



**US Army Corps
of Engineers**

Construction Engineering
Research Laboratory



Maintenance Resource Prediction Model Data Base Manager (MRPM-DBM) User's Manual

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The Maintenance Resource Prediction Model (MRPM) is a computer system designed to assist in planning and programming maintenance resources, based on the anticipated resource requirements of actual installation facilities, for prediction periods of 1 to 10 years.

This report is part of a larger research project that has provided improved maintenance resource data for use during Army facility planning, design, and maintenance activities. Data bases and computer systems were developed to assist: (1) planners in preparing DD Form 1391 documentation, (2) designers in life-cycle component selection, and (3) maintainers in resource planning. The data bases and computer systems are being used by U.S. Army Corps of Engineers (USACE) designers at the District and installation levels, and by resource programmers at the USACE Headquarters, Major Army Command, and installation levels. These research products may also prove useful to other Government agencies and to the private sector.

This manual describes procedures to install the computer system that maintains all tasks and component resource information for the MRPM, and to input, maintain, and report all related task resource information.

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FOREWORD

This research was conducted for Headquarters U.S. Army Corps of Engineers and the Office of the Assistant Chief of Engineers under various Research, Development, Testing, and Evaluation (RDTE) and reimbursable funding documents. Work began under RDTE in 1980 and continued in reimbursable projects during 1984-1991. The technical monitor for the RDTE part was Dr. Larry Schindler, CEMP-ECE-G, and for the reimbursable part was Ms. Val Corbridge, DAEN-ZCF-R.

The work was performed by the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory (USACERL). The principal investigators were Dr. Edgar Neely and Mr. Robert Neathammer. The primary contractor for much of the data development was the Department of Architectural Engineering, Pennsylvania State University. Dr. Michael O'Connor is Chief of USACERL-FS. The USACERL technical editor was Linda Wheatley, Information Management Office.

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MAINTENANCE RESOURCE PREDICTION MODEL DATA BASE MANAGER (MRPM-DBM) USER'S MANUAL

1 INTRODUCTION

Background

Maintenance* and repair (M&R) cost estimates are needed during planning, design, and operations/maintenance of Army facilities. During planning, life-cycle costs are needed to evaluate alternative ways of meeting requirements (e.g., to lease, undertake new construction, or renovate existing facilities). During design, M&R requirements for various types of components, such as built-up or shingle roofs, are needed so the total life-cycle cost (LCC) of the building can be minimized. Once the facility has been constructed, outyear predictions of M&R costs are needed to help program enough funds so that Army facilities are maintained properly and do not deteriorate from lack of maintenance.

The Directorate of Engineering and Construction (EC), Headquarters, U.S. Army Corps of Engineers (HQUSACE),** asked the U.S. Army Construction Engineering Research Laboratory (USACERL) to coordinate the assembly of a single centralized maintenance and repair data base for use by Corps designers. This research was required because designers were not able to obtain reliable maintenance and repair data to support their LCC analysis from installations or from the technical literature. One of the first tasks in the research effort was to determine if reliable data bases, which could be adapted for Corps use, existed in government or private industry. Comprehensive data bases of maintenance costs for government and private sector facilities did not exist. The little data available always depended on widely varying standards of maintenance used to maintain the facilities for which the data was collected. Such data was unreliable for prediction purposes. Recognizing this, HQUSACE asked USACERL to develop an M&R cost data base for U.S. Army Corps of Engineers (USACE) designers to use in performing LCC analyses during the design of new facilities. Initial results were presented in several USACERL reports.¹

Soon after this request, the Facilities Programming and Budgeting Branch of the Facilities Engineering Directorate asked USACERL to develop prediction models for outyear maintenance requirements of the Army facility inventory. The Programming Office of EC, responsible for Military Construction, Army (MCA) planning, also requested USACERL to provide methods and automated tools to help installations perform economic analyses, and also to allow analysts to obtain future maintenance cost data.

In response to these requests, USACERL began a multiyear effort to develop a comprehensive M&R cost research program for buildings. This coordinated program is the key to all detailed estimation of future maintenance costs for Army facilities.

*Maintenance in this report means all work required to keep a facility in good operating condition; it includes all maintenance, repair, and replacement of components required over the life of a facility.

**At the time of this request, EC was part of the Office of the Chief of Engineers, which has since reorganized. In addition, EC has now become the Directorate of Military Programs.

¹ R.D. Neathammer, *Life-Cycle Cost Database Design and Sample Cost Data Development*, Interim Report P-120/ADA0997222 (U.S. Army Construction Engineering Research Laboratory [USACERL], February 1981); R.D. Neathammer, *Life-Cycle Cost Database: Vol I, Design, and Vol II, Sample Data Development*, Technical Report (TR) P-139/ADA126644 and ADA126645 (USACERL, January 1983), Appendices E through G.

Research Performed and Reports Published

This is one of several interrelated reports addressing maintenance resource prediction in the facility life-cycle process. This is a user's manual for the computer system that maintains all tasks and component resource information contained in the products described within this section. This program includes all labor, material, and equipment resources required to accomplish maintenance over the life of the facility. The overall research effort is described in a USACERL Technical Report.² This project has produced several products. Five of the products are described below.

The first research product was a data base containing maintenance tasks related to every building construction component. This data base provides labor, material, and equipment resource information as well as the frequency of task occurrence. This information is published in a series of four USACERL Special Reports by engineering systems: (1) architectural, (2) heating, ventilation, and air-conditioning (HVAC), (3) plumbing, and (4) electrical. The title for the series is *Maintenance Task Data Base for Buildings*.³ Figure 1 shows a typical task data form from this data base. This data is also available in electronic form. The data base is used in a personal computer (PC) system under the Disk Operating System (DOS). This computer program allows a facility to be defined by entering the components and component quantities comprising the facility. The maintenance tasks for each component are used to determine the resources required annually to maintain the facility.

The second research product is a component resource summary for the first 25 years of a facility. The tasks for the component were scheduled and combined into one set of annual resource requirements. This annual resource information is published in a series of four USACERL Special Reports titled *Maintenance Component Data Base for Buildings*.⁴ Figure 2 shows an example component summary from this data base. The data base is also available in electronic form. This data can be used to perform any type of economic analysis such as one for a 20-year life using an 8 percent discount rate.

The third research product was a set of 25-year present worth tables for use by designers in selecting components for design features with little or no effect on building energy use (discount rate of 10 percent) and components for design features with a significant effect on building energy use (discount rate of 7 percent). The task resources were scheduled for the first 25 years of facility life using the average frequency of occurrence for each task. Individual task resources were summed for each year to produce one total labor hour, equipment hour, and material cost requirement for each facility age. The yearly

² E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Resource Prediction in the Facility Life-Cycle Process*, TR P-90/10/ADA222504 (U.S. Army Construction Engineering Research Laboratory [USACERL], 1990).

³ E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Task Data Base for Buildings: Architectural Systems*, Special Report (SR) P-91/23 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Task Data Base for Buildings: Heating, Ventilation, and Air-Conditioning Systems*, SR P-91/21/ADA239954 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Task Data Base for Buildings: Plumbing Systems*, SR P-91/18 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Task Data Base for Buildings: Electrical Systems*, SR P-91/25/ADA240326 (USACERL, 1991).

⁴ E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Component Data Base: Architectural Systems*, SR P-91/27/ADA238395 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Component Data Base: Heating, Ventilation, and Air-Conditioning Systems*, SR P-91/22/ADA236425 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Maintenance Component Data Base: Plumbing Systems*, SR P-91/30/ADA238828 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Building Component Maintenance Data Base: Electrical Systems*, SR P-91/19/ADA238881 (USACERL, 1991).

Task Code: 0311356

Component: SHINGLES System: ROOFING Subsystem: ROOF COVERING
 Task Description: REPLACE NEW OVER EXISTING - SHINGLED ROOF
 Unit of Measure: SQUARE FEET Frequency of Occurrence: H: 18.00 A: 20.00 L: 22.00
 Persons per Team: 4 Task Duration: 4.5175 hours Once every (H,A,L) years
 Trade: REFRIG/AIR COND. Task Classification: 1

Subtask Description	Labor Resources		Material Resources	
	Description	Quantity	Unit Cost	
1. SETUP/SECURE/TAKE DOWN LADDER	SHINGLE	1.0 SF	0.2600	
2. REPLACE WITH NEW SHINGLE	MASTIC	1.0 SF	0.1500	
3. CLEAN UP			0.4100	
4. REMOVE/REPLACE CONDENSER TUBE				

SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	0.023047	0.006914	0.029961
Material Cost \$	0.410000		0.410000
Equipment Hours			0.014981

Figure 1-1. Typical Task Data Form.

CACES No.: 031134 - Roll Roofing			031135 - Shingles			
Labor Hours	Materials \$	Equipment Hours	YR	Labor Hours	Materials \$	Equipment Hours
0.0076	0.0165	0.0039	1	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	2	0.0024	0.0220	0.0013
0.0090	0.0165	0.0046	3	0.0026	0.0220	0.0014
0.0076	0.0165	0.0039	4	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	5	0.0032	0.0330	0.0017
0.0090	0.0165	0.0046	6	0.0026	0.0220	0.0014
0.0076	0.0165	0.0039	7	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	8	0.0024	0.0220	0.0013
0.0090	0.0165	0.0046	9	0.0026	0.0220	0.0014
0.0414	0.7496	0.0207	10	0.0032	0.0330	0.0017
0.0076	0.0165	0.0039	11	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	12	0.0026	0.0220	0.0014
0.0090	0.0165	0.0046	13	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	14	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	15	0.0034	0.0330	0.0018
0.0090	0.0165	0.0046	16	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	17	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	18	0.0026	0.0220	0.0014
0.0090	0.0165	0.0046	19	0.0024	0.0220	0.0013
0.0414	0.7496	0.0207	20	0.0332	0.4675	0.0167
0.0076	0.0165	0.0039	21	0.0026	0.0220	0.0014
0.0076	0.0165	0.0039	22	0.0024	0.0220	0.0013
0.0090	0.0165	0.0046	23	0.0024	0.0220	0.0013
0.0076	0.0165	0.0039	24	0.0026	0.0220	0.0014
0.0076	0.0165	0.0039	25	0.0032	0.0330	0.0017

All data is per square foot of roof area.

All data is per square foot of roof area.

Figure 1-2. Typical Component Summary.

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)												
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				PRESENT MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
	By Resources				Annual Maintenance and Repair				Replacement and High Costs Tasks			
	um	labor	material	equipment	Washington D.C. Total	labor	material	equipment	Yr	labor	material	equipment
ARCHITECTURE												
ROOFING												
ROOF COVERING												
BUILTUP ROOFING	SF	0.03987	0.37166	0.01924	1.25	0.00487	0.03167	0.00244	28	0.04938	0.70490	0.02469
PLACE NEW MEMBRANE OVER EXISTING-BUILDUP									14	0.02414	0.69960	0.01207
MOD. BIT./THERMOPLASTIC	SF	0.02415	0.33069	0.01208	0.66	0.00245	0.03218	0.00123	20	0.03659	0.85860	0.02829
THERMOSETTING	SF	0.01667	0.23941	0.00833	0.61	0.00173	0.02202	0.00086	20	0.03683	0.89960	0.01841
SLATE	SF	0.01808	0.10432	0.00904	0.50	0.00253	0.01458	0.00126	70	0.06885	6.04200	0.03442
CEMENT ASBESTOS	SF	0.01760	0.24341	0.00881	0.63	0.00246	0.03403	0.00123	70	0.05437	0.75190	0.02718
TILE	SF	0.01519	0.20982	0.00759	0.54	0.00212	0.02933	0.00106	70	0.10169	3.07400	0.05084
ROLL ROOFING	SF	0.07156	0.42684	0.03578	2.01	0.00757	0.01556	0.00378	10	0.04141	0.74963	0.02070
SHINGLES	SF	0.02222	0.22132	0.01111	0.71	0.00262	0.02383	0.00131	40	0.04118	0.74497	0.02059
REPLACE NEW OVER EXISTING--SHINGLED ROOF									20	0.02996	0.43460	0.01498
METAL												
FIBERGLASS RIGID STP. ROOF	SF	0.01422	0.11058	0.00711	0.42	0.00199	0.01546	0.00099	30	0.36265	2.17300	0.18132
CONCRETE, SEALED PANEL ROOF	SF	0.02161	1.15262	0.01080	1.63	0.00228	0.06266	0.00114	20	0.04543	6.01550	0.02272
CONCRETE, SEALED PANEL RF4	SF	0.04260	0.11748	0.02131	1.06	0.00596	0.01642	0.00298	60	0.06123	24.07419	0.03061
CONCRETE, SEALED POURED	SF	0.03950	0.08408	0.01974	0.96	0.00552	0.01175	0.00276	300	0.04342	24.07419	0.02171
FIBERGLASS, RIGID ROOF	SF	0.09872	0.62996	0.04936	2.81	0.01380	0.08807	0.00690	500	3.81056	18.03219	1.90528
	SF	0.03832	1.15262	0.01915	2.00	0.00468	0.06266	0.00234	20	0.04133	6.01550	0.02066

See NOTES on the last page of this table for Explanation of Column Headings

Figure 1-3. LCC Analysis.

component resource values were multiplied by the appropriate present worth factor to produce a present worth value for every year. The present worth values for each year were added for the 25 years to produce one set of 25-year summary resource values which the designer can use easily and quickly. The 25-year summary values are published in a series of four USACERL Special Reports titled *Building Maintenance and Repair for Life-Cycle Cost Analysis*.⁵ Figure 3 shows an example LCC analysis from this data base. The data base is also available in electronic form. The first three resource columns provide data to allow designers to calculate the LCC at any location by multiplying by the correct labor rate, equipment rate, and material geographic adjustment factor. The multiplication and addition have been performed for the Military District of Washington, DC, and results are given in the sixth column of the table. The right section of the table presents the information in a format that can be accepted by typical LCC analysis computer programs (e.g., the Corps of Engineers' LCCID program).

