NUCLARR

NUCLEAR COMPUTERIZED LIBRARY FOR ASSESSING REACTOR RELIABILITY

EGG-HFRU--10214

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Version 3.5
Quick Reference Guide

October 1992

DISCLAIMER

INEL Idaho National Engineering Laboratory

ABSTRACT

This Reference Guide contains instructions on how to install and use Version 3.5 of the NRC-sponsored Nuclear Computerized Library for Assessing Reactor Reliability (NUCLARR). The NUCLARR data management system is contained in compressed files on the floppy diskettes that accompany this Reference Guide. NUCLARR is comprised of hardware component failure data (HCFD) and human error probability (HEP) data, both of which are available via a user-friendly, menu driven retrieval system. The data may be saved to a file in a format compatible with IRRAS 3.0 and commercially available statistical packages, or used to formulate log-plots and reports of data retrieval and aggregation findings.

FIN No. A6850--Nuclear Computerized Library for Assessing Reactor Reliability (NUCLARR)

ACKNOWLEDGEMENTS

Dr. Paul M. Lewis of the U.S. Nuclear Regulatory Commission (NRC) is gratefully acknowledged for his continued contributions as the program manager for NUCLARR. Thanks are also due to Dr. Harold S. Blackman of the Risk Evaluation and Applied Mathematics Group at the INEL for his technical direction, recommendations, and contributions in the area of program development, and to Kevin De Wall and Bill Nelson for their editorial reviews.

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ACRONYMS

EGA	Enhanced Graphics Adapter
HCFD	Hardware Component Failure Data
HEP	Human Error Probability
HRA	Human Reliability Analysis
INEL	Idaho National Engineering Laboratory
LAN	Local Area Network
NRC	Nuclear Regulatory Commission
NUCLARR	Nuclear Computerized Library for Assessing Reactor Reliability
PC	Personal Computer
PRA	Probabilistic Risk Assessment
VGA	Video Graphics Adapter

1. INTRODUCTION

The NUCLARR Quick Reference Guide and the NUCLARR software are available, free of charge, to NRC staff and their contractors through the NUCLARR Clearinghouse, established at the Idaho National Engineering Laboratory. Copies of the software are available to others on a cost-recovery basis.

Information for obtaining the NUCLARR software and/or documentation should be directed to either of the following:

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Human Factors Branch
5650 Nicholson Lane, NL/N-316
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Idaho Falls, ID 83415 USA
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Purpose of the NUCLARR Quick Reference Guide

- To acquaint you with an important computer-based repository of data for use in Probabilistic Risk Assessments (PRAs) and Human Reliability Analyses (HRAs).

- To present information on performing searches, aggregating data, generating reports, and converting data to ASCII for use with other software programs.

Organization of the NUCLARR Quick Reference Guide

- Section 1, Introduction, includes an overview of the organization of the NUCLARR Quick Reference Guide.

- Section 2, Getting Started, provides the hardware requirements and installation procedures.

- Section 3, NUCLARR Basics, presents a description of menus, lists, and prompts. It also discusses available on-line helps and pre-defined keys.

- Sections 4 and 5, Using the HEP Side of NUCLARR and Using the Hardware Side of NUCLARR, guide you through the software from searching for data to printing reports. Screens and menus are presented and accompanied by an explanation of their use.

- Section 6, Rebuild All Data Files, contains instructions for rebuilding the NUCLARR raw data files.
- Section 7, MAR-D File Generation, guides you through creation of an ASCII file that can be read by IRRAS.
- Appendix A contains two examples of NUCLARR sessions, one for HEP and one for hardware.
- Appendix B contains the codes used on the HEP side of NUCLARR.
- Appendix C contains the codes used on the hardware side of NUCLARR.
- Appendix D contains information on the use of NUCLARR on the LAN.

Additional Information

- For an introduction to the NUCLARR system, see NUREG/CR-4639, Nuclear Computerized Library for Assessing Reactor Reliability (NUCLARR), Volume 1: Summary Description.
- For a hardcopy listing of all NUCLARR data, see NUREG/CR-4639, Nuclear Computerized Library for Assessing Reactor Reliability (NUCLARR), Volume 5: Data Manual.

2. GETTING STARTED

If the required hardware is available (Table 1), install the program using the procedures and commands that follow.

Hardware Required

- The NUCLARR program runs on an IBM PC (personal computer) or IBM PC compatible computer. See Table 1 for the minimum configuration requirements. NUCLARR may also be loaded and run on a local area network (LAN). For instructions on LAN operation, see Appendix D.

- The installation program checks automatically for most of these minimum requirements. It makes the changes as required (with your approval) or tells you what is deficient and what is needed.

Installation Procedures

The installation procedure copies all of the required files from the floppy diskettes onto the hard drive. It makes the required subdirectories (\NUCLARR, \NUCLARR\REPORTS, and \HALO88) if they do not already exist. To install NUCLARR, follow the instructions below:

1. Change to the drive from which NUCLARR will be installed (i.e., type A: or B: and press <ENTER>).

   (Note: The words and/or characters that are to be actually typed are in capital letters throughout this manual, while the keys to be pressed are in capital letters, as shown above for <ENTER>).

2. Insert the first install diskette (labelled INSTALL3_1, INSTALL5_1 or INSTALL7_1).

3. Type the INSTALL# part of the name (i.e., INSTALL3, INSTALL5 or INSTALL7) and press <ENTER>.

   Additional installation instructions are displayed on the computer screen. Follow these instructions. If you have to stop the installation before it is complete to verify a minimum configuration requirement, you can rerun it from the start without a problem. When through with the installation procedure, place the NUCLARR diskettes in a safe place.

4. To enter the directory that contains the NUCLARR program, type CD\NUCLARR and press <ENTER>.

5. To run NUCLARR, type NUCLARR and press <ENTER>.

Table 1. Minimum Configuration Requirements for NUCLARR

1. IBM-PC or PC compatible

2. 490 K available memory

   note: In order to find the total and available memory on your PC, type CHKDSK and press <ENTER>. The statement displayed on the screen lists the number of bytes of total memory and the number of bytes available. NUCLARR can utilize extended and enhanced memory if they are available. In addition, it may not run reliably with memory-resident programs, such as Borland's Sidekick, which are loaded into memory during computer start-up and remain there until inactivated. These should be inactivated before starting NUCLARR. Failure to do so can result in stack overflow and memory errors. For instructions on inactivating the memory-resident programs, see the user's guides for the programs in question.

3. 20 megabyte hard disk with at least 5.5 megabytes available for installation of NUCLARR.

4. The CONFIG.SYS file should have the following statements[1] for NUCLARR to run properly:

   ```
   DEVICE=C:\ANSI.SYS (or DEVICE=C:\DOS\ANSI.SYS)
   FILES=35
   BUFFERS=20
   ```

   note: To check the configuration file, type TYPE C:\CONFIG.SYS, then press <ENTER>.

5. The file ANSI.SYS must be in the root (C:\) or C:\DOS directory.

   note: To check this, type DIR C:\ANSI.SYS (or DIR C:\DOS\ANSI.SYS), then press <ENTER>.

6. EGA (enhanced graphics adapter) or VGA (video graphics adapter) card

7. EGA or VGA monitor (color is preferred). If the "STICK" command is used to set the colors on the monitor, the NUCLARR installation package will override them.

8. DOS operating system 3.1 or higher

[1] With DOS Version 5.0 it is possible to place ANSI.SYS in high memory. To do this, check with the instructions in your DOS Manual.

3. NUCLARR BASICS

You navigate through the NUCLARR software by selecting options from menus and lists and entering commands on data entry screens. In addition, readily accessible on-line help screens and function keys are available to assist you in the operation of the system.

Types of Screens

There are several types of screens displayed by NUCLARR. These include menus for selection of options, lists, data entry screens, and built-in help screens. These are discussed below.

Menus

- The various options available in NUCLARR are selected from menus (see Figure 1). Each menu option has a number or a function key listing on the left, followed by a description of the option on the right.
- To select an option designated by a function key, press that function key.
- To select an option designated by a number, use the arrow keys to highlight the desired option and press <ENTER> or type the number of the desired option.
- To Exit from a menu, press the function key displayed on the menu for Exit.

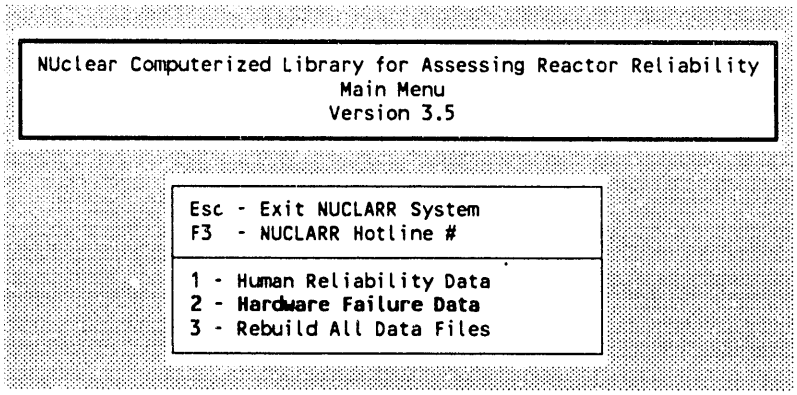

Figure 1. NUCLARR Main Menu

Lists

- There are times during a NUCLARR session when you must select from a list (see Figure 2). These lists may include components, systems, human actions, or any number of data base attributes.

- To select from a list, highlight the item of choice by using the arrow keys, then press <ENTER>.

- In most cases there will only be one column to select from. When there is more than one column in a list, use the left or right arrow keys to move between columns. If a list is extensive and contains more than will fit in the window, use the arrow keys or <PgUp>/<PgDn> to see the entire list.

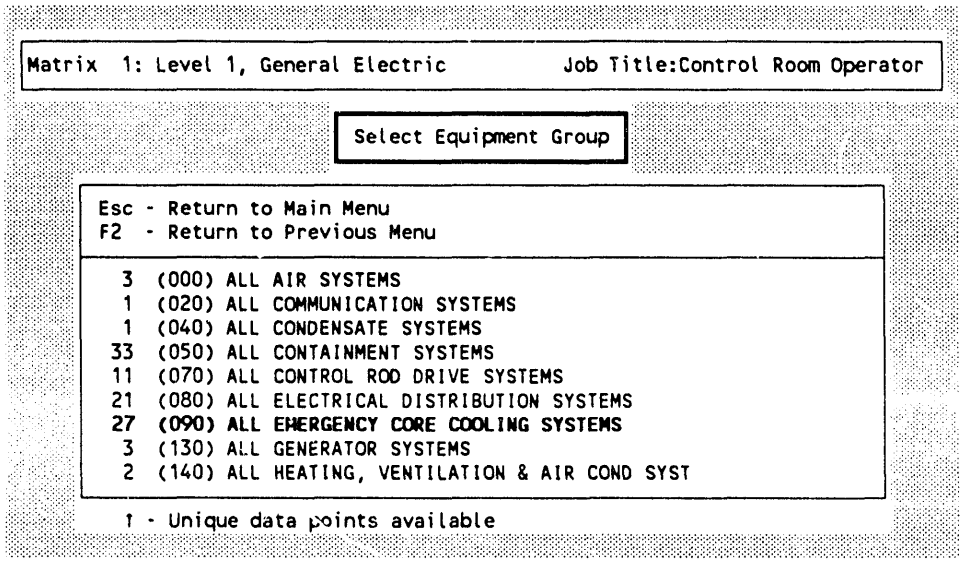

Figure 2. Listing of Equipment Groups During a Descriptive Search of HEP

Data Entry Screens

- Occasionally you will be required to make entries into NUCLARR using data entry screens (Figure 3). These are used for HEP and hardware ad hoc searches, reporting, and file saving.

- An entry screen may have a number of entry fields. Default values are typically displayed. These default values can be modified by typing in the new value.

- Some fields have specific legal entry values or ranges. NUCLARR checks entries and prompts you when an illegal or out-of-range entry has been made.

- Some fields have specific helps, which are called up by placing the cursor in the field and pressing <F1>.

- The COMMAND line, as shown at the bottom of Figure 3, is a variation of the data entry screen. To execute a command, position the cursor inside of the box next to the word COMMAND, enter the code letter of the desired operation, then press <ENTER>.

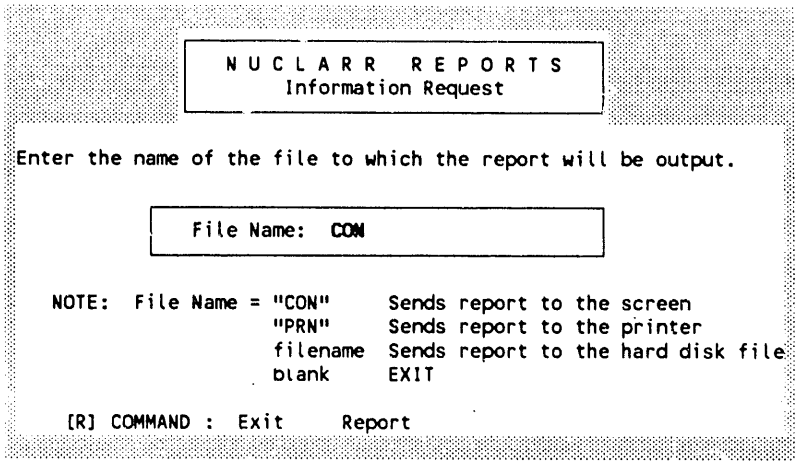

Figure 3. Sample Data Entry Screen

Built-In Helps

- On-line help screens are readily available throughout NUCLARR.
- Position the cursor on the menu option or field in question and press <F1> to access the appropriate help screen. NUCLARR then displays additional information on the chosen option, or field, and any background information that is needed.
- In many cases, there are multiple help screens. Instructions for exiting the help screen or proceeding to the next one are given at the bottom of the screen. Some of the help screens actually assist you in entering information into data entry screens (see Figure 4).

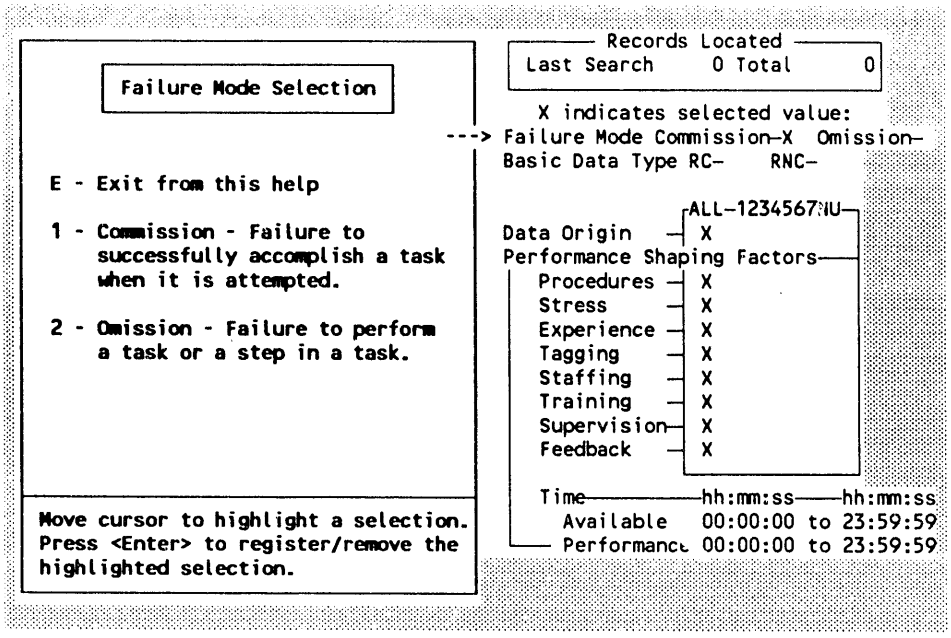

Figure 4. Example of a Help Screen

Pre-Defined Keys

NUCLARR uses the following pre-defined keys for assistance during operation of the software. Active function keys for any menu are displayed on that menu.

