_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.06 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP1_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_PROG_MAT
 EDITION 1 ENCODED BY MASTER AT 19.27.06 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_PROG_MAT
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF FILE HISTZCP2
 EDITION 1 ENCODED BY MASTER AT 19.27.11 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 5 DIRECT REFERENCES
 FILE HISTZCP2
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_ZCP2_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_ZCP2_DT
 ITEM HIS_ZCP_DR
 ITEM HIS_ZCP_DCD
 ITEM HZP2_FILLER
 REPORT OF ITEM HIS_ZCP2_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.08 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP2_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_ZCP_DR
 EDITION 1 ENCODED BY MASTER AT 19.27.09 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP_DR
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_ZCP_DCD
 EDITION 1 ENCODED BY MASTER AT 19.27.10 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP_DCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HZP2_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.27.11 ON 27 NOV 1984
 ALIAS
 FILL12
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HZP2_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE HISTZCP3

EDITION 1 ENCODED BY MASTER AT 19.27.18 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 FILE HISTZCP3
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_ZCP3_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_ZCP3_DT
 ITEM HIS_2807_CNG
 ITEM HIS_2807_OSD
 ITEM HIS_2807_RQ
 ITEM HZP3_FILLER
 REPORT OF ITEM HIS_ZCP3_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP3_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_2807_CNG
 EDITION 1 ENCODED BY MASTER AT 19.27.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_2807_CNG
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_2807_OSD
 EDITION 1 ENCODED BY MASTER AT 19.27.15 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_2807_OSD
 DEF2807_RQ
 EDITION 1 ENCODED BY MASTER AT 19.27.16 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_2807_RQ
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HZP3_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.27.17 ON 27 NOV 1984
 ALIAS
 FILL13
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HZP3_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE HISTZCP4
 EDITION 1 ENCODED BY MASTER AT 19.27.24 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 FILE HISTZCP4
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_ZCP4_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_ZCP4_DT
 ITEM HIS_1391_REC
 ITEM HIS_1391_DIS
 ITEM HIS_1391_OK
 ITEM HZP4_FILLER
 REPORT OF ITEM HIS_ZCP4_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.20 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP4_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_1391_REC
 EDITION 1 ENCODED BY MASTER AT 19.27.20 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_1391_REC
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_1391_DIS

EDITION 1 ENCODED BY MASTER AT 19.27.21 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_1391_DIS
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_1391_OK
 EDITION 1 ENCODED BY MASTER AT 19.27.22 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_1391_OK
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HZP4_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.27.23 ON 27 NOV 1984
 ALIAS
 FILL14
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HZP4_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE HISTZCP5
 EDITION 1 ENCODED BY MASTER AT 19.27.27 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 3 DIRECT REFERENCES
 FILE HISTZCP5
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_ZCP5_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_ZCP5_DT
 ITEM HIS_DSE_SD
 REPORT OF ITEM HIS_ZCP5_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.26 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_ZCP5_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_DSE_SD
 EDITION 1 ENCODED BY MASTER AT 19.27.27 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_DSE_SD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF FILE HISTACE1
 EDITION 1 ENCODED BY MASTER AT 19.27.45 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 16 DIRECT REFERENCES
 FILE HISTACE1
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HATRANS DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HATRANS
 ITEM HKN
 ITEM HACTDR
 ITEM HACEDR
 ITEM HACEDCD
 ITEM HPA
 ITEM HPY
 ITEM HSCP
 ITEM HPPY
 ITEM HDTFY
 ITEM HDTPA
 ITEM HODRCN
 ITEM HNDRCN
 ITEM HPDRCN
 ITEM HACEFILLER
 REPORT OF ITEM HATRANS
 EDITION 1 ENCODED BY MASTER AT 19.27.29 ON 27 NOV 1984
 ALIAS
 ACEITRANS
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES

ITEM HATRANS
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HKN
 EDITION 1 ENCODED BY MASTER AT 19.27.30 ON 27 NOV 1984
 ALIAS
 HISKEYNR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HKN
 DEFAULTED-AS
 CHARACTERS 13
 REPORT OF ITEM HACTDR
 EDITION 1 ENCODED BY MASTER AT 19.27.31 ON 27 NOV 1984
 ALIAS
 ACTDR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HACTDR
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HACEDR
 EDITION 1 ENCODED BY MASTER AT 19.27.32 ON 27 NOV 1984
 ALIAS
 HISACEDR
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HACEDR
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HACEDCD
 EDITION 1 ENCODED BY MASTER AT 19.27.32 ON 27 NOV 1984
 ALIAS
 HISACEDCD
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HACEDCD
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HPA
 EDITION 1 ENCODED BY MASTER AT 19.27.33 ON 27 NOV 1984
 ALIAS
 HISPADES
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HPA
 DEFAULTED-AS
 NUMERIC-CHARACTER 8
 REPORT OF ITEM HFY
 EDITION 1 ENCODED BY MASTER AT 19.27.34 ON 27 NOV 1984
 ALIAS
 HISFYDES
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HFY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM HSCP
 EDITION 1 ENCODED BY MASTER AT 19.27.35 ON 27 NOV 1984
 ALIAS
 HISSCOPEDES
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HSCP
 DEFAULTED-AS
 NUMERIC-CHARACTER 9
 REPORT OF ITEM HPPY
 EDITION 1 ENCODED BY MASTER AT 19.27.36 ON 27 NOV 1984
 ALIAS
 HISPCFY
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HPPY
 DEFAULTED-AS
 CHARACTERS 2
 REPORT OF ITEM HDTFY
 EDITION 1 ENCODED BY MASTER AT 19.27.38 ON 27 NOV 1984
 ALIAS
 HISDATEFY
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES

ITEM HDTFY
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HDTFA
 EDITION 1 ENCODED BY MASTER AT 19.27.39 ON 27 NOV 1984
 ALIAS
 HISDATEPA
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HDTFA
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HODRCN
 EDITION 1 ENCODED BY MASTER AT 19.27.41 ON 27 NOV 1984
 ALIAS
 HISOLDDRCN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HODRCN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM HNDRCN
 EDITION 1 ENCODED BY MASTER AT 19.27.42 ON 27 NOV 1984
 ALIAS
 HISNEWDRCN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HNDRCN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM HPDRCN
 EDITION 1 ENCODED BY MASTER AT 19.27.43 ON 27 NOV 1984
 ALIAS
 HISPREDRCN
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HPDRCN
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF ITEM HACEFILLER
 EDITION 1 ENCODED BY MASTER AT 19.27.44 ON 27 NOV 1984
 ALIAS
 FILL15
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HACEFILLER
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF FILE HISTMPES
 EDITION 1 ENCODED BY MASTER AT 19.27.53 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 7 DIRECT REFERENCES
 FILE HISTMPES
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_MPES_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_MPES_DT
 ITEM HIS_CST_DT
 ITEM HIS_PRJ_CST
 ITEM HIS_CST_CD
 ITEM HIS_SOLAR
 ITEM HMPS_FILLER
 REPORT OF ITEM HIS_MPES_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.48 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_MPES_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_CST_DT
 EDITION 1 ENCODED BY MASTER AT 19.27.49 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_CST_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_PRJ_CST
 EDITION 1 ENCODED BY MASTER AT 19.27.50 ON 27 NOV 1984

THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_PRJ_CST
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM HIS_CST_CD
EDITION 1 ENCODED BY MASTER AT 19.27.50 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_CST_CD
DEFAULTED-AS
CHARACTERS 1
REPORT OF ITEM HIS_SOLAR
EDITION 1 ENCODED BY MASTER AT 19.27.51 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_SOLAR
DEFAULTED-AS
NUMERIC-CHARACTER 8
REPORT OF ITEM HMPS_FILLER
EDITION 1 ENCODED BY MASTER AT 19.27.52 ON 27 NOV 1984
ALIAS
FILL16
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HMPS_FILLER
DEFAULTED-AS
CHARACTERS 3
REPORT OF FILE HISTMPE1
EDITION 1 ENCODED BY MASTER AT 19.28.01 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 8 DIRECT REFERENCES
FILE HISTMPE1
PARENT MAIN
SEGTYPE SH1
SORT-KEY
ITEM HIS_MPE1_DT DESCENDING
FORM DEFAULTED-AS
CONTAINS
ITEM HIS_MPE1_DT
ITEM HIS_MPE_DR
ITEM HIS_DEI_DT
ITEM HIS_DEI_RQ
ITEM HIS_MPE_DCD
ITEM HISENREVD
ITEM HISENRN
REPORT OF ITEM HIS_MPE1_DR
EDITION 1 ENCODED BY MASTER AT 19.27.55 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_MPE1_DT
DEFAULTED-AS
NUMERIC-CHARACTER 6
REPORT OF ITEM HIS_MPE_DR
EDITION 1 ENCODED BY MASTER AT 19.27.56 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_MPE_DR
DEFAULTED-AS
NUMERIC-CHARACTER 6
REPORT OF ITEM HIS_DEI_DT
EDITION 1 ENCODED BY MASTER AT 19.27.57 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_DEI_DT
DEFAULTED-AS
NUMERIC-CHARACTER 6
REPORT OF ITEM HIS_MPE_DQ
EDITION 1 ENCODED BY MASTER AT 19.27.58 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_DEI_RQ
DEFAULTED-AS
CHARACTERS 1
REPORT OF ITEM HIS_MPE_DCD
EDITION 1 ENCODED BY MASTER AT 19.27.59 ON 27 NOV 1984
THIS MEMBER IS DIRECTLY REFERRED TO ONCE
THIS MEMBER CONTAINS 0 DIRECT REFERENCES
ITEM HIS_MPE_DCD
DEFAULTED-AS
CHARACTERS 1

REPORT OF ITEM HISENREVDT
 EDITION 1 ENCODED BY MASTER AT 19.27.59 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HISENREVDT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6

REPORT OF ITEM HISENRN
 EDITION 1 ENCODED BY MASTER AT 19.28.00 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HISENRN
 DEFAULTED-AS
 CHARACTERS 2

REPORT OF FILE HISTMPC1
 EDITION 1 ENCODED BY MASTER AT 19.28.07 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 5 DIRECT REFERENCES
 FILE HISTMPC1
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_MPC1_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_MPC1_DT
 ITEM HIS_DES_DD
 ITEM HIS_MPC_DCD
 ITEM HMPC_FILLER

REPORT OF ITEM HIS_MPC1_DT
 EDITION 1 ENCODED BY MASTER AT 19.28.04 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_MPC1_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6

REPORT OF ITEM HIS_DES_DD
 EDITION 1 ENCODED BY MASTER AT 19.28.05 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_DES_DD
 DEFAULTED-AS
 NUMERIC-CHARACTER 6

REPORT OF ITEM HIS_MPC_DCD
 EDITION 1 ENCODED BY MASTER AT 19.28.06 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_MPC_DCD
 DEFAULTED-AS
 CHARACTERS 1

REPORT OF ITEM HMPC_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.28.06 ON 27 NOV 1984
 ALIAS
 FILL16
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HMPC_FILLER
 DEFAULTED-AS
 CHARACTERS 3

REPORT OF FILE HISTMPC2
 EDITION 1 ENCODED BY MASTER AT 19.28.12 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 4 DIRECT REFERENCES
 FILE HISTMPC2
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_MPC2_DT DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_MPC2_DT
 ITEM HIS_CONCOM
 ITEM HIS_DES_AMT

REPORT OF ITEM HIS_MPC2_DT
 EDITION 1 ENCODED BY MASTER AT 19.28.09 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_MPC2_DT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6

REPORT OF ITEM HIS_CONCOM

EDITION 1 ENCODED BY MASTER AT 19.28.10 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_CONCOM
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_DES_AMT
 EDITION 1 ENCODED BY MASTER AT 19.28.11 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_DES_AMT
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF FILE HISTLVL
 EDITION 1 ENCODED BY MASTER AT 19.28.17 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 4 DIRECT REFERENCES
 FILE HISTLVL
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_DT_LVL DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_DT_LVL
 ITEM HIS_LVL
 ITEM HLVL_FILLER
 REPORT OF ITEM HIS_DT_LVL
 EDITION 1 ENCODED BY MASTER AT 19.28.14 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_DT_LVL
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_LVL
 EDITION 1 ENCODED BY MASTER AT 19.28.15 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_LVL
 DEFAULTED-AS
 CHARACTERS 1
 REPORT OF ITEM HLVL_FILLER
 EDITION 1 ENCODED BY MASTER AT 19.28.16 ON 27 NOV 1984
 ALIAS
 FILL19
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HLVL_FILLER
 DEFAULTED-AS
 CHARACTERS 3
 REPORT OF FILE HISTCFY
 EDITION 1 ENCODED BY MASTER AT 19.28.20 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 3 DIRECT REFERENCES
 FILE HISTCFY
 PARENT MAIN
 SEGTYPE SH1
 SORT-KEY
 ITEM HIS_DT_CFY DESCENDING
 FORM DEFAULTED-AS
 CONTAINS
 ITEM HIS_DT_CFY
 ITEM HIS_CFY
 REPORT OF ITEM HIS_DT_CFY
 EDITION 1 ENCODED BY MASTER AT 19.28.19 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO 2 TIMES
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_DT_CFY
 DEFAULTED-AS
 NUMERIC-CHARACTER 6
 REPORT OF ITEM HIS_CFY
 EDITION 1 ENCODED BY MASTER AT 19.28.20 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES
 ITEM HIS_CFY
 DEFAULTED-AS
 CHARACTERS 4
 REPORT OF FILE COM2SEG
 EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
 THIS MEMBER IS DIRECTLY REFERRED TO ONCE
 THIS MEMBER CONTAINS 0 DIRECT REFERENCES

```

REPORT OF FILE SITESEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE CATSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE CAT3DESC
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE DESCRSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE DIVSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE INSTSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE MACMSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE ZBDICSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE AUTHSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE NOTEAUTH
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE APPRSEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
REPORT OF FILE NOTESEG
  EDITION **DUMMY** CREATED BY MASTER AT 19.28.36 ON 27 NOV 1984
  THIS MEMBER IS DIRECTLY REFERRED TO ONCE
  THIS MEMBER CONTAINS 0 DIRECT REFERENCES
>enddmr
DM000621      END OF DATA ON PRIMARY INPUT FILE
DM000721      642 FREE BLOCKS 038 FREE BLOCKS ON DATA ENTRIES DATA SET
DM000731      966 FREE BLOCKS ON INDEX DATA SET
DM000751      2 % UTILIZATION OF ERROR RECOVERY DATA SET
DM000801      8480 BYTES USED IN STACK STORAGE
DM000811      63688 BYTES USED IN NON-STACK STORAGE
DM000701      4 LINES READ FROM PRIMARY INPUT FILE
DM000711      3360 LINES PRINTED
R: T-5 91/16 61 15 28 16

```

APPENDIX C:

DATA USED TO IDENTIFY STANDARD REPORTS

The Standard Report Definition file contains the information shown in Tables C1 through C3.

REPORT ID	TARGET ITEM NAME	QUALIFYING ITEM NAME
1	prog_ele	fy
2	auth_amt,prog_amt,cwe_amt, des_percent, des_st_dt, des_comp_dt,dist_name	fy

Table C1. Target data items and qualifying items for two reports.

DATA ITEM NAME	INTERNAL KEYWORD
prog_ele	amount,element,program
auth_amt	amount,authorized,authority
prog_amt	amount,program
cwe_amt	current,estimate,amount,project
des_percent	progress,design,completion,percent
des_st_dt	design,start,date
des_comp_dt	design,completion,date
dist_name	district,title,regional
fy	current,year,congress,fiscal

Table C2. Internal keywords corresponding to data items in Table C1.

INTERNAL KEYWORD	SEARCH KEYWORD
program,project	program,project
current	current
amount	amount,cost
fiscal	fiscal
year	year,yr
element	element
congress	congress
estimate	estimate
design	design
completion	completion
percent	percent
start	start
date	date
district	district
title	title
regional	regional,region
authority	authoirty
authorized	authorized
progress	progress

Table C3. Contents of the current TSK.

APPENDIX D:

SAMPLE QUERY PROCESSING SESSION

CMS>sdrep

***** WELCOME TO THE REPORT GENERATOR *****

THIS SYSTEM IS A QUESTION - DRIVEN INTERACTIVE ONE.
IT ACCEPTS AN INITIAL QUERY FROM THE USER, E.G.,
SHOW THE COST FOR PROJECT-B12 AND YEAR - 81
AND DECIDES WHICH REPORTS SATISFY THE INITIAL QUERY
AND THEN GENERATES THE REPORT SELECTED BY THE USER.

JUST FOLLOW THE PROMPTS AND PROCEED THROUGH TO
OBTAIN THE DESIRED REPORT.

NOTE: THE REPORT GENERATOR MAY BE EXITED AT ANY
TIME A PROMPT IS PRESENTED BY TYPING "QUIT"
EXCEPT WHEN PROMPTED WITH
"ENTER INITIAL QUERY". THEN EITHER "ENDQ"
OR A NULL LINE ARE REQUIRED TO EXIT.

ENTER AN INITIAL QUERY

>tell me about cost summarized by program element

:
>

FOLLOWING STANDARD REPORT(S) SATISFY YOUR QUERY
REPORT ID REPORT FULL NAME

1 SUMELEM

WHICH OF THE ABOVE REPORT DO YOU WANT?
TYPE WANTED REPORT ID (E.G. 1,2,...)
OR TYPE ! FOR MORE DESCRIPTION
OF THE REPORT(S)
OR, TYPE RETURN KEY IF YOU DON'T LIKE ANY
OF THESE REPORTS

>!

REPORT ID	REPORT FULL NAME	REPORT DESCRIPTION
1	SUMELEM	SUMMARY BY PROGRAM ELEMEN T DOLLARS IN THOUSANDS

WHICH OF THE ABOVE REPORT DO YOU WANT?
TYPE WANTED REPORT ID (E.G. 1,2,...)
OR, TYPE RETURN KEY IF YOU DON'T LIKE ANY
OF THESE REPORTS

>1

YOU HAVE SELECTED THE FOLLOWING STANDARD REPORTS
FOR GENERATION

REPORT ID REPORT FULL NAME

1 SUMELEM

IS THIS LISTING CORRECT ?

Type YES/NO

>yes

TO COMPLETE THE QUERY, YOU MUST SPECIFY THE VALUES OF FOLLOWING DATA ITEMS
CFY IN PMMFILE FORMAT - A2
DESC FISCAL YEAR

>84

WORKING X 47 ON 12/02/84

FOCUS 4.0.14V <ST> CREATED 01/26/84

>>>>>>>>>

WELCOME TO FOCUS

>>>>>>>>>WORKING

NUMBER OF RECORDS IN TABLE= 376 LINES= 6

PAUSE.. PLEASE ISSUE CARRIAGE RETURN WHEN READY

>

PAGE 1

FY 1984 SUMMARY BY PROGRAM ELEMENT
DOLLARS IN THOUSANDS

FY

84

PRO_TITLE

GENERAL PURPOSE FORCES	768,982
INTELLIGENCE	8,936
RESEARCH & DEVELOPMENT	59,284
CENTRAL SUPPLY & MAINT	73,871
TRAINING & PERSONNEL	182,002
ADMINISTRATIVE	209,666

TOTAL	1,302,741
-------	-----------

>SELECT ACTION TO BE TAKEN:

1. EXECUTE A DIFFERENT QUERY.
2. EXIT FROM THE REPORT GENERATOR.

>1

**** WELCOME TO THE REPORT GENERATOR ****

THIS SYSTEM IS A QUESTION - DRIVEN INTERACTIVE ONE.
IT ACCEPTS AN INITIAL QUERY FROM THE USER, E.G.,
SHOW THE COST FOR PROJECT-B12 AND YEAR - 81
AND DECIDES WHICH REPORTS SATISFY THE INITIAL QUERY
AND THEN GENERATES THE REPORT SELECTED BY THE USER.

