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Estimating Pressurized Water Reactor Decommissioning Costs

A User's Manual for the PWR Cost Estimating Computer Program (CECP) Software

Draft Report for Comment

Prepared by
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Operated by
Battelle Memorial Institute

Prepared for
U.S. Nuclear Regulatory Commission

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ABSTRACT

With the issuance of the Decommissioning Rule (July 27, 1988), nuclear power plant licensees are required to submit to the U.S. Regulatory Commission (NRC) for review, decommissioning plans and cost estimates. This user's manual and the accompanying Cost Estimating Computer Program (CECP) software provide a cost-calculating methodology to the NRC staff that will assist them in assessing the adequacy of the licensee submittals. The CECP, designed to be used on a personal computer, provides estimates for the cost of decommissioning PWR power stations to the point of license termination. Such cost estimates include component, piping, and equipment removal costs; packaging costs; decontamination costs; transportation costs; burial costs; and manpower costs. In addition to costs, the CECP also calculates burial volumes, person-hours, crew-hours, and exposure person-hours associated with decommissioning.

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FOREWORD

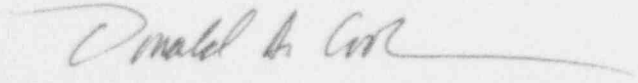
This user's manual and computer software has been developed to assist the U.S. Nuclear Regulatory Commission (NRC) in evaluating certain licensee submittals of their estimated cost to decommission a pressurized water reactor (PWR) power plant. The report was prepared by Battelle Pacific Northwest Laboratory (PNL) for the NRC.

This document supports the effort underway to reevaluate the cost of decommissioning a reference PWR in NUREG/CR-5884 Revised Analyses of Decommissioning for the Reference Pressurized Water Reactor Power Station. This user's manual is a companion to the above referenced document and provides the methodology that was used to prepare the results in NUREG/CR-5884. The NRC staff is considering use of this information to support its evaluation of licensee decommissioning plan submittals and its determination of the acceptability of licensees' decommissioning cost estimates.

Licensees are not required to use this computer program to plan their decommissioning activities and estimate their projected decommissioning costs. However, the program may be useful to licensees to obtain information on NRC's basis for decommissioning cost estimates; likewise, others may find this software and user's manual useful to validate their independent studies.

NUREG/CR-6054 is not a substitute for NRC regulations, and compliance is not required. The approaches and/or methods described in this NUREG/CR are provided for information only. Publication of this report does not necessarily constitute NRC approval or agreement with the information contained herein.

Any interested party may submit comments on this report for consideration by the staff. To be certain of consideration, comments on this report must be received by the due date published in the Federal Register Notices. Comments received after the due date will be considered to the extent practical. Comments should be sent to the Chief, Rules Review and Directives Branch, Division of Freedom of Information and Publications Services, Mail Stop-223, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Further technical information can be obtained from Mr. George J. Mencinsky, Office of Nuclear Regulatory Research, Mail Stop NL/S-139, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Telephone (301) 492-3735.



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Office of Nuclear Regulatory Research

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The author gratefully acknowledges the assistance provided by individuals at the Pacific Northwest Laboratory[a] during the course of this study and preparation of the draft report. Richard I. Smith and George J. Konzek provided most of the algorithms used in the CECP and validated many calculations. Patrick N. McDuffie provided a technical review of the CECP program. George J. Mencinsky of the Nuclear Regulatory Commission provided constructive criticism and guidance throughout the study. The editorial review prior to publication was contributed by Sheila Q. Bennett.

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1.0 INTRODUCTION, REQUIREMENTS, AND PROGRAM INSTALLATION

The Cost Estimating Computer Program (CECP), designed for use on an IBM personal computer or equivalent, was developed for estimating the cost of decommissioning light-water reactor power stations to the point of license termination. Such costs estimates include component, piping, and equipment removal costs; packaging costs; decontamination costs; transportation costs; burial volumes and costs; and manpower staffing costs. Using equipment and consumables costs and inventory data supplied by the user, the CECP calculates unit cost factors and then combines these factors with transportation and burial cost algorithms to produce a complete report of decommissioning costs. In addition to costs, the CECP also calculates person-hours, crew-hours, and exposure person-hours associated with decommissioning.

The CECP uses a data base, but it is not a commercial data base product. For this reason, data may be entered and information extracted only through the CECP program itself. The detailed and summary output files (Section 2.2) produced by the CECP are in ASCII format and may be accessed and printed using any IBM PC-compatible word processing program.

This document covers only the pressurized water reactor (PWR) version of the CECP software. The boiling water reactor (BWR) version, when available, will be covered by a separate document.

1.1 REQUIREMENTS

The CECP runs on the IBM PC family of computers and compatibles (8088, 286, 386SX, 386DX, 486SX, 486DX). Basic requirements are

- DOS 3.3 or higher
- A color monitor capable of showing 80 columns of text. (An EGA or VGA is highly recommended.) The CECP will not work with a monochrome monitor.
- 640K of standard memory. Expanded or extended memory is not required.

* A hard disk.

The CECP does not use a mouse or a math co-processor.

1.2 INSTALLATION

The CECP software can be installed onto your hard disk automatically (Section 1.2.1) or manually (Section 1.2.2). Automatic installation is recommended. You should install the software manually only if you encounter problems with the automatic installation. Before proceeding to Section 1.2.1, you need to read the remainder of this section to become familiar with the software and installation process.

The CECP software is available either on three 360K 5-1/4 diskettes or on a single 1.44M 3.5-inch diskette. Table 1.1 shows how the files are arranged on the three-diskette version. The 1.44M version contains the same files loaded onto a single diskette. Before discussing the installation process, a brief discussion of these files is in order.

TABLE 1.1. Contents of the CECP 360K Diskettes

DISK 1:	DISK 2:	DISK 3:
INSTALL.EXE	ID2	ID3
CECP.EXE	MPE.EXE	DEFAULT.PD1
MP1.EXE	MPF.EXE	DEFAULT.PD2
MP2.EXE	MPH.EXE	DEFAULT.PD3
MP3.EXE	MPI.EXE	DEFAULT.PDA
MPA.EXE		DEFAULT.PDB
MPB.EXE		DEFAULT.PDC
MPC.EXE		DEFAULT.PDD
MPD.EXE		DEFAULT.PDE
MPG.EXE		DEFAULT.PDF
		DEFAULT.PDG
		DEFAULT.PDH
		SITES.DAT
		HANF.DAT
		BARN.DAT
		GENERIC.DAT
		HANFBURY.EXE
		BARNBURY.EXE
		GENBURY.EXE

The **INSTALL.EXE** file (also referred to as **INSTALL**) is the CECP installation program to be discussed shortly. The **ID2** and **ID3** files (present on the three-disk version only) are not CECP files; they are used by the three-disk version of **INSTALL** to identify each disk. Files **CECP.EXE**, **MP1.EXE**, **MP2.EXE**, **MP3.EXE**, and **MPA.EXE** through **MPI.EXE** make up the CECP program itself. Files **DEFAULT.PD1**, **DEFAULT.PD2**, **DEFAULT.PD3**, **DEFAULT.PDA** through **DEFAULT.PDH**, **SITES.DAT**, **HANF.DAT**, **BARN.DAT**, and **GENERIC.DAT** are default data files. Once installed on your hard disk, these fifteen default files must not be deleted. The CECP will not run without them. The remaining files (**HANFBURY.EXE**, **BARNBURY.EXE**, and **GENBURY.EXE**, are utility programs for setting up burial cost schedules (Section 5).

To load the CECP software onto your hard disk, you run the **INSTALL** program (Section 1.2.1). In brief, **INSTALL** will do the following: It will put the CECP program files and the utility files into a subdirectory of your hard disk. It will then put the default files into another subdirectory. Next it will ask you to supply the name of the word processing program you want to use as a file editor. Finally, it will create a small file, **PATHNAME.LOC**, in the same subdirectory as your program files. Do not delete this file; it tells the CECP where the default data files reside.

As mentioned above, **INSTALL** will ask you to supply the full path name of the DOS word processing program you want to use as your file editor. The intent of the editor is to allow you to quickly view CECP output files while remaining within the CECP environment. It will not be necessary to perform any actual editing of these files. For this reason, it is recommended that you use the smallest, simplest ASCII editor you can find. **EDIT.COM**, the editor that comes with DOS 5.0, is a good choice; it loads fast and allows easy viewing of large files with no annoying "line wrap." Large, sophisticated word processing programs such as Wordperfect™ are not recommended for two reasons: First, because these programs use their own special internal formatting techniques, it may take an irritatingly long time to load and format a CECP file. Second, the line widths of many CECP files exceed 80 characters and will wrap around on the screen, making the file difficult to read. (You may of course, set the font style, page size, and

margins to correct the problem, but this takes time and defeats the purpose of examining the files quickly.)

Before installing the CECP software, it is strongly recommended that you make backup copies of the CECP diskettes with the DOS utility, Diskcopy. Once you have made backup copies, you are ready to load the CECP program and default files onto your hard disk by running **INSTALL** as described in Section 1.2.1. **INSTALL**'s operation is self-explanatory; just respond to the questions asked.

1.2.1 Automatic Installation

To install the CECP software automatically, proceed as follows:

1. Make sure you are in DOS, with the command prompt (usually **C:\>** or **D:\>**) visible.
2. If you are going to use the three-disk version, insert Disk 1 in drive A.(a) If you are going to use the single-disk version, then just insert that single disk into drive A.
3. Type a: and then press <ENTER>.
4. Type **install** and then press <ENTER>.
5. **INSTALL** is now running. Follow the instructions on the screen. For the three-disk version, the instructions will tell you when to insert Disk 2 and Disk 3.
6. After you exit the installation program, type **cecp**<ENTER> to run the CECP program.

1.2.2 Manual Installation

If you experience difficulties with **INSTALL**, you can load the CECP onto your hard disk manually. Follow these steps:

1. Create a subdirectory on your hard disk to hold the CECP program files. Assume, for purposes of illustration, that you choose **C:\CECPPROG**.
2. Copy all the program files (these files have an **EXE** extension) from DISK 1, DISK 2, and DISK 3 into **C:\CECPPROG**. Do not copy **INSTALL.EXE**. (For the 1.44M version, just copy all files with the **EXE** extension, except **INSTALL.EXE**, into **C:\CECPPROG**.)

(a) Drive A is used for illustration. You may, of course, use any legitimate floppy drive.

3. Create a second subdirectory on your hard disk to hold the CECP default data files. Assume that you choose **C:\CECPDATA**.

4. Copy all remaining files (except **ID2**, **ID3**, and **INSTALL.EXE**, of course) into **C:\CECPDATA**.

5. Make sure you are at the **C:\CECPPROG** prompt, and then type the following:

```
copy con pathname.loc<ENTER>
C:\CECPDATA<ENTER>
C:\DOS\EDIT.COM<Ctrl-Z><ENTER>
```

   You have just created a file, **PATHNAME.LOC**, located in **C:\CECPPROG**, which contains the path to the location of the CECP default files. The third line in the example above is the complete name, including path, of the editor or word processor you want to use as a file viewer. If you do not want to use an editor, omit the third line. You would then type this instead:

```
copy con pathname.loc<ENTER>
C:\CECPDATA<Ctrl-Z><ENTER>
```

6. To run the CECP, type **CECP**<ENTER> at the **C:\CECPPROG** prompt.

1.3 ERROR MESSAGES

If some or all of the default files fail to get transferred to the proper subdirectory during the installation procedure, you will get an error message similar to the one shown in Figure 1.1 when you start the CECP. To correct the problem, copy the missing files into the indicated subdirectory. If all fifteen files are missing, it is probable that your **PATHNAME.LOC** file contains the wrong subdirectory, as discussed in the next paragraph.

A second kind of error occurs if the CECP cannot find your **PATHNAME.LOC** file. This is illustrated in Figure 1.2. To correct this error, type in the subdirectory containing the default files and press <Enter>. For the example shown in Figure 1.2, the subdirectory **c:\cecpdata** has been typed in. Once this is done, the **PATHNAME.LOC** file will be created containing the subdirectory you typed in, and the CECP Main Menu should appear. If **PATHNAME.LOC** contains the wrong subdirectory, you will get the fatal error message of Figure 1.1, with all fifteen default files listed. If this happens, delete **PATHNAME.LOC** and perform Step 5 of Section 1.2.2.

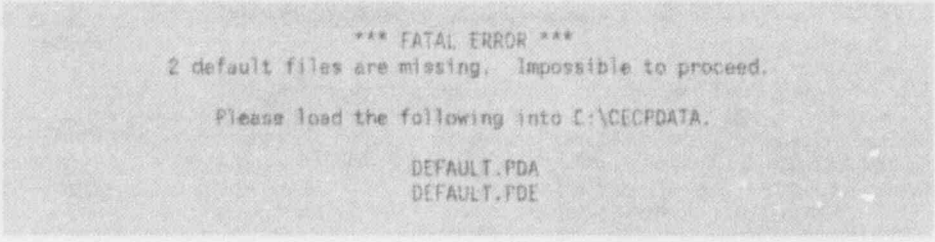

FIGURE 1.1. A Fatal Error Message

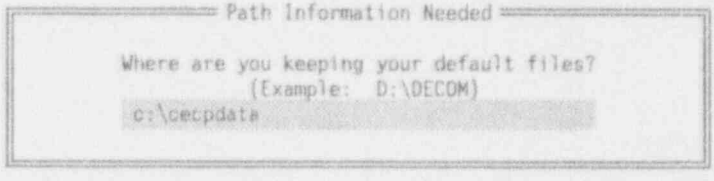

FIGURE 1.2. An Example of a Missing PATHNAME.LOC File

The last error associated with CECP installation is more subtle. Suppose the Main Menu appears, but nothing happens when you press 2, say, to call up Menu Item 2. This means the program file that runs Menu Item 2, **MP2.EXE**, is missing. To correct this type of error, exit from the CECP by pressing <Alt-X>. Then check to make sure that all the program files on the disks have been loaded into the program subdirectory on your hard disk. The easiest way to ensure that this has been done is to perform Step 2 of Section 1.2.2.

2.0 COST ESTIMATING COMPUTER PROGRAM (CECP) OVERVIEW

The CECP Main Menu is shown in Figure 2.1. Your first task is to enter certain general data that the CECP will need later in calculating site-specific costs. This is done by selecting 1, 2, and 3 from the Main Menu. For example, when you type 1, a file menu appears (Section 2.1), from which you select the data file **DEFAULT.PD1**. (File nomenclature will be discussed later.) A data entry screen then appears, permitting you to enter labor costs, burial costs, overhead costs, consumables costs, physical constants (e.g., the density of reinforced concrete), etc. You may then modify whatever values you like and save this new information to a file. In fact, you may save data to several files during the same session. The next time you access Item 1, you will have several files to choose from: the default file, **DEFAULT.PD1** (which is always available), and the files you created. Any of these files may be loaded into memory and used as a basis for creating a new file. Data for items 2 and 3 are entered in the same way. If you do not supply your own files for 1, 2, and 3, the CECP will use the default files.

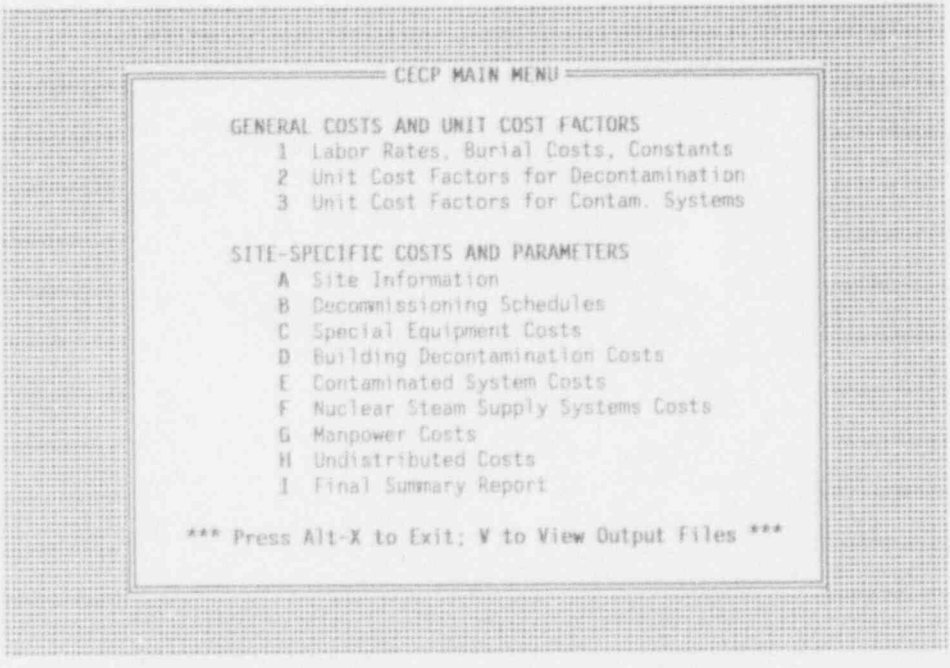

FIGURE 2.1. CECP Main Menu

Having entered general information into the data base, you now enter site-specific data. Data for menu Items **A**, **B** and **C** are entered first, in any order, then data for Items **D** through **H**, in any order. When you select Items **D**, **E**, **F**, **G**, or **H**, the CECP requests you to specify which input files (from 1 through 3 and **A** and **B**) to use. For each of the Items **D** through **H**, the CECP calculates cost and exposure information in detail and then writes the results to appropriate output files. To get a complete site summary that combines data from Items **A** through **H**, select Item **I**.

The overall method for entering data is outlined in Figure 2.2.

2.1 FILE MENUS

When you select a menu item (**1-3** or **A-H**) from the Main Menu, the first thing you will see is a file menu, an example of which is shown in Figure 2.3. Each menu item contains its own file menu. It is from these menus that the CECP will prompt you for the files it needs to perform the task at hand. The number and types of files needed depend on the menu item selected. For Menu

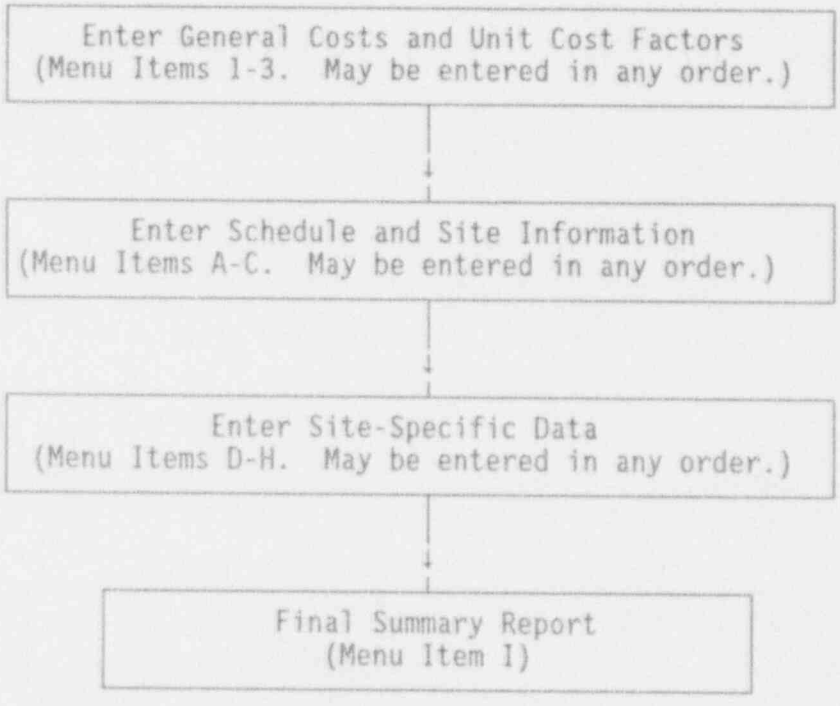

FIGURE 2.2. Flow Diagram for Entering Data into the CECP

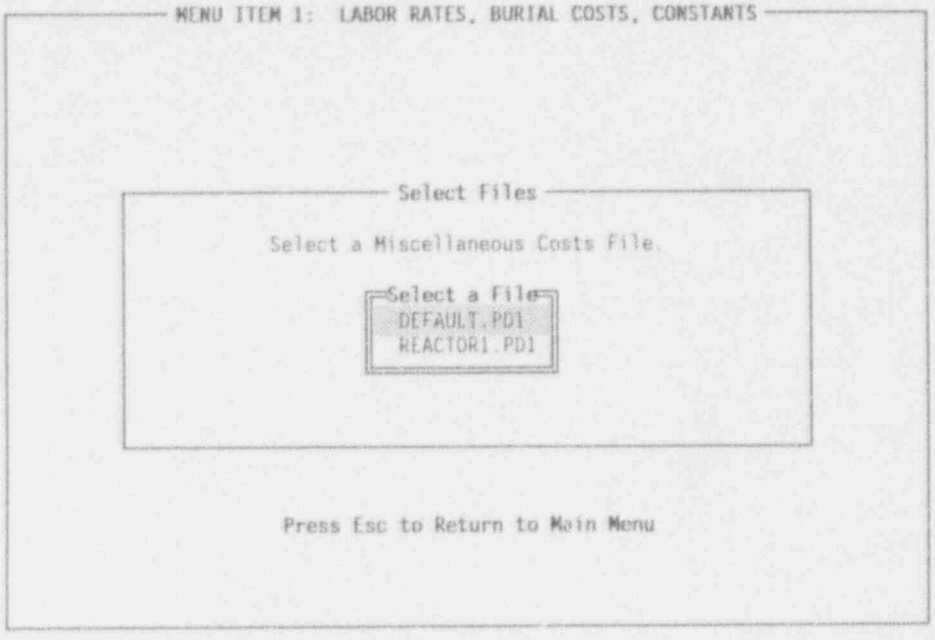

FIGURE 2.3. A File Menu

Item A only one file is needed, but for Menu Item D, five different types of files are needed. Files are selected by moving the selector bar (shown positioned over **DEFAULT.PD1** in Figure 2.3) up and down with the arrow keys (↑ and ↓) and then pressing <Enter>. If you change your mind and decide not to proceed, you may return to the Main Menu by pressing <Esc>. Once all the files have been selected, the file menu screen will be replaced by that menu item's data entry screen.

2.2 CECP FILES

The types of files used by the CECP can be determined by examining their file extensions. For a project called REACTOR1, say, the CECP will produce **REACTOR1.PDA**, **REACTOR1.PRD**, and **REACTOR1.PSH**, among others. The first letter of the file extension refers to reactor type: **P** for PWR reactors and **B** for BWR reactors. Since the PWR version of the CECP only deals with PWR reactors, this letter will always be **P**. When the BWR CECP is developed, it will use **B**.

The second letter in the file extension will either be a **D** (data files), an **R** (result files), or an **S** (summary files). Data files are created by the

user for the CECP to use in lieu of the default files in its calculations. Result files are the results of the CECP's calculations and make up the decommissioning cost estimates for a reactor. The summary files are for the CECP's own use in constructing result files. The three file categories are discussed in more detail in the next few paragraphs.

To help the user in preparing data files, eleven default data files (**DEFAULT.PD1**, **DEFAULT.PD2**, **DEFAULT.PD3**, **DEFAULT.PDA**, **DEFAULT.PDB**, ..., **DEFAULT.PDH**) are included in the software package. The idea is to use these default files as building blocks for constructing data files for each site-specific application. Some files, such as the **DEFAULT.PD1**, **DEFAULT.PD2**, and **DEFAULT.PD3** may require little or no modification. The others will require significant changes to tailor them to the specific reactor sites.

The CECP creates five result files:

REACTOR1.PRD, a detailed description of building decontamination costs

REACTOR1.PRE, a detailed compilation of contaminated system costs

REACTOR1.PRF, a detailed breakdown of RPV and RPV internals costs

REACTOR1.PRG, a detailed account of manpower costs

REACTOR1.PRI, a general summary of all decommissioning costs.

These files make up the complete decommissioning cost estimates for a reactor case study, which, in this example is for "REACTOR1." All result files are in ASCII format and may be examined and printed out using any word processor the user desires. Examples of result files appear in Section 7.0.

The last category of files, the summary files (**PSC**, **PSD**, etc.), enable the CECP to construct **PRI** files. All summary files are in binary format and cannot be examined by the user.

The last letter in the file extension indicates from what menu item the file was produced. Thus a **PRD** file is the report file produced from Menu Item D (Building Decontamination Costs), whereas a **PSC** file is the summary file produced from Menu Item C (Special Equipment Costs). Each menu item produces

at most one data file, one summary file, and one result file. Some menu items produce only one file. For example, Menu Item 1 produces only a data file (PD1).

2.3 UNIT COST FACTORS, WORK DIFFICULTY FACTORS, AND RADIATION DOSE RATES

The algorithms used by the CECP for calculating unit cost factors and work difficulty factors are not discussed in this manual. Such information can be found in Appendix C of NUREG/CR-5884, Revised Analyses of Decommissioning for the Reference Pressurized Water Reactor Power Station.

For simplicity, radiation dose rates are based solely on cobalt-60. It is assumed that this nuclide is by far the most significant source of occupational radiation exposure. When the user enters dose rates for the various decommissioning activities, it will be understood (unless specified otherwise) that these are the dose rates at the time of reactor shutdown. The CECP will use the decommissioning schedules and shutdown dose rates as a baseline for determining the actual dose rates prevailing at the times the activities are performed.

3.0 SETTING UP GENERAL COST FILES AND UNIT COST FACTOR FILES

For the CECP to calculate decommissioning costs, it must have available to it certain data files. These files, containing data of a general nature, are created from CECP Menu Items 1, 2, and 3 (Figure 2.1). From Menu Item 1 (Labor Rates, Burial Costs, Constants), data files with a PD1 suffix, for example, **REACTOR1.PD1**, are created. (These files will be referred to collectively as **PD1** files.) From Item 2 (Unit Cost Factors for Decontamination), you can create **PD2** files, and from Item 3 (Unit Cost Factors for Contaminated Systems), you can create **PD3** files.

3.1 MENU ITEM 1: LABOR RATES, BURIAL COSTS, CONSTANTS

This portion of the CECP is used to set up data files containing information of a more general nature. Such files are saved with an PD1 suffix, for example, **REACTOR1.PD1**. For the remainder of this discussion, such files will be referred to as **PD1** files. Data saved in these files are not necessarily reactor-dependent. Labor costs, consumables costs, and overhead rates may be identical (or nearly so) for all reactors within a particular geographical region. Thus you may find that a single **PD1** file may be adequate to handle a dozen or more reactors. Of course, nothing prevents you from maintaining a separate file for each reactor. As many as 150 **PD1** files can be maintained in the CECP data subdirectory at one time.

Figure 3.1 shows the input screen for Menu Item 1. It is from this screen that you create your **PD1** files. The selector bar is shown positioned over the first item, "Laborer hourly rate." There are 48 items in all, 21 of which are visible at any one time.

Before explaining how a **PD1** file is actually created from the input screen, it is necessary to discuss the contents of the file itself. This is done in the next section.

3.1.1 Contents of the DEFAULT.PD1 File

Table 3.1 shows the contents of **DEFAULT.PD1**. An explanation of each of the items in the file follows.

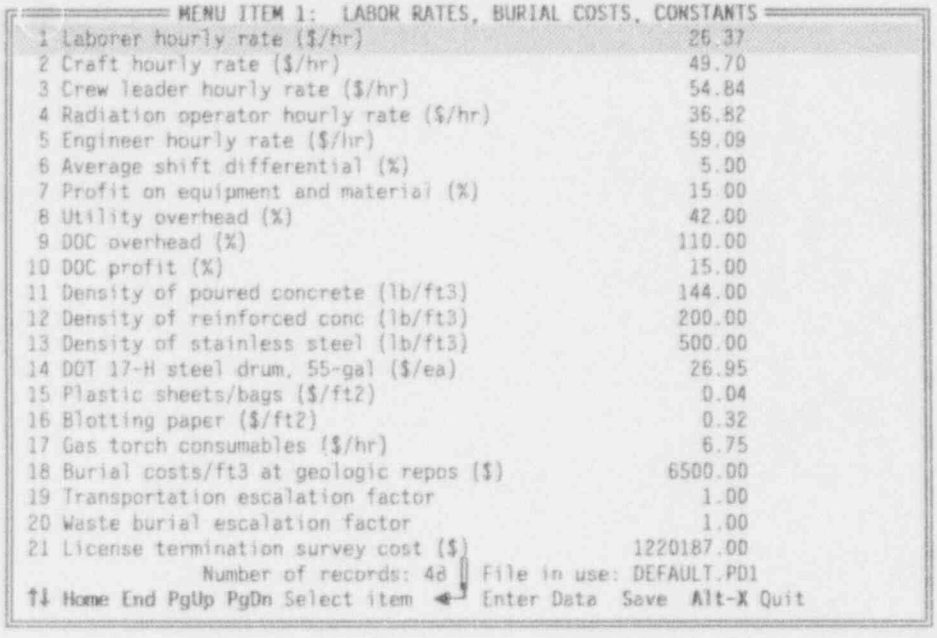

FIGURE 3.1. Data Entry Screen for Menu Item 1

1-6: The personnel hourly labor rates (Items 1-5) include overhead costs. Item 6, average shift differential, is based on the assumption that there are two shifts, with rates for the second shift 10% higher than the first. Thus, the average shift differential for both shifts is 5%. In general, if the shift differential for the second shift is X%, then the average shift differential is (X/2)%.

7-14: Self-explanatory.

15-17: These three basic consumables are used by the CECP in many decommissioning tasks.

18: Nominal cost for burial of one cubic foot of greater than class C (GTCC) material at a geologic repository. This cost is quite speculative, since a geologic repository (or other such disposal facility as the NRC may approve) does not yet exist.

19-20: These factors are unity for 1993 dollars. An escalation factor of 1.05, for example, increases prices by 5%. Item 20 is the low-level waste escalation factor.

21: This is the cost of the survey to determine whether the site may be released for unrestricted use. The survey is also known as termination survey, post remedial-action survey or final survey.

TABLE 3.1. Contents of DEFAULT.PD1

1	Laborer hourly rate ($/hr)	26.37
2	Craft hourly rate ($/hr)	49.70
3	Crew leader hourly rate ($/hr)	54.84
4	Radiation operator hourly rate ($/hr)	36.82
5	Engineer hourly rate ($/hr)	59.09
6	Average shift differential (%)	5.00
7	Profit on equipment and material (%)	15.00
8	Utility overhead (%)	42.00
9	DOC overhead (%)	110.00
10	DOC profit (%)	15.00
11	Density of poured concrete (lb/ft3)	144.00
12	Density of reinforced conc (lb/ft3)	200.00
13	Density of stainless steel (lb/ft3)	500.00
14	DOT 17-H steel drum, 55-gal ($/ea)	26.95
15	Plastic sheets/bags ($/ft2)	0.04
16	Blotting paper ($/ft2)	0.32
17	Gas torch consumables ($/hr)	6.75
18	Burial costs/ft3 at geologic repos ($)	6500.00
19	Transportation escalation factor	1.00
20	Waste burial escalation factor	1.00
21	License termination survey cost ($)	1220187.00
22	Effective standard box width (ft)	4.00
23	Effective standard box depth (ft)	4.00
24	Effective standard box length (ft)	6.00
25	Standard box 4 x 4 x 6 cost ($)	645.00
26	Maritime container 8 x 4 x 20 cost ($)	4965.00
27	Maritime container weight (lb)	4000.00
28	Maritime container volume (ft3)	640.00
29	Cask liner for 8-120B cask ($)	4695.00
30	Special u-shaped container ($)	1565.00
31	Canister for GTCC material ($)	520.00
32	Spec. container, inner-wall shaped ($)	470.00
33	Cask liner for 8-120B cask, oval ($)	4695.00
34	High integrity container (HIC) ($)	7825.00
35	NuPac 14/210H cask rental ($/day)	1250.00
36	CNS 8-120B cask rental ($/day)	1250.00
37	NAC LWT cask rental ($/day)	3130.00
38	TN-8 cask rental ($/day)	3340.00
39	Laundry services ($/person-day)	21.00
40	Uncompacted drums of waste (drums/day)	5.00
41	Dry waste compaction ratio	5.00
42	Small tools (% of direct labor costs)	2.00
43	Piping/equip/HXs (curies/ft2)	0.005600
44	SG vessel & internals (curies/ft2)	0.021000
45	RCS piping (curies/ft2)	0.080000
46	Pressurizer & relief tank (curies/ft2)	0.003700
47	Maint. allow. ($/yr) (SAFSTOR only)	17379.00
48	Length (ft) to which pipes will be cut	15.00

22-25: These items apply to the metal box used to bury waste at the low-level waste disposal site. The values shown here refer to the standard 4 x 4 x 6-ft B-25 container. If you do not want to use these dimensions, you may supply your own in Items 22 through 24. Permissible values for width and depth are from 2 to 8 feet. Permissible values for the length are from 2 to 20 feet. The CECP will not let you enter values outside these ranges. The CECP calculates the box volume as width x depth x length. The weight of the empty box is calculated as 9.375 x (width x depth + width x length + depth x length). For a 4 x 4 x 6-ft box this works out to 600 lb, the assumed weight of the standard B-25 container.

26-28: These items apply to the modified maritime container whose dimensions are 8 x 4 x 20 ft. Item 28 is consistent with these dimensions. Permissible values for Item 28 are from 320 to 1280 cubic feet.

29-33: These items are the costs for the special containers used in the packaging of the reactor pressure vessel (RPV) components that will be disposed of at a geologic repository.

34: The cost of one polyethylene high-integrity container (HIC).

35-38: These are the daily rental charges for the casks used in shipping radioactive waste.

39: Protective clothing, laundry, and equipment services are postulated to be provided by an offsite subcontractor. Units are $/person-shift, where one shift is eight hours.

40-41: These two items, taken together, determine the number of 55-gallon drums of compacted dry active waste that accumulate per day in the course of active decommissioning work. For example, if Item 40 is 6 and Item 41 is 3, then two 55-gallon drums of compacted waste are produced daily. Item 41 must be greater than or equal to 1 but not greater than 25.

42: This item sets the cost for small tools based on a percentage of direct labor costs.

43-46: These items refer to the assumed surface contamination levels (in curies per square foot) for the component types indicated. These levels are at shutdown.

47: This item is the annual equipment allowance used toward the repair of buildings during periods of extended safe storage. It applies only to SAFSTOR cases.

48: This sets the length, in feet, that system piping will be cut to before being put into the modified maritime container. Permissible values for Item 48 range from 2 to 20 ft.

3.1.2 Entering Data

To enter data, you must first put the selector bar over the desired item. The ↑ and ↓ keys move the selector up and down one line at a time. The <PgUp> and <PgDn> keys move the selector up and down the list a full screen (20 lines) at a time; the <Home> and <End> keys move the selector to the top and bottom of the list.

When the selector bar is positioned where you want it, press <Enter>. The portion of the bar over the data field will change color from white-on-blue to yellow-on-red, and a cursor will appear, indicating that you may begin entering data. When typing in the data, you may use the <BackSpace>, <Del>, or the left and right arrow keys (←, →) as needed. The <Ins> key toggles between the insert and typeover mode. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>; the data field will revert to its original blue-on-white color, and the cursor will disappear. If you change your mind while entering data, press <Esc> and the previous value of that field will be restored.

Each **PD1** file contains exactly 48 items. You cannot delete an item or add additional items; you can only change the data values.

3.1.3 Saving Data

You are encouraged to save data as you go along. Pressing <S> will open the **Save Data to a File** window in the middle of the screen, and you will be invited to name and save your data to a file. Press <Esc> or <Enter> at this point, if you decide not to save your data. Otherwise, type in a file name, up to eight letters long, and press <Enter>. You cannot enter a file extension. The CECP will provide the correct extension for you. If, for example, you enter **reactor1**, the CECP will create the file **REACTOR1.PD1**.

It is very important that the default files supplied with the CECP software not be modified. For this reason, the CECP will not permit you to save a file named **DEFAULT**. If you try to do so, you will see an error message superimposed over the **Save Data to a File** window (Figure 3.2). Press any key to clear the error message.

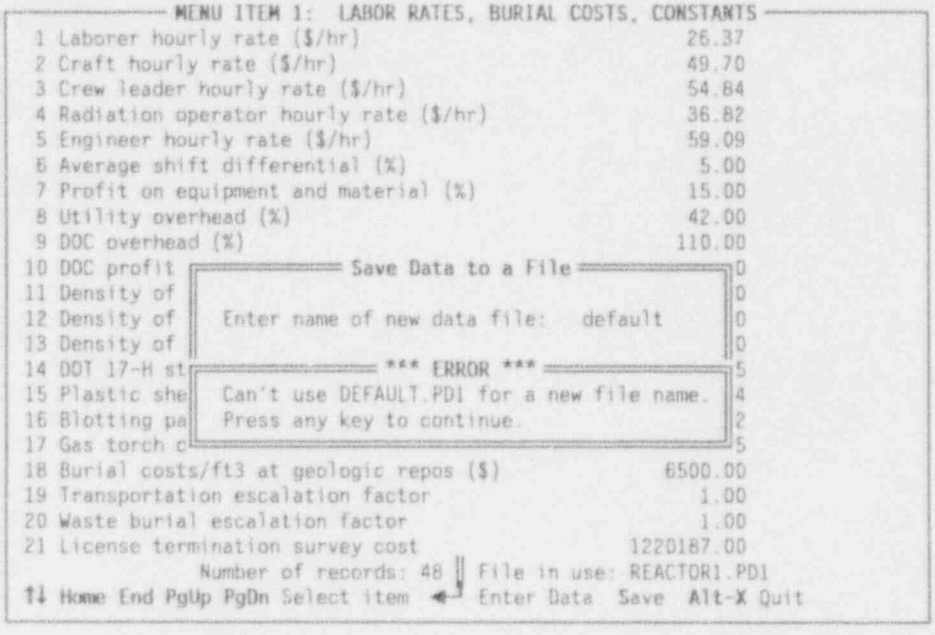

FIGURE 3.2. A File Name Error Message

3.1.4 Exiting

To leave this portion of the CECP, press <Alt-X>. The **Save Data to a File** window will open as described above, and you will be given a final opportunity to save your work, if you have not previously done so. If you elect not to save your work, press <Enter> or <Esc>, and you will be returned to the Main Menu. If you do save your work at this point, you will be returned to the Main Menu as soon as file processing is completed.

You may also exit the data entry screen by using short-cut keys, as explained in Section 6.0.

3.2 MENU ITEM 2: UNIT COST FACTORS FOR DECONTAMINATION

This portion of the CECP allows you to create numerical data files that the CECP uses to calculate unit cost factors for building decontamination. Such files end with a "PD2" suffix, for example, **REACTOR1.PD2**. For the remainder of this discussion, these files will be referred to as **PD2** files. The **PD2** data files include crew sizes, work difficulty adjustments, non-productive time adjustments, material costs, and radiation dose rates.

The data entry screen, from which you create your **PD2** files, is shown in Figure 3.3. The selector bar is shown positioned over Item 17. There are 161 items in all; 21 are visible at any one time.