A fourth research product was a PC system that allows task resource information to be maintained and tables for the above three reports to be produced. The PC system is written in dBASE III PLUS, and is described in this report.

A fifth research product was a PC system that allows facilities to be described by entering the components within the facility. Future year resource predictions are produced by applying the individual tasks and then forming resource summaries by subsystems, systems, facilities, installations, reporting installations, Major Army Commands (MACOMs), and Army. A summary-level computer system was also developed for use by the Department of the Army (DA) and MACOMs. The summary-level system applies the most basic data contained in the current facility real property inventory files: (1) current facility use, (2) floor area, and (3) construction date.

Objectives

The major objectives of this user's manual are to describe how to:

1. Install the system on a PC
2. Enter new components, tasks, and resource information
3. Maintain existing components, tasks, and resource information
4. Produce the tables required in the standard research reports.

Approach

The first activity in the research project was to survey the literature for available maintenance data and review the historical data available at Army installations. No comprehensive task resource data base was located. Review of historical data revealed that installations have always been underfunded and that the limited data available shows when work was performed, not when it *should have been* performed. The Navy had developed a series of manuals dealing with labor hours required to perform several basic

⁵ E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Architectural Systems*, SR P-91/17/ADA239828 (USACERL, 1991); *Heating, Ventilation, and Air-Conditioning Systems*, SR P-91/20/ADA240325 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Plumbing Systems*, SR P-91/24/ADA240160 (USACERL, 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and Robert P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Electrical Systems*, SR P-91/26/ADA239911 (USACERL, 1991).

maintenance tasks. This work had been adopted by the Department of Defense (DOD) for triservice use, and published in a series of Technical Bulletins (TBs) under the general title *Engineered Performance Standards* (EPS).

The next activity was to survey a sample of USACE District offices to determine what data sources they used and to solicit their opinions on structure and content of a maintenance data base. An advisory committee composed of District personnel, installation representatives, and private sector consultants met and agreed that there was no accurate historical data available. They recommended that a data base be developed using the EPS rather than historical data.

The third activity was to develop a task resource data base that included all labor, material, and equipment resources required to produce accurate maintenance and repair data. Once the basic task data base was developed, a component summary data base was created by summing all task resources for a component. Individual task labor hour, equipment hour, and material costs resources were summarized by facility age for the first 25 years of the facilities' lives.

LCC data bases were generated from the component data base. Component summaries were input into a program that computed present worth values for each component.

Mode of Technology Transfer

The tables pertinent to designer use will be issued as a supplement to Technical Manual (TM) 5-802-1, *Economic Studies for Military Construction Design—Applications* (DA, 31 December 1986).

Hardware and Software Requirements

This computer system requires 8 MB of disk storage. dBASE III PLUS is used as the programming language. A laser printer is required to produce camera ready tables for inclusion in technical reports.

MRPM-DBM Installation Procedure

dBASE III PLUS

To install "dBASE III PLUS" follow the instructions as given in the dBase manual "Getting Started with dBASE III PLUS." This report assumes dBase will be installed on the C: drive.

From the C:\ prompt:

```
TYPE:MD \dBASE
PRESS THE <ENTER> KEY
TYPE:CD \dBASE
PRESS THE <ENTER> KEY
```

Insert the System Disk #1 in the floppy disk drive.

TYPE:A:
PRESS THE <ENTER> KEY

TYPE: INSTALL C:
PRESS THE <ENTER> KEY

At the prompt, remove the System Disk #1 and insert System Disk #2.

PRESS THE <ENTER> KEY
TYPE: C\

Examine the "CONFIG.SYS" file (normally in the C\ directory) on the hard drive.

TYPE: TYPE CONFIG.SYS
PRESS THE <ENTER> KEY

Be sure that there are two lines that have the following minimum values:

BUFFERS = 15
FILES = 50

If the values are below the minimum values or missing, use the DOS EDLIN utility to change the values.

After dBASE is installed, update the AUTOEXEC.BAT file in the C\ directory. To access dBASE from any directory, the PATH statement must include C:\dBASE.

TYPE: TYPE AUTOEXEC.BAT
PRESS THE <ENTER> KEY

MRPM-DBM System

After dBASE has been properly installed, the MRPM-DBM system can be set up. Insert the MRPM-DBM diskette into the floppy drive. Type A:Install C:. (Note: If the floppy drive is different than A: (i.e., B:), replace A: with the floppy drive's letter. Also, if the system is to be installed on a different hard drive, replace C with the letter of the hard drive. The computer will automatically install MRPM-DBM on the hard drive. It will create a directory called MRPM-DBM on the drive that was specified, and copy all of the files from the disk into the MRPM-DBM directory.

TYPE: A:INSTALL C:
PRESS THE <ENTER> KEY

Standard Function Keys

A few function keys are standard throughout the program. The arrow keys allow the cursor to move throughout the screen. The <BACKSPACE> and <DELETE> keys work as they would in any word processor program. The <ESC> key will, in most cases, terminate the program.

Standard Screen Format

There are two items that appear on a number of screens throughout the MRPM-DBM System. One is a status line from dBASE, called the "Scoreboard" (Figure 1-4). The other item is a header displaying the editing keys used in the ADDING and CHANGING options (Figure 1-5).

The SCOREBOARD is a status line shown in the figure below:

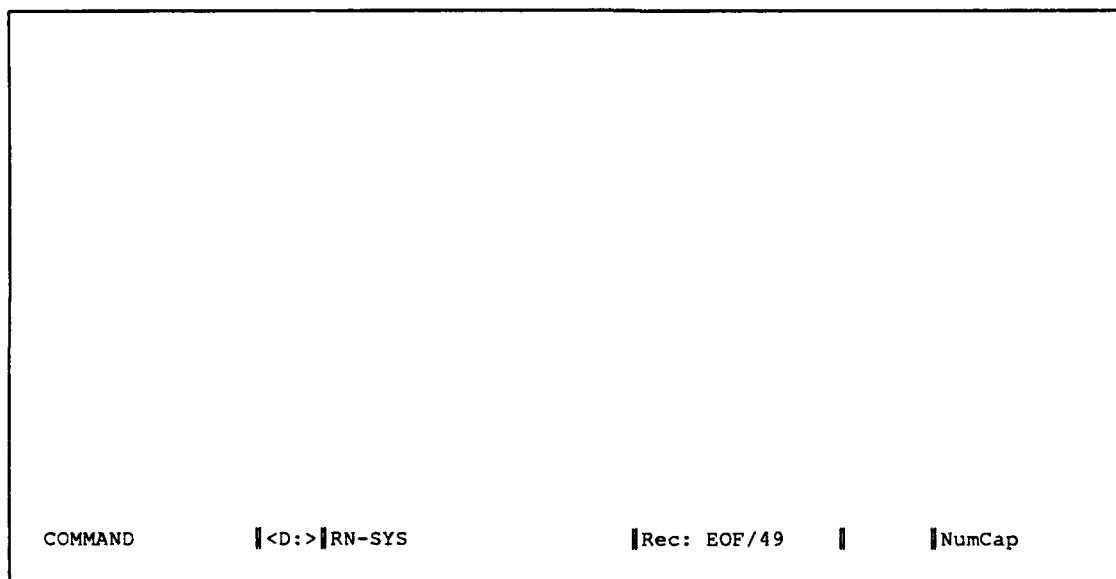


Figure 1-4. The Scoreboard.

The SCOREBOARD is divided into six areas which inform the user of the actions of the MRPM-DBM system.

"COMMAND" displays the status of the Program. If the system is waiting for input, the word COMMAND will be displayed. If records are being added, APPEND will be displayed; and if the user is editing, EDIT will be displayed.

"<D:>" displays the drive dBASE is accessing.

"RN-SYS" displays the name of the file dBASE is currently accessing.

"EOF/49" displays where the user is in the dBASE III PLUS data file, i.e., EOF/49 means the user is at the end of a file containing 49 records.

" " this area is not used with the MRPM-DBM system.

"NumCap" displays the keyboard locks you have selected, i.e., NumLock, or CapsLock, or both.

The next screen is used when you select either the ADDING or CHANGING of records:

CURSOR	<-- -->	UP	DOWN	DELETE	Insert Mode: Ins
Char:	← →	↑	↓	Char: Del	Exit/Save: ^End
Word:	Home End	Page: PgUp	PgDn	Field: ^Y	Abort: Esc
		Help: F1		Record: ^U	Memo: ^Home

Figure 1-5. The Editing Keys.

This header displays in four columns the keys used in the EDIT/ADD mode. The header is displayed or removed by pressing the <F1> Key. Throughout the header a "carat" (^) represents the <CTRL> key.

The first column shows how to move the Cursor Left/Right. To move the cursor one character to the Left/Right, use the Left/Right arrow keys. To move one word to the left use the <HOME> key. To move one word to the right press the <END> key.

The second column displays how to move up and down through the data base. To move up a line use the UP arrow key. To move down a line use the down arrow key. To move up a page use the <PAGEUP> key. To move down a page use the <PAGEDOWN> key.

The third column shows how to delete. To delete a character use the <DEL> key. To delete a line use the <CTRL>Y keys simultaneously. To delete a record type <CTRL>U.

The fourth column explains the other options in the program. To insert rather than type over a character, use the <INS> key. To exit the option AND save your changes, type <CTRL><END>. To exit the program without saving changes, press <ESC>. If you wish to add a short memo to the file, press <CTRL><HOME>.

System Data Table Design and Definition

A typical building is subdivided into engineering systems, subsystems, and components. All maintenance tasks are listed for each component. The resources required to perform each task are identified and the significance of the task resources discussed. Component summary tables listing resources by component age were developed by combining all tasks that were scheduled to be performed during each year. A summary of labor, material, and equipment requirements is given by component age. LCC analysis tables are created by applying discount factors to the resources given in the component summary tables. The resulting tables can be used to perform LCC analysis.

The MRPM-DBM system uses a seven-digit alphanumeric character string to represent the division of a building into segments:

1. AREA - Used to denote the Engineering System represented by the first two characters in the numbering system. Table 1-1 contains the current Engineering System Areas. This information is stored in the data file called "RN-AREA.DBF".

2. SYSTEM - Each engineering system can be divided into sections or systems. The first three characters identify the system. The information is stored in the database file called "RN-SYS.DBF".

3. SUBSYSTEM - Each system can be divided into sections or subsystems. The first four numbers denote the Subsystem. The Subsystem information is stored in the database file called "RN-SUB.DBF".

4. COMPONENTS - Each subsystem is then divided into items or components. The fifth and sixth number denote the component. The component information is stored in the database file called "RN-COMP.DBF".

5. TASK - A task is an activity performed by one trade. Tasks are identified by a non-zero character in the last position. The task information is stored in the database file called "RN-TASK.DBF".

Table 1-1. Engineering Systems Area

INDEX	DESCRIPTION OF THE ENGINEERING SYSTEM AREA
03	ROOFING
04	EXTERIOR CLOSURE
05	INTERIOR CONSTRUCTION
06	INTERIOR FINISHES
08	PLUMBING
09	HEATING, VENTILATION, AND AIRCONDITIONING
11	INTERIOR ELECTRICAL
12	SPECIAL INTERIOR ELECTRICAL SYSTEM
16	SITE UTILITIES

2 THE MRPM-DBM SYSTEM

2.1 Introduction

This chapter describes all functions of the system in the order that the functions appear on the screen. The chapter is arranged to be a step by step walk through of the MRPM-DBM system. All keystrokes are preceded by the word "TYPE:" before the command to be entered.

To start the MRPM-DBM system after the proper installation procedures described in Chapter 1, move to the C:\MRPM-DBM directory and type MRPM from the DOS prompt C:\MRPM-DBM.

```
TYPE: C:\
PRESS THE <ENTER> KEY
TYPE: CD \MRPM-DBM
PRESS THE <ENTER> KEY
TYPE: MRPM
PRESS THE <ENTER> KEY
```

The following screen will be displayed.

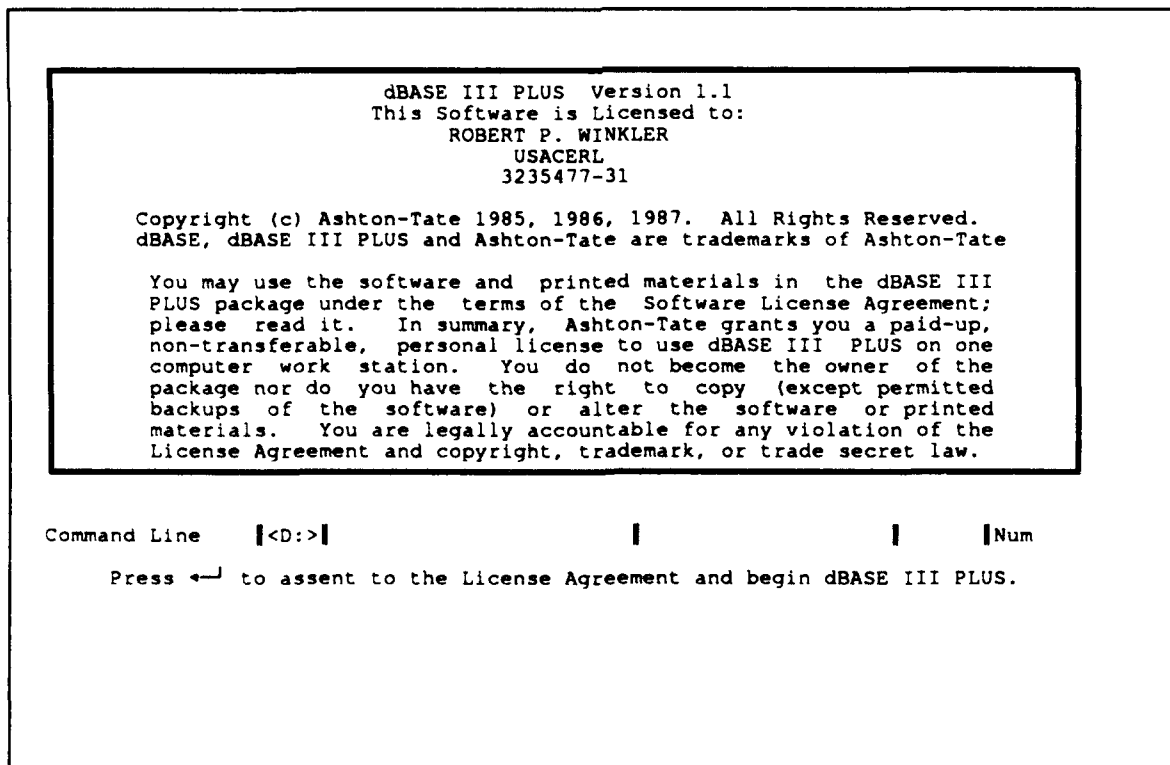


Figure 2.1-1. dBASE III PLUS Licensing Agreement.

