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Volume 2 of 3

MASTER

A Capital Requirements Estimating Model (CREMOD) for Electric Utilities Volume II: User's Manual

January 1980

Prepared for:
U.S. Department of Energy
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Assistant Administrator for Applied Analysis
Under Contract No. EC-77-C-01-8558

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A Capital Requirements Estimating Model (CREMOD) for Electric Utilities Volume II: User's Manual

January 1980

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PREFACE

In the past, using the Mid-Term Energy Forecasting System (MEFS) to estimate the capital requirements of the U.S. energy sector involved a time consuming and cumbersome process. An off-line computer program called the "Capital Report Writer" was used to multiply appropriate supply activity levels obtained from a given MEFS equilibrium solution by predetermined capital coefficients to arrive at aggregate capital requirements of the various energy subsectors. However, this approach was simplistic and ignored critical aspects of the dynamics of the capital investment process. Hence, it could not be used with confidence to analyze the question of capital availability; and its output required considerable manual adjustment to obtain accuracy.

As a part of a program of improvement, under Department of Energy Contract EC-77-C-01-8558, the Logistics Management Institute (LMI) was tasked with the development of a rapid and automated method of determining the capital requirements of the electric utility sector which is the energy sector with the highest capital needs and that having the potential for the greatest financial problems.

The automated model developed by LMI disaggregates new plant capacity activity levels from the MEFS Integrating Model solution over time using actual projected commissioning dates. It computes the effect on aggregate capital requirements of the dispersal of new plant capital expenditures over relatively long (e.g., 7-10 years) construction lead times. It also incorporates the effects of real escalation in the electric utility construction industry.

This series of documents (Volumes I, II, and III) supports the computerized model developed by LMI for estimating capital requirements for each year between the current year and the MEFS target year.

Portions of the model documentation assume that the reader has a rudimentary knowledge of the manner in which electric utility capital requirements are presently modeled within the overall MEFS framework. This documentation is divided into three volumes. Volume I contains a methodological description, model description, and a guide to model applications. Volume II is the user's manual. The user's manual outlines the model's capabilities and constraints, specific data requirements to run the model and a detailed operational guide to the model. The user's manual was organized in such a way as to provide an appreciation for the environment in which the model operates. Volume III contains listings of the computer program and input data for the model. This volume serves the user as a reference guide to the computer model. This documentation complies with the Interim Model Document Standards issued by the Office of Analysis, Oversight, and Access of the Energy Information Administration in December 1978.

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(Scenarios B, C, D)
Annual BUILD Limit File FBLD* (Scenarios B, C, D)

1. INTRODUCTION

SUMMARY OF MODEL FUNCTIONS

When CREMOD is accessed by the user, its program control module requests the user to choose which one of the following seven alternative model functions s/he wishes to use:

- 1) Compute Capital Requirements (CCR)
- 2) Display BUILD Limits (DBL)
- 3) Revise/Display Plant Type Master File (RMF)
- 4) Revise/Display Capital Coefficients (RCC)
- 5) Revise/Display Capital Expenditure Profiles (RCE)
- 6) Display Interim MEFS Solution Files (DMS)
- 7) Stop

The model logic flow, input data files, and output reports necessary to execute any one of these functions is shown in Figure 1-1. Each function is executed by a single logic module which accesses certain data files and prints a report. The model as a whole accesses seven data files during any given run.

1. Compute Capital Requirements (CCR). This main computation function is executed by the module MAINCOMP. All seven input data files are accessed in the process. The Plant Type Master File FMAST* contains a list of all relevant MEFS activity descriptions for use by MAINCOMP in generating its output report. The Annual BUILD Limit File FB LD* provides regional annual maximum capacities for committed, deferrable, and new nuclear plant and for committed and deferrable coal plants to aid in disaggregation of nuclear and coal plant activity levels, respectively, over time. The MEFS interim solution files, SN85**, SN90**, and SN95**, provide MEFS solutions for 1985, 1990, and 1995 runs, respectively, from the Mid-Term Energy Market Model (MEMM). In general, all three files must be accessed regardless of whether a

FIGURE 1-1
CREMOD FUNCTIONS

1985 or 1990 target year is specified, due to the overlapping of construction lead times; and, hence, capital requirements. Also, these three files must be created prior to invoking CREMOD by accessing the proper MEFS packed solution files.¹ The capital coefficient file FCOEF* provides capital coefficient values consistent with those used in the MEMM to be multiplied by disaggregated activity levels from SN85**, 90**, and 95**. It also provides interest during construction (IDC) values for plant types having long construction lead times. Finally, the file FCEP* provides capital expenditure profiles for each plant type to be used in spreading yearly capital cost figures backward over time.

2. Display BUILD Limits (DBL). This function is performed as a check to ensure that the annual BUILD limits in FBLD*, when aggregated over time, are consistent with the target year BUILD limits appearing in the MEMM preprocessor. It is executed by the module DYBLIM. DYBLIM can produce either a summary level BUILD limit report or a more detailed report for comparison with preprocessor output values. The MEMM MEFS preprocessor tables are revised periodically to incorporate updated estimates of plant construction progress and commissioning dates made by NEAD and CEPAD personnel. It is important that the CREMOD annual BUILD limit files also be periodically revised to incorporate these updated estimates so that the annual BUILD limits used by CREMOD as the basis for disaggregating MEMM activity levels are always completely consistent with the MEMM preprocessor BUILD limits. The DBL function should be executed, at a minimum, subsequent to any revisions to the CREMOD annual BUILD limit files, and the results compared to MEMM preprocessor values. CREMOD includes an option to spread projected capacity additions

¹Procedures for creating these files are described in the next section and in Chapter 2.

linearly over each of the three segments of the MEFS planning horizon for all plant types and regions. This can be used to get approximate capital requirements estimates for plant types for which annual BUILD limit values are ordinarily available but are not up-to-date in FBLD*.

3. Revise/Display Plant Type Master File (RMF). This function is executed by the module RVMAST which accesses the file FMAST* in the process. Under the revise option, the user can update the contents of FMAST* on a plant-type by plant-type basis. Revision of this file should be called for fairly infrequently to incorporate (1) changes in MEFS plant type descriptions or (2) new codes indicating a change of status of a plant type in CREMOD regarding annual BUILD limit availability or IDC rate visibility in its capital coefficients. The display option generates a formatted display of the entire file FMAST*.

4. Revise/Display Capital Coefficients (RCC). The purpose of this function is fourfold: (1) to revise capital coefficients used in CREMOD to accord with revisions undertaken by CEPAD, NEAD, or other DOE personnel with respect to the MEMM preprocessor capital coefficient tables; (2) to revise real escalation or IDC data as MEFS assumptions about these quantities are revised; (3) to add real escalation or IDC data for certain plant types for which it was not previously known to a record after it became known (e.g., through new analyses of plant capital costs); and (4) to display the entire contents of the Capital Coefficient Data File FCOEF* for comparison with the MEMM preprocessor capital coefficient tables. This function is executed by the module RVCOEf which accesses FCOEF* and either revises or displays the file contents as specified by the CREMOD user. File revisions are made on a plant-type by plant-type basis.

5. Revise/Display Capital Expenditure Profiles (RCE). The purpose of this function is twofold: (1) to revise the file, FCEP*, of CREMOD capital expenditure profiles to incorporate updated estimates of how these profiles may vary in the future and (2) to display the contents of FCEP* for comparison and documentation. It is executed by the module RVCEP which either revises or displays the contents of FCEP* as specified by the user. Again, revisions are made on a plant-type by plant-type basis for the most part.

6. Display Interim MEFS Solution Files (DMS). The purpose of this function is to provide a complete display of MEFS solution activity levels used by CREMOD to aid in analysis and interpretation of CREMOD capital requirements output reports. It is executed by the module DYSOLN. This module retrieves the desired MEFS solution from the interim solution files SN85**, SN90**, and SN95**, and relevant plant type descriptions from the file FMAST*; it generates a formatted output report of these data.

DATA PREPARATION

The "DIRECT" Program

CREMOD was designed to allow interactive revision of several of its files to project capital requirements. To accomplish this, it uses direct access methods to retrieve and update data. A special program is used to prepare and format the input data in a manner suitable for processing by CREMOD. This program, named DIRECT, reads a character formatted file entered through the TSO editor into a binary formatted direct access file to be accessed directly by CREMOD. Hence, the DIRECT program is an integral part of the CREMOD system even though it performs no computations.

The interactive file update capability allowed by CREMOD extends to the capital coefficient file FCOEF*, the plant type master file FMAST*, and the capital expenditure profile file FCEP*. This gives the user the flexibility

to change several numbers during the same run session of CREMOD. If the data change is considered permanent, then it is necessary to update the appropriate character format data file through the TSO editor and rerun the program DIRECT for that data file.

Interactive update capability does not extend to either the activity levels in the MEFS interim solution files or the annual BUILD limits as these parameters are derived by models exogenous to the CREMOD system and are treated as constant within the CREMOD framework. Annual BUILD limits can be modified, however, using the TSO editor.

The relation of DIRECT to the CREMOD system files is shown in Figure 1-2.

The "PERUSE" Program

Another program required by the CREMOD system is a DOE supported program called PERUSE. This program scans the MEFS solution files and writes activity levels for those plant types addressed by CREMOD into a user designated file to be accessed later by CREMOD. PERUSE must be run three times to create the three solution files containing 1985, 1990, and 1995 activity levels, respectively. Part of the purpose of PERUSE is to format this data in a manner suitable for processing by CREMOD. A file called BUILDS.DATA is used to instruct the PERUSE program as to what data is needed for the CREMOD model. A listing of BUILDS.DATA and a sample run of PERUSE which creates an activity level solution file for CREMOD is contained in Appendix A of this manual (Volume III).

FIGURE 1.2

CREMOD SYSTEM FLOW

1. THE FILE NAME EXTENSION **.PS** STANDS FOR PHYSICAL SEQUENTIAL.
2. THE FILE NAME EXTENSION **.DATA** IS USED TO IDENTIFY THE DIRECT ACCESS VERSIONS OF THESE FILES.

2. INPUT DATA FILES

INTRODUCTION

The seven input data files used by CREMOD are the:

1. Plant Type Master File (FMAST*)
2. Build Limit Data File (FBLD*)
3. Capital Coefficient Data File (FCOEF*)
4. Capital Expenditure Profile File (FCEP*)
5. 1985 MEFS Interim Solution File (SN85**)
6. 1990 MEFS Interim Solution File (SN90**)
7. 1995 MEFS Interim Solution File (SN95**)

In general, these files are designed and structured to permit highly accurate capital requirements estimates, subject to constraints on data availability and MEFS modeling accuracy. Careful attention was given during the file design phase to data source reliability. Data elements were chosen so that updating of file contents (where applicable) can be accomplished with a minimum of inconvenience. For the most part, DOE organizations which must be depended upon to provide necessary data for updating CREMOD files are already responsible for generating this data. Hence, given a reasonable degree of CREMOD user coordination with CREMOD input data source organizations, keeping the files current should not be difficult.

The one or two asterisks at the end of each file name reflect a CREMOD system naming convention. This convention as well as the CREMOD structure allows for the existence of alternative sets of input data reflecting different assumptions about electricity supply and demand.

The seven CREMOD input data files are described in detail below.