MENU ITEM 2: UNIT COST FACTORS FOR DECONTAMINATION

1	Surf Wash:	Suit-up time (minutes)	120.000
2	Surf Wash:	Breaks (minutes)	30.000
3	Surf Wash:	ALARA (minutes)	25.000
4	Surf Wash:	Warmup (minutes)	15.000
5	Surf Wash:	Cleanup (minutes)	50.000
6	Surf Wash:	Number of laborers	2.000
7	Surf Wash:	Number of crafts	1.000
8	Surf Wash:	Number of crew Leaders	0.500
9	Surf Wash:	Number of rad monitors	0.500
10	Surf Wash:	Crew dose rate (millirem/hr)	3.000
11	Surf Wash:	Cleansing rate (ft2/min)	8.000
12	Surf Wash:	Vacuum hose replacement ($)	1180.000
13	Surf Wash:	HEPA filter replacement ($)	300.000
14	Surf Wash:	Misc. parts ($)	2000.000
15	Surf Wash:	Waste water process. ($/gal)	10.000
16	Surf Wash:	Mob/demob costs ($)	20000.000
17	Conc Rmvl:	Suit-up time (minutes)	120.000
18	Conc Rmvl:	Breaks (minutes)	30.000
19	Conc Rmvl:	ALARA (minutes)	10.000
20	Conc Rmvl:	Number of laborers	3.000
21	Conc Rmvl:	Number of crafts	0.000

Number of records: 161 File in use: REACTOR1.PD2

↑↓ Home End PgUp PgDn Select item ↵ Enter Data Save Alt-X Quit

FIGURE 3.3. Data Entry Screen for Menu Item 2

The next section discusses the contents of a **PD2** file in detail. Then, in Section 3.2.2, the process of actually creating a **PD2** file from the input screen will be addressed.

3.2.1 Contents of a Decontamination Unit Cost Factor File

A complete **PD2** file, **DEFAULT.PD2**, is shown in Table 3.2. As the table shows, there are 13 different categories of data: surface washing (lines 1-16), concrete removal (17-29), metal removal (30-40), concrete cutting (42-52), handrails (54-65), gratings (66-76), polar cranes (77-89), bridge cranes (90-102), refueling cranes (103-114), spent fuel pool (115-118), HVAC ducts and equipment (119-130), containment air coolers (131-142), and floor drains (143-161). A discussion of these data items, by category, follows Table 3.2.

TABLE 3.2. Contents of DEFAULT.PD2

1	Surf Wash:	Suit-up time (minutes)	120.000
2	Surf Wash:	Breaks (minutes)	30.000
3	Surf Wash:	ALARA (minutes)	25.000
4	Surf Wash:	Warmup (minutes)	15.000
5	Surf Wash:	Cleanup (minutes)	50.000
6	Surf Wash:	Number of laborers	2.000
7	Surf Wash:	Number of crafts	1.000
8	Surf Wash:	Number of crew leaders	0.500
9	Surf Wash:	Number of rad monitors	0.500
10	Surf Wash:	Crew dose rate (millirem/hr)	3.000
11	Surf Wash:	Cleansing rate (ft2/min)	8.000
12	Surf Wash:	Vacuum hose replacement ($)	1180.000
13	Surf Wash:	HEPA filter replacement ($)	300.000
14	Surf Wash:	Misc. parts ($)	2000.000
15	Surf Wash:	Waste water process. ($/gal)	10.000
16	Surf Wash:	Mob/demob costs ($)	20000.000
17	Conc Rmvl:	Suit-up time (minutes)	120.000
18	Conc Rmvl:	Breaks (minutes)	30.000
19	Conc Rmvl:	ALARA (minutes)	10.000
20	Conc Rmvl:	Number of laborers	3.000
21	Conc Rmvl:	Number of crafts	0.000
22	Conc Rmvl:	Number of crew leaders	0.250
23	Conc Rmvl:	Number of rad monitors	0.250
24	Conc Rmvl:	Crew dose rate (millirem/hr)	3.000
25	Conc Rmvl:	Cleansing rate (ft2/hr)	100.000
26	Conc Rmvl:	Cutting bits ($/hr)	13.000
27	Conc Rmvl:	Filters ($/hr)	2.500
28	Conc Rmvl:	Cleaning sys. rental ($/wk)	2300.000
29	Conc Rmvl:	Compressor rental ($/month)	2025.000
30	Mtl Rmvl:	Staging (in minutes)	60.000
31	Mtl Rmvl:	Height adjustment (%)	10.000
32	Mtl Rmvl:	Respiratory prot. adj. (%)	20.000
33	Mtl Rmvl:	ALARA (minutes)	25.000
34	Mtl Rmvl:	Suit-up time (minutes)	120.000
35	Mtl Rmvl:	Breaks (minutes)	30.000
36	Mtl Rmvl:	Number of laborers	3.000
37	Mtl Rmvl:	Number of crafts	1.500
38	Mtl Rmvl:	Number of crew leaders	0.500
39	Mtl Rmvl:	Number of rad monitors	0.500
40	Mtl Rmvl:	Crew dose rate (millirem/hr)	3.000
41	Conc Cttg:	Staging (in minutes)	60.000
42	Conc Cttg:	Height adjustment (%)	10.000
43	Conc Cttg:	Respiratory prot. adj. (%)	10.000
44	Conc Cttg:	ALARA (minutes)	25.000
45	Conc Cttg:	Suit-up time (minutes)	120.000
46	Conc Cttg:	Breaks (minutes)	30.000
47	Conc Cttg:	Number of laborers	1.000
48	Conc Cttg:	Number of crafts	1.000
49	Conc Cttg:	Number of crew leaders	0.500
50	Conc Cttg:	Dose rate (millirem/hr)	3.000
51	Conc Cttg:	Cutting rate (inch-feet/min)	1.000
52	Conc Cttg:	Blade costs ($/in-ft of cut)	0.440
53	Handrails:	Cleansing rate (ft/hr)	20.000
54	Handrails:	Suit-up time (minutes)	120.000
55	Handrails:	Breaks (minutes)	30.000
56	Handrails:	ALARA (minutes)	10.000
57	Handrails:	Number of laborers	2.000

TABLE 3.2. (contd)

58	Handrails:	Number of crafts	0.000
59	Handrails:	Number of crew leaders	0.500
60	Handrails:	Number of rad monitors	0.500
61	Handrails:	Dose rate (millirem/hr)	3.000
62	Handrails:	Industrial wipes ($/ft2)	0.070
63	Handrails:	Wipe usage rate (ft2/ft)	1.350
64	Handrails:	Washing fluid ($/gal)	15.000
65	Handrails:	Washing fluid usage (ft/gal)	430.000
66	Gratings:	Removal rate (ft2/hr)	68.750
67	Gratings:	Suit-up time (minutes)	120.000
68	Gratings:	Breaks (minutes)	30.000
69	Gratings:	ALARA (minutes)	25.000
70	Gratings:	Respiratory prot. adj. (%)	20.000
71	Gratings:	Number of laborers	3.000
72	Gratings:	Number of crafts	0.000
73	Gratings:	Number of crew leaders	0.500
74	Gratings:	Number of rad monitors	0.500
75	Gratings:	Dose rate (millirem/hr)	3.000
76	Gratings:	Grating wgt. (lb/ft2)	10.400
77	P. Crane:	Number of polar cranes	1.000
78	P. Crane:	Number of crafts	2.000
79	P. Crane:	Number of laborers	2.000
80	P. Crane:	Number of rad monitors	0.500
81	P. Crane:	Number of crew leaders	0.500
82	P. Crane:	Vendor person-hr required	1904.000
83	P. Crane:	Cost of vendor person-hr ($)	55.000
84	P. Crane:	Removal time (hours)	264.000
85	P. Crane:	Cleanup time (hours)	40.000
86	P. Crane:	Equip. & mob/demob costs ($)	132300.000
87	P. Crane:	Cost of burial container ($)	3650.000
88	P. Crane:	Burial weight w/container (lb)	45000.000
89	P. Crane:	Burial volume (ft3)	1360.000
90	B. Crane:	Number of bridge cranes	1.000
91	B. Crane:	Number of crafts	2.000
92	B. Crane:	Number of laborers	2.000
93	B. Crane:	Number of rad monitors	0.500
94	B. Crane:	Number of crew leaders	0.500
95	B. Crane:	Vendor person-hr required	976.000
96	B. Crane:	Cost of vendor person-hr ($)	55.000
97	B. Crane:	Removal time (hours)	176.000
98	B. Crane:	Cleanup time (hours)	40.000
99	B. Crane:	Equip. & mob/demob costs ($)	22100.000
100	B. Crane:	Cost of burial container ($)	3650.000
101	B. Crane:	Burial weight w/container (lb)	40000.000
102	B. Crane:	Burial volume (ft3)	1360.000
103	R. Cranes:	Number of refueling cranes	2.000
104	R. Cranes:	Duration (in minutes)	720.000
105	R. Cranes:	Height adjustment (%)	0.000
106	R. Cranes:	Respiratory prot. adj. (%)	20.000
107	R. Cranes:	ALARA (minutes)	25.000
108	R. Cranes:	Suit-up time (minutes)	120.000
109	R. Cranes:	Breaks (minutes)	30.000
110	R. Cranes:	Number of laborers	3.000
111	R. Cranes:	Number of crafts	1.500
112	R. Cranes:	Number of rad monitors	0.500
113	R. Cranes:	Number of crew leaders	0.500
114	R. Cranes:	Dose rate (millirem/hr)	12.000

TABLE 3.2. (contd)

115	Fuel Pool:	Specialty contractor ($)	750000.000
116	Fuel Pool:	Number of HICs	5.000
117	Fuel Pool:	Days of cask rental	21.000
118	Fuel Pool:	Duration (days)	30.000
119	HVAC Duct:	Suit-up time (minutes)	120.000
120	HVAC Duct:	Breaks (minutes)	30.000
121	HVAC Duct:	ALARA (minutes)	25.000
122	HVAC Duct:	Resp. protection (%)	20.000
123	HVAC Duct:	Rmvl time (minute/ft)	8.875
124	HVAC Duct:	Number of laborers	2.000
125	HVAC Duct:	Number of crafts	0.000
126	HVAC Duct:	Number of crew leaders	0.500
127	HVAC Duct:	Number of rad monitors	0.500
128	HVAC Duct:	Crew dose rate (millirem/hr)	1.000
129	HVAC Duct:	Linear feet of ductwork	4566.000
130	HVAC Duct:	Wgt of assoc. eqpt. (lb)	129700.000
131	Air Coolers:	Suit-up time (minutes)	120.000
132	Air Coolers:	Breaks (minutes)	30.000
133	Air Coolers:	ALARA (minutes)	25.000
134	Air Coolers:	Height adjustment (%)	20.000
135	Air Coolers:	Number of laborers	2.000
136	Air Coolers:	Number of crafts	2.000
137	Air Coolers:	Number of crew leaders	0.500
138	Air Coolers:	Number of rad monitors	0.500
139	Air Coolers:	Dose rate (millirem/hr)	1.000
140	Air Coolers:	Rmvl time/cooler (min)	1442.000
141	Air Coolers:	Number of coolers	4.000
142	Air Coolers:	Weight per cooler (lb)	142752.000
143	Drains:	Number of drains	210.000
144	Drains:	Removal time (in minutes)	291.000
145	Drains:	Height adjustment (%)	7.000
146	Drains:	Respiratory prot. adj. (%)	0.000
147	Drains:	ALARA (minutes)	25.000
148	Drains:	Suit-up time (minutes)	120.000
149	Drains:	Breaks (minutes)	30.000
150	Drains:	Number of laborers	1.000
151	Drains:	Number of crafts	1.000
152	Drains:	Number of crew leaders	0.500
153	Drains:	Number of rad monitors	0.500
154	Drains:	Dose rate (millirem/hr)	0.500
155	Drains:	Drilling rate (inches/hr)	7.000
156	Drains:	Floor thickness (inches)	24.000
157	Drains:	Bit replacement costs ($/in)	4.600
158	Drains:	Power unit rental ($/week)	1035.000
159	Drains:	Drain puller rental ($/week)	138.000
160	Drains:	Absorbent material (ft2)	11.875
161	Drains:	Plastic (ft2)	50.000

Surface Washing (Items 1-16)

All contaminated surfaces are washed using a manually operated cleaning system, which washes the surface using high-pressure (250 psig) jets and col-

lects the water and removed material simultaneously using a vacuum collection system. The first five items are the lost time adjustments for the surface washing task and are based on the following assumptions:

- The crews work eight-hour shifts.
- Each crew member suits-up or unsuits in anticontamination clothing eight times per shift, taking 15 minutes each time, including travel time to and from the workplace (Item 1).
- The crews take two 15-minute breaks per shift (Item 2).
- The crew members devote 25 minutes per shift to ALARA-related activities, such as reviewing radiation protection guidance (Item 3).
- It takes 15 minutes to warm up and adjust the cleaning system at the beginning of each shift (Item 4).
- Cleanup activities at the end of each shift take 50 minutes (Item 5).

Items 6 through 9 describe the crew composition. Item 10 is the average dose rate in millirem/hr immediately after reactor shutdown. Item 11 is the postulated floor-cleansing rate, in square feet/minute. (The CECP will adjust the cleansing rate for walls and ceilings, as discussed in Section 4.4.1). Items 12 through 14 are the annual replacement costs for the listed parts.

The surface washing procedure produces waste water that will be processed and disposed of by a specialty contractor. Item 15 is the specialty contractor's processing fee on a per-gallon basis. Item 16 is the cost of mobilizing and demobilizing the specialty contractor's personnel.

Concrete Removal (Items 17-29)

Contaminated concrete surfaces that are not sufficiently decontaminated using the high-pressure washing system are removed with a commercially available pneumatically operated surface removal system. You can adjust the depth of concrete to be removed, as discussed in Section 4.4.1. Items 17 through 24 have the same meanings as the corresponding items discussed above under surface washing and will not be discussed here. Item 25 is similar to Item 11, but note that the rate here is expressed in square feet/hr. Items 26 through 29 are material costs expressed in the units shown.

Metal Removal (Items 30-40)

All contaminated metal surfaces are assumed to be stainless steel and may be any thickness you specify, per Section 4.4.1. The metal is cut using a plasma arc torch mounted on a mechanically driven track system. The cutting rate is 4 ft/min, which includes the torch changeout time of 15 minutes for every 30 minutes of torch operation. The surfaces are cut into nominal 7.5 x 18-ft. segments for packaging in modified maritime containers.

Item 30, staging, is the time required to set up for and secure from the metal removal operation at a particular location. It includes installing scaffolding at the surface location and setting up the contamination control system. It also includes the time required to remove the contamination control system, take down the scaffolding and move to the next location. The times required to perform other operations (install the track-mounted torch system, attach lifting devices to surface section, make the cuts, and so on) are accounted for by metal removal algorithms within the CECP.

Items 31 and 32 are work difficulty factors: the height and respiratory protection adjustment factors, in percent. Workers are less efficient while working on scaffolding. The height adjustment factor is used to take this fact into account. The particular factor used here (10%) means that the crews work at 1/(1.1) = 91% of normal. Worker efficiency while working in respiratory equipment is set by Item 32. The value of 20% used here corresponds to an efficiency of 1/1.2 = 83%.

The remaining items in the metal removal category have the same meanings as those discussed in previous categories.

Concrete Cutting (Items 41-52)

All concrete walls and floors are assumed to be uncontaminated or to have been decontaminated before sawing operations begin. Thus, the costs of cutting uncontaminated concrete to provide access to other components are considered to be cascading costs. Although the concrete itself is considered to be uncontaminated, workers will still most likely be working in radiation areas. To allow for this, Item 50 may be used to specify an average area dose rate at reactor shutdown.

Material and labor costs for cutting uncontaminated concrete walls and floors are based on the cut measured in inch-feet (i.e., a cut 1 inch deep and 1 foot long equals 1 inch-foot). Specifying the number of inch-feet per cut is described in Section 4.4.1. The cutting rate is specified by Item 51, and saw blade costs by Item 52.

Item 42, staging, is the time required per location, in minutes, to install and remove scaffolding, to install and remove the track-mounted cutting system, and to install and remove the vacuum/water-spray dust control system. The meanings of the remaining items have been discussed previously.

Handrails (Items 53-65)

All contaminated handrails are assumed to be 2-inch-diameter carbon steel. One linear foot (LF) of handrail equals about 1/2 ft^2 of surface area. The decontamination rate, in LF/hr, is set by Item 53. Decontamination will be done manually using industrial wipes and Radiacwash™ (diluted 5:1). Fluid costs and fluid usage rates are set by Items 64 and 65. Costs and usage rates for the industrial wipes are set by Items 62 and 63. Note that the industrial wipe usage rate is expressed in units of square feet of wipe area per LF of handrail. Meanings for the remaining items have been discussed previously.

Steel Floor Gratings (Items 66-76)

It is assumed that contaminated steel floor grating (on stairs, platforms, and walkways) will be removed during decommissioning in essentially the same manner in which it was installed. Therefore, installation labor factors were used.[1]

The grating removal rate is set by Item 66. The weight of the grating, in lb/ft^2, is set by Item 76. The remaining items have their usual meanings.

Polar Cranes (Items 77-89) and Bridge Cranes (Items 90-102)

These items provide a means for specifying the removal of building cranes, which are complex, specialized jobs, requiring the assistance of a vendor. The number of polar cranes to be removed is specified by Item 77 and the number of bridge cranes by Item 90. The time required by vendor personnel

to remove the cranes is set by Items 84 and 97. Vendor equipment costs are set by Items 86 and 99.

After the cranes have been removed, the decommissioning operations contractor (DOC) decontamination crew will begin work. The members of this crew are defined by Items 78-81 for polar cranes and Items 91-94 for bridge cranes. The times required for these crews to decontaminate the cranes are set by Items 85 and 98.

These cranes will be buried in special containers whose parameters may be set by Items 87-89 and 100-102.

Refueling Cranes (Items 103-114)

These cranes will be removed by DOC staff; no vendor assistance will be required. All items in this category have their previously defined meanings.

Spent Fuel Pool Water Treatment and Disposal (Items 115-118)

After the spent nuclear fuel inventory has been reduced to zero, the spent fuel pool (SFP) water must be treated before release, because all waste solutions are expected to contain measurable radioactivity. This specialized task is performed by a vendor whose costs may be defined by Item 115. The number of HICs required is specified by Item 116, and the number of days of NuPac14/210H cask rental is specified by Item 117. Total duration in days is set by Item 118.

HVAC Ductwork (Items 119-130) and Containment Air Coolers (Items 131-142)

The HVAC systems are among the last items removed, because the HVAC systems need to be in service until essentially all the contaminated materials have been removed. It is assumed that the ductwork and equipment are only mildly contaminated, with very small dose rates associated with removal activities. This dose rate (which is the assumed dose rate at the time of removal, not adjusted from the reactor shutdown baseline) is set by Item 128 for ductwork and Item 139 for the air coolers.

The extent of the ductwork to be removed is specified by Item 129, LF of ductwork, and Item 130, the weight, in pounds, of the equipment associated

with the ducts. The time to remove one LF of ductwork is specified by Item 123. The remaining ductwork items have their previously defined meanings.

Containment air cooler Items 131-139 have their previously defined meanings, and Items 140-142 are self-explanatory.

Removal of Contaminated Floor Drains (Items 143 - 161)

The removal operation for each drain consists of cutting out a concrete plug containing the drain. Each plug weighs about 550 pounds and has a volume of about 2.8 cubic feet, assuming the plug is 16 inches in diameter and the floor is two feet thick. The floor thickness can be set by Item 156. The time required to set up and remove each drain (not including the effects of the work difficulty adjustments and lost time adjustments, Items 145-149) is set by Item 144. The crew composition for this operation is set by Items 150-153. The weekly equipment rental costs for the two major pieces of equipment are set by Items 158 and 159. Bit replacement costs per inch of depth cut are set by Item 157. The remaining items are self-explanatory.

3.2.2 Entering Data, Saving Files, and Exiting

The data entry, file saving, and exiting procedures are precisely the same as for Sections 3.1.2, 3.1.3, and 3.1.4 and will not be repeated here.

3.3 MENU ITEM 3: UNIT COST FACTORS FOR CONTAMINATED SYSTEMS

This portion of the CECP allows you to create numerical data files that the CECP uses to calculate unit cost factors for potentially contaminated plant systems. Such files end with a "PD3" suffix, for example, **REACTOR1.PD3**. These **PD3** data files include crew sizes, work difficulty adjustments, non-productive time adjustments, material costs, and radiation dose rates.

The data entry screen, from which you will create your **PD3** files, is shown in Figure 3.4. The selector bar is shown positioned over Item 74. There are 117 items in all, with 21 visible at any one time.

Before explaining how a **PD3** file is actually created from the input screen, it is necessary to discuss the contents of the file itself. This is done in the next section.

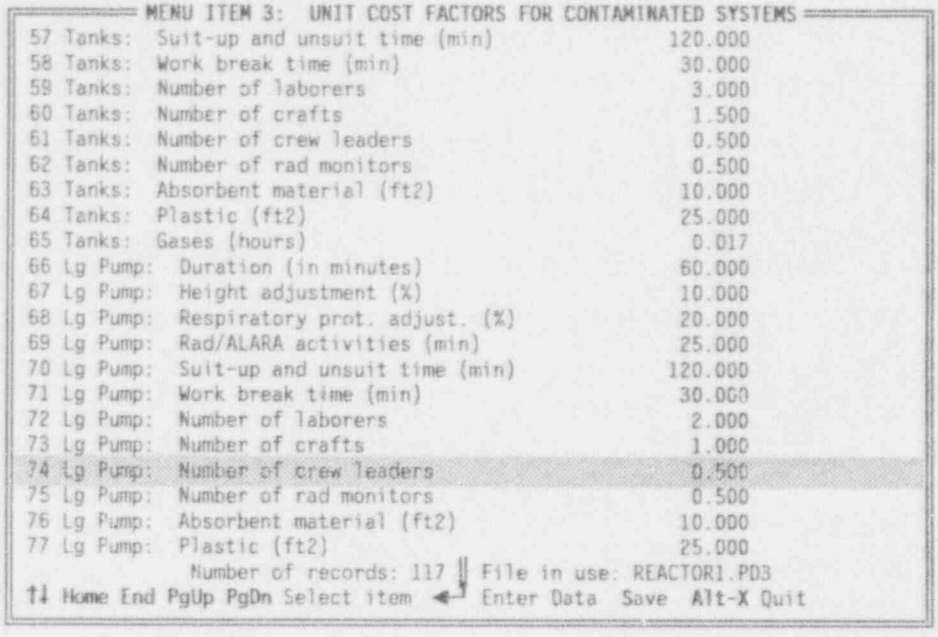

FIGURE 3.4. Data Entry Screen for Menu Item 3

3.3.1 Contents of a Work Difficulty Factor File

The contents of **DEFAULT.PD3** is shown in Table 3.3. There are nine categories of potentially contaminated system components listed:

1. Large Piping
2. Small Piping
3. Large Valves
4. Small Valves
5. Tanks
6. Large Pumps
7. Small Pumps
8. Large Miscellaneous
9. Small Miscellaneous

Within each category there are thirteen data items:

1. Duration (in minutes)
2. Height Adjustment (%)
3. Respiratory Prot. Adjust. (%)
4. Rad/ALARA Activities (min.)
5. Suit-up and Unsuit Time (min.)
6. Work Break Time (min.)
7. Number of Laborers
8. Number of Crafts
9. Number of Crew Leaders
10. Number of Rad Monitors
11. Absorbent Material (sq ft)
12. Plastic (sq ft)
13. Gases (hours)

Data Items 2 through 10 should be familiar from Section 3.2.1 and will not be discussed in detail again here. Item 1, Duration, is the time, in minutes, required for the crew (Items 7 through 10) to complete the removal

TABLE 3.3. Contents of DEFAULT.PD3

1	Lg Pipe:	Duration (in minutes)	87.000
2	Lg Pipe:	Height adjustment (%)	10.000
3	Lg Pipe:	Respiratory prot. adjust. (%)	20.000
4	Lg Pipe:	Rad/ALARA activities (min)	25.000
5	Lg Pipe:	Suit-up and unsuit time (min)	120.000
6	Lg Pipe:	Work break time (min)	30.000
7	Lg Pipe:	Number of laborers	3.000
8	Lg Pipe:	Number of crafts	1.500
9	Lg Pipe:	Number of crew leaders	0.500
10	Lg Pipe:	Number of rad monitors	0.500
11	Lg Pipe:	Absorbent material (ft2)	15.000
12	Lg Pipe:	Plastic (ft2)	37.500
13	Lg Pipe:	Gases (hours)	0.033
14	Sm Pipe:	Duration (in minutes)	61.000
15	Sm Pipe:	Height adjustment (%)	10.000
16	Sm Pipe:	Respiratory prot. adjust. (%)	20.000
17	Sm Pipe:	Rad/ALARA activities (min)	25.000
18	Sm Pipe:	Suit-up and unsuit time (min)	120.000
19	Sm Pipe:	Work break time (min)	30.000
20	Sm Pipe:	Number of laborers	3.000
21	Sm Pipe:	Number of crafts	1.500
22	Sm Pipe:	Number of crew leaders	0.500
23	Sm Pipe:	Number of rad monitors	0.500
24	Sm Pipe:	Absorbent material (ft2)	10.000
25	Sm Pipe:	Plastic (ft2)	25.000
26	Sm Pipe:	Gases (hours)	0.017
27	Lg Valve:	Duration (in minutes)	87.000
28	Lg Valve:	Height adjustment (%)	10.000
29	Lg Valve:	Respiratory prot. adjust. (%)	20.000
30	Lg Valve:	Rad/ALARA activities (min)	25.000
31	Lg Valve:	Suit-up and unsuit time (min)	120.000
32	Lg Valve:	Work break time (min)	30.000
33	Lg Valve:	Number of laborers	3.000
34	Lg Valve:	Number of crafts	1.500
35	Lg Valve:	Number of crew leaders	0.500
36	Lg Valve:	Number of rad monitors	0.500
37	Lg Valve:	Absorbent material (ft2)	15.000
38	Lg Valve:	Plastic (ft2)	37.500
39	Lg Valve:	Gases (hours)	0.033
40	Sm Valve:	Duration (in minutes)	61.000
41	Sm Valve:	Height adjustment (%)	10.000
42	Sm Valve:	Respiratory prot. adjust. (%)	20.000
43	Sm Valve:	Rad/ALARA activities (min)	25.000
44	Sm Valve:	Suit-up and unsuit time (min)	120.000
45	Sm Valve:	Work break time (min)	30.000
46	Sm Valve:	Number of laborers	3.000
47	Sm Valve:	Number of crafts	1.500
48	Sm Valve:	Number of crew leaders	0.500
49	Sm Valve:	Number of rad monitors	0.500
50	Sm Valve:	Absorbent material (ft2)	10.000
51	Sm Valve:	Plastic (ft2)	25.000
52	Sm Valve:	Gases (hours)	0.017
53	Tanks:	Staging (in minutes)	90.000
54	Tanks:	Height adjustment (%)	10.000
55	Tanks:	Respiratory prot. adjust. (%)	20.000
56	Tanks:	Rad/ALARA activities (min)	25.000
57	Tanks:	Suit-up and unsuit time (min)	120.000

TABLE 3.3. (contd)

58	Tanks:	Work break time (min)	30.000
59	Tanks:	Number of laborers	3.000
60	Tanks:	Number of crafts	1.500
61	Tanks:	Number of crew leaders	0.500
62	Tanks:	Number of rad monitors	0.500
63	Tanks:	Absorbent material (ft2)	10.000
64	Tanks:	Plastic (ft2)	25.000
65	Tanks:	Gases (hours)	0.017
66	Lg Pump:	Duration (in minutes)	60.000
67	Lg Pump:	Height adjustment (%)	10.000
68	Lg Pump:	Respiratory prot. adjust. (%)	20.000
69	Lg Pump:	Rad/ALARA activities (min)	25.000
70	Lg Pump:	Suit-up and unsuit time (min)	120.000
71	Lg Pump:	Work break time (min)	30.000
72	Lg Pump:	Number of laborers	2.000
73	Lg Pump:	Number of crafts	1.000
74	Lg Pump:	Number of crew leaders	0.500
75	Lg Pump:	Number of rad monitors	0.500
76	Lg Pump:	Absorbent material (ft2)	10.000
77	Lg Pump:	Plastic (ft2)	25.000
78	Lg Pump:	Gases (hours)	0.017
79	Sm Pump:	Duration (in minutes)	60.000
80	Sm Pump:	Height adjustment (%)	10.000
81	Sm Pump:	Respiratory prot. adjust. (%)	20.000
82	Sm Pump:	Rad/ALARA activities (min)	25.000
83	Sm Pump:	Suit-up and unsuit time (min)	120.000
84	Sm Pump:	Work break time (min)	30.000
85	Sm Pump:	Number of laborers	2.000
86	Sm Pump:	Number of crafts	1.000
87	Sm Pump:	Number of crew leaders	0.500
88	Sm Pump:	Number of rad monitors	0.500
89	Sm Pump:	Absorbent material (ft2)	10.000
90	Sm Pump:	Plastic (ft2)	25.000
91	Sm Pump:	Gases (hours)	0.017
92	Lg Misc:	Duration (in minutes)	60.000
93	Lg Misc:	Height adjustment (%)	10.000
94	Lg Misc:	Respiratory prot. adjust. (%)	20.000
95	Lg Misc:	Rad/ALARA activities (min)	25.000
96	Lg Misc:	Suit-up and unsuit time (min)	120.000
97	Lg Misc:	Work break time (min)	30.000
98	Lg Misc:	Number of laborers	2.000
99	Lg Misc:	Number of crafts	1.000
100	Lg Misc:	Number of crew leaders	0.500
101	Lg Misc:	Number of rad monitors	0.500
102	Lg Misc:	Absorbent material (ft2)	10.000
103	Lg Misc:	Plastic (ft2)	25.000
104	Lg Misc:	Gases (hours)	0.017

TABLE 3.3. (contd)

105	Sm Misc:	Duration (in minutes)	60.000
106	Sm Misc:	Height adjustment (%)	10.000
107	Sm Misc:	Respiratory prot. adjust. (%)	20.000
108	Sm Misc:	Rad/ALARA activities (min)	25.000
109	Sm Misc:	Suit-up and unsuit time (min)	120.000
110	Sm Misc:	Work break time (min)	30.000
111	Sm Misc:	Number of laborers	2.000
112	Sm Misc:	Number of crafts	1.000
113	Sm Misc:	Number of crew leaders	0.500
114	Sm Misc:	Number of rad monitors	0.500
115	Sm Misc:	Absorbent material (ft2)	10.000
116	Sm Misc:	Plastic (ft2)	25.000
117	Sm Misc:	Gases (hours)	0.017

operation, with no work difficulty adjustments (2,3) or nonproductive time factors (4,5,6) applied. In the case of tanks, staging includes only the equipment setup and removal times. The cutting times are a function of tank size and shape and are calculated by the CECP.

The quantity of consumable materials consumed during the removal operation is specified by the last three items. Note that the unit costs for these items are maintained in lines 15 through 17 of a PD1 file.

3.3.2 Entering Data, Saving Files, and Exiting

The data entry, file saving, and exiting procedures are precisely the same as for Sections 3.1.2, 3.1.3, and 3.1.4 and will not be repeated here.

3.4 REFERENCES

1. Building Construction Cost Data. 1991. Robert Snow Means Company, Inc., Kingston, Massachusetts.

4.0 ENTERING SITE-SPECIFIC DATA AND CREATING OUTPUT FILES

Once the **PD1**, **PD2**, and **PD3** data files described in Section 3.0 have been created, proceed to Menu Items A through I to complete the decommissioning costs for a specific reactor plant. This section describes in detail how this is done.

To illustrate the general process, consider this example. Suppose you want to do decommissioning costs for a project called **REACTOR1**. You would proceed as follows:

1. Make sure you have set up the **PD1**, **PD2**, and **PD3** files containing the general data appropriate for **REACTOR1**. Let us suppose that you have decided that **DEFAULT.PD1**, **DECON1.PD2**, and **BOP2.PD3** are the appropriate files to use for **REACTOR1**. Notice that these files do not have to be named **REACTOR1.PD1**, **REACTOR1.PD2**, and **REACTOR1.PD3**.

2. Create **REACTOR1.PDA**, **REACTOR1.PDB**, and **REACTOR1.PDC**, as described in Sections 4.1, 4.2, and 4.3, below. These files are not dependent on each other and may be created in any order.

3. Create **REACTOR1.PDD**, **REACTOR1.PDE**, and **REACTOR1.PDF**, as described in Sections 4.4, 4.5, and 4.6, below. These files are independent of each other and may be created in any order, but you must do step 2 before starting step 3.

4. Create **REACTOR1.PDG** and **REACTOR1.PDH** per Sections 4.7 and 4.8. These files are independent of each other and of the files created in step 3, but you must complete step 2 before starting step 4.

5. Create **REACTOR1.PRI** per Section 4.9. This is the decommissioning summary report for the REACTOR1 case study. An example of this type of file (**TEST.PRI**) is shown in Section 7.0.

The details of the above process are discussed in the following sections.

4.1 MENU ITEM A: SITE INFORMATION

From this portion of the CECP you define site characteristics such as site name, truck distances to the geologic repository (for GTCC waste) and low-level waste sites, and so on. Site characteristics information is maintained in files having an "PDA" suffix, for example, **REACTOR1.PDA**.

When you select Menu Item A from the Main Menu, the file menu will prompt you for the **PDA** file to use. (When you select Item A for the first time, the only **PDA** file available will be the one supplied with the CECP package, **DEFAULT.PDA**.) Once you have selected your **PDA** file, you will see a site information data entry screen, similar to the one shown in Figure 4.1.

Most of the terms shown on this screen should be self-explanatory. All distances are in miles. Line 10 allows you to select which low-level burial site to use. HANFORD and BARNWELL are the names of the low-level waste sites currently in operation. You may also select GENERIC if you want to use a hypothetical site. In Figure 4.1, Hanford has been chosen. This means, for example, that line 5 is the distance from "Reactor1" to Hanford and that line 8 is the distance from Hanford to the supplier. It is assumed there is only one geologic repository, and that it is located at Yucca Mountain, Nevada.

The "Supplier" refers to the supplier of transportation casks and HICs. (For simplicity, it is assumed that all casks and HICs are furnished by a single supplier.) Line 3, "Elect. Cnsmp. at Shutdown (MW)," is the average electrical energy consumption rate for the site, in megawatts, at shutdown.

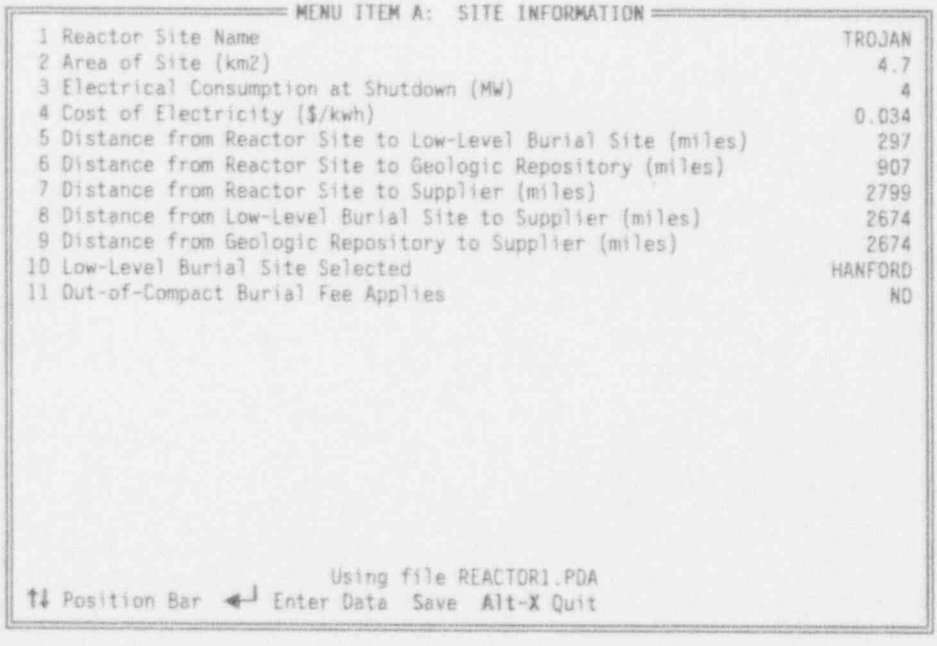

FIGURE 4.1. Data Entry Screen for Menu Item A

Line 4, "Cost of Electricity ($/kWh)," is the cost, in dollars per kilowatt-hour, of the electrical energy consumed in Line 3.

4.1.1 Entering Data

To enter data, put the selector bar on the desired line with the ↑ or ↓ key, then press <Enter>. The portion of the bar over the data field will change color from white-on-blue to yellow-on-red and a cursor will appear, indicating that you may begin entering data. When typing in the data, you may use the <BackSpace>, <Del>, or the left and right arrow keys (←, →) as needed. The <Ins> key toggles between the insert and typeover modes. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>; the data field will revert to its original blue-on-white color and the cursor will disappear. If you change your mind while entering data, press <Esc> and the previous value of that field will be restored.

As implied earlier, line 10 is a toggle. To enter data for this line, put the selector bar on the line and press <Enter> until the desired name (HANFORD, BARNWELL, or GENERIC) appears.

Entering data for line 1, **Site Name**, is a bit unusual. Put the selector bar on Item 1, and press <Enter>. The screen will change to the Site Selection Screen shown in Figure 4.2. Now use ↑, ↓, <PgUp>, <PgDn>, <Home>, and <End> to position the bar over the reactor name of your choice and press <Enter>. The screen will revert back to Figure 4.1, except that the site name and the truck distances from the reactor site to the repository and low-level waste site will have been changed to reflect the new site you have chosen. You must still enter your own values for lines 7, 8, and 9.

When in the Site Selection Screen, you may choose your own site name. To do this, press the space bar, enter the name when prompted, and press <Enter>. The screen will revert back to Figure 4.1, with your site name displayed. The other fields will show default values you can change as required.

4.1.2 Saving Data and Exiting

To save your site data, press <S>; the **Save Data to a File** window will open in the middle of the screen, and you will be prompted for a file

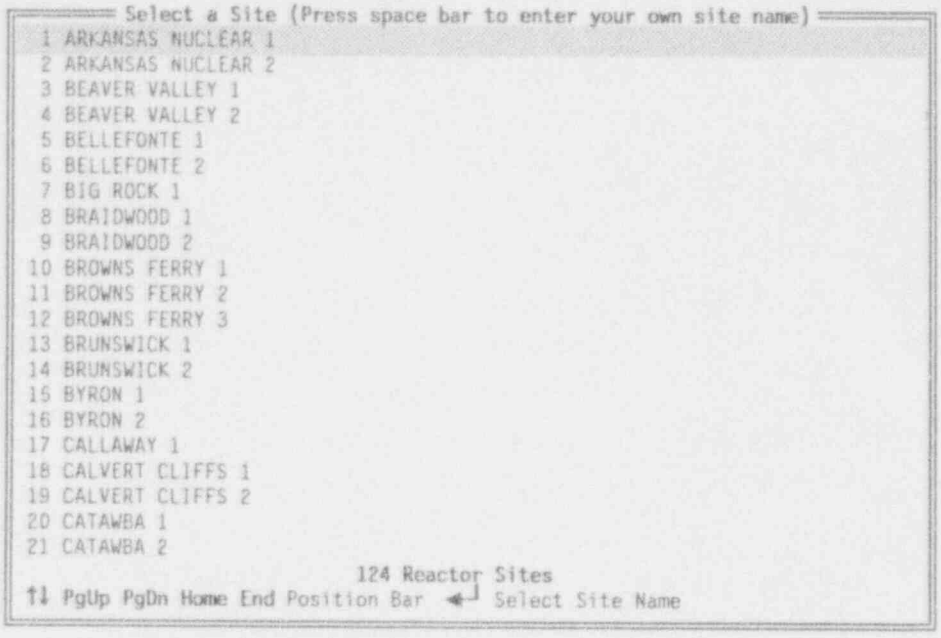

FIGURE 4.2. Site Selection Screen

name. Press <Esc> or <Enter> at this point, if you decide not to save your data. Otherwise, type in a file name up to eight letters long and press <Enter>. If, for example, you enter **reactor1**, the CECP will create the file **REACTOR1.PDA**.