This screen is a dBASE III PLUS license agreement. To continue:

PRESS THE <ENTER> KEY

```

* * * * *
*   DA CERL Program - By:
*                       Bob Becker
*                       Rafael Otalora
*                       A.S.C.
* * * * *
===> Select one of the following <===
      1 Add Records
      2 Search/Edit/Delete Records
      3 Generate Reports
      4 File Maintenance

      0 EXIT TO DOS

Enter your selection here >

Command      |<D:>|      |      |      |Num
```

Figure 2.1-2. Main Screen.

The user has entered the MRPM-DBM system. The options are:

- 1: ADD RECORDS [see Sec. 2.2]
This option allows a new set of information to be entered.
- 2: SEARCH/EDIT/DELETE RECORDS [see Sec. 2.3]
This option allows the user to find, change data within, and remove data from the data base.
- 3: GENERATE REPORTS [see Sec. 2.4]
This option allows the user to print Tables based upon stored data.
- 4: FILE MAINTENANCE [see Sec. 2.5]

This option allows the user to backup files.

- 0: EXIT TO DOS
This option stops the MRPM-DBM system and returns the user to the DOS prompt.

Make a selection by typing the number to the left of the option at the cursor location after: "Enter your Selection Here>". When a number key is pressed, the system will display the appropriate screen.

2.2 Adding Records

2.2.1 Introduction

From the main screen:

To add a record, type 1.

TYPE: 1

The following screen will be displayed.

```

Select the Data File you wish to use:

1 AREA
2 SYSTEM
3 SUBSYSTEM
4 TASK Data & Calculation
5 EPS/CACES REFERENCES

0 Return To Main Menu

Enter your selection >

Command      |<D:>|      |      |      |Num
```

Figure 2.2-1. Adding Records Menu.

Select the level of the data to be added.

1. AREA [see sec. 2.2.2]

This option allows the user to add to the most general of all subdivisions, i.e., Interior Finishes or Electrical.

2. SYSTEM [see sec. 2.2.3]

This option allows the user to add to the next level, i.e., Interior Finishes - Wall Finishes.

3. SUBSYSTEM [see sec. 2.2.4]

This option allows the user to add data records to the most specific of all subdivisions, i.e., Paper, Plastic, and Fabric.

4. TASK DATA [see sec. 2.2.5]

This option allows the user to add a component and the accompanying task, i.e., carpeted interior wall finishes - Replacement.

5. EPS/CACES REFERENCE [see sec 2.2.6]

This bookkeeping option allows storing of the source for the information listed in the Task Data.

0. To return to the Main Menu.

2.2.2 Adding Records to the Area Data File

From the Adding Records Menu:

To add to the area data file, type 1.

TYPE: 1

The following screen will be displayed.

CURSOR <-- --> Char: ← → Word: Home End	Field: UP DOWN Page: PgUp PgDn Help: F1	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit/Save: ^End Abort: Esc Memo: ^Home
---	---	--	--

A_NO
A_DSCR

APPEND |<D:>|RN-AREA |Rec: EOF/15 | |Num

Figure 2.2.2-1. Area.

You can use the keys to insert both the area number (A_NO) and description (A_DSCR).

A_NO - This is a two-character identifier, i.e., 03, 12.

A_DSCR - This is the description and can be as many as 35 characters.

When the first area is finished, use the down arrow key to move to the next blank field. When all new records have been added, type <CONTROL><END> to exit. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

For example, to add an area for Furniture, Type 1 at the Adding Menu. Type the Number chosen for Furniture - 99. The computer will automatically put the cursor at the description line where the user can type in "FURNITURE". To exit and save, press <CONTROL><END>.

2.2.3 Adding Records to the System Data File

From the Adding Records Menu:

To add to the System data file, type 2

TYPE: 2

The following screen will be displayed.

CURSOR <-- --> Char: ← → Word: Home End	Field: UP DOWN ↑ ↓ Page: PgUp PgDn Help: F1	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit/Save: ^End Abort: Esc Memo: ^Home
---	--	--	--

SY_NO
SY_DSCR

APPEND |<D:>|RN-SYS |Rec: EOF/49 | |Num

Figure 2.2.3-1. System.

Now use the keys to insert both the system number (SY_NO) and description (SY_DSCR).

SY_NO - This three character ID is composed of the two-character Area ID and one additional character.

SY_DSCR - This description can be as many as 35 characters.

When the first system is input, use the down arrow key to move to the next blank field. When all new records have been added, type <CONTROL><END> to save and exit. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

For example, to add office furniture as a system of the newly created Furniture Area, first select 2 from the Adding Records Menu. Type the number chosen for Office Furniture - 991 (It must be three characters, and the first two must be the area number). The computer will automatically move to the description line where the user can type in "OFFICE FURNITURE". To exit and save, press <CONTROL><END>.

2.2.4 Adding Records to the Subsystem Data File

From the Adding Records Menu:

To add to the area Subsystem file, type 3.

TYPE: 3

The following screen will be displayed.

CURSOR <-- --> Char: ← → Word: Home End	Field: UP ↑ DOWN ↓ Page: PgUp PgDn Help: F1	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit/Save: ^End Abort: Esc Memo: ^Home
--	---	---	--

TASK_CODE
SUB_DSCR

APPEND |<D:>|RN-SUB |Rec: EOF/160 | |Num

Figure 2.2.4-1. Subsystem.

Now use the keys to insert both the subsystem number (TASK_CODE) and description (SUB_DSCR).

TASK_CODE - This four-character ID contains the three-character system ID and one additional character.

SUB_DSCR - This description can be as many as 35 characters.

When the first subsystem is input, use the down arrow key to move to the next blank field. When all new records have been added, type <CONTROL><END> to exit and save. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

For example, to add a subsystem for desks under office furniture, first select 3 from the Adding Records Menu. Type the number chosen for desks - 9912 (It must be four characters, the first two must be the area number, and the third must be the system number). The computer will automatically move to the description line where the user can type in "DESKS".

To exit and save press <CONTROL><END>.

2.2.5 Adding Records to the Task Data File

From the Adding Records Menu:

To add a record to the task data file, type 4.

TYPE: 4

The following screen will be displayed.

T A S K D A T A F O R M			
			03/18/91
+-----+			
TASK CODE NO	:	:	
Enter <D>ata, <E>dit Data, <Q>uit to Main Menu			
Enter-->			
Command	<D:> RN-SUB	Rec: 160/160	Num

Figure 2.2.5-1. Task Data Form.

You are given three options:

- 1 - Enter <D>ata - to add new data
- 2 - <E>dit Data - to change existing data
- 3 - <Q>uit - To return to the previous menu.

Since you are adding a new record:

TYPE: D

The cursor will move to the task code number. Now input the new task data code number, i.e., 9888888.

The following screen will be displayed.

```

                                T A S K   D A T A   F O R M
                                03/18/91
+-----+
TASK CODE NO :9888888:

Component not found. Enter <A>dd to Component
Data File, <T>ry another number, or <Q>uit to Main Menu.      |      | Num
```

Figure 2.2.5-2. Add the Component.

You have three options:

1. <A>dd to the Component Data File - This will allow you to input the number in the file.
2. <T>ry another number - If you mistyped the number use this option.
3. <Q>uit - Return to Main Menu.

If this is the first task for an undefined component, the system will ask if you would like to add to the component file. Type T if you mistyped the number, otherwise press A.

TYPE: A

The following screen will be displayed.

```

                                C O M P O N E N T

      Today is 03/18/91
-----
Task Code :9988888:
Compnt Dscr :                               :

                                Enter the above requested information.

Command      |<D:>|RN-COMP                        |Rec: 1034/1034  |      |Num

```

Figure 2.2.5-3. Component Description.

Enter the description for the component you wish to add.

TYPE: <Component Description>
PRESS THE <ENTER> KEY

The following screen will be displayed.

```

                                T A S K   D A T A   F O R M

                                04/09/91
+-----+
TASK CODE NO :9988888:
Component Dscr  ::

                                Enter--> D
CommaIs this the right component (T/F)? T |Rec: 1034/1035  |      |NumCaps

```

Figure 2.2.5-4. Component Description Verification.

The system will ask the user to verify the component number and description. If all is correct, type T.

TYPE: T

The following screen will be displayed.

Enter the following information:

Task Description Code
Description of Task
Unit of Measure

Command

<D:>RN-TASK

Rec: 3235/3235

Num

Figure 2.2.5-5. Description Code.

The user is asked for the Description Code, the Description, and the unit of measure. Enter each of these prompts with the desired values.

Task Description Code - This is a seven-digit numeric identifying the task, included in the code is the six-digit component number.

Description of Task - This is a 35-character string identifying the task.

Unit of Measure - All tasks under a component **MUST** use the same unit of measure (Table 2-1).

Table 2-1. Unit of Measure

INDEX	2 DIGIT CODE	DESCRIPTION
1	CT	COUNT
2	SF	SQUARE FEET
3	LF	LINEAR FEET
4	TF	1000 LINEAR FEET
5	PC	PER CIRCUIT
6	AC	ACRE
7	TS	1000 SQUARE FEET

TYPE: <Task Description Code>
PRESS THE <ENTER> KEY

TYPE: <Description of Task>
PRESS THE <ENTER> KEY

TYPE: <Unit of Measure>
PRESS THE <ENTER> KEY

The following screen will be displayed.

Enter the following data:

Freq of Occur: H
Freq A:
Freq L:

Persons per team:
Task Classification (Low/High=0/1):

Trade :

Subtask Description and labor hours:

1-
2-
3-
4-
5-
6-
7-
8-
9-
10-
11-

.
.
.
.
.
.
.
.
.
.
.

Command

<D:>RN-TASK

Rec: 3235/3235

Num

Figure 2.2.5-6. Task Frequency Labor Information.

Please fill in the blanks with the information you would like to store.

Frequency of Occurrence - The Frequency of Occurrence is measured in hundreds of years. You must define three different Frequency of Occurrences. Assume you have 100 occurrences of the task. When would the first component require the execution of the task? This is the High (H) Frequency of Occurrence. When would the last component require the execution of the task? This is the Low (L) Frequency of Occurrence. When would the average component require the task to be performed? This would be the Average (A) Frequency of Occurrence.

Persons per Team - This is the number of people required to perform the task. In most cases it would be one person. For roofing work, it would require at least two people to comply with OSHA requirements. For large boiler work, it could require as many as four people.

Trade - Each task is performed by one trade. Enter the two digit code identifying the correct trade from Table 2-2.

Task Classification - This is a one digit numeric identifying the task as either:

- 1 - A replacement Task
- 0 - All other Tasks

Subtask Description and Labor Hours - The EPS should be used to determine all subtasks and labor hours to be performed. When not covered in the EPS under any heading, use any other published standards. Labor hours are stated for the execution of one unit of measure and can be entered to six significant figures (0.123456) if required. The largest allowable value is 9999.999999.

TYPE: <The Frequency of Occurrence - H,A,L>
PRESS THE <ENTER> KEY

TYPE: <Persons per Team>
PRESS THE <ENTER> KEY

TYPE: <Trade>
PRESS THE <ENTER> KEY

TYPE: <Task Classification>
PRESS THE <ENTER> KEY

TYPE: <Subtask Description and Labor Hours>
PRESS THE <ENTER> KEY

When all subtasks have been entered, press <PAGEDOWN> to move to the material screen.

Table 2-2. Trade Codes

INDEX	DESCRIPTION
1*	CARPENTRY
2*	ELECTRICAL, INTERIOR
3*	PLUMBING
4*	METAL
5*	PAINTING
6*	REFRIG./AIR CONDITIONING
7	ROADS
8*	GROUNDS
9*	HEATING SYSTEM
10	PM TEAM
12	ELECTRICAL, EXT.
13	WATER DIST.
14	SEWER MAINTENANCE
15	RAILROAD MAINTENANCE
16*	MASONRY
17*	ROOFER
18	KITCHEN EQUIPMENT
19*	STEAMFITTER
20	FIRE PREVENTION AND PROTECTION
21	ENTOMOLOGY
22	FUEL HANDLING
23	REFUSE COLLECTION & DIST.
24	CUSTODIAL
25	MOB. EQUIPMENT MAINTENANCE
30	HEATING PLANTS, HP
31	WATER PLANTS
32*	SEWAGE PLANTS
35	HEATING PLANTS, LP
40	ERMD
41	EPS REAL PROPERTY
42	ADMINISTRATION
43	SUPPLY/STORAGE
46	BUILDING AND GROUNDS
47	UTILITES
49	FE UTILITIES

*Actual trades used in system.

When 11 subtasks have been entered, the following screen will be displayed.

```

Subtask Description and labor hours:
12-      .
13-      .
14-      .
15-      .
16-      .
17-      .
18-      .
19-      .
20-      .
21-      .
22-      .

% Comp Repl Cost:      Task has a note? (T/F) F

Command      |<D:>|RN-TASK      |Rec: 3235/3235      |      |Num

```

Figure 2.2.5-7. Continuing Subtasks.