THE PLANT TYPE MASTER FILE (FMAST*)

The purpose of this file is to provide plant type names as well as information to be used to determine what logic routines should be entered in

computing capital requirements for a given plant type or plant type groupings. Its contents are listed in the accompanying record layout for FMAST* (Figure 2-1). The sequential ordering of plant types in this file is critical to the proper functioning of CREMOD as different sets of projections are keyed to plant type groupings in this file.

The first field element is the plant type descriptor or name. The second data element in each record of FMAST* is simply the plant type designator which identifies the plant type with respect to which the data elements are defined. This is accessed in generating three model reports: the Capital Requirements Report, the MEFS Solution Report, and the Master File Data Report. The third element is a 0-1 indicator which can be set to show whether or not build limit data by region and year is available to CREMOD for the given plant type. The fourth and last data element is a 0-1 indicator which can be set to show whether or not a given plant type has a non-zero IDC rate as specified in CREMOD's Capital Coefficient Data File FCOEF*. It is of interest primarily with respect to generation of the portion of the Capital Requirements Report which breaks out IDC from direct capital costs. A value of "1" indicates that this portion of the Capital Requirements Report can be meaningfully generated for the given plant type. A value of zero indicates that this portion of the Capital Requirements Report would not be meaningful. This might occur, for example, in the case of a conversion plant type for which construction lead times are frequently short.

This file can be revised on a record-by-record basis by the module RVMAS*. It should not require frequent revision.

THE ANNUAL BUILD LIMIT DATA FILE (FBLD*)

The primary purpose of this file is to provide annual build limits in megawatts for committed, deferrable, and new nuclear plants and for committed

Figure 2-1
Plant Type Master File
 (FMAST*)
File Layout

<u>Relative Position</u>	<u>Field Name</u>	<u>Type</u>	<u>Format</u>	<u>Comments</u>
1. 1-32	Plant type descriptor	Alpha	8 A4	
2. 33-34	Plant type designator	Alpha	2 A1	Also known as the mode
3. 35	Unit data code	Alpha	A1	0 = no build limit data in FBLD* 1 = build limit data in FBLD*
4. 36	IDC code	Alpha	A1	0 = no IDC data available for plant type 1 = IDC data available for plant type

2-3

Naming Conventions

Character format file name: FMAST*.PS

Random binary file name: FMAST*.DATA

FMAST* = FMAST

L
M
H

 ; L, M, H represent the low, medium and high supply scenarios respectively

and deferrable coal plants. When this data is available for a given plant type, and DOE region, it is used by the capital requirements estimating module MAINCOMP to break up MEMM generated activity levels into yearly components. When its contents are used, cumulative amounts of added capacity through MEFS target years remains the same. The build limit file simply provides more accurate information on the expected timing of plants coming on line that would otherwise be available. A file layout for FBLD* appears in Figure 2-2.

Annual BUILD limits may be applied by CREMOD either by directing the model to utilize build limits for a plant type through the unit data code in the plant type master file or by interactively directing CREMOD to use annual BUILD limits for all plants for which they are available. These two ways of directing CREMOD to use annual BUILD limits interact as illustrated in the decision table below for a hypothetical plant type (Figure 2-3). In this manner, annual BUILD limit use can either be guaranteed via the Plant Type Master File FMAST* or the BUILD limit use decision can be left with the user.

THE CAPITAL COEFFICIENT DATA FILE (FCOEF)

Purpose, Content, and Updating

The primary purpose of this file is to store regional capital coefficients to be segmented over time in accordance with an appropriate capital expenditure profile and multiplied by an appropriate activity level in the main capital requirements computation module. Its contents are listed in Figure 2-4 (under "Field Name").

The first data element in each record, the coefficient base year, is that year (e.g., 1975 at present) with respect to which constant dollar capital coefficients input to MEFS are defined. The second data element, the plant type designator, is the MEFS two digit code identifying the plant type with respect to which all the data elements are defined. Elements 3 through

Figure 2-2
Build Limit File
(FBLD*)
File Layout

<u>Relative Position</u>	<u>Field Name</u>	<u>Type</u>	<u>Format</u>	<u>Comments</u>
1. 1-2	Plant type (mode)	Alpha	2 A1	
2. 3-4	Year of build limit	Integer	I2	Last two digits (YY)
3. 5-6	Region of build limit (e.g., V1)	Alpha	2 A1	Region may be in any order
4. 7-10	Build limit in MWE for preceeding region	Integer	I4	Must follow region, right justify
5-13. 11-64	Up to nine region/build limit combinations may follow in any order			

Naming Conventions

Character formal file name: FBLD*.DATA

FBLD* = FBLD

L
M
H

 ; L, M, H represent the low, medium and high supply scenarios respectively

Figure 2-3. Decision Rules for Annual
BUILD Limit Utilization

Plant Type Master File

UDC Code = 1

UDC Code = 0

Interactive Query

Use Available BUILD Limits ? Y

Use Available BUILD Limits ? N

Decision Table

Decision Values

BUILD Limits Used?

0, N

No

0, Y

Yes

1, N

Yes

1, Y

Yes

Figure 2-4
Capital Coefficient File
 (FCOEF*)
File Layout

<u>Relative Position</u>	<u>Field Name</u>	<u>Type</u>	<u>Format</u>	<u>Comments</u>
1. 1-2	Coefficient base year	Integer	I2	Last two digits of year (YY)
2. 3-4	Plant type (mode)	Alpha	2 A1	
3. 5-8	Capital coefficient for U1	Integer	I4	In \$/kw max allowed = \$9,999
4. 9-12	" U2	Integer	I4	"
5. 13-16	" U3	Integer	I4	"
6. 17-20	" U4	Integer	I4	"
7. 21-24	" U5	Integer	I4	"
8. 25-28	" U6	Integer	I4	"
9. 29-32	" U7	Integer	I4	"
10. 33-36	" U8	Integer	I4	"
11. 37-40	" U9	Integer	I4	"
12. 41-44	" UA	Integer	I4	"
13. 45-48	Real esc. rate to 1985	Integer	I4	Program multiplies by 10^{-3}
14. 49-52	Real esc. rate 1985-1990	Integer	I4	" 10^{-3}
15. 53-56	Real esc. rate 1990-1995	Integer	I4	" 10^{-3}
16. 57-59	IDC #1	Integer	I3	" 10^{-4}
17. 60-62	Composite esc. rate	Integer	I3	" 10^{-3}
18. 63-65	IDC #2 (through 1984)	Integer	I3	" 10^{-3}

Naming Conventions

Character format file name: FCOEF*.PS

Random binary file name: FCOEF*.DATA

FCOEF* = FMAST

L
M
H

 ; L, M, H represent the low, medium and high supply scenarios, respectively

12 are the values of the capital coefficients for the given plant type and each of the ten utility regions. Differences in coefficient values among regions reflect primarily variations in labor and material rates in the electric utility construction industry. These ten coefficients include projected electric utility industry real escalation to 1985. This assumption accords with the convention presently used to submit capital coefficients to the MEFS. Element 13 is the real escalation rate assumed in the 1985 coefficient values and if not readily known, can usually be found in the derivation of the coefficient values. Elements 14 and 15 are the real escalation rates used to compute the 1990 and 1995 coefficient values, respectively, in the MEFS from the 1985 value. These two values, if not already known, can be easily calculated. Element 16, the IDC rate, is resident in FCOEF* only for those plant types, e.g., most BUILDS, for which construction lead times are long enough for an IDC component of capital to be meaningful. When resident, it is that IDC value originally used in deriving the 1985 baseline capital coefficients (elements 3 through 12). It is generally known for the plant types with long construction lead times addressed by the MEFS. Elements 17 and 18, the cumulative escalation and IDC through 1984 are both used to convert 1984 baseline capital coefficients from the MEMM preprocessor to 1975 which is an implicit assumption of the capital values exclusive of any escalation or IDC to which real escalation and IDC can be added on a yearly basis by CREMOD.

FCOEF* can be revised on a record-by-record basis by the module RVCOEF. It should require revision only infrequently, e.g., when a new study recommends that certain baseline coefficients be modified or econometric analyses suggest a change in the 1985-89 or 1990-94 real escalation rates.

Naming Conventions

The MEFS model presently requires three complete sets of regional capital coefficients for use with respect to different runs of the MEMM. These sets reflect "high," "medium," and "low" supply economic scenarios and are contained in FCOEFH, FCOEFM, and FCOEFL, respectively.

CREMOD can operate using any given set of capital coefficients in place of those reflecting specific economic scenarios simply by having the user request that the file containing the appropriate set be accessed in his/her initial interactions with the model. This interaction can be facilitated by adopting a capital coefficient file naming convention which permits the user to easily recall and readily identify his/her desired set. Such a set might, for example, be the six digit sequence.

FCF + 3 alphanumeric characters

where the 3 characters are chosen by the CREMOD user when she/he defines the file.

THE CAPITAL EXPENDITURE PROFILE FILE (FCEP*)

Purpose, Content, and Revision

This file provides, for each plant type, a capital expenditure profile of the main computation module. This is used as a basis for spreading the capital cost of each new unit backward over its construction lead time from the time of its activation. Its contents are listed in Figure 2-5 (under "Field Name") and in Figure 2-6. The first data element identifies the plant type with respect to which the remaining record entries are defined. Element 2 is the construction lead time (N) in years and the following N elements are the fractions of plant capital cost incurred in each of these years. A maximum lead time of 20 years is permitted within the record.

Figure 2-5
Capital Expenditure Profile File
(FCEP*)
File Layout

<u>Relative Position</u>	<u>Field Name</u>	<u>Type</u>	<u>Format</u>	<u>Comments</u>
1. 1-2	Plant type (mode)	Alpha	2 A1	
2. 3-4	Lead time in years	Integer	I2	Right justified
3. 5-8	% expenditure in first year	Integer	I4	Program multiplies by 10^{-3}
4. 9-65	% expenditure in n'th year	Integer	19(I3)	Program multiplies by 10^{-3} Up to 19 allowed

Naming Conventions

Character format file name: FCEP*.PS

Randon binary file name: FCEP*.DATA

FCEP* = FCEP $\begin{bmatrix} L \\ M \\ H \end{bmatrix}$; L, M, H represent the low, medium and high supply scenarios, respectively

FCEP* can be loaded initially by hand through the TSO editor. Plant type profiles are generated by CEPAD personnel.

Naming Conventions

CREMOD enables the user to examine the impact of alternative capital expenditure profiles on yearly capital requirements estimates by permitting access to any number of alternative versions of FCEP*. The user can access a desired supply scenario profile set or other profile set simply by an appropriate specification during his initial interaction with the model. As in the case of the file FCOEF*, instituting a naming convention for these files makes the process of accessing the desired file easier.