JUST FOLLOW THE PROMPTS AND PROCEED THROUGH TO
OBTAIN THE DESIRED REPORT.

NOTE: THE REPORT GENERATOR MAY BE EXITED AT ANY
TIME A PROMPT IS PRESENTED BY TYPING "QUIT"
EXCEPT WHEN PROMPTED WITH
"ENTER INITIAL QUERY", THEN EITHER "ENDQ"
OR A NULL LINE ARE REQUIRED TO EXIT.

ENTER AN INITIAL QUERY

>
>tell me anything about current program cost

>

FOLLOWING STANDARD REPORT(S) SATISFY YOUR QUERY
REPORT ID REPORT FULL NAME

2 CONFUN2

WHICH OF THE ABOVE REPORT DO YOU WANT?
TYPE WANTED REPORT ID (E.G. 1,2... ..)
OR TYPE ! FOR MORE DESCRIPTION
OF THE REPORT(S)
OR, TYPE RETURN KEY IF YOU DON'T LIKE ANY
OF THESE REPORTS

>!

REPORT ID	REPORT FULL NAME	REPORT DESCRIPTION
2	CONFUN2	MCA CONSTRUCTION FUNDS ST ATUS

WHICH OF THE ABOVE REPORT DO YOU WANT?
TYPE WANTED REPORT ID (E.G. 1,2,....)
OR, TYPE RETURN KEY IF YOU DON'T LIKE ANY
OF THESE REPORTS

>

SELECT ACTION TO BE TAKEN:

1. EXECUTE A DIFFERENT QUERY.
2. EXIT FROM THE REPORT GENERATOR.

>2

16:49 EDT
CMS>

APPENDIX E:

LISTING OF FILES

```

YSIMAP:
  PROCEDURE OPTIONS(MAIN);

/*
* PROJECT:          REPORT GENERATOR
* PROGRAMMER:       DEPARTMENT OF COMPUTER SCIENCE
*                   UNIVERSITY OF ILLINOIS
*
* FILENAME:         THESAURUS.PLI
* LANGUAGE:         PL/I UNDER CMS
* DEPENDENCIES:     SKWDIN DATA
*
* DATE:            DECEMBER, 1984
*/

/* THIS MODULE READS IN ALL THE USER SEARCH KEYWORDS AND THEIR
   ASSOCIATED INTERNAL KEYWORDS FROM THE DATAFILE SKWDIN. IT
   THEN CREATES THE HASH TABLE AND WRITES THE TABLE IN TO
   THE DATA FILE SKWDOUT FOR USE DURING QUERY PARSING
*/

DCL SKWDOUT FILE OUTPUT STREAM ENV (F RECSIZE(80));
DCL NULL BUILTIN;
DCL WDLENG DEC FIXED(2) INIT(12); /* WORD LENGTH */
DCL (SKWD,INKWD) CHAR(12) VARYING, /* USER SEARCH KEYWORD */
/* INTERNAL KEYWORD */
/* WORD OR TOKEN */
WD CHAR(12) VARYING,
END_LINE CHAR(12) VARYING INIT(' '),
MORE_REC BIT(1) INIT('1'B), /* MORE RECORDS IN FILE */
YES BIT(1) INIT('1'B),
NO BIT(1) INIT('0'B),
NEXT DEC FIXED INIT(1012),
FLAG BIT(1),
INFL BIT(1),
INDX DEC FIXED,
(1,J,K) DEC FIXED,
MORE_WD BIT(1), /* MORE WORDS IN LINE */
HTBSIZE DEC FIXED INIT(1213), /* HASH TABLE SIZE */
BKSIZE DEC FIXED INIT(4), /* BUCKET SIZE */
TBSIZE DEC FIXED INIT(1013), /* OVERFLOW TABLE SIZE */
C(80) CHAR(1), /* INPUT LINE BUFFER */
PTR POINTER,
DCL 1 HTABLE(0:HTBSIZE-1), /* HASH TABLE -- THESAURUS */
2 TBL(BKSIZE),
3 SKWDF CHAR(12), /* USER SEARCH KEYWORD */
3 COUNT DEC FIXED INIT((HTBSIZE*BKSIZE)0),
/* NUMBER INTERNAL KEYWORDS */
/* TO INTERNAL KEYWORD LIST */
3 INKWDPTR POINTER,
2 OVERFL DEC FIXED INIT((HTBSIZE)0);
DCL 1 INKWDFREC BASED(CURR_INKWD_PT), /* NODE OF INTERNAL KEYWORD LIST */
2 INKWDF CHAR(12) VARYING, /* INTERNAL KEYWORD */
2 NEXTINKWD POINTER; /* NEXT INTERNAL KEYWORD */

/*****
/* MAIN PROCEDURE */
/*****

ON ENDFILE(SYSIN) MORE_REC=NO;
DO WHILE(MORE_REC);
  GET EDIT(C) (80 A(1));
  INFL=YES;
  MORE_WD=MORE_REC;
  DO WHILE(MORE_WD);
    WD=GETWD;
    IF (WD = ' ') THEN MORE_WD=NO;
  ELSE DO;
    IF INFL THEN
      DO;
        INKWD=WD;
        INFL=NO;
      END;
  END;

```

```

ELSE DO;
  SKWD=WD;
  /* COMPUTE HASHING FUNCTION INDEX */
  INDX=MOD(HASHF(SKWD),TBSIZE);
  FLAG=YES;
  DO WHILE (FLAG);
    I=1;
    /* CHECK IF BUCKET IS FULL */
    DO WHILE (FLAG & (I<=BKSIZE));
      IF (COUNT(INDX,I) NE 0) THEN DO;
/* CHECK IF THE RECORD IS OCCUPIED */
        IF (SKWDF(INDX,I)=SKWD) THEN
/* CHECK IF THE SEARCH KEYWORD IS THE SAME */
          DO;
            PTR=INKWDPT(INDX,I);
/* INSERT INTERNAL KEYWORD */
            DO WHILE (FLAG & (PTR NE NULL));
              IF PTR->INKWDF=INKWD THEN DO;
                PUT LIST('DUPLICATED',INKWD);
                FLAG=NO;
              END; /* END IF PTR-> THEN */
              ELSE DO;
                PTR=PTR->NEXTINKWD;
              END; /* END ELSE */
            END; /* END WHILE */
            IF FLAG THEN DO;
              COUNT(INDX,I)=COUNT(INDX,I)+1;
              ALLOCATE INKWDREC;
              NEXTINKWD=INKWDPT(INDX,I);
              INKWDPT(INDX,I)=CURR_INKWD_PT;
              INKWDF=INKWD;
              FLAG=NO;
            END; /* END FLAG */
          END;
        ELSE
          I=I+1;
        END;
      ELSE DO;
        SKWDF(INDX,I)=SKWD;
        COUNT(INDX,I)=COUNT(INDX,I)+1;
        ALLOCATE INKWDREC;
        INKWDPT(INDX,I)=CURR_INKWD_PT;
        INKWDF=INKWD;
        NEXTINKWD=NULL;
        FLAG=NO;
      END;
    END;
    IF FLAG THEN
      DO;
        IF (OVERFL(INDX)=0) THEN
          DO;
            NEXT=NEXT+1;
            OVERFL(INDX)=NEXT;
          END;
        INDX=OVERFL(INDX);
      END;
    END; /* DO WHILE FLAG */
  END; /* END ELSE */
END;
END; /* DO WHILE MORE_WD */
END; /* DO WHILE MORE_REC */
DO I=0 TO HTBSIZE-1;
  IF (COUNT(I,1) NE 0) THEN
    DO;
      DO J=1 TO BKSIZE;
        IF (COUNT(I,J) NE 0) THEN DO;
          PUT FILE(SKWDOUT) EDIT(I,J,SKWDF(I,J),COUNT(I,J))
            (COL(1),2(F(5),X(1)),A(12),X(1),F(5));
          PUT FILE(SKWDOUT) EDIT('') (COL(1),A(0));
          PTR=INKWDPT(I,J);
          DO K=1 TO COUNT(I,J);
            PUT FILE(SKWDOUT) (PTR->INKWDF);
            PTR=PTR->NEXTINKWD;
          END; /* DO K */
        END; /* IF (COUNT(I,J) THEN */
      END; /* END DO J */
    IF (OVERFL(I) NE 0) THEN
      PUT FILE(SKWDOUT) EDIT(I,'0',OVERFL(I)) (COL(1),3 (F(5),X(1)));
    END; /* END THEN */
  END; /* END DO I */

```

```

/...../
/
/  PROCEDURE:  GETWD
/
/  PURPOSE:   THIS FUNCTION DETERMINES AND RETURNS THE
/             NEXT WORD OR TOKEN FROM THE INPUT BUFFER,
/             C. IF NO 'NEXT' WORD EXISTS, THE NULL
/             STRING IS RETURNED.
/...../

```

```

GETWD:
  PROCEDURE RETURNS(CHAR(12) VARYING);
  DCL FLAG BIT(1);
  WD CHAR(12) VARYING;
  I DEC FIXED STATIC INIT(1);
  FLAG=YES;
  DO WHILE (I LE 80 AND FLAG);
    IF (C(I) NE ' ') THEN
      FLAG=NO;
      ELSE I=I+1;
  END;
  WD='';
  IF (NOT FLAG) THEN
    DO;
      FLAG=YES;
      DO WHILE (I LE 80 AND FLAG);
        IF (C(I)=' ') THEN FLAG=NO;
      ELSE DO;
        WD=WD CAT C(I);
        I=I+1;
      END;
    END;
  END;
  IF (WD = '') THEN I=1;
  RETURN(WD);
END GETWD;

```

```

/...../
/
/  PROCEDURE:  CONV
/
/  PURPOSE:   THIS FUNCTION CONVERTS A CHARACTER TO
/             ITS INTERNAL NUMERICAL REPRESENTATION.
/...../

```

```

CONV:
  PROCEDURE(CHR) RETURNS(DEC FIXED(3,0));
  DCL CHR CHAR(1);
  RETURN(UNSPEC(CHR));
END CONV;

```

```

/...../
/
/  PROCEDURE:  HASHF
/
/  PURPOSE:   THIS FUNCTION CALCULATES AND RETURNS THE
/             INDEX INTO THE HASH TABLE FOR THE
/             SPECIFIED WORD. (THE DETAILS OF THE
/             HASHING FUNCTION USED CAN BE FOUND IN
/             THE EXTERNAL DOCUMENTATION.)
/...../

```

```

HASHF:
  PROCEDURE(STR) RETURNS (DEC FIXED(12));
  DCL IND DEC FIXED(3,0);
  STR CHAR(12) VARYING;
  POS DEC FIXED(2) INIT(7) STATIC;
  LNG DEC FIXED(2,0);
  LNG=LENGTH(STR);
  IF (LNG=0) THEN
    RETURN(0);
  ELSE
    RETURN(HASHF(SUBSTR(STR,1,LNG-1))*POS+CONV(SUBSTR(STR,LNG,1)));
  END HASHF;
END YSIMAP;

```

```
ZSRDEF: PROCEDURE OPTIONS(MAIN).
```

```
/*
* PROJECT:          REPORT GENERATOR
* PROGRAMMER:       DEPARTMENT OF COMPUTER SCIENCE
*                  UNIVERSITY OF ILLINOIS
*
* FILENAME:        DFNGENERATOR.FLI
* LANGUAGE:        PL/I UNDER CMS
* DEPENDENCIES:
*
* DATE:           DECEMBER, 1984
*/
```

```
/* THIS PROGRAM ALLOWS A USER TO MANUALLY CREATE THE
STANDARD REPORT DEFINITIONS. IT PROMPTS THE USER
FOR THE REQUIRED INFORMATION AND THEN PROPERLY
ARRANGES IT IN THE DATA FILE SRDEF. THE OTHER
OPTION IS TO CALL THE DATA DICTIONARY ACCESS
PROCEDURE. THIS LATER METHOD AUTOMATICALLY
CREATES THE SRDEF FILE.
*/
```

```
DCL SRDEF FILE RECORD OUTPUT SEQUENTIAL ENV(P(1950));
DCL I REPORT,
    2 RID      FIXED(2),      /* REPORT ID */
    2 FNAME    CHAR(32),      /* REPORT FULL NAME */
    2 DES      CHAR(72),      /* REPORT DESCRIPTION */
    2 T_NUM    FIXED(2),      /* NO. OF TARGET ITEMS */
    2 Q_NUM    FIXED(2),      /* NO. OF QUALIFIERS */
    2 TITEM(10),
    3 TINAME   CHAR(12),      /* ITEM NAME */
    3 FORMAT   CHAR(10),      /* FORMAT */
    3 DBNAME   CHAR(8),       /* DATABASE NAME */
    3 LOGID    CHAR(8),       /* LOGIN ID */
    3 PASSWD   CHAR(8),       /* PASSWORD */
    3 FULNAM   CHAR(32),      /* FULL NAME OF THE ITEM */
    3 TIDES    CHAR(72),      /* DESCRIPTION OF THE ITEM */
    3 HEIGHT   FIXED(2),      /* LENGTH OF ACCESS PATH */
    3 PATH(4)  CHAR(8),      /* ARRAY OF PARENT SEGMENTS */
DCL (I,J,K)   FIXED(2);
DCL YESORNO CHAR(3);
DCL NUMBER   FIXED(2);
```

```
/*.....*/
/* MAIN PROCEDURE */
/*.....*/
```

```
OPEN FILE (SRDEF);
DO I=1 TO 3; /* INPUT REPORT RECORD */
  DISPLAY('NOW ENTER REPORT RECORD');
  RID = 1;
  DO J=1 TO 10; /* INIT WORK AREA */
    TITEM(J).TINAME = '';
    TITEM(J).FORMAT = '';
    TITEM(J).DBNAME = '';
    TITEM(J).LOGID = '';
    TITEM(J).PASSWD = '';
    TITEM(J).FULNAM = '';
    TITEM(J).TIDES = '';
    TITEM(J).HEIGHT = '';
  DO K=1 TO 4;
    TITEM(J).PATH(K) = '';
  END;
END;
DISPLAY('ENTER REPORT FULL NAME--CHAR(32)');
REPLY(FNAME);
DISPLAY('ENTER DES OF REPORT--CHAR(72)');
REPLY(DES);
DISPLAY('ENTER NO. OF TARGET ITEMS');
GET LIST (NUMBER);
T_NUM = NUMBER;
DO J=1 TO T_NUM; /* TARGET ITEM */
  CALL GETITEM(J);
END;
DISPLAY('ENTER NO. OF QUALIFIERS');
GET LIST (NUMBER);
Q_NUM = NUMBER;
DO J=1 TO Q_NUM; /* QUALIFIER */
```

```

        CALL GETITEM(J + T_NUM);
    END;

    WRITE FILE (SRDEF) FROM (REPORT);
    DISPLAY('WRITE REPORT RECORD ONCE');
    DISPLAY('ANY MORE REPORTS? (YES OR NO)') REPLY(YESORNO);
    IF YESORNO NE 'YES' THEN GO TO ZSREND;
END; /* REPORT */

```

```

.....
/*
/*  PROCEDURE    GETITEM
/*
/*  PURPOSE:    THIS PROCEDURE PROMPTS THE USER TO ENTER
/*              A DATA ITEM.
/*
/*
/*.....

```

```

GETITEM: PROCEDURE(P);          /* ENTER ITEM DATA */
    DCL P  FIXED(2);
    DISPLAY('NOW ENTER ITEM');
    DISPLAY('ENTER ITEM NAME---CHAR(12)');
    REPLY(TITEM(P).TINAME);
    DISPLAY('ENTER FORMAT---CHAR(10)');
    REPLY(TITEM(P).FORMAT);
    DISPLAY('ENTER DATABASE NAME---CHAR(8)');
    REPLY(TITEM(P).DBNAME);
    DISPLAY('ENTER LOGIN ID---CHAR(8)');
    REPLY(TITEM(P).LOGID);
    DISPLAY('ENTER PASSWORD---CHAR(8)');
    REPLY(TITEM(P).PASSWD);
    DISPLAY('ENTER FULL NAME OF THE ITEM---CHAR(32)');
    REPLY(TITEM(P).FULNAM);
    DISPLAY('ENTER DESCRIPTION OF THE ITEM---CHAR(72)');
    REPLY(TITEM(P).TIDES);
    DISPLAY('ENTER LENGTH OF ACCESS PATH');
    GET LIST (NUMBER);
    TITEM(P).HEIGHT = NUMBER;
    DISPLAY('NOW ENTER THE ACCESS PATH');
    DO K=1 TO TITEM(P).HEIGHT; /* ACCESS PATH */
        DISPLAY('ENTER PARENT SEGMENT NAME---CHAR(8)');
        REPLY(TITEM(P).PATH(K));
    END; /* ACCESS PATH */
END; /* ITEM */

CLOSE FILE (SRDEF);
ZSREND: DISPLAY('SRDEF FILE COMPLETED');
END ZSRDEF;

```

```
YUSINT:
  PROCEDURE OPTIONS(MAIN);
```

```
/*
 * PROJECT:      REPORT GENERATOR
 * PROGRAMMER:   DEPARTMENT OF COMPUTER SCIENCE
 *               UNIVERSITY OF ILLINOIS
 *
 * FILENAME:     FRONTENDDRIVER.PLI
 * LANGUAGE:     PL/I UNDER CMS
 * DEPENDENCIES: INITTHESAURUS.PLI      INITREPORTDFNS.PLI
 *               SETDBINTERFACE.PLI    QUERYPARSER.PLI
 *               DECISIONMAKER.PLI
 *
 * DATE:        DECEMBER, 1984
 */
```

```
/* THIS MODULE CONTAINS THE DRIVER FOR THE FRONT END
   OF THE REPORT GENERATOR.
*/
```

```
DCL SYSIN FILE INPUT STREAM ENV ( F RECSIZE (80));
DCL URIFR FILE OUTPUT STREAM ENV(F(236));
DCL SYSPRINT FILE OUTPUT STREAM ENV ( F RECSIZE (80));

DCL YQINIT ENTRY EXTERNAL, /* INITIALIZATION OF THESAURUS */
  YUINIT ENTRY EXTERNAL, /* INITIALIZATION OF STANDARD REPORT */
                        /* DEFINITIONS */
  YAINIT ENTRY EXTERNAL, /* SET UP DATA DICTIONARY INTERFACE */
  YQPARSE ENTRY EXTERNAL, /* QUERY PARSER */
  ZUIF ENTRY EXTERNAL; /* DECISION MAKER */

DCL YES BIT(1) INIT('1'),
  NO BIT(1) INIT('0');
DCL MORE_Q BIT(1) INIT('1') STATIC EXTERNAL; /* ANOTHER QUERY */
```

```
/*.....*/
/* MAIN PROCEDURE */
/*.....*/
```

```
CALL YQINIT;
CALL YUINIT;
CALL YAINIT;
OPEN FILE(URIFR);
  PUT FILE(URIFR) EDIT(-1) (COL(1),F(2));
CLOSE FILE(URIFR);
  CALL YQPARSE;
  IF MORE_Q THEN CALL ZUIF;
END YUSINT;
```

```

YQINIT:
  PROCEDURE OPTIONS(MAIN);

/*
* PROJECT:          REPORT GENERATOR
* PROGRAMMER:       DEPARTMENT OF COMPUTER SCIENCE
*                   UNIVERSITY OF ILLINOIS
*
* FILENAME:         INITTHESAURUS.PL1
* LANGUAGE:         PL/I UNDER CMS
* DEPENDENCIES:     SKWDOUT.DATA
*
* DATE:            DECEMBER, 1984
*/

/* THIS MODULE INITIALIZES THE PARSER'S INTERNAL REPRESENTATION
OF THE THESAURUS. IT SIMPLY READS THE DATA FROM THE FILE
SKWDOUT.DATA AND CREATES THE HASH TABLE.
*/

DCL SKWDOUT FILE INPUT STREAM ENV(F RECSIZE(80));
DCL NULL BUILTIN;
DCL YES BIT(1) INIT('1'B),
    NO BIT(1) INIT('0'B),
    PTR POINTER;
DCL HTBSIZE DEC FIXED INIT(1213), /* HASH TABLE SIZE */
    TBSIZE DEC FIXED INIT(1013), /* OVERFLOW TABLE SIZE */
    BKSZ DEC FIXED INIT(4); /* BUCKET SIZE */
DCL 1 HTABLE(0:1212) STATIC EXTERNAL, /* HASH TABLE--THESAURUS */
    2 TBL(4),
    3 SKWDF CHAR(12), /* USER SEARCH KEYWORD */
    3 COUNT DEC FIXED INIT((1213*4)0), /* NUMBER INTERNAL KEYWORDS */
    3 INKWDPTR POINTER, /* NEXT INTERNAL KEYWORD */
    2 OVERFL DEC FIXED INIT((1013)0);
DCL 1 INKWDRREC BASED(CURR_INKWD_PTR), /* NODE OF INTERNAL KEYWORD LIST */
    2 INKWDF CHAR(12) VARYING, /* INTERNAL KEYWORD */
    2 NEXTINKWD POINTER; /* NEXT INTERNAL KEYWORD */

DCL (I,J) DEC FIXED,
    MORE_REC BIT(1) INIT('1'B);

/*****
/* MAIN PROCEDURE */
*****/

ON ENDFILE(SKWDOUT) MORE_REC=NO;
DO WHILE (MORE_REC);
  GET FILE(SKWDOUT) EDIT(I,J) (COL(1),F(5),X(1),F(5));
  IF J=0 THEN
    GET FILE(SKWDOUT) EDIT (OVERFL(1)) (X(1),F(5));
  ELSE DO;
    GET FILE(SKWDOUT) EDIT(SKWDF(I,J),COUNT(I,J))(X(1),A(12),X(1),F(5));
    PTR=NULL;
    GET FILE(SKWDOUT) SKIP;
    DO K=1 TO COUNT(I,J);
      ALLOCATE INKWDRREC;
      GET FILE(SKWDOUT) (INKWDF);
      NEXTINKWD=PTR;
      PTR=CURR_INKWD_PTR;
    END; /* END DO K */
    INKWDPTR(I,J)=PTR;
  END; /* END ELSE */
END; /* END WHILE */
END YQINIT;