To exit this portion of the CECP, press <Alt-X>. The **Save Data to a File** window will open as described above, and you will be given a final opportunity to save your work, if you have not previously done so. If you elect not to save your work, press <Enter> or <Esc>, and you will be returned to the Main Menu. If you do save your work at this point, you will be returned to the Main Menu as soon as file processing is completed.

4.2 MENU ITEM B: DECOMMISSIONING SCHEDULES

In this section, you organize site decommissioning activities into schedules composed of up to five time periods. These schedules are maintained by the CECP in files having a "PDB" suffix, as, for example, **REACTOR1.PDB**.

When you select Menu Item B from the Main Menu, the file menu will prompt you for the **PDB** file to use. (When you select Item B for the first

time, the only **PDB** file available will be the one supplied with the CFCP package, **DEFAULT.PDB**.) Once you have selected your **PDB** file, you will see a scheduling screen, similar to the one shown in Figure 4.3.

4.2.1 Entering Data

When the data entry screen appears, you will be in the top part of the screen, and the selector bar will be positioned as shown in Figure 4.3. Each of the 5 lines in this part of the screen is composed of three fields: **Name of Period**, **Start Year**, and **Stop Year**. To enter data, use the arrow keys (↑,↓,←,→) to move the selector bar over the desired field and press <Enter>. The bar will change color from white-on-blue to yellow-on-red and a cursor will appear, indicating that you may begin entering data. As you enter data, you may use the <Backspace>, <Del>, or the left and right arrow keys (←,→) as needed. The <Ins> key toggles between the insert and typeover modes. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>. The data field will revert to its original

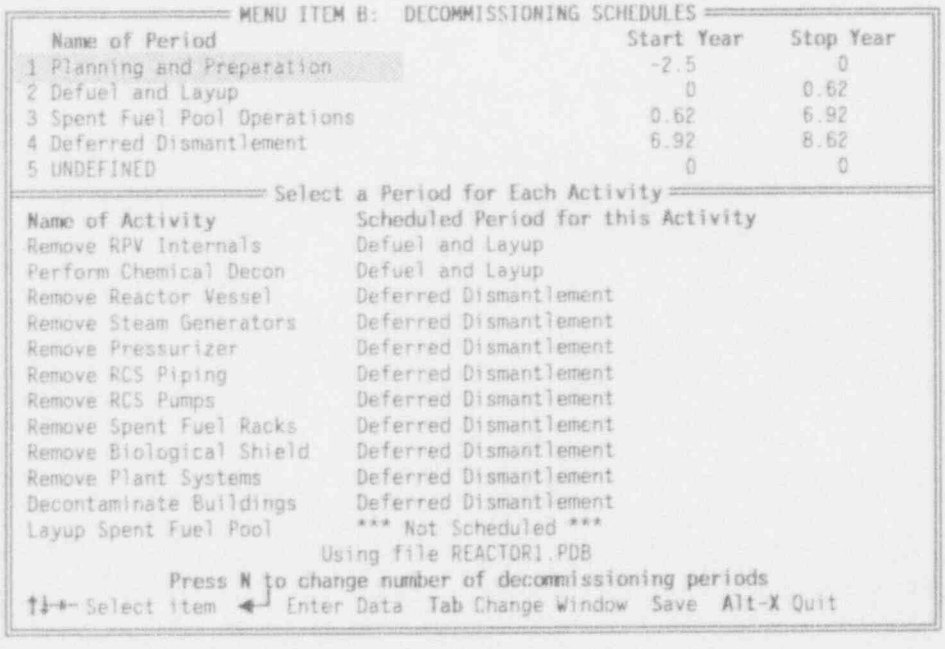

FIGURE 4.3. Data Entry Screen for Menu Item B

blue-on-white color and the cursor will disappear. If you change your mind while entering data, press <Esc> and the previous value of that field will be restored.

Period descriptions may be up to 30 characters long. The time fields are in years and decimal fractions of years and are defined in relation to reactor shutdown, which occurs at year zero. Times before shutdown are negative. The first period in this example, "Planning and Preparation," starts 2.5 years before reactor shutdown and ends at shutdown.

To specify the number of periods to be scheduled, press <N>. A window will open, requesting the number of periods. Enter a number from 1 to 5 and press <Enter>. If you specified, say, four periods, you will notice that period 5 on the top half of the screen is now labeled UNDEFINED, and you will be unable to access it. If you specified only two periods, then periods 3, 4, and 5 will be undefined and unaccessible.

Make certain you define periods chronologically. That is, period 2 must follow period 1, period 3 must follow period 2, and so on. Also make sure that the starting and stopping times between periods do not overlap. **If these precautions are not adhered to, the CECP may produce unreliable results.**

Having defined the periods, you press <Tab> to enter the bottom half of the screen, **Select a Period for Each Activity**. While you are in this portion of the screen, the only editing keys you can use are ↑, ↓, and <Enter>. The arrow keys move you up and down the activity list and <Enter> cycles through the period descriptions you defined above. Thus, to assign steam generator removal to period 4, you would use ↑ or ↓ to put the bar opposite **Remove Steam Generators** and then press <Enter> until "Deferred Dismantlement" (the name you gave to period 4) appears. If you do not want to assign an activity to any period, just press <Enter> until ***** Not Scheduled ***** appears. This ensures that this activity will not appear in the summary tables (Section 4.9). You will also notice that it will not be possible to assign activities to undefined periods.

Notice that four periods are defined in Figure 4.3, but activities are scheduled only for periods 2 and 4. This is normal. Periods 1 and 3 still

exist and there will be costs associated with them (e.g., Menu Item G), but no active decommissioning is taking place during these periods.

The last activity, **Layup Spent Fuel Pool**, applies only to decommissioning studies that use an extended safe storage period. If you schedule this activity, make sure it is scheduled to occur during the safe storage period. Scheduling this activity also causes the CECP to calculate an equipment repair allowance (Section 3.1.1, Item 46) for the safe storage period. Figure 4.4 shows the proper way to use a safe storage scenario.

4.2.2 Saving Data and Exiting

You may save data as you go along. Pressing <S> will open the **Save Data to a File** window in the middle of the screen, and you will be invited to save your data to a file. Press <Esc> or <Enter> at this point, if you decide not to save your data. Otherwise, type in a file name up to eight letters long and press <Enter>. If, for example, you enter **reactor1**, the CECP will create the file **REACTOR1.PDB**.

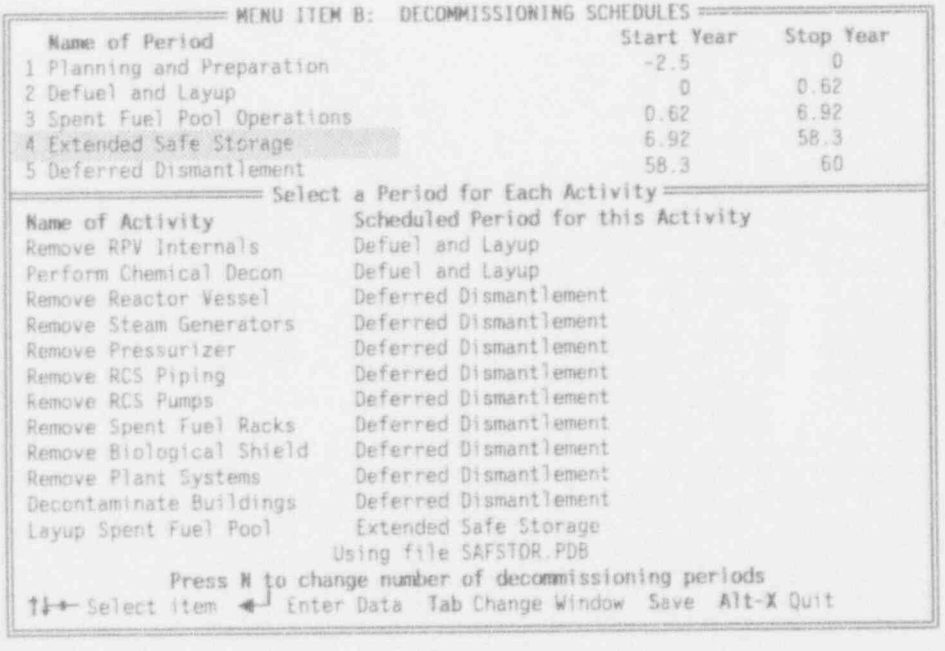

FIGURE 4.4. A Schedule Incorporating an Extended Safe Storage Period

To leave this portion of the CECP, press <Alt-X>. The **Save Data to a File** window will open as described above, and you will be given a final opportunity to save your work, if you have not previously done so. If you elect not to save your work, press <Enter> or <Esc> and you will be returned to the Main Menu. If you do save your work at this point, you will be returned to the Main Menu as soon as file processing is completed.

4.3 MENU ITEM C: SPECIAL EQUIPMENT COSTS

This portion of the CECP allows you to create data files of the specialized major equipment that must be available for decommissioning. Such files are identified by the "PDC" suffix; for example, **REACTOR1.PDC**. Vendor and contract costs are not to be entered in **PDC** files.

When you select Menu Item C from the Main Menu, the file menu will prompt you for the **PDC** file to use. (When you select Item C for the first time, the only **PDC** file available will be the one supplied with the CECP package, **DEFAULT.PDC**.) Once you have selected your **PDC** file, the data entry screen, an example of which is shown in Figure 4.5, will appear.

MENU ITEM C: SPECIAL EQUIPMENT COSTS

	Description of Item	Tot. Cost($)
1	Remote manipulator for under-water in-vessel cutting	1102500
2	Underwater plasma-arc cutting system (2 each)	154400
3	Cutting table plus jig	33000
4	Oxyacetylene cutting system	3300
5	Plasma-arc cutting system (2 each)	66000
6	Track-mounted drive unit (4 each)	17600
7	Closed circuit, high-resolution television	55100
8	High-pressure water jet	176400
9	Kelly Decontamination System (3 each)	558000
10	Underwater lights, viewing windows/periscope	11000
11	Submersible pumps with disposable filter (3 each)	19800
12	Mobile scissors-type manlift (Sky Climber Series 47) (4 ea.)	154400
13	Genie Zoom-Boom manlift, 45 ft.	52900
14	Bobcat front-end loader (light-duty) (2 each)	39600
15	6818 kg forklift (3 each)	297600
16	9100 kg mobile hydraulic crane (2 each)	81600
17	Safety nets (as required)	50700
18	Polyurethane foam generator (2 each)	19800
19	Wall-saw, 35 h.p., w/Power unit (2 each)	44200

Number of records: 26 | File in use: DEFAULT.PDC

↑↓→← Home End PgUp PgDn Move Bar ↵ Enter Data Insert Item Delete Item
Ctrl End Insert Item at Bottom of List Save Data to a File Alt-X Quit

FIGURE 4.5. Data Entry Screen for Menu Item C

Figure 4.5 shows the first 19 of the 26 records that make up the **DEFAULT.PDC** file. Each record consists of two fields: 1) a description of the piece of equipment and 2) its cost in dollars. A total of 200 records may be entered.

4.3.1 Entering Data

To enter data, use the positioning keys (↑, ↓, →, ←, <PgUp>, <PgDn>, <Home>, and <End>) to put the blue selector bar over the item desired, and then type in the data. The ↑ and ↓ keys move the selector up and down one line at a time. The <PgUp> and <PgDn> keys move the selector up and down the list a screenful (18 lines) at a time; the <Home> and <End> keys move the selector to the top and bottom of the list. To move from one field to another on the same line, use the → and the ← keys.

With the selector bar positioned as desired, press <Enter>. The bar will change color from white-on-blue to yellow-on-red and a cursor will appear, indicating that you may begin entering data. As you enter data, you may use the <Backspace>, <Del>, or the left and right arrow keys (←, →) as needed. The <Ins> key toggles between the insert and typeover modes. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>; the data field will revert to its original blue-on-white color, and the cursor will disappear. If you change your mind while entering data, press <Esc> and the previous value of that field will be restored.

Adding and deleting records is straightforward. To add a record, place the selector bar anywhere on the line where you want the new record to go, then press <Ins>. As an example, suppose you want to add a new record at line 10. Placing the selector bar anywhere on line 10 and pressing <Ins> produces the result shown in Figure 4.6. Line 10 has been replaced by a new default data component, and the number of records has been updated to 27. At this point you replace the **No Name** equipment description with your own description, and then enter the cost information.

Adding a record to the end of the list is slightly different. Place the selector bar on the last item in the list. (Pressing <End> will get you to

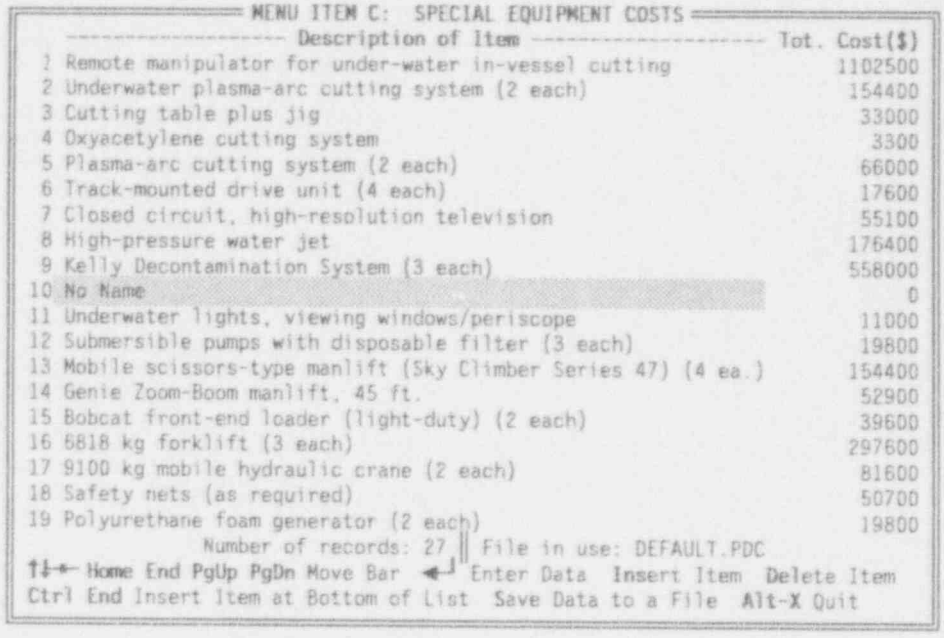

FIGURE 4.6. Data Entry Screen for Menu Item C: Adding a Record

the end of the list immediately.) Then press <Ctrl-End>. The new default item will appear at the end of the list. Update the record as described earlier.

To delete a record, put the selector bar on the desired line, and then press <Del>. A warning will appear, asking you to confirm the deletion. To proceed with the deletion, press <Y>. To cancel, press any other key.

4.3.2 Saving Data and Exiting

You may save data as you go along. Pressing <S> will open the **Save Data to a File** window in the middle of the screen, and you will be invited to save your data to a file. Press <Esc> or <Enter> at this point, if you decide not to save your data. Otherwise, type in a file name, up to 8 letters long, and press <Enter>. If, for example, you enter **reactor1**, the CECP will create the file **REACTOR1.PDC**. In addition to this file, the CECP creates **REACTOR1.PSC**, a binary file used to construct the site summary result file, **REACTOR1.PRI**. See Section 4.9.

To leave this portion of the CECP, press <Alt-X>. The **Save Data to a File** window will open as described above, and you will be given a final opportunity to save your work, if you have not previously done so. If you elect not to save your work, press <Enter> or <Esc>, and you will be returned to the Main Menu. If you do save your work at this point, you will be returned to the Main Menu as soon as file processing is completed.

4.4 MENU ITEM D: BUILDING DECON COSTS

This part of the CECP allows you to specify, on a building-by-building basis, the concrete and metal surfaces that are to be washed (decontaminated) and the volumes of concrete and metal that are to be removed and subsequently buried. Handrails to be decontaminated and floor gratings to be removed may also be specified. Sometimes portions of walls, ceilings, or floors must be cut out to gain access to the regions beyond. These so-called cascading costs may also be specified in this section of the CECP.

This portion of the CECP creates three files: a **PDD** data file, a building decontamination result file (**PRD**) and a building decontamination summary file (**PSD**). As mentioned in Section 2.2, the user creates the **PDD** file (either from the supplied **DEFAULT.PDD** file or from other **PDD** files the user created earlier), and the CECP creates the result file (**PRD**) and the summary file (**PSD**).

When you select Item D from the Main Menu, the file menu will appear, and you will be prompted to specify which **PD1**, **PD2**, **PDA**, **PDB**, and **PDD** files you want to use as data input files. One file must be entered from each file type. When you select Item D for the first time, the only **PDD** file available to you from the file menu will be the one supplied with the CECP package, **DEFAULT.PDD**.

You create **PDD** files from the data entry screen, an example of which is shown in Figure 4.7. The first line of the screen shows the building to be decontaminated. The second line consists of the field names for the components to be decontaminated or removed. The next 17 lines list the components themselves. (The selector bar is shown over the name of the first component).

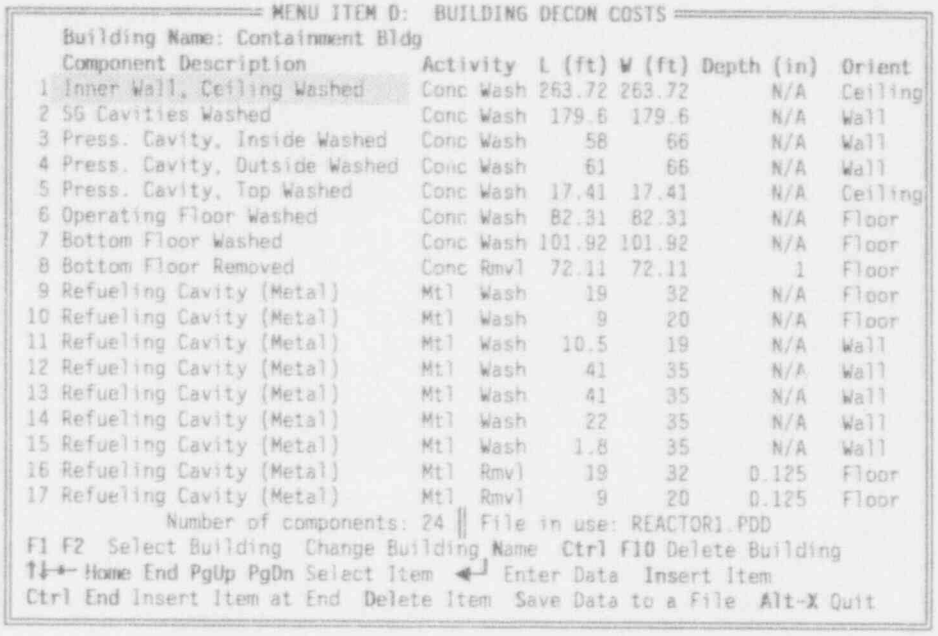

FIGURE 4.7. Data Entry Screen for Menu Item D

The last line, just above the help menu, indicates the total number of building components and the file in use.

4.4.1 Component Definitions

Building decontamination data consist of components, and each component consists of six fields: Component Description, Activity, Length, Width, Depth, and Orientation. (See the line just above the first component in Figure 4.7). A data component is properly defined only when all six of these fields are provided with meaningful values. Each line of data on the screen represents one component. For example, the third line in Figure 4.7 describes a component having the following field values:

Field Name	Field Value
Component Description	Press. Cavity, Inside Washed
Activity	Conc Wash (i.e., concrete wash)
Length	58 (58 feet long)
Width	66 (66 feet wide)
Depth (in)	N/A (depth field not applicable)
Orientation	Wall

Each of these fields is discussed below. The actual process of entering the data is discussed later.

Component Description

This is the name of the component or region to be decontaminated or removed. You may enter any description you like, up to a maximum of 30 characters. While the description is completely arbitrary, you should try to make it be consistent with the activity name and orientation, as in the example above.

Activity

You may select from among the following activities: **Conc Wash** (concrete wash), **Conc Rmvl** (concrete removal), **Mtl Wash** (metal wash), **Mtl Rmvl** (metal removal), **Conc Cttg** (concrete cutting), **Handrails**, and **Gratings**. Note that handrails are decontaminated and not removed, and gratings are removed, not decontaminated.

Length, Width and Depth

In the case of concrete and metal removal, these three parameters define the area and depth of the material to be removed. For example, to specify the removal of a volume of concrete 4 feet long by 3 feet wide by 0.125 inch deep, you would enter 4 into the length field, 3 into the width field, and 0.125 into the depth field. Notice that the length and width fields are in feet and the depth field is in inches. If you know the surface area but not the individual length and width values, you can use the square root of the area for the length and width fields. The first entry shows an example of this: the known surface area of 69548 square feet is represented by length and width values of 263.72 feet.

In the cases of concrete and metal washing and gratings, only the length and width fields are defined. The depth field will be automatically marked **N/A**, and it will not be possible to enter a value in this field.

For concrete cutting, only the length and depth fields are defined (the width field is automatically marked **N/A**). Here, length refers to perimeter of the cut (in feet), and depth refers to the depth of the cut (in inches). For

example, to specify the removal of a rectangular block 4 feet long by 3 feet wide from a concrete wall 12 inches thick, you would enter 14 in the **Length** field and 12 in the **Depth** field.

For handrails, only the **Length** of the rail is defined.

Orientation

Because decontaminating walls and ceilings is more time-consuming and costly than decontaminating floors, it is important that the orientation be specified for certain operations. The **Orient** field is used for this purpose. You may select **Floor**, **Wall**, **Ceiling**, or **Stairs**. Note that for gratings and handrails, the **Orient** field is not defined.

4.4.2 Entering Data

To enter data, use the positioning keys (↑, ↓, →, ←, <PgUp>, <PgDn>, <Home>, <End>) to put the blue selector bar over the item desired and then enter the data. The ↑ and ↓ keys move the selector up and down one line at a time. The <PgUp> and <PgDn> keys move the selector up and down the list a screenful (16 lines) at a time; the <Home> and <End> keys move the selector to the top and bottom of the list. To move from one field to another on the same line, use the → and the ← keys.

With the selector bar positioned as desired, press <Enter>. For all fields but the Activity and Orientation fields, the bar will change color from white-on-blue to yellow-on-red and a cursor will appear, indicating that you may begin entering data. As you enter data, you may use the <Backspace>, <Del>, or the left and right arrow keys (←, →) as needed. The <Ins> key toggles between the insert and typeover modes. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>; the data field will revert to its original blue-on-white color, and the cursor will disappear. If you change your mind while entering data, press <Esc>, and the previous value of that field will be restored.

For the case of the Activity and Orientation fields, you do not actually type in the data. Instead, you put the selector bar over the field and press <Enter> until the desired field name appears.

Adding and deleting components is straightforward. To add a component, place the selector bar anywhere on the line where you want the new component to go, then press <Ins>. As an example, suppose you want to add a new component at line 10. Placing the selector bar anywhere on line 10 and pressing <Ins> produce the result shown in Figure 4.8. Line 10 is now replaced by a new default data component. At this point, replace the **No Name** Component Description with your own description, and then enter your remaining data into the other fields.

Adding a component to the end of the list is slightly different. Place the selector bar on the last item in the list. (Pressing <End> will get you to the end of the list immediately.) Then press <Ctrl-End>. The new default item will appear at the end of the list. Update the fields as described earlier; a total of 100 components may be entered.

An item is deleted by putting the selector bar on the desired line and then pressing <Del>. A warning will appear, asking you to confirm the deletion. To proceed with the deletion, press <Y>. To cancel, press any other key.

MENU ITEM D: BUILDING DECON COSTS

Building Name: Containment Bldg

	Component Description	Activity	L (ft)	W (ft)	Depth (in)	Orient
1	Inner Wall, Ceiling Washed	Conc Wash	263.72	263.72	N/A	Ceiling
2	SG Cavities Washed	Conc Wash	179.6	179.6	N/A	Wall
3	Press. Cavity, Inside Washed	Conc Wash	58	66	N/A	Wall
4	Press. Cavity, Outside Washed	Conc Wash	61	66	N/A	Wall
5	Press. Cavity, Top Washed	Conc Wash	17.41	17.41	N/A	Ceiling
6	Operating Floor Washed	Conc Wash	82.31	82.31	N/A	Floor
7	Bottom Floor Washed	Conc Wash	101.92	101.92	N/A	Floor
8	Bottom Floor Removed	Conc Rmvl	72.11	72.11	1	Floor
9	Refueling Cavity (Metal)	Mtl Wash	19	32	N/A	Floor
10	No Name	Conc Wash	0	0	N/A	Wall
11	Refueling Cavity (Metal)	Mtl Wash	9	20	N/A	Floor
12	Refueling Cavity (Metal)	Mtl Wash	10.5	19	N/A	Wall
13	Refueling Cavity (Metal)	Mtl Wash	41	35	N/A	Wall
14	Refueling Cavity (Metal)	Mtl Wash	41	35	N/A	Wall
15	Refueling Cavity (Metal)	Mtl Wash	22	35	N/A	Wall
16	Refueling Cavity (Metal)	Mtl Wash	1.8	35	N/A	Wall
17	Refueling Cavity (Metal)	Mtl Rmvl	19	32	0.125	Floor

Number of components: 25 ‖ File in use: REACTOR1.PDD

F1 F2 Select Building Change Building Name Ctrl F10 Delete Building

↑↓←→ Home End PgUp PgDn Select Item ↵ Enter Data Insert Item

Ctrl End Insert Item at End Delete Item Save Data to a File Alt-X Quit

FIGURE 4.8. Data Entry Screen for Menu Item D: Adding a Component

So far, the discussion has been confined to a single building. To access other buildings, use <F1> and <F2>. Pressing <F1> moves you down the list of buildings; pressing <F2> moves you up. The CECP can accommodate up to 10 buildings. If data for a building is yet to be entered, the data screen will be essentially blank, as shown in Figure 4.9. For this discussion, assume that data have been entered for only three buildings. This means that Buildings 4 through 10 are undefined, and the names for these buildings are set to their default values: **Bldg 4**, **Bldg 5**, and so on.

To enter data for **Bldg 4** (Figure 4.8), press <N>. The building name field will change from blue-on-gray to yellow-on-red, and a cursor will appear. Type in the building name (up to 30 characters), using the edit keys as desired. Press <Enter> when done. You may now enter data for this building in the manner previously described.

To delete a building from the data base, press <Ctrl> <F10>. The CECP will then ask you to confirm the deletion by pressing the <Y> key. Pressing any other key will cancel the deletion. When a building is deleted, all data for that building will be deleted, the building name will be converted back to

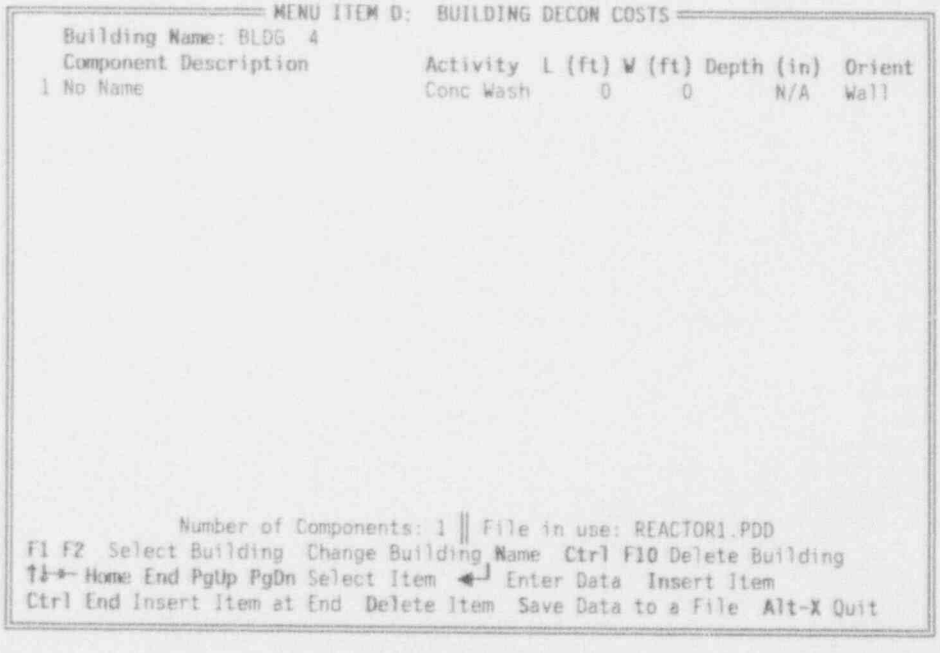

FIGURE 4.9. Data Entry Screen for Menu Item D: A Blank Screen

its original default value (**Bldg N**, where N is a number from 1 to 10), and the screen will once again resemble Figure 4.9.

4.4.3 Data Files

To save your building decon files, press <S> to open the **Save Data to a File** window in the middle of the screen. You will be prompted for a file name. Press <Esc> or <Enter> if you decide not to save your data. Otherwise, type in a file name up to eight letters long and press <Enter>. If, for example, you enter **reactor1**, the CECP will create the two files **REACTOR1.PDD**, a data file, and **REACTOR1.PRD**, a detailed report file in ASCII format which you can print out later at your convenience or examine with your editor or word processor. The CECP will also create **REACTOR1.PSD**, which will be used by the report generator, Menu Item I, to create the general summary report file **REACTOR1.PR1**.

4.4.4 Exiting

To leave the building decontamination portion of the CECP, press <Alt-X>. The **Save Data to a File** window will open as described above, and you will be given a final opportunity to save your work if you have not previously done so. If you elect not to save your work, or have previously done so, press <Enter> or <Esc>, and you will be returned to the Main Menu. If you do save your work at this point, you will be returned to the Main Menu as soon as file processing is completed.

4.5 MENU ITEM E: CONTAMINATED SYSTEMS COSTS

This portion of the CECP creates three files: a **PDE** data file, a contaminated-systems-result file (**PRE**) and a contaminated systems summary file (**PSE**). File creation works much the same as discussed in Section 4.4: the user creates the **PDE** file (either from the supplied **DEFAULT.PDE** file or from other **PDE** files the user created earlier), and the CECP creates the result file (**PRE**) and the summary file (**PSE**).

The **PDE** files are created from a double-wide data-entry screen shown in Figure 4.10. The top part of Figure 4.10 shows the left side of the data screen; the bottom part shows the right half. The first line on both halves

MENU ITEM E: CONTAMINATED SYSTEMS COSTS

System Name: Clean Radioactive Waste Treatment System

	Component Description	Category	Disposal	Quantity*
1	Reactor Coolant Drain Tank	Tank	Sea-Van	1
2	Reactor Coolant Drain Pump	Lg Pump	Sea-Van	2
3	Reactor Coolant Drain Filter	Tank	Mtl Box	1
4	Spent Resin Storage Tank	Tank	Sea-Van	1
5	Clean Waste Recv. Tank	Tank	Sea-Van	2
6	Clean Waste Recv. Pump	Lg Pump	Sea-Van	2
7	Treated Waste Mon. Tank	Tank	Sea-Van 0	2
8	Treated Waste Mon. Pump	Lg Pump	Sea-Van	2
9	Aux Building Drain Tank	Tank	Sea-Va:	1
10	Aux Building Drain Pump	Lg Pump	Sea-Van	2
11	Chemical Waste Drain Tank	Tank	Sea-Van	1
12	Chemical Waste Drain Pump	Lg Pump	Sea-Van	2
13	Waste Conc. Hold. Tank	Tank	Sea-Van	1
14	Waste Conc. Hold. Pump	Lg Pump	Sea-Van	1
15	Clean Waste Filter	Tank	Mtl Box	1

*NOTE: For piping, Quantity refers to feet of piping. For other categories, Quantity refers to the number of items of equipment.

Number of records: 19 ‖ File in use: REACTOR1.PDE

F1 F2 Select System Change System Name Ctrl F10 Delete System

↑↓→← Home End PgUp PgDn Select Item ↵ Enter Data Insert Item

Ctrl End Insert Item at End Delete Item Save Data to a File Alt-X Quit

MENU ITEM E: CONTAMINATED SYSTEMS COSTS

System Name: Clean Radioactive Waste Treatment System

	Volume (ft3)	Weight (lb)	Diameter*	Length*	Millirem/Hr
1	N/A	1670	3	8	100
2	8	500	1	0.167	100
3	N/A	350	1.3	4.7	100
4	N/A	6800	9	11	100
5	N/A	10958	10	30	100
6	8	500	1	0.167	100
7	N/A	11200	10	26	100
8	3	230	1	0.167	100
9	N/A	2090	6	9	50
10	12	1300	1	0.167	50
11	N/A	5400	10	15	50
12	3	200	1	0.167	50
13	N/A	2090	6	10	1000
14	3	230	1	0.167	1000
15	N/A	67	0.6	2.2	100

*NOTE: Diameters and lengths of valves and diameters of piping are in inches. Diameters and lengths of other equipment (if applicable) are in feet.

Number of records: 19 ‖ File in use: REACTOR1.PDE

F1 F2 Select System Change System Name Ctrl F10 Delete System

↑↓→← Home End PgUp PgDn Select Item ↵ Enter Data Insert Item

Ctrl End Insert Item at End Delete Item Save Data to a File Alt-X Quit

FIGURE 4.10. Left and Right Halves of the Data Entry Screen for Menu Item E

of this screen shows the contaminated system. The second line consists of the field names for the system components. The next seventeen lines list the components themselves. (The selector bar is shown over the name of the first system component.) The last line, just above the help menu, indicates the total number of components in the system and the file in use.

4.5.1 Component Definitions

Contaminated system data consist of components. Each component has 9 fields, the first four appearing on the left screen, the remainder on the right. The nine fields are Component Description, Category, Disposal, Quantity, Volume, Weight, Tank Diameter, Tank Height, and Dose Rate. A data component is properly defined only when all nine of these fields are provided with meaningful values. Each line of data on these screens represents one component. For example, line 4 of Figure 4.10 describes a component having the following field values:

Field Name	Field Value
Component Description	Spent Resin Storage Tank
Category	Tank
Disposal	Sea-Van (A modified maritime container)
Quantity	1
Volume	N/A (Volume not required for tanks)
Weight	6800 (6800 pounds)
Tank Diameter	9 (9 feet)
Tank Height	11 (11 feet)
Dose Rate	100 (100 millirem/hr at shutdown)

Each of these fields is described below. Procedures for entering data are discussed later.

Component Description

This is the name of the contaminated system component that is to be removed. You may enter any description you like, up to a maximum of 42 characters. The description is arbitrary, but you should try to make it consistent with the category name, as in the example above.

Category

You may select from among the following categories:

1. **Lg Pipe** (piping diameter greater than 3 inches)
2. **Sm Pipe** (piping diameter 3 inches or less)
3. **Lg Valve** (valves greater than 3 inches)
4. **Sm Valve** (valves 3 inches or smaller)
5. **Tank**
6. **Lg Pump** (pumps greater than 100 pounds)
7. **Sm Pump** (pumps 100 pounds or less)
8. **Lg HX** (Heat exchangers greater than 100 pounds)
9. **Sm HX** (Heat exchangers 100 pounds or less)
10. **Lg Misc.** (miscellaneous equipment greater than 100 pounds)
11. **Sm Misc.** (miscellaneous equipment less than 100 pounds)

Disposal

Disposal refers to the disposal container to be used and whether the shipment is contaminated. If you want the components to be shipped by B-25 metal container, use **Mtl Box** for contaminated shipments or **Mtl Box 0** for uncontaminated shipments. The B-25 container is 4 feet wide, 4 feet high, and 6 feet long, but you can specify different dimensions, as discussed in Section 3.1.1. To ship components by modified maritime container, use **Sea-Van** for contaminated shipments or **Sea-Van 0** for uncontaminated shipments. The maritime container is 8 feet wide, 4 feet high, and 20 feet long.

Quantity

Quantity is simply the number of items to be disposed of. In line 2 of Figure 4.10, for example, two reactor coolant drain pumps are shown. In the case of piping, quantity is the number of feet.

Volume

This is the volume, in cubic feet, of **each** item listed under quantity. That is, (quantity x volume) is the total volume of the components. In the case of piping, volume is the volume (in cubic feet) of one linear foot of piping. This field is marked **N/A** for tanks, because most tanks will be cut up for disposal, and the CECP will calculate effective tank volumes for you.

Weight

This is the weight, in pounds, of each item listed under quantity. Thus (quantity x weight) is the total weight of the components. For piping, weight is the weight (in pounds) of one liner foot of piping.

Diameter and Length

For valves and piping, units are in inches. But note that piping length is specified under Quantity, above. For other equipment, units are in feet.

Millirem/Hr

This is the average dose rate, in millirem/hour, that the removal crew will be subjected to while removing that component, assuming work is done immediately after shutdown.

4.5.2 Entering Data

To enter data, use the positioning keys (↑, ↓, →, ←, <PgUp>, <PgDn>, <Home>, and <End>) to put the blue selector bar over the item desired and then type in the data. The ↑ and ↓ keys move the selector up and down one line at a time. The <PgUp> and <PgDn> keys move the selector up and down the list a screenful (14 lines) at a time; the <Home> and <End> keys move the selector to the top and bottom of the list. To move from one field to another on the same line, use the → and the ← keys. Pressing → when the selector is over the Quantity field will cause the display to shift to the right half of the screen, allowing access to the Volume, Weight, Tank Diameter, Tank Height, and Dose Rate fields. Similarly, pressing ← when the selector is over the Volume field will shift the display back to the left half of the screen.

When the selector bar is positioned as desired, press <Enter>. For all fields but Category and Disposal, the bar will change color from white-on-blue to yellow-on-red, and a cursor will appear. This indicates that you may begin entering data. When typing in the data, you may use the <BackSpace>, <Del>, or left and right arrow keys (←, →) as needed. The <Ins> key toggles between the insert and typeover modes. A beep indicates that you tried to enter an illegal character. When satisfied with your entry, press <Enter>; the data field will revert to its original blue-on-white color, and the cursor will

disappear. If you change your mind while entering data, press <Esc>; the previous value of that field will be restored.

For the case of the Category and Disposal fields, you do not actually type in the data. Instead, put the selector bar over the field and press <Enter> until the desired field name appears.

Adding and deleting system components are done in the same manner as described in Section 4.4.2 and will not be repeated here.

4.5.3 Saving Files and Exiting

Files are saved as described in Section 3.1.3, except that they are saved with the **PDE** extension. Thus, if you save the file with the name **REACTOR1**, a **REACTOR1.PDE** file is created. In addition to this file, the CECP also creates a **REACTOR1.PRE** file and a **REACTOR1.PSE** file. The **REACTOR1.PRE** file is a detailed report file listing the contaminated system items removed and their associated transportation and burial costs. Occupational radiation doses are also given. This file is discussed in greater detail in Section 7.0. The **REACTOR1.PSE** file is a binary data file used by the CECP in Menu Item I to construct **REACTOR1.PRI**. You exit this portion of the CECP and return to the Main Menu as described in Section 3.1.4.

4.6 MENU ITEM F: NUCLEAR STEAM SUPPLY SYSTEM (NSSS) COSTS

Menu Item F creates three files: a **PDF** data file, a result file (**PRF**) containing detailed cost and exposure information on RPV and RPV internals, and a summary file (**PSF**). File creation works much the same as discussed in Sections 4.4 and 4.5: the user creates the **PDF** file (either from the supplied **DEFAULT.PDF** file or from other **PDF** files the user created earlier), and the CECP creates the result file (**PRF**) and the summary file (**PSF**).

When you select Item F from the Main Menu, the file menu will appear, and you will be prompted to specify which **PD1**, **PDA**, **PDB**, and **PDF** files you want to use as data input files. One file from each file type must be entered. When you select Item F for the first time, the only **PDF** file available to you from the file menu will be the one supplied with the CECP package, **DEFAULT.PDF**.