FIGURE 2-6. CONTENTS OF THE CAPITAL
EXPENDITURE PROFILE FILE (FCEP*)

1.	Plant Type Designator	
2.	Construction Lead Time (N) in Years ($N \leq 20$)	
3.	Fraction of Capital Cost in Year	1
4.	" " " " " "	2
5.	" " " " " "	3
6.	" " " " " "	4
7.	" " " " " "	5
8.	" " " " " "	6
9.	" " " " " "	7
10.	" " " " " "	8
11.	" " " " " "	9
12.	" " " " " "	10(=N)
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		

One possible naming convention for the set of FCEP files is

$$\text{FCEP} + \begin{bmatrix} \text{L} \\ \text{M} \\ \text{H} \end{bmatrix} + \begin{bmatrix} 1 \\ 2 \\ . \\ . \\ \text{N} \end{bmatrix}$$

The first 4 characters, FCEP, indicate that it is the capital expenditure profile file. The letter "H" indicates an optimistic forecast based upon shorter construction lead times, e.g., due to a policy of quicker issuance of construction permits. The letter "M" indicates a medium supply forecast based, for example, on existing lead times. The letter "L" indicates a pessimistic forecast, e.g., due to more stringent EPA standards or the construction of larger plants. The last variable is an alphanumeric character indicating the particular file version desired within each of the above three categories. This would be used in the individually specified file scenario of CREMOD. Typical examples would be

FCEPM1 - Baseline case, Version #1,
FCEPH2 - Optimistic case, Version #2,
etc.

The names of the three different scenario versions of the Plant Type Master File, Capital Coefficient File, Capital Expenditure Profile File, and Annual BUILD Limit File appearing in Volume III of this documentation are shown in Figure 2-7.

PIES INTERIM SOLUTION FILES (SN85**, SN90**, SN95**)

Background

Each time the MEMM is run for a given set of economic scenario assumptions and a given target year, the solution that it generates is stored in a file. This file is "packed" by a computer program in order to reduce its storage requirements. A DOE supported program called "PERUSE" can then be used to access specific solutions in the packed file. PERUSE contains

FIGURE 2-7. NAMES OF SCENARIO DEPENDENT FILES

I. Low Supply Scenario			
(1)	Plant Type Master File	-	FMASTL
(2)	Capital Coefficient File	-	FCOEFL
(3)	Capital Expenditure Profile File	-	FCEPL
(4)	Build Limit File	-	FBLDL
II. Medium Supply Scenario			
(1)	Plant Type Master File	-	FMASTM
(2)	Capital Coefficient File	-	FCOEFM
(3)	Capital Expenditure Profile File	-	FCEPM
(4)	Build Limit File	-	FBLDM
III. High Supply Scenario			
(1)	Plant Type Master File	-	FMASTH
(2)	Capital Coefficient File	-	FCOEFH
(3)	Capital Expenditure Profile File	-	FCEPH
(4)	Build Limit File	-	FBLDH

several accessing commands which permit the solution file user to access only information of interest. For example, the user can display all rows, all columns, or all of the solution matrix from a given run. The user can also add columns or rows or compute averages of solution values.

A file of commands named BUILDS.DATA is used to direct PERUSE in accessing the activity levels for the plant types required by CREMOD. The format of this file is exactly the same as the format of commands entered interactively through PERUSE. A listing of this file of commands is shown in Figure 2-8.

Use of PERUSE

MEMM solutions to be operated on by CREMOD are accessed in two steps (see Figure 2-9). First, the user accesses the PERUSE program and uses the PERUSE command file, BUILDS.DATA to store the portions of the given MEMM solution required by CREMOD in an interim solution file. In this way, an interim solution file is created for each MEMM run the CREMOD user wishes to

FIGURE 2-8. BUILDS.DATA
FILE OF PERUSE COMMANDS

```
LIST BUILDS.DATA
BUILDS.DATA
00010 D C BU+++++
00020 D C RU+EN+++
00040 D C RU+CF+++
00050 D C RU+CL+++
00060 D C RU+CR+++
00070 D C RU+CS+++
00080 D C RU+CT+++
00090 D C RU+CU+++
00100 D C RU+CV+++
00110 D C RU+CW+++
00120 D C RU+CX+++
00130 D C RU+CY+++
00140 D C RU+CZ+++
00150 D C RU+DF+++
00160 D C RU+DG+++
00170 D C RU+DI+++
00180 D C RU+DK+++
00190 D C RU+DL+++
00200 D C RU+DM+++
READY
```

analyze. Next, the user specifies the interim file whose contents s/he wishes CREMOD to operate on when s/he first accesses CREMOD. A sample PERUSE run is shown in Figure 2-10. It illustrates how the low supply scenario file 3N85L5 is created using the command file BUILDS.DATA. User responses to PERUSE prompts are underlined.

A given interim solution file is created by accessing PERUSE and exercising a PERUSE command such as:

DISPLAY COLUMNS BU*****

(this command writes all the build activity levels into an output file). The content of a record in the resulting file is depicted in Figure 2-11. When this file is accessed by CREMOD, only a portion of the column name (the two

FIGURE 2-9

CREMOD USE OF SOLUTION FILES

CREATION OF INTERIM SOLUTION FILES*

USE OF INTERIM SOLUTION FILES

FIGURE 2-10. SAMPLE PERUSE RUN

READY

PERUSE

04/03/79 16:40:04

.....WELCOME TO PERUSE.....

IS THE SOLUTION FILE ALREADY PACKED(Y OR N)? >Y

PREFIX OF PACKED FILE(CR DEFAULTS TO CURRENT PREFIX)? >CN6121.PEJ.PCKSLN

SUFFIX OF PACKED FILE TO PERUSE? >R3HB111H

FILE FOR INPUT QUERIES(CR DEFAULTS TO THE TERMINAL)? >BUILDS.DATA

FILE FOR OUTPUT(CR DEFAULTS TO THE TERMINAL)? >SN85L5

OUTPUT WILL BE WRITTEN TO CN6121.GJ3.SN85L5

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

INPUT A COMMAND

SEE OUTPUT IN FILE CN6121.GJ3.SN85L5

READY

LOGOFF

GJ3 LOGGED OFF TSO AT 16:51:53 ON APRIL 3, 1979

digit plant type designator and DOE region number) and the activity level are read into a table by CREMOD to be operated on in generating the appropriate CREMOD report.

FIGURE 2-11. RECORD CONTENTS OF PIES INTERIM SOLUTION FILES
SN85, SN90, OR SN95

1. Name
2. Status
3. Activity Level
4. Cost
5. Lower Limit
6. Upper Limit
7. Reduced Cost

Since the CREMOD user is not permitted to alter the output solution activity files either through the TSO editor or CREMOD, knowledge of these file structures is not required.

Naming conventions for the output solution activity levels are strongly suggested, however. These names are input to the PERUSE program by the user. The naming convention for the solution files is:

$$[SN] + [YY] + \begin{bmatrix} L \\ M \\ H \end{bmatrix} + [i], \text{ where}$$

$[YY]$ is the target year, '85, '90, or '95, with respect to which the solution is defined.

$[L, M, \text{ or } H]$ indicates the low, medium, or high supply scenario reflected by the MEMM input assumptions.

$[i]$ is a sequence number indicating which set the file is a member of.

Solution files are processed by CREMOD in sets of three. An example would be the files,

SN85M5, SN90M5, and SN95M5.

These names indicate that these files are the 1985, 1990 and 1995, medium supply scenario, sequence group five solution files.

3. CREMOD OPERATING INSTRUCTIONS

INTRODUCTION

The CREMOD system programs and data files are maintained under the DOE IBM/370-168 TSO operating system. Prior to running CREMOD, the user must verify that the proper interim solution files have been created. This is done through the DOE supported program PERUSE. The user must also verify that the direct access versions of the specific Plant Type Master File FMAST*, the Capital Coefficient File FCOEF*, and the Capital Expenditure Profile File FCEP* to be accessed have been created. This is done by using the CREMOD system program DIRECT (see Figure 3-1). The user simply types in the command

EXEC DIRECT

and gives the file name of the appropriate file in response to a program query. An example run for DIRECT is contained in Figure 3-2.

To run the model, the user types

EXEC CREMOD.

The computer then responds with a query for the particular supply scenario that the user is interested in (see Figure 3-3). The program allocates the files containing capital coefficients, expenditure profiles, etc., corresponding to this scenario. It then asks the user to enter the names of the set of interim solution files to be accessed by the model.

After this, program control passes to the main program level. At this level, the user may execute one of the seven main functions performed by CREMOD. These are listed below. Use of each one is demonstrated in this section.

- (1) Compute Capital Requirements
- (2) Display Build Limits

FIGURE 3.1
CREMOD SYSTEM FLOW

1. THE FILE NAME EXTENSION .PS STANDS FOR PHYSICAL SEQUENTIAL.

2. THE FILE NAME EXTENSION .DATA IS USED TO IDENTIFY THE DIRECT ACCESS VERSIONS OF THESE FILES.

FIGURE 3-2. RUN DIRECT

READY
EXEC DIRECT
PROGRAM TO SET UP DIRECT ACCESS FILES FOR CREMOD
INPUT FILE NAME 7FCDEFM
ENTRY (A) CN6121.GJ3.FCDEFM.DATA DELETED
G1 COMPILER ENTERED
SOURCE ANALYZED
PROGRAM NAME = MAIN
◆ NO DIAGNOSTICS GENERATED

◆◆◆ END OF DIRECT PROGRAM ◆◆◆ RECORDS= 150

READY

FIGURE 3-3. RUN CREMOD

EXEC CREMOD

◆◆◆ CREMOD ◆◆◆

LOW, MEDIUM, HIGH OR INDIVIDUALLY SPECIFIED SUPPLY SCENARIO (L/M/H/I) M

ENTER PIES SOLUTION FILES (SN85◆◆, SN90◆◆, SN95◆◆): SN85M5, SN90M5, SN95M5

◆◆◆ CREMOD ◆◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

1

- (3) Revise/Display Plant Type Master File
- (4) Revise/Display Capital Coefficients
- (5) Revise/Display Capital Expenditure Profiles
- (6) Display Interim MEFS Solution Files
- (7) Stop

Figure 3-3 illustrates how CREMOD is run. User inputs are underlined. In this example, the user selects the medium supply scenario and then specifies that the MEFS solution files to be used are SN85M5, SN90M5 and SN95M5. He next selects the option to compute capital requirements.

THE COMPUTE CAPITAL REQUIREMENTS OPTION

When the user selects Option 1, program control is passed to the module that computes capital requirements. This module reads the MEFS interim solution files for 1985, 1990 and 1995 into a table if the file has not already been accessed by CREMOD. A printout at the user's terminal lists any anomalies appearing in the MEFS solution files. An anomaly is defined to occur for a region and plant type if its activity levels are not monotonically nondecreasing over the period from 1985 to 1990 to 1995¹. In this case, CREMOD adjusts the data to ensure monotonicity.

The user is next prompted to answer a number of questions in order to specify assumptions to be made in this particular run session of CREMOD. These include the supply scenario, the MEFS base year (this must be the same as that used in the corresponding MEMM run), the user base year and the user inflation rate. The user then may select an option that specifies that particular type of aggregation of plant types desired in the capital report. CREMOD currently has programmed into its logic twenty-six different combinations of plant types from which the user may choose. In addition, the user may examine capital requirements over any combination of the ten DOE

¹Such anomalies occasionally occur due to certain dynamic properties of the MEMM.

regions. The first example (Figure 3-4) in this section illustrates how the user would create a capital requirements report for nuclear plant types (Option 2) for DOE regions U5, U6 and U7. User responses to CREMOD prompts are underlined. The second example (Figure 3-5) shows how s/he would generate a report for all plant types and all ten DOE regions. Annual BUILD limits are used in computing capital requirements in the second example but not in the first example.