<F1>	Press <F1> to view help screens associated with the menu option or field that the cursor is currently on. The helps define the field or menu option, give ranges, defaults, warnings, important information, and in some cases, are actually used to input data.
<F2>	Press <F2> to return to the previous menu.
<F3>	Press <F3> to display the NUCLARR hotline telephone number.
<F5>	Press <F5> to clear the buffer (computer memory) of data from a previous search.
<F8>	Press <F8> to review notes on aggregation methods used in NUCLARR. The arrow keys and <PgUp>/<PgDn> allow paging through the text file.
<F9>	Press <F9> to review the documents from which the NUCLARR data was obtained.
arrow keys	Press the arrow keys to move between fields on input screens and to navigate through lists.
<ESC>	Press <ESC> to return to the main menu.
<CTRL><END>	Position the cursor at the left side of an entry field and press <CTRL> and <END> simultaneously to delete the field entry.
<HOME>	Press <HOME> to position the cursor in the COMMAND box.
<PgUp>/<PgDn>	Press <PgUp>/<PgDn> to navigate quickly through long lists.

NUCLARR Menus

- At any given point in a NUCLARR session, you can select what you want to accomplish from the menu presented.
- The first two levels of menus are shown in this section (Figures 5-7). The menu is shown on the right-hand page. A description of the options is listed on the facing page. Additional screens are discussed in detail in Section 4 and 5.

- The hierarchy of menus is as follows:

Main Menu

1 - Human Reliability Data

1 - Retrieve a Saved Data Set
2 - Begin Descriptive Search
3 - Use Ad Hoc Search to Locate Records
4 - View the Located HEP Data Records
5 - Aggregate Probabilities for Located Records
6 - Report on Located Data Records
7 - Plot from Located Data Records
8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS

1 - IRRAS-Compatible ASCII File (MAR-D format)
2 - DBASE III-Compatible ASCII File
3 - SAS-Compatible File
4 - SPSS-Compatible File

9 - Save Current Records as a Data Set

2 - Hardware Failure Data

1 - Retrieve a Saved Data Set
2 - Begin Descriptive Search
3 - Use Ad Hoc Search to Locate Records
4 - View the Located HW Data Records
5 - Aggregate Probabilities for Located Records
6 - Report on Located Data Records
7 - Plot from Located Data Records
8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS

1 - IRRAS-Compatible ASCII File (MAR-D format)
2 - DBASE III-Compatible ASCII File
3 - SAS-Compatible File
4 - SPSS-Compatible File

9 - Save Current Records as a Data Set

3 - Rebuild All Data Files

NUCLARR Main Menu

This is the main menu in the NUCLARR software system (see Figure 5). It controls access to the two sides of the data base (HEP and hardware failure data) and allows for rebuilding of the NUCLARR data files should they become damaged. Options 1 and 2 and their corresponding menus are described briefly on the following pages and in detail in Sections 4 and 5. Option 3 is described in Section 6.

Main Menu Options

Option	Description
Esc - Exit NUCLARR System	Exit NUCLARR and return to DOS. This is the only safe way to leave the program.
F3 - NUCLARR Hotline #	Display the telephone number of the NUCLARR clearinghouse in case assistance is needed in running NUCLARR.
1 - Human Reliability Data	Access the HEP data in NUCLARR.
2 - Hardware Failure Data	Access the hardware failure data in NUCLARR.
3 - Rebuild All Data Files	Restructure the files in the database. If you have seen the message "Press Control A to Abort or Any Other Key to Continue" during a NUCLARR session, or if power has gone off while using NUCLARR, this option may possibly recover the NUCLARR data files.

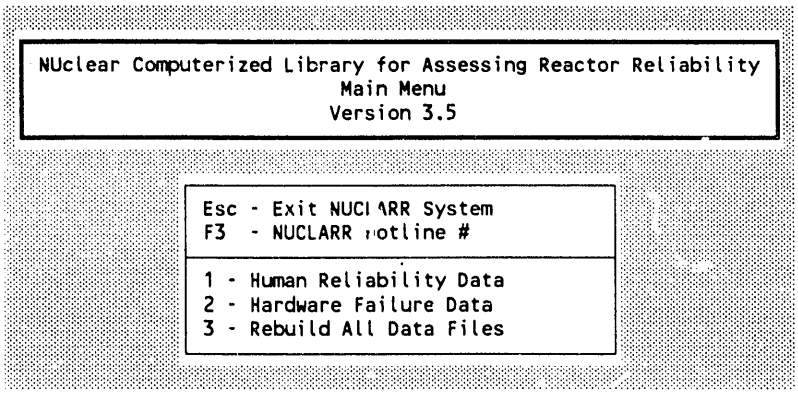

Figure 5. NUCLARR Main Menu

Human Error Probability Data - Main Retrieve Menu Options

This menu is used to perform searches of HEP data, aggregate located data records, and view the results in a variety of ways (see Figure 6).

Human Error Probability Data - Main Retrieve Menu

Option	Description
Esc - Return to Main Menu	Exit HEP Retrieve and redisplay the NUCLARR main menu.
F3 - NUCLARR Hotline #	Display the telephone number of the NUCLARR clearinghouse in case assistance is needed in running NUCLARR.
F8 - Review Notes on Aggregation Methods for HEP	View the aggregations methods used for HEP data.
F9 - Review Documents	Review all HEP documents.
1 - Retrieve a Saved Data Set	Retrieve a data set from a previous NUCLARR session. The file must have been saved using option 9.
2 - Begin a Descriptive Search	Search for HEP data using a hierarchy of menus which guides you to a selected data set.
3 - Use Ad Hoc Search to Locate Records	Search for HEP data by entering all search criteria on one screen.
4 - View the Located HEP Data Records	View the located HEP raw data records and remove individual data records from the set.
5 - Aggregate Probabilities for Located Records	Aggregate data for all located records.
6 - Report on Located Data Pecords	Send a listing of the located data records and aggregations (if option 5 has been performed) to the screen, the printer, or a file.
7 - Plot from Located Data Records	View log plots of the located data.
8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS	Generate an ASCII file which can be transported to IRRAS, dBASE, SAS, or SPSS.
9 - Save Current Records as a Data Set	Save the located data records for use during a future NUCLARR session. The data set is brought back into NUCLARR using option 1.
F1 - General NUCLARR Help	Display general NUCLARR Help.

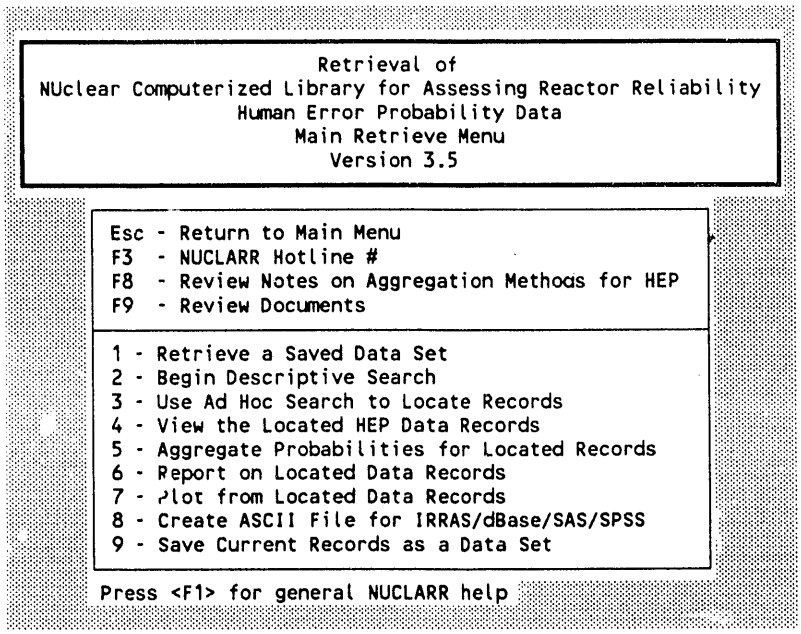

Figure 6. Human Error Probability Data - Main Retrieve Menu

Hardware Component Failure Data - Main Retrieve Menu Options

This menu is used to perform searches of hardware component failure data, aggregate located data records, and view the results in a variety of ways (see Figure 7).

Hardware Component Failure Data - Main Retrieve Menu

Option	Description
Esc - Return to Main Menu	Exit HW Retrieve and redisplay the NUCLARR main menu.
F3 - NUCLARR Hotline #	Display the telephone number of the NUCLARR clearinghouse in case assistance is needed in running NUCLARR.
F8 - Review Notes on Aggregation Methods for HW	View the aggregations methods used for hardware data.
F9 - Review Documents	Review all hardware documents.
1 - Retrieve a Saved Data Set	Retrieve a data set from a previous NUCLARR session. The file must have been saved using option 9.
2 - Begin a Descriptive Search	Search for hardware failure data using a hierarchy of menus which guides you to a selected data set.
3 - Use Ad Hoc Search to Locate Records	Search for hardware failure data by entering all search criteria on one screen.
4 - View Located Hardware Data Records	View the located hardware raw data and remove individual data records from the set.
5 - Aggregate Probabilities for Located Records	Aggregate data for all located records.
6 - Report on Located Data Records	Send a listing of the located data records and aggregations (if option 5 has been performed) to the screen, the printer, or a file.
7 - Plot from Located Data Records	View log plots of the located data.
8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS	Generate an ASCII file which can be transported to IRRAS, dBASE, SAS, or SPSS.
9 - Save Current Records as a Data Set	Save the located data records for use during a future NUCLARR session. The data set is brought back into NUCLARR using Option 1.
F1 - General NUCLARR Help	Display general NUCLARR Help.

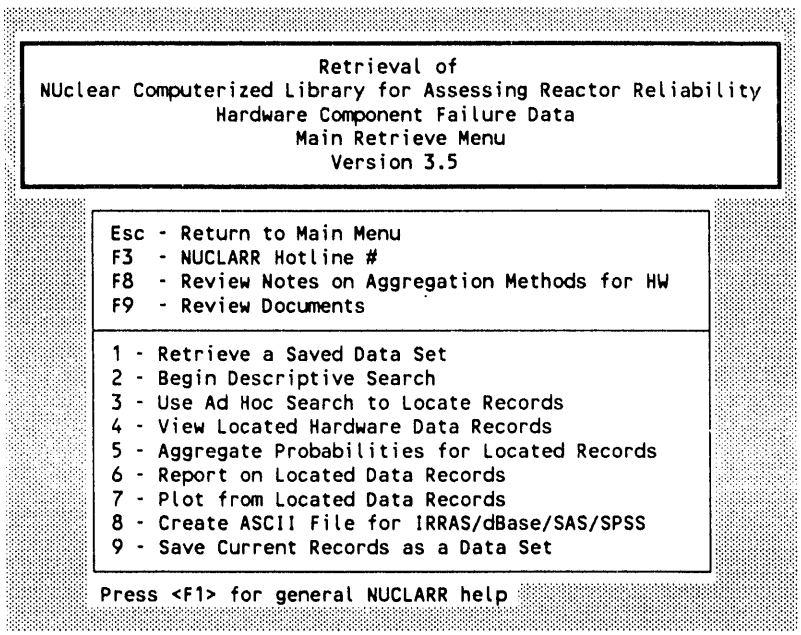

Figure 7. Hardware Component Failure Data - Main Retrieve Menu.

4. USING THE HEP SIDE OF NUCLARR

This section guides you through the HEP menus and options. If you feel confident and want to proceed directly to using NUCLARR, the following steps are recommended:

1. Select Human Reliability Data
2. Perform a descriptive search
3. View located data
4. Aggregate data
5. Plot or report on located data

- To start NUCLARR, type CD\NUCLARR and press <ENTER>, then type NUCLARR and press <ENTER>.
- Select Option 1, Human Reliability Data. The options on the resulting Main Retrieve Menu (Figure 6) are described in this section.
- Options 1, 2, and 3 on the HEP Main Retrieve Menu load data into the computer. Options 4-9 perform operations on the located data.

Option 1 - Retrieve a Saved Data Set

Select Option 1 from the HEP Main Retrieve Menu to get a data set saved from a previous NUCLARR session.

- Position the cursor in the field labelled "from file" and enter the name of the data set to be retrieved.
- Enter <M>, for Move, in the COMMAND box and press <ENTER>. This transfers the previously saved data set into memory and returns you to the HEP Main Retrieve Menu.

Option 2 - Begin Descriptive Search

Select Option 2 from the HEP Main Retrieve Menu to begin a Descriptive Search. This method of searching uses a hierarchical system of menus that guides you through a search of the data, gradually narrowing the selection until the required data set is located.

Select Taxonomy Level

Select one of the three levels of detail for the search from the first menu (see Figure 8).

- Level 1, Plant Systems, allows you to select a job title (Figure 9) and vendor (Figure 10) prior to selecting the system and human action.

- Level 2, Plant Components, allows you to select only job title prior to the component/human action searches.
- Level 3 takes you directly to the equipment selection screen and specific displays, instruments, or controls.

Subsequent search screens vary depending on the level of detail selected here.