If there are more than 11 subtasks, use this screen as a continuation, otherwise, press <PAGEDOWN>.

TYPE: <The other subtasks> or <PAGEDOWN>

The following screen will be displayed.

```

Compnts Cntng Task:
1st Component:      2nd Component:      3rd Component:
4th Component:      5th Component:      6th Component:
7th Component:      8th Component:      9th Component:

Material resources:
  Description  Quantity      Unit Cost
1.
2.
3.
4.
5.
6.
7.

Command      |<D:>|RN-TASK      |Rec: 3235/3235      |      |Num

```

Figure 2.2.5-8. Components Containing Task.

The user is given the option of entering or editing the data. Since a new record is being added, select data.

TYPE: D

Now input the new task data code number, i.e., 9999999.

TYPE: <The task data number>

The following screen will be displayed.

Enter the followEPS & CACES REFERENCES FILE

TASK CODE9999999

CACES

BOOK NUMBER

OPERATION NUMBER

TASK NUMBER

PERCENT APPLIED

Command

<D:>RN-REF

Rec: 393/393

Num

Figure 2.2.6-2. Enter the Following Information.

The user is now able to enter the CACES Number, EPS Book Number, the operation number, task number, and the percent the EPS/CACES reference is used in the task.

CACES Number - The prime material price should be taken from CACES. Enter the Code Number for the Prime Material in the Task.

EPS Book Number - Enter the Source for the Labor Hours. This could be an EPS manual or any other source document.

Operation Number - This could be an EPS Number or a chapter from some other source.

Task Number - This could be an EPS task number or a page number from another source.

Percent Applied - This is the proportion of the EPS Reference Task used in the MRPM subtask.

TYPE: <CACES Number>
PRESS THE <ENTER> KEY

TYPE: <EPS Book Number>
PRESS THE <ENTER> KEY

TYPE: <Operation Number>
PRESS THE <ENTER> KEY

TYPE: <Task Number>
PRESS THE <ENTER> KEY

TYPE: <Percent Applied>
PRESS THE <ENTER> KEY

2.3 Search/Edit/Delete Records

2.3.1 Introduction

From the Main Menu:

To change records, type 2.

TYPE: 2

The following screen will be displayed.

Select the Data File You Wish to Use			
1) System			
2) Sub-System			
3) Component			
4) Task Data Information			
5) References			
0) Return to Previous Menu			
Enter Your Selection			
Command	<D:>		Num

Figure 2.3-1. Edit Menu.

Select the level of record to be changed:

1. SYSTEM [see sec. 2.3.2] allows the user to change to the second level of subdivision, i.e., Roofing.
2. SUBSYSTEM [see sec. 2.3.3] allows the user to change data records to the most specific of all subdivisions, i.e., Roof Coverings.
3. COMPONENT [see sec. 2.3.4] allows the user to change the item you will be performing a task on.
4. TASK DATA [see sec. 2.3.5] will allow the user to edit the tasks in the database.
5. EPS/CACES REFERENCE [see sec 2.3.6] is a bookkeeping option that allows the user to edit the source for the information listed in the Task Data.

or press 0 to return to the Main Menu.

2.3.2 Changing the System Data File

From the Edit Menu:

To change the system data file, type 1.

TYPE: 1

The following screen will be displayed.

```
Enter the SYSTEM Number:

Command      |<D:>|RN-SYS          |Rec: 30/49      |      |Num
```

Figure 2.3.2-1. System Number.

The following screen will be displayed.

CURSOR	<-- -->	Field:	UP	DOWN	DELETE	Insert Mode:	Ins
Char:	← →	Page:	↑	↓	Char:	Del	Exit/Save: ^End
Word:	Home End	Help:	PgUp	PgDn	Field:	^Y	Abort: Esc
			F1		Record:	^U	Memo: ^Home

SY_NO	081
SY_DSCR	SANITARY

EDIT	<D:> RN-SYS	Rec: 4/49		Num
------	-------------	-----------	--	-----

Figure 2.3.2-2. System Number and Description.

The user can now use the keys as explained on the top of the screen to change both the System number and description.

SY_NO - This three-character ID is composed of the two-character Area ID and one additional character.

SY_DSCR - This description can be as many as 35 characters.

When finished changing the first System, use the down arrow key to move to the next field. When finished changing the data, type <CONTROL><END> to save and exit. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

You can now use the keys to change both the Subsystem number (TASK_CODE) and description.

TASK_CODE - This four-character ID is composed of the three-character system ID and one additional character.

SUB_DSCR - This description can be as many as 35 characters.

When the user has finished editing the first subsystem, use the down arrow key to move to the next field. When finished changing the records, type <CONTROL><END> to save and exit. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

The following screen will be displayed.

Press <1> to Continue Editing,<0> to Return to Previous Menu.

Command	<D:> RN-SYS	Rec: 4/49		Num
---------	--------------	-----------	--	-----

Figure 2.3.3-3. Continue Editing.

To continue editing Subsystem records, type 1, otherwise, type 0.

TYPE: 0 or 1

2.3.4 Changing the Component Data File

From the Editing Menu:

To change the component data file, type 3.

TYPE: 3

The following screen will be displayed.

Enter the COMPONENT Number:

Command |<D:>|RN-COMP |Rec: 472/1034 | |Num

Figure 2.3.4-1. Component Number.

Enter the Component number to be reviewed, i.e., 081130.

TYPE: <The component Number>

The following screen will be displayed.

CURSOR <-- --> Char: ← → Word: Home End	Field: UP DOWN ↑ ↓ Page: PgUp PgDn Help: F1	DELETE Char: Del Field: ^Y Record: ^U	Insert Mode: Ins Exit/Save: ^End Abort: Esc Memo: ^Home
---	---	--	--

TASK_CODE 081130
COMP_DSCR URINAL

EDIT |<D:>|RN-COMP |Rec: 3/1034 | |Num

Figure 2.3.4-2. Component Number and Description.

The user can now use the keys to change both the component number (TASK_CODE) and description (COMP_DSCR).

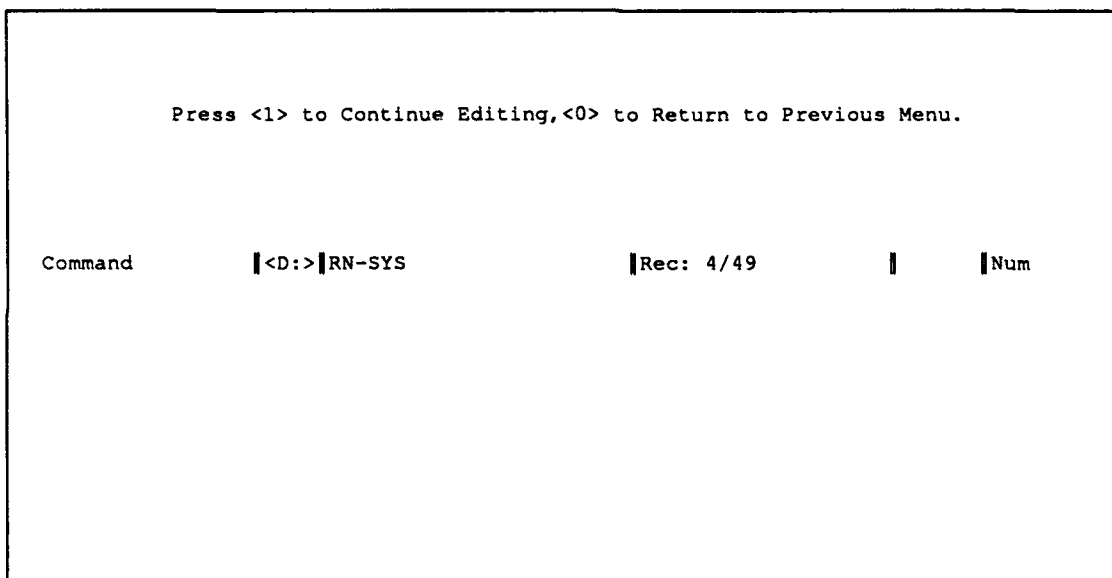
TASK_CODE - This six-character ID is composed of the four-character Subsystem ID and two additional characters.

COMP_DSCR - This description can be as many as 35 characters.

When finished changing the first component, use the down arrow key to move to the next field. When finished changing the records, type <CONTROL><END> to exit and save. None of the data entered is saved until the user presses <CTRL><END>.

TYPE: <CONTROL><END>

The following screen will be displayed.



```
Press <1> to Continue Editing,<0> to Return to Previous Menu.

Command      |<D:>|RN-SYS          |Rec: 4/49      |      |Num
```

Figure 2.3.4-3. Continue Editing.

To continue editing the component records, type 1, otherwise, type 0.

TYPE: 0 or 1

2.3.5 Changing the Task Data File

From the Edit Menu:

To change a record to the task data file, type 4.

TYPE: 4

The following screen will be displayed.

```
Enter the TASK CODE Number: 0811301

Command      |<D:>|RN-TASK      |Rec: 1294/3238  |      |Num
```

Figure 2.3.5-1. Enter a Task Code.

You should now enter the task code you wish to edit.

TYPE: <The Task Code>

The following screen will be displayed.

```
Enter the following information:

Task Description Code M/R
Description of Task   Replace Flush Valve
Unit of Measure      1-CT

Command      |<D:>|RN-TASK      |Rec: 3235/3235  |      |Num
```

Figure 2.3.5-2. Description Code.

The user may now edit the present values for the Description Code, the Description, and the unit of measure.

Task Description Code - This is a seven-digit numeric identifying the task, included in the Code is the six-digit component number.

Description of Task - This is a 35-character string identifying the task with a phrase of words.

Unit of Measure - All Tasks under a component **MUST** use the same unit of measure. The units of measure is shown in Table 2-1.

TYPE: <Task Description Code>
PRESS THE <ENTER> KEY

TYPE: <Description of Task>
PRESS THE <ENTER> KEY

TYPE: <Unit of Measure>
PRESS THE <ENTER> KEY

The following screen will be displayed.

Enter the following data:		
Freq of Occur: H 1:6	Freq A: 1:7	Freq L: 1:8
Persons per team: 1		
Trade : 3	Task Classification (Low/High=0/1): 0	
Subtask Description and labor hours:		
1- TURN VALVE OFF/ON	0.008000	
2- REMOVE PACKING NUTS	0.021000	
3- REMOVE FLUSH VALVE	0.013000	
4- INSTALL NEW VALVE	0.043000	
5- CHECK FOR LEAK	0.005000	
6-	0.000000	
7-	0.000000	
8-	0.000000	
9-	0.000000	
10-	0.000000	
11-	0.000000	
Command	<D:> RN-TASK	Rec: 8/3243 Num

Figure 2.3.5-3. Frequency.

The user can now enter detailed data for the task. Please replace the data with the information the system is to use in calculations.

Frequency of Occurrence - The Frequency of Occurrence is measured in hundreds of years. You must define three different Frequency of Occurrences. Assume you have 100 occurrences of the task.

When would the first component require the execution of the task? This is the High (H) Frequency of Occurrence. When would the last component require the execution of the task? This is the Low (L) Frequency of Occurrence. When would the average component require the task to be performed? This would be the Average (A) Frequency of Occurrence.

Persons per Team - This is the number of people required to perform the task. In most cases it would be one person. For roofing work, it would require at least two people to comply with OSHA requirements. For large boiler work, it could require as many as four people.

Trade - Each task is performed by one trade. Enter the two-digit code identifying the correct trade from Table 2-2.

Task Classification - This is a one-digit numeric identifying the task as either:

- 1 - A replacement Task
- 0 - All other Tasks

Subtask Description and Labor Hours - The EPS should be used to determine all subtasks to be performed. When not covered in the EPS under any heading, use any other material standard. Labor hours are stated for the execution of one unit of measure and can be entered to six significant figures (0.123456) if required. The largest allowable value is 9999.999999.

TYPE: <The Frequency of Occurrence - H,A,L>
PRESS THE <ENTER> KEY

TYPE: <Persons per Team>
PRESS THE <ENTER> KEY

TYPE: <Trade>
PRESS THE <ENTER> KEY

TYPE: <Task Classification>
PRESS THE <ENTER> KEY

TYPE: <Subtask Description and Labor Hours>
PRESS THE <ENTER> KEY

The following screen will be displayed.

```

Subtask Description and labor hours:
12-      .
13-      .
14-      .
15-      .
16-      .
17-      .
18-      .
19-      .
20-      .
21-      .
22-      .

% Comp Repl Cost:  QT-311      Task has a note? (T/F) F
Command      |<D:>|RN-TASK      |Rec: 3235/3235      |      |Num

```

Figure 2.3.5-4. Continuing Subtasks.

If there are more than 11 subtasks, this screen will show the continuation of subtasks; it will be blank most of the time. To edit, enter the new data, otherwise press <PAGEDOWN>.

TYPE: <The other subtasks> or <PAGEDOWN>

The following screen will be displayed.

```

Compts Cntng Task:
1st Component:0811300      2nd Component:      3rd Component:
4th Component:      5th Component:      6th Component:
7th Component:      8th Component:      9th Component:

Material resources:
Description  Quantity      Unit Cost
1. Flush Valve  1      11.30
2.      .
3.      .
4.      .
5.      .
6.      .
7.      .

Command      |<D:>|RN-TASK      |Rec: 3235/3235      |      |Num

```

Figure 2.3.5-5. Components Containing Task.

Again replace the old data with the new component numbers that will use this task. For example, if the task is interior painting, components such as plaster walls should be included in this list. Any new materials needed to complete the task may be entered also.

Components Containing this Task - The system allows recording all components that use this identical task. This information can be used when the performance methods are changed to ensure that all tasks are updated correctly.

Material Resources - List all materials required to perform the task. Material waste should be considered also. Prices should be taken from the CACES.

Quantity - Enter the amount of the material required to accomplish one unit of measure.