```

YQPARSE:
PROCEDURE OPTIONS(MAIN).

```

/*
* PROJECT      REPORT GENERATOR
* PROGRAMMER   DEPARTMENT OF COMPUTER SCIENCE
*              UNIVERSITY OF ILLINOIS
*
* FILENAME:    QUERYPARSER.PLI
* LANGUAGE:    PL/I UNDER CMS
* DEPENDENCIES: ACCESSDICTIONARY.PLI
*
* DATE:        DECEMBER, 1984
*/

```

```

/* THIS MODULE IMPLEMENTS THE QUERY PARSING.
IT ANALYZES THE USER'S QUERY AND EXTRACTS THE
TARGET ITEMS AND/OR THE QUALIFYING ITEMS FROM THE QUERY.
(FOR DETAILED INFORMATION SEE THE THESAURUS
OF USER SEARCH KEYWORDS (TSK) AND STATE
DIAGRAM DESCRIBED IN THE EXTERNAL DOCUMENTATION.)
THEN THE DATA DICTIONARY IS ACCESSED TO OBTAIN
THE ACTUAL DATABASE NAMES CORRESPONDING TO THESE
ITEMS WHICH ARE PASSED TO THE DECISION MAKER. */

```

```

DCL NULL BUILTIN;
DCL (SKWD,INKWD) CHAR(12), /* USER SEARCH KEYWORD */
/* INTERNAL KEYWORD */
BUFSZ DEC FIXED(4) INIT(800), /* BUFFER SIZE */
BUF(BUFSZ) CHAR(1), /* INPUT QUERY BUFFER */
YES BIT(1) INIT('1'B),
NO BIT(1) INIT('0'B),
MORE_Q BIT(1) STATIC EXTERNAL, /* MORE LINES IN QUERY */
MORE_WD BIT(1), /* MORE WORDS IN LINE */
WD CHAR(12) VARYING, /* TOKEN OR WORD */
STATE DEC FIXED(1), /* STATE OF SYSTEM */
FOUND BIT(1),
QCON BIT(1) INIT(YES), /* CONTINUE QUERYING */
(WPOS,WEND,ITEMPOS,ITEMEND) DEC FIXED(3),
/* WORD POSITION; WORD END; ITEM POSITION; ITEM END */
QLENG DEC FIXED(3), /* LENGTH OF QUERY */
ERR DEC FIXED(1), /* ERROR FLAG */
YESORNO CHAR(4),
PTR POINTER,
DCL HTBSIZE DEC FIXED INIT(1213), /* HASH TABLE SIZE */
TBSIZE DEC FIXED INIT(1013), /* OVERFLOW TABLE SIZE */
BKSIZ DEC FIXED INIT(4), /* BUCKET SIZE */
DCL 1 HTABLE(0:1212) STATIC EXTERNAL, /* HASH TABLE--THESAURUS */
2 TBL(4),
3 SKWDF CHAR(12), /* USER SEARCH KEYWORD */
3 COUNT DEC FIXED INIT((1213*4)0), /* TO INTERNAL KEYWORD LIST */
3 INKWDPTR POINTER,
2 OVERFL DEC FIXED INIT((1013)0),
DCL 1 YSKWDL BASED(CURR_SKWD_PT), /* USER SEARCH KEYWORD */
2 IKCOUNT DEC FIXED(2), /* NUMBER OF ASSOCIATED */
/* INTERNAL KEYWORDS */
2 IKPTR POINTER, /* NEXT INTERNAL KEYWORD */
2 NEXTSK POINTER, /* NEXT USER SEARCH KEYWORD */
DCL 1 INKWDL BASED(CURR_INKW_PT), /* INTERNAL KEYWORD RECORD */
2 INKWDF CHAR(12) VARYING, /* INTERNAL KEYWORD NAME */
2 NEXTINKWDPTR POINTER, /* NEXT INTERNAL KEYWORD */
DCL 1 YTARGET BASED(CURR_TARGET_PT), /* NODE OF TARGET ITEM LIST */
2 STCOUNT DEC FIXED(2), /* NUMBER OF ASSOCIATED */
/* INTERNAL KEYWORDS */
2 MATCH BIT(1) INIT('1'B),
2 STQPTR POINTER, /* TO INTERNAL KEYWORD LIST */
2 NEXTTG POINTER, /* NEXT TARGET ITEM */
DCL 1 YQUALI BASED(CURR_QUALI_PT), /* NODE OF QUALIFIER LIST */
2 SQCOUNT DEC FIXED(2), /* NUMBER OF ASSOCIATED */
/* INTERNAL KEYWORDS */
2 QVALUEU CHAR(12), /* QUALIFIER VALUE */
2 QVALUEB CHAR(12),
2 MATCH BIT(1) INIT('1'B),
2 SQUPTR POINTER, /* TO INTERNAL KEYWORD LIST */
2 NEXTQU POINTER, /* NEXT QUALIFIER ITEM */
DCL (TGHEAD,QUHEAD) POINTER STATIC EXTERNAL,
/* HEAD OF TARGET AND QUALIFIER ITEM LIST */
DCL (TCOUNT,QCOUNT) DEC FIXED(2), /* NUMBER TARGET ITEMS */

```

```

/* NUMBER QUALIFIER ITEMS */
DCL SKHEAD POINTER; /* HEAD OF USER SEARCH KEYWORD LIST */
DCL HEAD POINTER STATIC EXTERNAL;
/* HEAD TO LIST OF ACTUAL DATABASE ITEM NAMES */
DCL CATPTR POINTER STATIC EXTERNAL; /* CATAGORY PTR */
DCL TMEM CHAR(40) STATIC EXTERNAL;
/* TARGET MEMBER -- SINGLE KEYWORD FROM FORMAT */
DCL 1 CATREC BASED(CATPTR), /* NODE OF CATAGORY LIST */
    2 CATMEMN CHAR(32), /* CATAGORY MEMBER NAME */
    2 CATMEMT CHAR(32), /* CATAGORY ITEM NAME */
    2 CATNEXT POINTER; /* NEXT CATAGORY */
DCL ZACSD3 ENTRY EXTERNAL; /* DATA DICTIONARY MODULE */
DCL FORMLENG DEC FIXED(2) INIT(40), /* FORMAT LENGTH */
    FORMWD(50) CHAR(FORMLENG) VARYING INIT((50)');
/* KEYWORD FORMAT FOR DICTIONARY ACCESS */
DCL NOTG DEC FIXED(1) INIT(1), /* NO TARGET ITEM */
    NOTITEM DEC FIXED(1) INIT(2),
    NOQITEM DEC FIXED(1) INIT(3), /* TARGET ITEM HAS NO DATA ITEM */
    MISQUP DEC FIXED(1) INIT(4), /* QUALIFIER ITEM HAS NO DATA ITEM */
    MISQUV DEC FIXED(1) INIT(5), /* QUALIFYING ITEM PART MISSING */
    ILGCHR DEC FIXED(1) INIT(6); /* ILLEGAL CHARACTER */

/* ***** */
/* MAIN PROCEDURE */
/* ***** */

CALL INTRO;

DO WHILE(QCON),
    CALL INITQ;
    CALL NEWTG;
    MORE_Q=QUERYIN;
    MORE_WD=MORE_Q;
    QCON=MORE_Q;
    STATE=0;
DO WHILE(MORE_WD);
    WD=GETWD;
    IF WD='' THEN MORE_WD=NO;
    ELSE DO;
        SELECT(STATE);
        WHEN(0) DO;
            ITEMEND=WEND;
            SELECT;
            WHEN(CKWD(WD)) DO;
                STATE=2;
                ITEMPOS=WPOS;
            END;
            WHEN(EQU(WD));
            WHEN(CONJ(WD));
            OTHERWISE DO;
                ITEMPOS=WPOS;
                STATE=1;
            END;
        END; /* END SELECT */
        END; /* END 0 */
        WHEN(1) DO;
            ITEMEND=WEND;
            IF (CKWD(WD)) THEN DO;
                STATE=2;
                ITEMPOS=WPOS;
            END;
            ELSE IF (CONJ(WD) OR QUALIFIER(WD)) THEN DO;
                CALL MSG(NOTITEM, '', ITEMPOS, ITEMEND);
                IF (QUALIFIER(WD)) THEN DO;
                    STATE=3;
                    CALL NEWQU;
                END;
            END;
        END;
        WHEN(2) DO;
            SELECT;
            WHEN(CONJ(WD)) DO;
                STATE=0;
                TGHEAD->STGPTR=SKHEAD;
                CALL ACSDD(1);
                CALL NEWTG;
            END;

```

```

        WHEN(QUALIFIER(WD)) DO;
            STATE-3;
            TGHEAD->STGPTR-SKHEAD;
            CALL ACSDD(1);
            CALL NEWQU;
        END;
        OTHERWISE DO;
            ITEMEND-WEND;
            IF (CKWD(WD)) THEN DO;
                TGHEAD->STCOUNT-TGHEAD->STCOUNT+1;
            END;
        END;
    END;
END;
END;
WHEN(3) DO;
    IF (TCOUNT-0) THEN DO;
        CALL MSG(NOTG, '', 0, 0);
    END;
    ELSE
        SELECT;
            WHEN(CONJ(WD));
            WHEN(EQU(WD));
            WHEN(CKWD(WD)) DO;
                STATE-6;
                ITEMPOS-WPOS;
                ITEMEND-WEND;
            END;
            OTHERWISE DO;
                STATE-4;
                ITEMPOS-WPOS;
                ITEMEND-WEND;
            END;
        END;
    END; /* END SELECT */
END; /* END 3 */
WHEN(4) DO;
    SELECT;
        WHEN(EQU(WD)) CALL MSG(NOQITEM, WD, ITEMPOS, ITEMEND);
        WHEN(CONJ(WD)) CALL MSG(MISQUP, '', ITEMPOS, ITEMEND);
        OTHERWISE DO;
            IF (CKWD(WD)) THEN DO;
                STATE-5;
            END;
            ITEMEND-WEND;
        END;
    END; /* END OTHERWISE */
END; /* END SELECT */
END; /* END WHEN(4) */
WHEN(5) DO;
    IF EQL(WD) THEN DO;
        STATE-6;
        QUHEAD->SQUPTR-SKHEAD;
        CALL ACSDD(2);
    END;
    ELSE IF (CONJ(WD)) THEN
        CALL MSG(MISQUV, '', ITEMPOS, ITEMEND);
    ELSE DO;
        ITEMEND-WEND;
        IF (CKWD(WD)) THEN DO;
            QUHEAD->SQCOUNT-QUHEAD->SQCOUNT+1;
        END;
    END;
    END; /* END ELSE */
END; /* END WHEN(5) */
WHEN(6) DO;
    IF (CONJ(WD)) THEN
        CALL MSG(MISQUV, '', ITEMPOS, ITEMEND);
    ELSE IF (NOT EQL(WD)) THEN DO;
        QUHEAD->QVALUEU-WD;
        STATE-7;
    END;
END; /* END WHEN(6) */
WHEN(7) DO;
    CALL NEWQU;
    IF CONJ(WD) THEN STATE-3;
    ELSE DO;
        ITEMPOS-WPOS;
        IF (CKWD(WD)) THEN DO;
            STATE-6;
        END;
        ELSE STATE-4;
    END; /* END ELSE */
END; /* END 7 */
END; /* END SELECT */

```

```

        END; /* END ELSE */
    END; /* END WHILE MORE_WD */
    IF (MORE_Q) THEN DO;
    SELECT;
    WHEN (STATE=0) DO;
        TGHEAD=TGHEAD->NEXTTG;
        TCOUNT=TCOUNT-1;
        IF (TCOUNT=0) THEN DO;
            CALL MSG(NOTG, '', 0, 0);
        END;
    END;
    WHEN (STATE=1) DO;
        CALL MSG(NOTITEM, '', ITEMPOS, ITEMEND);
        TGHEAD=TGHEAD->NEXTTG;
        TCOUNT=TCOUNT-1;
        IF (TCOUNT=0) THEN CALL MSG(NOTG, '', 0, 0);
    END;
    WHEN (STATE=2) DO;
        TGHEAD->STGPTR=SKHEAD;
        ITEMEND=WEND;
        CALL ACSDD(1);
        IF (STATE=0) THEN DO;
            TCOUNT=TCOUNT-1;
            TGHEAD=TGHEAD->NEXTTG;
        END;
        IF (TCOUNT=0) THEN
            CALL MSG(NOTG, '', 0, 0);
        END;
    WHEN (STATE=3 OR STATE=4) DO;
        IF (STATE=4) THEN CALL MSG(MISQUP, '', ITEMPOS, ITEMEND);
        QUHEAD=QUHEAD->NEXTQU;
        QCOUNT=QCOUNT-1;
        END;
    WHEN (STATE=5 OR STATE=6) DO;
        CALL MSG(MISQUV, '', ITEMPOS, ITEMEND);
        QUHEAD=QUHEAD->NEXTQU;
        QCOUNT=QCOUNT-1;
        END;
    WHEN (STATE=7);
    END; /* END SELECT */
    IF (ERR=0) THEN QCON=NO;
    ELSE IF (ERR NE 1) THEN DO;
        PUT EDIT ('DO YOU WANT TO CONTINUE THIS QUERY? ');
        (COL(1), A);
        CALL YORN (YESORNO);
        IF YESORNO = 'YES' THEN QCON=NO;
        ELSE DO;
            PUT SKIP;
            PUT SKIP;
            PUT SKIP EDIT('REPORT GENERATOR EXITED AT USER'S REQUEST')(A);
            STOP;
        END;
    END;
    END; /* END ELSE */
END; /* END WHILE QCON */
END; /* END IF MORE_Q */

```

```

/* ..... */
/*
/* PROCEDURE   INITQ
/*
/* PURPOSE:    THIS PROCEDURE INITIALIZES THE VARIABLES
/*              FOR THE QUERY PARSER
/*
/* ..... */

```

```

INITQ
PROCEDURE,
QCON=YES,
TGHEAD=NULL,
QUHEAD=NULL,
TCOUNT=0,
QCOUNT=0,
ERR=NO,
END INITQ.

```

```

/* ..... */
/*
/* PROCEDURE   NEWTG
/*
/* ..... */

```

```

/* PURPOSE      THIS PROCEDURE ADDS A NEW TARGET ITEM      */
/*              TO THE CURRENT LIST OF TARGET ITEMS.        */
/* ..... */

```

```

NEWTG:
  PROCEDURE;

```

```

  ALLOCATE YTARGET;
  CURR_TARGET_PT->NEXTTG=TGHEAD;
  TCOUNT=TCOUNT+1;
  TGHEAD=CURR_TARGET_PT;
  TGHEAD->STCOUNT=1;
  TGHEAD->STGPTR=NULL;
  SKHEAD=NULL;
  END NEWTG;

```

```

/* ..... */
/* PROCEDURE:   NEWQU */
/* ..... */
/* PURPOSE:     THIS PROCEDURE ADDS A NEW QUALIFIER ITEM  */
/*              TO THE CURRENT LIST OF QUALIFIER ITEMS.    */
/* ..... */

```

```

NEWQU:
  PROCEDURE;

```

```

  ALLOCATE YQUALI;
  CURR_QUALI_PT->NEXTQU=QUHEAD;
  QCOUNT=QCOUNT+1;
  QUHEAD=CURR_QUALI_PT;
  QUHEAD->SQCOUNT=1;
  QUHEAD->SQUPTR=NULL;
  SKHEAD=NULL;
  END NEWQU;

```

```

/* ..... */
/* PROCEDURE:   CONSL */
/* ..... */
/* PURPOSE:     THIS FUNCTION CONVERTS LOWER CASE LETTERS */
/*              TO UPPER CASE LETTERS.                     */
/* ..... */

```

```

CONSL:
  PROCEDURE(CHR) RETURNS(CHAR(1));
  DCL CHR CHAR(1);
  SELECT(CHR);
  WHEN('A') RETURN('A');
  WHEN('B') RETURN('B');
  WHEN('C') RETURN('C');
  WHEN('D') RETURN('D');
  WHEN('E') RETURN('E');
  WHEN('F') RETURN('F');
  WHEN('G') RETURN('G');
  WHEN('H') RETURN('H');
  WHEN('I') RETURN('I');
  WHEN('J') RETURN('J');
  WHEN('K') RETURN('K');
  WHEN('L') RETURN('L');
  WHEN('M') RETURN('M');
  WHEN('N') RETURN('N');
  WHEN('O') RETURN('O');
  WHEN('P') RETURN('P');
  WHEN('Q') RETURN('Q');
  WHEN('R') RETURN('R');
  WHEN('S') RETURN('S');
  WHEN('T') RETURN('T');
  WHEN('U') RETURN('U');
  WHEN('V') RETURN('V');
  WHEN('W') RETURN('W');
  WHEN('X') RETURN('X');
  WHEN('Y') RETURN('Y');
  WHEN('Z') RETURN('Z');
  OTHERWISE RETURN(CHR);
  END;

```

END CONS1;

```

/...../
/*
/* PROCEDURE:  QUERYIN
/*
/* PURPOSE:    THIS FUNCTION PROMPTS THE USER TO ENTER A
/*              QUERY.  IT READS THE QUERY IN ONE CHARACTER
/*              AT A TIME CONVERTING IT TO UPPER CASE AND
/*              PLACING EACH INTO A BUFFER.  IT RETURNS A
/*              FLAG INDICATING WHETHER A QUERY WAS
/*              ENTERED.
/*              '0' -- NO QUERY OR REQUEST TO EXIT
/*              '1' -- A QUERY WAS ACCEPTED
/*
/...../