If a capital expenditure profile for one or more plant types does not sum to 1, the user will receive a message indicating this when the profile file is first accessed by CREMOD. This message may indicate a small rounding error in the profile for the particular plant type or it may indicate a more serious data error. The CREMOD user should revise the profile as appropriate.

DISPLAY BUILD LIMITS OPTION

The user may display the data in the build limit file using one of two available display options.

Option 1 prompts the user to input a plant type. The data for this particular plant type is printed out by region and year. Subtotals are calculated through 1984, 1989 and 1994.

Option 2 aggregates the data in the build limit file by plant type. Plant types addressed are committed, deferrable, and new nuclear and all committed and deferrable coal plant types. The Option 2 output format facilitates direct comparison with corresponding MEMM preprocessor tables.

Examples (Figures 3-6 and 3-7) for both format types with user responses to CREMOD prompts are shown below.

REVISE/DISPLAY PLANT TYPE MASTER FILE OPTION

The plant type master file is central to processing by CREMOD as it provides a master list of plant types in the system. It is important to note

FIGURE 3-4. THE COMPUTE CAPITAL REQUIREMENTS OPTION (EXAMPLE 1)

◆◆◆ COMPUTE CAPITAL REQUIREMENTS ◆◆◆

REGION: U2	MODE: 20	1985: 0.0	1990: 10522.496	1995: 10417.082
REGION: U4	MODE: V0	1985: 0.0	1990: 1.133	1995: 0.0
REGION: U1	MODE: 60	1985: 2610.333	1990: 0.0	1995: 0.0
REGION: U7	MODE: 60	1985: 0.0	1990: 2765.041	1995: 1498.250
REGION: U9	MODE: 60	1985: 3914.041	1990: 10595.414	1995: 0.0
REGION: UA	MODE: 60	1985: 2011.875	1990: 736.708	1995: 873.250
REGION: U1	MODE: 72	1985: 180.000	1990: 180.000	1995: 175.500
REGION: U4	MODE: 72	1985: 226.000	1990: 226.000	1995: 221.321
REGION: U5	MODE: 72	1985: 50.000	1990: 50.000	1995: 49.500
REGION: U9	MODE: 72	1985: 1344.000	1990: 1344.000	1995: 1313.042
REGION: U4	MODE: CT	1985: 2176.000	1990: 0.0	1995: 0.0
REGION: U5	MODE: CT	1985: 146.000	1990: 0.0	1995: 0.0
REGION: U7	MODE: CT	1985: 1248.458	1990: 718.958	1995: 0.0
REGION: U9	MODE: CT	1985: 0.0	1990: 537.000	1995: 0.0
REGION: U8	MODE: LA	1985: 0.0	1990: 12410.836	1995: 10154.582

ENTER SUPPLY SCENARIO LOW(1),MED(2),HIGH(3)

2
ENTER PIES BASE YEAR (YY)

79
ENTER USER BASE YEAR (YY)

79
ENTER INFLATION RATE (DEC.)

?

0

These two questions are asked
only once per run session

ENTER PLANT TYPE COMBINATION OPTION(0 TO LIST OPTIONS)

?
0
 (1) INDIVIDUALLY SPECIFIED
 (2) NUCLEAR
 (3) BITUMINOUS WITH SCRUBBER
 (4) BITUMINOUS WITHOUT SCRUBBER
 (5) SUB-BITUMINOUS WITH SCRUBBER
 (6) SUB-BITUMINOUS WITHOUT SCRUBBER
 (7) LIGNITE WITH SCRUBBER
 (8) LIGNITE WITHOUT SCRUBBER
 (9) COAL WITH SCRUBBER
 (10) COAL WITHOUT SCRUBBER
 (11) ALL COAL BUILDS
 (12) TURDINE
 (13) COMBINED CYCLE
 (14) HYDROELECTRIC
 (15) ALL FUEL GAS
 (16) ALL BUILDS
 (17) ALL OIL TO COAL CONVERSIONS
 (18) ALL GAS TO COAL CONVERSIONS
 (19) ALL NEW PLANT COAL TO COAL CONVERSIONS
 (20) ALL EXISTING PLANT CONVERSIONS
 (21) ALL OTHER CONVERSIONS
 (22) ALL CONVERSIONS
 (23) ALL EMERGING TECHNOLOGIES
 (24) ALL (UTILITY CAPITAL)
 (25) TRANSMISSION & DISTRIBUTION
 (26) ALL (NET OF T & D)

Listing of plant type aggregation
 options available to user

ENTER PLANT TYPE COMBINATION OPTION(0 TO LIST OPTIONS)

?
2
 COMMITTED, DEFERABLE, NEW OR ALL (Y, Z, O, ALL)

ALL
 ENTER REGIONS

U5, U6, U7
 NY PROFILE DOES NOT SUM TO 1 (1001)
 NZ PROFILE DOES NOT SUM TO 1 (1001)
 40 PROFILE DOES NOT SUM TO 1 (988)
 NO PROFILE DOES NOT SUM TO 1 (1001)
 USE AVAILABLE BUILD LIMITS ?

User should confirm these profiles

N
 LIST PLANT TYPES/REGIONS IN PIES OPTION ? (Y/N)

Y
 REGIONS: U5 U6 U7

PLANT TYPES FOR OPTION 2

23	NUCLEAR	NY
46	NUCLEAR	NZ
69	NUCLEAR	NO

FIGURE 3-4 (CONT.)

◆◆◆CREMOD CAPITAL REQUIREMENTS REPORT ◆◆◆
TOTAL PIES CAPITAL REQUIREMENTS THROUGH 1990 SUMMED OVER
INDICATED PLANT TYPES AND REGIONS

YEAR	CWIP (GW)	CUMULATIVE CW COMPLETED (GW)	CAPITAL EXPENDED (\$ MIL.)	CUMULATIVE CAPITAL EXPENDED (\$ MIL.)
1979	29.13	4.05	2300.14	2300.14
1980	28.72	8.10	2167.51	4467.65
1981	28.31	12.15	1889.18	6356.83
1982	27.90	16.20	1614.29	7971.12
1983	27.49	20.25	1429.25	9400.37
1984	27.08	24.30	1363.02	10763.39
1985	25.30	26.08	1442.75	12206.14
1986	23.53	27.85	1787.36	13993.50
1987	21.76	29.63	2128.35	16121.85
1988	19.98	31.40	2351.83	18473.68
1989	18.21	33.18	2412.68	20886.37
1990	14.56	36.82	2227.07	23113.43

TOTAL PIES CAPITAL REQUIREMENTS THROUGH 1990 SUMMED OVER
INDICATED PLANT TYPES AND REGIONS

YEAR	ANNUAL CAPITAL EXPENDITURE (\$ MIL.)			CUMULATIVE CAPITAL EXPENDITURES (\$ MIL.)		
	DIRECT	INTEREST	TOTAL	DIRECT	INTEREST	TOTAL
1979	1759.08	541.05	2300.14	1759.08	541.05	2300.14
1980	1639.95	527.55	2167.51	3399.04	1068.61	4467.65
1981	1392.91	496.28	1889.18	4791.94	1564.89	6356.83
1982	1164.76	449.53	1614.29	5956.70	2014.42	7971.12
1983	1033.88	395.37	1429.25	6990.58	2409.78	9400.37
1984	1020.13	342.90	1363.02	8010.71	2752.68	10763.39
1985	1140.67	302.07	1442.75	9151.39	3054.75	12206.14
1986	1446.21	341.15	1787.36	10597.60	3395.90	13993.50
1987	1728.97	399.38	2128.35	12326.56	3795.29	16121.85
1988	1885.46	466.37	2351.83	14212.02	4261.66	18473.68
1989	1882.88	529.80	2412.68	16094.90	4791.46	20886.37
1990	1654.12	572.95	2227.07	17749.02	5364.41	23113.43

FIGURE 3-5. COMPUTE CAPITAL REQUIREMENTS (EXAMPLE 2)

◆◆◆ CREMOD ◆◆◆

ENTER FUNCTION DESIRED (0 TO LIST):

1

◆◆◆ COMPUTE CAPITAL REQUIREMENTS ◆◆◆

ENTER USER BASE YEAR (YY)

79

ENTER INFLATION RATE (DEC.)

?

0

ENTER PLANT TYPE COMBINATION OPTION(0 TO LIST OPTIONS)

?

24

ENTER REGIONS

^ALL

USE AVAILABLE BUILD LIMITS ?

Y

LIST PLANT TYPES/REGIONS IN PIES OPTION ? (Y/N)

N

FIGURE 3-5 (CONT.)

◆◆◆CREMOD CAPITAL REQUIREMENTS REPORT ◆◆◆
 TOTAL PIES CAPITAL REQUIREMENTS THROUGH 1990 SUMMED OVER
 INDICATED PLANT TYPES AND REGIONS

YEAR	CWIP (GW)	CUMULATIVE CW COMPLETED (GW)	CAPITAL EXPENDED (\$ MIL.)	CUMULATIVE CAPITAL EXPENDED (\$ MIL.)
1979	197.33	46.68	19549.06	19549.06
1980	200.94	82.03	19008.47	38557.53
1981	215.59	113.86	20336.36	58893.88
1982	224.90	144.01	23199.22	82093.11
1983	244.42	166.53	24851.87	106944.98
1984	256.08	190.05	25301.24	132246.22
1985	246.47	230.73	25515.07	157761.30
1986	239.91	268.35	26056.28	183817.58
1987	230.90	308.97	27783.00	211600.58
1988	225.36	344.57	29295.92	240896.50
1989	195.96	377.91	30169.41	271065.91
1990	160.14	415.60	28152.31	299218.22

TOTAL PIES CAPITAL REQUIREMENTS THROUGH 1990 SUMMED OVER
 INDICATED PLANT TYPES AND REGIONS

YEAR	ANNUAL CAPITAL EXPENDITURE (\$ MIL.)			CUMULATIVE CAPITAL EXPENDITURES (\$ MIL.)		
	DIRECT	INTEREST	TOTAL	DIRECT	INTEREST	TOTAL
1979	16549.75	2999.31	19549.06	16549.75	2999.31	19549.06
1980	16453.54	2554.93	19008.47	33003.28	5554.24	38557.53
1981	17820.23	2516.13	20336.36	50823.51	8070.37	58893.88
1982	20463.51	2735.71	23199.22	71287.02	10806.08	82093.11
1983	21745.67	3106.20	24851.87	93032.70	13912.29	106944.98
1984	21679.86	3621.38	25301.24	114712.55	17533.67	132246.22
1985	21487.65	4027.42	25515.07	136200.21	21561.09	157761.30
1986	22112.93	3943.35	26056.28	158313.14	25504.44	183817.58
1987	23761.83	4021.18	27783.00	182074.97	29525.62	211600.58
1988	25245.74	4050.17	29295.92	207320.71	33575.79	240896.50
1989	25970.21	4199.20	30169.41	233290.92	37775.00	271065.91
1990	23930.66	4221.65	28152.31	257221.58	41996.64	299218.22

◆◆◆ CREMOD ◆◆◆

ENTER FUNCTION DESIRED (0 TO LIST):

2
READY

FIGURE 3-6. DISPLAY BUILD LIMITS OPTION

◆◆ CREMOD ◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

2

◆◆ BUILD LIMIT MODULE ◆◆

ENTER PIES BASE YEAR (YY)

79

DISPLAY FORMAT (1), (2), OR END (E) ?