TYPE: <Components containing task>
PRESS THE <ENTER> KEY

TYPE: <Material resources>
PRESS THE <ENTER> KEY

2.3.6 EPS/CACES References

From the Edit Menu:

To edit the EPS/CACES data file, type 5.

TYPE: 5

The following screen will be displayed.

Enter the TASK CODE Number:

Command |<D:>|RN-TASK |Rec: 1294/3238 | |Num

Figure 2.3.6-1. Task Code.

The user can now input the task data code number, i.e., 9999999, to be edited.

TYPE: <The task data number>

The following screen will be displayed.

Enter the following: EPS & CACES REFERENCES FILE

TASK CODE9999999

CACES

BOOK NUMBER

OPERATION NUMBER

TASK NUMBER

PERCENT APPLIED

Command

<D:>RN-REF

Rec: 393/393

Num

Figure 2.3.6-2. Enter the Following.

The user is now able to edit the CACES Number, EPS Book Number, the operation number, task number, and the percent the EPS/CACES reference is used in the task.

CACES Number - The prime material price should be taken from the CACES. Enter the Code Number for the Prime Material in the Task.

EPS Book Number - Enter the Source for the Labor Hours.

Operation Number - This could be an EPS Number or a chapter from some other source.

Task Number - This could be an EPS task number or a page number from another source.

Percent Applied - This is the amount of the Task Reference used in the Task.

TYPE: <CACES Number>
PRESS THE <ENTER> KEY

TYPE: <EPS Book Number>
PRESS THE <ENTER> KEY

TYPE: <Operation Number>
PRESS THE <ENTER> KEY

TYPE: <Task Number>
PRESS THE <ENTER> KEY

TYPE: <Percent Applied>
PRESS THE <ENTER> KEY

2.4 Generating Reports

2.4.1 Introduction

From the Main Menu:

In order to generate a report, type 3, as the selection on the main screen.

TYPE: 3

The following screen will be displayed.

```

                                ==> REPORT MENU <==

Do you wish to run the:

1) Basic Task Information Table (REPORT 1)
2) Task Data Form (REPORT 2)
3) Component Data Form (REPORT 3)
4) EPS/CACES references (REPORT 4)
5) Maintenance Dollars Form (REPORT 5)

0) Return to Main Menu

Enter Your Selection >
```

Figure 2.4-1. Report Menu.

There are now five options:

1: Basic Task Information Table [see Sec. 2.4.2]

The Basic Task Information Table is a summary of the information in report two.

2: Task Data Form [see Sec. 2.4.3]

This research product is a data base containing maintenance tasks related to every building construction component, such as a shingle roof or a sink.

3: Component Data Form [see Sec. 2.4.4]

This research product is a component resource summary for the first 25 years of a facility.

4: EPS/CACES References [see Sec. 2.4.5]

The source document for each labor and material resource is stored in this reference table.

5: Life Cycle Costs Form [see Sec. 2.4.6]

This research product will allow the user to produce 25-year present worth tables for use by designers in selecting components.

Make a selection by typing the option number after "Enter Your Selection>".

2.4.2 Basic Task Information Table

2.4.2.1 Introduction

The Basic Task Information Table is a summary of the information in the Task Data Base for any of the four systems. A typical report is shown in Table 2-3. This data includes the CACES number, task description, unit of measure, trade code, the average, high, and low frequencies of task occurrence, labor hours, material costs, and equipment hours.

The following screen will be displayed.

```
REPORT 1: Basic Task Information Table
Select One of the Following Groups:

1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection >
```

Figure 2.4.2-1. Report 1 Basic Task.

Table 2-3. Basic Task Information Table

CACES TASK CODE	TASK DESCRIPTION	INDEX NO. TO UNIT OF MEASURE ROW	INDEX NO. TO TRADE	FREQUENCY OF OCCURRENCE			RESOURCES IN EQUIVALENT MAN HOURS		
				High	Average	Low	Labor	Material	Equipment
0811503	REPLACE WASHER IN FAUCET	1	3	1.0000	2.0000	3.0000	0.144300	0.140000	0.144300
0811803	REPLACE FAUCETS	1	3	8.0000	10.0000	12.0000	0.817700	46.000000	0.817700
0811804	RESEAL	1	3	4.0000	5.0000	6.0000	0.767000	0.720000	0.767000
0811E04	REPLACE SINK	1	3	26.0000	35.0000	44.0000	3.068000	67.000000	1.534000
0811101	REPLACE GLAND	1	3	1.0000	2.0000	3.0000	0.336700	0.420000	0.336700
0811M03	REPLACE EYE WASH STATION	1	3	20.0000	25.0000	30.0000	2.600000	104.000000	1.300000
0812102	UNCLOG MAIN DRAIN	4	3	7.5000	10.0000	12.5000	0.819000	3.840000	0.819000
0813402	REPLACE OLD VALVE WITH NEW, PARTIAL	1	3	15.0000	20.0000	25.0000	0.572000	71.670000	0.572000
0813C03	REPLACE PUMP/MOTOR ASSEMBLY, PARTIAL	1	3	15.0000	20.0000	25.0000	2.873400	110.000000	1.436500
0814502	REMOVE OLD VALVE INSTALL NEW, PARTIAL	1	3	7.5000	10.0000	12.5000	3.900000	118.330000	1.950000
0814C01	CLEAN & SERVICE	1	3	4.0000	5.0000	6.0000	1.571700	0.000000	1.571700
0814J03	REPLACE WATER HEATER	1	3	10.0000	15.0000	20.0000	4.706000	13825.000000	2.353000
0823102	INSP./CHECK PUMP/MOTOR OPER., LUBR., CHECK ALIGN.	1	3	1.0000	1.0000	1.0000	0.162500	0.260000	0.162500
0831312	REPLACE PIPE AND FITTINGS, 10 FT.	4	3	2.0000	3.0000	4.0000	10.744500	20.800000	5.372250
0841302	CHECK OPERATION AND ADD SALT	1	3	0.0833	0.0833	0.0833	0.585000	32.000000	0.585000

The Basic Task Information Table menu screen allows selection of one of six options:

1. Plumbing - Print sections of the data base related to the plumbing system.
2. Electrical - Print sections of the data base related to the electrical system.
3. Architectural - Print sections of the data base related to the architectural system.
4. HVAC - Print sections of the data base related to the HVAC system.
5. All - Print the entire data base.
0. Return to the previous Menu.

Select any of the systems by typing the corresponding option number after "Enter Your Selection>".

The following screen will be displayed for selections 1, 2, 3, 4, or 5.

MAKE SURE THAT YOUR PRINTER IS TURNED ON AND HAS PAPER!

Choose output format of Report 1:

O	Original type (10 char/inch PICA); 6 lines/inch
C	Condensed type (17 char/inch); 6 lines/inch
S	Condensed Laser (17 char/inch); 8 lines/inch, SIDEWAYS on page

SELECT YOUR OUTPUT FORMAT (O, C or S): S

Figure 2.4.2-2. Print Size Selection.

Select the type of print: O, C, or S.

NOTE: CHECK THE PRINTER'S USER MANUAL TO ENSURE IT IS CAPABLE OF PRINTING THE OPTION SELECTED.

TYPE: O, C, or S

The following screen will be displayed.

```

                                MAKE SURE THAT YOUR PRINTER IS TURNED ON AND HAS PAPER!

Choose output format of Report 1:
O   Original type (10 char/inch PICA); 6 lines/inch
C   Condensed type (17 char/inch); 6 lines/inch
S   Condensed Laser (17 char/inch); 8 lines/inch, SIDEWAYS on page

                                SELECT YOUR OUTPUT FORMAT (O, C or S):  S

Enable Generation of Report to Screen? Y

Command      |<D:>|RN-TASK                |Rec: 1294/3232    |      |Num

```

Figure 2.4.2-3. Displayed on Screen.

After selecting a font, the user will be asked whether or not to display the file on the screen as it is being printed. Displaying the text on the screen will dramatically increase processing times.

TYPE: Y or N

The system will use the existing data files to compile and print the Basic Task Information Tables selected.

2.4.3 The Task Data Form

2.4.3.1 Introduction

This research product is a data base containing maintenance tasks related to every building construction component, such as a shingle roof or a sink. This task data base provides labor, material, and equipment resource information as well as the frequency of task occurrence.

The task data form gives detailed resources by subtask for each task. A typical Task Data Form is shown in Figure 1-1.

The following screen will be displayed.

```
REPORT 2: Task Data Form NumCaps

Do you wish a report on:

1) An individual task
2) Tasks from a certain number on
3) Groups of tasks
4) Range of tasks
5) Create ASCII files containing ALL tasks

0) Return to previous menu

Enter Your Choice >
```

Figure 2.4.3-1. Choice of Tasks (i.e., Individual Groups or Ranges).

There are six options:

1. One task [see Sec. 2.4.3.2]
2. Beginning at one task and printing the rest of the file [see Sec. 2.4.3.3]
3. One or all of the systems in the Database [see Sec. 2.4.3.4]
4. A range of tasks [see Sec. 2.4.3.5]
5. The entire task file to a separate ASCII file [see Sec. 2.4.3.6]
0. Return to the previous menu.

2.4.3.2 Printing an Individual Task

To print one Task Data Form, type 1.

TYPE: 1

The following screen will be displayed.

```
Enter the Task Code Number:

Command      |<D:>|      |      |      |NumCaps
```

Figure 2.4.3.2-1. One Task Screen.

Enter the Code for the Task to be printed, i.e., 0311351 for debris removal by hand and inspection.

TYPE: <The number of the Task>

The following screen will be displayed.

```
Enter the Task Code Number: 0311351

CHOOSE OUTPUT FORMAT:

1) One Task Data Form per page, 6 lines/inch
2) One Task Data Form per page, 8 lines/inch
3) One Task Data Form per page, 10 lines/inch
0) Return to previous menu

ENTER YOUR CHOICE : 1

Command      |<D:>|RN-TASK      |Rec: 1336/3232      |      |NumCaps
```

Figure 2.4.3.2-2. Selecting the Print Size.

Now the user has the opportunity to select the print format.

To print a report identical to the one published in the 4 CERL Task Reports, use option 3.

TYPE: 1, 2, or 3

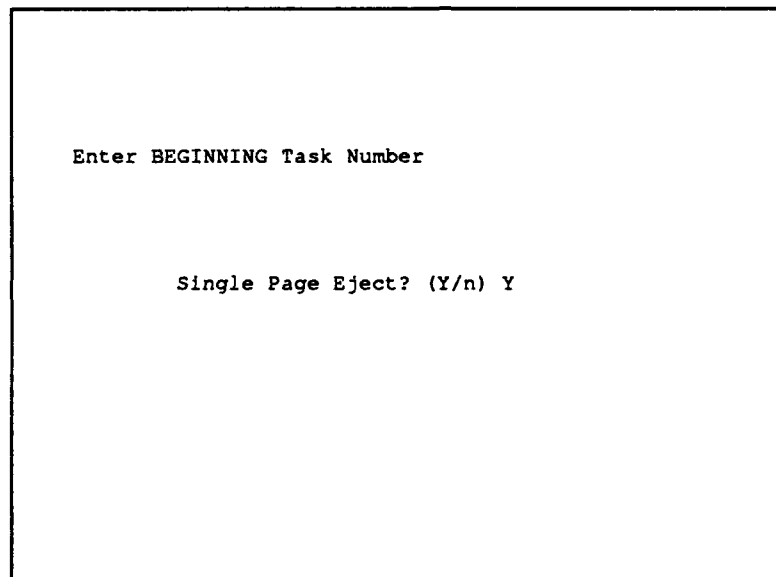
The system will print the Task Data Form and return to the control menu.

2.4.3.3 Printing From One Task On

To print the remaining Task Data Form file beginning with a specific task, type 2.

TYPE: 2

The following screen will be displayed.



```
Enter BEGINNING Task Number

Single Page Eject? (Y/n) Y
```

Figure 2.4.3.3-1. Printing a Range.

Enter the starting task, i.e., 311351 for debris removal by hand.

TYPE: <Task Number>

The user now has the option of "single page eject." This means a page break after one form is printed. Type Y if an individual sheet feeder (such as a LaserJet) is being used. Type N if using continuous feed paper.

TYPE: Y or N
PRESS THE <ENTER> KEY

The following screen will be displayed.

```
Enter BEGINNING Task Number    0311351

Single Page Eject? (Y/n) Y

CHOOSE OUTPUT FORMAT:

1) One Task Data Form per page, 6 lines/inch
2) One Task Data Form per page, 8 lines/inch
3) One Task Data Form per page, 10 lines/inch
4) Two Task Data Forms per page, 10 lines/inch
0) Return to previous menu

ENTER YOUR CHOICE : 1

Command  |<D:>|RN-TASK      |Rec: 1336/3232  |      |Num
```

Figure 2.4.3.3-2. Select a Format.

Now select the print format.

TYPE: 1, 2, 3, 4, or 0

The system will now print all Task Data Forms starting with the task selected.

The standard print form is option 4: Two Task Data Forms per page, 10 lines/inch.
To print a report identical to the one published in the 4 CERL Task Reports, use option 4.

2.4.3.4 Printing a Group of Tasks

To print a group of tasks, type 3.

TYPE: 3

The following screen will be displayed.

Select One of the Following Groups:

- 1) Plumbing
- 2) Electrical
- 3) Architectural
- 4) HVAC
- 5) All
- 0) Return to Previous Menu

Enter Your Selection > 1

Figure 2.4.3.4-1. Printing a Group.

Now select any of the groups to print. If the user types 5, the system will print all the Task Forms in the Database.