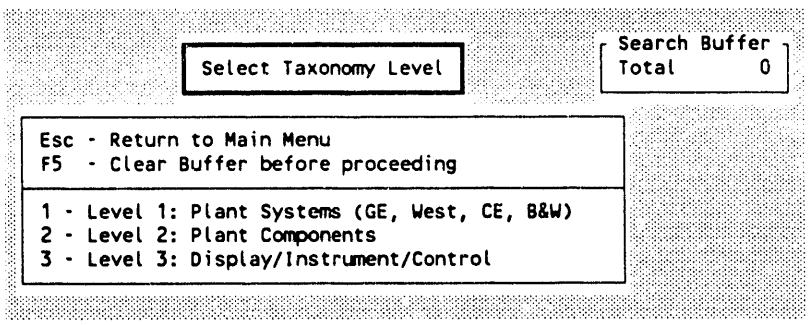

Figure 8. HEP - Select Taxonomy Level Screen

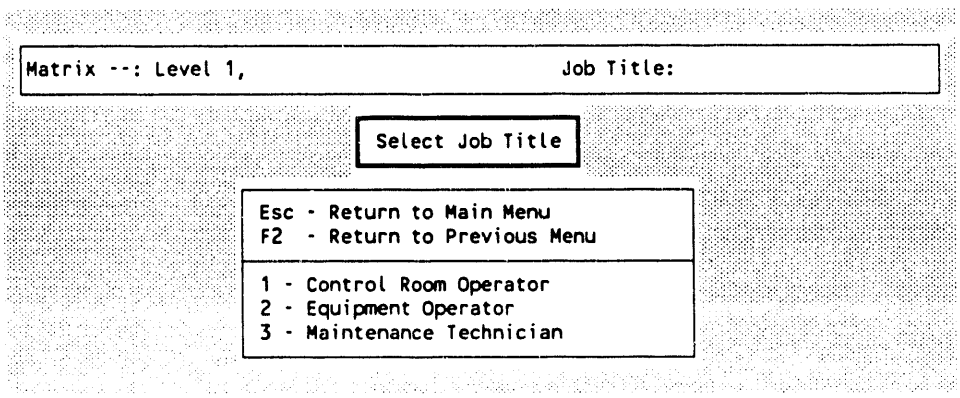

Figure 9. HEP - Select Job Title Screen

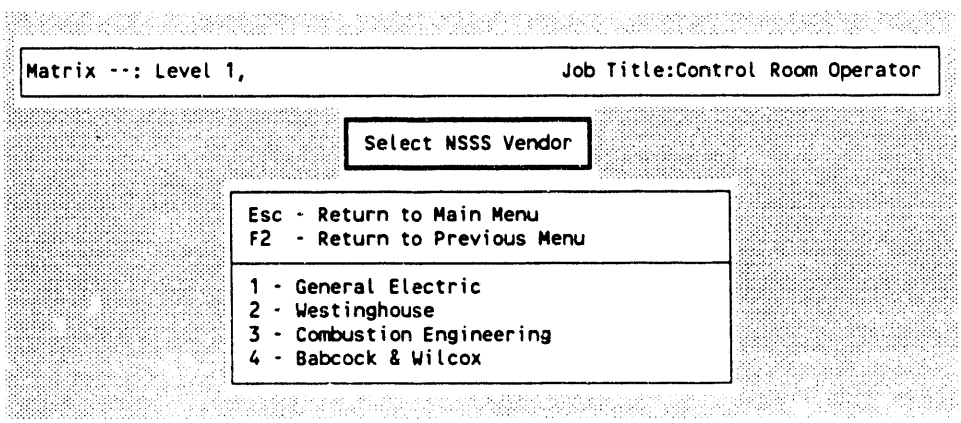

Figure 10. HEP - Select NSSS Vendor Screen

Select Equipment Group

Two screens are used to select the equipment group. The contents of these screens varies depending on the level of detail previously selected.

- The first screen contains a general listing of the equipment available and the number of unique data points available[2] (see Figure 11). In addition, the data code is shown in parentheses. This convention is used throughout the HEP Descriptive Search. Highlight your selection by using the arrow keys, then press <ENTER>.

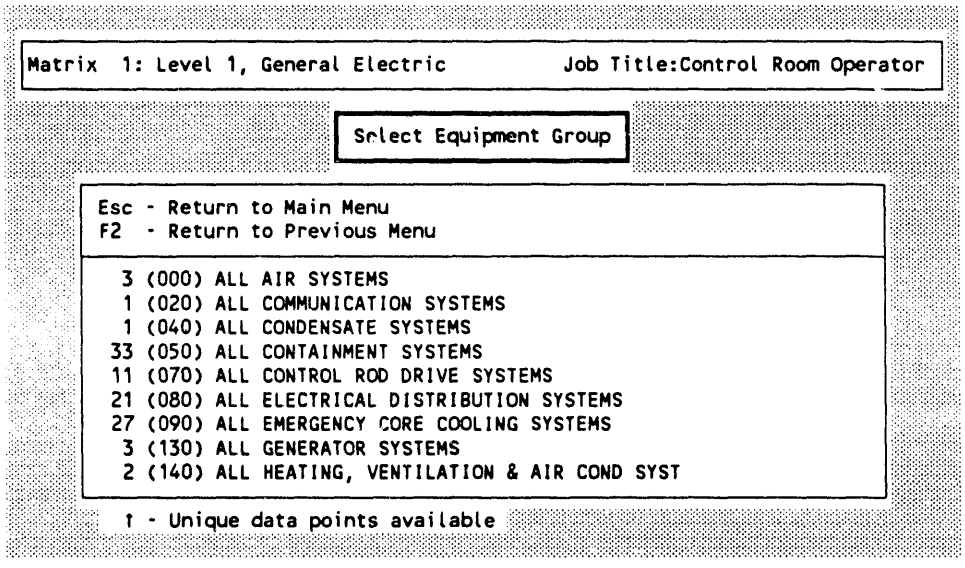

Figure 11. HEP - System level screen for Select Equipment Group

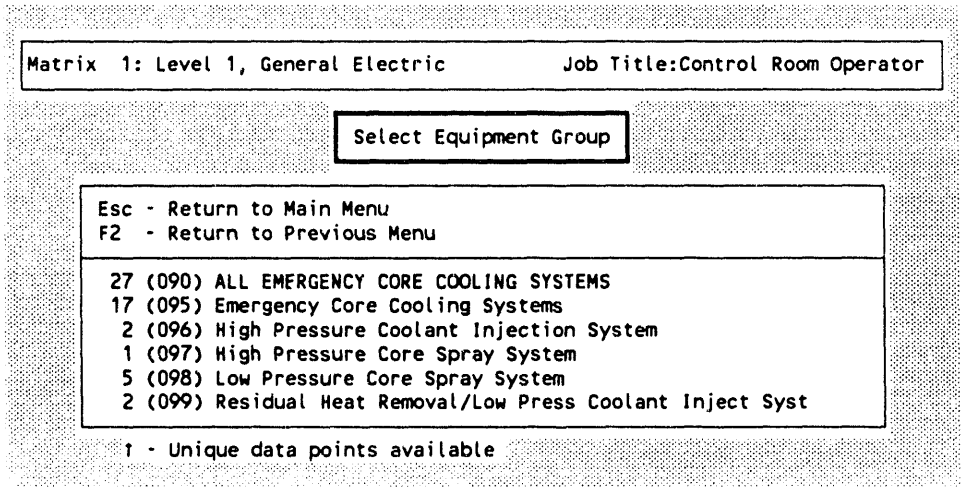

Figure 12. HEP - Detail level screen for Select Equipment Group

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[2] NUCLARR HEP data are entered into applicable "cells". Since more than once cell may be applicable, this number of unique data points available assures that there are no duplicate data points located or aggregated.

- The second Select Equipment Group screen allows for a more detailed level of searching (see Figure 12). If you want all equipment, select the "ALL" option. Selection from this screen takes you to the Select Human Actions screen (see Figure 13).

Select Human Actions

The human actions displayed depend on the level of detail previously selected.

- Highlight the desired action and press <ENTER>. At this point, NUCLARR locates the data records for subsequent viewing, reporting, plotting, etc.
- Selection from this screen takes you to the Data Display Options menu (Figure 14).

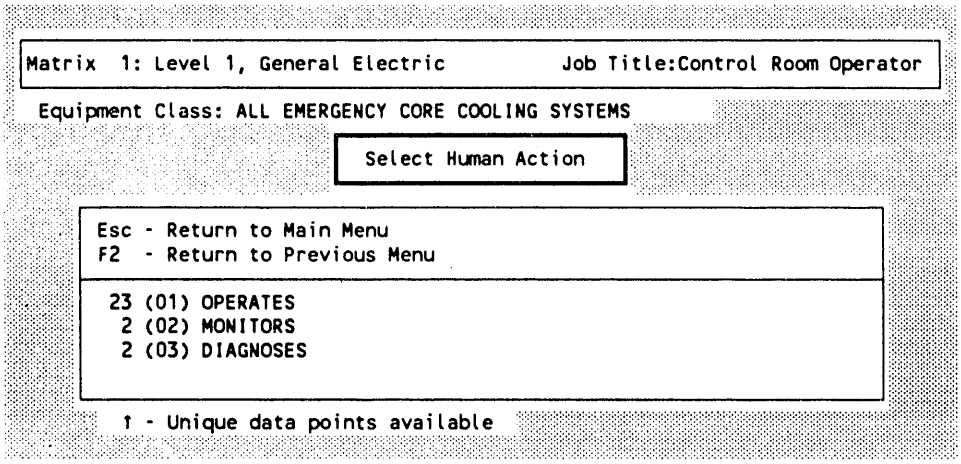

Figure 13. HEP - Select Human Actions Screen

Data Display Options

The Data Display Options menu (Figure 14) presents the current search criteria and several options for the located data records.

- Return to the Main Menu to view, aggregate, plot, and report on the located data.
- Return to the previous menu to select additional items.
- Clear the buffer to remove the located data records. This allows you to perform a different search by returning to previous menus.
- View the located records page through the data and remove individual data records.
- Select report to generate a report of the located data records to the console, the printer, or a file.

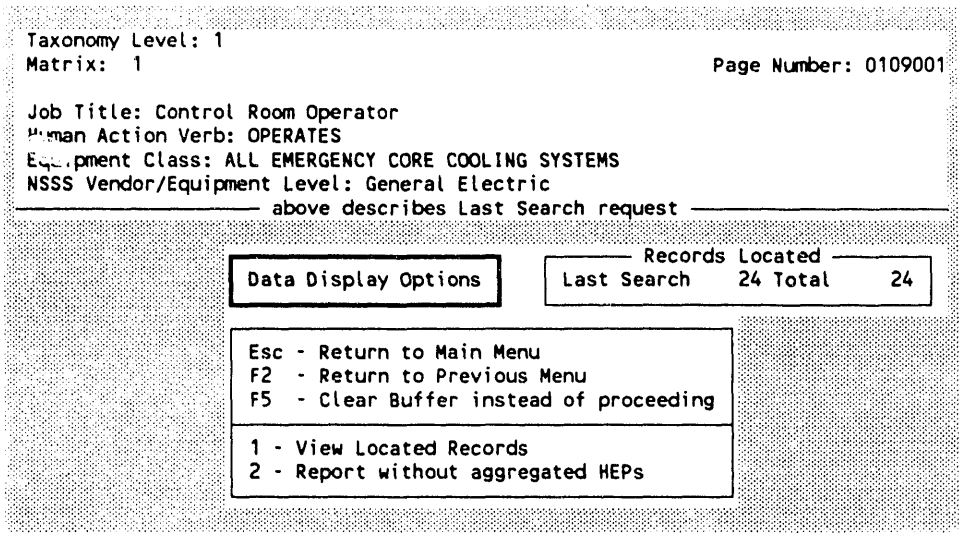

Figure 14. HEP - Data Display Options Menu

- **Clear buffer instead of proceeding**

  After clearing the buffer, you have two choices (see Figure 15).

  - Return to the Main Menu to start a new search from the beginning.
  - Return to the Previous Search Selection Menu to maintain the previous search criteria and back through the menus making modifications to the previous search.

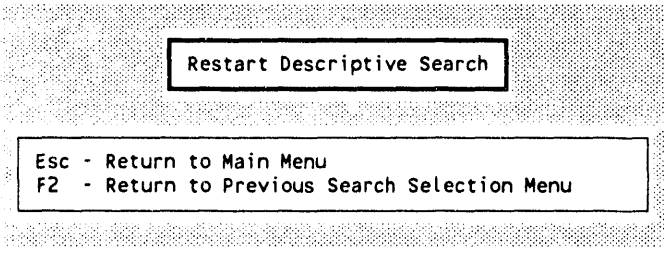

Figure 15. HEP - Restart Descriptive Search after Clearing Buffer

- **View located records**

  See the section on Option 4, View the Located HEP Data Records, for a complete description of this option and how it works. It is included here so you can view the located raw data records and make refinements to the previous search without having to start from the beginning.

- **Report without aggregated HEPs**

  See the section on Option 6, Report on Located Data Records, for a complete description of this option and how it works. This option is included here so you can read the raw data records and make slight refinements to the

previous search without having to start from the beginning.

Option 3 - Use Ad Hoc Search to Locate Records

Select Option 3 from the HEP Main Retrieve Menu to conduct an Ad Hoc Search without going through the multiple screens of the Descriptive Search. This option is for experienced users and allows for more search criteria. All fields on this screen must have an entry (see Figure 16). Follow the procedures below for doing an Ad Hoc Search.

1. Use the arrow keys to move the cursor to the field for Matrix Selection, shown in Figure 16. Press <F1>. Follow the instructions on the help screen to select the level of detail for the search.

   - Option 1, or Level 1, allows selection of a job title and vendor for plant systems.
   - Option 2, or Level 2, allows only for selection of job title for plant components.
   - Option 3, or Level 3, allows only for actions used with specific displays, instruments, or controls.

   Continue to follow the instructions on the screens. When a final selection has been made, NUCLARR returns you to the Ad Hoc Search Screen. Subsequent entry of search criteria depends on the level of detail selected here.

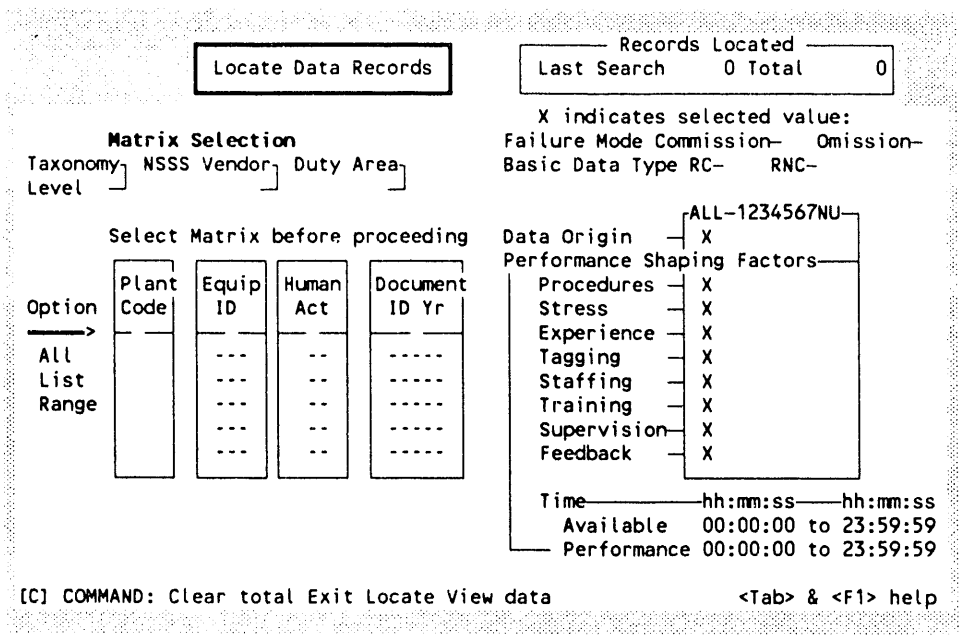

Figure 16. HEP - Ad Hoc Search Screen

2. Use the arrow keys to move the cursor to the single-character option field for Plant Code.

   - Enter <A>, for All, in the option field if the search is to be performed for all plant codes. For specific plants, use <L>ist or <R>ange, then move the cursor to the multiple-character field below the option. If the code is known, type it in directly. If the plant code is unknown, refer to Appendix B, HEP Codes, or press <F1> for a complete list of plant codes.

   - If you need to delete a previously entered plant code, position the cursor at the left of the plant code field and press <CTRL> and <END> simultaneously. (Note: this applies to all input fields in NUCLARR.)