Figure 4.11 shows the input screen for Menu Item F. It is from this input screen that you create new PDF files. The general screen layout should be familiar frbm previous discussions and will not be discussed further.

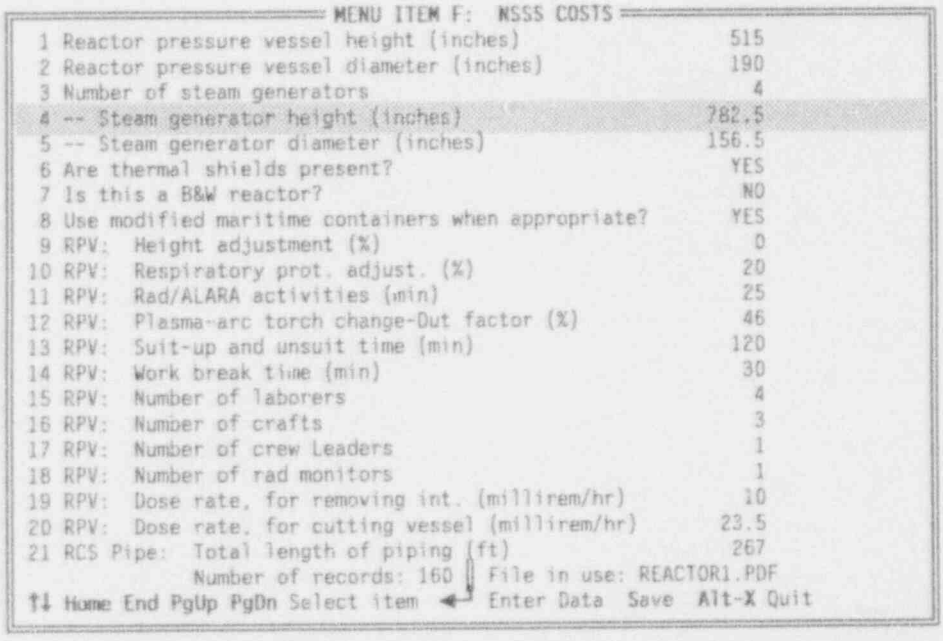

FIGURE 4.11. Data Entry Screen for Menu Item F

4.6.1 Contents of a PDF File

A **DEFAULT.PDF** file is shown in Table 4.1. There are 12 categories of NSSS system components listed in this file:

General Data (Items 1-8)
Reactor Pressure Vessel (9-20)
Reactor Coolant System Piping (21-37)
Large Miscellaneous Piping (38-54)
Small Miscellaneous Piping (55-71)
RCS Insulation (72-73)
Pressurizer (74-95)
Reactor Coolant System Pumps (96-115)
Fuel Racks (116-119)
Biological Shield (120-150)
Chemical Decontamination of RCS (151-157)
Boron Disposal (158-160)

An explanation of each item in the file is given below.

TABLE 4.1. Contents of DEFAULT.PDF

1	Reactor pressure vessel height (inches)	515.000
2	Reactor pressure vessel diameter (inches)	190.000
3	Number of steam generators	4
4	-- Steam generator height (inches)	782.500
5	-- Steam generator diameter (inches)	156.500
6	Are thermal shields present?	YES
7	Is this a B&W reactor?	NO
8	Use modified maritime containers when appropriate?	YES
9	RPV: Height adjustment (%)	0.000
10	RPV: Respiratory prot. adjust. (%)	20.000
11	RPV: Rad/ALARA activities (min)	25.000
12	RPV: Plasma-arc torch change-out factor (%)	46.000
13	RPV: Suit-up and unsuit time (min)	120.000
14	RPV: Work break time (min)	30.000
15	RPV: Number of laborers	4.000
16	RPV: Number of crafts	3.000
17	RPV: Number of crew leaders	1.000
18	RPV: Number of rad monitors	1.000
19	RPV: Dose rate, for removing int. (millirem/hr)	10.000
20	RPV: Dose rate, for cutting vessel (millirem/hr)	23.500
21	RCS Pipe: Total length of piping (ft)	267.000
22	RCS Pipe: Total weight of piping (lb)	226070.000
23	RCS Pipe: Total volume of piping (ft3)	1758.000
24	RCS Pipe: Rmvl. time (in minutes)	190.000
25	RCS Pipe: Height adjustment (%)	10.000
26	RCS Pipe: Respiratory prot. adjust. (%)	20.000
27	RCS Pipe: Rad/ALARA activities (min)	25.000
28	RCS Pipe: Suit-up and unsuit time (min)	120.000
29	RCS Pipe: Work break time (min)	30.000
30	RCS Pipe: Number of laborers	3.000
31	RCS Pipe: Number of crafts	1.500
32	RCS Pipe: Number of crew leaders	0.500
33	RCS Pipe: Number of rad monitors	0.500
34	RCS Pipe: Absorbent material (ft2)	20.000
35	RCS Pipe: Plastic (ft2)	50.000
36	RCS Pipe: Gases (hours)	0.330
37	RCS Pipe: Dose rate (millirem/hr)	300.000
38	Lg Pipe: Total length of piping (ft)	600.000
39	Lg Pipe: Total weight of piping (lb)	28270.000
40	Lg Pipe: Total volume of piping (ft3)	306.000
41	Lg Pipe: Rmvl. time (in minutes)	87.000
42	Lg Pipe: Height adjustment (%)	10.000
43	Lg Pipe: Respiratory prot. adjust (%)	20.000
44	Lg Pipe: Rad/ALARA activities (min)	25.000
45	Lg Pipe: Suit-up and unsuit time (min)	120.000
46	Lg Pipe: Work break adjustment time (min)	30.000
47	Lg Pipe: Number of laborers	3.000
48	Lg Pipe: Number of crafts	1.500
49	Lg Pipe: Number of crew leaders	0.500
50	Lg Pipe: Number of rad monitors	0.500
51	Lg Pipe: Absorbent material (ft2)	15.000
52	Lg Pipe: Plastic (ft2)	37.500
53	Lg Pipe: Gases (hours)	0.033
54	Lg Pipe: Dose rate (millirem/hr)	300.000
55	Sm Pipe: Total length of piping (ft)	1600.000
56	Sm Pipe: Total weight of piping (lb)	3140.000
57	Sm Pipe: Total volume of piping (ft3)	34.000

TABLE 4.1. (contd)

58	Sm Pipe:	Rmvl. time (in minutes)	61.000
59	Sm Pipe:	Height adjustment (%)	10.000
60	Sm Pipe:	Respiratory prot. adjust. (%)	20.000
61	Sm Pipe:	Rad/ALARA activities (min)	25.000
62	Sm Pipe:	Suit-up and unsuit time (min)	120.000
63	Sm Pipe:	Work break time (min)	30.000
64	Sm Pipe:	Number of laborers	3.000
65	Sm Pipe:	Number of crafts	1.500
66	Sm Pipe:	Number of crew leaders	0.500
67	Sm Pipe:	Number of rad monitors	0.500
68	Sm Pipe:	Absorbent material (ft2)	10.000
69	Sm Pipe:	Plastic (ft2)	25.000
70	Sm Pipe:	Gases (hours)	0.017
71	Sm Pipe:	Dose rate (millirem/hr)	300.000
72	RCS Insulation Volume (ft3)		5120.000
73	RCS Insulation Weight (lb)		3200.000
74	Pressurizer:	Weight (lb)	195500.000
75	Pressurizer:	Volume (ft3)	2440.000
76	Pressurizer:	Rmvl. time (in minutes)	480.000
77	Pressurizer:	Height adjustment (%)	10.000
78	Pressurizer:	Respiratory prot. adj. (%)	20.000
79	Pressurizer:	Rad/ALARA activities (min)	25.000
80	Pressurizer:	Suit-up and unsuit time (min)	120.000
81	Pressurizer:	Work break time (min)	30.000
82	Pressurizer:	Number of laborers	3.000
83	Pressurizer:	Number of crafts	1.500
84	Pressurizer:	Number of crew leaders	0.500
85	Pressurizer:	Number of rad monitors	0.500
86	Pressurizer:	Absorbent material (ft2)	200.000
87	Pressurizer:	Plastic (ft2)	500.000
88	Pressurizer:	Gases (hours)	0.330
89	Pressurizer:	Dose rate (millirem/hr)	300.000
90	Pressurizer:	Transport cradle ($)	5000.000
91	Pressurizer:	Barge/rail transport ($)	23075.520
92	Pressurizer:	Unloading/misc. trans. ($)	149218.200
93	Pressurizer:	Relief tank diameter (ft)	10.700
94	Pressurizer:	Relief tank height (ft)	27.000
95	Pressurizer:	Relief tank weight (lb)	27200.000
96	RCS Pumps:	Number of pumps	4.000
97	RCS Pumps:	Total weight all pumps (lb)	762400.000
98	RCS Pumps:	Total volume (ft3)	4200.000
99	RCS Pumps:	Rmvl. time (1 pump, minutes)	480.000
100	RCS Pumps:	Height adjustment (%)	10.000
101	RCS Pumps:	Respiratory prot. adj. (%)	20.000
102	RCS Pumps:	Rad/ALARA activities (min)	25.000
103	RCS Pumps:	Suit-up and unsuit time (min)	120.000
104	RCS Pumps:	Work break time (min)	30.000
105	RCS Pumps:	Number of laborers	3.000
106	RCS Pumps:	Number of crafts	1.500
107	RCS Pumps:	Number of crew leaders	0.500
108	RCS Pumps:	Number of rad monitors	0.500
109	RCS Pumps:	Absorbent material (ft2)	200.000
110	RCS Pumps:	Plastic (ft2)	500.000
111	RCS Pumps:	Gases (hours)	0.330
112	RCS Pumps:	Dose rate (millirem/hr)	300.000
113	RCS Pumps:	One shipping cradle ($)	5000.000
114	RCS Pumps:	Barge/rail transport ($/pump)	23075.520
115	RCS Pumps:	Unloading/misc. trans. ($/pump)	149218.200

TABLE 4.1. (contd)

116	Fuel Racks:	Number of fuel assemblies	1408.000
117	Fuel Racks:	Special container, ea ($)	5273.000
118	Fuel Racks:	Removal contract ($)	661500.000
119	Fuel Racks:	Dose rate (millirem/hr)	1.000
120	Biol Shld:	Height of shield to be removed (ft)	21.000
121	Biol Shld:	Inside diameter of shield (ft)	20.000
122	Biol Shld:	Outside diameter of shield (ft)	28.000
123	Biol Shld:	Initial equipment set up (minutes)	120.000
124	Biol Shld:	Install equipment (minutes/layer)	60.000
125	Biol Shld:	Ins. mats/start fog spray (min/blast)	30.000
126	Biol Shld:	Evac. area/ignite charges (min/blast)	15.000
127	Biol Shld:	Rmv. mats/stop fog spray (min/blast)	30.000
128	Biol Shld:	Remove rubble (minutes/blast)	120.000
129	Biol Shld:	Final cleanup and survey (minutes)	240.000
130	Biol Shld:	Drill 1 hole (minutes)	10.000
131	Biol Shld:	Place charge in 1 hole (minutes)	5.000
132	Biol Shld:	Verify 1 charge has detonated (min)	1.000
133	Biol Shld:	Cut 1 piece of re-bar w/torch (min)	2.000
134	Biol Shld:	Number of crew leaders	1.000
135	Biol Shld:	Number of laborers	2.000
136	Biol Shld:	Number of skilled workers	2.000
137	Biol Shld:	Number of explosive demolition experts	1.000
138	Biol Shld:	Number of rad monitors	0.500
139	Biol Shld:	Height adjustment (%)	10.000
140	Biol Shld:	Respiratory prot. adj. (%)	20.000
141	Biol Shld:	Rad/ALARA activities (min)	25.000
142	Biol Shld:	Suit-up and unsuit time (min)	120.000
143	Biol Shld:	Work break time (min)	30.000
144	Biol Shld:	Crew dose rate (millirem/hr)	50.000
145	Biol Shld:	Blasting mats ($/day)	22.000
146	Biol Shld:	Blasting caps ($ each)	1.790
147	Biol Shld:	explosives ($/lb)	1.330
148	Biol Shld:	track drill bits ($ each)	165.600
149	Biol Shld:	Air compressor, 750 CFM ($/month)	2575.000
150	Biol Shld:	Fog spray system nozzles ($ each)	139.090
151	Chem Decon:	Subcontractor costs ($)	13250000.000
152	Chem Decon:	Energy costs ($)	302900.000
153	Chem Decon:	Time required to perform decon (days)	135.000
154	Chem Decon:	Person-hours	8448.000
155	Chem Decon:	Estimated dose (person-rem)	45.700
156	Chem Decon:	Num of HICs req'd for chem decon	18.000
157	Chem Decon:	Num of HICs req'd for spent IX resin	5.000
158	Boron Disp:	Volume of boric acid solution (gal)	179100.000
159	Boron Disp:	Vendor disposal cost ($/gal)	6.000
160	Boron Disp:	Days required to pelletize above soln	164.000

1-6: Self-explanatory.

7: A Babcock and Wilcox (B&W) reactor has three steam generator nozzles per steam generator; other reactors have two.

8: Answering this item with a **NO** will cause the CECP to use B-25 containers for the disposal of all NSSS piping and insulation and the pressurizer relief tank. If this item is marked **YES**, the modified

maritime container will be used for these components. It is strongly recommended that the you always answer this item YES.

9-11: Defined in Section 3.2.1.

12: This is a work difficulty factor based on the failure rate and changeout time for a plasma-arc cutting torch. This factor lengthens the time required to cut up the RPV internals. A factor of 46%, for example, means that, due to torch failures, the cutting time is increased by 46%. This work difficulty factor is applied only to cutting up the reactor internals.

13-18: Defined in Section 3.2.1.

19-20: Cutting the RPV internals will be done underwater by manipulators. Cutting the RPV vessel will be done at a later time, in air. Items 19 and 20 allow you to specify the dose rates, at reactor shutdown, for these two operations.

21-23: Self-explanatory.

24: The time in minutes associated with setting up all equipment and decontamination controls, making one circumferential cut, and then removing all equipment and moving on to the next cut location. This does not take into account any work difficulty factors or nonproductive time adjustments (Items 25-29).

25-37: Defined in Section 3.2.1.

38-71: These items have the same meanings as the corresponding ones in the RCS category (21-37).

72-73: This is the insulation removed from the various RCS components.

74-89: Items 74 and 75 are self-explanatory. Items 76-89 have their usual meanings. As always, the removal time (76) does not include the work difficulty factors (77-78) or nonproductive time factors (79-81).

90: The cost of the pressurizer shipping cradle, a modified steam generator cradle.

91: The cost of transporting the pressurizer by barge or rail.

92: The cost of removing the pressurizer from the barge or rail and then transporting it to the low-level burial site.

93-95: Self-explanatory.

96-115: These terms are either self-explanatory or have the same meanings as the corresponding ones for pressurizer removal.

116-119: The fuel racks will be removed by a contractor at the cost specified by Item 118. This contract cost does not include transportation or burial charges.

Based on the number of assemblies specified by Item 116, the CECP will estimate the number of special containers (117) that will be required to transport the fuel racks to the burial site. Item 119 is the average dose rate, in millirem/hour, above and at the edge of the SFP at the time the work is performed.

120-150: The activated portion of the reactor biological shield must be removed from the containment building by controlled drilling and blasting. The concrete bioshield is in the shape of a hollow cylinder, which will be removed in layers. Each layer consists of several concentric rings (the exact number of rings and layers is determined by the CECP, based on the values given in items 120-122). After one set of rings has been removed, the next set in the layer beneath is removed, and so on, until all sets have been removed. Because the rings are large, only half a ring will be removed at a time.

To remove the rings, a track drill is used to drill holes into the concrete on 2-foot centers, parallel to the axis of the cylinder. Explosives are inserted into the holes and back-filled with sand. After installing blasting mats and starting the fog spray system, the explosive charges are detonated.

Item 123 is the time required to set up all equipment for the complete job. Item 129 is the cleanup time after all drilling and blasting is completed. Item 124 is the equipment setup time for each layer. Items 125-128 specify the lengths of time required to perform the tasks associated with each blast (a blast removes one half of one ring of concrete). These tasks include installing the blasting mats and starting the fog spray system (125), evacuating the area and igniting the charges (126), etc.

Items 130-133 are self-explanatory.

Items 134-143 have their usual meanings.

Item 144 is the estimated dose rate at shutdown.

Items 145-150 are the material costs in the units specified.

151-157: The chemical decontamination of the reactor coolant system is performed by a subcontractor at a cost specified by Item 151. Item 151 includes both the decontamination cost itself and the subsequent water treatment and release costs.

Total energy costs incurred during chemical decontamination operations are specified in Item 152. Primary contributors to these costs are the electrical costs associated with running the RCS and other pumps.

The remaining items are self-explanatory.

158-160: Deborating the primary system results in a large volume of concentrated boric acid solution. Items 158-160 refer to the disposition of this solution by a vendor. Item 158 is merely the volume of the solution, in gallons, and Item 159 is the vendor's processing charge in $/gallon. The end product, a pelletized powder, is then packaged in 55-gallon drums and shipped to the burial site. Shipping and burial charges are not included in the vendor's processing fee. Item 160 is self-explanatory.

4.6.2 Entering Data, Saving Files, and Exiting

Data entry is the same as for **PD1** files, Section 3.1.2, except that, in lines 6 through 8, pressing <Enter> will cause the field to toggle between **YES** and **NO**.

You save files as described in Section 3.1.3, except that files are saved with the **PDF** extension. Thus, if you save a file with the name **REACTOR1**, a **REACTOR1.PDF** file is created. In addition to this file, the CECP also creates a **REACTOR1.PRF** file and a **REACTOR1.PSF** file. The **REACTOR1.PRF** file is a detailed output file, showing the costs associated with removing the reactor pressure vessel and its internals. The **REACTOR1.PSF** file is binary data file used by the CECP in Menu Item I to construct the **REACTOR1.PRI**. You exit this portion of the CECP and return to the Main Menu as described in Section 3.1.4.

4.7 MENU ITEM G: MANPOWER COSTS

This portion of the CECP allows you to enter utility and DOC manpower costs for each decommissioning period. These costs are saved in **PDG** files. When you select Item G from the Main Menu, the file menu will appear, and you will be prompted in succession to specify which **PD1**, **PDB**, and **PDG** files you want to use as data input files. When you select Item G for the first time, the only **PDG** file available to you from the file menu will be the one supplied with the CECP package, **DEFAULT.PDG**. The labor costs used in **DEFAULT.PDG** are

representative of labor costs at the Trojan Plant located in Rainier, Oregon. The utility overhead positions were supplied by the Portland General Electric Company, the majority owner and operator of the Trojan plant.

Once the **PD1**, **PDB**, and **PDG** files have been chosen, the input data screen (Figure 4.12) appears, allowing you to create new **PDG** files.

The first line of this screen lists the manpower fields: Job Description, Annual Salary, Organization, and Person-Years per Period. This last field requires an entry for each of the periods you defined in your schedule file (**PDB**). For line item 15, for example, the Job Description is **Health Physics Manager**, the salary is **55950**, the organization is **U** (for utility) and the Person-Years per Period are **0.125**, **0.62**, **0.63**, **0**, and **0**. If a period is not used, you should enter a **0**. Notice that salaries are calculated on a per-period basis, not on an annual basis.

The organization codes are **U**, **D**, and **N**, which stand for "Utility," "DOC," and "Neither." Use **N** for safety consultants, other specialists, or specialty contractors who are not part of the utility or DOC staffs. Do not include overhead costs when entering annual salaries for utility or DOC

MENU ITEM G: MANPOWER COSTS

	Job Description	Salary	Org	Person-yrs per Period				
1	Plant Manager	91210	U	0.125	0.62	0.63	1.7	0
2	Assistant Plant Manager	73820	U	0.125	0.62	0.63	0	0
3	Secretary	20500	U	0.125	3.69	0.63	1.7	0
4	Clerk	19120	U	0	9.85	3.15	6.8	0
5	Accountant	48610	U	0	1.23	0.63	1.7	0
6	Contracts/Procurement Spec.	48610	U	0.625	1.85	0.63	1.7	0
7	Industrial Safety Specialist	47600	U	0	1.85	0.63	1.5	0
8	Planning/Scheduling Engineer	52630	U	0	0.62	0	0	0
9	Radioactive Ship. Specialist	55950	U	0	1.85	0.63	1.5	0
10	Chemistry Supervisor	52630	U	0.25	0.62	0	0	0
11	Chemistry Technician	30290	U	0	2.46	0.63	0.4	0
12	Quality Assurance Manager	61140	U	0.625	0.62	0	0	0
13	Quality Assurance Engineer	34710	U	0	2.46	0	1.7	0
14	Quality Assurance Technician	30290	U	0	4.92	0.63	0	0
15	Health Physics Manager	55950	U	0.125	0.62	0.63	0	0
16	Sr. Health Physics Technician	51440	U	0	2.46	1.89	0	0
17	Health Physics/ALARA Planner	51440	U	0	0.62	0	1.7	0
18	Health Physics Technician	31710	U	0	9.85	0	0	0
19	Nuclear Records Specialist	43260	U	0.25	0.62	0.63	1.7	0

Number of records: 68 | File in use: REACTOR1.PDG

↑↓←→ Home End PgUp PgDn Move Bar ↵ Enter Data Insert Item Delete Item
Ctrl End Insert Item at Bottom of List Save Data to a File Alt-X Quit

FIGURE 4.12. Data Entry Screen for Menu Item G

personnel; the CECP will calculate these costs automatically. If the organization code is **U**, the salary, including overhead, is calculated as

Salary w/overhead = (1 + (utility overhead)/100) X (annual salary),

where "utility overhead" is line 8 of the **PD1** file you specified.

If the organization code is **N**, the salary with overhead is:

Salary w/overhead = (1 + (DOC overhead)/100) X (1 + (DOC profit)/100) X (annual salary),

where "DOC overhead" and "DOC profit" are lines 9 and 10 of the same **PD1** file.

No overhead costs are calculated for the **N** category, so if you want to allow for overhead costs in this category, include them in the annual salary.

4.7.1 Entering Data, Saving Files, and Exiting

Data entry is very similar to the procedures discussed in Section 4.4 or 4.5 and won't be repeated here. Note that the organization field is set by pressing <Enter> until the desired value (**U**, **D**, or **N**) appears. To specify that a manpower position is also a radiation worker position, precede the description with a tilde (~) as in line 16 or 18 in Figure 4.12. The CECP makes additional calculations for radiation workers to determine their occupational radiation exposures and protective clothing costs.

You save files as described in Section 3.1.3, except that files are saved with the **PDG** extension. Thus, if you save a file with the name **REACTOR1**, a **REACTOR1.PDG** file is created. In addition to this file, the CECP also creates **REACTOR1.PRG**, a complete listing of manpower costs by period, and **REACTOR1.PSG**, a binary data file used by the CECP in Menu Item I to construct **REACTOR1.PRI**. You exit this portion of the CECP and return to the Main Menu as described in Section 3.1.4.

4.8 MENU ITEM H: UNDISTRIBUTED COSTS

This portion of the CECP allows you to enter property taxes, insurance costs, and other undistributed costs for each decommissioning period. These

costs are saved in **PDH** files. When you select Item H from the Main Menu, the file menu will appear, and you will be prompted to specify which **PDA**, **PDB**, and **PDH** files you want to use as data input files. When you select Item H for the first time, the only **PDH** file available to you from the file menu will be the one supplied with the CECP package, **DEFAULT.PDH**.

Once the **PDA**, **PDB**, and **PDH** files have been chosen, the input data screen (Figure 4.13) appears, allowing you to create new **PDH** files.

For each decommissioning period, you may enter data for the following items:

1. Average annual property taxes
2. Average annual nuclear insurance costs
3. Regulatory costs per period (not annual costs)
4. DOC mobilization and de-mobilization costs
5. Energy consumption fraction
6. Environmental monitoring.

Figure 4.13 shows all six of these items for the first three periods and the first three items for period 4. Notice that property taxes (Item 1) and insurance (Item 2) are on an annual basis. Because the CECP has already

MENU ITEM H: UNDISTRIBUTED COSTS

1	Period 1:	Property Taxes ($/year)	0
2		Insurance ($/year)	0
3		Regulatory Costs ($)	357330
4		DOC Mobil/Demobil ($)	0
5		Energy Consumption Fraction	0
6		Environ. Monitoring ($/yr)	0
7	Period 2:	Property Taxes ($/year)	0
8		Insurance ($/year)	2768600
9		Regulatory Costs ($)	370800
10		DOC Mobil/Demobil ($)	0
11		Energy Consumption Fraction	1
12		Environ. Monitoring ($/yr)	48603
13	Period 3:	Property Taxes ($/year)	9000
14		Insurance ($/year)	600000
15		Regulatory Costs ($)	22579.2
16		DOC Mobil/Demobil ($)	0
17		Energy Consumption Fraction	0.005708
18		Environ. Monitoring ($/yr)	4860
19	Period 4:	Property Taxes ($/year)	90000
20		Insurance ($/year)	1198600
21		Regulatory Costs ($)	1024335

Using File REACTOR1.PDH

↑↓ Home End PgUp PgDn Select item ↵ Enter Data Save Alt-X Quit

FIGURE 4.13. Data Entry Screen for Menu Item H

loaded your **PDB** file, it knows how long each period is and can calculate these costs for each period. Regulatory costs (Item 3) are costs associated with applicable state or NRC safety and security inspections. These costs are on a per-period basis.

There are significant costs associated with a contractor establishing itself at the work site. These costs include obtaining temporary office facilities, obtaining the required special equipment, and assembling the work force. There are similar costs for closing down the work site. All these costs are covered by Item 4.

The energy consumption fraction (Item 5) is the fraction of total site energy costs that is to be allocated to decommissioning activities. Enter a decimal number from 0 to 1. If you enter 1, all site energy costs will be allocated to decommissioning; if you enter 0, the utility will pay all energy costs.

Environmental monitoring (Item 6) is the annual cost of monitoring the extent and consequences of releases of radioactivity or chemicals from the nuclear power plant. Such monitoring is conducted by a specialty contractor. The percentage of monitoring costs you charge to decommissioning depends on the amount of active decommissioning work done during each period. For the example used in **REACTOR1.PDH**, no monitoring costs were assigned for period 1, 100% ($48603/year) were assigned in period 2, 10% ($4860/year) were assigned in period 3, and 100% were assigned in period 4.

4.8.1 Entering Data, Saving Files, and Exiting

Data is entered in precisely the same manner that was described in Section 3.1.2. You save files as described in Section 3.1.3, except that files are saved with the **PDH** extension. Thus, if you save a file with the name **REACTOR1**, a **REACTOR1.PDH** file is created. In addition to this file, the CECP also creates **REACTOR1.PSH**, a binary data file used by the CECP in Menu Item I to construct **REACTOR1.PRI**, the result summary file. Exit this portion of the CECP and return to the Main Menu as described in Section 3.1.4.

4.9 MENU ITEM I: FINAL SUMMARY REPORT

This part of the CECP creates a site summary of all decommissioning cost estimates. When you select Item I from the Main Menu, the file menu will appear, and you will be prompted to specify which **PD1** file to use. The screen shown in Figure 4.14 will then appear. From this screen, you select the case study for which you want to get a summary report. You may also copy and delete files from this menu.

To obtain a summary report for a case study, move the selector bar up or down to pick the study you want. Assume you pick REACTOR2. Then the screen will appear as shown in Figure 4.15. This screen applies **only** to decommissioning studies that are variations of a base case. Suppose, for example, that Reactor1 is your primary case study for a certain reactor. You decide it would be interesting to see how increasing the work difficulty factors will increase overall decommissioning costs. To do this you run another case, Reactor2, say, which is identical to Reactor1, except that you have increased the work difficulty factors in files **REACTOR2.PD2**, **REACTOR2.PD3**, and **REACTOR2.PDF**. You create all your other Reactor2 files in

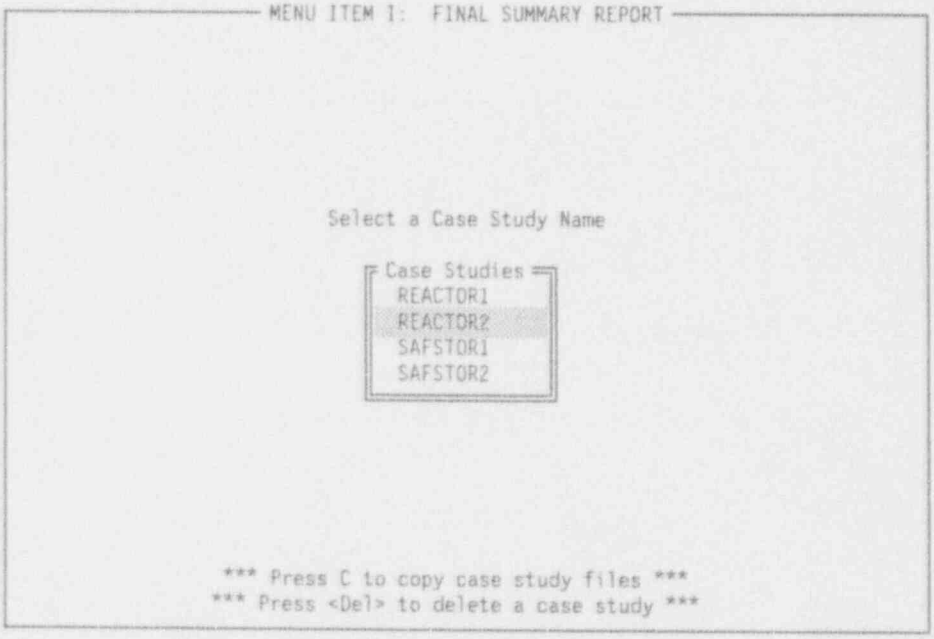

FIGURE 4.14. Selecting a Case Study

in the usual way. They will be identical to the corresponding Reactor1 files except that they will have the **REACTOR2** prefix. Now you run Menu Item I to generate a summary for the Reactor2 case. Since Reactor2 is a "sensitivity case" (a variation of a base case study), you may want to answer "yes" to the prompt in Figure 4.15. Doing so will cause the screen to change as shown in Figure 4.16. Since Reactor1 is the base case for Reactor2, you would select **REACTOR1** and press <Enter>. The CECP will now automatically create new **REACTOR2.PDB**, **REACTOR2.PDG**, **REACTOR2.PRG** and **REACTOR2.PDH** files and create appropriate new summary files (**REACTOR2.PSG** and **REACTOR2.PSH**) to reflect the increased person-hours that were a result of the increased work difficulty factors.

Whether or not you decide to make use of the sensitivity case option, the CECP will now proceed to create the summary by combining data from all the summary files (**PSC** through **PSH**) with the information obtained from the input file (**DEFAULT.PD1**). The result is **REACTOR2.PRI**, the summary report for the Reactor2 case. The CECP will report when it has completed building the summary file. You then press <ESC> to return to the Main Menu.

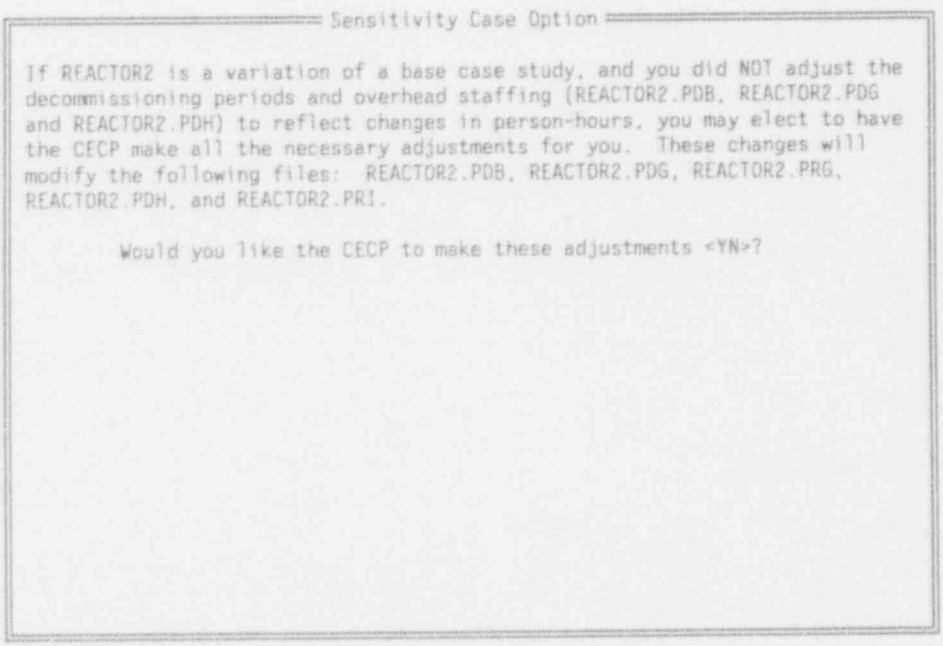

FIGURE 4.15. Sensitivity Case Option

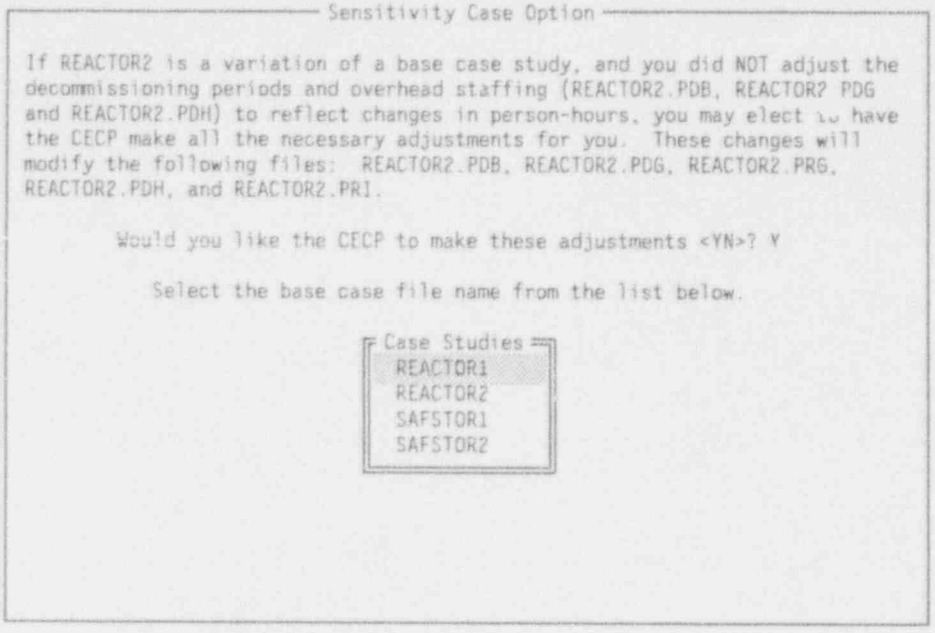

FIGURE 4.16. Selecting the Base Case

It may happen that some of the summary files are missing. If this occurs, the CECP will list the names of the missing files at the top of the summary file. If you see this error, it means you neglected to run certain portions of the CECP before you created the summary file. The following table shows the portions of the CECP you need to run to produce the intermediate summary files.

Intermediate Summary File	CECP Menu Item
PSC	C: Special Equipment Costs
PSD	D: Building Decon Costs
PSE	E: Contaminated System Costs
PSF	F: NSSS Costs
PSG	G: Manpower Costs
PSH	H: Undistributed Costs

As mentioned earlier, in addition to creating summary files, you may also copy and delete files from the screen shown in Figure 4.14. To copy files to a diskette or to another drive or subdirectory, move the selector bar up or down to pick the case you want, and then press <C>. A small window will

open and you will be asked to specify the destination path name for the case files you selected. Type in the path name and press <Enter>. If the path exists, the files will be copied. If the path cannot be found or if a disk drive door is open, you will hear a beep, indicating an error. Make sure your path name is correct and try again. Should you decide not to copy files, press <ESC>.

To delete all files associated with a case study, move the selector bar up or down to pick the case you want, and then press <Del>. A warning window will open, asking you to confirm the deletion of all files. To continue with the deletion, press <Y>, and all files making up that study will be deleted. Pressing any key but <Y> will cancel the file deletion operation.

5.0 BURIAL COST DATA

With the exception of the highly activated reactor components that must to be sent to a GTCC geologic repository, the CECP assumes that all radioactive materials resulting from decommissioning will be sent to a low-level waste site.

Burial costs for the geologic repository are assumed to be based solely on a cost-per-unit-volume basis. This number is entered by the user as Item 18 in Menu Item 1 (Table 3.1).

Burial cost data for the low-level waste sites are more complex than the geologic repository and must be stored in files. Recall that the user tells the CECP which low-level burial site to use (Menu Item A, Figure 4.1, line 10). If the user specifies HANFORD, the CECP reads in a set of values appropriate to the Hanford Site from the **HANF.DAT** file. Similarly, if the user specifies BARNWELL, data from **BARN.DAT** is read. Finally, if the user specifies GENERIC, the CECP will read the **GENERIC.DAT** file.

The Hanford and Barnwell sites change their rate schedules frequently. To keep the data files up to date, three utility programs have been included with the CECP package. The **HANFBURY.EXE** utility updates **HANF.DAT**, **BARNBURY.EXE** updates **BARN.DAT**, and **GENBURY.EXE** updates **GENERIC.DAT**. These utilities are run at the DOS prompt, not from within the CECP itself.

5.1 BURIAL COSTS FOR HANFORD

This section explains how to use the **HANFBURY.EXE** utility to update the **HANF.DAT** file. To run **HANFBURY.EXE**, make sure you are in the CECP program subdirectory and then type **HANFBURY**<Enter> at the DOS prompt. Figure 5.1 shows the first screen that you will see. As the figure shows, Screen 1 is used for creating a lookup table for packages. The ">" symbol means "greater than." So line 5, for example, means that a package whose dose rate is greater than 5 R/hr but less than or equal to 10 R/hr will be charged $44.50 per cubic foot. The selector bar, shown positioned over the upper bound of

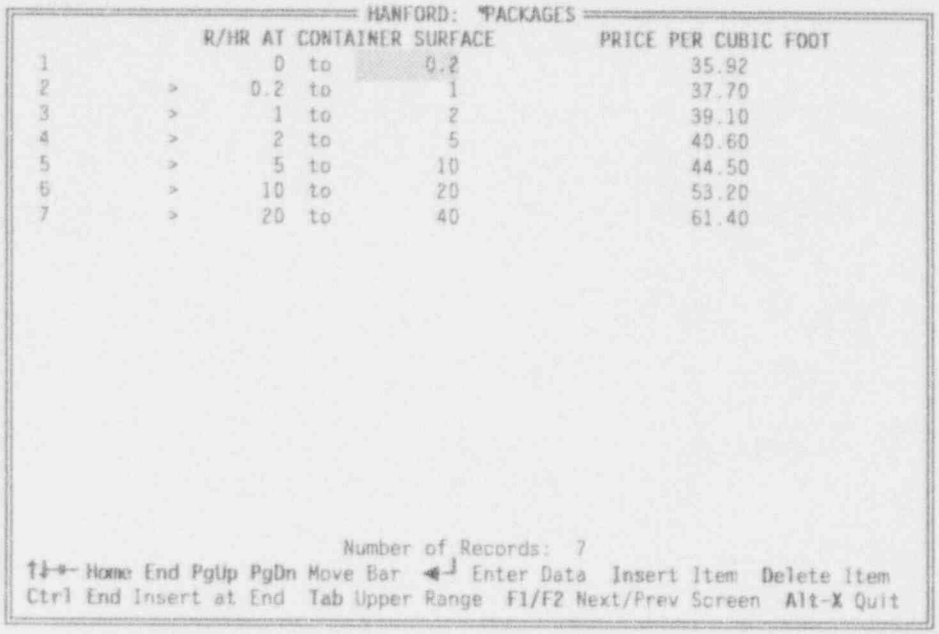

FIGURE 5.1. Hanford Burial Data, Screen 1

the first dose range in line 1, is moved around on the screen in a manner identical to that discussed in previous sections of this document and will not be discussed further here.