TYPE: 1, 2, 3, 4, 5, or 0

The following screen will be displayed.

```

                                CHOOSE OUTPUT FORMAT:

                                1) One Task Data Form per page, 6 lines/inch
                                2) One Task Data Form per page, 8 lines/inch
                                3) One Task Data Form per page, 10 lines/inch
                                4) Two Task Data Forms per page, 10 lines/inch
                                0) Return to previous menu

                                ENTER YOUR CHOICE : 1

Command      |<D:>|RN-TASK      |Rec: 1/3232      |      |Num

```

Figure 2.4.3.4-2. Printing the Format.

Select the print format.

TYPE: 1, 2, 3, 4, or 0

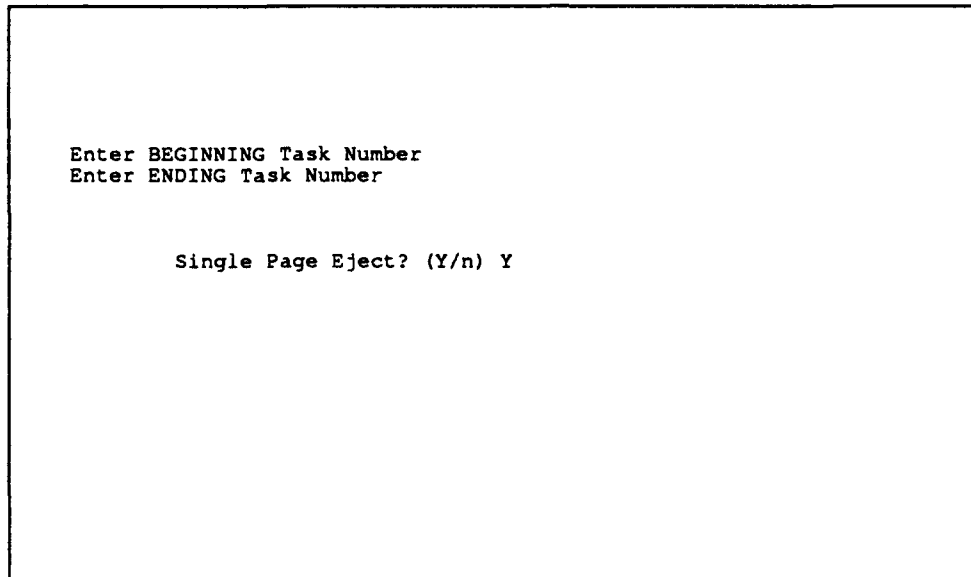
To print a report identical to the one published in the 4 CERL Task Reports, use option 4. The system will print the group of Task Data Forms selected.

2.4.3.5 Printing a Range of Tasks

To print a range of tasks, type 4.

TYPE: 4

The following screen will be displayed.



```
Enter BEGINNING Task Number
Enter ENDING Task Number

Single Page Eject? (Y/n) Y
```

Figure 2.4.3.5-1. Printing a Range of Tasks.

Type in the beginning task number, i.e., 0311351 for debris removal by hand, and the task number of the final to be printed.

TYPE: <Beginning Task Number>

TYPE: <Ending Task Number>

The user now has the option of "single page eject." This means a page break after one form is printed. Type Y if an individual sheet feeder (such as LaserJet is being used). Type N if using continuous feed paper.

TYPE: Y or N

PRESS THE <ENTER> KEY

The following screen will be displayed.

```
CHOOSE OUTPUT FORMAT:

1) One Task Data Form per page, 6 lines/inch
2) One Task Data Form per page, 8 lines/inch
3) One Task Data Form per page, 10 lines/inch
4) Two Task Data Forms per page, 10 lines/inch
0) Return to previous menu

ENTER YOUR CHOICE : 1

Command |<D:>|RN-TASK          |Rec: 1/3232          | |Num
```

Figure 2.4.3.5-2. Printing Format.

Select the Task Data Form format.

TYPE: 1, 2, 3, 4, or 0

To print a report identical to the one published in the 4 CERL Task Reports, use option 4. The system will now print all Task Data Forms in the range selected.

2.4.3.6 Printing to an ASCII File

To make a file containing all Task Data Forms, select 5.

TYPE: 5

The following screen will be displayed.

```

Your ASCII export files will be named "ASCII_XX.OUT", where "X"
is a 2-digit number indicating the first 2 digits of the Task Codes
in that particular file.

Enable Generation of Report to Screen? Y

Command      |<D:>|RN-TASK      |Rec: 1294/3232      |      |Num

```

Figure 2.4.3.6-1. Printing to an ASCII File.

The user is now asked if the report is to be shown on the screen, answer Y or N.

TYPE: Y or N
PRESS THE <ENTER> KEY

The system will now generate ASCII files with each type of task (the first two numbers in the task code denote the type of task) being stored in its own file.

2.4.4 The Component Data Form

2.4.4.1 Introduction

This research product is a component resource summary for the first 25 years of a facility. The tasks for the component are scheduled and combined into one set of annual resource requirements. A typical Component Data Form is shown in Figure 1-2.

From the Report Menu:

To Print a Component Data Report, type 3.

TYPE: 3

The following screen will be displayed.

```
REPORT 3: Component Data Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice >
```

Figure 2.4.4-1. Component Data Form Menu.

The user now has a choice of Component Data Forms to print.

There are five options for printing:

1. One component [see Sec. 2.4.4.2]
2. Beginning at one component and printing the rest of the file [see Sec. 2.4.4.3]
3. One or all of the systems in the Database [see Sec. 2.4.4.4]
4. A range of components [see Sec. 2.4.4.5]
5. Generating or printing all components [see Sec. 2.4.4.6].

2.4.4.2 Printing an Individual Component

To print one component, Type 1.

TYPE: 1

The following screen will be displayed.

```
REPORT 3: Component Data FNUM

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number >
```

Figure 2.4.4.2-1. Enter the Component Number.

Type in the number of the component to be printed, i.e., 081130 - Urinal.

TYPE: <The component number>

The following screen will be displayed.

```

                                REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130

                                Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
```

Figure 2.4.4.2-2. Output Format.

Choose the Report output format. The user can also choose whether the report should be printed to the Printer, Disk, or Both.

TYPE: 1, 2, 3, or 0 for output style.

To print a report identical to the one published in the 4 CERL Building Component Reports, use option 3.

TYPE: P, D, or B for output format.

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D

Your disk file will be named "RN-RPT3.OUT"
Single Page Eject? (Y/n) Y
```

Figure 2.4.4.2-3. File Name and Single Page Eject

The system will now give the name of the disk file - RN-RPT3.OUT (if the user chose to save to a disk file). It will also ask if page breaks are desired.

TYPE: Y or N

The following screen will be displayed.

```
REPORT 3:      Num

Calculate Totals for Components? Y

Enable Generation of Report to Screen? Y

Material Inflation Factor?      1.06
```

Figure 2.4.4.2-4. Report Generation.

Calculating Totals

Important questions regarding the report are now asked. First is the choice to calculate the totals for the component listing. This will total all the years by heading (labor, material costs, equipment hours), and give the present worth value for each heading.

TYPE: Y or N

Screen Generation

The next choice decides whether or not you would like to have the report printed on the screen as well.

TYPE: Y or N

The Material Inflation Factor

The final choice is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts from July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The system will now prepare the requested reports.

2.4.4.3 Printing From One Component On

To print the remaining Component Data Form file beginning with a specific component, type 2.

TYPE: 2

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. >
```

Figure 2.4.4.3-1. Beginning Component.

Type in the component number to begin the listing, i.e., 081130 - Urinals.

TYPE: <The beginning component number>

The following screen will be displayed.

```

                                REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
```

Figure 2.4.4.3-2. Report Output.

The user can now choose the Report output style and the media the report is to be saved to: Printer, Disk, or Both.

TYPE: 1, 2, 3, or 0 for output style.

To print a report identical to the one published in the 4 CERL Building Component Reports, use option 3.

TYPE: P, D, or B for output destination.

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130

Choose Report Output Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D

Your disk file will be named "RN-RPT3.OUT"
Single Page Eject? (Y/n) Y
```

Figure 2.4.4.3-3. File Name and Single Page Eject.

The system will now give the name of the disk file - RN-RPT3.OUT (if the user chose to save to a disk file). It will also ask if page breaks are desired.

TYPE: Y or N

The following screen will be displayed.

REPORT 3:	Num
Calculate Totals for Components?	Y
Enable Generation of Report to Screen?	Y
Material Inflation Factor?	1.06

Figure 2.4.4.3-4. Report Generation.

Calculating Totals

Important questions regarding the report are now asked. First is the choice to calculate the totals for the component listing. This will total all the years by heading (labor, material costs, equipment hours), and give the present worth value for each heading.

TYPE: Y or N

Screen Generation

The next choice is whether or not to print the report on the screen as well.

TYPE: Y or N

Material Inflation Factor

The final choice is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts from July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

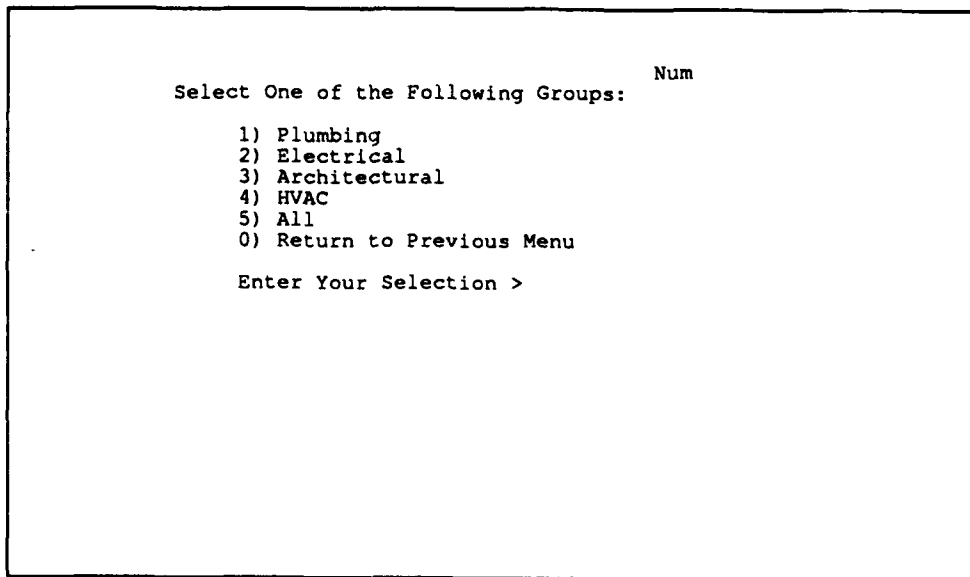
The system will now prepare the requested reports.

2.4.4.4 Printing a Group of Components

To print a group of components, type 3.

TYPE: 3

The following screen will be displayed.



```

                                Num
Select One of the Following Groups:
1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection >
```

Figure 2.4.4.4-1. Select the Group.

The user can now select any of the groups to print. If the user types 5, the system will print all the Task Forms in the Database.

TYPE: 1, 2, 3, 4, 5, or 0

The following screen will be displayed.

	Num
Select One of the Following Groups:	
1) Plumbing	
2) Electrical	
3) Architectural	
4) HVAC	
5) All	
0) Return to Previous Menu	
Enter Your Selection > 1	
Choose Report Output 3 Format:	
1) Original-sized print (2 80-yr. Component listings/ 2 pages)	
2) Compressed-print (2 80-yr. Component listings/ page)	
3) Super-Compressed (6 25-yr. Component listings/ page)	
0) Return to Previous Menu	
Enter Your Choice > 3	

Figure 2.4.4.4-2. Report Output.

The user can now choose the Report output style and the destination for the report: Printer, Disk, or Both.

TYPE: 1, 2, 3, or 0 for output style.

To print a report identical to the one published in the 4 CERL Building Component Reports, use option 3.

TYPE: P, D, or B for output format.

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D

Your disk file will be named "RN-RPT3.OUT"
Single Page Eject? (Y/n) Y
```

Figure 2.4.4.4-3. File Name and Single Page Eject.

The system will now give the name of the disk file - RN-RPT3.OUT (if the user chose to save to a disk file). It will also ask if page breaks are desired.

TYPE: Y or N

The following screen will be displayed.

REPORT 3:	Num
Calculate Totals for Components?	Y
Enable Generation of Report to Screen?	Y
Material Inflation Factor?	1.06

Figure 2.4.4.4-4. Report Generation.

Calculating Totals

Important questions regarding the report are now asked. First is the choice to calculate the totals for the component listing. This will total all the years by heading (labor, material costs, equipment hours), and give the present worth value for each heading.

TYPE: Y or N

Report Date

The next choice is whether or not to print the report on the screen as well.

TYPE: Y or N

Material Inflation Factor

The final choice is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but you should use an inflation factor that adjusts from July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The system will now prepare the requested reports.

2.4.4.5 Printing a Range of Components

To print a range of components, type 4.

TYPE: 4

The following screen will be displayed.

```
REPORT 3: Component Data FNum  
Do you wish to generate a report on:  
1) An individual component  
2) Components from a certain number on  
3) Groups of components  
4) Range of components  
5) All components (must be generated first)  
0) Return to previous menu  
  
Enter Your Choice > 4  
  
Enter BEGINNING Component No. >
```

Figure 2.4.4.5-1. Enter Beginning Number.

Now enter the first and last component numbers of the range of tasks to be printed.

TYPE: <The beginning component number>

TYPE: <The ending component number>

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130   Enter ENDING No. > 081130

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D
```

Figure 2.4.4.5-2. Report Output.

Now choose the Report output style and the destination for the report: Printer, Disk, or Both.

TYPE: 1, 2, 3, or 0 for output style.

To print a report identical to the one published in the 4 CERL Building Component Reports, use option 3.

TYPE: P, D, or B for output format.

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130    Enter ENDING No. > 081130

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D

Your disk file will be named "RN-RPT3.OUT"
Single Page Eject? (Y/n) Y
```

Figure 2.4.4.5-3. File Name and Single Page Eject.

The system will now give the name of the disk file - RN-RPT3.OUT (if the user chose to save to a disk file). It will also ask if page breaks are desired.