3. Use the same method of selection for Equipment ID, Human Action, and Document. (Note: When using <F1> to select Equipment ID, do not select those groups that end in "0", i.e, those that say "ALL". Instead, enter a range or list of the actual values.)

4. Failure Mode and Basic Data Type use helps for data entry. To make an entry in Failure Mode, position the cursor on "Failure Mode" and press <F1>, then follow the instructions on the screen. One or both failure modes may be selected. Follow the same steps to select Basic Data Type.

5. The entries for Data Origin and Performance Shaping Factors have already been filled in. If you want to change these entries, highlight the desired field, press <F1>, and follow the instructions on the screen.

6. When all entries have been made, enter <L>, for Locate, in the COMMAND box, then press <ENTER>. The records conforming to the search criteria are placed in the computer's memory. You may make additional searches by modifying the entries on the screen, adding to the records already located.

7. You may <V>iew the located records from this screen or <E>xit and select Option 4, View the Located HEP Data Records, from the Main Retrieve Menu.

8. If you want to perform a different search, <C>lear total to remove the current data set from memory.

9. Use <E>xit to return to the HEP Main Retrieve Menu.

Option 4 - View the Located HEP Data Records

Select Option 4 from the HEP Main Retrieve Menu to view the located data and remove undesired records (see Figure 17).

- The <N>ext and <P>revious options allow you to page through the data records, which are displayed as one data point per page.

- The option to <S>how aggregated HEPs shows HEPs at the "task" and "cell" level. The "task" is the individual data point. The "cell" represents the

detail level (i.e., job title and/or NSSS vendor) plus the search criteria of human actions and equipment. Since there can be any number of data points that conform to this combination, they are all considered "tasks" within this "cell". These have all been previously aggregated in NUCLARR to reflect the "cell" value. You should aggregate your own data, however, since a detailed search could have fewer data points than are included in a NUCLARR "cell."

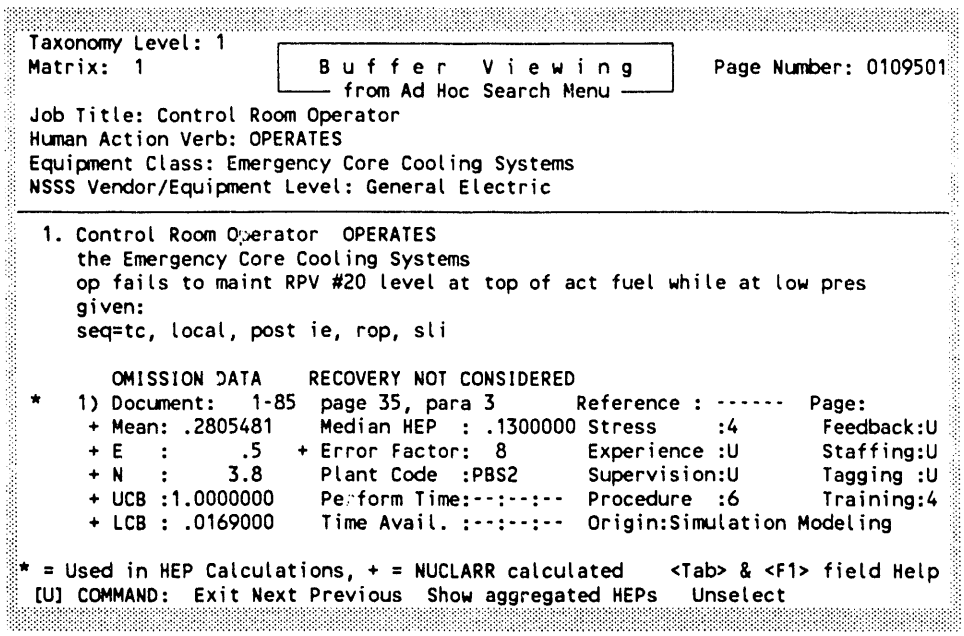

Figure 17. HEP - Buffer Viewing Screen

- Use <U>nselect to remove a data point from the located data set.
- To obtain additional information for any field in the data record, use <TAB> to highlight the field of interest, then press <F1>.
- Use <E>xit to return to the HEP Main Retrieve Menu.

Option 5 - Aggregate Probabilities for Located Records

Select Option 5 from the HEP Main Retrieve Menu to aggregate the located NUCLARR data.

- NUCLARR displays a box for you to enter an optional two-line description of the data. Enter a description, if desired, then press <ENTER>. NUCLARR aggregates the data and displays the results on the screen, along with your data description. Options from this screen are <E>xit to the HEP Main Retrieve Menu or <R>eport.
- You can generate a report containing the aggregated values and the raw data by selecting <R>eport on the COMMAND line. You may view this report on the screen, send it to the printer, or save it to a file for later viewing.

The report generations screen gives instructions for obtaining these reports. After reporting, you are returned to the HEP Main Retrieve Menu.

Option 6 - Report on Located Data Records

Select Option 6 from the HEP Main Retrieve Menu to generate a report of the located data records. You may view this report on the screen, send it to the printer, or save it in a file for later viewing. Reports saved to files are generated in the \NUCLARR\REPORTS directory. The report generation screen gives instructions for obtaining these reports. After reporting, you are returned to the HEP Main Retrieve Menu.

Option 7 - Plot from Located Data Records

NUCLARR has the capability to produce log plots from the located data, displaying the median and the confidence bounds of the individual data points. Data is sorted in order of increasing HEP. Follow the steps below to plot your data.

1. Select Option 7 from the HEP Main Retrieve Menu to produce the plot selection screen shown in Figure 18.

2. Check the display type highlighted. If it is incorrect, type <S> in the COMMAND box, for Set Display Type, then press <ENTER>. Highlight the correct display type, then press <ENTER> again.

3. Enter a plot title, if desired. Use <D>ata plot to view a plot with individual HEPs and bounds. Use <A>ggregated data plot to have the aggregated HEP and bounds added to the data plot.

4. <E>xit returns you to the HEP Main Retrieve Menu.

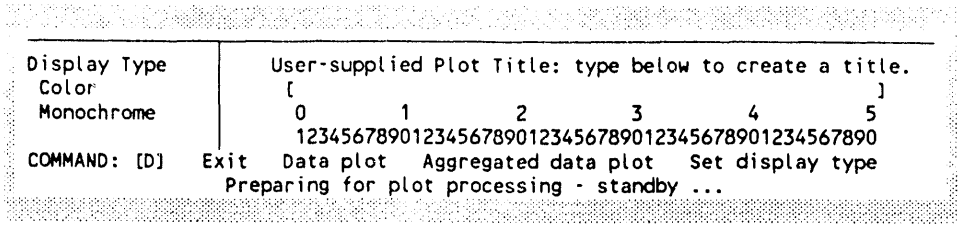

Figure 18. HEP - Plot Selection Screen

5. While the plot is displayed on the screen, you can exit to the plot selection screen shown in Figure 18 by pressing <ENTER> or you can generate a report. Use <R>eport and follow the instructions on the screen to generate an abbreviated report of the plotted HEP data (see Figure 19). The report is in order of increasing HEP and coded according to the search that generated it. This coding provides a cross reference between the plotted data and the data shown in reports.

- The code on the plot report can be used to locate the data in a raw data report or when viewing the data (see Figure 20).
- The first three numbers shown in bold in Figure 18 (Mat, Row, and Col) are put together to form the "Page Number" shown in bold in Figure 20.
- The number under the column "Task" in Figure 19 is the number shown before the words "Control Room Operator OPERATES" in Figure 20.
- All options that generate raw data (whether view or reports) sort the data in order of "page number".

No.	Mat	Row	Col	Task	Numb	Mean	Med	ErrFact	UpCon	LowCon
1	**1**	**99**	**1**	**1**	1	9.0E-4	5.0E-4	6	3.0E-3	8.3E-5
2	1	98	1	2	1	2.0E-3	7.5E-4	10	7.5E-3	7.5E-5
3	13	68	30	3	1	2.0E-3	7.5E-4	10	7.5E-3	7.5E-5
4	1	167	1	11	1	2.0E-3	7.5E-4	10	7.5E-3	7.5E-5
5	9	1	21	2	1	2.0E-3	7.5E-4	10	7.5E-3	7.5E-5

Figure 19. HEP - Plot Report

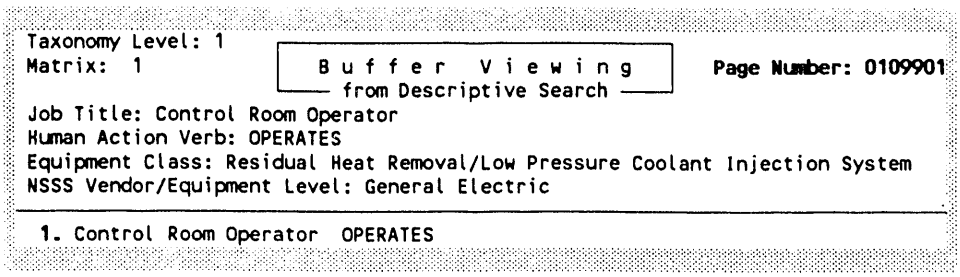

Figure 20. HEP - Report Code on Buffer Viewing Screen

Option 8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS[3]

NUCLARR has the ability to generate ASCII files compatible with other software packages.

- Select Option 8 from the HEP Main Retrieve Menu, then select a conversion type (see Figure 21).

[3] IRRAS (Integrated Reliability and Risk Assessment System) is an NRC-sponsored risk assessment tool available through the Idaho National Engineering Laboratory, Idaho Falls, Idaho. The dBASE software is available from Ashton-Tate, SAS is available through the SAS Institute Inc., and SPSS is available through SPSS, Inc.

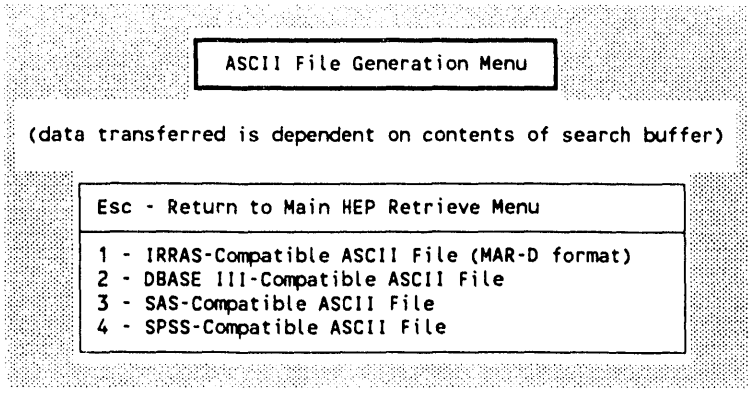

Figure 21. HEP - ASCII File Generation Menu

IRRAS-Compatible ASCII File (MAR-D format)

This option allows you to generate a file containing NUCLARR aggregated data along with user-input required by IRRAS. For information on how to use this option, see Section 6, IRRAS-Compatible ASCII File (MAR-D format). Data must be aggregated prior to this selection.

DBASE III, SAS, and SPSS-Compatible ASCII Files

All three of these options function the same way. After selecting an option, NUCLARR displays the screen shown in Figure 22.

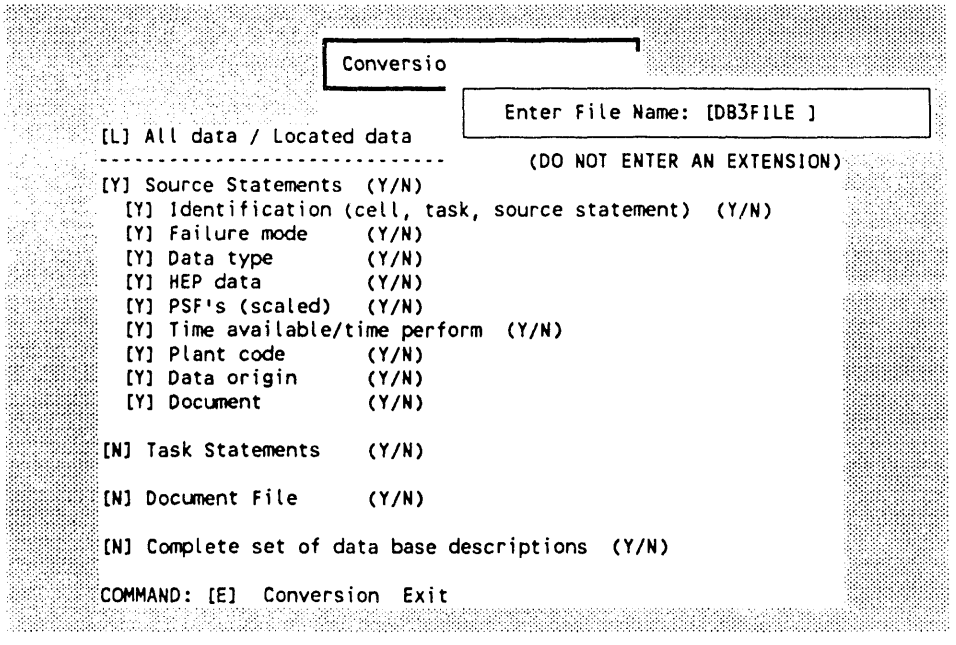

Figure 22. HEP - Conversion to ASCII File Screen

You must designate a filename. Enter a filename, without an extension, and

press <ENTER>. This is the base filename. Extensions are added by NUCLARR. If you want the default filename of DATA, just press <ENTER>.

Fill in the screen according to what you want converted. Type <C>, for Conversion, in the COMMAND box, then press <ENTER>. The requested file is generated and you are returned to the ASCII File Generation Menu shown in Figure 21.

Several files may be generated in the directory \NUCLARR\REPORTS, depending on what you converted. Do NOT view the data files (those with the extensions of DOC, SRC, or TSK) using an editor, as this can put special characters in the file which are not recognized by NUCLARR or IRRAS. The file without an extension may be read or printed. It contains the structure of the data files.

Option 9 - Save Current Records as a Data Set

Select Option 9 from the HEP Main Retrieve Menu to save the located data set for a future NUCLARR session.

- After selecting this option, you may enter an optional two-line description of the data. Press <ENTER> to continue.

- Position the cursor in the field labelled "to file", and enter the name of the file to be saved. Enter <M>, for Move, in the COMMAND box and press <ENTER>. You are returned to the HEP Main Retrieve Menu when the file has been saved.

5. USING THE HARDWARE SIDE OF NUCLARR

This section guides you through the hardware menus and options (see Appendix A for an example). If you feel confident and want to proceed directly to using NUCLARR, the following steps are recommended:

1. Select Hardware Failure Data
2. Perform a descriptive search
3. View located data
4. Aggregate data
5. Report on located data

- To start NUCLARR, type CD\NUCLARR and press <ENTER>, then type NUCLARR and press <ENTER>.
- Select Option 2, Hardware Failure Data. The options on the resulting Main Retrieve Menu (Figure 7) are described in this section.
- Options 1, 2, and 3 on the Hardware Main Retrieve Menu load data into the computer. Options 4-9 perform operations on the located data.

Option 1 - Retrieve a Saved Data Set

Select Option 1 from the Hardware Main Retrieve Menu to get a data set saved from a previous NUCLARR session. NUCLARR displays a screen showing information on all previously saved data sets (see Figure 23).