```

```

QUERYIN:
  PROCEDURE RETURNS(BIT(1));
  DCL 1 CHR,
      2 C(80) CHAR(1);
  DCL LREC CHAR(80) DEFINED CHR;
  DCL ITEMP INIT(0);

  BUF=' ';
  LREC='1';
  I=0;
  PUT SKIP;
  PUT EDIT ('ENTER THE INITIAL QUERY') (COL(1),A);
  DO WHILE(LREC NE (80)');
    GET EDIT(LREC) (A(80));
    IF (LREC NE (80)') THEN
      DO;
        ITEMP=1*80;
        DO J=1 TO 80;
          IF (C(J) GE 'A' & C(J) LE 'Z') THEN
            BUF(J+ITEMP)=CONSL(C(J));
          ELSE
            BUF(J+ITEMP)=C(J);
        END; /*END DO*/
        I=I+1;
      END; /*END THEN */
    END; /*END WHILE */
  QLENG=ITEMP+80;
  IF (BUF(1) CAT BUF(2) CAT BUF(3) CAT BUF(4) = 'ENDQ' OR I = 0)
    THEN RETURN('0');
  ELSE RETURN('1');
END QUERYIN;

```

```

/...../
/*
/* PROCEDURE:  GETWD
/*
/* PURPOSE:    THIS FUNCTION DETERMINES AND RETURNS THE
/*              NEXT WORD OR TOKEN IN THE QUERY BUFFER
/*              IF NO 'NEXT' WORD EXISTS THE NULL STRING
/*              IS RETURNED.
/*
/...../

```

```

GETWD:
  PROCEDURE RETURNS(CHAR(12) VARYING);
  DCL FLAG BIT(1) INIT(YES);
  WD CHAR(12) VARYING INIT('');
  WTEMP CHAR(12) VARYING INIT('');
  I DEC FIXED(3) STATIC INIT(1);
  WSTATE DEC FIXED(1) STATIC INIT(1);
  ILN DEC FIXED(1);
  DO WHILE(FLAG);
    SELECT(WSTATE),
      WHEN(1) DO;
      DO WHILE (I LE BUFSZ AND DELM(BUF(I)));
        I=I+1;
      END;
      IF (I GT BUFSZ) THEN DO;
        I=1;
        FLAG=NO;
      END;
    END;
  END;

```

```

END;
ELSE
  SELECT
    WHEN (CHRINWD(BUF(1))) WSTATE-2;
    WHEN (EQU(BUF(1))) WSTATE-3;
    WHEN (COMMA(BUF(1))) WSTATE-4;
    OTHERWISE WSTATE-5;
  END; /* END SELECT */
END; /* END WHEN(1) */

WHEN(2) DO;
  FLAG-NO;
  WPOS-1;
  DO WHILE(1 LE BUFSZ AND CHRINWD(BUF(1)));
    WD-WD CAT BUF(1);
    I-I+1;
  END;
  IF (1 LE BUFSZ) THEN WEND-I-1;
  ELSE WEND-I;
  IF (1 GT BUFSZ) THEN DO;
    I-1;
    WSTATE-1;
  END; /* END IF */
  ELSE
    SELECT;
    WHEN (DELM(BUF(1))) WSTATE-1;
    WHEN (EQU(BUF(1))) WSTATE-3;
    WHEN (COMMA(BUF(1))) WSTATE-4;
    OTHERWISE WSTATE-5;
  END; /* END SELECT */
END; /* WHEN(2) */

WHEN(3) DO;
  FLAG-NO;
  WD-WD CAT BUF(1);
  I-I+1;
  IF (1 GT BUFSZ) THEN DO;
    I-1;
    WSTATE-1;
  END;
  ELSE
    SELECT;
    WHEN (DELM(BUF(1))) WSTATE-1;
    WHEN (CHRINWD(BUF(1))) WSTATE-2;
    WHEN (EQU(BUF(1))) WSTATE-3;
    WHEN (COMMA(BUF(1))) WSTATE-4;
    OTHERWISE WSTATE-5;
  END; /* END SELECT */
END; /* WHEN(3) */

WHEN(4) DO;
  FLAG-NO;
  WD-WD CAT BUF(1);
  I-I+1;
  IF (1 GT BUFSZ) THEN DO;
    I-1;
    WSTATE-1;
  END;
  ELSE
    SELECT;
    WHEN (DELM(BUF(1))) WSTATE-1;
    WHEN (CHRINWD(BUF(1))) WSTATE-2;
    WHEN (EQU(BUF(1))) WSTATE-3;
    WHEN (COMMA(BUF(1))) WSTATE-4;
    OTHERWISE WSTATE-5;
  END; /* END SELECT */
END; /* WHEN(4) */

WHEN(5) DO;
  DO WHILE(1 LE BUFSZ AND NOT LEGALCHR(BUF(1)));
    IF (STATE -5) THEN DO;
      WTEMP-BUF(1);
      CALL MSG(1LGCHR,WTEMP,I,I+1);
    END;
    I-I+1;
  END;
  IF (1 GT BUFSZ) THEN DO;
    WSTATE-1;
    I-1;
  END; /* END IF */
  ELSE
    SELECT;
    WHEN (DELM(BUF(1))) WSTATE-1;
    WHEN (CHRINWD(BUF(1))) WSTATE-2;

```

```

        WHEN (EQU(BUF(1))) WSTATE=3;
        WHEN (COMMA(BUF(1))) WSTATE=4;
        OTHERWISE;
    END;
END; /* END SELECT 5 */
END; /* END SELECT */
END; /* END WHILE */
RETURN(WD);
END GETWD;

```

```

.....
/*
/* PROCEDURE:   CHRINWD
/*
/* PURPOSE:     THIS FUNCTION CHECKS IF A GIVEN CHARACTER
/*               IS A LEGAL ALPHA-NUMERIC CHARACTER OR
/*               AN '_'.
/*
/* .....

```

```

CHRINWD:
PROCEDURE(CHR) RETURNS(BIT(1));
DCL CHR CHAR(1);
RETURN(CHR='_ ' OR (CHR GE 'A' AND CHR LE 'Z') OR (CHR GE '0' AND
CHR LE '9'));
END CHRINWD;

```

```

.....
/*
/* PROCEDURE:   DELM
/*
/* PURPOSE:     THIS FUNCTION CHECKS IF A GIVEN CHARACTER
/*               IS A DELIMITER, I.E. A BLANK.
/*
/* .....

```

```

DELM:
PROCEDURE(CHR) RETURNS(BIT(1));
DCL CHR CHAR(1);
RETURN(CHR=' ');
END DELM;

```

```

.....
/*
/* PROCEDURE:   EQU
/*
/* PURPOSE:     THIS FUNCTION CHECKS IF A GIVEN CHARACTER
/*               IS AN EQUAL SIGN, '='.
/*
/* .....

```

```

EQU:
PROCEDURE(CHR) RETURNS(BIT(1));
DCL CHR CHAR(1);
RETURN(CHR='=');
END EQU;

```

```

.....
/*
/* PROCEDURE:   COMMA
/*
/* PURPOSE:     THIS FUNCTION CHECKS IF A GIVEN CHARACTER
/*               IS A COMMA, ','.
/*
/* .....

```

```

COMMA:
PROCEDURE(CHR) RETURNS(BIT(1));
DCL CHR CHAR(1);
RETURN(CHR=',');
END COMMA;

```

```

/...../
/*
/*  PROCEDURE    LEGALCHR
/*
/*  PURPOSE:     THIS FUNCTION CHECKS IF A GIVEN CHARACTER
/*                IS AN ALPHANUMERIC OR ONE OF THE FOLLOWING:
/*                A ' ', A '-' OR A '.',
/*
/...../

```

```

LEGALCHR:
PROCEDURE(CHR) RETURNS(BIT(1));
DCL CHR CHAR(1);
RETURN(CHRINWD(CHR) OR DELM(CHR) OR EQU(CHR) OR COMMA(CHR));
END LEGALCHR;

```

```

/...../
/*
/*  PROCEDURE:   CKWD
/*
/*  PURPOSE:     THIS FUNCTION SEARCHES THE DATA DICTIONARY,
/*                A HASH TABLE, FOR THE SPECIFIED WORD. IT
/*                RETURNS A FLAG INDICATING ITS PRESENCE.
/*                'YES' OR '1' -- WORD FOUND
/*                'NO' OR '0' -- NOT IN TABLE
/*
/...../

```

```

CKWD:
PROCEDURE(STR) RETURNS(BIT(1));
DCL STR CHAR(12) VARYING,
    SKWD CHAR(12),
    TMPTR POINTER,
    FLAG BIT(1) INIT('1'B);

INDX=MOD(HASHF(STR),1013);
SKWD=STR;
DO WHILE(FLAG);
    I=1;
    DO WHILE(I LE 4);
        IF (COUNT(INDX,I)=0) THEN RETURN(NO);
        ELSE DO;
            IF (SKWDF(INDX,I)=SKWD) THEN DO;
                ALLOCATE YSKWDL;
                CURR_SKWD_PT->NEXTSK=SKHEAD;
                SKHEAD=CURR_SKWD_PT;
                SKHEAD->IKPTR=INKWDPT(INDX,I);
                SKHEAD->IKCOUNT=COUNT(INDX,I);
                RETURN(YES);
            END; /* END IF THEN */
            ELSE I=I+1;
        END; /* END ELSE IF COUNT=NE '0'B */
    END; /* END WHILE I LE 4 */
    IF (OVERFL(INDX)=0) THEN RETURN(NO);
    ELSE INDX=OVERFL(INDX);
END; /*END WHILE FLAG */
END CKWD;

```

```

/...../
/*
/*  PROCEDURE:   CONV
/*
/*  PURPOSE:     THIS FUNCTION CONVERTS A CHARACTER TO
/*                ITS INTERNAL NUMERIC REPRESENTATION
/*
/...../

```

```

CONV:
PROCEDURE(CHR) RETURNS(DEC FIXED(3,0));
DCL CHR CHAR(1);
RETURN(UNSPEC(CHR));
END CONV;

```

```

/...../
/*
/*  PROCEDURE    HASHF
/*

```

```

/*
/* PURPOSE:      THIS FUNCTION CALCULATES AND RETURNS THE
/*               INDEX INTO THE HASH TABLE FOR THE
/*               SPECIFIED WORD. (THE DETAILS OF THE
/*               HASHING FUNCTION USED CAN BE FOUND IN
/*               THE EXTERNAL DOCUMENTATION )
/*
/* .....

```

```

HASHF:
PROCEDURE(STR) RETURNS (DEC FIXED(12));
DCL IND DEC FIXED(3,0);
  STR CHAR(12) VARYING;
  POS DEC FIXED(2) INIT(7) STATIC ;
  LNG DEC FIXED(2,0);
  LNG=LENGTH(STR);
  IF (LNG=0) THEN
    RETURN(0);
  ELSE
    RETURN(HASHF(SUBSTR(STR,1,LNG-1))*POS+CONV(SUBSTR(STR,LNG,1)));
  END HASHF;

```

```

/* .....
/*
/* PROCEDURE    QUALIFIER
/*
/* PURPOSE:     THIS FUNCTION DETERMINES IF THE SPECIFIED
/*               WORD IS ONE OF THE RESERVED WORDS.
/*               'WITH', 'WHERE', OR 'FOR'.
/*
/* .....

```

```

QUALIFIER:
PROCEDURE(STR) RETURNS(BIT(1));
DCL STR CHAR(12) VARYING;

RETURN(STR='WITH' OR STR='WHERE' OR STR='FOR');
END QUALIFIER;

```

```

/* .....
/*
/* PROCEDURE:   EQL
/*
/* PURPOSE:     THIS FUNCTION DETERMINES IF THE SPECIFIED
/*               WORD IS: '-', 'IS' OR 'ARE'.
/*
/* .....

```

```

EQL:
PROCEDURE(STR) RETURNS(BIT(1));
DCL STR CHAR(12) VARYING;
RETURN(STR='-' OR STR='IS' OR STR='ARE');
END EQL;

```

```

/* .....
/*
/* PROCEDURE:   CONJ
/*
/* PURPOSE:     THIS FUNCTION DETERMINES IF THE SPECIFIED
/*               WORD IS: 'AND'.
/*
/* .....

```

```

CONJ:
PROCEDURE(STR) RETURNS(BIT(1));
DCL STR CHAR(12) VARYING;
RETURN(STR='AND' OR STR=',');
END CONJ;

```

```

/* .....
/*
/* PROCEDURE    YORN
/*
/* PURPOSE      THIS PROCEDURE PROMPTS THE USER TO INPUT
/*               'YES', 'NO' OR 'QUIT'.
/*
/* .....

```

```

YORN:  PROCEDURE (YN);
      DCL YN CHAR(4);
      YN = '';

      DO WHILE (((YN NE 'YES') AND (YN NE 'NO')) AND (YN NE 'QUIT'));
        DISPLAY ('TYPE YES/NO')  REPLY(YN);
      END; /*DO*/
      IF YN = 'QUIT' THEN
        BEGIN;
          PUT SKIP;
          PUT SKIP;
          PUT SKIP EDIT ('REPORT GENERATOR EXITED AT USER'S REQUEST')
              (A);
        STOP;
      END;
END YORN;

```

```

/...../
/*      PROCEDURE:  MSG                                */
/*      PURPOSE:    THIS PROCEDURE DISPLAYS THE APPROPRIATE */
/*                  ERROR OR WARNING MESSAGE ON THE USER'S */
/*                  TERMINAL SCREEN.                        */
/...../

```

```

MSG:
  PROCEDURE(ERRCODE,WORD,WBEGIN,WEND);
DCL  ERRCODE DEC FIXED(1);
      WTMP CHAR(20) VARYING;
      WORD CHAR(12) VARYING;
      (WBEGIN,WEND,IBEGIN,IEND) DEC FIXED(3);
      ERRCON CHAR(20) VARYING; /* CONTENTS CONTAIN ERROR PART */
      ETYPE CHAR(9) VARYING; /* MESSAGE TYPE */
      MSG CHAR(50) VARYING; /*CONTENTS OF MESSAGE */
      FLAG BIT(1);
      IBEFORE DEC FIXED(1) INIT(6);
      IAFTER DEC FIXED(1) INIT(5);

  SELECT(ERRCODE);
  WHEN(NOTG) DO;
    ETYPE='ERROR';
    MSG='NO TARGET ITEM GIVEN, QUERY IGNORED';
    MORE_WD=NO;
  END;
  WHEN(NOTITEM) DO;
    ETYPE='WARNING';
    MSG=' DOES NOT SPECIFY A DATA ITEM, IGNORED ';
    TGHEAD=TCHEAD->NEXTTG;
    TCOUNT=TCOUNT-1;
    STATE=0;
    CALL NEWTG;
  END;
  WHEN(NOQITEM) DO;
    ETYPE='WARNING';
    MSG=' DOES NOT SPECIFY A DATA ITEM, IGNORED ';
    QUHEAD=QUHEAD->NEXTQU;
    QCOUNT=QCOUNT-1;
    WTMP=WORD;
    DO WHILE(FLAG);
      WD=GETWD;
      WTMP=WTMP CAT WD;
      FLAG=NO;
      IF (EQL(WD)) THEN FLAG=YES;
      ELSE IF (WD='') THEN
        MORE_WD=NO;
      END; /* END WHILE */
      STATE=7;
    END;
  WHEN(MISQUP) DO;
    ETYPE='WARNING';
    MSG=' QUALIFYING ITEM PART MISSING, IGNORED ';
    QUHEAD=QUHEAD->NEXTQU;
    QCOUNT=QCOUNT-1;
    STATE=3;
    CALL NEWQU;
  END; /* WHEN(1) */
  WHEN(MISQUV) DO;
    ETYPE='WARNING';

```

```

MSG=' QUALIFIER VALUE PART MISSING FOR ' ;
STATE=3;
QUHEAD=QUHEAD->NEXTQU;
QCOUNT=QCOUNT-1;
CALL NEWQU;
END; /* WHEN(2) */
WHEN(1LGCHR) DO;
  ETYPE='ERROR';
  MSG=' IS AN ILLEGAL CHAR., TREATED AS A BLANK';
END; /* WHEN(3) */
END; /* SELECT ERRCODE */
SELECT
  WHEN(ERRCODE=1LGCHR) DO;
    IBEGIN=WBEGIN-1BEFORE;
    IEND=WEND+1AFTER;
    IF (IBEGIN LE 0) THEN IBEGIN=1;
    IF (IEND GT QLENG) THEN IEND=QLENG;
    ERRCON='';
    DO K=IBEGIN TO IEND;
      ERRCON=ERRCON CAT BUF(K);
    END;
    PUT EDIT(ETYPE, ' ', WORD, ' ' IN ' ', ERRCON, ' ', MSG)
      (COL(1), A, COL(2), 6 A, COL(2), A);
END; /* WHEN 1LGCHR */
WHEN (ERRCODE=NOTG)
  PUT EDIT(ETYPE, MSG) (COL(1), A, COL(2), A);
WHEN(ERRCODE=NOTITEM OR ERRCODE=NOQITEM) DO;
  ERRCON='';
  DO K=WBEGIN TO WEND;
    ERRCON=ERRCON CAT BUF(K);
  END;
  PUT EDIT(ETYPE, ' ', ERRCON, ' ', MSG)
    (COL(1), A, COL(2), 4 A);
  IF (ERRCODE=NOQITEM) THEN DO;
    WTMP=ERRCON CAT WTMP;
    PUT EDIT(' ', WTMP, ' ') (X(1), 3 A);
  END;
END; /* END NOTITEM OR NOQITEM */
WHEN(ERRCODE=MISQUV OR ERRCODE=MISQUP) DO;
  ERRCON='';
  DO K=WBEGIN TO WEND;
    ERRCON=ERRCON CAT BUF(K);
  END;
  PUT EDIT(ETYPE, MSG, ' ', ERRCON, ' ')
    (COL(1), A, COL(2), 4 A);
END; /* MISQUV */
END; /* END SELECT */
ERR=ERRCODE;
END MSG;

```

```

/...../
/*
/* PROCEDURE: ACSDD
/*
/* PURPOSE: THIS PROCEDURE FOR EACH TARGET OR QUALIFIER
/* ITEM ACCESSES THE DATA DICTIONARY AND
/* CONVERTS THE INTERNAL KEYWORDS ASSOCIATED
/* WITH THE ITEM TO A LIST OF ACTUAL DATABASE
/* ITEM NAMES.
/*
/...../

```

```

ACSDD.
PROCEDURE(TGORQU);
DCL TGORQU DE: FIXED(1);
DCL (RL, KL, HL, P, PP) POINTER,
    (I, J, K) FIXED(2);

SELECT(TGORQU);
WHEN(1) DO;
  PP = NULL;
  WDNUM=1;
  CALL FORM(TGHEAD->STCOUNT, TGHEAD->STGPTR, WDNUM);
  IF FORMWD(1)=' ' THEN WDNUM=0;
  DO K=1 TO WDNUM;
    TMEM=FORMWD(K);
    FORMWD(K)='';
  HEAD = NULL;
  CALL ZACSD3; /* ACCESS D/D WITH TMEM */
  IF HEAD NE NULL THEN CALL SORTL;