TYPE: Y or N

The following screen will be displayed.

REPORT 3:	Num
Calculate Totals for Components?	Y
Enable Generation of Report to Screen?	Y
Material Inflation Factor?	1.06

Figure 2.4.4.5-4. Report Generation.

Calculating Totals

Important questions regarding the report are now asked. First is the choice to calculate the totals for the component listing. This will total all the years by heading (labor, material costs, equipment hours), and give you the present worth value for each heading.

TYPE: Y or N

Report Date

The next choice is whether or not to print the report on the screen as well.

TYPE: Y or N

Material Inflation Factor

The final choice is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts from July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The system will now prepare the requested reports.

2.4.4.6 Generating or Printing All Components

To generate or print every component in the database, type 5.

TYPE: 5

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D
```

Figure 2.4.4.6-1. Report Format.

Now choose the report output style and the destination for the report: Printer, Disk, or Both.

TYPE: 1, 2, 3, or 0 for output style.

To print a report identical to the one published in the 4 CERL Building Component Reports, use option 3.

TYPE: P, D, or B for output format.

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Choose Report Output 3 Format:
1) Original-sized print (2 80-yr. Component listings/ 2 pages)
2) Compressed-print (2 80-yr. Component listings/ page)
3) Super-Compressed (6 25-yr. Component listings/ page)
0) Return to Previous Menu
Enter Your Choice > 3
Direct Report to Printer (P), Disk File (D), or Both (B)? D

Your disk file will be named "RN-RPT3.OUT"
Single Page Eject? (Y/n) Y
```

Figure 2.4.4.6-2. File Name and Single Page Eject.

The system will now give the name of the disk file - RN-RPT3.OUT (if the user chose to save to a disk file). It will also ask if page breaks are desired.

TYPE: Y or N

The following screen will be displayed.

REPORT 3:	Num
Calculate Totals for Components?	Y
Enable Generation of Report to Screen?	Y
Material Inflation Factor?	1.06

Figure 2.4.4.6-3. Report Generation.

Calculating Totals

Important questions regarding the report are now asked. First is the choice to calculate the totals for the component listing. This will total all the years by heading (labor, material costs, equipment hours), and give you the present worth value for each heading.

TYPE: Y or N

Report Date

The next choice is whether or not to print the report on the screen as well.

TYPE: Y or N

Material Inflation Factor

The final choice is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts from July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The system will now prepare the requested reports.

2.4.5 The EPS/CACES References

2.4.5.1 Introduction

The source document for each labor and material resource is stored in this reference table. The document name and number and all internal references are entered. A typical form is shown in Table 2-4.

The following screen will be displayed.

```
REPORT 4:  EPS/CACES references

Do you wish a report on:

1)  Tasks from certain number on
2)  Groups of tasks
3)  Range of tasks

0)  Return to previous menu

Enter Your Choice >
```

Figure 2.4.5-1. Options.

The user has the option of printing:

1. Beginning at one task and printing the rest of the file [see Sec. 2.4.5.2]
2. One or all of the systems in the data base [see Sec. 2.4.5.3]
3. A range of components [see Sec. 2.4.5.4].

2.4.5.2 Printing From One Task On

To print beginning with one task and continuing, type 1.

TYPE: 1

Table 2-4. EPS/CACES References

TASK CODE	CACES	BOOK NO.	OPERATION NO.	TASK NO.	PERCENT APPLIED
0311371		TB 420-14	DT-231	3	1%+10%
0311371		TB 420-18	PT-649	5	100%+10%
0311371		TB 420-4	CT-159	9	2%
0311372		TB 420-18	PT-649	5	100%+10%
0311372		TB 420-4	CT-159	9	2%
0311372		TB 420-18	PT-649	5	(200%)+10%
0311373	75101008	TB 420-4	CT-159	9	2%
0311373	75101008	TB 420-4	CT-463	1	2%+10%
0311373	75101008	TB 420-4	CT-452	1	2%+10%
0311373	75303111	TB 420-4	CT-447	2	2%+10%
0311373	75303111	TB 420-4	CT-22	3	2%+10%
0311373	75303111	TB 420-4	CT-22	1	2%+10%
0311374	75101008	TB 420-4	CT-159	9	2%
0311374	75101008	TB 420-4	CT-463	1	2.5%+10%
0311374	75501001	TB 420-4	CT-454	1	2.5%+10%
0311374	75501001	TB 420-4	CT-452, 453	1	2.5%+10%
0311374	75303111	TB 420-4	CT-455	1	(2) 2.5%+10%
0311374	75303111	TB 420-4	CT-456, 453	1, 3	2.5%+10%
0311374	75303111	TB 420-4	CT-22	1	2.5%+10%
0311375	75302212	TB 420-4	CT-159	9	2%
0311375	75302212	TB 420-18	PT-601	ALL	0.2%+10%
0311375	75302212	TB 420-4	CT-462	1	0.2%+10%
0311375	75302212	TB 420-4	CT-462	2	0.2%+10%
0311375	75302212	TB 420-4	CT-22	1	0.2%+10%
0311377	75101008	TB 420-4	CT-159	9	0.2%
0311377	75101008	TB 420-4	CT-477	1	100%+10%
0311377	75302212	TB 420-4	CT-477	2	100%+10%
0311377	75302212	TB 420-4	PT-601	ALL	30%+10%
0311377	75501001	TB 420-4	CT-477	5	100%+10%
0311377	75501001	TB 420-4	CT-463	2	100%+10%
0311377	75501001	TB 420-4	CT-22	1	100%+10%
0311381		TB 420-4	CT-159	9	2%
0311381		TB 420-14	DT-231	3	1%+10%
0311381		TB 420-18	PT-649	5	100%+10%
0311382		TB 420-4	CT-159	9	2%
0311382		TB 420-18	PT-649	5	200%+10%
0311383	75101008	TB 420-4	CT-159	9	2%
0311383	75101008	TB 420-4	CT-463	1	2%+10%
0311383	75101008	TB 420-4	CT-452	1	2%+10%
0311383	75101008	TB 420-4	CT-449	2	2%+10%
0311383	75101008	TB 420-4	CT-22	3	2%+10%
0311383	75101008	TB 420-4	CT-22	1	2%+10%
0311384	75101008	TB 420-4	CT-159	9	2%
0311384	75101008	TB 420-4	CT-463	1	2.5%+10%
0311384	75101008	TB 420-4	CT-454	1	2.5%+10%
0311384	75101008	TB 420-14	DT-212	ALL	2.5%+10%
0311384	75101008	TB 420-4	CT-418	1	(2.5%) 110%
0311384	75101008	TB 420-4	CT-22	1	(2.5%) 110%

The following screen will be displayed.

```
REPORT 4: EPS/CACES references

Do you wish a report on:

1) Tasks from certain number on
2) Groups of tasks
3) Range of tasks

0) Return to previous menu

Enter Your Choice > 1

Enable Generation of Report to Screen? Y
```

Figure 2.4.5.2-1. Generation to the Screen.

The user is now asked if the report should be on the screen as well as printed.

TYPE: Y or N

The following screen will be displayed.

Enter BEGINNING No.

Command	<D:>			Num
---------	------	--	--	-----

Figure 2.4.5.2-3 Beginning Number.

Enter the beginning task number, i.e., 0311351- debris removal by hand.

TYPE: <The beginning Task number>

The System will now generate the EPS/CACES Reference report you selected.

2.4.5.3 Printing a Group of Tasks

To print a group of task references, type 2.

TYPE: 2

The following screen will be displayed.

```
REPORT 4: EPS/CACES refereNums

Do you wish a report on:

1) Tasks from certain number on
2) Groups of tasks
3) Range of tasks

0) Return to previous menu

Enter Your Choice > 2

Enable Generation of Report to Screen? Y
```

Figure 2.4.5.3-1. Generation to the Screen.

The user is now asked if the report is to be shown on the screen as well as printed.

TYPE: Y or N

The following screen will be displayed.

```

Select One of the Following Groups:

1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection >

Command      |<D:>|RN-REF      |Rec: 390/391      |      |Num
```

Figure 2.4.5.3-2. Select a Group.

Now select any of the groups to print. If you type 5, the system will print all the Task Forms in the Database.

TYPE: 1, 2, 3, 4, 5, or 0

The System will now generate the EPS/CACES Reference report selected.

2.4.5.4 Printing a Range of Tasks

To print a range of tasks, type 3

TYPE: 3

The following screen will be displayed.

```
REPORT 4: EPS/CACES refereNums

Do you wish a report on:

1) Tasks from certain number on
2) Groups of tasks
3) Range of tasks

0) Return to previous menu

Enter Your Choice > 3

Enable Generation of Report to Screen? Y
```

Figure 2.4.5.4-1. Generation to the Screen.

The user is now asked if the report is to be shown on the screen as well as printed.

TYPE: Y or N

The following screen will be displayed.

```
Enter BEGINNING No.  
Enter ENDING No.      9999999  
  
Command      |<D:>|      |      |      |Num
```

Figure 2.4.5.4-2. Enter Beginning Number.

Now enter the first and last task numbers of the range of tasks to be printed.

TYPE: <The beginning task number>

TYPE: <The ending task number>

Your EPS/CACES Reference report will now be generated.

2.4.6 The Life Cycle Cost Form

2.4.6.1 Introduction

This research product is a set of 25-year present worth tables for use by designers in selecting components for design features with little or no effect on building energy use (discount rate of 10 percent) and components for design features with a significant effect on building energy use (discount rate of 7 percent). The task resources were scheduled for the first 25 years of facility life using the average frequency of occurrence for each task. Individual task resources were summed for each year to produce one total labor hour, equipment hour, and material cost requirement for each facility age. The yearly component resource values were multiplied by the appropriate present worth factor to produce a present worth value for every year. The present worth values for each year were added for the 25 years to produce one set of 25-year summary resource values which the designer can use easily and quickly. A typical LCC form is shown in Figure 1-3. The date of the study is assumed to be 3 years before the beneficial occupancy date. All discounting for the 10 percent tables is by midyear. All discounting for the 7 percent tables is by end-of-year conventions.

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:
1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1
```

Figure 2.4.6.1-1. Component Data Form Menu.

The user now has a choice of Component Data Forms to print.

The user has the option of printing:

1. One component [see Sec. 2.4.6.2]
2. Beginning at one component and printing the rest of the file [see Sec. 2.4.6.3]
3. One or all of the systems in the data base [see Sec. 2.4.6.4]
4. A range of components [see Sec. 2.4.6.5]
5. Generating or printing all components [see Sec. 2.4.6.6].

2.4.6.2 Printing Individual Components

To print one component, type 1.

TYPE: 1

The following screen will be displayed.

```
REPORT 3: Component Data FNum  
Do you wish to generate a report on:  
1) An individual component  
2) Components from a certain number on  
3) Groups of components  
4) Range of components  
5) All components (must be generated first)  
0) Return to previous menu  
Enter Your Choice > 1  
Enter the Component Number >
```

Figure 2.4.6.2-1. Enter the Component Number.

Type in the number of the component to be printed, i.e., 081130 - Urinal.

TYPE: <The component number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130
Generate New Report (G) or Print Existing Report (P)? > G
```

Figure 2.4.6.2-2. Generate or Print.

The user can now either generate a new LCC report or use ones already created. Selecting G will delete the existing report file and create a new report file with only this information. Selecting P will create a report from the existing file.

TYPE: G or P

2.4.6.2.1 Generating Reports

NOTE: GENERATING A REPORT WILL ERASE ALL EXISTING REPORTS OF THE SAME TYPE. IN MOST CASES, GENERATE ONLY REPORT 5 (ALL COMPONENTS).

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130
Generate New Report (G) or Print Existing Report (P)? > G

Present Worth Factor?: 1- 7 % 1
                      2-10 %
Which report date?    03/14/91
Material Inflation Factor? 1.06
Equipment Rate?        0.00
```

Figure 2.4.6.2.1-1. Report Date Box.

The Present Worth Factor

The first option is whether to use a Present Worth Factor (PWF) of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For all other non-energy projects, use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

Report Date

Enter the report date or press enter to use today's date as a default.

TYPE: <The date>
PRESS THE <ENTER> KEY

Material Inflation Factor

The next option is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, an inflation factor that adjusts July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The Equipment Rate

The final option is an equipment rate. This is the cost per hour charged for all maintenance trucks, given in dollars/hour.

TYPE: <The equipment rate>

The system will now generate the LCC forms requested.

2.4.6.2.2 Printing an Existing Report

Typing P will print the last report generated. If changes are necessary, refer to "Generating a Report."

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 1
                  2-10%
```

Figure 2.4.6.2.2-1. Factors Choice.

The user is asked whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999
```

Figure 2.4.6.2.2-2. Starting and Ending Pages.

The user can now choose a specific section of the data base to print. The default values will print the entire report.

TYPE: <Starting page numbers>

TYPE: <Ending Page number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 1

Enter the Component Number > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 1

Direct Report to Printer (P), Disk File (D), or Both (B)?
```

Figure 2.4.6.2.2-3. Printer/Disk/Both.

The user can also select the destination for the report: Printer, Disk, or Both.

TYPE: P, D, or B for output format.

The system will now print the existing report to the chosen destination.

2.4.6.3 Printing From One Component On

To print a report starting with one component and continuing through the data, type 2.

TYPE: 2

The following screen will be displayed.

```
REPORT 3: Component Data FNum

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. >
```

Figure 2.4.6.3-1. Beginning Component.

Type in the component number to begin the listing, i.e., 081130 - Urinals.

TYPE: <The beginning component number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130
Generate New Report (G) or Print Existing Report (P)? > G
```

Figure 2.4.6.3-2. Generate or Print.

The user can now either generate a new LCC report or use ones already created.

TYPE: G or P

2.4.6.3.1 Generating Reports

NOTE: GENERATING A REPORT WILL ERASE ALL EXISTING REPORTS OF THE SAME TYPE. IN MOST CASES, GENERATE ONLY REPORT 5 (ALL COMPONENTS).

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130
Generate New Report (G) or Print Existing Report (P)? > G

Present Worth Factor?: 1- 7 % 1
                      2-10 %
Which report date?      03/14/91
Material Inflation Factor? 1.06
Equipment Rate?          0.00
```

Figure 2.4.6.3.1-1. Report Date Box.