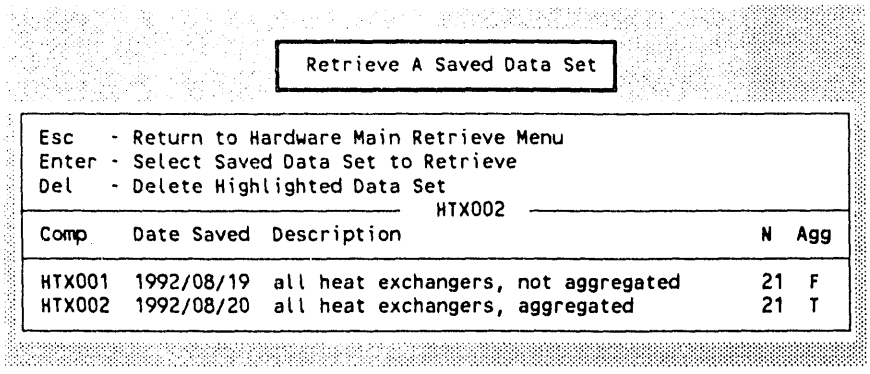

Figure 23. HCFD - Retrieve a Saved Data Set Screen

- To retrieve a previously saved data set, highlight the data set of interest and press <ENTER>.
- If the list of data sets is extensive, use <PgUp>/<PgDn> to scan the list. If you know the three character code for the component, type the three characters and the highlighted bar moves to the first data set with those three characters.

- To delete a previously saved data set, highlight the data set and press <DELETE>. NUCLARR prompts you to confirm any deletion of a saved data set.

Option 2 - Begin Descriptive Search

Select Option 2 from the Hardware Main Retrieve Menu to begin a Descriptive Search. This method of searching uses a hierarchical system of menus that guides you through a search of the data, gradually narrowing the selection until the required data set is located.

Select Hardware Category

NUCLARR hardware data is divided into mechanical and electrical subgroups.

- Highlight the appropriate category using the arrow keys, then press <ENTER>.

- NUCLARR now displays the Select Component screen. The content of all subsequent search screens depends on prior selections that have been made.

Select Component

The Select Component screen (Figure 24) allows you to select a component.

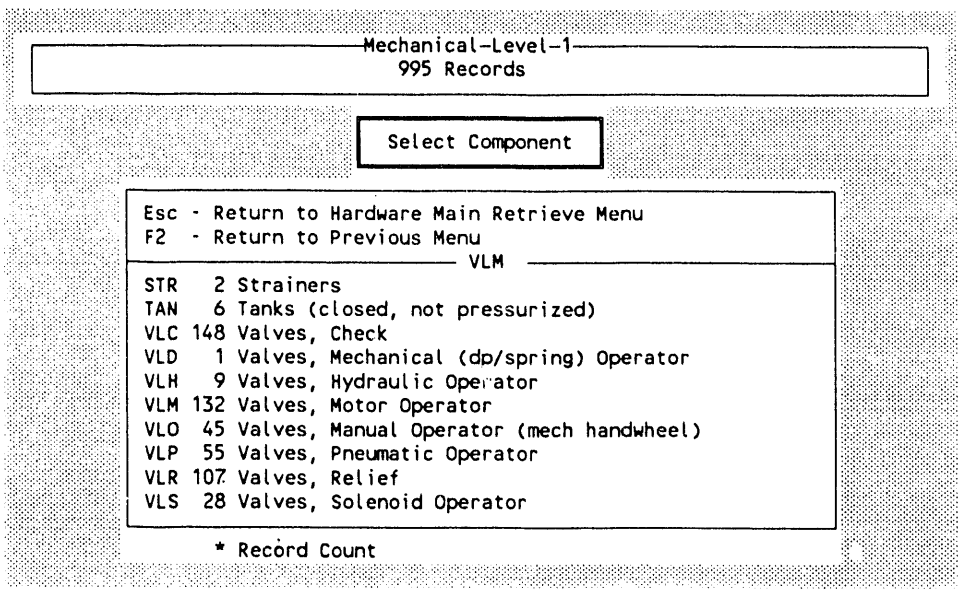

Figure 24. HCFD - Select Component Screen for Mechanical Data

- The number of data records is presented next to the available selections. This convention is used throughout the Hardware Descriptive Search.

- Highlight a component using the arrow keys, then press <ENTER>.
- In some cases there are more items in the list than will fit on one screen. If this is the case, use the arrow keys or <PAGE UP>/<PAGE DOWN> to scan the entire list. If you know the three character component code, type it and the highlighted bar goes to that component. If the code you type has no data, NUCLARR positions the bar on the component code closest to the one you have typed.
- Selection of a component takes you to the Select Design screen.

Select Design

The Select Design screen (Figure 25) allows you to select a design for the previously chosen component.

- You can select all designs by highlighting the first item in the list. Any other choice selects a specific design.
- After you make this selection, NUCLARR displays the Failure Mode/Normal State Selection screen.

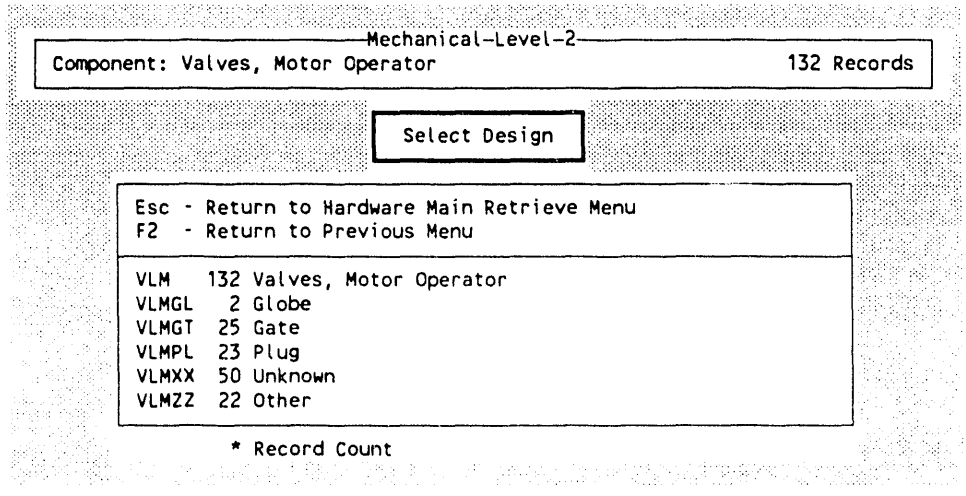

Figure 25. HCFD - Select Design Screen for Motor Operator Valves

Select Failure Mode

At this time, the Select Failure Mode/Normal State screen allows you to select a failure mode.

- You may select "ALL" failure modes or a specific failure mode (see Figure 26).
- After selection of the failure mode, NUCLARR displays a list of normal states on the right side of the screen (Figure 27).

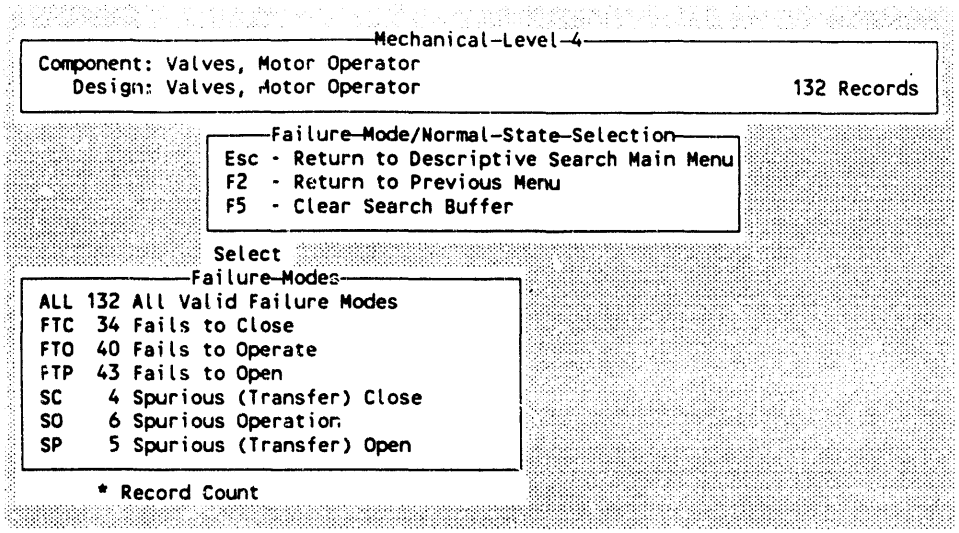

Figure 26. HCFD - Select Failure Modes List

Select Normal State

Select the desired normal state from the screen shown in Figure 27. After you make this selection, NUCLARR locates the data records for subsequent viewing, reporting, plotting, etc. and takes you to the Data Record Summary screen.

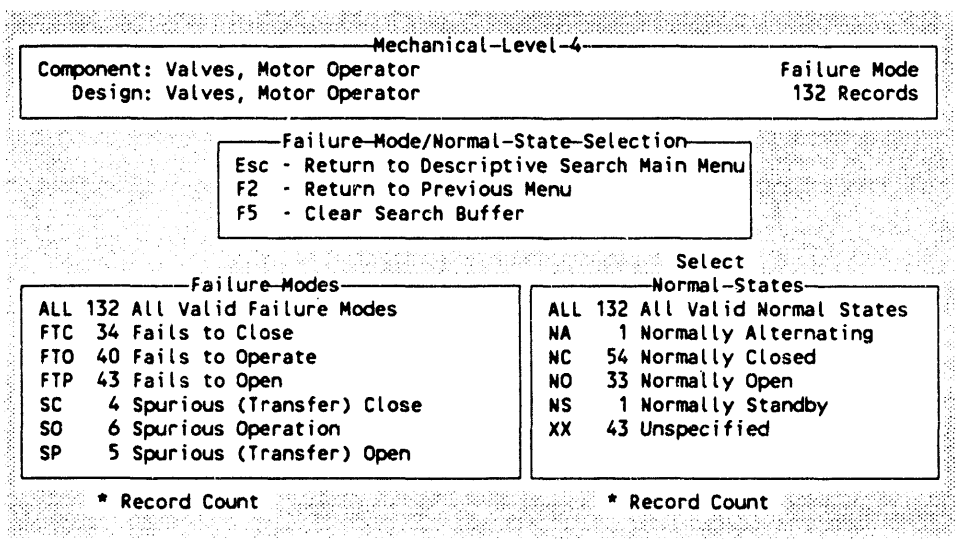

Figure 27. HCFD - Select Normal State List

- Once records are located, returning to any previous selection screen adds to the data set. Press <F5>, for Clear Search Buffer, to clear the current data set and perform a new search.

- Return to the Hardware Main Retrieve Menu to aggregate, plot, and report on the located data.

Data Record Summary

See section on Option 4, View Located Hardware Data Records, for a complete description of this option and how it works. It is included here so you can view the located raw data records and make refinements to the previous search without having to start from the beginning.

- Exiting from this screen returns you to the Failure Mode/Normal State Selection screen. (When exiting from Option 4, you are returned to the Main Retrieve Menu.)

Option 3 - Use Ad Hoc Search to Locate Records

Select Option 3 from the Hardware Main Retrieve Menu to conduct an Ad Hoc Search without going through the multiple screens of the Descriptive Search. This option allows you to use more search criteria. After you select this option, NUCLARR displays the screen shown in Figure 28. Follow the procedures below for doing an Ad Hoc Search.

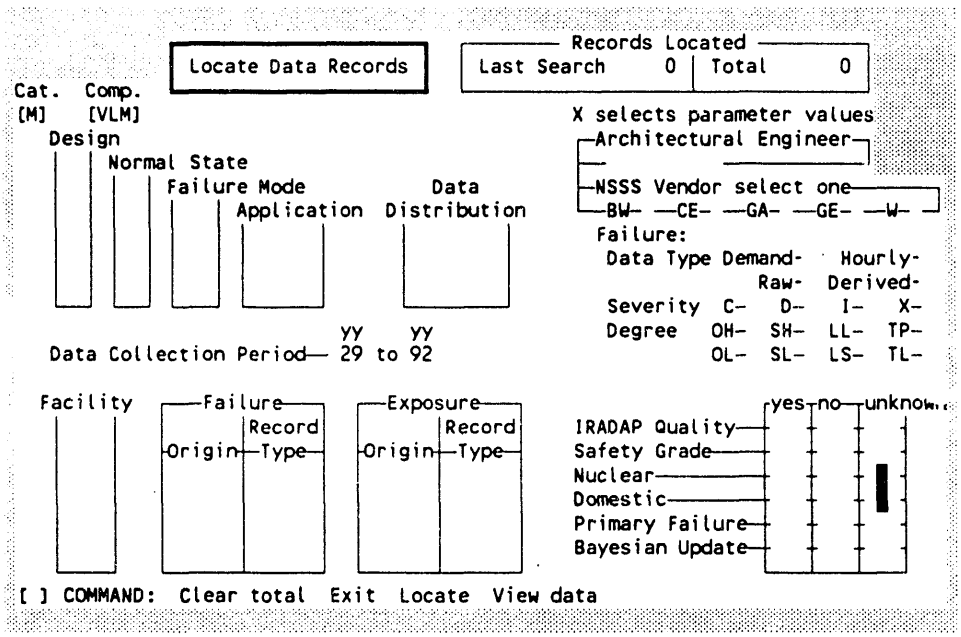

Figure 28. HCFD - Ad Hoc Search Screen

1. Use the arrow keys to move the cursor to the field for Category. Enter <M>, for Mechanical, or <E>, for Electrical, then enter the three character component code in the field for Component. These are the only search fields that are required. If you know the component code, type it in directly. If you do not know the code, refer to Appendix C, Hardware Codes, or press <F1> for the help screen shown in Figure 29.

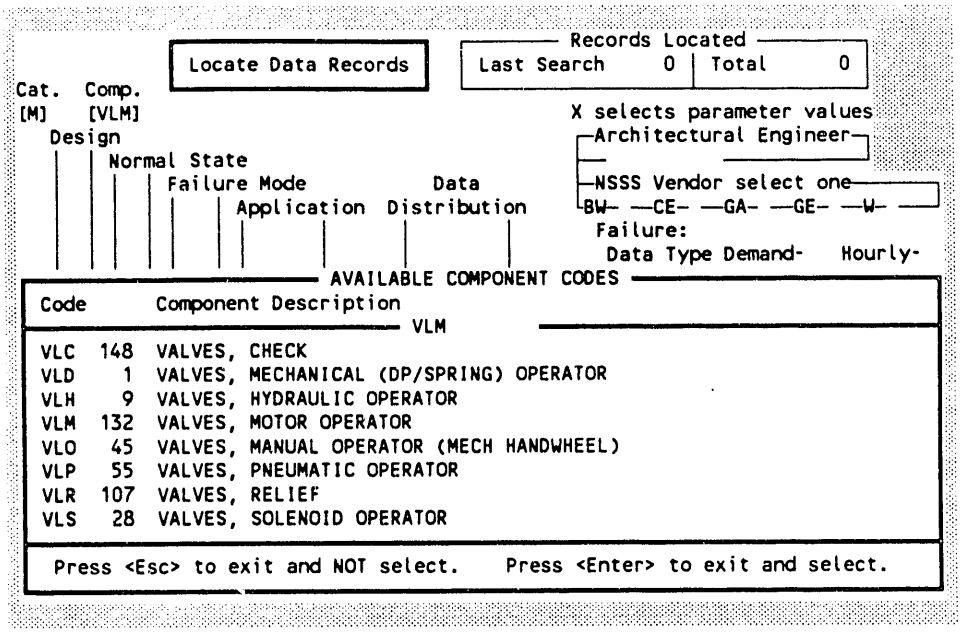

Figure 29. HCFD - Help for Component Selection

2. If you use <F1>, highlight the desired component and press <ENTER> to have the code entered on the Locate Data Records screen. For large lists, use <PgUp>/<PgDn> to locate the component or type up to three characters of the component (i.e., type <VLM> and the highlighted bar moves to the component code "VLM").