2

COM(1), DEF(2) OR NEW(3) ?

1

TARGET YEAR (85, 90, 95) ?

95

BUILD LIMIT SUMMARY (MWE)

=====

	NY	2Y	3Y	4Y	JY	QY	XY	PY	EY
	----	----	----	----	----	----	----	----	----
U1	2344	0	0	0	0	0	0	0	0
U2	5922	0	0	0	0	0	0	0	0
U3	7622	2077	0	0	0	0	1700	0	0
U4	19668	2650	1340	0	870	720	3112	0	0
U5	17117	1978	0	0	1300	0	3568	500	0
U6	8229	0	0	0	0	0	550	940	0
U7	2300	837	0	0	0	0	0	0	1360
U8	330	0	0	800	0	0	200	1000	1268
U9	6666	0	700	1174	0	0	250	0	0
UA	4879	0	0	0	0	0	0	0	0
TOTAL	75077	7542	2040	1974	2170	720	9380	2440	2628

	OY	VY
	----	----
U1	0	0
U2	0	0
U3	0	0
U4	0	0
U5	1697	0
U6	9183	3195
U7	4754	0
U8	830	1390
U9	0	0
UA	530	0
TOTAL	16994	4585

FIGURE 3-7. DISPLAY BUILD LIMITS OPTION

DISPLAY FORMAT (1), (2), OR END (E) ?

1

ENTER PLANT TYPE

NY

BUILD LIMIT DATA (MWE)

PLANT TYPE: NY

YEAR	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
1979	0	784	3123	3115	1905	912	0	330	1084	0
1980	0	854	0	2317	2201	0	0	0	1106	0
1981	0	0	1050	5730	1078	1150	0	0	1140	1103
1982	0	0	1050	2064	3058	2415	0	0	1140	0
1983	0	0	76	0	4811	1359	0	0	1098	0
1984	0	437	207	2350	1865	1250	2300	0	0	1267
1985	1194	1710	1065	3192	2199	209	0	0	1098	1267
1986	1150	1067	0	900	0	0	0	0	0	1242
1987	0	1070	1051	0	0	0	0	0	0	0
1988	0	0	0	0	0	934	0	0	0	0
THRU 84:	0	2075	5506	15576	14918	7086	2300	330	5568	2370
THRU 89:	2344	5922	7622	19668	17117	8229	2300	330	6666	4879
THRU 94:	2344	5922	7622	19668	17117	8229	2300	330	6666	4879

DISPLAY FORMAT (1), (2), OR END (E) ?

E

that the order of the plant type records in this file is critical as this information is "hard-coded" into the CREMOD logic that computes capital requirements for a particular capital requirements option.

This option provides the user with the capability to revise or display the file FMAST*. The user selects the option desired by responding to a prompt for direction by CREMOD. A user response of the letter "D" will cause a formatted listing of the entire file to be printed at the user's terminal. A response of the letter "R" will cause the program to go into an update mode for this file. In the update mode, the user may either change information in a field of one of the existing records or add a new record to the file. The record addition function is only entered when the program cannot find a plant type that the user selected for revision.

The user exits from this module by typing an "E" in response to the prompt for direction at this program level.

An example (Figure 3-8) is shown for the display and revise commands for the plant type master file. The user's responses to CREMOD queries are underlined.

REVISE/DISPLAY CAPITAL COEFFICIENTS OPTION

The capital coefficients file is organized by plant type. There are three basic commands at this option level. They are: R, to revise data in the capital coefficients file; D, to display data in the capital coefficients file; and E, which will return program control to the main option level.

The capital coefficients file is displayed in two parts. Part 1 displays the capital coefficients for all regions and all plant types (Figure 3-9) and Part 2 displays the IDC rates and escalation rates associated with each plant type (Figure 3-10).

FIGURE 3-8. REVISE/DISPLAY PLANT TYPE MASTER FILE OPTION

◆◆◆ CREMOD ◆◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

3

◆◆◆ REVISE/DISPLAY PLANT TYPE MASTER FILE ◆◆◆

REVISE, DISPLAY OR END (R/D/E) ?

D

PIES CODE	PIES DESCRIPTOR	UNIT DATA CODE	IDC CODE
----	-----	-----	-----
1Y	OIL FIRED STEAM	0	0
2Y	BIT/HI SUL/SCR	0	0
3Y	BIT/MED SUL/SCR	0	0
4Y	BIT/LOW SUL/SCR	0	0
5Y	GAS FIRED TURBINE	0	0
6Y	DISTILLATE TURBINE	0	0
AY	COMBINED CYCLE GAS	0	0
7Y	COMBINED CYCLE DIST	0	0
8Y	GAS FIRED STEAM	0	0
JY	BIT/HIGH SUL/N SCR	0	0
QY	BIT/MED SUL/N SCR	0	0
XY	BIT/LOW SUL/N SCR	0	0
PY	SUB-BIT/MED SUL/SCR	0	0
EY	SUB-BIT/LOW SUL/SCR	0	0
MY	SUB-BIT/MED SUL/N SCR	0	0
OY	SUB-BIT/LOW SUL/N SCR	0	0
VY	LIG/MED SUL/SCR	0	0
ZY	LIG/LOW SUL/SCR	0	0
TY	LIG/MED SUL/N SCR	0	0
YY	LIG/LOW SUL/N SCR	0	0
9Y	HYDRO PONDAGE	0	0
KY	HYDRO PUMP STORAGE	0	0
NY	NUCLEAR	0	0
1Z	OIL FIRED STEAM	0	0

FIGURE 3-8 (CONT.)

PIES CODE	PIES DESCRIPTOR	UNIT DATA CODE	IDC CODE
2Z	BIT/HI SUL/SCR	0	0
3Z	BIT/MED SUL/SCR	0	0
4Z	BIT/LOW SUL/SCR	0	0
5Z	GAS FIRED TURBINE	0	0
6Z	DISTILLATE TURBINE	0	0
AZ	COMBINED CYCLE/GAS	0	0
7Z	COMBINED CYCLE/DIST	0	0
8Z	GAS FIRED STEAM	0	0
JZ	BIT/HIGH SUL/N SCR	0	0
QZ	BIT/MED SUL/N SCR	0	0
XZ	BIT/LOW SUL/N SCR	0	0
PZ	SUB-BIT/MED SUL/SCR	0	0
EZ	SUB-BIT/LOW SUL/SCR	0	0
MZ	SUB-BIT/MED SUL/N SCR	0	0
OZ	SUB-BIT/LOW SUL/N SCR	0	0
VZ	LIG/MED SUL/SCR	0	0
ZZ	LIG/LOW SUL/SCR	0	0
TZ	LIG/MED SUL/N SCR	0	0
YZ	LIG/LOW SUL/N SCR	0	0
9Z	HYDRO PONDAGE	0	0
KZ	HYDRO PUMP STORAGE	0	0
NZ	NUCLEAR	0	0
10	OIL FIRED STEAM	0	0
20	BIT/HI SUL/SCR	0	0
30	BIT/MED SUL/SCR	0	0

PIES CODE	PIES DESCRIPTOR	UNIT DATA CODE	IDC CODE
40	BIT/LOW SUL/SCR	0	0
50	GAS FIRED TURBINE	0	0
60	DISTILLATE TURBINE	0	0
A0	COMBINED CYCLE/GAS	0	0
70	COMBINED CYCLE/DIST	0	0
80	GAS FIRED STEAM	0	0
J0	BIT/HIGH SUL/N SCR	0	0
Q0	BIT/MED SUL/N SCR	0	0
X0	BIT/LOW SUL/N SCR	0	0
P0	SUB-BIT/MED SUL/SCR	0	0
E0	SUB-BIT/LOW SUL/SCR	0	0
M0	SUB-BIT/MED SUL/N SCR	0	0
O0	SUB-BIT/LOW SUL/N SCR	0	0
V0	LIG/MED SUL/SCR	0	0
Z0	LIG/LOW SUL/SCR	0	0
T0	LIG/MED SUL/N SCR	0	0
Y0	LIG/LOW SUL/N SCR	0	0
90	HYDRO PONDAGE	0	0
K0	HYDRO PUMP STORAGE	0	0
N0	NUCLEAR	0	0
CF	CONVERT OIL TO BIT/HI SUL/N SCR	0	0
CG	CONVERT OIL TO BIT/MD SUL/N SCR	0	0
CH	CONVERT OIL TO BIT/LO SUL/N SCR	0	0
CI	CONVERT OIL TO BIT/HI SUL/SCR	0	0
CJ	CONVERT OIL TO BIT/MED SUL/SCR	0	0

FIGURE 3-8 (CONT.)

PIES CODE	PIES DESCRIPTOR	UNIT DATA CODE	IDC CODE
----	-----	-----	-----
CK	CONVERT OIL TO BIT/LO SUL/SCR	0	0
CL	CONVERT GAS TO BIT/HI SUL/N SCR	0	0
CM	CONVERT GAS TO BIT/MD SUL/N SCR	0	0
DN	CONVERT GAS TO BIT/MD SUL/N SCR	0	0
CO	CONVERT GAS TO BIT/HI SUL/SCR	0	0
CP	CONVERT GAS TO BIT/HI SUL/SCR	0	0
CQ	CONVERT GAS TO BIT/LO SUL/SCR	0	0
DF	CHANGE N/BIT/LO S TO HI S/W SCR	0	0
DG	CHANGE N BIT/LO S TO MD S/W SCR	0	0
DH	CHANGE N BIT/MD S TO HI S/W SCR	0	0
DI	CHANGE N SUB-B/L S TO M S/W SCR	0	0
DJ	CHANGE N LIG/LO S TO MD S/W SCR	0	0
CV	CONVERT BIT/LO S TO HI S/W SCR	0	0
CW	CONVERT BIT/LO S TO MED S/W SCR	0	0
CX	CONVERT BIT/MED S TO HI S/W SCR	0	0
CY	CONVERT SUB-B/LO S TO M S/W SCR	0	0
CZ	CONVERT LIG/LO S TO MED S/W SCR	0	0
CR	CONVERT OIL TO GAS STEAM	0	0
CS	CONVERT NEW OIL TO GAS STEAM	0	0
CT	CONVERT GAS TO OIL STEAM	0	0
CU	CONVERT DISTILLATE TO GAS TURB.	0	0
DK	CONVERT GAS TO DISTILLATE TURB.	0	0
DL	CONVERT N DIST TO GAS COMB CYCL	0	0
DM	CONVERT E DIST TO GAS COMB CYCL	0	0
GE	WIND (BUILD)	0	0

PIES CODE	PIES DESCRIPTOR	UNIT DATA CODE	IDC CODE
----	-----	-----	-----
GK	PHOTOVOLTAICS (BUILD)	0	0
GG	SOLAR THERMAL (BUILD)	0	0
GP	BIOMASS-ELECTRIC (BUILD)	0	0
GN	OCEAN THERMAL (BUILD)	0	0
G1	HYDROTHERMAL I (BUILD)	0	0
G2	HYDROTHERMAL II (BUILD)	0	0
G3	HYDROTHERMAL III (BUILD)	0	0
LE	BUILD CENTRAL ELECTRIC: AFB	0	0
LC	BUILD LOW-MED BTU GAS COMB CYCL	0	0
TD	TRANSMIT ELEC NEW	0	0
L9	BUILD MED BTU COAL GAS COM TEC	0	0
LA	BUILD MED BTU COAL GAS ADV TEC	0	0
LG	BUILD METHANOL TO GAS	0	0
LV	BUILD METHANOL TO DISTILLATE	0	0
MH	RDF UTILITY SOLID WASTE BUILD	0	0
TV	TRANSMISSION (VARIABLE)	0	0
TF	TRANSMISSION (FIXED)	0	0
TN	NEW DISTRIBUTION	0	0
TM	METERING COSTS	0	0

REVISE, DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

TD

FIELD NO.	DATA ELEMENT	CONTENTS
1	PLANT TYPE DESIGNATOR	TD
2	PLANT TYPE DESCRIPTOR	TRANSMIT ELEC NEW
3	UNIT DATA CODE	0
4	IDC CODE	0

ENTER FIELD NO. TO REVISE (1-4, 0 TO END)

2

NEW VALUE ?