To see how to modify the data, suppose that a new Hanford rate schedule comes out that is identical to the previous one, except that line 7 has been modified and a new range (new line 8) has been added. The new rates are

H/HR AT CONTAINER SURFACE	PRICE PER CU. FT
> 20 - 30	61.40
> 30 - 40	72.30

Data from this modified schedule is incorporated as follows: First, move the bar down to line 7 and enter the new upper range, "30." Then, to create a new line of data at the bottom, press <Ctrl-End>. Figure 5.2 shows the situation at this point. Notice that the upper range value in line 7 (30 R/HR) has been automatically copied into the lower range value in line 8. So, the only values left to be entered are "40" and "72.40" in line 8. Entering new values

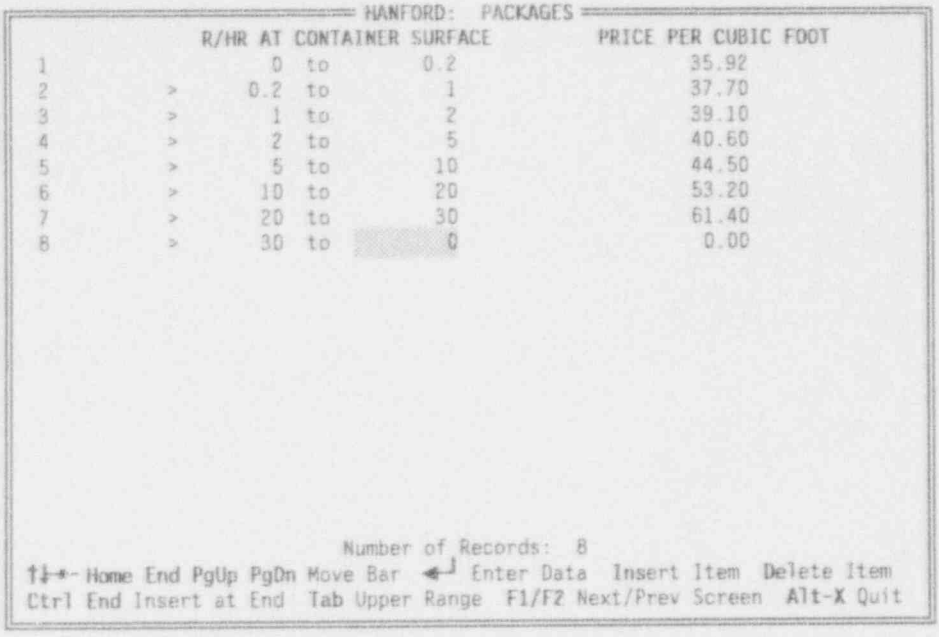

FIGURE 5.2. Entering New Data

into the middle of the table is done in a similar manner. Using the <Ins> key as needed, enter the upper range value for each line; the program will automatically adjust the lower range values for the line. Then enter the new values for the PRICE PER CUBIC FOOT column. Lines may be deleted using the <Del> key. The program will request confirmation before deleting any line.

To specify dose rates above the last value given in the table, use the <Tab> key to open the UPPER RANGE INFORMATION window. With the data as shown in Figure 5.1, the screen will appear as indicated in Figure 5.3 when the <Tab> key is pressed. To enter data in this window, just move the selector bar up or down, type in the data, and press <Enter>. Close the window by pressing <Esc>.

So far, the discussion has been confined to Screen 1 (HANFORD: PACKAGES). To move to the next screen, press <F1>; to move to the previous one, press <F2>. Data entry for Screens 2, 3, and 4 is the same as for Screen 1 and will not be discussed. Screen 5, HANFORD: SPECIAL CHARGES, TAXES AND FEES is shown in Figure 5.4.

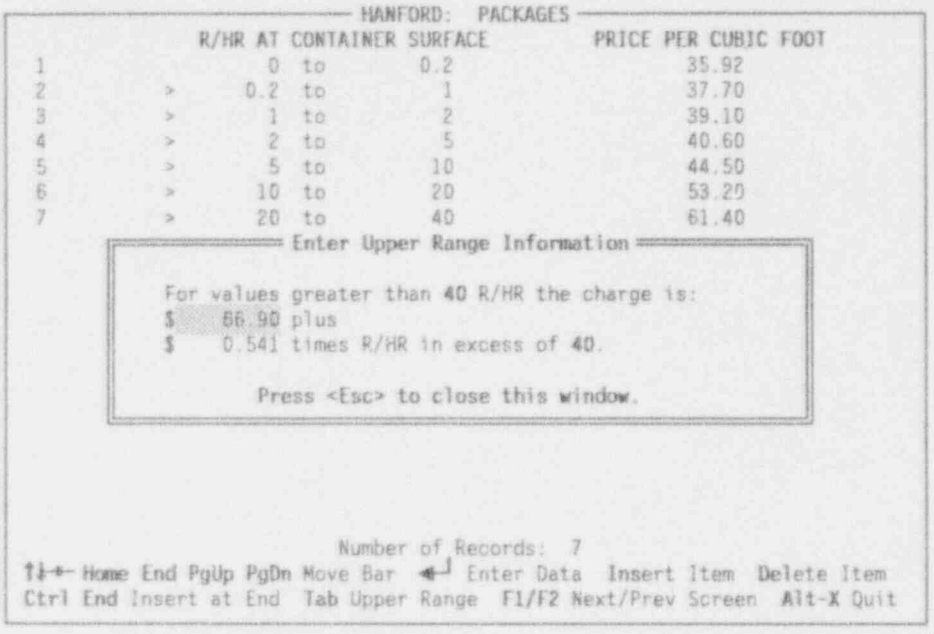

FIGURE 5.3. Entering Upper Range Information

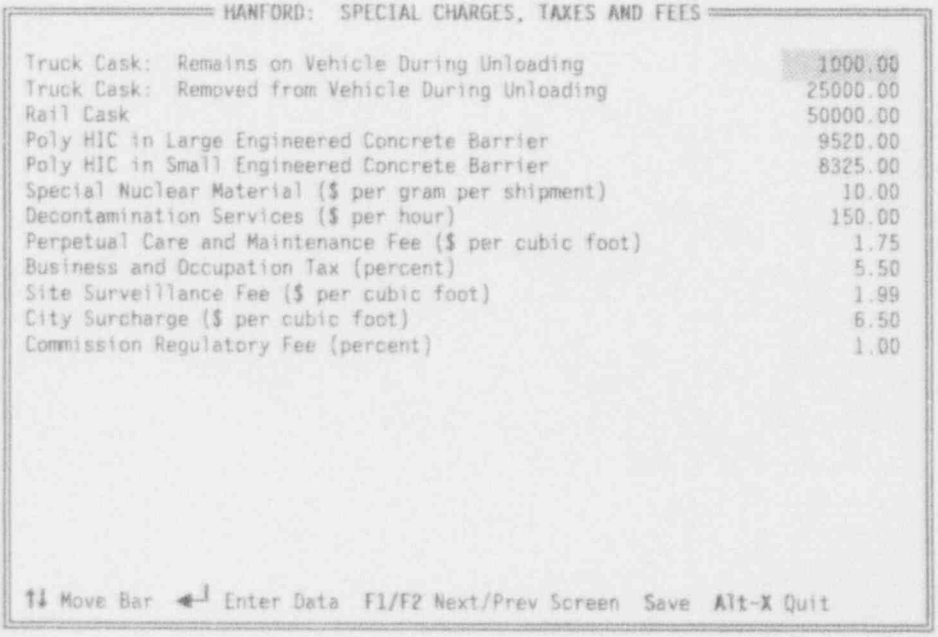

FIGURE 5.4. Miscellaneous Burial Data

As can be seen in Figure 5.4, , Screen 5 consists of miscellaneous data. The last item, "Commission Regulatory Fee," is in percent; the remaining items are in dollars. Data entry for this screen is very simple: merely put the bar where you want it, press <Enter>, type in your data, and press <Enter> again.

You may save data to the **HANF.DAT** file at any time by pressing the <S> key. Note that this overwrites the previous data in the file. To exit from **HANFBURY.EXE**, press <Alt-X>.

5.2 BURIAL COSTS FOR BARNWELL AND GENERIC SITES

As mentioned previously, the burial cost data for Barnwell is stored in the **BARN.DAT** file. To update data in this file, the user runs the **BARNBURY.EXE** utility. To run the utility, make sure you are in the CECP program subdirectory, and then type **BARNBURY**<Enter> at the DOS prompt.

You enter data for the Barnwell Site in virtually the same way as you do for the Hanford Site discussed in Section 5.1. **BARNBURY.EXE** has only three lookup table screens, compared with four for **HANFBURY.EXE**. The fourth screen is a miscellaneous data screen similar to Screen 5 of the Hanford data.

To enter data for a generic site, the user runs the **GENERIC.EXE** utility to update the **GENERIC.DAT** file. Rate schedules for generic sites are modeled on the Hanford rate schedule. Thus, the screens in **GENERIC.EXE** are identical with **HANFBURY.EXE**, except that the word GENERIC replaces HANFORD.

6.0 A SAMPLE RUN

Now that the details of CECP operation have been presented, it is a good idea to actually create a case study, so that the user can see how all the parts of the CECP work together. Let us make a case study called **TEST**. To do this, we will start with Menu Item 1 and work down through Menu Item I. Once **TEST** is created, you can examine its output files using the file viewer. In the interests of time and simplicity, we will use the default values throughout, so that no actual data entry will be required. Because we will be going down the menu items in order, we will use some short-cut keys that will make our work somewhat easier. We proceed as follows:

1. At the Main Menu, press <1> to access Menu Item 1. Press <Enter> to pick the **DEFAULT.PD1** file. Then, because we do not want to change any data, press <S> to save the file. Type in **TEST**<Enter> to create the **TEST.PD1** file. This file will be identical in content to **DEFAULT.PD1**. Now, rather than pressing <Alt-X> to get back to the Main Menu, press <Alt-2> instead. This short-cut key will put you directly into the file menu of Menu Item 2.

2. At this point, you should be in the file menu of Menu Item 2. Press <Enter> to load **DEFAULT.PD2**. Again, just press <S> and type **TEST**<Enter> to create **TEST.PD2**. Press <Alt-3> to get into the file menu of Menu Item 3.

3. You should be in the file menu of Menu Item 3. Press <Enter> to load **DEFAULT.PD3**. Then press <S> and type in **TEST**<Enter> to create **TEST.PD3**. Press <Alt-A> to get into the file menu of Menu Item A.

4. You are now in the file menu of Menu Item A, the first of the site-specific data items. Press <Enter> to load **DEFAULT.PDA**. Once again, because you are not going to modify any data, just press <S> and then type **TEST**<Enter> to make the **TEST.PDA** file. Then press <Alt-B> to get into the file menu of Menu Item B.

5. Press <Enter> from the file menu of Item B to load **DEFAULT.PDB**. Then press <S> and type **TEST**<Enter> to make **TEST.PDB**. Press <Alt-C> to get into the file menu of Item C.

6. As before, press <Enter> to load **DEFAULT.PDC**. Press <S> and type **TEST**<Enter>. This time, the CECP creates both your **TEST.PDC** file and a summary file, **TEST.PSC**. Recall that the summary files will be used later to construct the **TEST.PRI** file. Press <Alt-D> to get to Item D.

7. You should now be in the file menu of Menu Item D. The building decontamination portion of the CECP requires five input files, not just one file as in the previous steps. While in the file menu, you will be prompted to supply, in order, one data file from each of these categories: **PDB**, **PDD**, **PD1**, **PD2**, and **PDA**. For all but the **PDD** category, two files will be available for input: the DEFAULT file and your TEST file. Since all your TEST data files are the same as the default files, it does not matter which you choose. Later, of course, as you create more cases, you will have to be careful which input files you use. Once you have loaded all the data files, create your **TEST.PDD** file by pressing <S> and then typing **TEST**<Enter>. In addition to **TEST.PDD**, the CECP will also make a **TEST.PRD** report file and a **TEST.PSD** summary file. Now, press <Alt-E> to get to the file menu of Item E.

8. By now the process should be clear. Proceed as above until you get to the file menu of Menu Item I. The only data file needed by Item I is a **PD1** file. Choose either **DEFAULT.PD1** or **TEST.PD1**. The screen now looks like Figure 4.14, except that the only case study available is the one you are constructing, TEST. Press <Enter> to accept TEST. The screen changes to Figure 4.15, but the files listed are the TEST files. TEST is not a variation of a previous study, so press <N> here. If all goes well, you will get a message saying that report file TEST.PRI is complete.

To view the output files you created (**TEST.PRD**, **TEST.PRE**, **TEST.PRF**, **TEST.PRG**, and **TEST.PRI**), press <Esc> and then <V> at the Main Menu, or just press <Alt-V> while still in Menu I. You should see the screen shown in Figure 6.1. Then to examine, for example, the **PRI** files available, press <5>. The screen changes to the one shown in Figure 6.2. Because the only case study available is the one you just created, there is only one **PRI** file, **TEST.PRI**. (There is no **DEFAULT.PRI** file. In fact, the only **DEFAULT** files the CECP permits are data input files.) Press <Enter> to select **TEST.PRI**. The CECP will then turn control over to the editor you specified during the installation procedure. Thus, you should see **TEST.PRI** on the screen, running in your editor. You may use your editor in the manner you are accustomed to. When you exit from your editor, the screen will revert to Figure 6.1. Should you decide to change to a different editor, press <W>. A small window will open, allowing you to type in the name of your new editor. The CECP will use this editor until you change it again from this menu. To exit from the file viewer menu, press <Esc>.

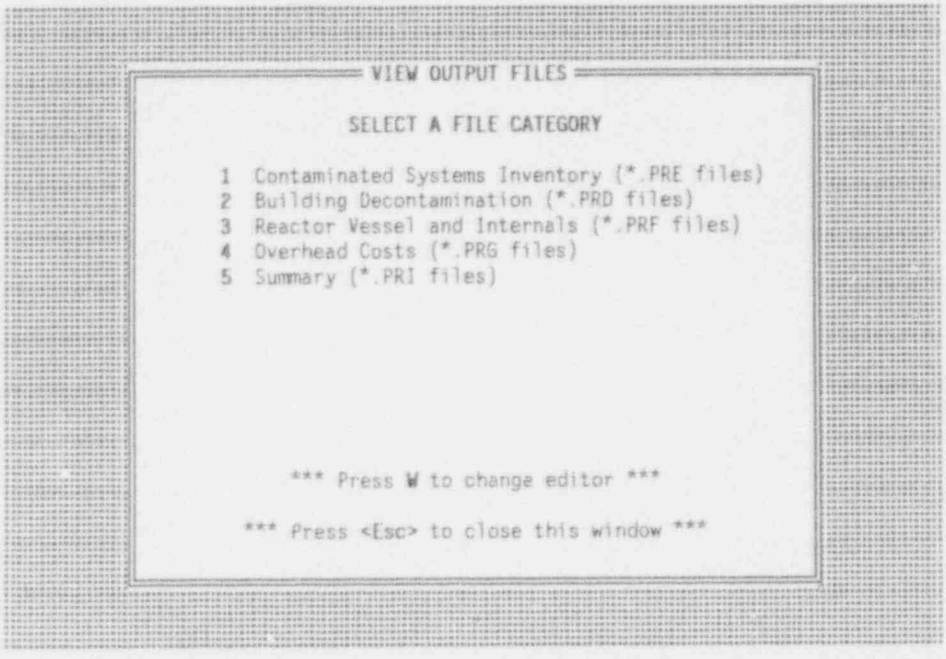

FIGURE 6.1. The File Viewer Menu

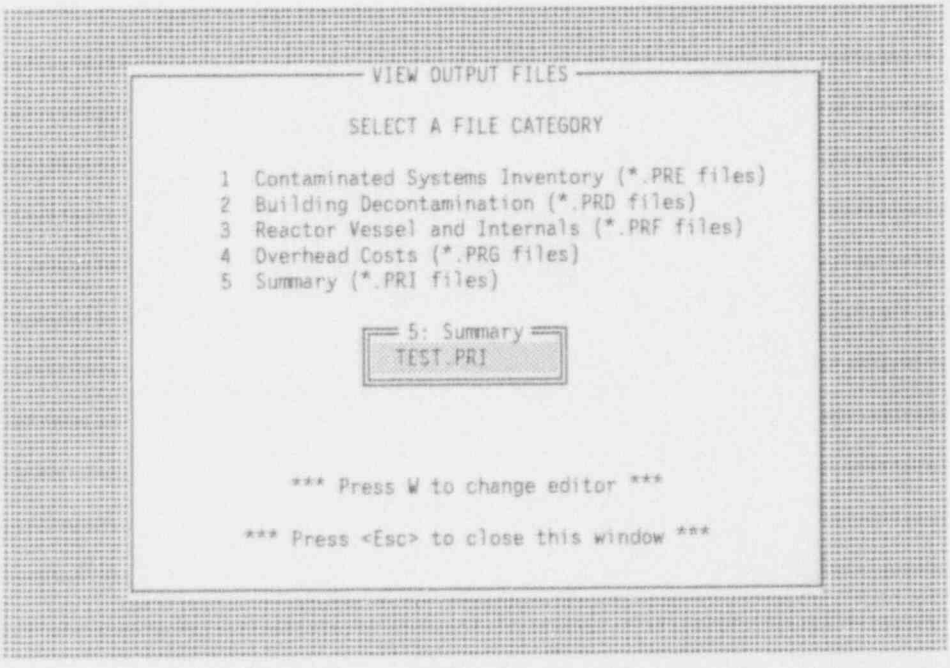

FIGURE 6.2. Selecting Summary Output Files

7.0 CECP OUTPUT FILES

This section contains complete listings of the five output files produced by the CECP. The examples shown here are the **TEST** files you created in Section 6.0.

Table 7.1 is the **TEST.PRE** file created from Menu Item E, which contains a detailed report of the potentially radioactive system components that are to be removed during the decommissioning process. Note that this report is in three parts: 1) "POTENTIALLY RADIOACTIVE SYSTEMS: PHYSICAL CHARACTERISTICS"; 2) "POTENTIALLY RADIOACTIVE SYSTEMS: CREW-HOURS, MAN-HOURS, ETC."; and 3) "POTENTIALLY RADIOACTIVE SYSTEMS: REMOVAL, TRANSPORTATION, DISPOSAL COSTS." The column headings used in (1) were previously defined in Section 4.5. The headings in (2) are self-explanatory. The headings used in (3) are defined below.

Removal: The total labor costs (including overhead, shift differential and consumables costs) of removing the listed components.

Container: The cost of the B-25 containers or modified Sea-Vans needed to accommodate the component.

Transport: The cost of shipping the component by truck to the burial site.

Disposal: The cost of burying the component at the burial site, including applicable burial surcharges.

TABLE 7.1. Contents of File TEST.PRE

File: E:\NRC\TESTME.PRE
Plant Name: TROJAN

++
+ INVENTORY OF POTENTIALLY RADIOACTIVE SYSTEMS: PHYSICAL CHARACTERISTICS +
++

*** Component Cooling Water System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Sample HX	Lg HX	Sea-Van	9	7,000	27		

*** Clean Radioactive Waste Treatment System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Reactor Coolant Drain Tank	Tank	Sea-Van	1	1,670	10	3.00	8.00
Reactor Coolant Drain Pump	Lg Pump	Sea-Van	2	500	8		
Reactor Coolant Drain Filter	Tank	Mtl Box	1	350	1	1.30	4.70
Spent Resin Storage Tank	Tank	Sea-Van	1	6,800	30	9.00	11.00
Clean Waste Recv. Tank	Tank	Sea-Van	2	10,958	75	10.00	30.00
Clean Waste Recv. Pump	Lg Pump	Sea-Van	2	500	8		
Treated Waste Mon. Tank	Tank	Sea-Van 0	2	11,200	66	10.00	26.00
Treated Waste Mon. Pump	Lg Pump	Sea-Van	2	230	3		
Aux Building Drain Tank	Tank	Sea-Van	1	2,090	27	6.00	9.00
Aux Building Drain Pump	Lg Pump	Sea-Van	2	1,300	12		
Chemical Waste Drain Tank	Tank	Sea-Van	1	5,490	41	10.00	15.00
Chemical Waste Drain Pump	Lg Pump	Sea-Van	2	200	3		
Waste Conc. Hold. Tank	Tank	Sea-Van	1	2,090	29	6.00	10.00
Waste Conc. Hold. Pump	Lg Pump	Sea-Van	1	230	3		
Clean Waste Filter	Tank	Mtl Box	1	67	0	0.60	2.20
Clean Rad. Waste Evaporator	Lg HX	Sea-Van	1	40,000	2,052		
Clean Rad. Waste Evap. Condenser	Lg HX	Sea-Van	1	8,000	28		
3 Inch Valve	Sm Valve	Sea-Van	19	153	1		
2 Inch Valve	Sm Valve	Sea-Van	64	90	1		

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Containment Spray System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Pump	Lg Pump	Sea-Van 0	2	6,800	113		
Pump	Sm Pump	Sea-Van 0	2	100	2		
Tank	Tank	Sea-Van 0	1	2,500	28	9.00	10.00
18 Inch Valve	Lg Valve	Sea-Van 0	4	4,900	61		
14 Inch Valve	Lg Valve	Sea-Van 0	6	2,760	31		
10 Inch Valve	Lg Valve	Sea-Van 0	6	1,458	18		
3 Inch Valve	Sm Valve	Sea-Van 0	6	153	1		
1 1/2 Inch Valve	Sm Valve	Sea-Van 0	6	62	1		
1 Inch Valve	Sm Valve	Sea-Van 0	6	50	0		
3/4 Inch Valve	Sm Valve	Sea-Van 0	12	30	0		

*** Chemical and Volume Control System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Regenerative HX	Lg HX	Mtl Box	3	6,600	21		
Seal Water HX	Lg HX	Mtl Box	1	1,700	17		
Letdown HX	Lg HX	Mtl Box	1	1,900	32		
Excess Letdown HX	Lg HX	Mtl Box	1	1,600	7		
Centrif. Chrg. Pump	Lg Pump	Sea-Van	2	17,090	344		
Vol. Control Tank	Tank	Sea-Van	1	4,850	29	7.50	10.40
Chem. Mix Tank	Tank	Sea-Van	1	77	0	0.75	2.50
Holdup Tank	Tank	Sea-Van	3	30,000	121	18.00	34.00
Monitor Tank	Tank	Sea-Van	2	20,000	56	20.00	10.00
Boric Acid Tank	Tank	Sea-Van	2	20,000	90	12.00	34.00
Batch Tank	Tank	Sea-Van 0	1	1,450	24	4.00	5.80
Resin Fill Tank	Tank	Sea-Van 0	1	260	20	5.30	6.20
Reciprocal Charg. Pump	Lg Pump	Sea-Van	1	17,700	343		
Boric Acid Pump	Lg Pump	Sea-Van	2	618	10		
Reactor Coolant Filter	Tank	Mtl Box	1	200	1	1.25	4.25
Mixed Bed Demineralizer	Tank	Sea-Van	2	1,050	4	2.20	5.40
Cation IX	Tank	Mtl Box	1	1,050	4	2.20	5.40
Seal Injection Filter	Tank	Mtl Box	2	1,650	1	0.80	6.30
Concentrate Holding Tank	Tank	Sea-Van	1	3,500	24	5.50	7.80
Evaporator Feed IX	Tank	Mtl Box	3	1,050	4	2.20	5.40
Evaporator Condensate IX	Tank	Mtl Box	2	1,050	4	2.20	5.40
Condensate Filter	Tank	Mtl Box	1	40	0	0.67	3.25
Concentrates Filter	Tank	Mtl Box	1	40	0	0.67	3.25
Conc. Hold. Tank Transfer Pump	Lg Pump	Sea-Van	2	200	3		
Gas Stripper Feed Pump	Lg Pump	Sea-Van	2	200	3		
Boric Acid Evaporator Condenser	Tank	Sea-Van	2	20,000	6	2.10	8.20

TABLE 7.1. Contents of File TEST.PRE (contd)

Boric Acid Evaporator Vent Condenser	Tank	Sea-Van	2	600	1	1.10	5.00
Boric Acid Evap. Distillate Condenser	Tank	Sea-Van	2	300	3	1.10	12.10
IX Filter	Tank	Mtl Box	1	150	1	1.00	3.30
Recirculation Pump	Lg Pump	Sea-Van	1	200	3		
Standpipes	Tank	Sea-Van	4	540	1	0.50	7.00
6 Inch Valve	Lg Valve	Sea-Van	2	588	7		
4 Inch Valve	Lg Valve	Sea-Van	35	268	3		
3 Inch Valve	Sm Valve	Sea-Van	49	153	1		
2 Inch Valve	Sm Valve	Sea-Van	184	90	1		
1 Inch Valve	Sm Valve	Sea-Van	28	50	0		
3/4 Inch Valve	Sm Valve	Sea-Van	80	30	0		

*** Dirty Radioactive Waste Treatment System

						----- Tanks -----	
Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Dia(ft)	Hgt(ft)
Reactor Cavity Drain Pump	Lg Pump	Sea-Van	1	800	47		
Reactor Containment Sump Pump	Lg Pump	Sea-Van	2	1,500	19		
Laundry Drain Tank	Tank	Sea-Van	1	2,000	27	6.00	9.00
Laundry Strainer	Tank	Sea-Van	1	150	--	0.00	0.00
Laundry Drain Tank Pump	Lg Pump	Sea-Van	1	200	3		
Laundry Waste Filter	Tank	Sea-Van	1	150	--	0.00	0.00
Dirty Waste Monitor Tank	Tank	Sea-Van	1	5,800	34	10.00	12.00
Dirty Waste Monitor Tank Pump	Lg Pump	Sea-Van	2	200	3		
Dirty Waste Monitor Tank Filter	Tank	Sea-Van	2	76	0	0.60	3.00
Dirty Waste Drain Tank	Tank	Sea-Van	1	6,540	36	10.00	13.00
Dirty Waste Drain Tank Pump	Lg Pump	Sea-Van	2	400	8		
Aux. Building Sump Pump	Lg Pump	Sea-Van	2	1,300	27		
3 Inch Valve	Sm Valve	Sea-Van	14	153	1		
2 Inch Valve	Sm Valve	Sea-Van	32	90	1		

*** Main Steam System (Within Containment)

						----- Tanks -----	
Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Dia(ft)	Hgt(ft)
Flow Orifices	Lg Misc.	Sea-Van 0	4	2,500	43		
28 Inch Piping	Lg Pipe	Sea-Van 0	590	248	4		
14 Inch Piping	Lg Pipe	Sea-Van 0	420	85	1		
3 Inch Piping	Sm Pipe	Sea-Van 0	500	10	0		

TABLE 7.1. Contents of File TEST.P[illegible] (contd)

*** Radioactive Gaseous Waste System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Surge Tank	Tank	Sea-Van	1	890	8	3.00	6.00
Decay Tank	Tank	Sea-Van	4	10,800	43	10.00	16.00
Gas Compressor	Lg Misc.	Sea-Van	2	8,000	200		
Moisture Separator	Sm Misc.	Sea-Van	2	100	4		
Br. Seal Wtr. HX	Lg HX	Mtl Box	2	7,700	27		
4 Inch Valve	Lg Valve	Sea-Van	1	268	3		
3 Inch Valve	Sm Valve	Sea-Van	3	153	1		
2 Inch Valve	Sm Valve	Sea-Van	16	90	1		
1 1/2 Inch Valve	Sm Valve	Sea-Van	35	62	1		
1 Inch Valve	Sm Valve	Sea-Van	12	50	0		
3/4 Inch Valve	Sm Valve	Sea-Van	16	30	0		

*** Residual Heat Removal System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Pump	Lg Pump	Sea-Van	2	6,800	28		
HX Unit	Lg HX	Mtl Box	2	23,100	212		
14 Inch Valve	Lg Valve	Sea-Van	7	2,760	31		
12 Inch valve	Lg Valve	Sea-Van	3	1,972	24		
10 Inch Valve	Lg Valve	Sea-Van	2	1,458	18		
8 Inch Valve	Lg Valve	Sea-Van	18	1,029	15		
2 Inch Valve	Sm Valve	Sea-Van	2	90	1		
3/4 Inch Valve	Sm Valve	Sea-Van	10	30	0		

*** Safety Injection System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Accuml. Tank	Tank	Sea-Van	4	76,500	56	11.00	21.00
Boron Injection Tank	Tank	Sea-Van	1	28,500	37	5.50	12.50
Safety Injection Pump	Lg Pump	Sea-Van	2	8,600	165		
Refueling Water Storage Tank	Tank	Sea-Van	1	177,800	362	44.00	39.60
Primary Makeup Water Storage Tank	Tank	Sea-Van	1	99,200	206	30.00	35.40
10 Inch Valve	Lg Valve	Sea-Van	8	1,458	18		
8 Inch Valve	Lg Valve	Sea-Van	8	1,029	15		
6 Inch Valve	Lg Valve	Sea-Van	2	588	7		
4 Inch Valve	Lg Valve	Sea-Van	9	268	3		

TABLE 7.1. Contents of File TEST.PRE (contd)

3 Inch Valve	Sm Valve	Sea-Van	4	153	1
2 Inch Valve	Sm Valve	Sea-Van	1	90	1
1 1/2 Inch Valve	Sm Valve	Sea-Van	4	62	1
1 Inch Valve	Sm Valve	Sea-Van	33	50	0
3/4 Inch Valve	Sm Valve	Sea-Van	20	30	0

*** Spent Fuel Cooling System

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
Pump	Lg Pump	Sea-Van	1	1,000	15		
Pump	Lg Pump	Sea-Van	2	900	15		
Pump	Lg Pump	Sea-Van	1	700	12		
Filter	Tank	Mtl Box	1	360	1	0.90	3.80
Filter	Tank	Mtl Box	1	360	1	0.90	3.80
Filter	Tank	Mtl Box	1	150	1	0.75	3.80
Demineralizer	Tank	Sea-Van	1	2,200	40	4.00	10.00
Spent Fuel Pool Heat Exchangers	Lg HX	Mtl Box	2	6,100	44		
10 Inch Valve	Lg Valve	Sea-Van	8	1,458	18		
8 Inch Valve	Lg Valve	Sea-Van	12	1,029	15		
6 Inch Valve	Lg Valve	Sea-Van	1	588	7		
4 Inch Valve	Lg Valve	Sea-Van	16	268	3		
3 Inch Valve	Sm Valve	Sea-Van	9	153	1		
2 Inch Valve	Sm Valve	Sea-Van	2	90	1		
1 Inch Valve	Sm Valve	Sea-Van	10	50	0		
3/4 Inch Valve	Sm Valve	Sea-Van	5	30	0		

*** Stainless Steel Piping (3 - 24 Inches)

Component Description		Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
24 Inch Class I	(0.375" thick)	Lg Pipe	Sea-Van	170	95	3		
18 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	30	71	2		
16 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	300	63	1		
14 Inch Class I	(1.250" thick)	Lg Pipe	Sea-Van	170	170	1		
14 Inch Class II	(0.250" thick)	Lg Pipe	Sea-Van	200	37	1		
14 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	270	55	1		
14 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	610	55	1		
12 Inch Class I	(1.125" thick)	Lg Pipe	Sea-Van	150	140	1		
12 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	400	50	1		
12 Inch Class III	(0.406" thick)	Lg Pipe	Sea-Van	270	54	1		
10 Inch Class I	(1.000" thick)	Lg Pipe	Sea-Van	330	104	1		
10 Inch Class II	(0.165" thick)	Lg Pipe	Sea-Van	320	19	1		
10 Inch Class II	(0.365" thick)	Lg Pipe	Sea-Van	360	40	1		
10 Inch Class III	(0.365" thick)	Lg Pipe	Sea-Van	60	40	1		

TABLE 7.1. Contents of File TEST.PRE (contd)

10 Inch Non-Nuc. Grade	(0.165" thick)	Lg Pipe	Sea-Van	1,000	19	1
8 Inch I	(0.906" thick)	Lg Pipe	Sea-Van	250	75	0
8 Inch II	(0.322" thick)	Lg Pipe	Sea-Van	530	29	0
8 Inch II	(0.500" thick)	Lg Pipe	Sea-Van	50	43	0
8 Inch II	(0.906" thick)	Lg Pipe	Sea-Van	20	75	0
8 Inch III	(0.322" thick)	Lg Pipe	Sea-Van	620	29	0
8 Inch Non-Nuc. Grade	(0.148" thick)	Lg Pipe	Sea-Van	400	13	0
8 Inch Non-Nuc. Grade	(0.322" thick)	Lg Pipe	Sea-Van	130	29	0
6 Inch I	(0.718" thick)	Lg Pipe	Sea-Van	550	45	0
6 Inch II	(0.134" thick)	Lg Pipe	Sea-Van	100	9	0
6 Inch II	(0.280" thick)	Lg Pipe	Sea-Van	500	19	0
6 Inch III	(0.280" thick)	Lg Pipe	Sea-Van	90	19	0
6 Inch Non-Nuc. Grade	(0.134" thick)	Lg Pipe	Sea-Van	1,400	9	0
4 Inch I	(0.531" thick)	Lg Pipe	Sea-Van	280	23	0
4 Inch II	(0.120" thick)	Lg Pipe	Sea-Van	250	6	0
4 Inch II	(0.237" thick)	Lg Pipe	Sea-Van	500	11	0
4 Inch II	(0.337" thick)	Lg Pipe	Sea-Van	70	15	0
4 Inch II	(0.531" thick)	Lg Pipe	Sea-Van	180	23	0
4 Inch III	(0.237" thick)	Lg Pipe	Sea-Van	1,340	11	0
4 Inch Non-Nuc. Grade	(0.120" thick)	Lg Pipe	Sea-Van	2,200	6	0
3 Inch I	(0.437" thick)	Sm Pipe	Sea-Van	40	14	0
3 Inch II	(0.120" thick)	Sm Pipe	Sea-Van	220	4	0
3 Inch II	(0.216" thick)	Sm Pipe	Sea-Van	2,000	8	0
3 Inch II	(0.437" thick)	Sm Pipe	Sea-Van	1,100	14	0
3 Inch III	(0.216" thick)	Sm Pipe	Sea-Van	1,460	8	0
3 Inch Non-Nuc. Grade	(0.120" thick)	Sm Pipe	Sea-Van	5,000	4	0
3 Inch Non-Nuc. Grade	(0.216" thick)	Sm Pipe	Sea-Van	20	8	0

*** Stainless Steel Piping (1/2 - 2 Inches)

Component Description		Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
2 Inch Class I	(0.343" thick)	Sm Pipe	Sea-Van	550	7	0		
2 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	200	4	0		
2 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	800	5	0		
2 Inch Class II	(0.343" thick)	Sm Pipe	Sea-Van	1,450	7	0		
2 Inch Class III	(0.154" thick)	Sm Pipe	Sea-Van	4,100	4	0		
2 Inch Non-Nuc. Grade	(0.154" thick)	Sm Pipe	Sea-Van	1,400	4	0		
1 1/2 Inch Class I	(0.281" thick)	Sm Pipe	Sea-Van	700	5	0		
1 1/2 Inch Class II	(0.145" thick)	Sm Pipe	Sea-Van	200	3	0		
1 1/2 Inch Class II	(0.200" thick)	Sm Pipe	Sea-Van	800	4	0		
1 1/2 Inch Class II	(0.281" thick)	Sm Pipe	Sea-Van	200	5	0		
1 1/2 Inch Class III	(0.145" thick)	Sm Pipe	Sea-Van	1,700	3	0		
1 1/2 Inch Non-Nuc. Grade	(0.145" thick)	Sm Pipe	Sea-Van	1,500	3	0		

TABLE 7.1. Contents of File TEST.PRE (contd)

1 Inch Class I	(0.250" thick)	Sm Pipe	Sea-Van	100	3	0
1 Inch Class II	(0.133" thick)	Sm Pipe	Sea-Van	100	2	0
1 Inch Class II	(0.179" thick)	Sm Pipe	Sea-Van	300	2	0
1 Inch Class II	(0.250" thick)	Sm Pipe	Sea-Van	600	3	0
1 Inch Class III	(0.133" thick)	Sm Pipe	Sea-Van	1,500	2	0
1 Inch Non-Nuc. Grade	(0.133" thick)	Sm Pipe	Sea-Van	2,000	2	0
3/4 Inch Class I	(0.218" thick)	Sm Pipe	Sea-Van	290	2	0
3/4 Inch Class II	(0.113" thick)	Sm Pipe	Sea-Van	200	1	0
3/4 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	300	1	0
3/4 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	700	2	0
3/4 Inch Class III	(0.113" thick)	Sm Pipe	Sea-Van	900	1	0
3/4 Inch Non-Nuc. Grade	(0.113" thick)	Sm Pipe	Sea-Van	1,000	1	0
1/2 Inch Class I	(0.187" thick)	Sm Pipe	Sea-Van	105	1	0
1/2 Inch Class II	(0.147" thick)	Sm Pipe	Sea-Van	200	1	0
1/2 Inch Class II	(0.187" thick)	Sm Pipe	Sea-Van	200	1	0
1/2 Inch Class III	(0.109" thick)	Sm Pipe	Sea-Van	800	1	0
1/2 Inch Non-Nuc. Grade	(0.109" thick)	Sm Pipe	Sea-Van	1,000	1	0

*** Retrofit Materials

Component Description	Category	Disposal	Qty	Wgt(lb)	Vol(ft3)	Tanks Dia(ft)	Tanks Hgt(ft)
2 Inch Piping	Sm Pipe	Sea-Van	52	4	0		
3/4 Inch Piping	Sm Pipe	Sea-Van	40	1	0		
1/2 Inch Piping	Sm Pipe	Sea-Van	304	1	0		
2 Inch valve	Sm Valve	Sea-Van	4	90	1		
1 Inch valve	Sm Valve	Sea-Van	3	50	0		
3/4 Inch valve	Sm Valve	Sea-Van	8	30	0		
Tank	Tank	Sea-Van	2	2,000	27	6.00	9.00
Dry waste compactor	Lg Misc.	Sea-Van	1	2,000	30		
Skid-mounted unit	Lg Misc.	Sea-Van	1	500	8		
Shielded box	Lg Misc.	Sea-Van	1	150	1		

NOTE: For piping, "Qty" refers to feet of piping. For other categories "Qty" refers to the number of items of equipment.