3. The <F1> method of entering data can be used for all fields except those on the right side of the screen (NSSS Vendor, Failure Data Type, etc.). For these fields, enter an "X" to make a selection, or, in the case of the Data Collection Period, enter the range of years.

4. When all entries have been made, enter <L>, for Locate, in the COMMAND box, then press <ENTER>. The records conforming to the search criteria are located. You may make additional searches by modifying the entries on the screen, adding to the records already located. However, you may only search on one component at a time.

5. You may <V>iew the located data or <E>xit and select Option 4, View the Located Hardware Data Records, from the Main Retrieve Menu.

6. If you want to perform a different search, type <C>, for Clear, in the COMMAND box and press <ENTER>. This clears the previous data set.

7. Use <E>xit to return to the Hardware Main Retrieve Menu.

Option 4 - View Located Hardware Data Records

Select Option 4 from the Hardware Main Retrieve Menu to view the located data and remove undesired records. If aggregations have been performed, NUCLARR displays the Event Aggregation screen shown in Figure 30; otherwise, the Data

Record Summary screen shown in Figure 31 appears. Aggregated data is separated according to failure mode group.

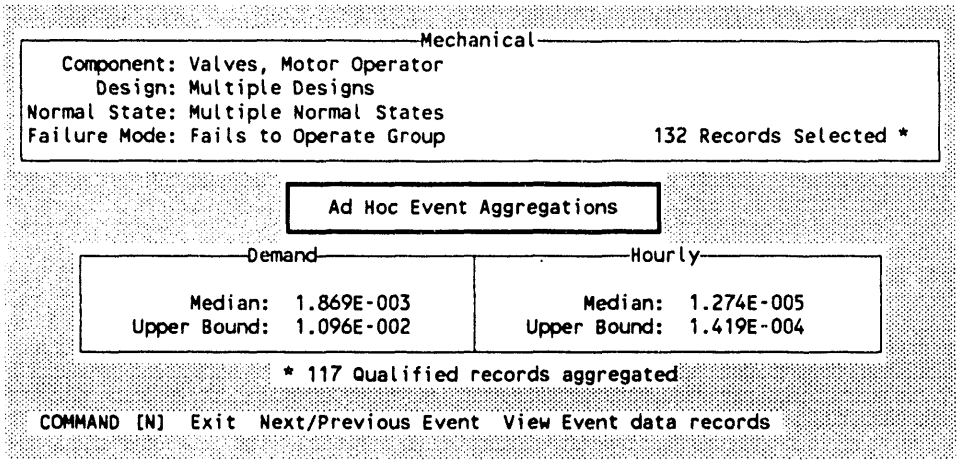

Figure 30. HCFD - Ad Hoc Event Aggregations Screen

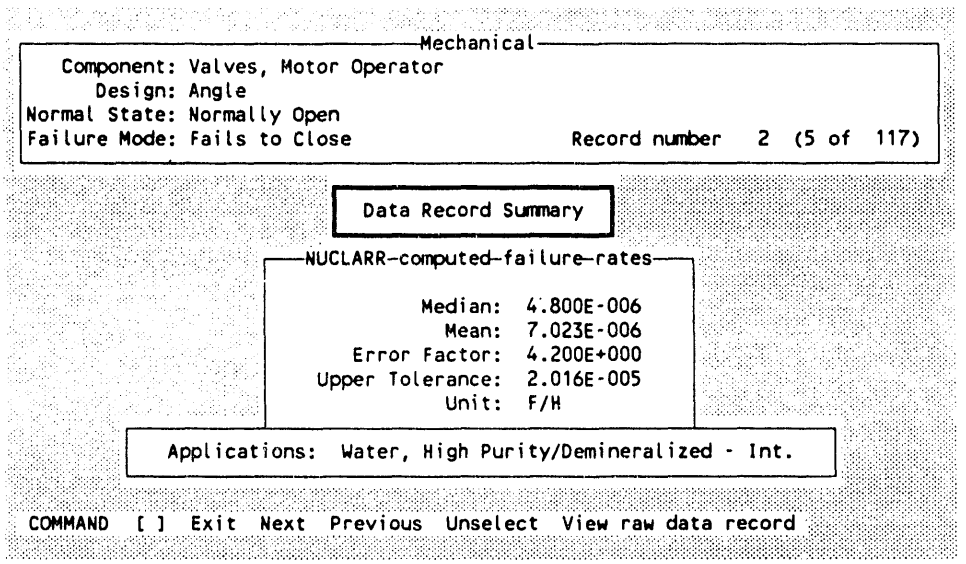

Figure 31. HCFD - Data Record Summary Screen

- The <N>ext/<P>revious event command (Figure 30) allows you to page through the aggregations.
- The <V>iew Event Data Records option takes you to the Data Record Summary screen (Figure 31).
- Use <E>xit to return to the Hardware Main Retrieve Menu.
- The <N>ext and <P>revious options allow you to page through the data records, which are displayed as one data point per page.

- Use <U>nselect to remove a data point from the located data set.
- <V>iew lets you view the raw data record (Figure 32).

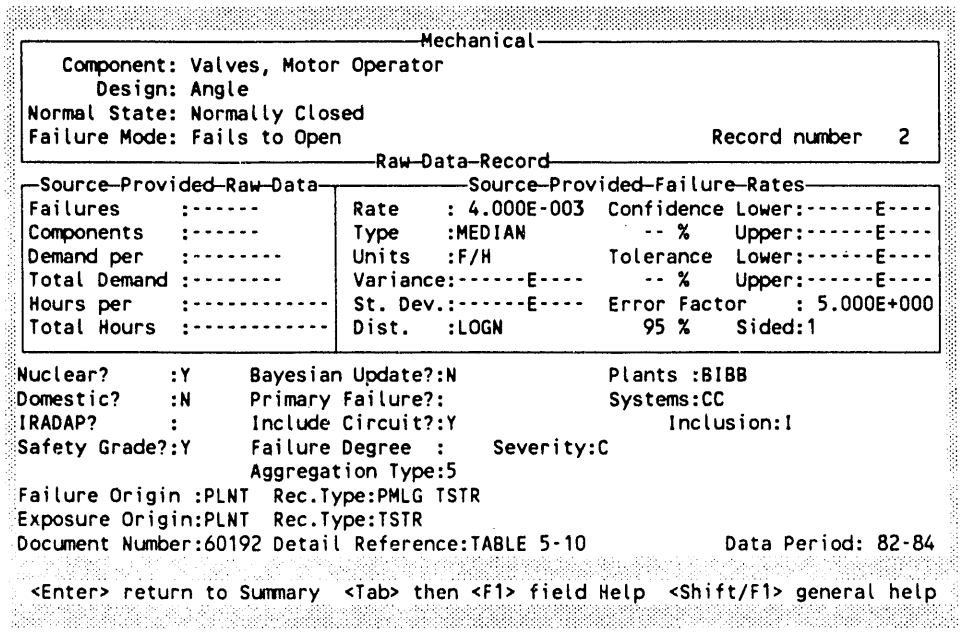

Figure 32. HCFD - Raw Data Record Screen

- <E>xit from the Data Record Summary screen to return to the Ad Hoc Event Aggregations screen.
- To obtain additional information for any field in the data record, use <TAB> to highlight the field of interest, then press <F1>.
- Press <ENTER> to return to the Data Record Summary screen.

Option 5 - Aggregate Probabilities for Located Records

Select Option 5 from the Hardware Main Retrieve Menu to aggregate the located data. NUCLARR displays a message at the bottom of the screen telling you when the aggregations are complete.

Option 6 - Report on Located Data Records

Select Option 6 from the Hardware Main Retrieve Menu to generate a report of the located data records. You may view this report on the screen, send it to the printer, or save it to a file for later viewing. Reports saved to files are generated in the \NUCLARR\REPORTS directory. The report generation screen gives instructions for obtaining these reports.

Option 7 - Plot from Located Data Records

NUCLARR has the capability to produce probability log plots from the located data. Data is sorted in order of increasing probability. Follow the steps below to plot your data.

1. Select Option 7 from the Hardware Main Retrieve Menu to produce the plot selection screen shown in Figure 33.

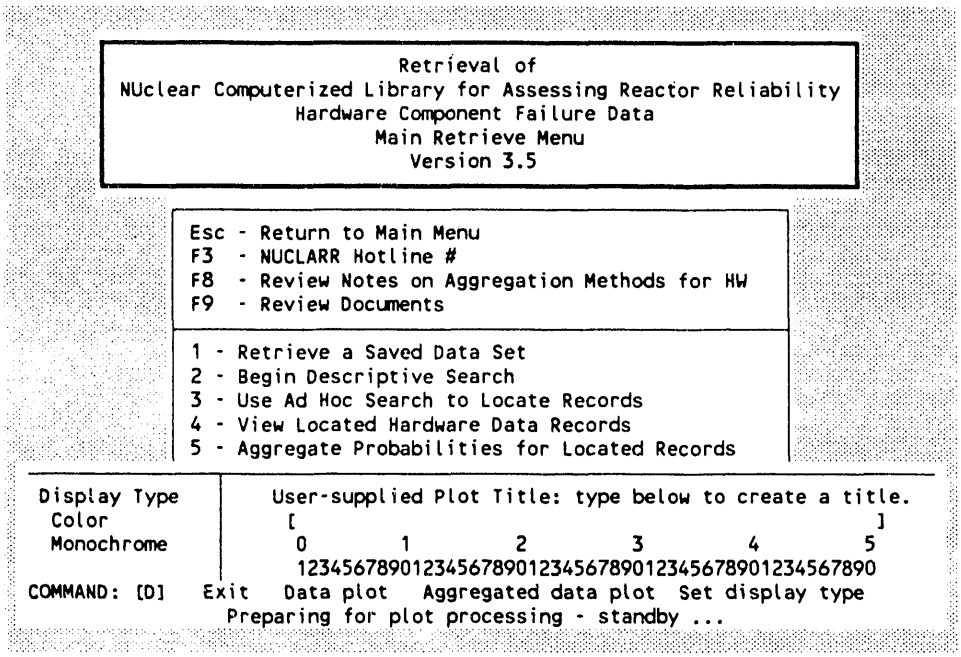

Figure 33. HCFD - Plot Selection Screen

2. Check the display type highlighted. If it is incorrect, type <S> in the COMMAND box, for Set Display Type, then press <ENTER>. Highlight the correct display type then press <ENTER> again.

3. Enter a plot title, if desired. Use <D>ata plot to view a plot with individual failure rates and bounds. Use <A>ggregated data plot to have the aggregated failure rates and bounds added to the data plot. Hourly and demand data are always plotted separately. Aggregated date plots always separate the different failure mode groups. Press <ENTER> to view successive plots. When all plots have been viewed, you are returned to the plot selection screen shown in Figure 33.

4. <E>xit returns you to the Hardware Main Retrieve Menu.

5. While the plot is displayed on the screen, use <R>eport and follow the instructions on the screen to generate an abbreviated report of the plotted Hardware data (see Figure 34). The report is in order of increasing probability and coded according to the search that generated it. This coding provides a cross reference between the plotted data and the data shown in reports.

- The code on the plot report can be used to locate the data in a raw data report or when viewing the data (see Figure 35).

- The codes shown in bold in Figure 34 are also shown decoded on the raw data record in Figure 35.

- "Cat" is the category, mechanical or electrical, shown at the top of Figure 35. "Comp" is the component, "Dsgn" is the design, "Fail" is the failure mode, and "Norm" is the normal state.

- The "ID" is the record number. These codes are shown on both the Descriptive and Ad Hoc Search screens (see Figures 31-33). In addition, all NUCLARR Hardware codes are shown in Appendix C.

No.	Cat	Comp	Dsgn	Fail	Norm	ID	Mean	Med	ErrFact	UpTol	LowTol
1	M	VLM	XX	FTO	XX	92	---E--	2.3E-4	---E--	2.0E-3	---E--
2	M	VLM	ZZ	FTC	NO	7	6.5E-4	4.0E-4	5.0E+0	2.0E-3	---E--
3	M	VLM	XX	FTC	XX	1	5.9E-4	7.0E-4	---E--	2.3E-3	---E--
4	M	VLM	XX	FTO	XX	96	7.0E-4	7.1E-4	---E--	9.4E-4	---E--
5	M	VLM	PL	FTP	NC	6	---E--	9.0E-4	5.0E+0	4.5E-3	---E--

Figure 34. HCFD - Plot Report

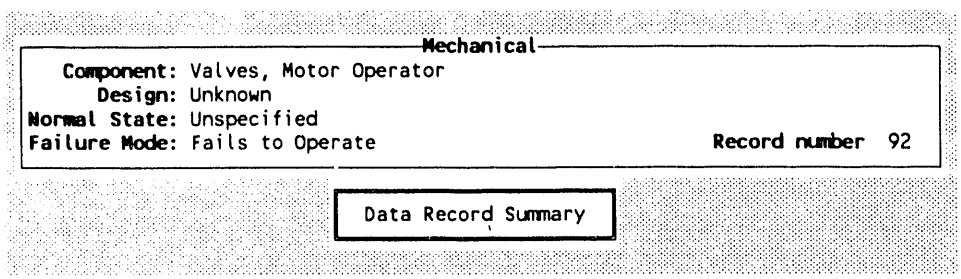

Figure 35. HCFD - Report Code on Buffer Viewing Screen

Option 8 - Create ASCII File for IRRAS/dBASE/SAS/SPSS[4]

NUCLARR has the ability to generate ASCII files compatible with other software packages.

- Select Option 8 from the Hardware Main Retrieve Menu, then select a conversion type (see Figure 36).

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[4] IRRAS (Integrated Reliability and Risk Assessment System) is an NRC-sponsored risk assessment tool available through the Idaho National Engineering Laboratory, Idaho Falls, Idaho. The dBASE software is available from Ashton-Tate, SAS is available through the SAS Institute Inc., and SPSS is available through SPSS, Inc.