```

```

        END;
        TGHEAD->STGPTR = PP;
        IF (PP = NULL) THEN DO;
            CALL MSG(NOTITEM, '', ITEMPOS, ITEMEND);
            STATE=0;
        END;
    END; /* WHEN WHEN TG */

    WHEN(2) DO;
        PP = NULL;
        WDNUM=1;
        CALL FORM(QUHEAD->SQCOUNT, QUHEAD->SQPTR, WDNUM);
        DO K=1 TO WDNUM;
            TMEM=FORMWD(K);
            FORMWD(K)='';
            HEAD = NULL;
            CALL ZACSD3; /* ACCESS D/D WITH TMEM */
            IF HEAD NE NULL THEN CALL SORTL;
        END;
        QUHEAD->SQPTR = PP;
        IF (PP = NULL) THEN DO;
            CALL MSG(NOTITEM, WD, ITEMPOS, ITEMEND);
        END;
    END; /* WHEN QUALIFIER */
    OTHERWISE;
    END; /* END SELECT */
    GO TO ACSD0;

/* ..... */
/*
/* PROCEDURE:  SORTL
/*
/* PURPOSE:    THIS PROCEDURE CHECKS ALL WORDS IN THE LIST
/*              OF DATABASE ITEM NAMES RETURNED FROM THE
/*              DATA DICTIONARY TO SEE IF THEY ARE CURRENTLY
/*              IN THE LIST. IF NOT, THEN THEY ARE ADDED TO
/*              THE END OF THE LIST.
/* ..... */

SORTL:  PROCEDURE;
        IF PP = NULL THEN
            BEGIN;
                I = 1;
                HL = HEAD;
                P = PP;
                DO WHILE (HL NE NULL);
                    ALLOCATE INKWDREC;
                    CURR_INKWD_PT->NEXTINKWD = NULL;
                    CURR_INKWD_PT->INKWDF = HL->CATREC.CATMEMN;
                    IF I > 1 THEN P->NEXTINKWD = CURR_INKWD_PT;
                    ELSE PP = CURR_INKWD_PT;
                    HL = HL->CATREC.CATNEXT;
                    P = CURR_INKWD_PT;
                    I = I + 1;
                END; /* HL */
            END;
        ELSE BEGIN; /* FOR NEXT INTERNAL KEYWORD */
            HL = HEAD;
            DO WHILE (HL NE NULL);
                P = PP;
                DO WHILE (P NE NULL);
                    IF HL->CATREC.CATMEMN = P->INKWDF THEN
                        GO TO S02;
                    IF P->NEXTINKWD NE NULL THEN
                        P = P->NEXTINKWD;
                    ELSE GO TO S01;
                END;
                ALLOCATE INKWDREC;
                CURR_INKWD_PT->INKWDF = HL->CATREC.CATMEMN;
                CURR_INKWD_PT->NEXTINKWD = NULL;
                P->NEXTINKWD = CURR_INKWD_PT;
            S02:  HL = HL->CATREC.CATNEXT;
            END;
        END;
    END SORTL;
ACSD0  END ACSD0;

/* ..... */

```

```

/*
/* PROCEDURE: FORM
/*
/* PURPOSE: THIS PROCEDURE FORMATS A CHARACTER STRING OF
/* ALL THE INTERNAL KEYWORDS ASSOCIATED WITH
/* THE SPECIFIED TARGET OR QUALIFIER ITEM.
/* EACH KEYWORD IS DELIMITED BY * AND THEY
/* ARE SEPARATED BY A ' '.
/*
/* .....

```

```

FORM:
  PROCEDURE(SKNUM, PTR, WDNUM) RECURSIVE;
  DCL (PTR, PTM) POINTER;

  DO I=WDNUM TO 1 BY -1;
    TMP=PTR->IKCOUNT;
    PTM=PTR->IKPTR;
    DO J=TMP TO 1 BY -1;
      IF FORMWD(I)=' ' THEN DO;
        FORMWD((I-1)*TMP+J)=' ' CAT PTM->INKWDF CAT ' ';
      END;
      ELSE DO;
        FORMWD((I-1)*TMP+J)=FORMWD(I) CAT ' ' CAT ' ' CAT
          PTM->INKWDF CAT ' ';
      END;
      PTM=PTM->NEXTINKWD;
    END;
  END;
  WDNUM=WDNUM*TMP;
  IF (SKNUM=1) THEN DO;
    RETURN;
  END;
  ELSE DO;
    CALL FORM(SKNUM-1, PTR->NEXTSK, WDNUM);
  END;
END FORM;

```

```

/*
/* PROCEDURE: INTRO
/*
/* PURPOSE: THIS PROCEDURE DISPLAYS THE INTRODUCTION
/* TO THE REPORT GENERATOR ON THE USER'S
/* TERMINAL SCREEN.
/*
/* .....

```

```

INTRO: PROCEDURE;

  PUT SKIP;
  PUT SKIP EDIT ('***** WELCOME TO THE REPORT GENERATOR *****')
    (COL(15), A);
  PUT SKIP;
  PUT SKIP;
  PUT SKIP EDIT ('THIS SYSTEM IS A QUESTION - DRIVEN INTERACTIVE ONE.')
    (COL(8), A);
  PUT SKIP EDIT ('IT ACCEPTS AN INITIAL QUERY FROM THE USER, E.G.,')
    (COL(8), A);
  PUT SKIP EDIT ('SHOW THE COST FOR PROJECT - B12 AND YEAR - 1981')
    (COL(11), A);
  PUT SKIP EDIT ('AND DECIDES WHICH REPORTS SATISFY THE INITIAL QUERY')
    (COL(8), A);
  PUT SKIP EDIT ('AND THEN GENERATES THE REPORT SELECTED BY THE USER.')
    (COL(8), A);
  PUT SKIP;
  PUT SKIP EDIT ('JUST FOLLOW THE PROMPTS AND PROCEED THROUGH TO')
    (COL(8), A);
  PUT SKIP EDIT ('OBTAIN THE DESIRED REPORT.') (COL(8), A);
  PUT SKIP;
  PUT SKIP EDIT ('NOTE THE REPORT GENERATOR MAY BE EXITED ANY')
    (COL(8), A);
  PUT SKIP EDIT ('TIME A PROMPT IS PRESENTED BY TYPING "QUIT"')
    (COL(15), A);
  PUT SKIP EDIT ('EXCEPT WHEN PROMPTED WITH')(COL(15), A);
  PUT SKIP EDIT ('ENTER INITIAL QUERY', THEN EITHER "ENDQ"')
    (COL(15), A);
  PUT SKIP EDIT ('OR A NULL LINE ARE REQUIRED TO EXIT')(COL(15), A);
  PUT SKIP;
  PUT SKIP;

END INTRO;
END YQPARSE;

```

```

YAINIT  PROCEDURE OPTIONS(MAIN);

/*
*   PROJECT:          REPORT GENERATOR
*   PROGRAMMER:       DEPARTMENT OF COMPUTER SCIENCE
*                     UNIVERSITY OF ILLINOIS
*
*   FILENAME:        SETDBINTERFACE.PLI
*   LANGUAGE:        PL/I UNDER CMS
*   DEPENDENCIES:    DMRUS
*
*   DATE:            DECEMBER, 1984
*/

/* THIS MODULE SETS UP THE PROPER INTERFACE WITH THE DATA
   DICTIONARY SO IT CAN BE ACCESSED LATER.
*/

/* DMRUS IS THE INTERFACE PROGRAM BETWEEN USER PROGRAM AND DATA DICTIONARY
   SUPPLIED BY DATA MANAGER */
DCL DMRUS ENTRY EXTERNAL OPTIONS(ASM,INTER);

DCL DMOUT FILE OUTPUT STREAM ENV (F RECSIZE(80));
DCL 1 DOUTPUT CHAR(150);

/* DCONTROL CONTAINS THE PARAMETERS NEEDED TO ACCESS DATA DICTIONARY */
DCL 1 DCONTROL STATIC EXTERNAL,
3 DCOMMUNE CHAR (64),
3 DDMR CHAR (8) INIT(' DMR '),
3 DBUFFLEN FIXED BIN (27) ALIGNED INIT(800),
3 DINPLEN FIXED BIN (15) ALIGNED INIT(72),
3 DINPLREC FIXED BIN (15) ALIGNED INIT(72),
3 DOUTLEN FIXED BIN (15) ALIGNED INIT(150),
3 DOUTLREC FIXED BIN (15) ALIGNED,
3 DFUNC PIC '9' INIT(1),
3 DRETURN PIC '9',
3 DRETURN1 PIC '9',
3 DRETURN2 PIC '9',
3 DSEVRITY CHAR (1),
3 DOPTION1 PIC '9' INIT(1),
3 DOPTION2 PIC '9' INIT(3),
3 DOPTION3 PIC '9',
3 DOPTION4 PIC '9',
3 DOPTION5 PIC '9' INIT(2),
3 DOPTION6 PIC '9' INIT(1),
3 DOPTION7 PIC '9' INIT(0),
3 DOPTION8 PIC '9' INIT(0),
3 DOPTION9 PIC '9',
3 DOUTWAIT FIXED DEC (5),
3 DOUTTOTL FIXED DEC (5),
3 DOUTTOTM FIXED DEC (5),
3 DINPNO FIXED DEC (3),
3 FILLER00001 CHAR (3),
3 DINPUT CHAR (72);

/*****
*   MAIN PROCEDURE
*****/

DCOMMUNE=LOW(64),
DINPUT = 'DICTIONARY DTEST ',

/* THE DICTIONARY NAME HAS TO BE CHANGED TO ACCESS DIFFERENT DATA DICTIONARY */
CALL DMRUS(DCONTROL,DOUTPUT),
DINPUT = 'AUTHORITY '||UCDCS' ',
CALL DMRUS(DCONTROL,DOUTPUT),
END YAINIT.

```

ZACSD3 : PROCEDURE OPTIONS(MAIN);

```

/*
 * PROJECT:      REPORT GENERATOR
 * PROGRAMMER:   DEPARTMENT OF COMPUTER SCIENCE
 *              UNIVERSITY OF ILLINOIS
 *
 * FILENAME:     ACCESSDICTIONARY.PLI
 * LANGUAGE:     PL/I UNDER CMS
 * DEPENDENCIES: DMRUS
 *
 * DATE:        DECEMBER, 1984
 */

```

```

/* THIS MODULE ACCESSES THE DATA DICTIONARY THROUGH THE DMRUS
INTERFACE USING THE COMMAND 'WHAT FORMS ...' IN ORDER TO
RETRIEVE MEMBER NAMES FOR A REPORT'S KEYWORDS IN THE
CATEGORY CLASSIFICATION.
*/

```

```

DCL DMRUS ENTRY EXTERNAL OPTIONS(ASM,INTER);
DCL NULL BUILTIN;
DCL MOD BUILTIN;
DCL 1 CATREC BASED(CATPTR),
    2 CATMEMN CHAR(32),
    2 CATMEMT CHAR(32),
    2 CATNEXT POINTER;
/* NODE OF CATEGORY LIST */
/* CATEGORY MEMBER NAME */
/* CATEGORY MEMBER TYPE */
/* NEXT CATEGORY */

DCL HEAD STATIC EXTERNAL POINTER; /* HEAD OF CATEGORY LIST */
DCL CATPTR STATIC EXTERNAL POINTER; /* CATEGORY PTR */
DCL TMEM STATIC EXTERNAL CHAR(40); /* TARGET MEMBER */
DCL TOTALN STATIC EXTERNAL CHAR(5);

```

```

DCL
1 DPQB_BASED4
3 FILLER00010
3 DPQBDTLL
5 DMTEST
5 FILLER00011 (10)
5 DPQBDMTP
5 FILLER00012
5 DPQBDMEM
3 FILLER00013
    BASED (DMR_PTR),
    CHAR (1),
    /*DETAIL LINE
    CHAR (4),
    CHAR (1),
    CHAR (32)
    /*MEMBER-TYPE
    CHAR (1),
    CHAR (32)
    /*MEMBER NAME
    CHAR (70),

```

```

DCL
1 DPQB_BASED5
3 FILLER00014
3 DPQBTOTL
5 FILLER00015
5 DPQBTOT
5 FILLER00016
5 DPQBTMEM
3 FILLER00017
    BASED (DMR_PTR)
    CHAR(1),
    CHAR(1)
    /* TOTAL
    CHAR(1)
    CHAR(20)
    CHAR (115)

```

DCL DMOUT FILE OUTPUT STREAM ENV (F RECSIZE=100)

DCL ATRACE FILE OUTPUT STREAM ENV (F RECSIZE=100)

```

DCL 1 DOUTPUT CHAR(150),
DCL 1 DCONTRO STATIC EXTERNAL,
DCL 1 DCOMMUNE CHAR (64),
3 DDMR CHAR (8) INIT('DMR000'),
3 DBUFFLEN FIXED BIN (27) ALIGNED INTR,
3 DINPLEN FIXED BIN (15) ALIGNED INTR,
3 DINPLRFC FIXED BIN (15) ALIGNED INTR,
3 DOUTLEN FIXED BIN (15) ALIGNED INTR,
3 DOUTLREC FIXED BIN (15) ALIGNED INTR,
3 DFUNC PIC '9' INIT(1),
3 DRETURN PIC '9',
3 DRETURN1 PIC '9',
3 DRETURN2 PIC '9',
3 DSEVRITY CHAR (1),
3 DOPTION1 PIC '9' INIT(1),
3 DOPTION2 PIC '9' INIT(1),
3 DOPTION3 PIC '9',
3 DOPTION4 PIC '9',
3 DOPTION5 PIC '9' INIT(1),

```

AD-A188 908

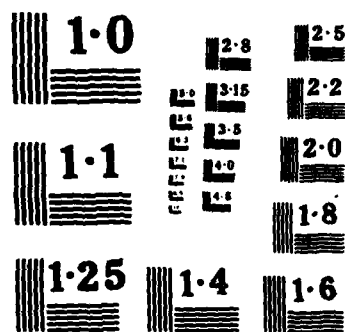
PROTOTYPE REPORT GENERATION FACILITY IN THE DATA
TRAFFIC MANAGEMENT SYSTE. (U) ILLINOIS UNIV AT URBANA
DEPT OF COMPUTER SCIENCE I ADIGUZEL ET AL. OCT 87
CERL-IR-P-88/02 DACW88-84-C-0011 F/G 5/1

2/2

UNCLASSIFIED

NL





```

3 DOPTION6 PIC '9' INIT(1),
3 DOPTION7 PIC '9' INIT(0),
3 DOPTION8 PIC '9' INIT(0),
3 DOPTION9 PIC '9',
3 DOUTWAIT FIXED DEC (5),
3 DOUTTOTL FIXED DEC (5),
3 DOUTTOTM FIXED DEC (5),
3 DINPNO   FIXED DEC (3),
3 FILLER00001 CHAR (3),
3 DINPUT   CHAR (72);

/*****
/*  MAIN PROCEDURE  */
*****/

ALLOCATE DPQB_BASED4;
ALLOCATE DPQB_BASED5;
HEAD = NULL;
PUT FILE(ATRACE) EDIT('TMEM= ',TMEM) (COL(1),A,A);
CALL CATAG(TMEN,HEAD);
/*
CALL LISTT(1)
*/
GO TO ZACSEND;

/*****
/*  PROCEDURE:  CATAG
/*
/*  PURPOSE:   THIS PROCEDURE CALLS DMRUS FOR EACH KEYWORD
/*             IN THE FORMATTED LIST, AND CREATES A LINKED
/*             LIST OF EACH MEMBER NAME RETURNED FROM THE
/*             DATABASE
/*
*****/

CATAG:
  PROCEDURE(STR,PTR);
  DCL STR CHAR(40),
  PTR POINTER,
  T   POINTER;

  PUT FILE(ATRACE) EDIT('INTERNAL KEYWORD IS: ',STR) (COL(1),A,A);
  DINPUT=WHAT FORMS ' CAT STR CAT ' ;
  CALL DMRUS(DCONTRO,DOUTPUT);
  DFUNC=2;
  PTR=NULL;
  CALL DMRUS(DCONTRO,DOUTPUT);
  T = NULL;
  I = 1;
  DO WHILE(DOUTWAIT > 0);
    IF DOUTWAIT NE 1 THEN BEGIN;
      ALLOCATE CATREC;
      CALL DMRUS(DCONTRO,DPQB_BASED4);
      IF (DMTEST = ' ') THEN DO;
        CATPTR->CATREC.CATMEMN=DPQBDMEM;
        CATPTR->CATREC.CATMEMT=DPQBDMTP;
        CATPTR->CATREC.CATNEXT=NULL;
        PUT FILE(ATRACE) EDIT('ITEM = ',CATPTR->CATREC.CATMEMN,'TYPE = ',
          CATPTR->CATREC.CATMEMT)(COL(1),A,A,X(4),A,A);
        IF I > 1 THEN T->CATREC.CATNEXT = CATPTR;
        ELSE PTR = CATPTR;
        T = CATPTR;
        I = I + 1;
      END;
    ELSE BEGIN;
      CALL DMRUS(DCONTRO,DPQB_BASED5);
      TOTALN = DPQBTOT;
      END;
      T=CATPTR;
    END;
    DFUNC = 1;
  END CATAG;

/*****
/*
*****/

```

```

/* PROCEDURE: LISTT */
/* PURPOSE: THIS PROCEDURE WRITES INTO THE DATA FILE ATRACE */
/* THE APPROPRIATE INFORMATION FROM EACH MEMBER */
/* OF THE CATEGORY LIST ACCORDING TO THE */
/* SPECIFIC COMMAND USED TO ACCESS THE DATABASE. */
/* ..... */

LISTT:
  PROCEDURE(TYPE);
  DCL TYPE FIXED(1);
  DCL PTR POINTER;

  IF TYPE = 1 THEN BEGIN;
    PTR = HEAD;
    PUT FILE(ATRACE) EDIT('WHAT FORMS--- CLASSIFICATION')(COL(1),A)
    ;
    PUT FILE(ATRACE) EDIT('GOT FOLLOW ITEMS FROM D/D FOR INTERNAL KEY'
    ) (COL(1),A);
    DO WHILE(PTR NE NULL);
      PUT FILE(ATRACE) EDIT(PTR->CATREC.CATMEMN,PTR->CATREC.CATMEMT
      ) (COL(1),X(2),A,X(2),A);
      PTR = PTR->CATREC.CATNEXT;
    END;
  END;

  IF TYPE = 2 THEN BEGIN;
    PTR = HEAD;
    PUT FILE(ATRACE) EDIT('WHAT USE--- ACCESS PATH')(COL(1),A);
    DO WHILE (PTR NE NULL);
      PUT FILE(ATRACE) EDIT(PTR->CATREC.CATMEMN,PTR->CATREC.CATMEMT)
      PTR->CATREC.CA
    END;
  END;

  IF TYPE = 3 THEN
    DISPLAY('NOW DISPLAY REPORT DETAILS');
  END LISTT;
ZACSEND: END ZACSD3;