TD SUPERCEDED BY TF/TV/TM/TN

ENTER FIELD NO. TO REVISE (1-4, 0 TO END)

0

REVISE, DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

XX

NO RECORD FOR PLANT TYPE: XX

DO YOU WANT TO ADD XX TO THE FILE (Y/N) ?

Y

ENTER PLANT TYPE DESCRIPTOR

TEST ADD RECORD CAPABILITY

ENTER UNIT DATA CODE

0

ENTER IDC CODE

0

REVISE, DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

XX

FIELD NO.	DATA ELEMENT	CONTENTS
1	PLANT TYPE DESIGNATOR	XX
2	PLANT TYPE DESCRIPTOR	TEST ADD RECORD CAPABILITY
3	UNIT DATA CODE	0
4	IDC CODE	0

ENTER FIELD NO. TO REVISE (1-4, 0 TO END)

0

REVISE, DISPLAY OR END (R/D/E) ?

E

◆◆◆ CREMOD ◆◆◆

FIGURE 3-9. DISPLAY CAPITAL COEFFICIENTS OPTION

◆◆◆ CREMOD ◆◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

4

◆◆◆ REVISE/DISPLAY CAPITAL COEFFICIENT FILE ◆◆◆

REVISE, DISPLAY OR END (R/D/E) ?

D

DISPLAY COEFFICIENTS OR INT/ESC RATES (1/2)

1

Y PIES	R CODE	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
75 1Y		365	400	365	330	365	325	360	340	365	330
75 2Y		555	610	555	505	555	495	545	0	0	505
75 3Y		530	585	530	480	530	470	520	510	550	480
75 4Y		500	550	500	455	500	445	490	465	500	455
75 5Y		145	145	145	145	145	145	145	145	145	145
75 6Y		145	145	145	145	145	145	145	145	145	145
75 7Y		265	290	265	240	265	235	260	245	265	240
75 8Y		265	290	265	240	265	235	260	245	265	240
75 8Y		270	295	270	245	270	240	265	250	270	245
75 JY		430	475	430	390	430	385	420	465	500	390
75 QY		430	475	430	390	430	385	420	465	500	390
75 XY		430	475	430	390	430	385	420	465	500	390
75 PY		550	605	550	500	550	490	540	530	570	500
75 EY		520	570	520	475	520	465	510	485	520	475
75 MY		450	495	450	410	450	400	440	485	520	410
75 OY		450	495	450	410	450	400	440	485	520	410
75 VY		565	620	565	515	565	505	555	550	590	515
75 ZY		540	595	540	490	540	480	530	500	540	490
75 TY		475	520	475	530	475	425	465	500	540	430
75 YY		475	520	475	530	475	425	465	500	540	430
75 9Y		729	729	670	683	729	729	729	685	670	301
75 KY		190	190	190	190	190	190	190	190	190	190
75 NY		720	795	765	525	620	550	835	1075	745	795
75 1Z		365	400	365	330	365	325	360	340	365	330

FIGURE 3-9 (CONT.)

Y PIES R CODE	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
75 2Z	555	610	555	505	555	495	545	0	0	505
75 3Z	530	585	530	480	530	470	520	510	550	480
75 4Z	500	550	500	455	500	445	490	465	500	455
75 5Z	145	145	145	145	145	145	145	145	145	145
75 6Z	145	145	145	145	145	145	145	145	145	145
75 AZ	265	290	265	240	265	235	260	245	265	240
75 7Z	265	290	265	240	265	235	260	245	265	240
75 8Z	270	295	270	245	270	240	265	250	270	245
75 JZ	430	475	430	390	430	385	420	465	500	390
75 QZ	430	475	430	390	430	385	420	465	500	390
75 XZ	430	475	430	390	430	385	420	465	500	390
75 PZ	550	605	550	500	550	490	540	530	570	500
75 EZ	520	570	520	475	520	465	510	485	520	475
75 MZ	450	495	450	410	450	400	440	485	520	410
75 OZ	450	495	450	410	450	400	440	485	520	410
75 VZ	565	620	565	515	565	505	555	550	590	515
75 ZZ	540	595	540	490	540	480	530	500	540	490
75 TZ	475	520	475	530	475	425	465	500	540	430
75 YZ	475	520	475	530	475	425	465	500	540	430
75 9Z	729	729	670	683	729	729	729	685	670	301
75 KZ	190	190	190	190	190	190	190	190	190	190
75 NZ	705	0	590	635	830	495	845	0	665	705
75 10	365	400	365	330	365	325	360	340	365	330
75 20	560	615	560	510	560	500	550	0	0	510
75 30	550	605	550	500	550	490	540	510	550	500

Y PIES R CODE	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
75 40	500	550	500	455	500	445	490	465	500	455
75 50	145	145	145	145	145	145	145	145	145	145
75 60	145	145	145	145	145	145	145	145	145	145
75 A0	265	290	265	240	265	235	260	245	265	240
75 70	265	290	265	240	265	235	260	245	265	240
75 80	270	295	270	245	270	240	265	250	270	245
75 J0	430	475	430	390	430	385	420	465	500	390
75 Q0	430	475	430	390	430	385	420	465	500	390
75 X0	430	475	430	390	430	385	420	465	500	390
75 P0	570	625	570	520	570	505	560	530	570	520
75 E0	520	570	520	475	520	465	510	485	520	475
75 M0	450	495	450	410	450	400	440	485	520	410
75 O0	450	495	450	410	450	400	440	485	520	410
75 V0	590	650	590	535	590	525	580	550	590	535
75 Z0	540	595	540	490	540	480	530	500	540	490
75 T0	475	520	475	530	475	425	465	500	540	430
75 Y0	475	520	475	530	475	425	465	500	540	430
75 90	729	729	670	683	729	729	729	685	670	301
75 K0	190	190	190	190	190	190	190	190	190	190
75 N0	815	875	880	710	790	755	910	0	740	885
75 CF	150	150	150	150	150	150	150	150	150	150
75 CG	150	150	150	150	150	150	150	150	150	150
75 CH	150	150	150	150	150	150	150	150	150	150
75 CI	150	150	150	150	150	150	150	150	150	150
75 CJ	150	150	150	150	150	150	150	150	150	150

FIGURE 3-9 (CONT.)

Y PIES R CODE	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
75 CK	150	150	150	150	150	150	150	150	150	150
75 CL	150	150	150	150	150	150	150	150	150	150
75 CM	150	150	150	150	150	150	150	150	150	150
75 DN	150	150	150	150	150	150	150	150	150	150
75 CO	150	150	150	150	150	150	150	150	150	150
75 CP	150	150	150	150	150	150	150	150	150	150
75 CQ	150	150	150	150	150	150	150	150	150	150
75 DF	118	118	118	118	118	118	118	118	118	118
75 DG	108	108	108	108	108	108	108	108	108	108
75 DH	118	118	118	118	118	118	118	118	118	118
75 DI	108	108	108	108	108	108	108	108	108	108
75 DJ	108	108	108	108	108	108	108	108	108	108
75 CV	113	113	113	113	113	113	113	113	113	113
75 CW	91	91	91	91	91	91	91	91	91	91
75 CX	63	63	63	63	63	63	63	63	63	63
75 CY	91	91	91	91	91	91	91	91	91	91
75 CZ	91	91	91	91	91	91	91	91	91	91
75 CR	0	0	0	0	0	0	0	0	0	0
75 CS	0	0	0	0	0	0	0	0	0	0
75 CT	0	0	0	0	0	0	0	0	0	0
75 CU	0	0	0	0	0	0	0	0	0	0
75 DK	0	0	0	0	0	0	0	0	0	0
75 DL	0	0	0	0	0	0	0	0	0	0
75 DM	0	0	0	0	0	0	0	0	0	0
75 GE	929	929	929	929	929	929	929	929	929	929

Y PIES R CODE	U1	U2	U3	U4	U5	U6	U7	U8	U9	UA
75 GK	2639	2639	2639	2639	2639	2639	2639	2639	2639	2639
75 GG	1286	1286	1286	1286	1286	1286	1286	1286	1286	1286
75 GP	714	786	714	651	714	634	702	664	714	651
75 GN	4282	4282	4282	4282	4282	4282	4282	4282	4282	4282
75 G1	0	0	0	0	0	423	0	434	524	682
75 G2	0	0	0	0	0	479	0	637	529	631
75 G3	0	0	0	0	0	575	0	637	639	657
75 LE	635	700	635	580	635	565	620	590	635	580
75 LC	635	700	635	580	635	565	620	590	635	580
75 TD	0	0	0	0	0	0	0	0	0	0
75 L9	0	0	0	0	0	0	0	0	0	0
75 LA	0	0	0	0	0	0	0	0	0	0
75 LG	0	0	0	0	0	0	0	0	0	0
75 LV	0	0	0	0	0	0	0	0	0	0
75 TV	0	0	0	0	0	0	0	0	0	0
75 TF	0	0	0	0	0	0	0	0	0	0
75 TH	0	0	0	0	0	0	0	0	0	0
75 TM	0	0	0	0	0	0	0	0	0	0

FIGURE 3-10. DISPLAY INT/ESC RATES

REVISE, DISPLAY OR END (R/D/E) ?