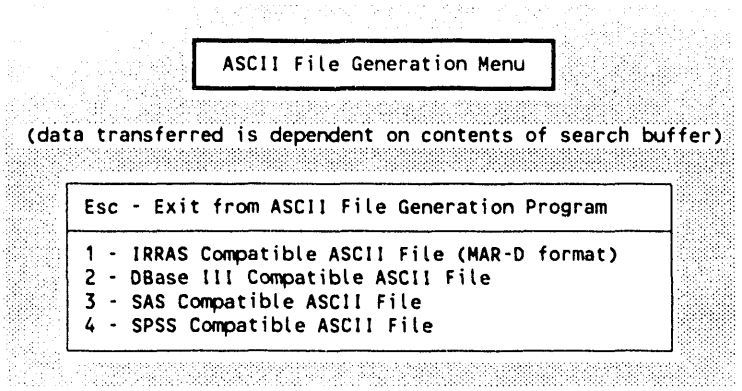

Figure 36. HCFD - ASCII File Generation Menu

IRRAS-Compatible ASCII File (MAR-D format)

This option allows you to generate a file containing NUCLARR aggregated hardware data along with user-input required by IRRAS. For information on how to use this option, see the Section 6, IRRAS-Compatible ASCII File (MAR-D format). Data must be aggregated prior to this selection.

DBASE III, SAS, and SPSS-Compatible ASCII Files

All three of these options function the same way. After selecting an option, you must specify a filename for the output. NUCLARR generates the ASCII file in the \NUCLARR\REPORTS directory. Use <E>xit to return to the ASCII File Generation menu shown in Figure 36.

Option 9 - Save Current Records as a Data Set

Select Option 9 from the Hardware Main Retrieve Menu to save the located data set for a future NUCLARR session. NUCLARR gives your data set a component ID consisting of the three character component code and a consecutive number. It also records the date you located the data set, the number of records in the data set, and whether or not they were aggregated. All you need to supply is a description of the data (see Figure 37).

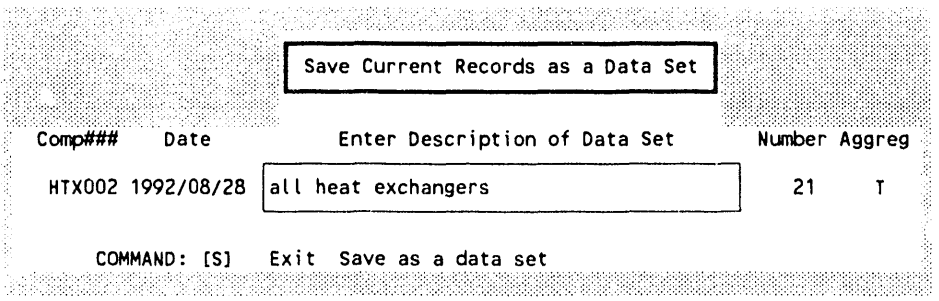

Figure 37. HCFD - Save Current Records as a Data Set Screen

- Position the cursor in the description field and enter a description of the data set.
- Enter <S>, for Save, in the COMMAND box and press <ENTER>.
- Use <E>xit to return to the Hardware Main Retrieve Menu.

6. REBUILDING DATA FILES

If a power outage occurs during NUCLARR use, or if you see the message "Press Control A to Abort or Any Other Key to Continue" during a NUCLARR session, the NUCLARR data could be damaged. Selecting the Rebuild option reconfigures the NUCLARR data files and, if they have not been too badly damaged, restores them to their original state.

- Depending on the speed of your computer, this could take 30 minutes or more.

- After selecting this option and confirming that you would really like to rebuild the data base, do NOT press <ESC>, <CTRL><C>, <CTRL><BREAK>, or any other combination that causes the program to stop. If the program is stopped for any reason during a rebuild of the data files, then another rebuild MUST be done, as the indexes to the data will be wrong.

- If power goes off during a NUCLARR session, or you must do <CTRL><ALT><DEL> to reboot, your next NUCLARR session will have located data records. Clear them and redo your search, as those records could be damaged also. The Rebuild option only rebuilds the original NUCLARR data files.

7. MAR-D FILE GENERATION

The NUCLARR routines for generating a MAR-D format ASCII file for IRRAS are accessed through Option 8 from the HEP or Hardware Main Retrieve Menu. Data must be aggregated prior to performing the MAR-D option. After selection of this option, full documentation is available through help screens.

HEP MAR-D File Generation

This option allows you to generate a file containing NUCLARR aggregated HEP data along with user-input required by IRRAS.

- You must first name the file and family that are to contain the data (see Figure 38). Fill in the fields for filename (an extension of BEI is automatically attached to the filename) and family name. This file will be located in the \NUCLARR\REPORTS directory. (Note: Do NOT use the same name for HEP and hardware files, as the most recently named file will overwrite the previous one.)

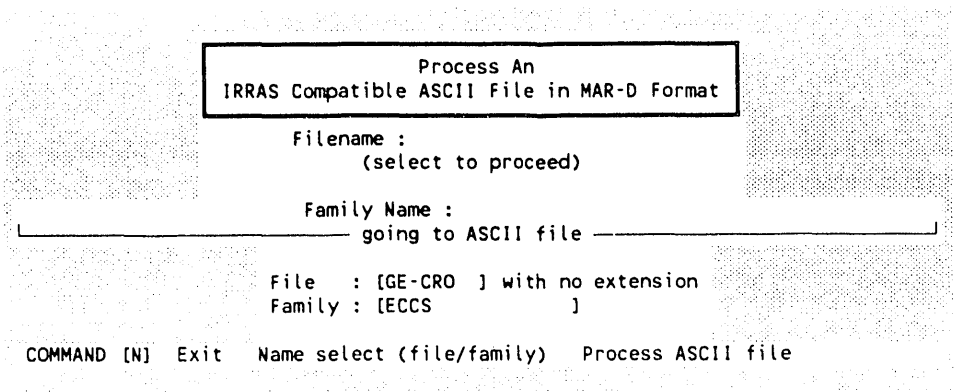

Figure 38. HEP - Select File/Family Screen

- Use <N>ame Select. NUCLARR presents the filename at the top of the screen with the message "to be generated".
- Now <P>rocess the ASCII file and the data screen shown in Figure 39 appears.
- There are optional input fields available for Correlation Class and Initiating Event. Use the arrow keys to access these fields, then enter the desired information. Press <F1> for a full set of help screens explaining the input fields and the options on the COMMAND line.
- To modify the data, use <I>nput and refer to the section on Input Other Data.
- To transfer the data, use <T>ransfer and refer to the section on Transfer Current Data.

- To review the existing file, enter <R>eview and refer to the section on Review Existing File.
- Use <E>xit to return to the Select File/Family screen shown in Figure 38.

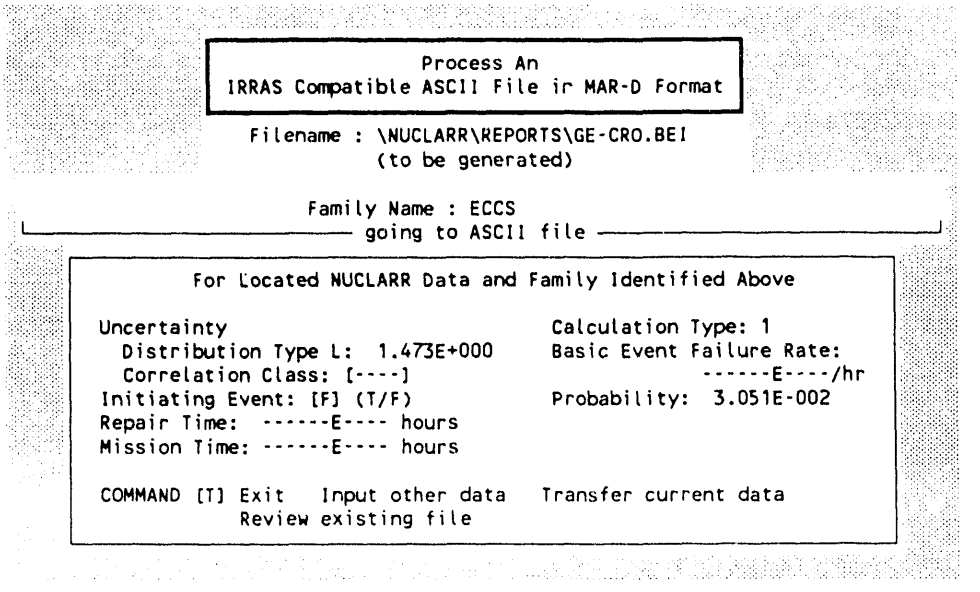

Figure 39. HEP - Located NUCLARR Data Screen

- **Input Other Data**

  You may input data values from a SLIM-MAUD session or any other method. Use <I>nput and select the desired option from the resulting menu (Figure 40).

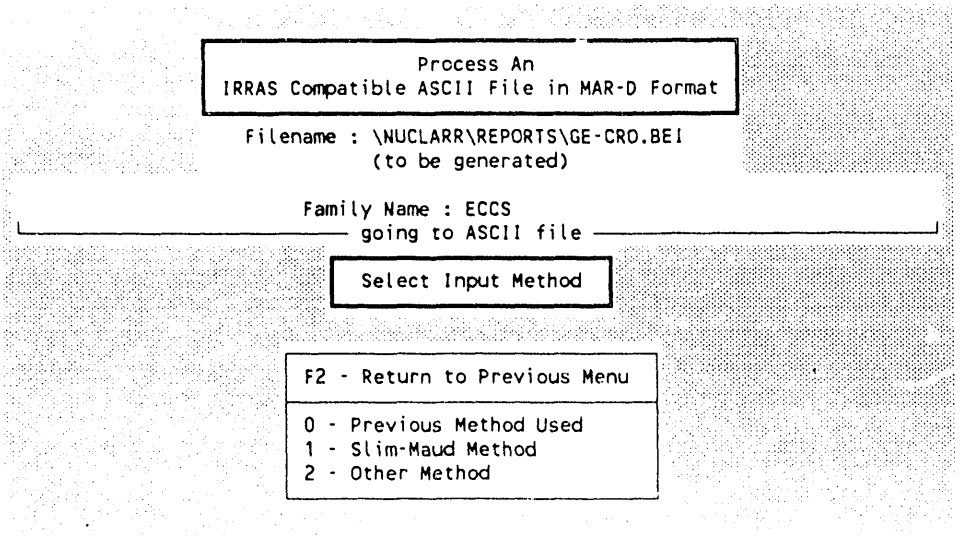

Figure 40. HEP - Select Input Method Screen

- Fill in the fields on the resulting screen, using <F1> for detailed help on required and optional entries.
- When you have finished data entry, <U>pdate the data. NUCLARR displays the message "input has been done". This message continues to appear with this data set. NUCLARR uses the input values when this message is present.
- <E>xit from the input screen to the screen shown in Figure 40, then use <F2> to return to the previous menu (i.e., the Located NUCLARR Data screen).
- From the Located NUCLARR Data screen, use <T>ransfer and refer to the section on Transfer Current Data.

- **Transfer Current Data**

Prior to transferring data, you must create a list of basic event names (see Figure 41). Enter the name of a basic event, then <A>dd from the COMMAND line. Repeat this process for all basic events.

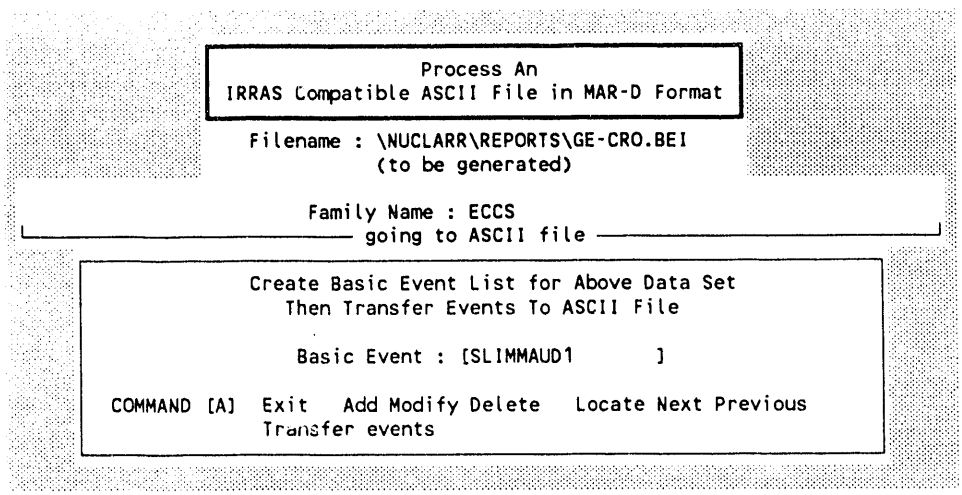

Figure 41. HEP - Create Basic Event List Screen

After creating the list, <T>ransfer the data. The message beneath the filename changes from "to be generated" to "existing file" and the message "already transferred" appears in the Create Basic Event List box. NUCLARR continues to display these messages after you <E>xit back to the Located NUCLARR Data screen (Figure 39) so that the analyst is aware of which operations have been performed on the data.

- **Review Existing File**

This option allows you to page through the data to be transferred (see Figure 42). The records (and record number) are in the order in which they were input.

- Use <L>ocate to get close to the desired record number, then use <N>ext or <P>revious to locate a record precisely.

- Use <R>eport to obtain a report of the data in the file. Do NOT view the MAR-D ASCII file itself using an editor, as this can put special characters in the file which are not recognized by NUCLARR or IRRAS. It should be viewed only through NUCLARR or a NUCLARR-generated report.

- Use <E>xit to return to the Located NUCLARR Data screen.

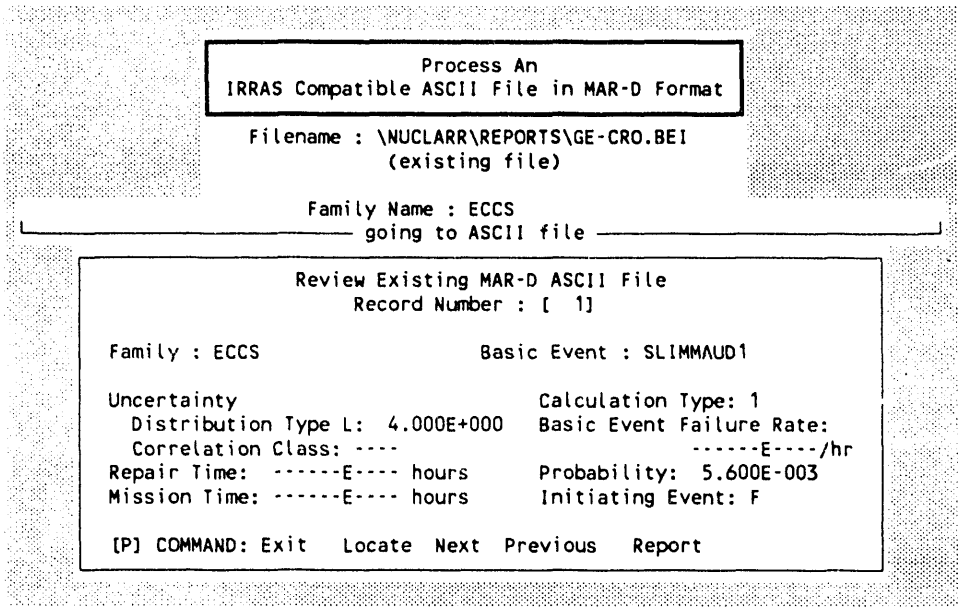

Figure 42. HEP - Review Existing MAR-D ASCII File Screen

Hardware MAR-D File Generation

This option allows you to generate a file containing NUCLARR aggregated HEP data along with user-input required by IRRAS.