TABLE 7.1. Contents of File TEST.PRE (contd)

File: E:\NRC\TESTME.PRE
Plant Name: TROJAN

++
+ POTENTIALLY RADIOACTIVE SYSTEMS: CREW-HOURS, PERSON-HOURS, ETC. +
++

*** Component Cooling Water System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Sample HX	Lg HX	Sea-Van	9	18.4	73.7	46.8	0.2	0.234
				18	74	47	0	0.234

*** Clean Radioactive Waste Treatment System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Reactor Coolant Drain Tank	Tank	Sea-Van	1	11.7	64.6	41.1	0.2	0.020
Reactor Coolant Drain Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Reactor Coolant Drain Filter	Tank	Mtl Box	1	9.4	51.6	32.8	0.1	0.005
Spent Resin Storage Tank	Tank	Sea-Van	1	23.5	129.3	82.2	0.3	0.099
Clean Waste Recv. Tank	Tank	Sea-Van	2	60.5	332.9	211.5	0.9	0.496
Clean Waste Recv. Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Treated Waste Mon. Tank	Tank	Sea-Van 0	2	57.3	315.3	200.3	0.8	0.000
Treated Waste Mon. Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Aux Building Drain Tank	Tank	Sea-Van	1	15.4	84.5	53.7	0.1	0.051
Aux Building Drain Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Chemical Waste Drain Tank	Tank	Sea-Van	1	25.2	138.8	88.2	0.2	0.142
Chemical Waste Drain Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Waste Conc. Hold. Tank	Tank	Sea-Van	1	15.4	84.8	53.9	2.2	0.055
Waste Conc. Hold. Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.2	0.002
Clean Waste Filter	Tank	Mtl Box	1	8.2	45.3	28.8	0.1	0.001
Clean Rad. Waste Evaporator	Lg HX	Sea-Van	1	2.0	8.2	5.2	0.0	0.000
Clean Rad. Waste Evap. Condenser	Lg HX	Sea-Van	1	2.0	8.2	5.2	0.0	0.000
3 Inch Valve	Sm Valve	Sea-Van	19	0.0	0.0	0.0	0.0	0.005
2 Inch Valve	Sm Valve	Sea-Van	64	0.0	0.0	0.0	0.0	0.008
				253	1,354	860	5	0.899

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Containment Spray System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Pump	Lg Pump	Sea-Van 0	2	4.1	16.4	10.4	0.0	0.000
Pump	Sm Pump	Sea-Van 0	2	4.1	16.4	10.4	0.0	0.000
Tank	Tank	Sea-Van 0	1	23.4	128.9	81.9	0.3	0.000
18 Inch Valve	Lg Valve	Sea-Van 0	4	11.9	65.3	41.5	0.2	0.000
14 Inch Valve	Lg Valve	Sea-Van 0	6	17.8	97.9	62.2	0.5	0.000
10 Inch Valve	Lg Valve	Sea-Van 0	6	17.8	97.9	62.2	0.8	0.000
3 Inch Valve	Sm Valve	Sea-Van 0	6	0.0	0.0	0.0	0.0	0.000
1 1/2 Inch Valve	Sm Valve	Sea-Van 0	6	0.0	0.0	0.0	0.0	0.000
1 Inch Valve	Sm Valve	Sea-Van 0	6	0.0	0.0	0.0	0 0	0.000
3/4 Inch Valve	Sm Valve	Sea-Van 0	12	0.0	0.0	0.0	0.0	0.000
				79	423	269	2	0.000

*** Chemical and Volume Control System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Regenerative HX	Lg HX	Mtl Box	3	6.1	24.6	15.6	0.6	0.202
Seal Water HX	Lg HX	Mtl Box	1	2.0	8.2	5.2	0.0	0.052
Letdown HX	Lg HX	Mtl Box	1	2.0	8.2	5.2	1.0	0.105
Excess Letdown HX	Lg HX	Mtl Box	1	2.0	8.2	5.2	0.0	0.023
Centrif. Chrg. Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Vol. Control Tank	Tank	Sea-Van	1	21.0	115.7	73.5	0.3	0.075
Chem. Mix Tank	Tank	Sea-Van	1	8.3	45.4	28.9	0.1	0.002
Holdup Tank	Tank	Sea-Van	3	133.5	734.0	466.4	1.9	1.644
Monitor Tank	Tank	Sea-Van	2	69.7	383.4	243.6	2.5	0.566
Boric Acid Tank	Tank	Sea-Van	2	70.0	385.2	244.7	3.9	0.680
Batch Tank	Tank	Sea-Van 0	1	12.9	70.7	45.0	0.2	0.000
Resin Fill Tank	Tank	Sea-Van 0	1	14.1	77.4	49.2	0.2	0.000
Reciprocal Charg. Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Boric Acid Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.2	0.003
Reactor Coolant Filter	Tank	Mtl Box	1	9.4	51.5	32.7	0.1	0.004
Mixed Bed Demineralizer	Tank	Sea-Van	2	18.9	104.0	66.1	0.3	0.020
Cation IX	Tank	Mtl Box	1	9.5	52.0	33.0	0.1	0.010
Seal Injection Filter	Tank	Mtl Box	2	18.7	102.7	65.3	0.3	0.008
Concentrate Holding Tank	Tank	Sea-Van	1	14.2	77.9	49.5	0.2	0.041
Evaporator Feed IX	Tank	Mtl Box	3	28.4	156.0	99.1	0.4	0.030
Evaporator Condensate IX	Tank	Mtl Box	2	18.9	104.0	66.1	0.3	0.020
Condensate Filter	Tank	Mtl Box	1	8.3	45.4	28.9	0.1	0.002
Concentrates Filter	Tank	Mtl Box	1	8.3	45.4	28.9	0.1	0.002

TABLE 7.1. Contents of File TEST.PRE (contd)

Conc. Hold. Tank Transfer Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Gas Stripper Feed Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Boric Acid Evaporator Condenser	Tank	Sea-Van	2	21.1	116.3	73.9	0.3	0.028
Boric Acid Evaporator Vent Condenser	Tank	Sea-Van	2	16.6	91.3	58.0	0.2	0.009
Boric Acid Evap. Distillate Condenser	Tank	Sea-Van	2	20.9	115.2	73.2	0.3	0.020
IX Filter	Tank	Mtl Box	1	8.3	45.6	28.9	0.1	0.003
Recirculation Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Standpipes	Tank	Sea-Van	4	37.3	204.9	130.2	0.5	0.010
6 Inch Valve	Lg Valve	Sea-Van	2	5.9	32.6	20.7	0.3	0.002
4 Inch Valve	Lg Valve	Sea-Van	35	103.8	571.1	362.9	6.4	0.014
3 Inch Valve	Sm Valve	Sea-Van	49	0.0	0.0	0.0	0.0	0.012
2 Inch Valve	Sm Valve	Sea-Van	184	0.0	0.0	0.0	0.0	0.024
1 Inch Valve	Sm Valve	Sea-Van	28	0.0	0.0	0.0	0.0	0.001
3/4 Inch Valve	Sm Valve	Sea-Van	80	0.0	0.0	0.0	0.0	0.002
				711	3,859	2,452	21	3.628

*** Dirty Radioactive Waste Treatment System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Reactor Cavity Drain Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Reactor Containment Sump Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Laundry Drain Tank	Tank	Sea-Van	1	15.4	84.5	53.7	0.2	0.051
Laundry Strainer	Tank	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
Laundry Drain Tank Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Laundry Waste Filter	Tank	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
Dirty Waste Monitor Tank	Tank	Sea-Van	1	25.0	137.5	87.4	0.4	0.120
Dirty Waste Monitor Tank Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Dirty Waste Monitor Tank Filter	Tank	Sea-Van	2	16.5	90.8	57.7	0.2	0.003
Dirty Waste Drain Tank	Tank	Sea-Van	1	25.1	138.0	87.7	0.4	0.127
Dirty Waste Drain Tank Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Aux. Building Sump Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
3 Inch Valve	Sm Valve	Sea-Van	14	0.0	0.0	0.0	0.0	0.004
2 Inch Valve	Sm Valve	Sea-Van	32	0.0	0.0	0.0	0.0	0.004
				102	533	338	1	0.325

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Main Steam System (Within Containment)

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Flow Orifices	Lg Misc.	Sea-Van 0	4	0.0	0.0	0.0	0.0	0.000
28 Inch Piping	Lg Pipe	Sea-Van 0	590	116.7	641.8	407.8	0.8	0.000
14 Inch Piping	Lg Pipe	Sea-Van 0	420	83.1	456.8	290.3	2.3	0.000
3 Inch Piping	Sm Pipe	Sea-Van 0	500	69.3	381.3	242.3	4.5	0.000
				269	1,480	940	8	0.000

*** Radioactive Gaseous Waste System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Surge Tank	Tank	Sea-Van	1	11.7	64.3	40.9	0.0	0.016
Decay Tank	Tank	Sea-Van	4	101.3	556.9	353.9	0.3	0.595
Gas Compressor	Lg Misc.	Sea-Van	2	0.0	0.0	0.0	0.0	0.000
Moisture Separator	Sm Misc.	Sea-Van	2	0.0	0.0	0.0	0.0	0.000
Br. Seal Wtr. HX	Lg HX	Mtl Box	2	4.1	16.4	10.4	0.0	0.176
4 Inch Valve	Lg Valve	Sea-Van	1	3.0	16.3	10.4	0.2	0.000
3 Inch Valve	Sm Valve	Sea-Van	3	0.0	0.0	0.0	0.0	0.000
2 Inch Valve	Sm Valve	Sea-Van	15	0.0	0.0	0.0	0.0	0.000
1 1/2 Inch Valve	Sm Valve	Sea-Van	35	0.0	0.0	0.0	0.0	0.003
1 Inch Valve	Sm Valve	Sea-Van	12	0.0	0.0	0.0	0.0	0.000
3/4 Inch Valve	Sm Valve	Sea-Van	16	0.0	0.0	0.0	0.0	0.000
				120	654	416	1	0.790

*** Residual Heat Removal System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
HX Unit	Lg HX	Mtl Box	2	4.1	16.4	10.4	0.2	1.405
14 Inch Valve	Lg Valve	Sea-Van	7	20.8	114.2	72.6	0.6	0.027
12 Inch valve	Lg Valve	Sea-Van	3	8.9	48.9	31.1	0.3	0.008
10 Inch Valve	Lg Valve	Sea-Van	2	5.9	32.6	20.7	0.3	0.004
8 Inch Valve	Lg Valve	Sea-Van	18	53.4	293.7	186.6	2.7	0.024
2 Inch Valve	Sm Valve	Sea-Van	2	0.0	0.0	0.0	0.0	0.000
3/4 Inch Valve	Sm Valve	Sea-Van	10	0.0	0.0	0.0	0.0	0.000
				97	522	332	4	1.472

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Safety Injection System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Accuml. Tank	Tank	Sea-Van	4	113.5	624.3	396.7	3.2	0.826
Boron Injection Tank	Tank	Sea-Van	1	15.5	85.5	54.3	0.2	0.059
Safety Injection Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Refueling Water Storage Tank	Tank	Sea-Van	1	85.7	471.3	299.5	0.1	1.919
Primary Makeup Water Storage Tank	Tank	Sea-Van	1	61.1	336.2	213.6	0.1	1.071
10 Inch Valve	Lg Valve	Sea-Van	8	23.7	130.5	82.9	1.1	0.016
8 Inch Valve	Lg Valve	Sea-Van	8	23.7	130.5	82.9	1.2	0.010
6 Inch Valve	Lg Valve	Sea-Van	2	5.9	32.6	20.7	0.3	0.002
4 Inch Valve	Lg Valve	Sea-Van	9	26.7	146.8	93.3	1.7	0.004
3 Inch Valve	Sm Valve	Sea-Van	4	0.0	0.0	0.0	0.0	0.001
2 Inch Valve	Sm Valve	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
1 1/2 Inch Valve	Sm Valve	Sea-Van	4	0.0	0.0	0.0	0.0	0.000
1 Inch Valve	Sm Valve	Sea-Van	33	0.0	0.0	0.0	0.0	0.001
3/4 Inch Valve	Sm Valve	Sea-Van	20	0.0	0.0	0.0	0.0	0.000
				360	1,974	1,254	8	3.912

*** Spent Fuel Cooling System

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Pump	Lg Pump	Sea-Van	2	4.1	16.4	10.4	0.0	0.003
Pump	Lg Pump	Sea-Van	1	2.0	8.2	5.2	0.0	0.002
Filter	Tank	Mtl Box	1	8.3	45.5	28.9	0.1	0.003
Filter	Tank	Mtl Box	1	8.3	45.5	28.9	0.1	0.003
Filter	Tank	Mtl Box	1	8.3	45.5	28.9	0.1	0.002
Demineralizer	Tank	Sea-Van	1	13.0	71.5	45.5	0.1	0.034
Spent Fuel Pool Heat Exchangers	Lg HX	Mtl Box	2	4.1	16.4	10.4	0.0	0.286
10 Inch Valve	Lg Valve	Sea-Van	8	23.7	130.5	82.9	1.1	0.016
8 Inch Valve	Lg Valve	Sea-Van	12	35.6	195.8	124.4	1.8	0.016
6 Inch Valve	Lg Valve	Sea-Van	1	3.0	16.3	10.4	0.2	0.001
4 Inch Valve	Lg Valve	Sea-Van	16	47.5	261.1	165.9	2.9	0.007
3 Inch Valve	Sm Valve	Sea-Van	9	0.0	0.0	0.0	0.0	0.002
2 Inch Valve	Sm Valve	Sea-Van	2	0.0	0.0	0.0	0.0	0.000
1 Inch Valve	Sm Valve	Sea-Van	10	0.0	0.0	0.0	0.0	0.000
3/4 Inch Valve	Sm Valve	Sea-Van	5	0.0	0.0	0.0	0.0	0.000
				160	861	547	6	0.375

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Stainless Steel Piping (3 - 24 Inches)

Component Description		Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
24 Inch Class I	(0.375" thick)	Lg Pipe	Sea-Van	170	33.5	184.9	117.5	0.2	0.233
18 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	30	5.9	32.6	20.7	0.1	0.031
16 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	300	59.3	326.3	207.4	1.4	0.270
14 Inch Class I	(1.250" thick)	Lg Pipe	Sea-Van	170	33.6	184.9	117.5	0.9	0.115
14 Inch Class II	(0.250" thick)	Lg Pipe	Sea-Van	200	39.6	217.5	138.2	1.1	0.159
14 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	270	53.4	293.7	186.6	1.5	0.211
14 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	610	120.6	663.5	421.6	3.4	0.477
12 Inch Class I	(1.125" thick)	Lg Pipe	Sea-Van	150	29.7	163.2	103.7	1.1	0.093
12 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	400	79.1	435.1	276.5	2.9	0.263
12 Inch Class III	(0.406" thick)	Lg Pipe	Sea-Van	270	53.4	293.7	186.6	2.0	0.190
10 Inch Class I	(1.000" thick)	Lg Pipe	Sea-Van	330	65.3	359.0	228.1	3.0	0.170
10 Inch Class II	(0.165" thick)	Lg Pipe	Sea-Van	320	63.3	348.1	221.2	2.9	0.197
10 Inch Class II	(0.365" thick)	Lg Pipe	Sea-Van	360	71.2	391.6	248.8	3.3	0.213
10 Inch Class III	(0.365" thick)	Lg Pipe	Sea-Van	60	11.9	65.3	41.5	0.6	0.035
10 Inch Non-Nuc. Grade	(0.165" thick)	Lg Pipe	Sea-Van	1,000	197.8	1,087.7	691.2	9.2	0.615
8 Inch I	(0.906" thick)	Lg Pipe	Sea-Van	250	49.4	271.9	172.8	2.5	0.100
8 Inch II	(0.322" thick)	Lg Pipe	Sea-Van	530	104.8	576.5	366.3	5.3	0.250
8 Inch II	(0.500" thick)	Lg Pipe	Sea-Van	50	9.9	54.4	34.6	0.5	0.022
8 Inch II	(0.906" thick)	Lg Pipe	Sea-Van	20	4.0	21.8	13.8	0.2	0.008
8 Inch III	(0.322" thick)	Lg Pipe	Sea-Van	620	122.6	674.4	428.5	6.2	0.292
8 Inch Non-Nuc. Grade	(0.148" thick)	Lg Pipe	Sea-Van	400	79.1	435.1	276.5	4.0	0.197
8 Inch Non-Nuc. Grade	(0.322" thick)	Lg Pipe	Sea-Van	130	25.7	141.4	89.9	1.3	0.061
6 Inch I	(0.718" thick)	Lg Pipe	Sea-Van	550	108.8	598.3	380.1	6.0	0.168
6 Inch II	(0.134" thick)	Lg Pipe	Sea-Van	100	19.8	108.8	69.1	1.1	0.038
6 Inch II	(0.280" thick)	Lg Pipe	Sea-Van	500	98.9	543.9	345.6	5.4	0.179
6 Inch III	(0.280" thick)	Lg Pipe	Sea-Van	90	17.8	97.9	62.2	1.0	0.032
6 Inch Non-Nuc. Grade	(0.134" thick)	Lg Pipe	Sea-Van	1,400	276.9	1,522.8	967.6	15.2	0.525
4 Inch I	(0.531" thick)	Lg Pipe	Sea-Van	280	55.4	304.6	193.5	3.4	0.057
4 Inch II	(0.120" thick)	Lg Pipe	Sea-Van	250	49.4	271.9	172.8	3.1	0.063
4 Inch II	(0.237" thick)	Lg Pipe	Sea-Van	500	98.9	543.9	345.6	6.1	0.119
4 Inch II	(0.337" thick)	Lg Pipe	Sea-Van	70	13.8	76.1	48.4	0.9	0.016
4 Inch II	(0.531" thick)	Lg Pipe	Sea-Van	180	35.6	195.8	124.4	2.2	0.037
4 Inch III	(0.237" thick)	Lg Pipe	Sea-Van	1,340	265.0	1,457.6	926.2	16.4	0.318
4 Inch Non-Nuc. Grade	(0.120" thick)	Lg Pipe	Sea-Van	2,200	435.1	2,393.0	1,520.6	26.9	0.553

TABLE 7.1. Contents of File TEST.PRE (contd)

3 Inch I	(0.437" thick)	Sm Pipe	Sea-Van	40	5.5	30.5	19.4	0.4	0.006
3 Inch II	(0.120" thick)	Sm Pipe	Sea-Van	220	30.5	167.8	106.6	2.0	0.042
3 Inch II	(0.216" thick)	Sm Pipe	Sea-Van	2,000	277.3	1,525.3	969.2	18.1	0.362
3 Inch II	(0.437" thick)	Sm Pipe	Sea-Van	1,100	152.5	838.9	533.1	10.0	0.170
3 Inch III	(0.216" thick)	Sm Pipe	Sea-Van	1,460	202.5	1,113.5	707.5	13.2	0.264
3 Inch Non-Nuc. Grade	(0.120" thick)	Sm Pipe	Sea-Van	5,000	693.3	3,813.3	2,423.1	45.3	0.962
3 Inch Non-Nuc. Grade	(0.216" thick)	Sm Pipe	Sea-Van	20	2.8	15.3	9.7	0.2	0.004
					4,153	22,842	14,514	231	8.138

*** Stainless Steel Piping (1/2 - 2 Inches)

Component Description		Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
2 Inch Class I	(0.343" thick)	Sm Pipe	Sea-Van	550	76.3	419.5	266.5	5.3	0.055
2 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.024
2 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	800	110.9	610.1	387.7	7.6	0.092
2 Inch Class II	(0.343" thick)	Sm Pipe	Sea-Van	1,450	201.1	1,105.9	702.7	13.9	0.145
2 Inch Class III	(0.154" thick)	Sm Pipe	Sea-Van	4,100	568.5	3,126.9	1,986.9	39.2	0.500
2 Inch Non-Nuc. Grade	(0.154" thick)	Sm Pipe	Sea-Van	1,400	194.1	1,067.7	678.5	13.4	0.171
1 1/2 Inch Class I	(0.281" thick)	Sm Pipe	Sea-Van	700	97.1	533.9	339.2	6.7	0.055
1 1/2 Inch Class II	(0.145" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.019
1 1/2 Inch Class II	(0.200" thick)	Sm Pipe	Sea-Van	800	110.9	610.1	387.7	7.6	0.071
1 1/2 Inch Class II	(0.281" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.016
1 1/2 Inch Class III	(0.145" thick)	Sm Pipe	Sea-Van	1,700	235.7	1,296.5	823.8	16.2	0.161
1 1/2 Inch Non-Nuc. Grade	(0.145" thick)	Sm Pipe	Sea-Van	1,500	208.0	1,144.0	726.9	14.3	0.142
1 Inch Class I	(0.250" thick)	Sm Pipe	Sea-Van	100	13.9	76.3	48.5	1.0	0.005
1 Inch Class II	(0.133" thick)	Sm Pipe	Sea-Van	100	13.9	76.3	48.5	1.0	0.006
1 Inch Class II	(0.179" thick)	Sm Pipe	Sea-Van	300	41.6	228.8	145.4	2.9	0.017
1 Inch Class II	(0.250" thick)	Sm Pipe	Sea-Van	600	83.2	457.6	290.8	5.7	0.029
1 Inch Class III	(0.133" thick)	Sm Pipe	Sea-Van	1,500	208.0	1,144.0	726.9	14.3	0.093
1 Inch Non-Nuc. Grade	(0.133" thick)	Sm Pipe	Sea-Van	2,000	277.3	1,525.3	969.2	19.1	0.124
3/4 Inch Class I	(0.218" thick)	Sm Pipe	Sea-Van	290	40.2	221.2	140.5	2.8	0.011
3/4 Inch Class II	(0.113" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.010
3/4 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	300	41.6	228.8	145.4	2.9	0.013
3/4 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	700	97.1	533.9	339.2	6.7	0.025
3/4 Inch Class III	(0.113" thick)	Sm Pipe	Sea-Van	900	124.8	686.4	436.1	8.6	0.044
3/4 Inch Non-Nuc. Grade	(0.113" thick)	Sm Pipe	Sea-Van	1,000	138.7	762.7	484.6	9.6	0.049

TABLE 7.1. Contents of File TEST.PRE (contd)

1/2 Inch Class I	(0.187" thick)	Sm Pipe	Sea-Van	105	14.6	80.1	50.9	1.0	0.003
1/2 Inch Class II	(0.147" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.006
1/2 Inch Class II	(0.187" thick)	Sm Pipe	Sea-Van	200	27.7	152.5	96.9	1.9	0.005
1/2 Inch Class III	(0.109" thick)	Sm Pipe	Sea-Van	800	110.9	610.1	387.7	7.6	0.029
1/2 Inch Non-Nuc. Grade	(0.109" thick)	Sm Pipe	Sea-Van	1,000	138.7	762.7	484.6	9.6	0.037
					3,313	18,224	11,580	228	1.956

*** Retrofit Materials

Component Description	Category	Disposal	Qty	Crew-Hrs	Pers-Hrs	Exp Hrs	Pers-Rem	Curies
2 Inch Piping	Sm Pipe	Sea-Van	52	7.2	39.7	25.2	0.5	0.006
3/4 Inch Piping	Sm Pipe	Sea-Van	40	5.5	30.5	19.4	0.4	0.002
1/2 Inch Piping	Sm Pipe	Sea-Van	304	42.2	231.9	147.3	2.9	0.010
2 Inch valve	Sm Valve	Sea-Van	4	0.0	0.0	0.0	0.0	0.001
1 Inch valve	Sm Valve	Sea-Van	3	0.0	0.0	0.0	0.0	0.000
3/4 Inch valve	Sm Valve	Sea-Van	8	0.0	0.0	0.0	0.0	0.000
Tank	Tank	Sea-Van	2	30.7	169.0	107.4	0.2	0.102
Dry waste compactor	Lg Misc.	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
Skid-mounted unit	Lg Misc.	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
Shielded box	Lg Misc.	Sea-Van	1	0.0	0.0	0.0	0.0	0.000
				86	471	299	4	0.120

NOTE: For piping, "Qty" refers to feet of piping. For other categories "Qty" refers to the number of items of equipment.

TABLE 7.1. Contents of File TEST.PRE (contd)

File: E:\NRC\TESTME.PRE
Plant Name: TROJAN

+ POTENTIALLY RADIOACTIVE SYSTEMS: REMOVAL, TRANSPORTATION, DISPOSAL COSTS (DOLLARS) +

*** Component Cooling Water System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Sample HX	Lg HX	Sea-Van	9	2,612	8,689	2,331	72,952	86,583
				2,612	8,689	2,331	72,952	86,583

*** Clean Radioactive Waste Treatment System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Reactor Coolant Drain Tank	Tank	Sea-Van	1	2,246	230	62	1,934	4,472
Reactor Coolant Drain Pump	Lg Pump	Sea-Van	2	568	138	37	1,158	1,901
Reactor Coolant Drain Filter	Tank	Mtl Box	1	1,786	24	12	193	2,016
Spent Resin Storage Tank	Tank	Sea-Van	1	4,519	938	252	7,874	13,582
Clean Waste Recv. Tank	Tank	Sea-Van	2	11,791	3,023	811	25,378	41,003
Clean Waste Recv. Pump	Lg Pump	Sea-Van	2	568	138	37	1,158	1,901
Treated Waste Mon. Tank	Tank	Sea-Van 0	2	11,146	3,089	829	25,938	41,003
Treated Waste Mon. Pump	Lg Pump	Sea-Van	2	563	63	17	533	1,176
Aux Building Drain Tank	Tank	Sea-Van	1	2,948	288	77	2,420	5,734
Aux Building Drain Pump	Lg Pump	Sea-Van	2	571	359	96	3,011	4,037
Chemical Waste Drain Tank	Tank	Sea-Van	1	4,871	745	200	6,253	12,069
Chemical Waste Drain Pump	Lg Pump	Sea-Van	2	563	55	15	463	1,096
Waste Conc. Hold. Tank	Tank	Sea-Van	1	2,960	288	77	2,420	5,746
Waste Conc. Hold. Pump	Lg Pump	Sea-Van	1	282	32	9	266	588
Clean Waste Filter	Tank	Mtl Box	1	1,568	5	2	37	1,612
Clean Rad. Waste Evaporator	Lg HX	Sea-Van	1	480	5,517	1,480	46,319	53,795
Clean Rad. Waste Evap. Condenser	Lg HX	Sea-Van	1	291	1,103	296	9,264	10,954
3 Inch Valve	Sm Valve	Sea-Van	19	0	401	108	3,366	3,875
2 Inch Valve	Sm Valve	Sea-Van	64	0	794	213	6,670	7,677
				47,722	17,230	4,629	144,655	214,236

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Containment Spray System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Pump	Lg Pump	Sea-Van 0	2	616	1,876	503	15,748	18,743
Pump	Sm Pump	Sea-Van 0	2	562	28	7	232	829
Tank	Tank	Sea-Van 0	1	4,500	345	92	2,895	7,832
18 Inch Valve	Lg Valve	Sea-Van 0	4	2,286	2,703	725	22,696	28,411
14 Inch Valve	Lg Valve	Sea-Van 0	6	3,429	2,284	613	19,176	25,502
10 Inch Valve	Lg Valve	Sea-Van 0	6	3,429	1,206	324	10,130	15,089
3 Inch Valve	Sm Valve	Sea-Van 0	6	0	127	34	1,063	1,224
1 1/2 Inch Valve	Sm Valve	Sea-Van 0	6	0	51	14	431	496
1 Inch Valve	Sm Valve	Sea-Van 0	6	0	41	11	347	400
3/4 Inch Valve	Sm Valve	Sea-Van 0	12	0	50	13	417	480
				14,823	8,711	2,337	73,135	99,005

*** Chemical and Volume Control System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Regenerative HX	Lg HX	Mtl Box	3	866	1,359	234	10,928	13,386
Seal Water HX	Lg HX	Mtl Box	1	287	117	60	938	1,402
Letdown HX	Lg HX	Mtl Box	1	292	130	67	1,049	1,538
Excess Letdown HX	Lg HX	Mtl Box	1	284	110	57	883	1,333
Centrif. Chrg. Pump	Lg Pump	Sea-Van	2	680	4,714	1,264	39,579	46,238
Vol. Control Tank	Tank	Sea-Van	1	4,039	669	179	5,616	10,504
Chem. Mix Tank	Tank	Sea-Van	1	1,571	11	3	89	1,674
Holdup Tank	Tank	Sea-Van	3	26,245	12,412	3,330	104,217	146,203
Monitor Tank	Tank	Sea-Van	2	13,451	5,517	1,480	46,319	66,766
Boric Acid Tank	Tank	Sea-Van	2	13,701	5,517	1,480	46,319	67,016
Batch Tank	Tank	Sea-Van 0	1	2,457	200	54	1,679	4,390
Resin Fill Tank	Tank	Sea-Van 0	1	2,693	36	10	301	3,040
Reciprocal Charg. Pump	Lg Pump	Sea-Van	1	340	2,441	655	20,496	23,932
Boric Acid Pump	Lg Pump	Sea-Van	2	570	170	46	1,431	2,217
Reactor Coolant Filter	Tank	Mtl Box	1	1,784	14	7	110	1,915
Mixed Bed Demineralizer	Tank	Sea-Van	2	3,607	290	78	2,432	6,406
Cation IX	Tank	Mtl Box	1	1,803	72	37	580	2,492
Seal Injection Filter	Tank	Mtl Box	2	3,556	113	58	1,821	5,549
Concentrate Holding Tank	Tank	Sea-Van	1	2,715	483	129	4,053	7,380
Evaporator Feed IX	Tank	Mtl Box	3	5,410	72	37	1,739	7,258
Evaporator Condensate IX	Tank	Mtl Box	2	3,607	72	37	1,159	4,875
Condensate Filter	Tank	Mtl Box	1	1,571	3	1	22	1,598
Concentrates Filter	Tank	Mtl Box	1	1,571	3	1	22	1,598

TABLE 7.1. Contents of File TEST.PRE (contd)

Conc. Hold. Tank Transfer Pump	Lg Pump	Sea-Van	2	563	55	15	463	1,096
Gas Stripper Feed Pump	Lg Pump	Sea-Van	2	563	55	15	463	1,096
Boric Acid Evaporator Condenser	Tank	Sea-Van	2	4,038	5,517	1,480	46,319	57,353
Boric Acid Evaporator Vent Condenser	Tank	Sea-Van	2	3,163	166	44	1,390	4,763
Boric Acid Evap. Distillate Condenser	Tank	Sea-Van	2	3,994	83	22	695	4,794
IX Filter	Tank	Mtl Box	1	1,576	10	5	83	1,675
Recirculation Pump	Lg Pump	Sea-Van	1	282	28	7	232	548
Standpipes	Tank	Sea-Van	4	7,092	298	80	2,501	9,971
6 Inch Valve	Lg Valve	Sea-Van	2	1,143	162	44	1,362	2,711
4 Inch Valve	Lg Valve	Sea-Van	35	20,004	1,294	347	10,862	32,506
3 Inch Valve	Sm Valve	Sea-Van	49	0	1,034	277	8,681	9,993
2 Inch Valve	Sm Valve	Sea-Van	184	0	2,284	613	19,176	22,072
1 Inch Valve	Sm Valve	Sea-Van	28	0	193	52	1,621	1,866
3/4 Inch Valve	Sm Valve	Sea-Van	80	0	331	89	2,779	3,199
				135,519	46,032	12,394	388,407	582,352

*** Dirty Radioactive Waste Treatment System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Reactor Cavity Drain Pump	Lg Pump	Sea-Van	1	295	110	30	926	1,362
Reactor Containment Sump Pump	Lg Pump	Sea-Van	2	576	414	111	3,474	4,574
Laundry Drain Tank	Tank	Sea-Van	1	2,948	276	74	2,316	5,614
Laundry Strainer	Tank	Sea-Van	1	0	21	6	174	200
Laundry Drain Tank Pump	Lg Pump	Sea-Van	1	282	28	7	232	548
Laundry Waste Filter	Tank	Sea-Van	1	0	21	6	174	200
Dirty Waste Monitor Tank	Tank	Sea-Van	1	4,814	800	215	6,716	12,545
Dirty Waste Monitor Tank Pump	Lg Pump	Sea-Van	2	563	55	15	463	1,096
Dirty Waste Monitor Tank Filter	Tank	Sea-Van	2	3,140	21	6	176	3,342
Dirty Waste Drain Tank	Tank	Sea-Van	1	4,833	902	242	7,573	13,550
Dirty Waste Drain Tank Pump	Lg Pump	Sea-Van	2	568	110	30	926	1,634
Aux. Building Sump Pump	Lg Pump	Sea-Van	2	581	359	96	3,011	4,046
3 Inch Valve	Sm Valve	Sea-Van	14	0	295	79	2,480	2,855
2 Inch Valve	Sm Valve	Sea-Van	32	0	397	107	3,335	3,839
				18,600	3,808	1,022	31,976	55,406

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Main Steam System (Within Containment)

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Flow Orifices	Lg Misc.	Sea-Van	0 4	61	1,379	370	11,580	13,390
28 Inch Piping	Lg Pipe	Sea-Van	0 590	22,481	20,170	5,410	169,351	217,413
14 Inch Piping	Lg Pipe	Sea-Van	0 420	16,003	4,918	1,319	41,296	63,536
3 Inch Piping	Sm Pipe	Sea-Van	0 500	13,348	707	190	5,935	20,179
				51,893	27,175	7,289	228,161	314,518

*** Radioactive Gaseous Waste System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Surge Tank	Tank	Sea-Van	1	2,233	123	33	1,031	3,420
Decay Tank	Tank	Sea-Van	4	19,561	5,958	1,598	50,024	77,141
Gas Compressor	Lg Misc.	Sea-Van	2	85	2,207	592	18,527	21,411
Moisture Separator	Sm Misc.	Sea-Van	2	6	28	7	232	273
Br. Seal Wtr. HX	Lg HX	Mtl Box	2	581	1,057	273	8,499	10,409
4 Inch Valve	Lg Valve	Sea-Van	1	572	37	10	310	929
3 Inch Valve	Sm Valve	Sea-Van	3	0	63	17	532	612
2 Inch Valve	Sm Valve	Sea-Van	16	0	199	53	1,667	1,919
1 1/2 Inch Valve	Sm Valve	Sea-Van	35	0	299	80	2,513	2,892
1 Inch Valve	Sm Valve	Sea-Van	12	0	83	22	695	800
3/4 Inch Valve	Sm Valve	Sea-Van	16	0	66	18	556	640
				23,037	10,119	2,704	84,586	120,445

*** Residual Heat Removal System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Pump	Lg Pump	Sea-Van	2	581	1,876	503	15,748	18,708
HX Unit	Lg HX	Mtl Box	2	646	0	1,538	31,212	33,397
14 Inch Valve	Lg Valve	Sea-Van	7	4,001	2,665	715	22,372	29,752
12 Inch valve	Lg Valve	Sea-Van	3	1,715	816	219	6,851	9,600
10 Inch Valve	Lg Valve	Sea-Van	2	1,143	402	108	3,377	5,030
8 Inch Valve	Lg Valve	Sea-Van	18	10,288	2,554	685	21,448	34,975
2 Inch Valve	Sm Valve	Sea-Van	2	0	25	7	208	240
3/4 Inch Valve	Sm Valve	Sea-Van	10	0	41	11	347	400
				18,374	8,379	3,786	101,563	132,101

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Safety Injection System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Accuml. Tank	Tank	Sea-Van	4	22,022	42,202	11,320	354,337	429,882
Boron Injection Tank	Tank	Sea-Van	1	2,987	3,931	1,054	33,002	40,974
Safety Injection Pump	Lg Pump	Sea-Van	2	633	2,372	636	19,917	23,558
Refueling Water Storage Tank	Tank	Sea-Van	1	17,114	24,522	6,578	205,886	254,099
Primary Makeup Water Storage Tank	Tank	Sea-Van	1	12,122	13,681	3,670	114,870	144,343
10 Inch Valve	Lg Valve	Sea-Van	8	4,572	1,609	432	13,506	20,119
8 Inch Valve	Lg Valve	Sea-Van	8	4,572	1,135	305	9,532	15,545
6 Inch Valve	Lg Valve	Sea-Van	2	1,143	162	44	1,362	2,711
4 Inch Valve	Lg Valve	Sea-Van	9	5,144	333	89	2,793	8,359
3 Inch Valve	Sm Valve	Sea-Van	4	0	84	23	709	816
2 Inch Valve	Sm Valve	Sea-Van	1	0	12	3	104	120
1 1/2 Inch Valve	Sm Valve	Sea-Van	4	0	34	9	287	331
1 Inch Valve	Sm Valve	Sea-Van	33	0	228	61	1,911	2,199
3/4 Inch Valve	Sm Valve	Sea-Van	20	0	83	22	695	800
				70,309	90,388	24,246	758,910	943,854

*** Spent Fuel Cooling System

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
Pump	Lg Pump	Sea-Van	1	287	138	37	1,158	1,620
Pump	Lg Pump	Sea-Van	2	573	248	67	2,084	2,972
Pump	Lg Pump	Sea-Van	1	286	97	26	811	1,219
Filter	Tank	Mtl Box	1	1,576	25	13	199	1,812
Filter	Tank	Mtl Box	1	1,576	25	13	199	1,812
Filter	Tank	Mtl Box	1	1,574	10	5	83	1,672
Demineralizer	Tank	Sea-Van	1	2,492	303	81	2,548	5,425
Spent Fuel Pool Heat Exchangers	Lg HX	Mtl Box	2	589	837	216	6,733	8,376
10 Inch Valve	Lg Valve	Sea-Van	8	4,572	1,609	432	13,506	20,119
8 Inch Valve	Lg Valve	Sea-Van	12	6,859	1,703	457	14,299	23,317
6 Inch Valve	Lg Valve	Sea-Van	1	572	81	22	681	1,355
4 Inch Valve	Lg Valve	Sea-Van	15	9,145	591	159	4,965	14,860
3 Inch Valve	Sm Valve	Sea-Van	9	0	190	51	1,595	1,835
2 Inch Valve	Sm Valve	Sea-Van	2	0	25	7	208	240
1 Inch Valve	Sm Valve	Sea-Van	10	0	69	18	579	666
3/4 Inch Valve	Sm Valve	Sea-Van	5	0	21	6	174	200
				30,100	5,971	1,608	49,821	87,500

TABLE 7.1. Contents of File TEST.PRE (contd)

*** Stainless Steel Piping (3 - 24 Inches)

Component Description		Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
24 Inch Class I	(0.375" thick)	Lg Pipe	Sea-Van	170	6,478	2,218	595	19,149	28,440
18 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	30	1,143	292	78	2,452	3,966
16 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	300	11,431	2,589	695	22,959	37,674
14 Inch Class I	(1.250" thick)	Lg Pipe	Sea-Van	170	6,478	3,991	1,071	33,508	45,047
14 Inch Class II	(0.250" thick)	Lg Pipe	Sea-Van	200	7,621	1,013	272	8,979	17,883
14 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	270	10,288	2,032	545	18,018	30,883
14 Inch Class III	(0.375" thick)	Lg Pipe	Sea-Van	610	23,243	4,591	1,231	41,249	70,314
12 Inch Class I	(1.125" thick)	Lg Pipe	Sea-Van	150	5,715	2,890	775	24,262	33,642
12 Inch Class II	(0.375" thick)	Lg Pipe	Sea-Van	400	15,241	2,734	733	24,243	42,952
12 Inch Class III	(0.406" thick)	Lg Pipe	Sea-Van	270	10,288	1,993	535	17,675	30,491
10 Inch Class I	(1.000" thick)	Lg Pipe	Sea-Van	330	12,574	4,739	1,271	40,907	59,492
10 Inch Class II	(0.165" thick)	Lg Pipe	Sea-Van	320	12,193	825	221	7,415	20,655
10 Inch Class II	(0.365" thick)	Lg Pipe	Sea-Van	360	13,717	2,010	539	17,821	34,087
10 Inch Class III	(0.365" thick)	Lg Pipe	Sea-Van	60	2,286	335	90	2,812	5,523
10 Inch Non-Nuc. Grade	(0.165" thick)	Lg Pipe	Sea-Van	1,000	38,103	2,579	692	23,780	65,154
8 Inch I	(0.906" thick)	Lg Pipe	Sea-Van	250	9,526	2,575	691	21,622	34,414
8 Inch II	(0.322" thick)	Lg Pipe	Sea-Van	530	20,195	2,087	560	18,750	41,592
8 Inch II	(0.500" thick)	Lg Pipe	Sea-Van	50	1,905	299	80	2,512	4,797
8 Inch II	(0.906" thick)	Lg Pipe	Sea-Van	20	762	206	55	1,730	2,753
8 Inch III	(0.322" thick)	Lg Pipe	Sea-Van	620	23,624	2,441	655	21,934	48,654
8 Inch Non-Nuc. Grade	(0.148" thick)	Lg Pipe	Sea-Van	400	15,241	739	198	6,729	22,908
8 Inch Non-Nuc. Grade	(0.322" thick)	Lg Pipe	Sea-Van	130	4,953	512	137	4,418	10,021
6 Inch I	(0.718" thick)	Lg Pipe	Sea-Van	550	20,957	3,436	922	30,469	55,784
6 Inch II	(0.134" thick)	Lg Pipe	Sea-Van	100	3,810	128	34	1,136	5,109
6 Inch II	(0.280" thick)	Lg Pipe	Sea-Van	500	19,051	1,308	351	11,753	32,464
6 Inch III	(0.280" thick)	Lg Pipe	Sea-Van	90	3,429	235	63	2,032	5,760
6 Inch Non-Nuc. Grade	(0.134" thick)	Lg Pipe	Sea-Van	1,400	53,344	1,794	481	16,539	72,158
4 Inch I	(0.531" thick)	Lg Pipe	Sea-Van	280	10,669	869	233	7,503	19,274
4 Inch II	(0.120" thick)	Lg Pipe	Sea-Van	250	9,526	193	52	1,738	11,509
4 Inch II	(0.237" thick)	Lg Pipe	Sea-Van	500	19,051	744	200	6,685	26,680
4 Inch II	(0.337" thick)	Lg Pipe	Sea-Van	70	2,667	145	39	1,214	4,065
4 Inch II	(0.531" thick)	Lg Pipe	Sea-Van	180	6,859	559	150	4,823	12,391
4 Inch III	(0.237" thick)	Lg Pipe	Sea-Van	1,340	51,058	1,994	535	18,386	71,973
4 Inch Non-Nuc. Grade	(0.120" thick)	Lg Pipe	Sea-Van	2,200	83,827	1,702	457	15,695	101,680