1
 DISPLAY COEFFICIENTS OR INT/ESC RATES. (1/2)

2

PIES CODE	ESCALATION RATES				INT. DUR. CONST.	
	(-84/YR) E1	(85-89/YR) E2	(90-94/YR) E3	(84/TOTAL) E4	RATE/YR IDC # 1	% TOTAL IDC # 2
1Y	0.0	0.0	0.0	0.0	0.0747	0.238
2Y	0.0	0.0	0.0	0.0	0.0747	0.252
3Y	0.0	0.0	0.0	0.0	0.0747	0.252
4Y	0.0	0.0	0.0	0.0	0.0747	0.252
5Y	0.0	0.0	0.0	0.0	0.0747	0.086
6Y	0.0	0.0	0.0	0.0	0.0747	0.086
AY	0.0	0.0	0.0	0.0	0.0747	0.203
7Y	0.0	0.0	0.0	0.0	0.0747	0.194
8Y	0.0	0.0	0.0	0.0	0.0747	0.238
JY	0.0	0.0	0.0	0.0	0.0747	0.238
QY	0.0	0.0	0.0	0.0	0.0747	0.238
XY	0.0	0.0	0.0	0.0	0.0747	0.238
PY	0.0	0.0	0.0	0.0	0.0747	0.252
EY	0.0	0.0	0.0	0.0	0.0747	0.252
MY	0.0	0.0	0.0	0.0	0.0747	0.238
OY	0.0	0.0	0.0	0.0	0.0747	0.238
VY	0.0	0.0	0.0	0.0	0.0747	0.252
ZY	0.0	0.0	0.0	0.0	0.0747	0.252
TY	0.0	0.0	0.0	0.0	0.0747	0.238
YY	0.0	0.0	0.0	0.0	0.0747	0.238
9Y	0.0	0.0	0.0	0.0	0.0747	0.216
KY	0.0	0.0	0.0	0.0	0.0747	0.216
NY	0.0	0.0	0.0	0.0	0.0747	0.273
1Z	0.0	0.0	0.0	0.0	0.0747	0.238

PIES CODE	ESCALATION RATES				INT. DUR. CONST.	
	(-84/YR) E1	(85-89/YR) E2	(90-94/YR) E3	(84/TOTAL) E4	RATE/YR IDC # 1	% TOTAL IDC # 2
2Z	0.0	0.0	0.0	0.0	0.0747	0.252
3Z	0.0	0.0	0.0	0.0	0.0747	0.252
4Z	0.0	0.0	0.0	0.0	0.0747	0.252
5Z	0.0	0.0	0.0	0.0	0.0747	0.086
6Z	0.0	0.0	0.0	0.0	0.0747	0.086
AZ	0.0	0.0	0.0	0.0	0.0747	0.203
7Z	0.0	0.0	0.0	0.0	0.0747	0.194
8Z	0.0	0.0	0.0	0.0	0.0747	0.238
JZ	0.0	0.0	0.0	0.0	0.0747	0.238
QZ	0.0	0.0	0.0	0.0	0.0747	0.238
XZ	0.0	0.0	0.0	0.0	0.0747	0.238
PZ	0.0	0.0	0.0	0.0	0.0747	0.252
EZ	0.0	0.0	0.0	0.0	0.0747	0.252
MZ	0.0	0.0	0.0	0.0	0.0747	0.238
OZ	0.0	0.0	0.0	0.0	0.0747	0.238
VZ	0.0	0.0	0.0	0.0	0.0747	0.252
ZZ	0.0	0.0	0.0	0.0	0.0747	0.252
TZ	0.0	0.0	0.0	0.0	0.0747	0.238
YZ	0.0	0.0	0.0	0.0	0.0747	0.238
9Z	0.0	0.0	0.0	0.0	0.0747	0.216
KZ	0.0	0.0	0.0	0.0	0.0747	0.216
NZ	0.0	0.0	0.0	0.0	0.0747	0.273
10	0.0	0.0	0.0	0.0	0.0747	0.238
20	0.0	0.0	0.0	0.0	0.0747	0.252
30	0.0	0.0	0.0	0.0	0.0747	0.252

FIGURE 3-10 (CONT.)

PIES CODE	(-84/YR) E1	ESCALATION RATES			INT. DUR. RATE/YR IDC # 1	CONST. % TOTAL IDC # 2
		(85-89/YR) E2	(90-94/YR) E3	(84/TOTAL) E4		
40	0.0	0.0	0.0	0.0	0.0747	0.252
50	0.0	0.0	0.0	0.0	0.0747	0.086
60	0.0	0.0	0.0	0.0	0.0747	0.086
A0	0.0	0.0	0.0	0.0	0.0747	0.203
70	0.0	0.0	0.0	0.0	0.0747	0.194
80	0.0	0.0	0.0	0.0	0.0747	0.238
J0	0.0	0.0	0.0	0.0	0.0747	0.238
Q0	0.0	0.0	0.0	0.0	0.0747	0.238
X0	0.0	0.0	0.0	0.0	0.0747	0.238
P0	0.0	0.0	0.0	0.0	0.0747	0.252
E0	0.0	0.0	0.0	0.0	0.0747	0.252
M0	0.0	0.0	0.0	0.0	0.0747	0.238
D0	0.0	0.0	0.0	0.0	0.0747	0.238
V0	0.0	0.0	0.0	0.0	0.0747	0.252
Z0	0.0	0.0	0.0	0.0	0.0747	0.252
T0	0.0	0.0	0.0	0.0	0.0747	0.238
Y0	0.0	0.0	0.0	0.0	0.0747	0.238
90	0.0	0.0	0.0	0.0	0.0747	0.216
K0	0.0	0.0	0.0	0.0	0.0747	0.216
N0	0.0	0.0	0.0	0.0	0.0747	0.273
CF	0.0	0.0	0.0	0.0	0.0	0.0
CG	0.0	0.0	0.0	0.0	0.0	0.0
CH	0.0	0.0	0.0	0.0	0.0	0.0
CI	0.0	0.0	0.0	0.0	0.0	0.0
CJ	0.0	0.0	0.0	0.0	0.0	0.0

PIES CODE	(-84/YR) E1	ESCALATION RATES			INT. DUR. RATE/YR IDC # 1	CONST. % TOTAL IDC # 2
		(85-89/YR) E2	(90-94/YR) E3	(84/TOTAL) E4		
CK	0.0	0.0	0.0	0.0	0.0	0.0
CL	0.0	0.0	0.0	0.0	0.0	0.0
CM	0.0	0.0	0.0	0.0	0.0	0.0
DN	0.0	0.0	0.0	0.0	0.0	0.0
CD	0.0	0.0	0.0	0.0	0.0	0.0
CP	0.0	0.0	0.0	0.0	0.0	0.0
CQ	0.0	0.0	0.0	0.0	0.0	0.0
DF	0.0	0.0	0.0	0.0	0.0	0.0
DG	0.0	0.0	0.0	0.0	0.0	0.0
DH	0.0	0.0	0.0	0.0	0.0	0.0
DI	0.0	0.0	0.0	0.0	0.0	0.0
DJ	0.0	0.0	0.0	0.0	0.0	0.0
CV	0.0	0.0	0.0	0.0	0.0	0.0
CW	0.0	0.0	0.0	0.0	0.0	0.0
CX	0.0	0.0	0.0	0.0	0.0	0.0
CY	0.0	0.0	0.0	0.0	0.0	0.0
CZ	0.0	0.0	0.0	0.0	0.0	0.0
CR	0.0	0.0	0.0	0.0	0.0	0.0
CS	0.0	0.0	0.0	0.0	0.0	0.0
CT	0.0	0.0	0.0	0.0	0.0	0.0
CU	0.0	0.0	0.0	0.0	0.0	0.0
DK	0.0	0.0	0.0	0.0	0.0	0.0
DL	0.0	0.0	0.0	0.0	0.0	0.0
DM	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.0	-.050	-.060	0.0	0.0	0.0

An example for the revise option is shown in Figure 3-11. To revise a record, the user enters the number of the field that s/he wishes to update. When the user is asked for the new value, this data is then entered. A "0" will complete the update of a particular record.

REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES OPTION

Option 5 also provides for display and revision of the records in its file. There are three basic commands at this option level. These are: R, to enter a revision mode; D, to display the entire file in a formatted listing; and E, to return to the main control level of CREMOD.

Figure 3-12 is an example of the display command. An example of a revision along with a record update is shown beginning in Figure 3-13. All profiles entered interactively must sum to 1.0 (e.g., 100 percent of capital expenditures).

User responses to this option's prompts are underlined.

DISPLAY PIES SOLUTION FILES OPTION

Unlike the Profile, Master, and Coefficient files, the CREMOD system allows only for selective review of the solution files and does not allow for a revision capability. However, the display option is very flexible and permits the user to review any combination of plant types over any user specified combination of regions. This option brings together the MEFS solution files for the three target years of 1985, 1990 and 1995. The activity levels, i.e., megawattage, of plants coming on line over this time period is displayed for the user selected plant type/region combinations.

In the example in Figure 3-14, the activity levels for plant types 1Y, N0, NY, and NZ are displayed for DOE regions U4, U7, and U8.

Should the user wish a display of all plant types and/or all regions, s/he would simply enter "ALL" in response to the prompts to enter regions or modes.

FIGURE 3-11. REVISE CAPITAL COEFFICIENTS

PIES CODE	ESCALATION RATES				INT. DUR. CONST.	
	(-84/YR) E1	(85-89/YR) E2	(90-94/YR) E3	(84/TOTAL) E4	RATE/YR IDC # 1	% TOTAL IDC # 2
GK	0.0	-.120	-.110	0.0	0.0	0.0
GG	0.0	-.050	-.020	0.0	0.0	0.0
GP	0.0	-.020	-.020	0.0	0.0	0.0
GN	0.0	-.180	-.020	0.0	0.0	0.0
G1	0.0	0.0	0.0	0.0	0.0	0.0
G2	0.0	0.0	0.0	0.0	0.0	0.0
G3	0.0	0.0	0.0	0.0	0.0	0.0
LE	0.0	0.0	0.0	0.0	0.0	0.0
LC	0.0	0.0	0.0	0.0	0.0	0.0
TD	0.0	0.0	0.0	0.0	0.0	0.0
L9	0.0	0.0	0.0	0.0	0.0	0.0
LA	0.0	0.0	0.0	0.0	0.0	0.0
LG	0.0	0.0	0.0	0.0	0.0	0.0
LV	0.0	0.0	0.0	0.0	0.0	0.0
TV	0.0	0.0	0.0	0.0	0.0	0.0
TF	0.0	0.0	0.0	0.0	0.0	0.0
TN	0.0	0.0	0.0	0.0	0.0	0.0
TM	0.0	0.0	0.0	0.0	0.0	0.0

REVISE, DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

TD

FIELD NO.	DATA ELEMENT	CONTENTS
1	COEFFICIENT BASE YEAR	75
2	PLANT TYPE DESIGNATOR	TD
3	1985 CAP. COEFF. FOR U1	0
4	1985 CAP. COEFF. FOR U2	0
5	1985 CAP. COEFF. FOR U3	0
6	1985 CAP. COEFF. FOR U4	0
7	1985 CAP. COEFF. FOR U5	0
8	1985 CAP. COEFF. FOR U6	0
9	1985 CAP. COEFF. FOR U7	0
10	1985 CAP. COEFF. FOR U8	0
11	1985 CAP. COEFF. FOR U9	0
12	1985 CAP. COEFF. FOR UA	0
13	REAL ESC. RATE TO 1985	0.0
14	REAL ESC. RATE TO 1985-1990	0.0
15	REAL ESC. RATE TO 1990-1995	0.0
16	IDC RATE	0.0
17	COMPOSITE ESCALATION RATE	0.0
18	IDC # 2 RATE	.0

ENTER FIELD NO. TO REVISE (1-18, 0 TO END)

?

3

NEW VALUE

?

1000

ENTER FIELD NO. TO REVISE (1-18, 0 TO END)

?

0

FIGURE 3-11 (CONT.)

REVISE, DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

XX

NO RECORD FOR PLANT TYPE: XX

DO YOU WANT TO ADD XX TO THE FILE (Y/N) ?

Y

ENTER COEFFICIENT BASE YEAR

?

75

ENTER 1985 CAP. COEFF. FOR U1

?