```

```
YUINIT:
  PROCEDURE OPTIONS(MAIN);
```

```
/*
* PROJECT:      REPORT GENERATOR
* PROGRAMMER:   DEPARTMENT OF COMPUTER SCIENCE
*               UNIVERSITY OF ILLINOIS
*
* FILENAME:     INITREPORTDEFNS.PL1
* LANGUAGE:     PL/I UNDER CMS
* DEPENDENCIES: SRDEF.DATA
*
* DATE:        DECEMBER, 1984
*/
```

```
/* THIS MODULE CREATES AND INITIALIZES THE INTERNAL REPRESENTATION
OF THE STANDARD REPORT DEFINITIONS TO BE USED IN THE FRONT END.
*/
```

```
/* STANDARD REPORT DEFINITION FILE */
DCL SRDEF FILE INPUT SEQUENTIAL ENV(F(1950));
DCL NULL      BUILTIN;
DCL DATE      BUILTIN;
DCL TIME      BUILTIN;
DCL SUBSTR    BUILTIN;
DCL INDEX     BUILTIN;

DCL 1 SREPORT, /* SR DEF TEMPLT */
2 SRID FIXED(2) INIT(0), /* REPORT ID */
2 SFNAME CHAR(32) INIT(''), /* REPORT NAME */
2 SDES CHAR(72) INIT(''), /* DESCRIPTION */
2 ST_NUM FIXED(2) INIT(0), /* NUMBER TARGET ITEMS */
2 SQ_NUM FIXED(2) INIT(0), /* NUMBER QUALIFIER ITEMS */
2 STITEM(10), /* TARGET & QUALIFIER ITEM LIST */
3 STINAM CHAR(12) INIT((10)''), /* ITEM NAME */
3 SFORMA CHAR(10) INIT((10)''), /* FORMAT */
3 SDBNAM CHAR(8) INIT((10)''), /* DATABASE */
3 SLOGID CHAR(8) INIT((10)''), /* LOGON ID */
3 SPASSW CHAR(8) INIT((10)''), /* PASSWORD */
3 SFULNA CHAR(32) INIT((10)''), /* FULL NAME */
3 STIDES CHAR(72) INIT((10)''), /* DESCRIPTION */
3 SHEIGH FIXED(2) INIT((10)0), /* LENGTH OF ARRAY PATH */
3 SPATH(4) CHAR(8) INIT((10)''), /* ARRAY OF PARENT SEGMENTS */

DCL 1 TITEM, /* ITEM RECORD FOR RIF_D */
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8),
2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT PICTURE '99',
2 PATH(4) CHAR(8);

DCL 1 RIFREC, /* RIF_R RECORD */
2 SRID PICTURE '99', /* REPORT ID */
2 QUL_NO PICTURE '99', /* NUMBER QUALIFIERS */
2 QUAL(5), /* QUALIFIER NAME */
3 QNAME CHAR(12), /* QUALIFIER VALUE */
3 QVALU CHAR(12),
3 QVALB CHAR(12),
3 QINDEX PICTURE '999', /* QUALIFIER INDEX */
3 QFLAG PICTURE '9', /* QUALIFIER FLAG */
2 TI_NO PICTURE '99', /* NUMBER TARGET ITEMS */
2 TINDEX(10) PICTURE '999', /* INDEX ARRAY TO TARGET ITEMS */

DCL 1 REPORT(3) STATIC EXTERNAL, /* WORKING RECORD FOR SR */
2 FNAME CHAR(32), /* FULL NAME */
2 DES CHAR(72), /* DESCRIPTION */
2 T_NUM FIXED(2) INIT((3)0), /* NUMBER TARGET ITEMS */
2 TLIST POINTER, /* TO TARGET ITEM LIST */
2 Q_NUM FIXED(2) INIT((3)0), /* NUMBER OF QUALIFIERS */
2 QLIST POINTER, /* TO QUALIFIER LIST */
2 FACTOR FIXED(1) INIT((3)0), /* MATCH FACTOR */
2 WANTED BIT(1) INIT((3)'0'B), /* WANTED TO BE PRODUCED */

DCL 1 TARGET BASED(WT), /* NODE OF TARGET ITEM LIST */
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8);
```

```

2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT FIXED(2),
2 PATH(4) CHAR(8),
2 MATCH BIT(1) INIT('0'B),
2 FWP POINTER; /* NEXT TARGET ITEM */
DCL 1 QUALIF BASED(WQ), /* NODE OF QUALIFIER LIST */
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8),
2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT FIXED(2),
2 PATH(4) CHAR(8),
2 VALU CHAR(12),
2 VALB CHAR(12),
2 INDEX FIXED(3),
2 FLAG FIXED(1),
2 MATCH BIT(1) INIT('0'B),
2 FWP POINTER; /* NEXT QUALIFIER ITEM */

DCL SP POINTER;
DCL S BIT(1) INIT('1'B); /* END OF FILE */
DCL NP FIXED(2); /* NUMBER TARGET ITEMS ALREADY CREATED */

```

```

/*****
/ MAIN PROCEDURE */
*****/

```

```

I = 1;
ON ENDFILE (SRDEF) S = '0'B;
DO WHILE(S); /* GET SR TEMPLAT */
  READ FILE (SRDEF) INTO (SREPORT);
  IF (S) THEN DO;

```

```

/*
  SFNAME = '';
  SDES = '';
  ST_NUM = 0;
  SQ_NUM = 0;
  DO J=1 TO 10;
    STITEM(J).STINAM = '';
    STITEM(J).SFORMA = '';
    STITEM(J).SDBNAM = '';
    STITEM(J).SLOGID = '';
    STITEM(J).SPASSW = '';
    STITEM(J).SFULNA = '';
    STITEM(J).STIDES = '';
    STITEM(J).SHEIGH = '';
    DO K=1 TO 4;
      STITEM(J).SPATH(K) = '';
    END;
  END;
*/

```

```

  REPORT(I).FNAME = SFNAME;
  REPORT(I).DES = SDES;
  REPORT(I).QLIST = NULL;
  REPORT(I).TLIST = NULL;
  REPORT(I).T_NUM = ST_NUM;
  REPORT(I).Q_NUM = SQ_NUM;
  NP = 1;
  SP = NULL;
  DO J=1 TO ST_NUM; /* CREATE SR TARGET ITEM LIST */
    ALLOCATE TARGET;
    WT->TARGET.NAME = STITEM(J).STINAM;
    WT->TARGET.FORMAT = STITEM(J).SFORMA;
    WT->TARGET.DBNAME = STITEM(J).SDBNAM;
    WT->TARGET.LOGID = STITEM(J).SLOGID;
    WT->TARGET.PASSWD = STITEM(J).SPASSW;
    WT->TARGET.FNAME = STITEM(J).SFULNA;
    WT->TARGET.DES = STITEM(J).STIDES;
    WT->TARGET.HEIGHT = STITEM(J).SHEIGH;
    DO K=1 TO 4;
      WT->TARGET.PATH(K) = STITEM(J).SPATH(K);
    END; /* K */
    WT->TARGET.FWP = NULL;
    IF NP > 1 THEN SP->TARGET.FWP = WT;
    ELSE REPORT(I).TLIST = WT;
  END;

```

```

      SP = WT;
      NP = NP + 1;
END; /* J */
NP = 1;
DO J = ST_NUM + 1 TO ST_NUM + SQ_NUM;
  ALLOCATE QUALIF;
  WQ->QUALIF.NAME = STITEM(J).STINAM;
  WQ->QUALIF.FORMAT = STITEM(J).SFORMA;
  WQ->QUALIF.DBNAME = STITEM(J).SDBNAM;
  WQ->QUALIF.LOGID = STITEM(J).SLOGID;
  WQ->QUALIF.PASSWD = STITEM(J).SPASSW;
  WQ->QUALIF.FNAME = STITEM(J).SFULNA;
  WQ->QUALIF.DES = STITEM(J).STIDES;
  WQ->QUALIF.HEIGHT = STITEM(J).SHIEGH;
  DO K=1 TO 4;
    WQ->QUALIF.PATH(K) = STITEM(J).SPATH(K);
  END; /* K */
  WQ->QUALIF.FWP = NULL;
  IF NP > 1 THEN SP->QUALIF.FWP = WQ;
  ELSE REPORT(1).QLIST = WQ;
  SP = WQ;
  NP = NP + 1;
END; /* J */
I = I + 1;
END; /* END IF S */
END; /* S */

END YUINIT;

```

```
ZUIF:    PROCEDURE OPTIONS (MAIN);
```

```
/*
*   PROJECT:          REPORT GENERATOR
*   PROGRAMMER:       DEPARTMENT OF COMPUTER SCIENCE
*                     UNIVERSITY OF ILLINOIS
*
*   FILENAME:         DECISIONMAKER.PLI
*   LANGUAGE:         PL/I UNDER CMS
*   DEPENDENCIES:     ACCESSDICTIONARY.PLI
*
*   DATE:            DECEMBER, 1984
*/
```

```
/* THIS MODULE DETERMINES WHICH STANDARD REPORTS, IF ANY,
MATCH THE USER'S QUERY, AND THEN FORMPTS THE USER TO
SELECT EITHER THE STANDARD REPORT(S), OR A NON-STANDARD
REPORT TO BE PRODUCED. THE USER ALSO HAS THE CHOICE
OF NOT GENERATING ANY REPORT. FOR A STANDARD REPORT,
THE INFORMATION -- TARGET AND QUALIFIER DATA ITEMS,
AND REPORT FORMAT(S) -- NEEDED IS PASSED TO THE ACTUAL
REPORT GENERATOR, I.E., THE BACKEND. */
```

```
DCL RIFR FILE OUTPUT SEQUENTIAL ENV(F(236)), /* REPORT FORMAT FILE */
RIFD FILE OUTPUT STREAM ENV(F(184)), /* DATA ITEM FILE */
DCL ZACSD3 ENTRY EXTERNAL; /* DICTIONARY ACCESS */
DCL NULL BUILTIN;
DCL DATE BUILTIN;
DCL TIME BUILTIN;
DCL SUBSTR BUILTIN;
DCL INDEX BUILTIN;

DCL REPNO DEC FIXED(1) INIT(2); /* RESPONSE NUMBER */
DCL 1 SREPORT, /* SR DEF TEMPLAT */
2 SRID FIXED(2), /* REPORT ID */
2 SPNAME CHAR(32), /* REPORT NAME */
2 SDES CHAR(72), /* DESCRIPTION */
2 ST_NUM FIXED(2), /* NUMBER TARGET ITEMS */
2 SQ_NUM FIXED(2), /* NUMBER QUALIFIER ITEMS */
2 STITEM(10), /* TARGET & QUALIFIER ITEM LIST */
3 STINAM CHAR(12), /* ITEM NAME */
3 SFORMA CHAR(10), /* FORMAT */
3 SDBNAM CHAR(8), /* DATABASE */
3 SLOGID CHAR(8), /* LOGON ID */
3 SPASSW CHAR(8), /* PASSWORD */
3 SPULNA CHAR(32), /* FULL NAME */
3 STIDES CHAR(72), /* DESCRIPTION */
3 SHEIGH FIXED(2), /* LENGTH OF ACCESS PATH */
3 SPATH(4) CHAR(8), /* ARRAY OF PARENT SEGMENTS */
DCL 1 TITEM, /* ITEM RECORD FOR RIF_D */
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8),
2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT PICTURE '99',
2 PATH(4) CHAR(8), /* ACCESS PATH ARRAY */
DCL 1 RIFREC, /* RIF_R RECORD */
2 SRID PICTURE '99', /* REPORT ID */
2 QUL_NO PICTURE '99', /* NUMBER QUALIFIERS */
2 QUAL(5),
3 QNAME CHAR(12), /* QUALIFIER NAME */
3 QVALU CHAR(12), /* QUALIFIER VALUE */
3 QVALB CHAR(12),
3 QINDEX PICTURE '999', /* QUALIFIER INDEX */
3 QFLAG PICTURE '9', /* QUALIFIER FLAG */
2 TI_NO PICTURE '99', /* NUMBER TARGET ITEMS */
2 TINDEX(10) PICTURE '999',
/* INDEX ARRAY TO TARGET ITEMS */
DCL 1 REPORT(3) STATIC EXTERNAL, /* WORKING RECORD FOR SR */
2 FNAME CHAR(32), /* FULL NAME */
2 DES CHAR(72), /* DESCRIPTION */
2 T_NUM FIXED(2), /* NUMBER OF TARGET ITEMS */
2 TLIST POINTER, /* TO TARGET ITEM LIST */
2 Q_NUM FIXED(2), /* NUMBER QUALIFIER ITEMS */
2 QLIST POINTER, /* TO QUALIFIER LIST */
```

```

2 FACTOR FIXED(1), /* MATCH FACTOR */
2 WANTED BIT(1); /* WANTED TO BE PRODUCED */
DCL 1 TARGET BASED(WT), /* NODE OF TARGET ITEM LIST */
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8),
2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT FIXED(2),
2 PATH(4) CHAR(8),
2 MATCH BIT(1) INIT('0'B), /* NEXT TARGET ITEM */
2 FWP POINTER, /* NODE OF QUALIFIER LIST */
DCL 1 QUALIF BASED(WQ),
2 NAME CHAR(12),
2 FORMAT CHAR(10),
2 DBNAME CHAR(8),
2 LOGID CHAR(8),
2 PASSWD CHAR(8),
2 FNAME CHAR(32),
2 DES CHAR(72),
2 HEIGHT FIXED(2),
2 PATH(4) CHAR(8),
2 VALU CHAR(12),
2 VALB CHAR(12),
2 INDEX FIXED(3),
2 FLAG FIXED(1),
2 MATCH BIT(1) INIT('0'B), /* NEXT NODE */
2 FWP POINTER;

DCL (S,RID) BIT(1) INIT('1'B); /* REPORT ID */

DCL RK POINTER; /* TO QUERY LIST */
DCL (TGHEAD,QUHEAD) POINTER STATIC EXTERNAL;
/* TARGET AND QUALIFIER HEAD OF LIST */
DCL FORMLENG DEC FIXED(2) INIT(40); /* FORMAT LENGTH */
FORMWD(50) CHAR(FORMLENG) VARYING;
/* FORMAT FOR DATA DICTIONARY ACCESS */
DCL (SN1,SN2,SN3) BIT(1) INIT('0'B);
/* EXACT MATCH, PARTIAL MATCH, NO MATCH */
DCL CASE_NO FIXED(1),
PN(5) FIXED(1);
/* PN(1) - NUMBER REPORTS WITH MATCH FACTOR - 1 */
DCL WANT CHAR(10) VARYING INIT('');
DCL YESORNO CHAR(4) INIT('');

DCL 1 YTARGET BASED(CURR_TARGET_PT), /* NODE OF TARGET ITEM LIST */
2 STCOUNT FIXED(2), /* NUMBER OF ASSOCIATED */
/* INTERNAL KEYWORDS */
2 MATCH BIT(1),
2 STGPTR POINTER, /* TO INTERNAL KEYWORD LIST */
2 NEXTTG POINTER, /* NEXT TARGET ITEM */
DCL 1 YQUALI BASED(CURR_QUALI_PT), /* NODE OF QUALIFIER ITEM LIST */
2 SQCOUNT FIXED(2), /* NUMBER OF ASSOCIATED */
/* INTERNAL KEYWORDS */
2 QVALUEU CHAR(12), /* QUALIFIER VALUE */
2 QVALUEH CHAR(12),
2 MATCH BIT(1),
2 SQPTR POINTER, /* TO INTERNAL KEYWORD LIST */
2 NEXTQU POINTER, /* NEXT QUALIFIER ITEM */
DCL 1 YSKWDL BASED(CURR_SKWDL_PT), /* USER SEARCH KEYWORD RECORD */
2 IKCOUNT DEC FIXED(2), /* NUMBER INTERNAL KEYWORDS */
2 IKPTR POINTER, /* NEXT INTERNAL KEYWORD */
2 NEXTSK POINTER, /* NEXT USER KEYWORD */
DCL 1 INKWDRFC BASED(CURR_INKWDRFC_PT), /* INTERNAL KEYWORD RECORD */
2 INKWDF CHAR(12) VARYING, /* INTERNAL KEYWORD */
2 NEXTINKWD POINTER, /* NEXT INTERNAL KEYWORD */
DCL IINDEX DEC FIXED(5) INIT(1),
/* COUNT OF THE TOTAL NUMBER OF TARGET AND QUALIFIER ITEMS PROCESSED */
DCL 1 FIXED(1),

/*****
/* MAIN PROCEDURE */
*****/

DO IF TGHEAD = NULL THEN BEGIN, /* NO TARGET ITEM GIVEN */
PUT SKIP,

```

```

        DISPLAY('IF YOU NEED HELP, TYPE HELP');
        DISPLAY('OTHERWISE, TYPE RETURN KEY TO ENTER QUERY AGAIN');
        REPLY(WANT);
        IF WANT='HELP' THEN CALL HELP;
        ELSE IF WANT='' THEN GO TO UIFEND;
        ELSE BEGIN;
            DISPLAY('BAD INPUT, DO IT AGAIN');
            GO TO D0;
        END;
        GO TO DEND;
    END;
D1: DO I=1 TO REPNO;                                /* COUNT MATCH FACTOR */
    CALL MTSR(I);                                    /* COUNT MATCH FACTOR */
    IF SN1 THEN REPORT(I).FACTOR=1;                /* EXACT MATCH */
    ELSE IF SN2 THEN REPORT(I).FACTOR=2;          /* PARTIAL MATCH */
    ELSE REPORT(I).FACTOR=3;                        /* NO SR MATCHED */
END D1;
D2: PN=0;                                           /* COUNT NUMBER OF MATCHED REPORTS */
DO I=1 TO REPNO;
    IF REPORT(I).FACTOR=1 THEN PN(1)=PN(1)+1;
    IF REPORT(I).FACTOR=2 THEN PN(2)=PN(2)+1;
    IF REPORT(I).FACTOR=3 THEN PN(3)=PN(3)+1;
END;
IF PN(1) > 0 THEN BEGIN;
    CALL CHOS(1,PN(1));
    GO TO DEND;
END;
ELSE IF PN(2) > 0 THEN BEGIN;
    CALL CHOS(2,PN(2));
    GO TO DEND;
END;
ELSE IF PN(3) > 0 THEN BEGIN;
    CALL CHOS(3,PN(3));
    GO TO DEND;
END;
ELSE CALL ERROR_HANDLE1;
DEND: ;

```

```

.....
/*
/* PROCEDURE: CHOS
/*
/* PURPOSE: THIS PROCEDURE INFORMS THE USER WHETHER
/* AND TO WHAT DEGREE HIS QUERY MATCHES ANY
/* ANY OF THE STANDARD REPORTS. IT THEN
/* PROMPTS THE USER TO SELECT EITHER ONE OR
/* MORE REPORTS OF THE DISPLAYED REPORTS,
/* OR A NON-STANDARD REPORT.
/*
/*
.....