TABLE 7.1. Contents of File TEST.PRE (contd)

3 Inch I	(0.437" thick)	Sm Pipe	Sea-Van	40	1,068	79	21	663	1,831
3 Inch II	(0.120" thick)	Sm Pipe	Sea-Van	220	5,873	131	35	1,180	7,220
3 Inch II	(0.216" thick)	Sm Pipe	Sea-Van	2,000	53,392	2,091	561	19,278	75,322
3 Inch II	(0.437" thick)	Sm Pipe	Sea-Van	1,100	29,366	2,172	583	19,519	51,640
3 Inch III	(0.216" thick)	Sm Pipe	Sea-Van	1,460	38,976	1,526	409	14,073	54,985
3 Inch Non-Nuc. Grade	(0.120" thick)	Sm Pipe	Sea-Van	5,000	133,480	2,986	801	28,656	165,923
3 Inch Non-Nuc. Grade	(0.216" thick)	Sm Pipe	Sea-Van	20	534	21	6	176	736
					799,941	65,806	17,652	584,448	1,467,847

*** Stainless Steel Piping (1/2 - 2 Inches)

Component Description		Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
2 Inch Class I	(0.343" thick)	Sm Pipe	Sea-Van	550	14,683	564	151	5,004	20,403
2 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	200	5,339	101	27	893	6,360
2 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	800	21,357	554	149	5,042	27,101
2 Inch Class II	(0.343" thick)	Sm Pipe	Sea-Van	1,450	38,709	1,488	399	13,543	54,140
2 Inch Class III	(0.154" thick)	Sm Pipe	Sea-Van	4,100	109,454	2,064	554	1º 030	131,102
2 Inch Non-Nuc. Grade	(0.154" thick)	Sm Pipe	Sea-Van	1,400	37,374	705	189	6,498	44,766
1 1/2 Inch Class I	(0.281" thick)	Sm Pipe	Sea-Van	700	18,687	469	126	4,216	23,498
1 1/2 Inch Class II	(0.145" thick)	Sm Pipe	Sea-Van	200	5,339	75	20	665	6,100
1 1/2 Inch Class II	(0.200" thick)	Sm Pipe	Sea-Van	800	21,357	401	107	3,646	25,510
1 1/2 Inch Class II	(0.281" thick)	Sm Pipe	Sea-Van	200	5,339	134	36	1,189	6,698
1 1/2 Inch Class III	(0.145" thick)	Sm Pipe	Sea-Van	1,700	45,383	638	171	5,880	52,072
1 1/2 Inch Non-Nuc. Grade	(0.145" thick)	Sm Pipe	Sea-Van	1,500	40,044	563	151	5,188	45,946
1 Inch Class I	(0.250" thick)	Sm Pipe	Sea-Van	100	2,670	39	11	338	3,057
1 Inch Class II	(0.133" thick)	Sm Pipe	Sea-Van	100	2,670	23	6	205	2,904
1 Inch Class II	(0.179" thick)	Sm Pipe	Sea-Van	300	8,009	90	24	796	8,919
1 Inch Class II	(0.250" thick)	Sm Pipe	Sea-Van	600	16,018	235	63	2,112	18,427
1 Inch Class III	(0.133" thick)	Sm Pipe	Sea-Van	1,500	40,044	348	93	3,205	43,689
1 Inch Non-Nuc. Grade	(0.133" thick)	Sm Pipe	Sea-Van	2,000	53,392	463	124	4,273	58,253
3/4 Inch Class I	(0.218" thick)	Sm Pipe	Sea-Van	290	7,742	78	21	688	8,528
3/4 Inch Class II	(0.113" thick)	Sm Pipe	Sea-Van	200	5,339	31	8	280	5,659
3/4 Inch Class II	(0.154" thick)	Sm Pipe	Sea-Van	300	8,009	61	16	546	8,632
3/4 Inch Class II	(0.218" thick)	Sm Pipe	Sea-Van	700	18,687	187	50	1,683	20,608
3/4 Inch Class III	(0.113" thick)	Sm Pipe	Sea-Van	900	24,026	140	38	1,293	25,498
3/4 Inch Non-Nuc. Grade	(0.113" thick)	Sm Pipe	Sea-Van	1,000	26,696	156	42	1,437	28,331

TABLE 7.1. Contents of File TEST.PRE (contd)

1/2 Inch Class I	(0.187" thick)	Sm Pipe	Sea-Van	105	2,803	19	5	162	2,989
1/2 Inch Class II	(0.147" thick)	Sm Pipe	Sea-Van	200	5,339	30	8	267	5,644
1/2 Inch Class II	(0.187" thick)	Sm Pipe	Sea-Van	200	5,339	36	10	318	5,703
1/2 Inch Class III	(0.109" thick)	Sm Pipe	Sea-Van	800	21,357	94	25	865	22,340
1/2 Inch Non-Nuc. Grade	(0.109" thick)	Sm Pipe	Sea-Van	1,000	26,696	117	31	1,081	27,926
					637,902	9,901	2,656	90,343	740,802

*** Retrofit Materials

Component Description	Category	Disposal	Qty	Removal	Container	Transport	Disposal	Tot. Costs
2 Inch Piping	Sm Pipe	Sea-Van	52	1,388	26	7	226	1,647
3/4 Inch Piping	Sm Pipe	Sea-Van	40	1,068	6	2	54	1,130
1/2 Inch Piping	Sm Pipe	Sea-Van	304	8,116	36	10	320	8,481
2 Inch valve	Sm Valve	Sea-Van	4	0	50	13	417	480
1 Inch valve	Sm Valve	Sea-Van	3	0	21	6	174	200
3/4 Inch valve	Sm Valve	Sea-Van	8	0	33	9	278	320
Tank	Tank	Sea-Van	2	5,896	552	148	4,632	11,227
Dry waste compactor	Lg Misc.	Sea-Van	1	12	276	74	2,316	2,678
Skid-mounted unit	Lg Misc.	Sea-Van	1	5	69	18	579	671
Shielded box	Lg Misc.	Sea-Van	1	1	21	6	174	201
				16,486	1,089	292	9,169	27,035

NOTE: For piping, "Qty" refers to feet of piping. For other categories "Qty" refers to the number of items of equipment.

Table 7.2 is **TEST.PRD**, a building decontamination file created from Menu Item D in Section 6.0. The first three sections of this file have the same general format as **TEST.PRE**. Most of the terms in the file are defined in Section 4.4. The removal, container, transport, and disposal costs have the same meanings as for **TEST.PRE**, discussed above.

For the case of metal and surface washing, nothing is actually removed, so "removal" costs refer to the labor costs associated with washing or decontaminating the surfaces. Because nothing is shipped, container costs and transportation costs are zero. However, there is a waste water processing cost (set by Menu Item 2). This cost is reflected in the disposal cost column.

The last part of the file is a general building summary of costs, person-hours and other parameters associated with each type of building decon activity: concrete and metal washing, concrete and metal removal, concrete cutting, handrail and stair tread decontamination, and floor grating removal.

TABLE 7.2. Contents of File TEST.PRD

File Name: E:\NRC\TEST.PRD (05-19-93/13:55)

Files used to prepare this report:
E:\NRC\TEST.PD2 (05-19-93/13:46)
E:\NRC\TEST.PD1 (05-19-93/13:46)
E:\NRC\TEST.PDA (05-19-93/13:49)

Plant Name: TROJAN

++
+ BUILDING COMPONENTS TO BE DECONTAMINATED +
++

*** Fuel Bldg

Component Description	Activity	Length (ft.)	Width (ft.)	Depth (in.)	Orientation
Fuel Pool (Two Walls)	Mtl Wash	58.0	40.5	N/A	Wall
Fuel Pool (Two Walls)	Mtl Wash	80.0	40.5	N/A	Wall
Fuel Pool (Floor)	Mtl Wash	29.0	40.0	N/A	Floor
Cask Loading Pit (Two walls)	Mtl Wash	24.0	40.5	N/A	Wall
Cask Loading Pit (Two walls)	Mtl Wash	16.0	40.5	N/A	Wall
Cask Loading Pit (Floor)	Mtl Wash	8.0	12.0	N/A	Floor
Wash Pit (Two Walls)	Mtl Wash	32.0	21.0	N/A	Wall
Wash Pit (Two Walls)	Mtl Wash	34.0	21.0	N/A	Wall
Wash Pit (Floor)	Mtl Wash	16.0	17.0	N/A	Floor
Load Pit Gate (Two Walls)	Mtl Wash	3.0	25.0	N/A	Wall
Load Pit Gate (Two Walls)	Mtl Wash	2.0	25.0	N/A	Wall
Load Pit Gate (Two Walls)	Mtl Wash	7.0	25.0	N/A	Wall
Load Pit Gate (Floor)	Mtl Wash	1.5	3.0	N/A	Floor
Load Pit Gate (Floor)	Mtl Wash	3.5	5.0	N/A	Floor
Transfer Canal (Two walls)	Mtl Wash	89.0	40.5	N/A	Wall
Transfer Canal (Two walls)	Mtl Wash	8.0	40.5	N/A	Wall
Transfer Canal (Two walls)	Mtl Wash	8.0	40.5	N/A	Wall
Transfer Canal (Two walls)	Mtl Wash	7.0	40.5	N/A	Wall
Transfer Canal (Floor)	Mtl Wash	4.0	44.5	N/A	Floor
Canal Gate (Two walls)	Mtl Wash	4.5	25.0	N/A	Wall
Canal Gate (Two walls)	Mtl Wash	3.0	25.0	N/A	Wall
Canal Gate (Two walls)	Mtl Wash	2.5	25.0	N/A	Wall
Canal Gate (Floor)	Mtl Wash	2.3	6.5	N/A	Floor
Canal Gate (Floor)	Mtl Wash	1.3	3.5	N/A	Floor
Fuel Pool (Two walls)	Mtl Rmvl	58.0	40.5	0.125	Wall
Fuel Pool (Two walls)	Mtl Rmvl	80.0	40.5	0.125	Wall
Fuel Pool (Floor)	Mtl Rmvl	29.0	40.0	0.125	Floor
Cask Loading Pit (Two walls)	Mtl Rmvl	24.0	40.5	0.125	Wall
Cask Loading Pit (Two walls)	Mtl Rmvl	16.0	40.5	0.125	Wall
Cask Loading Pit (Floor)	Mtl Rmvl	8.0	12.0	0.125	Floor
Wash Pit (Two walls)	Mtl Rmvl	32.0	21.0	0.125	Wall
Wash Pit (Two walls)	Mtl Rmvl	34.0	21.0	0.125	Wall
Wash Pit (Floor)	Mtl Rmvl	16.0	17.0	0.125	Floor
Load Pit Gate (Two walls)	Mtl Rmvl	3.0	25.0	0.125	Wall
Load Pit Gate (Two walls)	Mtl Rmvl	2.0	25.0	0.125	Wall
Load Pit Gate (Two walls)	Mtl Rmvl	7.0	25.0	0.125	Wall
Load Pit Gate (Floor)	Mtl Rmvl	1.5	3.0	0.125	Floor
Load Pit Gate (Floor)	Mtl Rmvl	3.5	5.0	0.125	Floor
Transfer Canal (Two walls)	Mtl Rmvl	89.0	40.5	0.125	Wall
Transfer Canal (Two walls)	Mtl Rmvl	8.0	40.5	0.125	Wall
Transfer Canal (Two walls)	Mtl Rmvl	8.0	40.5	0.125	Wall
Transfer Canal (Two walls)	Mtl Rmvl	7.0	40.5	0.125	Wall
Transfer Canal (Floor)	Mtl Rmvl	4.0	44.5	0.125	Floor
Canal Gate (Two walls)	Mtl Rmvl	4.5	25.0	0.125	Wall

TABLE 7.2. Contents of File TEST.PRD (contd)

Canal Gate (Two walls)	Mtl	Rmvl	3.0	25.0	0.125	Wall
Canal Gate (Two walls)	Mtl	Rmvl	2.5	25.0	0.125	Wall
Canal Gate (Floor)	Mtl	Rmvl	2.3	6.5	0.125	Floor
Canal Gate (Floor)	Mtl	Rmvl	1.3	3.5	0.125	Floor
Concrete Washed - 4th Floor	Conc	Wash	74.4	74.4	N/A	Floor
Concrete Washed - 3rd Floor	Conc	Wash	64.1	64.1	N/A	Floor
Concrete Washed - 2nd Floor	Conc	Wash	65.6	65.6	N/A	Floor
Concrete Washed - 1st Floor	Conc	Wash	94.4	94.4	N/A	Floor
Concrete Removed - 3rd Floor	Conc	Rmvl	36.4	36.4	1.000	Floor
Concrete Removed - 2nd Floor	Conc	Rmvl	45.1	45.1	1.000	Floor
Concrete Removed - 1st Floor	Conc	Rmvl	56.7	56.7	1.000	Floor
Concrete Cutting - 4th Floor	Conc	Cttg	104.0	N/A	30.000	Floor
Concrete Cutting - 3rd Floor	Conc	Cttg	32.0	N/A	18.000	Floor
Concrete Cutting - 2nd Floor 1	Conc	Cttg	32.0	N/A	12.000	Wall
Concrete Cutting - 2nd Floor 2	Conc	Cttg	82.0	N/A	12.000	Floor
Concrete Cutting - 1st Floor 1	Conc	Cttg	60.0	N/A	12.000	Floor
Concrete Cutting - 1st Floor 2	Conc	Cttg	96.0	N/A	30.000	Wall

*** Containment Bldg

Component Description	Activity	Length (ft.)	Width (ft.)	Depth (in.)	Orientation
Inner Wall, Ceiling Washed	Conc Wash	263.7	263.7	N/A	Ceiling
SG Cavities Washed	Conc Wash	179.6	179.6	N/A	Wall
Press. Cavity, Inside Washed	Conc Wash	58.0	66.0	N/A	Wall
Press. Cavity, Outside Washed	Conc Wash	61.0	66.0	N/A	Wall
Press. Cavity, Top Washed	Conc Wash	17.4	17.4	N/A	Ceiling
Operating Floor Washed	Conc Wash	82.3	82.3	N/A	Floor
Bottom Floor Washed	Conc Wash	101.9	101.9	N/A	Floor
Bottom Floor Removed	Conc Rmvl	72.1	72.1	1.000	Floor
Refueling Cavity (Metal)	Mtl Wash	19.0	32.0	N/A	Floor
Refueling Cavity (Metal)	Mtl Wash	9.0	20.0	N/A	Floor
Refueling Cavity (Metal)	Mtl Wash	10.5	19.0	N/A	Wall
Refueling Cavity (Metal)	Mtl Wash	41.0	35.0	N/A	Wall
Refueling Cavity (Metal)	Mtl Wash	41.0	35.0	N/A	Wall
Refueling Cavity (Metal)	Mtl Wash	22.0	35.0	N/A	Wall
Refueling Cavity (Metal)	Mtl Wash	1.8	35.0	N/A	Wall
Refueling Cavity (Metal)	Mtl Rmvl	19.0	32.0	0.125	Floor
Refueling Cavity (Metal)	Mtl Rmvl	9.0	20.0	0.125	Floor
Refueling Cavity (Metal)	Mtl Rmvl	10.5	19.0	0.125	Wall
Refueling Cavity (Metal)	Mtl Rmvl	41.0	35.0	0.125	Wall
Refueling Cavity (Metal)	Mtl Rmvl	41.0	35.0	0.125	Wall
Refueling Cavity (Metal)	Mtl Rmvl	22.0	35.0	0.125	Wall
Refueling Cavity (Metal)	Mtl Rmvl	1.8	35.0	0.125	Wall
Steel Floor Grating	Gratings	6,254.0	1.5	N/A	N/A
Handrails	Handrails	5,613.0	N/A	N/A	N/A

*** Auxiliary Bldg

Component Description	Activity	Length (ft.)	Width (ft.)	Depth (in.)	Orientation
Concrete Washed (Elev 93)	Conc Wash	90.0	90.0	N/A	Floor
Concrete Washed (Elev 77)	Conc Wash	89.5	89.5	N/A	Floor
Concrete Washed (Elev 61)	Conc Wash	84.8	84.8	N/A	Floor
Concrete Washed (Elev 45)	Conc Wash	97.9	97.9	N/A	Floor
Concrete Washed (Elev 25)	Conc Wash	71.6	71.6	N/A	Floor
Concrete Washed (Elev 5)	Conc Wash	76.5	76.5	N/A	Floor
Conc Rmvd (El 77 - 11 cells)	Conc Rmvl	66.0	8.0	1.000	Floor
Conc Rmvd (El 77 - 15 cells)	Conc Rmvl	75.0	7.0	1.000	Floor
Conc Rmvd (El 77 - 1 cell)	Conc Rmvl	106.0	5.0	1.000	Floor
Conc Rmvd (El 61)	Conc Rmvl	12.0	14.0	1.000	Floor

TABLE 7.2. Contents of File TEST.PRD (contd)

Conc Rmvd (El 61)	Conc Rmvl	6.0	23.0	1.000	Floor
Conc Rmvd (El 61)	Conc Rmvl	12.0	15.0	1.000	Floor
Conc Rmvd (El 61) (2 areas)	Conc Rmvl	28.0	16.0	1.000	Floor
Conc Rmvd (El 61) (4 areas)	Conc Rmvl	60.0	15.0	1.000	Floor
Conc Rmvd (El 61)	Conc Rmvl	10.0	8.0	1.000	Floor
Conc Rmvd (El 61)	Conc Rmvl	19.0	26.0	1.000	Floor
Conc Rmvd (El 45)	Conc Rmvl	32.0	40.0	1.000	Floor
Conc Rmvd (El 45)	Conc Rmvl	16.0	25.0	1.000	Floor
Conc Rmvd (El 45)	Conc Rmvl	32.0	11.0	1.000	Floor
Conc Rmvd (El 25)	Conc Rmvl	30.0	37.0	1.000	Floor
Conc Rmvd (El 25)	Conc Rmvl	8.0	12.0	1.000	Floor
Conc Rmvd (El 25)	Conc Rmvl	8.0	15.0	1.000	Floor
Conc Rmvd (El 25)	Conc Rmvl	30.0	21.0	1.000	Floor
Conc Rmvd (El 5)	Conc Rmvl	26.0	10.0	1.000	Floor
Conc Rmvd (El 5)	Conc Rmvl	11.0	18.0	1.000	Floor
Conc Rmvd (El 5)	Conc Rmvl	28.0	15.0	1.000	Floor
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	20.0	10.0	1.000	Floor
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	20.0	15.0	1.000	Floor
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	20.0	10.0	1.000	Floor
Conc Rmvd (El 5)	Conc Rmvl	15.0	14.0	1.000	Floor
Conc Rmvd (El 5)	Conc Rmvl	6.0	10.0	1.000	Floor
Cutting (El 61)	Conc Cttg	26.0	N/A	24.000	Floor
Cutting (El 45 - Two areas)	Conc Cttg	52.0	N/A	12.000	Floor
Cutting (El 25 - Three areas)	Conc Cttg	78.0	N/A	12.000	Floor
Cutting (El 25)	Conc Cttg	26.0	N/A	24.000	Floor
Cutting (El 5)	Conc Cttg	96.0	N/A	12.000	Floor
Steel Floor Gratings	Gratings	1,256.0	1.5	N/A	N/A
Stair Treads	Mtl Wash	934.6	5.0	N/A	Stairs
Handrails	Handrails	5,613.0	N/A	N/A	N/A

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+ BUILDING DECONTAMINATION: TIMES AND EXPOSURES +
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*** Fuel Bldg

Component Description	Activity	Time (hours)	Pers-hours	Exposure Pers-hours	Pers-Rem
Fuel Pool (Two Walls)	Mtl Wash	11.7	47.0	11.7	0.01
Fuel Pool (Two Walls)	Mtl Wash	16.2	64.8	16.2	0.02
Fuel Pool (Floor)	Mtl Wash	4.8	19.3	4.8	0.01
Cask Loading Pit (Two walls)	Mtl Wash	4.9	19.4	4.9	0.01
Cask Loading Pit (Two walls)	Mtl Wash	3.2	13.0	3.2	0.00
Cask Loading Pit (Floor)	Mtl Wash	0.4	1.6	0.4	0.00
Wash Pit (Two Walls)	Mtl Wash	3.4	13.4	3.4	0.00
Wash Pit (Two Walls)	Mtl Wash	3.6	14.3	3.6	0.00
Wash Pit (Floor)	Mtl Wash	1.1	4.5	1.1	0.00
Load Pit Gate (Two Walls)	Mtl Wash	0.4	1.5	0.4	0.00
Load Pit Gate (Two Walls)	Mtl Wash	0.3	1.0	0.3	0.00
Load Pit Gate (Two Walls)	Mtl Wash	0.9	3.5	0.9	0.00
Load Pit Gate (Floor)	Mtl Wash	0.0	0.1	0.0	0.00
Load Pit Gate (Floor)	Mtl Wash	0.1	0.3	0.1	0.00
Transfer Canal (Two walls)	Mtl Wash	18.0	72.1	18.0	0.02
Transfer Canal (Two walls)	Mtl Wash	1.6	6.5	1.6	0.00
Transfer Canal (Two walls)	Mtl Wash	1.6	6.5	1.6	0.00
Transfer Canal (Two walls)	Mtl Wash	1.4	5.7	1.4	0.00
Transfer Canal (Floor)	Mtl Wash	0.7	3.0	0.7	0.00
Canal Gate (Two walls)	Mtl Wash	0.6	2.3	0.6	0.00
Canal Gate (Two walls)	Mtl Wash	0.4	1.5	0.4	0.00
Canal Gate (Two walls)	Mtl Wash	0.3	1.3	0.3	0.00

TABLE 7.2. Contents of File TEST.PRD (contd)

Canal Gate (Floor)	Mtl	Wash	0.1	0.2	0.1	0.00
Canal Gate (Floor)	Mtl	Wash	0.0	0.1	0.0	0.00
Fuel Pool (Two walls)	Mtl	Rmvl	13.7	75.6	48.0	0.06
Fuel Pool (Two walls)	Mtl	Rmvl	16.0	88.2	56.1	0.07
Fuel Pool (Floor)	Mtl	Rmvl	8.7	47.7	30.3	0.04
Cask Loading Pit (Two walls)	Mtl	Rmvl	8.6	47.3	30.1	0.04
Cask Loading Pit (Two walls)	Mtl	Rmvl	7.1	39.1	24.8	0.03
Cask Loading Pit (Floor)	Mtl	Rmvl	3.1	17.3	11.0	0.01
Wash Pit (Two walls)	Mtl	Rmvl	5.8	32.1	20.4	0.02
Wash Pit (Two walls)	Mtl	Rmvl	5.9	32.3	20.5	0.02
Wash Pit (Floor)	Mtl	Rmvl	4.4	24.0	15.3	0.02
Load Pit Gate (Two walls)	Mtl	Rmvl	3.1	17.0	10.8	0.01
Load Pit Gate (Two walls)	Mtl	Rmvl	3.1	17.0	10.8	0.01
Load Pit Gate (Two walls)	Mtl	Rmvl	3.1	17.2	10.9	0.01
Load Pit Gate (Floor)	Mtl	Rmvl	0.0	0.0	0.0	0.00
Load Pit Gate (Floor)	Mtl	Rmvl	0.0	0.0	0.0	0.00
Transfer Canal (Two walls)	Mtl	Rmvl	16.4	90.3	57.4	0.07
Transfer Canal (Two walls)	Mtl	Rmvl	5.6	30.8	19.6	0.02
Transfer Canal (Two walls)	Mtl	Rmvl	5.6	30.8	19.6	0.02
Transfer Canal (Two walls)	Mtl	Rmvl	4.2	23.2	14.7	0.02
Transfer Canal (Floor)	Mtl	Rmvl	4.2	22.9	14.5	0.02
Canal Gate (Two walls)	Mtl	Rmvl	3.1	17.1	10.9	0.01
Canal Gate (Two walls)	Mtl	Rmvl	3.1	17.0	10.8	0.01
Canal Gate (Two walls)	Mtl	Rmvl	3.1	17.0	10.8	0.01
Canal Gate (Floor)	Mtl	Rmvl	0.0	0.0	0.0	0.00
Canal Gate (Floor)	Mtl	Rmvl	0.0	0.0	0.0	0.00
Concrete Washed - 4th Floor	Conc	Wash	23.1	92.3	23.1	0.03
Concrete Washed - 3rd Floor	Conc	Wash	17.1	68.5	17.1	0.02
Concrete Washed - 2nd Floor	Conc	Wash	17.9	71.7	17.9	0.02
Concrete Washed - 1st Floor	Conc	Wash	37.1	148.5	37.1	0.04
Concrete Removed - 3rd Floor	Conc	Rmvl	159.0	556.5	318.0	0.38
Concrete Removed - 2nd Floor	Conc	Rmvl	244.1	854.3	488.2	0.59
Concrete Removed - 1st Floor	Conc	Rmvl	385.4	1,348.8	770.8	0.93
Concrete Cutting - 4th Floor	Conc	Cttg	91.8	229.4	145.8	0.18
Concrete Cutting - 3rd Floor	Conc	Cttg	18.4	45.9	29.2	0.04
Concrete Cutting - 2nd Floor 1	Conc	Cttg	14.0	34.9	22.2	0.03
Concrete Cutting - 2nd Floor 2	Conc	Cttg	30.1	75.3	47.8	0.06
Concrete Cutting - 1st Floor 1	Conc	Cttg	22.5	56.3	35.8	0.04
Concrete Cutting - 1st Floor 2	Conc	Cttg	92.5	231.3	147.0	0.18

*** Containment Bldg

Component Description	Activity	Time (hours)	Pers-hours	Exposure Pers-hours	Pers-Rem
Inner Wall, Ceiling Washed	Conc Wash	347.7	1,391.0	347.7	0.42
SG Cavities Washed	Conc Wash	161.3	645.1	161.3	0.19
Press. Cavity, Inside Washed	Conc Wash	19.1	76.6	19.1	0.02
Press. Cavity, Outside Washed	Conc Wash	20.1	80.5	20.1	0.02
Press. Cavity, Top Washed	Conc Wash	1.5	6.1	1.5	0.00
Operating Floor Washed	Conc Wash	28.2	112.9	28.2	0.03
Bottom Floor Washed	Conc Wash	43.3	173.1	43.3	0.05
Bottom Floor Removed	Conc Rmvl	624.0	2,183.9	1,248.0	1.51
Refueling Cavity (Metal)	Mtl Wash	2.5	10.1	2.5	0.00
Refueling Cavity (Metal)	Mtl Wash	0.8	3.0	0.8	0.00
Refueling Cavity (Metal)	Mtl Wash	1.0	4.0	1.0	0.00
Refueling Cavity (Metal)	Mtl Wash	7.2	28.7	7.2	0.01
Refueling Cavity (Metal)	Mtl Wash	7.2	28.7	7.2	0.01
Refueling Cavity (Metal)	Mtl Wash	3.9	15.4	3.9	0.00
Refueling Cavity (Metal)	Mtl Wash	0.3	1.3	0.3	0.00
Refueling Cavity (Metal)	Mtl Rmvl	5.8	32.0	20.3	0.02

TABLE 7.2. Contents of File TEST.PRD (contd)

Refueling Cavity (Metal)	Mtl Rmvl	4.2	23.3	14.8	0.02
Refueling Cavity (Metal)	Mtl Rmvl	4.3	23.5	14.9	0.02
Refueling Cavity (Metal)	Mtl Rmvl	10.0	55.1	35.0	0.04
Refueling Cavity (Metal)	Mtl Rmvl	10.0	55.1	35.0	0.04
Refueling Cavity (Metal)	Mtl Rmvl	5.9	32.4	20.6	0.02
Refueling Cavity (Metal)	Mtl Rmvl	3.1	17.0	10.8	0.01
Steel Floor Grating	Gratings	257.7	1,030.8	491.2	0.59
Handrails	Handrails	421.0	1,262.9	561.3	0.68

*** Auxiliary Bldg

Component Description	Activity	Time (hours)	Pers-hours	Exposure Pers-hours	Pers-Rem
Concrete Washed (Elev 93)	Conc Wash	33.8	135.1	33.8	0.04
Concrete Washed (Elev 77)	Conc Wash	33.4	133.4	33.4	0.04
Concrete Washed (Elev 61)	Conc Wash	30.0	119.9	30.0	0.04
Concrete Washed (Elev 45)	Conc Wash	39.9	159.6	39.9	0.05
Concrete Washed (Elev 25)	Conc Wash	21.3	85.4	21.3	0.03
Concrete Washed (Elev 5)	Conc Wash	24.4	97.5	24.4	0.03
Conc Rmvd (El 77 - 11 cells)	Conc Rmvl	63.4	221.8	126.7	0.15
Conc Rmvd (El 77 - 15 cells)	Conc Rmvl	63.0	220.5	126.0	0.15
Conc Rmvd (El 77 - 1 cell)	Conc Rmvl	63.6	222.6	127.2	0.15
Conc Rmvd (El 61)	Conc Rmvl	20.2	70.6	40.3	0.05
Conc Rmvd (El 61)	Conc Rmvl	16.6	58.0	33.1	0.04
Conc Rmvd (El 61)	Conc Rmvl	21.6	75.6	43.2	0.05
Conc Rmvd (El 61) (2 areas)	Conc Rmvl	53.8	188.2	107.5	0.13
Conc Rmvd (El 61) (4 areas)	Conc Rmvl	108.0	378.0	216.0	0.26
Conc Rmvd (El 61)	Conc Rmvl	9.6	33.6	19.2	0.02
Conc Rmvd (El 61)	Conc Rmvl	59.3	207.5	118.6	0.14
Conc Rmvd (El 45)	Conc Rmvl	153.6	537.6	307.2	0.37
Conc Rmvd (El 45)	Conc Rmvl	48.0	168.0	96.0	0.12
Conc Rmvd (El 45)	Conc Rmvl	42.2	147.8	84.5	0.10
Conc Rmvd (El 25)	Conc Rmvl	133.2	466.2	266.4	0.32
Conc Rmvd (El 25)	Conc Rmvl	11.5	40.3	23.0	0.03
Conc Rmvd (El 25)	Conc Rmvl	14.4	50.4	28.8	0.03
Conc Rmvd (El 25)	Conc Rmvl	75.6	264.6	151.2	0.18
Conc Rmvd (El 5)	Conc Rmvl	31.2	109.2	62.4	0.08
Conc Rmvd (El 5)	Conc Rmvl	23.8	83.2	47.5	0.06
Conc Rmvd (El 5)	Conc Rmvl	50.4	176.4	100.8	0.12
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	24.0	84.0	48.0	0.06
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	36.0	126.0	72.0	0.09
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	24.0	84.0	48.0	0.06
Conc Rmvd (El 5)	Conc Rmvl	25.2	88.2	50.4	0.06
Conc Rmvd (El 5)	Conc Rmvl	7.2	25.2	14.4	0.02
Cutting (El 61)	Conc Cttg	19.7	49.3	31.4	0.04
Cutting (El 45 - Two areas)	Conc Cttg	19.7	49.3	31.4	0.04
Cutting (El 25 - Three areas)	Conc Cttg	28.7	71.8	45.7	0.06
Cutting (El 25)	Conc Cttg	19.7	49.3	31.4	0.04
Cutting (El 5)	Conc Cttg	35.0	87.4	55.6	0.07
Steel Floor Gratings	Gratings	51.8	207.0	98.7	0.12
Stair Treads	Mtl Wash	20.4	81.8	20.4	0.02
Handrails	Handrails	421.0	1,262.9	561.3	0.68

TABLE 7.2. Contents of File TEST.PRD (contd)

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+ BUILDING DECONTAMINATION: COSTS (DOLLARS) +
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*** Fuel Bldg

Component Description	Activity	Removal	Container	Transport	Disposal
Fuel Pool (Two Walls)	Mtl Wash	1,618	0	0	2,936
Fuel Pool (Two Walls)	Mtl Wash	2,232	0	0	4,050
Fuel Pool (Floor)	Mtl Wash	667	0	0	1,450
Cask Loading Pit (Two walls)	Mtl Wash	669	0	0	1,215
Cask Loading Pit (Two walls)	Mtl Wash	446	0	0	810
Cask Loading Pit (Floor)	Mtl Wash	55	0	0	120
Wash Pit (Two Walls)	Mtl Wash	463	0	0	840
Wash Pit (Two Walls)	Mtl Wash	492	0	0	893
Wash Pit (Floor)	Mtl Wash	156	0	0	340
Load Pit Gate (Two Walls)	Mtl Wash	52	0	0	94
Load Pit Gate (Two Walls)	Mtl Wash	34	0	0	63
Load Pit Gate (Two Walls)	Mtl Wash	121	0	0	219
Load Pit Gate (Floor)	Mtl Wash	3	0	0	6
Load Pit Gate (Floor)	Mtl Wash	10	0	0	22
Transfer Canal (Two walls)	Mtl Wash	2,483	0	0	4,506
Transfer Canal (Two walls)	Mtl Wash	223	0	0	405
Transfer Canal (Two walls)	Mtl Wash	223	0	0	405
Transfer Canal (Two walls)	Mtl Wash	195	0	0	354
Transfer Canal (Floor)	Mtl Wash	102	0	0	222
Canal Gate (Two walls)	Mtl Wash	77	0	0	141
Canal Gate (Two walls)	Mtl Wash	52	0	0	94
Canal Gate (Two walls)	Mtl Wash	43	0	0	78
Canal Gate (Floor)	Mtl Wash	8	0	0	18
Canal Gate (Floor)	Mtl Wash	3	0	0	5
Fuel Pool (Two walls)	Mtl Rmvl	2,625	1,687	453	14,167
Fuel Pool (Two walls)	Mtl Rmvl	3,069	2,327	624	19,541
Fuel Pool (Floor)	Mtl Rmvl	1,656	833	224	6,996
Cask Loading Pit (Two walls)	Mtl Rmvl	1,642	698	187	5,862
Cask Loading Pit (Two walls)	Mtl Rmvl	1,354	465	125	3,908
Cask Loading Pit (Floor)	Mtl Rmvl	597	69	18	579
Wash Pit (Two walls)	Mtl Rmvl	1,113	483	129	4,053
Wash Pit (Two walls)	Mtl Rmvl	1,120	513	138	4,306
Wash Pit (Floor)	Mtl Rmvl	831	195	52	1,640
Load Pit Gate (Two walls)	Mtl Rmvl	588	54	14	452
Load Pit Gate (Two walls)	Mtl Rmvl	587	36	10	302
Load Pit Gate (Two walls)	Mtl Rmvl	595	126	34	1,055
Load Pit Gate (Floor)	Mtl Rmvl	0	3	1	27
Load Pit Gate (Floor)	Mtl Rmvl	0	13	3	106
Transfer Canal (Two walls)	Mtl Rmvl	3,143	2,589	695	21,739
Transfer Canal (Two walls)	Mtl Rmvl	1,066	233	62	1,954
Transfer Canal (Two walls)	Mtl Rmvl	1,066	233	62	1,954
Transfer Canal (Two walls)	Mtl Rmvl	801	204	55	1,710
Transfer Canal (Floor)	Mtl Rmvl	791	128	34	1,074
Canal Gate (Two walls)	Mtl Rmvl	591	81	22	678
Canal Gate (Two walls)	Mtl Rmvl	588	54	14	452
Canal Gate (Two walls)	Mtl Rmvl	588	45	12	377
Canal Gate (Floor)	Mtl Rmvl	0	11	3	88
Canal Gate (Floor)	Mtl Rmvl	0	3	1	26
Concrete Washed - 4th Floor	Conc Wash	3,185	0	0	6,923
Concrete Washed - 3rd Floor	Conc Wash	2,364	0	0	5,139
Concrete Washed - 2nd Floor	Conc Wash	2,475	0	0	5,379
Concrete Washed - 1st Floor	Conc Wash	5,125	0	0	11,139
Concrete Removed - 3rd Floor	Conc Rmvl	22,639	714	573	9,510
Concrete Removed - 2nd Floor	Conc Rmvl	34,754	1,096	880	14,599

TABLE 7.2. Contents of File TEST.PRD (contd)

Concrete Removed - 1st Floor	Conc Rmvl	54,872	1,731	1,390	23,050
Concrete Cutting - 4th Floor	Conc Cttg	11,343	0	0	0
Concrete Cutting - 3rd Floor	Conc Cttg	2,247	0	0	0
Concrete Cutting - 2nd Floor 1	Conc Cttg	1,688	0	0	0
Concrete Cutting - 2nd Floor 2	Conc Cttg	3,706	0	0	0
Concrete Cutting - 1st Floor 1	Conc Cttg	2,762	0	0	0
Concrete Cutting - 1st Floor 2	Conc Cttg	11,323	0	0	0

*** Containment Bldg

Component Description	Activity	Removal	Container	Transport	Disposal
Inner Wall, Ceiling Washed	Conc Wash	47,900	0	0	86,935
SG Cavities Washed	Conc Wash	22,216	0	0	40,320
Press. Cavity, Inside Washed	Conc Wash	2,636	0	0	4,785
Press. Cavity, Outside Washed	Conc Wash	2,773	0	0	5,033
Press. Cavity, Top Washed	Conc Wash	209	0	0	379
Operating Floor Washed	Conc Wash	3,896	0	0	8,469
Bottom Floor Washed	Conc Wash	5,974	0	0	12,985
Bottom Floor Removed	Conc Rmvl	88,846	2,803	2,251	37,321
Refueling Cavity (Metal)	Mtl Wash	350	0	0	760
Refueling Cavity (Metal)	Mtl Wash	104	0	0	225
Refueling Cavity (Metal)	Mtl Wash	137	0	0	249
Refueling Cavity (Metal)	Mtl Wash	988	0	0	1,794
Refueling Cavity (Metal)	Mtl Wash	988	0	0	1,794
Refueling Cavity (Metal)	Mtl Wash	530	0	0	963
Refueling Cavity (Metal)	Mtl Wash	43	0	0	79
Refueling Cavity (Metal)	Mtl Rmvl	1,110	437	117	3,667
Refueling Cavity (Metal)	Mtl Rmvl	808	129	35	1,086
Refueling Cavity (Metal)	Mtl Rmvl	813	143	38	1,203
Refueling Cavity (Metal)	Mtl Rmvl	1,913	1,031	276	8,655
Refueling Cavity (Metal)	Mtl Rmvl	1,913	1,031	276	8,655
Refueling Cavity (Metal)	Mtl Rmvl	1,125	553	148	4,644
Refueling Cavity (Metal)	Mtl Rmvl	586	45	12	380
Steel Floor Grating	Gratings	30,095	13,699	3,675	115,018
Handrails	Handrails	36,274	108	70	1,435