100

ENTER 1985 CAP. COEFF. FOR U2

?

200

ENTER 1985 CAP. COEFF. FOR U3

?

300

ENTER 1985 CAP. COEFF. FOR U4

?

400

ENTER 1985 CAP. COEFF. FOR U5

?

500

ENTER 1985 CAP. COEFF. FOR U6

?

600

ENTER 1985 CAP. COEFF. FOR U7

?

700

ENTER 1985 CAP. COEFF. FOR U8

?

800

ENTER 1985 CAP. COEFF. FOR U9

?

900

ENTER 1985 CAP. COEFF. FOR UA

?

1000

ENTER REAL ESC. RATE TO 1985

?

0

ENTER REAL ESC. RATE TO 1985-1990

?

.05

ENTER REAL ESC. RATE TO 1990-1995

?

.075

ENTER IDC # 1 RATE

?

.25

ENTER COMPOSITE ESCALATION TO 1985

?

.10

ENTER IDC # 2 RATE

?

0

REVISE, DISPLAY OR END (R/D/E) ?

FIGURE 3-12. DISPLAY CAPITAL EXPENDITURE PROFILES OPTION

◆◆◆ CREMOD ◆◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

5

◆◆◆ REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES ◆◆◆

REVISE, DISPLAY OR END (R/D/E) ?

D

PLANT TYPE	LEAD TIME	PROFILE									
-----	-----	-----									
1Y	6	0.045	.188	.403	.255	.088	.021				
2Y	6	0.106	.224	.378	.209	.071	.012				
3Y	6	0.106	.224	.378	.209	.071	.012				
4Y	6	0.106	.224	.378	.209	.071	.012				
5Y	2	0.250	.750								
6Y	2	0.250	.750								
AY	6	0.091	.152	.169	.107	.255	.226				
7Y	6	0.091	.152	.169	.107	.255	.226				
8Y	6	0.045	.188	.403	.255	.088	.021				
JY	6	0.045	.188	.403	.255	.088	.021				
QY	6	0.045	.188	.403	.255	.088	.021				
XY	6	0.045	.188	.403	.255	.088	.021				
PY	6	0.106	.224	.378	.209	.071	.012				
EY	6	0.106	.224	.378	.209	.071	.012				
MY	6	0.045	.188	.403	.255	.088	.021				
OY	6	0.045	.188	.403	.255	.088	.021				
VY	6	0.106	.224	.378	.209	.071	.012				
ZY	6	0.106	.224	.378	.209	.071	.012				
TY	6	0.045	.188	.403	.255	.088	.021				
YY	6	0.045	.188	.403	.255	.088	.021				
9Y	6	0.030	.090	.300	.400	.180	.0				
KY	6	0.030	.090	.300	.400	.180	.0				
NY	10	0.013	.011	.016	.034	.129	.284	.261	.162	.058	.033
1Z	6	0.045	.188	.403	.255	.088	.021				

FIGURE 3-12 (CONT.)

PLANT TYPE		LEAD TIME	PROFILE						
-----		-----	-----						
2Z	6	0.106	.224	.378	.209	.071	.012		
3Z	6	0.106	.224	.378	.209	.071	.012		
4Z	6	0.106	.224	.378	.209	.071	.012		
5Z	2	0.250	.750						
6Z	2	0.250	.750						
AZ	6	0.091	.152	.169	.107	.255	.226		
7Z	6	0.091	.152	.169	.107	.255	.226		
8Z	6	0.045	.188	.403	.255	.088	.021		
JZ	6	0.045	.188	.403	.255	.088	.021		
QZ	6	0.045	.188	.403	.255	.088	.021		
XZ	6	0.045	.188	.403	.255	.088	.021		
PZ	6	0.106	.224	.378	.209	.071	.012		
EZ	6	0.106	.224	.378	.209	.071	.012		
MZ	6	0.045	.188	.403	.255	.088	.021		
OZ	6	0.045	.188	.403	.255	.088	.021		
VZ	6	0.106	.224	.378	.209	.071	.012		
ZZ	6	0.106	.224	.378	.209	.071	.012		
TZ	6	0.045	.188	.403	.255	.088	.021		
YZ	6	0.045	.188	.403	.255	.088	.021		
9Z	6	0.030	.090	.300	.400	.180	.0		
KZ	6	0.030	.090	.300	.400	.180	.0		
NZ	10	0.013	.011	.016	.034	.129	.284	.261	.162 .058 .033
10	6	0.045	.188	.403	.255	.088	.021		
20	6	0.106	.224	.378	.209	.071	.012		
30	6	0.106	.224	.378	.209	.071	.012		

PLANT TYPE		LEAD TIME	PROFILE						
-----		-----	-----						
40	6	0.106	.224	.378	.209	.071	.0		
50	2	0.250	.750						
60	2	0.250	.750						
A0	6	0.091	.152	.169	.107	.255	.226		
70	6	0.091	.152	.169	.107	.255	.226		
80	6	0.045	.188	.403	.255	.088	.021		
J0	6	0.045	.188	.403	.255	.088	.021		
Q0	6	0.045	.188	.403	.255	.088	.021		
X0	6	0.045	.188	.403	.255	.088	.021		
P0	6	0.106	.224	.378	.209	.071	.012		
E0	6	0.106	.224	.378	.209	.071	.012		
M0	6	0.045	.188	.403	.255	.088	.021		
O0	6	0.045	.188	.403	.255	.088	.021		
V0	6	0.106	.224	.378	.209	.071	.012		
Z0	6	0.106	.224	.378	.209	.071	.012		
T0	6	0.045	.188	.403	.255	.088	.021		
Y0	6	0.045	.188	.403	.255	.088	.021		
90	6	0.030	.090	.300	.400	.180	.0		
K0	6	0.030	.090	.300	.400	.180	.0		
N0	10	0.013	.011	.016	.034	.129	.284	.261	.162 .058 .033
CF	3	0.333	.333	.334					
CG	3	0.333	.333	.334					
CH	3	0.333	.333	.334					
CI	3	0.333	.333	.334					
CJ	3	0.333	.333	.334					

FIGURE 3-12 (CONT.)

PLANT TYPE LEAD TIME			PROFILE		
-----	-----	-----	-----	-----	-----
CK	3	0.333 .333 .334			
CL	3	0.333 .333 .334			
CM	3	0.333 .333 .334			
DN	3	0.333 .333 .334			
CD	3	0.333 .333 .334			
CP	3	0.333 .333 .334			
CQ	3	0.333 .333 .334			
DF	1	1.000			
DG	1	1.000			
DH	1	1.000			
DI	1	1.000			
DJ	1	1.000			
CV	1	1.000			
CW	1	1.000			
CX	1	1.000			
CY	1	1.000			
CZ	1	1.000			
CR	1	1.000			
CS	1	1.000			
CT	1	1.000			
CU	1	1.000			
DK	1	1.000			
DL	1	1.000			
DM	1	1.000			
GE	2	0.250 .750			

PLANT TYPE LEAD TIME			PROFILE		
-----	-----	-----	-----	-----	-----
GK	3	0.250 .750 .0			
GG	3	0.250 .750 .0			
GP	4	0.100 .500 .400 .0			
GN	6	0.030 .090 .300 .400 .180 .0			
G1	6	0.030 .090 .300 .400 .180 .0			
G2	6	0.030 .090 .300 .400 .180 .0			
G3	6	0.030 .090 .300 .400 .180 .0			
LE	5	0.120 .200 .400 .280 .0			
LC	5	0.120 .200 .400 .280 .0			
MH	6	0.106 .224 .378 .209 .071 .012			
TV	1	1.000			
TF	1	1.000			
TN	1	1.000			
TM	1	1.000			

FIGURE 3-13. REVISE CAPITAL EXPENDITURE PROFILES OPTION

REVISE,DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

TD

NO RECORD FOR PLANT TYPE: TD

DO YOU WANT TO ADD TD TO THE FILE (Y/N) ?

Y

ENTER NEW CONSTRUCTION LEAD TIME

?

5

ENTER NEW PROFILE AND RETURN

?

.20,.20,.30,.25,.05

REVISE,DISPLAY OR END (R/D/E) ?

R

ENTER PLANT TYPE (I.E. MODE)

TD

◀ Example of record addition

PLANT TYPE: TD

CONSTRUCTION LEAD TIME: 5 YEARS

YEAR

PROFILE ELEMENT

1

.200

2

.200

3

.300

4

.250

5

.050

ENTER NEW CONSTRUCTION LEAD TIME

?

3

ENTER NEW PROFILE AND RETURN

?

.50,.50,.50

PACE SUMS TO 1.500 MUST SUM TO 1.0

◀ Profiles are required by the program to sum to 1.0

ENTER NEW PROFILE AND RETURN

?

.50,.50

?

0

REVISE,DISPLAY OR END (R/D/E) ?

E

FIGURE 3-14. DISPLAY INTERIM MEFS SOLUTION FILES

◆◆◆ CREMOD ◆◆◆

CREMOD FUNCTIONS

- (1) COMPUTE CAPITAL REQUIREMENTS
- (2) DISPLAY BUILD LIMITS
- (3) REVISE/DISPLAY PLANT TYPE MASTER FILE
- (4) REVISE/DISPLAY CAPITAL COEFFICIENTS
- (5) REVISE/DISPLAY CAPITAL EXPENDITURE PROFILES
- (6) DISPLAY INTERIM PIES SOLUTION FILES
- (7) STOP

ENTER FUNCTION DESIRED (0 TO LIST):

6

◆◆◆ SOLUTION FILE MODULE ◆◆◆

ENTER REGIONS

U4,U7,U8

ENTER MODES

1Y,N0,NY,NZ

REGION: U4

PLANT TYPE NAME	MODE	ACTIVITY LEVEL (MWE)		
		1985	1990	1995
OIL FIRED STEAM	1Y	1713.00	1713.00	1713.00
NUCLEAR	N0	0.0	1280.00	15724.99
NUCLEAR	NY	15575.84	19667.91	19667.91
NUCLEAR	NZ	0.0	10220.00	12400.00
TOTAL FOR REGION	TOTAL	17288.8	32880.9	49505.9

REGION: U7

PLANT TYPE NAME	MODE	ACTIVITY LEVEL (MWE)		
		1985	1990	1995
OIL FIRED STEAM	1Y	0.0	0.0	0.0
NUCLEAR	N0	0.0	0.0	1738.00
NUCLEAR	NY	2300.00	2300.00	2300.00
NUCLEAR	NZ	0.0	0.0	1150.00
TOTAL FOR REGION	TOTAL	2300.0	2300.0	5188.0

REGION: U8

PLANT TYPE NAME	MODE	ACTIVITY LEVEL (MWE)		
		1985	1990	1995
OIL FIRED STEAM	1Y	37.00	37.00	37.00
NUCLEAR	N0	0.0	0.0	0.0
NUCLEAR	NY	330.00	330.00	330.00
NUCLEAR	NZ	0.0	0.0	0.0
TOTAL FOR REGION	TOTAL	367.0	367.0	367.0
GRAND TOTAL	TOTAL	19955.8	35547.9	55060.9

◆◆◆ CREMOD ◆◆◆

STOP OPTION

Option seven, the stop option, performs no computational function for CREMOD. This option terminates the current run session of CREMOD and returns the user to the TSO operating system.