```

```

CHOS PROCEDURE(FACTOR,PN);
DCL (FACTOR,PN,I,J) FIXED(1);
DCL RID BIT(1);
DCL SRF BIT(1);
DCL CASE(3) LABEL;

RID = '1'B. /* SR */
GO TO CASE(FACTOR);
/* CHOOSE EXACTLY MATCHED SR */
CASE(1) I=1;
PUT SKIP EDIT ('FOLLOWING STANDARD REPORT(S) SATISFY YOUR QUERY') (A);
DO J=1 TO REPNO;
    IF REPORT(J).FACTOR=1 THEN BEGIN;
        CALL LTSR(J,I);
        I = I + 1;
        IF I > PN THEN GO TO C1;
    END;
END;
C1: CALL SURE(1,SRF);
    IF SRF='1'B THEN CALL WRIF(RID);
    GO TO DEND;
/* CHOOSE PARTIALY MATCHED SR */
CASE(2) I=1;
PUT SKIP;
PUT SKIP EDIT ('THERE ARE NO STANDARD REPORTS') (A);
PUT SKIP EDIT ('WHICH EXACTLY MEET YOUR REQUEST') (A);
PUT SKIP EDIT ('THE FOLLOWING STANDARD REPORTS') (A);
PUT SKIP EDIT ('ALL PARTIALLY SATISFY YOUR QUERY') (A);

```

```

DO J-1 TO REPNO;
  IF REPORT(J).FACTOR-2 THEN BEGIN;
    CALL LTSR(J,1);
    I = I + 1;
    IF I > PN THEN GO TO C2;
  END;
END;
C2: CALL SURE(2,SRF);
  IF SRF-'1'B THEN
    CALL WRIF(RID);
  ELSE BEGIN;
    PUT EDIT ('DO YOU WANT TO GENERATE A NON-STANDARD')
      (A);
    PUT SKIP EDIT ('REPORT! (YES/NO)') (A);
    CALL YORN(YESORNO);
    IF YESORNO-'YES' THEN DO;
      RID = '0'B;
      CALL WRIF(RID);
    END;
    ELSE GO TO UIFEND;
  END;
GO TO CEND;
CASE(3): DISPLAY ('NO STANDARD REPORTS SATISFY YOUR QUERY');
  DISPLAY ('WOULD YOU LIKE TO HAVE A NON-STANDARD REPORT?');
  DISPLAY ('YES/NO');
  CALL YORN(YESORNO);
  IF YESORNO-'YES' THEN DO;
    RID = '0'B;
    CALL WRIF(RID);
  END;
  ELSE GO TO UIFEND;
CEND: END CHOS;

```

```

/...../
/*
/* PROCEDURE: MTSR
/*
/* PURPOSE: THIS PROCEDURE DETERMINES WHICH STANDARD
/* REPORTS MATCH THE USER'S REQUEST BY
/* COMPARING EACH TARGET AND QUERY ITEM OF
/* EACH STANDARD REPORT TO THE INTERNAL
/* KEYWORD LIST ASSOCIATED WITH THE USER'S
/* REQUEST. A MATCH FACTOR IS THEN
/* ASSIGNED TO EACH STANDARD REPORT BASED
/* ON THE FOLLOWING RULES:
/* FACTOR = 1, AN EXACT MATCH
/* FACTOR = 2, A PARTIAL MATCH
/* FACTOR = 3, IF NO MATCH AT ALL
/*
/...../

```

```

MTSR: PROCEDURE(P);
  DCL P FIXED(1);
  DCL (TC,QC) FIXED(2); /* NUMBER MATCHED TARGET & QUALIFER ITEMS */
  DCL K FIXED(1); /* NUMBER QUERY ITEMS */
  DCL (RL,SL,KL) POINTER INIT(NULL); /* TO TRAVERSE LISTS */

M0: TC=0;
  QC = 0;
  SN1='0'B;
  SN2 = '0'B;
  SN3 = '0'B;
  K = 0;
  RL = TGHEAD;
  DO WHILE( RL NE NULL ); /* COUNT NO. OF QUERY ITEMS */
    K = K + 1;
    RL = RL->NEXTTG;
  END;

M1: SL = REPORT(P).TLIST; /* TRY TO MATCH TARGET ITMES */
  DO WHILE ( SL NE NULL ); /* FOR EACH TARGET ITEM OF SR */
    RL = TGHEAD;
    SL->TARGET.MATCH = '0'B;
    DO WHILE ( RL NE NULL ); /* FOR TARGET ITEM IN QUERY LIST */
      KL = RL->STGPTR;
      DO WHILE (KL NE NULL); /* FOR EACH INTERNAL KEYWORD */
        IF SL->TARGET.NAME = KL->INKWDF THEN
          BEGIN;
            SL->TARGET.MATCH = '1'B;
            TC = TC + 1;
            GO TO M1A;
          END;
      END;
    END;
  END;

```

```

        END;
        KL - KL->NEXTINKWD;
        END;
        RL - RL->NEXTTG;
    END;
M1A:   SL - SL->TARGET.FWP;
    END;
M2:   IF (TC=REPORT(P).T_NUM) & (K=REPORT(P).T_NUM) THEN SN1='1'B;
    ELSE IF (TC > 0) & ( K < REPORT(P).T_NUM) THEN SN1='1'B;
    ELSE IF TC > 0 THEN SN2='1'B;
    ELSE SN3='1'B;
        /* TRY TO MATCH QUALIFIER LIST */
        /* IF MATCH, SET FLAG AND COPY THE VALUES */
M3:   SL - REPORT(P).QLIST;
    DO WHILE (SL NE NULL); /* FOR EACH QUALIFIER OF SR */
        RL - QUHEAD;
        SL->QUALIF.MATCH - '0'B;
        SL->QUALIF.FLAG - 0;
        SL->QUALIF.VALU - '';
        SL->QUALIF.VALB - '';
        DO WHILE (RL NE NULL); /* FOR QUALIFIER IN QUERY LIST */
            KL - RL->SQPTR;
            DO WHILE (KL NE NULL); /* FOR EACH INTERNAL KEYWORD */
                IF SL->QUALIF.NAME - KL->INKWDF THEN
                    BEGIN;
                        SL->QUALIF.MATCH - '1'B;
                        SL->QUALIF.FLAG - 1;
                        SL->QUALIF.VALU - RL->QVALUEU;
                        SL->QUALIF.VALB - RL->QVALUEB;
                        QC - QC + 1;
                        GO TO M3A;
                    END;
                    KL - KL->NEXTINKWD;
                END;
                RL - RL->NEXTQU;
            END;
        END;
        SL - SL->QUALIF.FWP;
M3A:   END;
    END MTSR;

```

```

/...../
/*
/* PROCEDURE: SURE
/*
/* PURPOSE: THIS PROCEDURE REQUIRES THE USER TO
/* VERIFY OR CONFIRM HIS EARLIER SELECTION
/* OF THE SPECIFIC REPORT(S) TO BE
/* GENERATED.
/*
/*
/...../

```

```

SURE: PROCEDURE(P,SRF);
    DCL F      FIXED(1);
        SRF    BIT(1);
    DCL A      CHAR(1);
        C      CHAR(REPNO*2);
        SRID   CHAR(20);
        I      FIXED(2);
        N      FIXED(1);
    DCL FLAG BIT(1);
        IND BIT(1);
        BAD_REQ BIT(1);
        YES BIT(1) INIT('1');
        NO BIT(1) INIT('0');

    C='12';
    DO I=1 TO REPNO;
        IF REPORT(I).FACTOR NE F THEN
            SUBSTR(C,I,1) - '0';
        END;
        FLAG=YES;
        IND=YES;
        BAD_REQ - NO;
        DO WHILE (FLAG);
S0:   IF BAD_REQ - NO THEN
            GOTO S1;

        BAD_REQ - NO;

```

```

PUT SKIP EDIT ('THE FOLLOWING REPORT(S) SATISFY YOUR QUERY:');
  (A);
DO I=1 TO REPNO;
  IF (REPORT(I).FACTOR = F) THEN
    PUT EDIT(1) (F(3));
  END;
S1: DO I=1 TO REPNO;
    REPORT(I).WANTED = '0'B;
  END;
S1A: PUT SKIP;
    PUT SKIP;
    DISPLAY('WHICH OF THE ABOVE REPORT(S) DO YOU WANT?');
    SRID='';
    DISPLAY('TYPE WANTED REPORT ID (E.G. 1,2,...)');
    IF (IND) THEN DO;
      DISPLAY('OR TYPE ? FOR MORE DESCRIPTION');
      DISPLAY('OF THE REPORT(S)');
      IND=NO;
    END;
    DISPLAY('OR, TYPE RETURN KEY IF YOU DON'T LIKE ANY');
    DISPLAY('OF THESE REPORTS');
    REPLY(SRID);
    PUT SKIP;
    SELECT(SRID);
    WHEN ('QUIT') DO;
      PUT SKIP;
      PUT SKIP EDIT('REPORT GENERATOR EXITED AT USER'S REQUEST');
      (A);
      STOP;
    END;
    WHEN('') DO;
      SRF='0'B;
      FLAG=NO;
    END;
    WHEN('') DO;
      J=1;
      DO I=1 TO REPNO;
        IF REPORT(I).FACTOR = F THEN DO;
          CALL LTSRF(1,J);
          J=J+1;
        END;
      END;
    END;
    OTHERWISE DO;
      DO I=1 TO 20; /* CHECK REQUEST */
        A = '';
        A = SUBSTR(SRID,1,1);
        IF ((A NE ' ') AND (A NE ',')) THEN
          BEGIN;
            N = INDEX(C,A);
            IF N=0 THEN
              BEGIN;
                PUT SKIP EDIT('REPORT ID ', A, ' IS NOT ') (A,A,A);
                PUT SKIP EDIT('ONE OF YOUR ABOVE SPECIFIED OPTIONS. ');
                (A);
                BAD_REQ = YES;
              END;
            ELSE REPORT(N).WANTED = '1'B;
          END;
        END;
      END;
      IF BAD_REQ THEN
        BEGIN;
          PUT SKIP;
          PUT SKIP EDIT ('TRY IT AGAIN') (A);
          PUT SKIP;
          GOTO S6;
        END;
      PUT SKIP;
S2: DISPLAY('YOU HAVE SELECTED THE FOLLOWING STANDARD REPORTS');
    DISPLAY ('FOR GENERATION');
    J=1;
    DO I=1 TO REPNO;
      IF REPORT(I).WANTED='1'B THEN DO;
        CALL LTSR(1,J);
        J = J + 1;
      END;
    END;
    PUT SKIP;
    DISPLAY('IS THIS LISTING CORRECT ?');
    CALL YORN(YESORNO);

```

```

      IF YESORNO='YES' THEN
        BEGIN;
          SRF = '1'B;
          FLAG=NO;
        END;
      END; /*END OTHERWISE */
    END; /* END SELECT */
  END; /* WHILE FLAG */
SEND: END SURE;

```

```

...../
/*
/* PROCEDURE: LTSR
/*
/* PURPOSE: THIS PROCEDURE DISPLAYS ON THE USER'S
/*          TERMINAL A LIST OF THE MATCHING
/*          STANDARD REPORTS.
/*
/*...../

```

```

LTSR: PROCEDURE(RID,P);
      DCL (RID,P) FIXED(1);

      IF P=1 THEN DO;
        PUT SKIP EDIT ('REPORT ID','REPORT FULL NAME') (R(FM1));
        PUT EDIT((45)'-' ) (COL(1),A(45));
      END;
      PUT SKIP EDIT (RID,REPORT(RID).FNAME) (R(FM2));
FM1:  FORMAT(X(2),A(9),X(2),A);
FM2:  FORMAT(X(2),F(9),X(2),A);
      END LTSR;

```

```

...../
/*
/* PROCEDURE: LTSRF
/*
/* PURPOSE: THIS PROCEDURE DISPLAYS ON THE USER'S
/*          TERMINAL A LIST OF THE MATCHING
/*          STANDARD REPORTS AND THEIR DESCRIPTIONS.
/*
/*...../

```

```

LTSRF:
  PROCEDURE(RID,P);
  DCL (RID,P) FIXED(1);
  DCL DESTMP CHAR(72);
  DESC(72) CHAR(1) DEFINED DESTMP;

  DESTMP=REPORT(RID).DES;
  IF (P=1) THEN DO;
    PUT SKIP EDIT('REPORT ID','REPORT FULL NAME',
      'REPORT DESCRIPTION') (COL(1),X(2),A(9),X(16),A(16),X(10),A);
    PUT EDIT((72)'-' ) (COL(1),A(72));
  END;
  PUT EDIT(RID,REPORT(RID).FNAME,DESC(1))
    (COL(1),X(6),F(2),X(5),A(32),X(2),A(1));
  DO J=2 TO 25;
    PUT EDIT(DESC(J))(A(1));
  END;
  DO I= 1 TO 2;
    IF (SUBSTR(DESTMP,26+(I-1)*25,25) NE (25)' ') THEN DO;
      PUT SKIP;
      PUT EDIT(' ') (COL(47),A(1));
      K=26+I*25-1;
      IF (K GT 72) THEN K=72;
      DO J=26+(I-1)*25 TO K;
        PUT EDIT(DESC(J)) (A(1));
      END;
    END;
  END;
END LTSRF;

```

```

...../
/*
/* PROCEDURE: YORN
/*
/* PURPOSE: THIS PROCEDURE PROMPTS THE USER TO INPUT
/*          'YES', 'NO' OR 'QUIT'.
/*
/*...../

```

```

/* ..... */
YORN: PROCEDURE(YN);
DCL YN CHAR(4);
YN = '';
DO WHILE(((YN NE 'YES') AND (YN NE 'NO')) AND (YN NE 'QUIT'));
    DISPLAY('TYPE YES/NO') REPLY(YN);
END;

IF YN = 'QUIT' THEN
DO;
    PUT SKIP;
    PUT SKIP;
    PUT SKIP EDIT ('REPORT GENERATOR EXITED AT USER'S REQUEST')
        (A);
    STOP;
END;
END YORN;

```

```

/* ..... */
/* PROCEDURE: ERROR_HANDLE1 */
/* ..... */
/* PURPOSE: THIS PROCEDURE WILL EVENTUALLY DEAL */
/* WITH ERRORS. */
/* ..... */

```

```

ERROR_HANDLE1:
PROCEDURE;
DISPLAY('NOW DEAL WITH ERRORS');
END;

```

```

/* ..... */
/* PROCEDURE: WRIF */
/* ..... */
/* PURPOSE: THIS PROCEDURE WRITES THE TARGET AND */
/* QUALIFIER DATA ITEMS ASSOCIATED WITH THE */
/* REQUESTED REPORT(S) INTO THE FILE RIFD */
/* IT ALSO WRITES THE REPORT(S) FORMAT INTO */
/* THE FILE RIFR. IN THE CASE OF */
/* NON-STANDARD REPORTS */
/* NOT YET IMPLEMENTED. */
/* ..... */

```

```

WRIF: PROCEDURE(RID);
DCL RID BIT(1);
P POINTER;
FILENAM CHAR(6);
(I,J,K) FIXED(2);
DCL ONCODE BUILTIN;

OPEN FILE(RIFR),FILE(RIFD);
ON RECORD (RIFR)
BEGIN;
    PUT SKIP;
    PUT SKIP EDIT('***** RECORD CONDITION RAISED IN WRITING
        FILE *****',FILENAM)(A,A(6));
    PUT SKIP EDIT('REPORT ',I,' IGNORED')
        (A,F(1),A);
    PUT SKIP EDIT('ON CODE = ',ONCODE)(A,F(2));
END;

W1: IF RID='1'B THEN /* SR */
BEGIN;
    DO I=1 TO REPNO;
    IF REPORT(I).WANTED='1'B THEN
    BEGIN;
        /* MOVE REPORT DATA TO TITEM */
        P = REPORT(I).TLIST;
        J = 0;
        DO K=1 TO 10;
            TINDEX(K) = '';
        END;
        DO WHILE(P NE NULL);
            /* MOVE TARGET ITEM DATA TO TITEM RECORD */

```

```

TITEM.NAME - P->TARGET.NAME;
TITEM.FORMAT - P->TARGET.FORMAT;
TITEM.DBNAME - P->TARGET.DBNAME;
TITEM.LOGID - P->TARGET.LOGID;
TITEM.PASSWD - P->TARGET.PASSWD;
TITEM.FNAME - P->TARGET.FNAME;
TITEM.DES - P->TARGET.DES;
TITEM.HEIGHT - P->TARGET.HEIGHT;
TITEM.PATH - P->TARGET.PATH;
PUT FILE(RIFD) EDIT(TITEM.NAME) (COL(1),A(12));
PUT FILE(RIFD) EDIT(TITEM.FORMAT) (A(10));
PUT FILE(RIFD) EDIT(TITEM.DBNAME) (A(8));
PUT FILE(RIFD) EDIT(TITEM.LOGID) (A(8));
PUT FILE(RIFD) EDIT(TITEM.PASSWD) (A(8));
PUT FILE(RIFD) EDIT(TITEM.FNAME) (A(32));
PUT FILE(RIFD) EDIT(TITEM.DES) (A(72));
PUT FILE(RIFD) EDIT(TITEM.HEIGHT) (F(2));
PUT FILE(RIFD) EDIT(TITEM.PATH) (4 A(8));
FILENAM = 'RIFD';
TINDEX(J + 1) = IINDEX;
IINDEX = IINDEX + 1;
J = J + 1;
P = P->TARGET.FWP;
END;
P = REPORT(1).QLIST;
J = 1;
DO K=1 TO 8;
QUAL(K).QNAME = '';
QUAL(K).QVALU = '';
QUAL(K).QVALB = '';
QUAL(K).QFLAG = 0;
QUAL(K).QINDEX = '';
END;
DO WHILE(P NE NULL);
/* MOVE QUALIFIER DATA TO TITEM RECORD */
TITEM.NAME - P->QUALIF.NAME;
TITEM.FORMAT - P->QUALIF.FORMAT;
TITEM.DBNAME - P->QUALIF.DBNAME;
TITEM.LOGID - P->QUALIF.LOGID;
TITEM.PASSWD - P->QUALIF.PASSWD;
TITEM.FNAME - P->QUALIF.FNAME;
TITEM.DES - P->QUALIF.DES;
TITEM.HEIGHT - P->QUALIF.HEIGHT;
TITEM.PATH - P->QUALIF.PATH;

PUT FILE(RIFD) EDIT(TITEM.NAME) (COL(1),A(12));
PUT FILE(RIFD) EDIT(TITEM.FORMAT) (A(10));
PUT FILE(RIFD) EDIT(TITEM.DBNAME) (A(8));
PUT FILE(RIFD) EDIT(TITEM.LOGID) (A(8));
PUT FILE(RIFD) EDIT(TITEM.PASSWD) (A(8));
PUT FILE(RIFD) EDIT(TITEM.FNAME) (A(32));
PUT FILE(RIFD) EDIT(TITEM.DES) (A(72));
PUT FILE(RIFD) EDIT(TITEM.HEIGHT) (F(2));
PUT FILE(RIFD) EDIT(TITEM.PATH) (4 A(8));
/* MOVE QUAL DATA TO RIFREC */
QUAL(J).QNAME = P->QUALIF.NAME;
QUAL(J).QVALU = P->QUALIF.VALU;
QUAL(J).QVALB = P->QUALIF.VALB;
QUAL(J).QFLAG = P->QUALIF.FLAG;
QUAL(J).QINDEX = IINDEX;
IINDEX = IINDEX + 1;
J = J + 1;
P = P->QUALIF.FWP;
END;
/* MOVE REPORT DATA TO RIFREC RECORD */
IF REPORT(1).T_NUM = 0 THEN GO TO W3;
RIFREC.SRID = 1;
RIFREC.TI_NO = REPORT(1).T_NUM;
RIFREC.QL_NO = REPORT(1).Q_NUM;
FILENAM = 'RIFR';
WRITE FILE (RIFR) FROM (RIFREC);
PUT SKIP;
END; /* REPORT(1) */
END;
END; /* SR */
W3: IF RID='0'B THEN DO;
DISPLAY('NOW BRANCH TO, AS OF YET, UNIMPLEMENTED ');
DISPLAY('NON-STANDARD REPORT GENERATOR');
END;
/* MOVE QUERY LIST DATA TO RIFREC AND TITEM RECORD */
/* THIS PORTION OF THE PROCEDURE IS TO BE DEVELOPED */

```

```

W3:  PUT SKIP;
    CLOSE FILE(RIFR),FILE(RIFD);
    END WRIF;

```

```

/...../
/*      PROCEDURE:  HELP      */
/*      PURPOSE:    THIS PROCEDURE LISTS ALL THE STANDARD    */
/*                  REPORTS CURRENTLY AVAILABLE IN THE        */
/*                  SYSTEM, AND DISPLAYS SOME EXAMPLE QUERIES */
/...../

```

```

HELP:  PROCEDURE;
      DCL I  FIXED(2);
      PUT SKIP;
      PUT SKIP EDIT('THE FOLLOWING STANDARD REPORTS ARE AVAILABLE:')
        (A);
      DO I=1 TO REPNO;
        CALL LTSR(I,I);
      END;
      PUT SKIP;
      PUT SKIP EDIT('QUERY EXAMPLES INCLUDE:') (A);
      PUT SKIP;
      PUT SKIP EDIT('      TELL ME SOMETHING ABOUT COST')(A);
      PUT SKIP EDIT('      SHOW THE COST FOR PROJECT-B12 AND YEAR-1981')
        (A);
      PUT SKIP EDIT('      REPORT COST WITH PROJECT-B12 AND YEAR-1981')
        (A);
      END HELP;
UIFEND: END ZUIF;