*** Auxiliary Bldg

Component Description	Activity	Removal	Container	Transport	Disposal
Concrete Washed (Elev 93)	Conc Wash	4,661	0	0	10,132
Concrete Washed (Elev 77)	Conc Wash	4,605	0	0	10,008
Concrete Washed (Elev 61)	Conc Wash	4,139	0	0	8,995
Concrete Washed (Elev 45)	Conc Wash	5,509	0	0	11,973
Concrete Washed (Elev 25)	Conc Wash	2,946	0	0	6,403
Concrete Washed (Elev 5)	Conc Wash	3,365	0	0	7,313
Conc Rmvd (El 77 - 11 cells)	Conc Rmvl	9,022	285	229	3,790
Conc Rmvd (El 77 - 15 cells)	Conc Rmvl	8,970	283	227	3,768
Conc Rmvd (El 77 - 1 cell)	Conc Rmvl	9,056	286	229	3,804
Conc Rmvd (El 61)	Conc Rmvl	2,870	91	73	1,206
Conc Rmvd (El 61)	Conc Rmvl	2,358	74	60	990
Conc Rmvd (El 61)	Conc Rmvl	3,076	97	78	1,292
Conc Rmvd (El 61) (2 areas)	Conc Rmvl	7,655	241	194	3,215
Conc Rmvd (El 61) (4 areas)	Conc Rmvl	15,378	485	390	6,460
Conc Rmvd (El 61)	Conc Rmvl	1,367	43	35	574
Conc Rmvd (El 61)	Conc Rmvl	8,441	266	214	3,546
Conc Rmvd (El 45)	Conc Rmvl	21,870	690	554	9,187
Conc Rmvd (El 45)	Conc Rmvl	6,835	216	173	2,871
Conc Rmvd (El 45)	Conc Rmvl	6,014	190	152	2,526
Conc Rmvd (El 25)	Conc Rmvl	18,966	598	480	7,967

TABLE 7.2. Contents of File TEST.PRD (contd)

Conc Rmvd (El 25)	Conc Rmvl	1,640	52	42	689
Conc Rmvd (El 25)	Conc Rmvl	2,050	65	52	861
Conc Rmvd (El 25)	Conc Rmvl	10,764	340	273	4,522
Conc Rmvd (El 5)	Conc Rmvl	4,442	140	113	1,866
Conc Rmvd (El 5)	Conc Rmvl	3,383	107	86	1,421
Conc Rmvd (El 5)	Conc Rmvl	7,176	226	182	3,014
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	3,417	108	87	1,435
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	5,126	162	130	2,153
Conc Rmvd (El 5 - Two areas)	Conc Rmvl	3,417	108	87	1,435
Conc Rmvd (El 5)	Conc Rmvl	3,588	113	91	1,507
Conc Rmvd (El 5)	Conc Rmvl	1,025	32	26	431
Cutting (El 61)	Conc Cttg	2,419	0	0	0
Cutting (El 45 - Two areas)	Conc Cttg	2,419	0	0	0
Cutting (El 25 - Three areas)	Conc Cttg	3,535	0	0	0
Cutting (El 25)	Conc Cttg	2,419	0	0	0
Cutting (El 5)	Conc Cttg	4,307	0	0	0
Steel Floor Gratings	Gratings	6,044	2,751	738	23,099
Stair Treads	Mtl Wash	2,820	0	0	5,841
Handrails	Handrails	36,274	108	70	1,435

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+ SUMMARY OF BUILDING DECONTAMINATION DATA (ALL COSTS IN DOLLARS) +
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*** Fuel Bldg

  Concrete Washing--
    Surface Area:          22,864 ft2
    Decon Costs:           13,150
    Crew Hours:                95
    Pers-Hours:               381
    Pers-Rem:                0.12

  Metal Washing--
    Surface Area:          15,428 ft2
    Decon Costs:           10,427
    Crew Hours:                76
    Pers-Hours:               303
    Pers-Rem:                0.09

  Concrete Removal--
    Surface Area:           6,570 ft2
    Weight Removed:        78,846 lb
    Removal Costs:        112,265
    Container Costs:        3,541
    Shipping Costs:         2,844
    Burial Costs:          47,158
    Burial Volume:            972 ft3
    Number of Drums:       131.41
    Crew Hours:               788
    Pers-Hours:             2,760
    Pers-Rem:                1.90

  Metal Removal--
    Surface Area:          15,428 ft2
    Weight Removed:        80,354 lb
    Removal Costs:         24,410
    Container Costs:       11,082
    Shipping Costs:         2,973
    Burial Costs:          93,047
```

TABLE 7.2. Contents of File TEST.PRD (contd)

```
    Burial Volume:          1,429 ft3
    Number of Vans:          2.23
    Crew Hours:                128
    Pers-Hours:                704
    Pers-Rem:                 0.54

  Concrete Cutting--
    Inch-feet:               8,664
    Cutting Costs:          33,069
    Crew Hours:                269
    Pers-Hours:                673
    Pers-Rem:                 0.52


*** Containment Bldg

  Concrete Washing--
    Surface Area:         127,124 ft2
    Decon Costs:           85,605
    Crew Hours:               621
    Pers-Hours:             2,485
    Pers-Rem:                 0.75

  Metal Washing--
    Surface Area:           4,690 ft2
    Decon Costs:            3,141
    Crew Hours:                23
    Pers-Hours:                91
    Pers-Rem:                 0.03

  Concrete Removal--
    Surface Area:           5,200 ft2
    Weight Removed:        62,398 lb
    Removal Costs:         88,846
    Container Costs:        2,803
    Shipping Costs:         2,251
    Burial Costs:          37,321
    Burial Volume:            770 ft3
    Number of Drums:       104.00
    Crew Hours:               624
    Pers-Hours:             2,184
    Pers-Rem:                 1.51

  Metal Removal--
    Surface Area:           4,690 ft2
    Weight Removed:        24,430 lb
    Removal Costs:          8,267
    Container Costs:        3,369
    Shipping Costs:           904
    Burial Costs:          28,289
    Burial Volume:            434 ft3
    Number of Vans:          0.68
    Crew Hours:                43
    Pers-Hours:               239
    Pers-Rem:                 0.18

  Handrails--
    Length                  5,613 ft
    Decon Costs:           36,274
    Container Costs:          108
    Shipping Costs:            70
```

TABLE 7.2. Contents of File TEST.PRD (contd)

```
   Burial Costs:          1,435
   Burial Volume:            30 ft3
   Number of Drums:        4.00
   Crew Hours:              421
   Pers-Hours:            1,263
   Pers-Rem:               0.68

 Floor Gratings--
   Area:                  9,381 ft2
   Removal Costs:        30,095
   Container Costs:      13,699
   Shipping Costs:        3,675
   Burial Costs:        115,018
   Burial Volume:         1,766 ft3
   Number of Vans:         2.76
   Crew Hours:              258
   Pers-Hours:            1,031
   Pers-Rem:               0.59


*** Auxiliary Bldg

 Concrete Washing--
   Surface Area:         43,860 ft2
   Decon Costs:          25,224
   Crew Hours:              183
   Pers-Hours:              731
   Pers-Rem:               0.22

 Concrete Removal--
   Surface Area:          9,827 ft2
   Weight Removed:      117,924 lb
   Removal Costs:       167,907
   Container Costs:       5,297
   Shipping Costs:        4,254
   Burial Costs:         70,531
   Burial Volume:         1,454 ft3
   Number of Drums:      196.54
   Crew Hours:            1,179
   Pers-Hours:            4,127
   Pers-Rem:               2.85

 Concrete Cutting--
   Inch-feet:             3,960
   Cutting Costs:        15,099
   Crew Hours:              123
   Pers-Hours:              307
   Pers-Rem:               0.24

 Handrails--
   Length                 5,613 ft
   Decon Costs:          36,274
   Container Costs:         108
   Shipping Costs:           70
   Burial Costs:          1,435
   Burial Volume:            30 ft3
   Number of Drums:        4.00
   Crew Hours:              421
   Pers-Hours:            1,263
   Pers-Rem:               0.68
```

TABLE 7.2. Contents of File TEST.PRD (contd)

Floor Gratings--		
Area:	1,684	ft2
Removal Costs:	6,044	
Container Costs:	2,751	
Shipping Costs:	738	
Burial Costs:	23,099	
Burial Volume:	355	ft3
Number of Vans:	0.55	
Crew Hours:	52	
Pers-Hours:	207	
Pers-Rem:	0.12	
Stair Treads--		
Area:	4,673	ft2
Decon Costs:	2,820	
Crew Hours:	20	
Pers-Hours:	82	
Pers-Rem:	0.02	

Reactor pressure vessel costs are provided by **TEST.PRF**, shown in Table 7.3. **TEST.PRF** was created from Menu Item F in Section 6.0. All terms in Table 7.3 should be self-explanatory. A summary of these costs appears in **TEST.PRI**, discussed below.

TABLE 7.3. Contents of File TEST.PRF

File name: E:\NRC\TEST.PRF

COSTS (IN DOLLARS) FOR REACTOR PRESSURE VESSEL AND INTERNALS

COMPONENTS	CUTTING	CONTAINERS	TRANSPORT	DISPOSAL	TOTAL
Insulation	50,439	1,290 4,695	1,332 33,189	9,311 8,345	108,600
Top Plate	3,409	1,565	1,332	34,508	40,813
Upper Portion CRD Guides		1,290	1,332	11,441	
Upper Portion Post and Columns	79,304	2,580	1,332	18,622	212,155
Lower Portion, Posts, Columns, CRD Guides		9,390	39,852	47,013	
Upper Core Barrel	12,305	1,290 14,085	1,332 47,396	13,780 36,840	127,028
Thermal Shields	17,667	3,120	127,994	327,600	476,382
Shroud Plates and Formers	50,551	4,160	162,241	436,800	653,751
Upper/Lower Grid Plates	25,219	4,160	129,310	436,800	595,489
Upper Portion of Support Posts and Inst. Guides	22,930	1,040	61,446	109,200	194,616
Lower Core Barrel	67,720	11,440	401,358	1,201,200	1,681,718
Support Forging and Tie Plates	42,712	28,170	68,537	84,170	223,589
Lower Posts and Instrument Guides	22,930	4,695	33,449	11,643	72,717
Upper/Lower RPV Heads	28,224	4,515	4,661	107,139	144,539
Upper/Lower RPV Flanges	11,238	4,515	4,661	69,864	90,278
Nozzle Sections	4,346	3,760	5,327	66,847	80,281
Lower Wall	28,480	103,290	184,231	257,783	573,784
Studs & Nuts	0	1,290	1,332	14,636	17,258
CRD & Instrument Penetrations	37,468	645	1,332	4,656	44,101
TOTALS	504,943	210,985	1,312,975	3,308,196	5,337,100

TABLE 7.3. Contents of File TEST.PRF (contd)

RPV Internals

Crew Hours	Pers Hours	Exposure Hours	Pers-Rem
1,216.37	10,947.30	772.90	61.83

PRESSURE VESSEL

Crew Hours	Pers Hours	Exposure Hours	Pers-Rem
337.83	3,040.43	214.66	16.24

A detailed report of manpower (overhead) costs by decommissioning period is provided by **TEST.PRG** in Table 7.4. This file was created from Menu Item G in Section 6.0. The names of the decommissioning periods are defined by **TEST.PDB**, created from Menu Item B. Job descriptions preceded by a tilde (~) are discussed in Section 4.7.1.

TABLE 7.4. Contents of File TEST.PRG

Overhead Costs (in dollars) for Planning and Preparation

Job Description	Overhead Position	Annual Salary	Annual Salary w/Ovhd	Pers-yrs per Period	Total
Plant Manager	Utility	91,210	129,518	0.125	16,190
Assistant Plant Manager	Utility	73,820	104,824	0.125	13,103
Secretary	Utility	20,500	29,110	0.125	3,639
Contracts/Procurement Spec.	Utility	48,610	69,026	0.625	43,141
Chemistry Supervisor	Utility	52,630	74,735	0.250	18,684
Quality Assurance Manager	Utility	61,140	86,819	0.625	54,262
Health Physics Manager	Utility	55,950	79,449	0.125	9,931
Nuclear Records Specialist	Utility	43,260	61,429	0.250	15,357
Training Engineer	Utility	52,630	74,735	0.250	18,684
Operations Manager	Utility	68,620	97,440	0.125	12,180
Plant Engineer	Utility	51,140	72,619	5.000	363,095
Maintenance Manager	Utility	67,190	95,410	0.125	11,926
Licensing Engineer	Utility	50,890	72,264	0.125	9,033
Security Manager	Utility	61,140	86,819	0.125	10,852
Project Manager	DOC	91,210	220,272	2.500	550,680
Assistant Project Manager	DOC	73,820	178,275	2.500	445,688
Secretary/Clerk	DOC	19,805	47,829	12.500	597,863
Lawyer/Financial Administrator	DOC	62,420	150,744	5.000	753,720
Contracts Specialist/Buyer	DOC	48,600	117,369	2.500	293,423
Procurement Specialist	DOC	44,200	106,743	2.500	266,858
Accountant	DOC	48,600	117,369	5.000	586,845
Engineer	DOC	50,890	122,899	5.000	614,495
Drafting Specialist	DOC	28,080	67,813	7.500	508,598
Quality Assurance Engineer	DOC	34,710	83,825	2.500	209,563
Utility Overhead Costs for Planning and Preparation					600,077
DOC Overhead Costs for Planning and Preparation					4,827,733
Total Overhead Costs for Planning and Preparation					5,427,810

TABLE 7.4. Contents of File TEST.PRG (contd)

Overhead Costs (in dollars) for Defuel and Layup

Job Description	Overhead Position	Annual Salary	Annual Salary w/Ovhd	Pers-yrs per Period	Total
Plant Manager	Utility	91,210	129,518	0.620	80,301
Assistant Plant Manager	Utility	73,820	104,824	0.620	64,991
Secretary	Utility	20,500	29,110	3.690	107,416
Clerk	Utility	19,120	27,150	9.850	267,428
Accountant	Utility	48,610	69,026	1.230	84,902
Contracts/Procurement Spec.	Utility	48,610	69,026	1.850	127,698
Industrial Safety Specialist	Utility	47,600	67,592	1.850	125,045
Planning/Scheduling Engineer	Utility	52,630	74,735	0.620	46,336
Radioactive Ship. Specialist	Utility	55,950	79,449	1.850	146,981
Chemistry Supervisor	Utility	52,630	74,735	0.620	46,336
Chemistry Technician	Utility	30,290	43,012	2.460	105,810
Quality Assurance Manager	Utility	61,140	86,819	0.620	53,828
Quality Assurance Engineer	Utility	34,710	49,288	2.460	121,248
Quality Assurance Technician	Utility	30,290	43,012	4.920	211,619
Health Physics Manager	Utility	55,950	79,449	0.620	49,258
~Sr. Health Physics Technician	Utility	51,440	73,045	2.460	179,691
Health Physics/ALARA Planner	Utility	51,440	73,045	0.620	45,288
~Health Physics Technician	Utility	31,710	45,028	9.850	443,526
Nuclear Records Specialist	Utility	43,260	61,429	0.620	38,086
Training Engineer	Utility	52,630	74,735	0.620	46,336
Operations Manager	Utility	68,620	97,440	0.620	60,413
Administration Manager	Utility	61,140	86,819	0.620	53,828
Operations Supervisor	Utility	61,140	86,819	2.460	213,575
~Control Operator	Utility	51,400	72,988	9.850	718,932
~Plant Equipment Operator	Utility	36,470	51,787	9.850	510,102
Plant Engineer	Utility	51,140	72,619	2.460	178,643
Maintenance Manager	Utility	67,190	95,410	0.620	59,154
Maintenance Supervisor	Utility	61,430	87,231	2.460	214,588
Licensing Engineer	Utility	50,890	72,264	1.850	133,688
~Craftsman	Utility	42,810	60,790	9.850	598,782
Custodian	Utility	22,710	32,248	1.230	39,665
Security Manager	Utility	61,140	86,819	0.620	53,828
Security Shift Supervisor	Utility	27,070	38,439	2.460	94,560
Security Patrolman	Utility	24,560	34,875	19.690	686,689
Utility Overhead Costs for Defuel and Layup					6,008,571
DOC Overhead Costs for Defuel and Layup					0
Total Overhead Costs for Defuel and Layup					6,008,571

TABLE 7.4. Contents of File TEST.PRG (contd)

Overhead Costs (in dollars) for Spent Fuel Pool Operations

Job Description	Overhead Position	Annual Salary	Annual Salary w/Ovhd	Pers-yrs per Period	Total
Plant Manager	Utility	91,210	129,518	0.630	81,596
Assistant Plant Manager	Utility	73,820	104,824	0.630	66,039
Secretary	Utility	20,500	29,110	0.630	18,339
Clerk	Utility	19,120	27,150	3.150	85,523
Accountant	Utility	48,610	69,026	0.630	43,486
Contracts/Procurement Spec.	Utility	48,610	69,026	0.630	43,486
Industrial Safety Specialist	Utility	47,600	67,592	0.630	42,583
Radioactive Ship. Specialist	Utility	55,950	79,449	0.630	50,053
Chemistry Technician	Utility	30,290	43,012	0.630	27,098
Quality Assurance Technician	Utility	30,290	43,012	0.630	27,098
Health Physics Manager	Utility	55,950	79,449	0.630	50,053
~Sr. Health Physics Technician	Utility	51,440	73,045	1.890	138,055
Nuclear Records Specialist	Utility	43,260	61,429	0.630	38,700
Operations Manager	Utility	68,620	97,440	0.630	61,387
Administration Manager	Utility	61,140	86,819	0.630	54,696
Operations Supervisor	Utility	61,140	86,819	0.630	54,696
~Control Operator	Utility	51,400	72,988	2.520	183,930
~Plant Equipment Operator	Utility	36,470	51,787	3.780	195,755
Plant Engineer	Utility	51,140	72,619	0.630	45,750
Maintenance Supervisor	Utility	61,430	87,231	0.630	54,956
Licensing Engineer	Utility	50,890	72,264	0.630	45,526
~Craftsman	Utility	42,810	60,790	2.520	153,191
Custodian	Utility	22,710	32,248	1.260	40,632
Security Manager	Utility	61,140	86,819	0.630	54,696
Security Shift Supervisor	Utility	27,070	38,439	1.890	72,650
Security Patrolman	Utility	24,560	34,875	5.040	175,770
Project Manager	DOC	91,210	220,272	0.500	110,136
Assistant Project Manager	DOC	73,820	178,275	0.500	89,138
Secretary/Clerk	DOC	19,805	47,829	2.500	119,573
Lawyer/Financial Administrator	DOC	62,420	150,744	1.000	150,744
Contracts Specialist/Buyer	DOC	48,600	117,369	0.500	58,685
Procurement Specialist	DOC	44,200	106,743	0.500	53,372
Accountant	DOC	48,600	117,369	1.000	117,369
Engineer	DOC	50,890	122,899	1.000	122,899
Drafting Specialist	DOC	28,080	67,813	1.500	101,720
Quality Assurance Engineer	DOC	34,710	83,825	0.500	41,913
Utility Overhead Costs for Spent Fuel Pool Operations					1,905,744
DOC Overhead Costs for Spent Fuel Pool Operations					965,549
Total Overhead Costs for Spent Fuel Pool Operations					2,871,293

TABLE 7.4. Contents of File TEST.PRG (contd)

Overhead Costs (in dollars) for Deferred Dismantlement

Job Description	Overhead Position	Annual Salary	Annual Salary w/Ovhd	Pers-yrs per Period	Total
Plant Manager	Utility	91,210	129,518	1.700	220,181
Secretary	Utility	20,500	29,110	1.700	49,487
Clerk	Utility	19,120	27,150	6.800	184,620
Accountant	Utility	48,610	69,026	1.700	117,344
Contracts/Procurement Spec.	Utility	48,610	69,026	1.700	117,344
Industrial Safety Specialist	Utility	47,600	67,592	1.500	101,388
Radioactive Ship. Specialist	Utility	55,950	79,449	1.500	119,174
Chemistry Technician	Utility	30,290	43,012	0.400	17,205
Quality Assurance Engineer	Utility	34,710	49,288	1.700	83,790
Health Physics/ALARA Planner	Utility	51,440	73,045	1.700	124,177
Nuclear Records Specialist	Utility	43,260	61,429	1.700	104,429
Training Engineer	Utility	52,630	74,735	1.500	112,103
Operations Supervisor	Utility	61,140	86,819	3.000	260,457
~Control Operator	Utility	51,400	72,988	4.500	328,446
~Plant Equipment Operator	Utility	36,470	51,787	4.500	233,042
Plant Engineer	Utility	51,140	72,619	6.000	435,714
Maintenance Supervisor	Utility	61,430	87,231	1.500	130,847
Licensing Engineer	Utility	50,890	72,264	1.700	122,849
~Craftsman	Utility	42,810	60,790	5.300	322,187
Custodian	Utility	22,710	32,248	3.400	109,643
Security Manager	Utility	61,140	86,819	0.200	17,364
Security Shift Supervisor	Utility	27,070	38,439	0.600	23,063
Security Patrolman	Utility	24,560	34,875	1.600	55,800
Project Manager	DOC	91,210	220,272	1.700	374,462
Assistant Project Manager	DOC	73,820	178,275	1.700	303,068
Secretary/Clerk	DOC	19,805	47,829	13.600	650,474
Industrial Safety Specialist	DOC	47,600	114,954	4.500	517,293
Planning/Scheduling Engineer	DOC	52,630	127,101	5.100	648,215
Radioactive Shipment Spec.	DOC	55,950	135,119	1.500	202,679
Lawyer/Financial Administrator	DOC	62,420	150,744	0.800	120,595
Contracts/Accounting Super.	DOC	62,420	150,744	1.700	256,265
Contracts Specialist/Buyer	DOC	48,600	117,369	1.700	199,527
Procurement Specialist	DOC	44,200	106,743	1.500	160,115
Accountant	DOC	48,600	117,369	1.700	199,527
Health Physics Supervisor	DOC	61,550	148,643	1.700	252,693
Health Physics/ALARA Planner	DOC	51,440	124,228	1.700	211,188
Engineering Supervisor	DOC	61,140	147,653	1.500	221,480
D&D Operations Supervisor	DOC	61,140	147,653	4.500	664,439
Engineer	DOC	50,890	122,899	12.000	1,474,788
Drafting Specialist	DOC	28,080	67,813	4.500	305,159
Quality Assurance Supervisor	DOC	61,140	147,653	1.700	251,010
Quality Assurance Engineer	DOC	34,710	83,825	1.700	142,503

TABLE 7.4. Contents of File TEST.PRG (contd)

Quali'v Assurance Technician	DOC	31,710	76,580	6.000	459,480
~Sr. H'lth Physics Technician	DOC	51,440	124,228	5.100	633,563
~Hea' 'ysics Technician	DOC	31,710	76,580	18.000	1,378,440
~Healt ,ys. Tech (m. hand.)	DOC	31,710	76,580	3.000	229,740
~Craftsman (mat'l handling)	DOC	42,810	103,386	3.000	310,158
~Utility Operator (m. hand.)	DOC	36,470	88,075	3.000	264,225
~Crew Leader (m. hand.)	DOC	47,230	114,060	1.500	171,090
Tool Crib Attendant	DOC	31,770	76,725	3.000	230,175
Protective Clothing Attendant	DOC	31,770	76,725	3.000	230,175
Licensing Engineer	DOC	50,890	122,899	1.700	208,928
Safety Consultant	Other	242,200	242,200	0.500	121,100

Utility Overhead Costs for Deferred Dismantlement	3,390,654
DOC Overhead Costs for Deferred Dismantlement	11,392,554
Total Overhead Costs for Deferred Dismantlement	14,783,208

The last output file, **TEST.PRI**, is shown in Table 7.5. This file, produced from Menu Item I in Section 6.0, summarizes the data shown in **TEST.PRE**, **TEST.PRD**, and **TEST.PRG**. The data is organized into the decommissioning periods defined by **TEST.PDB**. The notes following the table expain where each cost item originates.

The last part of each **PRI** file shows total decommissioning costs reorganized into the categories of labor and materials, energy, and waste disposal. These categories provide the cost terms in the decommissioning cost escalation formula presented in 10 CFR 50.75(c). That formula has been slightly modified to exclude escalation of property taxes and nuclear insurance costs from the calculation. The revised formula is

$$\text{Estimated Cost (year X)} = [\text{Reduced Cost (base year)}]\,[A\,L_x + B\,E_x + C\,B_x] + \text{Taxes \& Insurance (year X)},$$

where base year is the year for which the CECP input data are applicable. (The base year for **TEST.PRI** is 1993). Each **PRI** file provides the following elements of this equation: Reduced Cost (base year), the base-year labor and materials fraction (A), the base-year energy fraction (B), and the base-year disposal cost fraction (C). The user supplies the factors L_x, E_x, and B_x, which are the escalation of labor, energy, and waste disposal costs from the base year until the year of the estimate (year X). The user must also supply the taxes and insurance costs for year X. A complete discussion of the escalation equation will be found in the Report on Waste Burial Charges.[1]

TABLE 7.5. Contents of File TEST.PRI

Final Summary Report for TEST

PERIOD 1: Planning and Preparation (Year -2.5000 to Year 0.0000)

	Costs (dollars)										
Undistributed Costs	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Utility Staff[1]	0	0	0	0	0	600,077	600,077	0	0	0	0.00
DOC Staff[1]	0	0	0	0	0	4,827,733	4,827,733	0	0	0	0.00
Regulatory Costs[2]	0	0	0	0	0	357,330	357,330	0	0	0	0.00
Special Tools and Equipment[3]	0	0	0	0	0	3,227,775	3,227,775	0	0	0	0.00
Totals	0	0	0	0	0	9,012,915	9,012,915	0	0	0	0.00
Totals for PERIOD 1	0	0	0	0	0	9,012,915	9,012,915	0	0	0	0.00

PERIOD 2: Defuel and Layup (Year 0.0000 to Year 0.6200)

	Costs (dollars)										
Removal of NSSS[4]	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Removal of RPV Internals	0	395,187	92,970	1,111,430	2,787,273	0	4,386,859	3,454	1,216	10,947	61.83
Chemical Decontamination	13,250,000	0	0	0	466,302	0	13,716,302	4,600	1,408	8,448	45.70
Disposal of Concentrated Boron Sol.	1,074,600	0	1,725	0	23,278	0	1,099,602	480	3,936	11,808	12.00
Totals	14,324,600	395,187	94,695	1,111,430	3,276,852	0	19,202,763	8,534	6,560	31,203	119.53

	Costs (dollars)										
Dry Active Waste Costs for this Period[5]	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Dry Active Waste	0	0	11,050	7,185	149,130	0	167,365	3,075	0	0	0.00

	Costs (dollars)										
Undistributed Costs	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Utility Staff[1]	0	0	0	0	0	6,008,571	6,008,571	0	0	87,069	87.07
Regulatory Costs[2]	0	0	0	0	0	370,800	370,800	0	0	0	0.00
Environmental Monitoring Costs[2]	0	0	0	0	0	30,134	30,134	0	0	0	0.00
Laundry Services[6]	0	0	0	0	0	310,464	310,464	0	0	0	0.00
Small Tools and Minor Equipment[7]	0	0	0	0	0	7,904	7,904	0	0	0	0.00
Chemical Decontamination Energy[4]	0	0	0	0	0	302,900	302,900	0	0	0	0.00
Plant Power Usage[2]	0	0	0	0	0	738,643	738,643	0	0	0	0.00
Nuclear Liability Insurance[2]	0	0	0	0	0	1,716,532	1,716,532	0	0	0	0.00
Totals	0	0	0	0	0	9,485,948	9,485,948	0	0	87,069	87.07
Totals for PERIOD 2	14,324,600	395,187	105,745	1,118,615	3,425,982	9,485,948	28,856,076	11,610	6,560	118,272	206.60

TABLE 7.5. Contents of File TEST.PRI (contd)

PERIOD 3: Spent Fuel Pool Operations (Year 0.6200 to Year 6.9200)

	Costs (dollars)										
Undistributed Costs	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Utility Staff[1]	0	0	0	0	0	1,905,744	1,905,744	0	0	22,277	20.53
DOC Staff[1]	0	0	0	0	0	965,549	965,549	0	0	0	0.00
Regulatory Costs[2]	0	0	0	0	0	22,579	22,579	0	0	0	0.00
Environmental Monitoring Costs[2]	0	0	0	0	0	30,618	30,618	0	0	0	0.00
Laundry Services[6]	0	0	0	0	0	58,477	58,477	0	0	0	0.00
Plant Power Usage[2]	0	0	0	0	0	42,842	42,842	0	0	0	0.00
Property Taxes[2]	0	0	0	0	0	56,700	56,700	0	0	0	0.00
Nuclear Liability Insurance[2]	0	0	0	0	0	3,780,000	3,780,000	0	0	0	0.00
Totals	0	0	0	0	0	6,862,509	6,862,509	0	0	22,277	20.53
Totals for PERIOD 3	0	0	0	0	0	6,862,509	6,862,509	0	0	22,277	20.53

PERIOD 4: Deferred Dismantlement (Year 6.9200 to Year 8.6200)

	Costs (dollars)										
Removal of NSSS[4]	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Removal of Reactor Pressure Vessel	0	109,756	118,015	201,545	520,924	0	950,241	2,924	338	3,040	16.24
Steam Generator--Direct Removal Cost	1,070,711	4,790,297	137,363	682,290	3,349,743	0	10,030,404	64,524	1,443	86,557	60.00
Steam Generator--Cascading Costs	0	141,736	0	0	0	0	141,736	0	0	0	0.00
RCS Piping	0	22,144	31,179	8,363	261,781	0	323,467	4,019	115	634	4.87
Large Miscellaneous RCS Piping	0	22,862	3,899	1,046	34,572	0	62,379	503	119	653	5.01
Small Miscellaneous RCS Piping	0	42,714	433	116	3,891	0	47,154	56	222	1,220	9.36
RCS Insulation	0	0	39,720	5,327	248,293	0	293,341	5,120	0	0	0.00
Pressurizer	0	8,112	0	172,294	118,327	0	298,733	2,440	16	90	0.69
Pressurizer Relief Tank	0	5,868	3,751	1,006	31,497	0	42,122	484	30	166	1.27
Primary Pumps	0	32,448	0	689,175	203,678	0	925,301	4,200	65	360	2.76
Spent Fuel Racks	0	661,500	63,680	16,601	1,006,162	0	1,747,944	18,113	267	2,400	1.20
Biological Shield	0	140,185	86,917	44,867	699,105	0	971,074	12,936	419	2,722	25.21
Totals	1,070,711	5,977,622	484,957	1,822,631	6,477,973	0	15,833,895	115,318	3,034	97,842	126.61

	Costs (dollars)										
Removal of Contaminated Plant Systems[8]	Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Component Cooling Water System	0	2,612	8,689	2,331	72,952	0	86,583	1,120	18	74	0.19
Clean Radioactive Waste Treatment System	0	47,722	17,230	4,629	144,655	0	214,236	2,222	253	1,354	5.26
Containment Spray System	0	14,823	8,711	2,337	73,135	0	99,005	1,123	79	423	1.97
Chemical and Volume Control System	0	135,519	46,032	12,394	388,407	0	582,352	6,024	711	3,859	21.19
Dirty Radioactive Waste Treatment System	0	18,600	3,808	1,022	31,976	0	55,406	491	102	533	1.34
Main Steam System (Within Containment)	0	51,893	27,175	7,289	228,161	0	314,518	3,503	269	1,480	7.69
Radioactive Gaseous Waste System	0	23,037	10,119	2,704	84,586	0	120,445	1,325	120	654	0.54

TABLE 7.5. Contents of File TEST.PRI (contd)

Residual Heat Removal System	0	18,374	8,379	3,786	101,563	0	132,101	1,552	97	522	4.15
Safety Injection System	0	70,309	90,388	24,246	758,910	0	943,854	11,651	360	1,974	7.94
Spent Fuel Cooling System	0	30,100	5,971	1,608	49,821	0	87,500	788	160	861	6.35
Stainless Steel Piping (3 - 24 Inches)	0	799,941	65,806	17,652	584,448	0	1,467,847	8,483	4,153	22,842	230.67
Stainless Steel Piping (1/2 - 2 Inches)	0	637,902	9,901	2,656	90,343	0	740,802	1,276	3,313	18,224	228.36
Retrofit Materials	0	16,486	1,089	292	9,169	0	27,035	140	86	471	4.00
Totals	0	1,867,318	303,298	82,945	2,618,124	0	4,871,685	39,698	9,722	53,269	519.66

Decontamination of Site Buildings[9]	Costs (dollars) Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Fuel Bldg	23,577	136,674	14,624	5,817	140,205	0	320,896	2,401	1,087	4,147	2.65
Containment Bldg	125,020	127,209	19,979	6,899	182,063	0	461,170	2,999	1,990	7,293	3.74
Auxiliary Bldg	64,318	173,951	8,156	5,062	95,065	0	346,552	1,839	1,855	6,410	3.89
Waste Water Solidification Costs	293,300	0	54,775	55,592	86,524	0	490,192	1,414	875	2,624	0.71
Spent Fuel Pool Water Treatment	754,211	0	65,375	0	67,590	0	887,176	1,010	720	4,320	2.00
Concrete Cutting--Cascading Costs	0	48,168	0	0	0	0	48,168	0	392	980	0.75
Removal of HVAC Ducts	0	107,355	24,662	6,615	180,615	0	319,248	3,179	1,275	3,826	1.62
Removal of HVAC Equipment	0	37,708	346,541	92,957	2,203,430	0	2,680,636	44,670	200	1,000	0.51
Removal of HVAC Coolers	0	33,754	78,752	21,124	661,206	0	794,837	10,151	179	895	0.46
Bridge Crane	7,542	75,780	3,650	1,315	76,603	0	164,889	1,360	216	1,176	0.00
Polar Crane	7,542	237,020	3,650	1,522	76,603	0	326,336	1,360	304	2,104	0.00
Refueling Cranes	0	4,309	9,930	2,664	67,398	0	84,301	1,280	23	125	0.31
Floor Drains	0	248,660	7,925	4,091	63,746	0	324,423	1,180	1,715	5,145	1.09
Totals	1,275,509	1,230,588	638,019	203,658	3,901,049	0	7,248,822	72,843	10,632	40,046	17.73

Dry Active Waste Costs for this Period[5]	Costs (dollars) Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Dry Active Waste	0	0	39,730	25,834	536,188	0	601,752	11,057	0	0	0.00

Site Termination Survey[10]	Costs (dollars) Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Termination Survey Costs	0	0	0	0	0	1,220,187	1,220,187	0	0	0	0.00

Undistributed Costs	Costs (dollars) Decon	Remove	Package	Ship	Bury	Undist	Total	Cu Ft	C-Hrs	Pers-Hrs	Pers-Rem
Utility Staff[1]	0	0	0	0	0	3,390,654	3,390,654	0	0	29,744	11.97
DOC Staff[1]	0	0	0	0	0	11,271,454	11,271,454	0	0	69,888	28.13
Consultant/Other Staff[1]	0	0	0	0	0	121,100	121,100	0	0	0	0.00
DOC Mobilization/Demobilization Costs[2]	0	0	0	0	0	2,640,000	2,640,000	0	0	0	0.00
Regulatory Costs[2]	0	0	0	0	0	1,024,335	1,024,335	0	0	0	0.00
Environmental Monitoring Costs[2]	0	0	0	0	0	82,625	82,625	0	0	0	0.00
Laundry Services[6]	0	0	0	0	0	763,321	763,321	0	0	0	0.00
Small Tools and Minor Equipment[7]	0	0	0	0	0	207,485	207,485	0	0	0	0.00

TABLE 7.5. Contents of File TEST.PRI (contd)

Steam Generator--Undistributed Costs[4]	0	0	0	0	0	1,455,820	1,455,820	0	0	0	0.00
Plant Power Usage[2]	0	0	0	0	0	2,025,312	2,025,312	0	0	0	0.00
Property Taxes[2]	0	0	0	0	0	153,000	153,000	0	0	0	0.00
Nuclear Liability Insurance[2]	0	0	0	0	0	2,037,620	2,037,620	0	0	0	0.00
Totals	0	0	0	0	0	25,172,725	25,172,725	0	0	99,632	40.10
Totals for PERIOD 4	2,346,220	9,075,528	1,466,004	2,135,068	13,533,334	26,392,912	54,949,066	238,915	23,587	290,789	704.09
GRAND TOTALS	16,670,820	9,470,715	1,571,719	3,253,683	16,959,316	51,754,284	99,680,566	250,524	30,148	431,338	931.23
GRAND TOTALS with 25% contingency	20,838,525	11,838,394	1,964,686	4,067,104	21,199,145	64,692,855	124,600,708	250,524	30,148	431,338	931.23

Listed below are the fractions of the total cost that are attributable to labor and materials (A), energy and transportation (B), and waste burial (C). Property taxes and nuclear liability insurance are not included.

Cost Category	Cost Fraction	Costs (Dollars) w/o Contingency	Costs (Dollars) with 25% Contingency
A (labor and materials):	0.746	68,614,018	85,767,523
B (energy and transportation):	0.069	6,363,380	7,954,225
C (waste burial):	0.184	16,959,316	21,199,145
A + B + C ($)		91,936,714	114,920,893
Taxes and Insurance ($)		7,743,852	9,679,815
Grand Totals ($)		99,680,566	124,600,708

(1) From Menu Item G. A summary of TEST.PRG.
(2) From Menu Item H. Based on values from TEST.PDH, adjusted for the length of each decommissioning period, where applicable.
(3) From Menu Item C. Total costs for equipment shown in TEST.PDC.
(4) From Menu Item F. A summary of the NSSS costs shown in TEST.PRF.
(5) From Menu Item I. Based on lines 39 and 40 of the TEST.PDI file.
(6) From Menu Item I. Based on total person-hours for all activities in each period and on line 38 of the TEST.PDI file.
(7) From Menu Item I. Equal to direct labor costs (exclusive of any contractor costs) times the factor on line 41 of TEST.PDI.
(8) From Menu Item E. A summary of the system costs shown in TEST.PRE.
(9) From Menu Item D. A summary of the building decon costs shown in TEST.PRD. Also includes waste water disposal costs and large equipment costs calculated from the data entered in TEST.PD2.
(10) From Menu Item D. Calculated from line 20 of TEST.PDI and line 2 of TEST.PDA.

7.1 REFERENCES

1. Report on Waste Burial Charges - Escalation of Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities. NUREG/CR-1307 Revision 3, U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, Washington, D.C., May 1993.

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10. SUPPLEMENTARY NOTES

11. ABSTRACT *(200 words or less)*

With the issuance of the Decommissioning Rule (July 27, 1988), nuclear power plant licensees are required to submit to the U.S. Regulatory Commission (NRC) for review, decommissioning plans and cost estimates. This user's manual and the accompanying Cost Estimating Computer Program (CECP) software provide a cost-calculating methodology to the NRC staff that will assist them in assessing the adequacy of the licensee submittals. The CECP, designed to be used on a personal computer, provides estimates for the cost of decommissioning PWR power stations to the point of license termination. Such cost estimates include component, piping, and equipment removal costs; packaging costs; decontamination costs; transportation costs; burial costs; and manpower costs. In addition to costs, the CECP also calculates burial volumes, person-hours, crew-hours, and exposure person-hours associated with decommissioning.

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