The Present Worth Factor

The first option is whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

Report Date

Enter the report date or press enter to use today's date as a default.

TYPE: <The date> or
PRESS THE <ENTER> KEY

The Inflation Factor

The next option is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The Equipment Rate

The final option is an equipment rate. This is the cost per hour charged for all maintenance trucks, given in dollars/hour.

TYPE: <The equipment rate>

The system will now generate the LCC forms requested.

2.4.6.3.2 Printing an Existing Report

Typing P will print the last report generated. If changes are necessary, refer to "Generating a Report."

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 1
                  2-10%
```

Figure 2.4.6.3.2-1. Factors Choice.

The user is asked whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999
```

Figure 2.4.6.3.2-2. Starting and Ending Pages.

The user can now choose a specific range of pages to print out. The default values will print the entire report.

TYPE: <Starting page number>

TYPE: <Ending page number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 2

Enter BEGINNING Component No. > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999

Direct Report to Printer (P), Disk File (D), or Both (B)? D
```

Figure 2.4.6.3.2-3. Printer/Disk/Both.

The user can also choose the destination for the report: Printer, Disk, or Both.

TYPE: P, D, or B for output destination.

The system will now print the existing report to the chosen destination.

2.4.6.4 Printing a Group of Components

To print a group of components, type 3.

TYPE: 3

The following screen will be displayed.

	Num
Select One of the Following Groups:	
1) Plumbing	
2) Electrical	
3) Architectural	
4) HVAC	
5) All	
0) Return to Previous Menu	
Enter Your Selection >	

Figure 2.4.6.4-1. Select the Group.

The user can now select any of the groups to print. If 5 is typed, the system will print all the Task Forms in the Data base.

TYPE: 1, 2, 3, 4, 5, or 0

The following screen will be displayed.

	Num
Select One of the Following Groups:	
1) Plumbing	
2) Electrical	
3) Architectural	
4) HVAC	
5) All	
0) Return to Previous Menu	
Enter Your Selection > 5	
Generate New Report (G) or Print Existing Report (P)? > G	

Figure 2.4.6.4-2. Generate or Print.

The user can now either generate a new LCC Report or use ones already created.

TYPE: G or P

2.4.6.4.1 Generating Reports

NOTE: GENERATING A REPORT WILL ERASE ALL EXISTING REPORTS OF THE SAME TYPE. IN MOST CASES, GENERATE ONLY REPORT 5 (ALL COMPONENTS).

The following screen will be displayed.

	Num
Select One of the Following Groups:	
1) Plumbing	
2) Electrical	
3) Architectural	
4) HVAC	
5) All	
0) Return to Previous Menu	
Enter Your Selection > 5	
Generate New Report (G) or Print Existing Report (P)? > G	
Present Worth Factor?:	1- 7 % 1
	2-10 %
Which report date?	03/14/91
Material Inflation Factor?	1.06
Equipment Rate?	0.00

Figure 2.4.6.4.1-1. Report Date Box.

Present Worth Factor

The first option is whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used in studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

Report Date

Enter the report date or press enter to use today's date as a default.

TYPE: <The date> OR
PRESS THE <ENTER> KEY

Inflation Factor

The next option is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The Equipment Rate

The final option is an equipment rate. This is the cost per hour charged for all maintenance trucks, given in dollars/hour.

TYPE: <The equipment rate>

The system will now generate the LCC forms requested.

2.4.6.4.2 Printing an Existing Report

Typing P will print the last report generated. If changes are necessary, refer to "Generating a Report."

The following screen will be displayed.

```

                                     Num
Select One of the Following Groups:
1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 1
                  2-10%
```

Figure 2.4.6.4.2-1. Factors Choice.

The user is asked whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used in studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

The following screen will be displayed.

```

                                Num
Select One of the Following Groups:

1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999
```

Figure 2.4.6.4.2-2. Starting and Ending Pages.

The user can now choose a specific range of pages to print out. The default values will print the entire report.

TYPE: <Starting page numbers>

TYPE: <Ending page numbers>

The following screen will be displayed.

```

                                     Num
Select One of the Following Groups:

1) Plumbing
2) Electrical
3) Architectural
4) HVAC
5) All
0) Return to Previous Menu

Enter Your Selection > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999

Direct Report to Printer (P), Disk File (D), or Both (B)? D
```

Figure 2.4.6.4.2-3. Printer/Disk/Both.

The user can also choose the destination for the report: Printer, Disk, or Both.

TYPE: P, D, or B for output destination.

The system will now print the existing report to the chosen destination.

2.4.6.5 Printing a Range of Components

To print a range of components, type 4.

TYPE: 4

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130   Enter ENDING No. > 999999
```

Figure 2.4.6.5-1. Enter Beginning Number.

The user can now enter the first and last component numbers of the range of tasks to be printed.

TYPE: <The beginning components number>

TYPE: <The ending component number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130   Enter ENDING No. > 081130
Generate New Report (G) or Print Existing Report (P)? > G
```

Figure 2.4.6.5-2. Generate or Print.

The user can now either generate new LCC reports or use ones already created.

TYPE: G or P

2.4.6.5.1 Generating Reports

NOTE: GENERATING A REPORT WILL ERASE ALL EXISTING REPORTS OF THE SAME TYPE. IN MOST CASES, GENERATE ONLY REPORT 5 (ALL COMPONENTS).

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130 Enter ENDING No. > 081130
Generate New Report (G) or Print Existing Report (P)? > G

Present Worth Factor?: 1- 7 % 1
                      2-10 %
Which report date?      03/14/91
Material Inflation Factor? 1.06
Equipment Rate?          0.00
```

Figure 2.4.6.5.1-1. Report Date Box.

Present Worth Factor

The first option is whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy conservation projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

Report Date

Enter the report date or press enter to use today's date as a default.

TYPE: <The date> OR
PRESS THE <ENTER> KEY

Inflation Factor

The next option is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The Equipment Rate

The final option is an equipment rate. This is the cost per hour charged for all maintenance trucks, given in dollars/hour.

TYPE: <The equipment rate>

The system will now generate the LCC forms requested.

2.4.6.5.2 Printing an Existing Report

Typing P will print the last report generated. If changes are necessary, refer to "Generating a Report."

The following screen will be displayed.

REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

- 1) An individual component
- 2) Components from a certain number on
- 3) Groups of components
- 4) Range of components
- 5) All components (must be generated first)
- 0) Return to previous menu

Enter Your Choice > 4

Figure 2.4.6.5.2-1. Factors Choice.

The user is asked whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption studies. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4
```

Figure 2.4.6.5.2-2. Starting and Ending Pages.

The user can now choose a specific range of pages to print out. The default values will print the entire report.

TYPE: <Starting page number>

TYPE: <Ending page number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 4

Enter BEGINNING Component No. > 081130 Enter ENDING No. > 081130
Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999

Direct Report to Printer (P), Disk File (D), or Both (B)? D
```

Figure 2.4.6.5.2-3. Printer/Disk/Both.

The user can also choose the destination for the report: Printer, Disk, or Both.

TYPE: P, D, or B for output destination

The system will now print the existing report to the chosen destination.

2.4.6.6 Generating or Printing all Components

To generate or print every component in the database, type 5.

TYPE: 5

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Generate New Report (G) or Print Existing Report (P)? > G
```

Figure 2.4.6.6-1. Generate or Print.

The user can now either generate LCC reports or use ones already created.

TYPE: G or P

2.4.6.6.1 Generating Reports

NOTE: THE GENERATING REPORTS OPTION SHOULD ONLY BE USED HERE AS IT WILL REPLACE ANY PREVIOUS REPORTS.

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Generate New Report (G) or Print Existing Report (P)? > G

Present Worth Factor?: 1- 7 % 1
                      2-10 %
Which report date?      03/14/91
Material Inflation Factor? 1.06
Equipment Rate?          0.00
```

Figure 2.4.6.6.1-1. Report Date Box.

Present Worth Factor

The first option is whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy projects use 10 percent.

TYPE: 1 for 7 percent or 2 for 10 percent

Report Date

Enter the report date or press enter to use today's date as a default.

TYPE: <The date> OR
PRESS THE <ENTER> KEY

Inflation Factor

The next option is an inflation factor to bring the base dollar value (July 1985) up to the present time. The default value is 1.06, but an inflation factor that adjusts July 1985 to the year of the report should be used.

TYPE: <The inflation factor>

The Equipment Rate

The final option is an equipment rate. This is the cost per hour charged for all maintenance trucks, given in dollars/hour.

TYPE: <The equipment rate>

The system will now generate the LCC forms requested.

2.4.6.6.2 Printing an Existing Report

Typing P will print the last report generated. If changes are necessary, refer to "Generating a Report."

The following screen will be displayed.

```

                                REPORT 5: Maintenance DollNum Form
Do you wish to generate a report on:
1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 1
                  2-10%
```

Figure 2.4.6.6.2-1. Factors Choice.

The user is asked whether to use a PWF of 7 percent or 10 percent. The 7 percent PWF is to be used for studies with significant energy consumption. For non-energy projects use 10 percent .

TYPE: 1 for 7 percent or 2 for 10 percent

The following screen will be displayed.

```

                                REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999
```

Figure 2.4.6.6.2-2. Starting and Ending Pages.

The user can now choose a specific range of pages to print out. The default values will print the entire report.

TYPE: <Starting page number>

TYPE: <Ending page number>

The following screen will be displayed.

```
REPORT 5: Maintenance DollNum Form

Do you wish to generate a report on:

1) An individual component
2) Components from a certain number on
3) Groups of components
4) Range of components
5) All components (must be generated first)
0) Return to previous menu

Enter Your Choice > 5

Generate New Report (G) or Print Existing Report (P)? > P

For which factor? 1-7% 2
                  2-10%
Starting Page No. > 1
Ending Page No. > 99999

Direct Report to Printer (P), Disk File (D), or Both (B)?
D
```

Figure 2.4.6.6.2-3. Printer/Disk/Both.

The user can also choose the destination for the report: Printer, Disk, or Both.

TYPE: P, D, or B for output destination.

The system will now print the existing report to the chosen destination.

2.5 File Maintenance

2.5.1 Introduction

To use the file maintenance option, type 4.

TYPE: 4

The following screen will be displayed.

Do you wish to:			
1) Make Backup copies of your files?			
2) Re-index data files?			
0) Return to Previous Menu?			
Enter Your Selection >			
Command	<D:>		Num

Figure 2.5-1. Options.

The user can now make backups of the files [see sec 2.5.2] or Re-index the data files [see sec. 2.5.3].

TYPE: 1 for Backup or 2 for Re-indexing

2.5.2 Backing Up Copies of Your Files

A backup of all files should be made when the system is first loaded. Backups of your files should be made weekly, if small groups of data are charged. If large changes are made, the user should backup immediately.

The following screen will be displayed.

```

Select the file you wish to back-up:

1) Task Data File
2) System Data File
3) Sub-Task Data File
4) Component Data File

0) RETURN to Previous Menu

Enter Your Selection >

Command      |<D:>|      |      |      |Num
```

Figure 2.5.2-1. Files to Backup.

You may now select to backup:

1. The task data file
2. The component data file.

NOTE: You are unable to backup the System or Subsystem data files.

TYPE: 1 or 4

The following screen will be displayed.

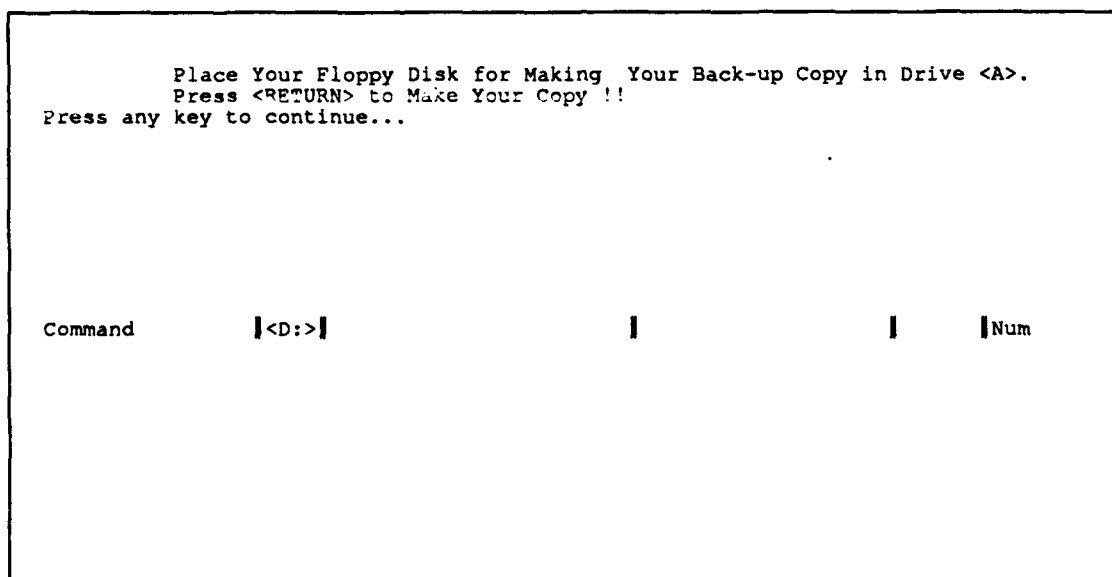


Figure 2.5.2-2. Insert Floppy.

Insert floppy disk into the A: drive and type <ENTER>.

PRESS THE <ENTER> KEY

The system will now backup the files selected.

2.5.3 Reindexing Data Files

Presently this is unimplemented.

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