```

QUAL: PROCEDURE OPTIONS (MAIN);

```

/*
* PROJECT: REPORT GENERATOR
* PROGRAMMER: DEPARTMENT OF COMPUTER SCIENCE
* UNIVERSITY OF ILLINOIS
*
* FILENAME: TESTQUALIFIED.PLI
* LANGUAGE: PL/I UNDER CMS
* DEPENDENCIES: RIFR.DATA
* RIFD.DATA
*
* DATE: DECEMBER, 1984
*/

```

```

/* THIS MODULE READS IN AND EXAMINES THE REPORT FORMAT(S) AND
THE ASSOCIATED QUALIFIER AND TARGET ITEMS CREATED BY THE
FRONT END. IT PROMPTS THE USER TO FILL IN ANY UNSPECIFIED
QUALIFIERS, AND THEN SENDS THE LIST OF REQUESTED REPORTS
TO THE REPORT GENERATOR VIA THE FILE INDATA.DATA
*/

```

```

DCL RIFR FILE UPDATE SEQUENTIAL ENV(F(236)),
RIFD FILE INPUT SEQUENTIAL ENV(F(184)),
INDATA FILE OUTPUT SEQUENTIAL ENV(F(80));

```

```

DCL 1 STITEM(15), /* TARGET & QUALIFIER ITEMS */
2 STINAM CHAR(12), /* ITEM NAME */
2 SFORMA, /* FORMAT */
3 SFORMA1 CHAR,
3 SFORMA2 CHAR(9),
2 SDBNAM CHAR(8), /* DATABASE */
2 SLOGID CHAR(8), /* LOGON ID */
2 SPASSW CHAR(8), /* PASSWORD */
2 SPULNA CHAR(32), /* FULL NAME */
2 STIDES CHAR(72), /* DESCRIPTION */
2 SHEIGH FIXED(2), /* LENGTH OF ACCESS PATH */
2 SPATH(4) CHAR(8), /* ARRAY OF PARENT SEGMENTS */
DCL 1 RIFREC, /* RIF_R RECORD */
2 SRID PICTURE '99', /* REPORT ID */
2 QUL_NO PICTURE '99', /* NUMBER OF QUALIFIERS */
2 QUAL(5),
3 QNAME CHAR(12), /* QUALIFIER NAME */
3 QVALU(12) CHAR, /* QUALIFIER VALUE */
3 QVALB CHAR(12),
3 QINDEX PICTURE '999', /* QUALIFIER INDEX */
3 QFLAG CHAR, /* QUALIFIER FLAG */
2 TI_NO PICTURE '99', /* NUMBER OF TARGET ITEMS */
2 TINDEX(10) PICTURE '999', /* INDEX ARRAY TO TARGET ITEMS */

```

```

DCL 1 INREC, /* INTERNAL DATA RECORD */
2 SRID PICTURE '99', /* REPORT ID */
2 DUMMY CHAR(78) INIT (' ');

```

```

DCL INVALU CHAR(12) INIT (' ');
DCL INVALU1(12) CHAR INIT (' ');

```

```

DCL FORMA2 CHAR(9) VARYING;
DCL J FIXED(2);
DCL LEN4 FIXED(2);
DCL I FIXED(2);
DCL K FIXED(2);
DCL CNT FIXED DECIMAL(2); /* NUMBER OF MISSING QUALIFIERS */
DCL UNFILL CHAR(5) VARYING; /* FLAG -- SIGNALS FILLED/UNFILLED */
DCL EMPTY CHAR(5) VARYING; /* FLAG -- SIGNALS EMPTY/NONEMPTY */
DCL CCNT FIXED(2);
DCL REM(10) FIXED(2); /* ARRAY OF INDICES TO MISSING QUALIFIERS */
DCL REMQ(10) FIXED(2); /* QUALIFIER NUMBER ARRAY FOR REM */

```

```

/*****
* MAIN PROCEDURE
*****/

```

```

OPEN FILE(RIFR), FILE(INDATA);
READ FILE(RIFR) INTO (RIFREC);
INREC.SRID = RIFREC.SRID;
WRITE FILE(INDATA) FROM (INREC);
IF (INREC.SRID <= 0)
THEN RETURN;

```

```

OPEN FILE(RIFD);
DO I = 1 TO TI_NO + QUL_NO;
  READ FILE(RIFD) INTO (STITEM(I));
END;
UNFILL = 'FALSE';
CNT = 0;
DO J = 1 TO QUL_NO;
  IF (QFLAG(I) = '0')
    THEN DO;
      CNT = CNT + 1;
      REM(CNT) = RIFREC.QUAL(I).QINDEX;
      REMQ(CNT) = 1;
      UNFILL = 'TRUE';
    END;
END;
IF UNFILL = 'TRUE'
  THEN CALL FILL;
RETURN;

```

```

/...../
/*
/* PROCEDURE: FILL
/*
/* PURPOSE: THIS PROCEDURE PROMPTS THE USER FOR THE
/* QUALIFIERS MISSING FROM HIS REQUESTED REPORT(S).
/*
/*...../

```

FILL : PROCEDURE;

```

PUT SKIP EDIT ('TO COMPLETE THE QUERY, YOU MUST SPECIFY THE ',
'VALUES OF THE FOLLOWING DATA ITEMS') (A,A);
DO I = 1 TO CNT;
  J = REM(CNT);
  FORMA2 = STITEM(J).SFORMA.SFORMA2;
  LEN4 = LENGTH(FORMA2);
  PUT SKIP EDIT(STITEM(J).STINAM, ' IN ', STITEM(J).SDBNAM,
  ' FORMAT = ', STITEM(J).SFORMA.SFORMA1, FORMA2)
  (A(12), A, A(8), A, A, A(LEN4));
  PUT SKIP EDIT ('DESC:', STITEM(J).STIDES) (A, A(72));
  GET EDIT(INVALU) (A(12));
  DO K = 1 TO 12;
    INVALU1(K) = SUBSTR(INVALU, K, 1);
  END;
  IF (STITEM(J).SFORMA.SFORMA1 = '1')
    THEN DO;
      CCNT = 12;
      EMPTY = 'FALSE';
      DO K = 1 TO 12 WHILE (EMPTY = 'FALSE');
        IF INVALU1(K) = ' '
          THEN DO;
            CCNT = K-1;
            EMPTY = 'TRUE';
          END;
      END;
      IF (CCNT < 12)
        THEN DO;
          DO K = 0 TO CCNT-1;
            INVALU1(12-K) = INVALU1(CCNT-K);
          END;
          DO K = 1 TO 12-CCNT;
            INVALU1(K) = ' ';
          END;
        END;
      DO K = 1 TO 12;
        RIFREC.QUAL(REMQ(I)).QVALU(K) = INVALU1(K);
      END;
    ELSE DO;
      DO K = 1 TO 12;
        RIFREC.QUAL(REMQ(I)).QVALU(K) = INVALU1(K);
      END;
    END;
  RIFREC.QUAL(REMQ(I)).QFLAG = '1';
END;
REWRITE FILE(RIFR) FROM (RIFREC);
END FILL;

END QUAL;

```

• PROJECT: REPORT GENERATOR
• PROGRAMMER: DEPARTMENT OF COMPUTER SCIENCE
• UNIVERSITY OF ILLINOIS

• FILENAME: LINKFRONTEND.EXEC
• LANGUAGE: CMS EXEC
• DEPENDENCIES: INITTHESAURUS.PLI
• SETDBINTERFACE.PLI
• DECISIONMAKER.PLI

INITREPORTDEFNS.PLI
QUERYPARSER.PLI

• DATE: DECEMBER, 1984

• THIS FILE LINKS THE MODULES COMPRISING THE FRONT
• END OF THE STANDARD REPORT GENERATOR.

GLOBAL T PLILIB

GLOBAL MACLIB DMPLI

LINKEDIT FRONTENDDRIVER INITTHESAURUS SETDBINTERFACE INITREPORTDEFNS QUERYPARSER DEC

```

*
* PROJECT: REPORT GENERATOR
* PROGRAMMER: DEPARTMENT OF COMPUTER SCIENCE
* UNIVERSITY OF ILLINOIS
*
* FILENAME: STANDARDREPORTGEN.EXEC
* LANGUAGE: CMS EXEC
* DEPENDENCIES:
*
* DATE: DECEMBER, 1984
*
* THIS FILE CONTAINS THE APPROPRIATE COMMANDS IN ORDER
* TO RUN THE STANDARD REPORT GENERATOR.
*
*CONTROL OFF
*ONEMORE
GLOBAL MACLIB DMPLI
GLOBAL T PLILIB
FILEDEF SYSIN TERMINAL (BLKSIZE 80)
FILEDEF SYSPRINT TERMINAL (BLKSIZE 80)
SET PROMPT U
FILEDEF SKWDOUT DISK SKWDOUT DATA B (RECFM F LRECL 80)
FILEDEF SRDEF DISK SRDEF DATA B (RECFM F LRECL 1060)
FILEDEF RIFR DISK RIFR DATA A (RECFM F LRECL 236)
FILEDEF RIFD DISK RIFD DATA A (RECFM F LRECL 184)
FILEDEF URIFR DISK RIFR DATA A (RECFM F LRECL 236)
*DEFINE STORAGE 10K
*IPL CMS
*CONTROL OFF
*DEFINE STORAGE 64K
*IPL CMS
SET LDRTHLS 07
FILEDEF DMIN TERMINAL (BLKSIZE 80)
FILEDEF DMOUT DISK ZACSOUT DATA B (RECFM F BLKSIZE 80)
FILEDEF DTEST DISK DTEST INDEX B (XTENT 1000)
FILEDEF DTESTD DISK DTEST DATA B (XTENT 1000)
FILEDEF DTESTS DISK DTEST SOURCE B (XTENT 1000)
FILEDEF DTESTE DISK DTEST RECOVER B (XTENT 1000)
FILEDEF DTESTJ DISK DTEST LOG B (XTENT 1000)
FILEDEF DTESTA DISK TMPWORK FILE B (BLKSIZE 640)
LOADMOD DM00
YUSINTNEW
FILEDEF RIFR DISK RIFR DATA A (RECFM F LRECL 236)
FILEDEF RIFD DISK RIFD DATA A (RECFM F LRECL 184)
FILEDEF INDATA DISK INDATA DATA A
* GENERATE REPORT
DISKIO READ RIFR DATA A (ITEM 1 QUIET EOF)
*IF %RETCODE NE 0 %GOTO -PASS
*READ ARGS
*IF %1 LE 0 %GOTO -PASS
QUAL1
*STACK CERRAPP1
*STACK EX CTL
SET ABENDXIT HLIABT
FTFOC2
SET ABENDXIT OFF
ERASE RIFR DATA A
ERASE RIFD DATA A
ERASE INDATA DATA A
-PASS
*%BEGTYPE
SELECT ACTION TO BE TAKEN:
1 EXECUTE A DIFFERENT QUERY.
2 EXIT FROM THE REPORT GENERATOR.
*END
*SPACE 1
*READ VARS %A1
*IF %A1 EQ 1 %GOTO -ONEMORE
*IF %A1 EQ 2 %GOTO -ENDREP
*%BEGTYPE
ILLIGAL INPUT TRY AGAIN
*END
*GOTO -PASS
-ENDDREP
*EXIT

```

ACRONYMS

CAPCES:	Construction, Appropriations, Programming, Control, and Execution Systems
CMS:	Conversational Monitoring System
DDD:	Dictionary of Data Definitions
DDS:	Data Dictionary/Directory System
DM:	Decision Maker
DSI:	Data Systems Interface
DTMS:	Data Traffic Management System
FOCUS:	A database management system
HQUSACE:	Headquarters, U.S. Army Corps of Engineers
MCPRS:	Military and Civil Progress Reporting System
MILCON:	U.S. Army Military Construction
OMA:	Operations and Maintenance, Army
PAX:	Programming, Administration, and eXecution
QP:	Query Parser
RAMP:	Responsiveness Analysis of Military Programs
RGF:	Report Generation Facility
RIF:	Report Information File
SRDEF:	Standard Report Definition File
TSK:	Thesaurus of Search Keywords and Internal Keywords
UI:	User Interface
U of I:	University of Illinois
USA-CERL:	U.S. Army Construction Engineering Research Laboratory

USA-CERL DISTRIBUTION

Chief of Engineers
ATTN: Tech Monitor
ATTN: CEIM-SL (2)
ATTN: CECC-P
ATTN: CECW
ATTN: CECW-0
ATTN: CECW-P
ATTN: CEEC
ATTN: CEEC-C
ATTN: CEEC-E
ATTN: CERD
ATTN: CERD-C
ATTN: CERD-M
ATTN: CERM
ATTN: DAEN-ZCE
ATTN: DAEN-ZCF
ATTN: DAEN-ZCI
ATTN: DAEN-ZCM
ATTN: DAEN-ZCZ

FESA, ATTN: Library 22060
ATTN: DET III 79906

US Army Engineer Districts
ATTN: Library (41)

US Army Engineer Divisions
ATTN: Library (14)

US Army Europe
AEAEN-ODCS/Engr 09403
ISAE 09081
V Corps
ATTN: DEH (11)
VII Corps
ATTN: DEH (15)
21st Support Command
ATTN: DEH (12)
USA Berlin
ATTN: DEH (12)
USASETAF
ATTN: DEH (10)
Allied Command Europe (ACE)
ATTN: DEH (3)

8th USA, Korea (19)

ROK/US Combined Forces Command 96301
ATTN: EUSA-HHC-CFC/Engr

USA Japan (USARJ)
ATTN: AJEN-DEH 96343
ATTN: DEH-Honshu 96343
ATTN: DEH-Okinawa 96331

416th Engineer Command 60623
ATTN: Facilities Engineer

US Military Academy 10966
ATTN: Facilities Engineer
ATTN: Dept of Geography &
Computer Science
ATTN: DSCPER/MAEN A

AMMRC, ATTN DRXMR-WE 02172

USA AMCCOM 61299-6000
ATTN: AMSMC-RI
ATTN: AMSMC-IS

AMC - Dir., Inst., & Servc
ATTN: DEH (23)
ATTN: AMCEN-A

DLA ATTN: DLA WI 22314

DNA ATTN: NADS 20305

FORSCOM
FORSCOM Engr, ATTN: AFEN-DEH
ATTN: DEH (23)

HSC
ATTN: HSLO-F 78234
ATTN: Facilities Engineer
Fitzsimons AMC 80240
Walter Reed AMC 20012

INSCOM - Ch, Instl. Div
ATTN: Facilities Engineer (3)

MDW, ATTN: DEH (3)

MTMC
ATTN: MTMC-SA 20315
ATTN: Facilities Engineer (3)

NARADCOM, ATTN: DRDNA-F 01760

TARCOM, Fac. Div. 48090

TRADOC
HQ, TRADOC, ATTN: ATEN-DEH
ATTN: DEH (19)

TSARCOM, ATTN: STSAS-F 63120

USACC, ATTN: Facilities Engr (2)

WESTCOM
ATTN: DEH, Ft. Shafter 96858
ATTN: APEN-IM

SHAPE 09055
ATTN: Surv. Section, CCB-OPS
Infrastructure Branch, LANDA

HQ USEUCOM 09128
ATTN: ECJ 4/7-LOE

FORT BELVOIR, VA 22060 (7)
ATTN: Canadian Liaison Officer
ATTN: British Liaison Officer
ATTN: Australian Liaison Officer
ATTN: French Liaison Officer
ATTN: German Liaison Officer
ATTN: Water Resources Support Ctr
ATTN: Engr Studies Center
ATTN: Engr Topographic Lab.
ATTN: ATZA-DTE-SU
ATTN: ATZA-DTE-EM
ATTN: R&D Command

CRREL, ATTN: Library 03755

WES, ATTN: Library 39180

HQ, XVIII Airborne Corps
and Fort Bragg
ATTN: AFZA-FE-EE 28307

Area Engineer, AEDC-Area Office
Arnold Air Force Station, TN 37389

Chanute AFB, IL 61868
3345 CES/DE, Stop 27

Norton AFB, CA 92409
ATTN: AFRCE-MX/DEE

AFESC, Tyndall AFB, FL 32403

NAVFAC
ATTN: Engineering Command (7)
ATTN: Division Offices (6)
ATTN: Naval Public Works Center (9)
ATTN: Naval Civil Engr Lab. (3)

NCEL
ATTN: Library, Code L08A 93043

Defense Technical Info. Center 22314
ATTN: DDA (2)

SETAF Engineer Design Office 09019

Engr Societies Library, NY 10017

Natl Guard Bureau Instl. Div 20310

US Govt Print Office 22304
Receiving Sect/Depository Copies (2)

US Army Env. Hygiene Agency
ATTN: HSHB E 21010

National Bureau of Standards 20899

RAMP DISTRIBUTION

Chief of Engineers

ATTN: DAEN-ZC
ATTN: DAEN-ZCP
ATTN: DAEN-ZCP-P
ATTN: DAEN-ZCP-R
ATTN: DAEN-ZCP-U

Commander HQ FORSCOM
ATTN: AFEN-COC 30330

Commander HQ TRADOC
ATTN: ATEN-C 23651

US Army Europe

ATTN: EUODE 09757
ATTN: EUOCO 09757
ATTN: EUOCO-C 09757
ATTN: EUDED 09757
ATTN: EUDED-M 09757
ATTN: EUDED-MA 09757
ATTN: EUDED-MO/EUDED-MP
ATTN: EUDED-MP 09757
ATTN: EUDED-P 09757
ATTN: EUDED-T 09757

US Army Engineer Division

ATTN: HNODE 25807
ATTN: HNODE-PM/HNODE-M 25807
ATTN: HNODE-DM 25807
ATTN: MEODE-M 09038
ATTN: MEODE 09038
ATTN: MEDPM/MEDCP-P 09038
ATTN: MRODE 68101
ATTN: MROCO-C 68101
ATTN: MRDED-MRDMO-A 68101
ATTN: NADDE 10007
ATTN: NADDE-M/NADCO 10007
ATTN: NPODE 97208
ATTN: NPOEN/NPDCO 97208
ATTN: ORODE 45201
ATTN: ORDED-M/ORDCO 45201
ATTN: POODE 96858
ATTN: PODED-M/PODCO 96858
ATTN: SADOE 30303
ATTN: SADEN-M/SADCO 30303
ATTN: SPODE 94111
ATTN: SPDED-T/SPDCO
ATTN: SWDZA 75242
ATTN: SWDED-M/SWDCO 75242
ATTN: MRKDE 64106
ATTN: MRKED-M/MRKCO 64106
ATTN: MRODE 68102
ATTN: MROED-M/MROCO 68102
ATTN: NABDE 21203
ATTN: NABEN-M/NABCO 21203
ATTN: NANDE 10278
ATTN: NANEN-M/NANCO-A 10278
ATTN: NAOOE 23510
ATTN: NAOEN-M/NAOOP 23510
ATTN: NPADE 99150
ATTN: NPAEN-PH/NPACO 99150
ATTN: NPSEN-RS/NPSCO 98142
ATTN: NPSDE 98142
ATTN: ORDED-M/ORDCO 45201
ATTN: ORLDE 40201
ATTN: ORLED-M/ORLCO 40201
ATTN: POFDE 96301
ATTN: POFED-M/POPCD 96301
ATTN: POJDE 96343
ATTN: POJED-M/POJCD 96343
ATTN: SAMDE 36628
ATTN: SAMEN-M/SAMCO 36628
ATTN: SASDE 31402
ATTN: SASEN-M/SASCO 31402
ATTN: SPKDE 95814
ATTN: SPLED-B/SPLCD 90053
ATTN: SPKED-M/SPKCO 95814
ATTN: SPLDF 90053
ATTN: SWFDE 76102

US Army Europe

HQ USAEUR and 7th Army
ATTN: AENEN 09403
ATTN: AENEN-CP 09403
ATTN: AENEN-IF 09403
ATTN: AENEN-MT 09403
ATTN: AEAGS-FMD 09403
ATTN: AEAGO-RM 09403

END

FILMED

MARCH, 19 88

DTIC