- You must first name the file and family that are to contain the data (see Figure 43). Fill in the fields for filename (an extension of BEI is automatically attached to the filename) and family name. This file will be located in the \NUCLARR\REPORTS directory. (Note: Do NOT use the same name for HEP and hardware files, as the most current file will overwrite the previous one.)

- Use <N>ame Select. NUCLARR presents the filename at the top of the screen with the message "to be generated".

- Now <P>rocess the ASCII file. The data screen shown in Figure 44 appears.

- Optional and required input fields are shown on the screen. Use the arrow keys to access these fields, then enter the desired information. Press <F1> for a full set of help screens explaining the input fields and the

options on the COMMAND line. The required fields vary depending on whether the data is hourly or demand. The software prompts you for the needed data if it hasn't been entered.

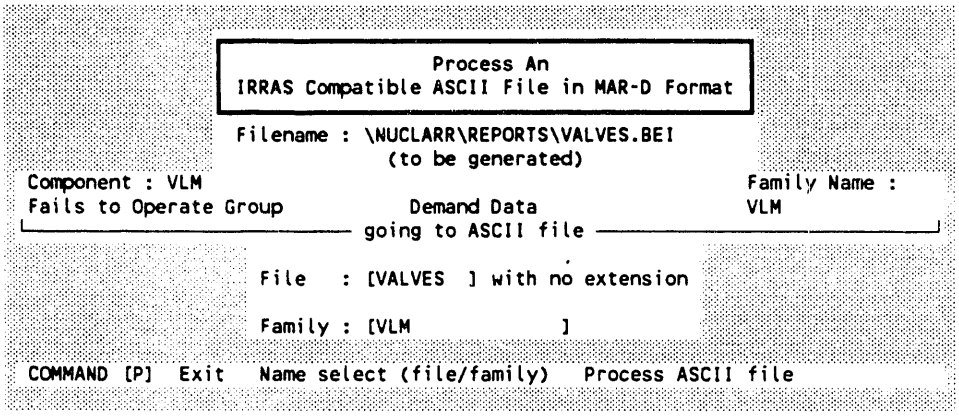

Figure 43. HCFD - Select File/Family Screen

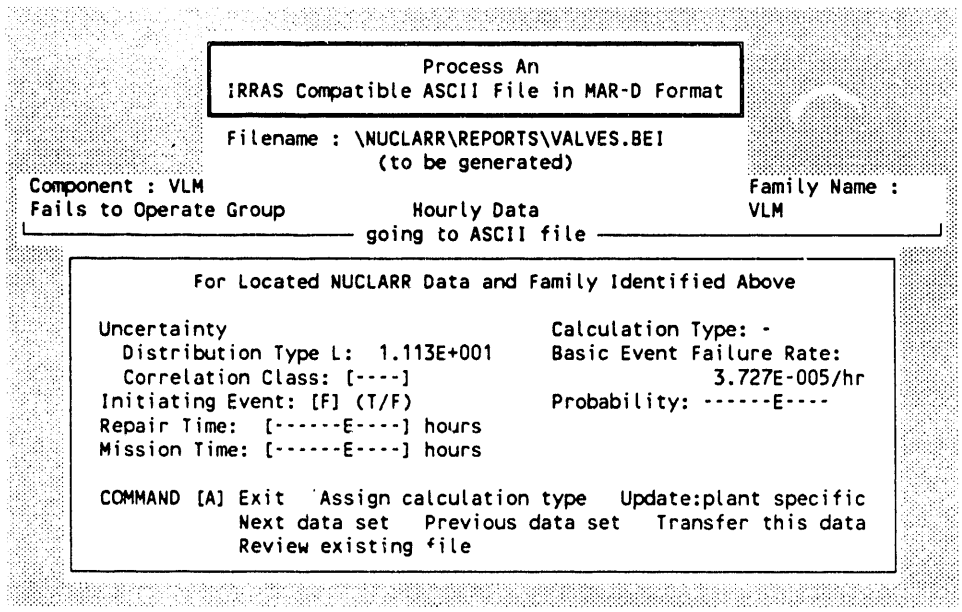

Figure 44. HCFD - Located NUCLARR Data Screen

- To assign a calculation type, use <A>ssign and refer to the section on Assign Calculation Type.
- To perform a plant specific update, use <U>pdate and refer to the section on Update: Plant Specific.
- To work with other data sets, use <N>ext and <P>revious. (The software separates hourly data from demand data. In addition, it does not combine failure mode groups.)

- To transfer the data, use <T>ransfer and refer to the section on Transfer This Data.

- To review the existing file, enter <R>eview and refer to the section on Review Existing File.

- Use <E>xit to return to the Select File/Family screen.

- **Assign Calculation Type**

  This screen is used to set the calculation type. This is done by entering information on the screen (Figure 45). This information is then converted into a calculation type.

  · Enter an "x" into the appropriate field for to designate "rare event" or "full equation", then specify a component description.

  · Select <A>ssign. NUCLARR displays the calculation type at the bottom of the screen and enters it in the appropriate box on the NUCLARR Located Data screen (Figure 44).

  · Use <E>xit to return to the Located NUCLARR Data screen.

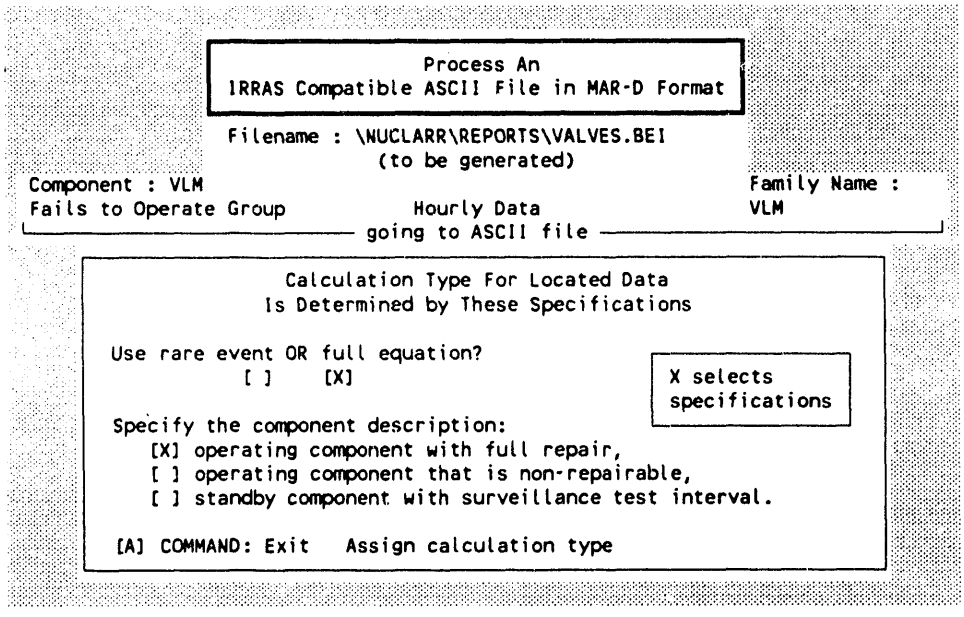

Figure 45. HCFD - Assign Calculation Type Screen

- **Update: Plant Specific**

  You may do a Bayesian update in NUCLARR or enter data from any other source.

  · Use <U>pdate and select the desired option from the resulting menu. Fill in the fields on the screen, using <F1> for detailed help on required and optional entries.

- Now <U>pdate the data. NUCLARR displays the message "update has been done". This message continues to appear with this data set. NUCLARR uses the updated values when this message shows.

- <E>xit to the screen shown in Figure 44. Select <T>ransfer and refer to the section on Transfer This Data.

- **Transfer This Data**

  Prior to transferring data, you must create a list of basic event names (see Figure 46).

  - Enter the name of a basic event, then <A>dd from the COMMAND line. Repeat this process for all basic events.

  - After creating the list, <T>ransfer the data. The message beneath the filename changes from "to be generated" to "existing file" and the message "already transferred" appears in the Create Basic Event List box. NUCLARR continues to display these messages after you <E>xit back to the Located NUCLARR Data screen (Figure 44) so that the analyst is aware of which operations have been performed on the data.

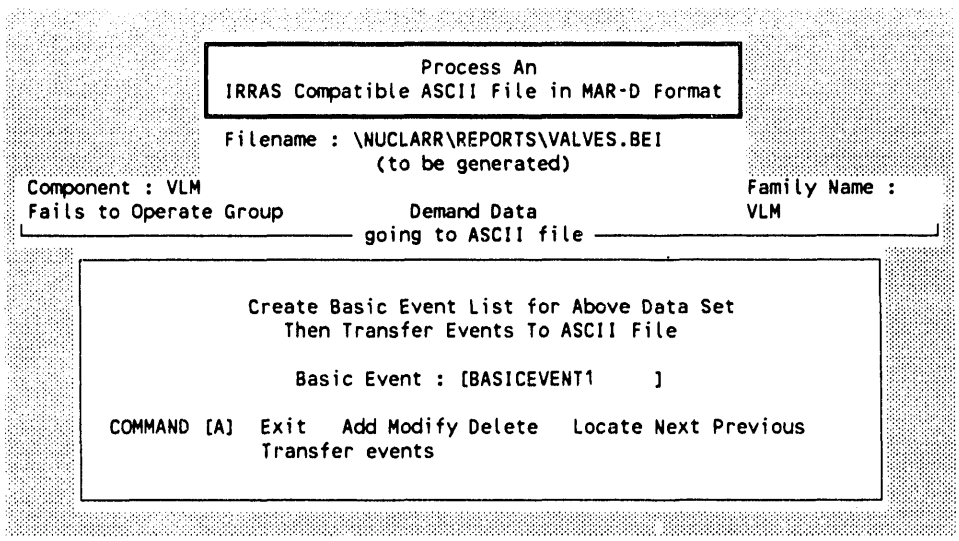

Figure 46. HCFD - Create Basic Event List Screen

- **Review Existing File**

  This option allows you to page through the data to be transferred (see Figure 47). The records (and record number) are in input order.

  - Use <L>ocate to get close to the desired record number, then use <N>ext or <P>revious to locate a record precisely.

  - Use <R>eport to obtain a report of the data in the file. Do NOT view the MAR-D ASCII file itself using an editor, as this can put special characters in the file which are not recognized by NUCLARR or IRRAS. It

should be viewed only through NUCLARR or a NUCLARR-generated report. Viewing it with an editor can damage it for transporting to IRRAS.

- Use <E>xit to return to the Located NUCLARR Data screen.

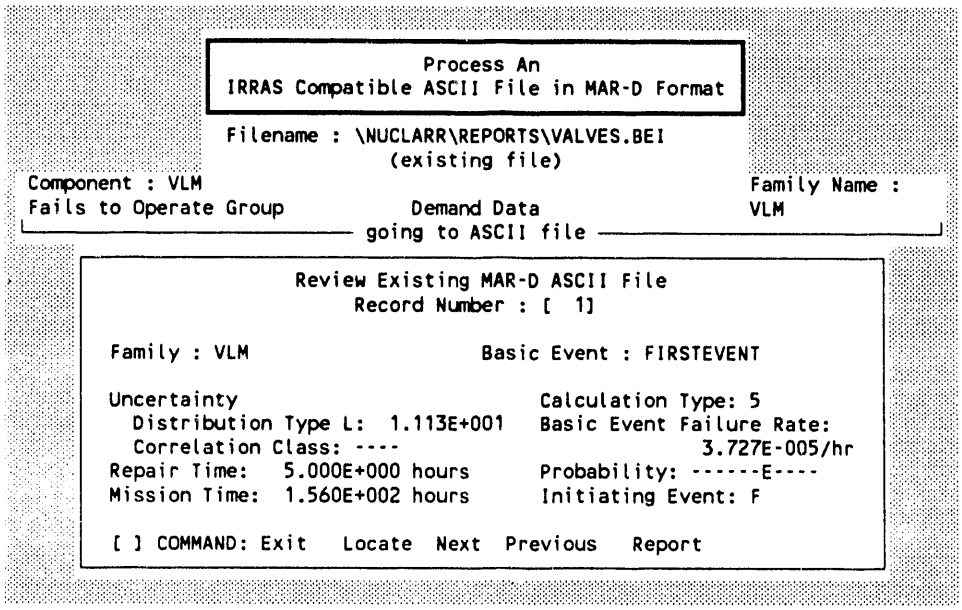

Figure 47. HCFD - Review Existing MAR-D ASCII File Screen

APPENDIX A - EXAMPLES

EXAMPLES

Two examples are presented here for you to follow. Both use the Descriptive Search method for locating data and include the plot option. Example 1 retrieves HEP data at the systems level. Example 2 retrieves Hardware data for gate valves.

Example 1: Retrieve HEP Data

You have been asked to obtain information on the control room operator operating the low pressure core spray system in a General Electric plant. You are a new user of the NUCLARR system. The first thing you must do is start the NUCLARR program.

- Type CD\NUCLARR, then press <ENTER>.
- Type NUCLARR, then press <ENTER>.

Since you want to obtain HEP data, press <1> to select the Human Reliability Data option.

The Descriptive Search is easiest for a novice user of NUCLARR, as it guides you through a search. Press <2> to begin the Descriptive Search.

You must now tell NUCLARR the level of detail you want in your search (i.e., a General Electric plant and systems).

- Press <1> to select Plant Systems.
- Press <1> to select Control Room Operator.
- Press <1> again to select General Electric plants.

You are now ready to tell NUCLARR what to search for.

- Use the down arrow key to locate and highlight ALL EMERGENCY CORE COOLING SYSTEMS, then press <ENTER>.
- Now use the down arrow key to highlight Low Pressure Core Spray System, then press <ENTER>.
- Highlight OPERATES, then press <ENTER>.

You have now retrieved the records of interest. They are in computer memory and ready to be viewed.

- Press <1> to view raw data for the first data record in the set.
- Use <N>ext and <P>revious to view additional records.
- Use <U>nselect to delete individual data records from your data set.

- Use <TAB> or the arrow keys to highlight any of the information fields on the screen, then press <F1> to get information about the highlighted field.

- To exit the viewing screen, press <HOME>, type <E> in the COMMAND box, then press <ENTER>.

After viewing the data records, you are satisfied with your search. You may now return to the HEP Main Retrieve Menu to perform additional operations on your data.

- Press <ESC> to return to the HEP Main Retrieve Menu.

You now want to aggregate the located data.

- Press <5> to have NUCLARR aggregate your data. You may enter an optional description of the data. Press <ENTER>.

- The aggregated data values are now displayed. To exit, enter <E> in the COMMAND Box, then press <ENTER>.

Now that you have aggregated your data, you would like to see it plotted.

- Press <7> to plot the located failure probabilities.

- If you have a color monitor, accept the default of "color" for Display Type. If you have a monochrome monitor, type <S> in the COMMAND box to set the display type, then press <ENTER>. Use the down arrow to highlight "monochrome", then press <ENTER>.

- Press <TAB> and type a title for your data plot (e.g., "CRO operates Low Pressure Core Spray System).

- Press <TAB> and type <A> to view a plot of aggregated data, then press <ENTER>.

- Your plot presents the located data.[5]

- Follow the instructions on the screens to return to the HEP Main Retrieve Menu.

Example 2: Retrieve Hardware Component Failure Data

You have been asked to obtain failure rates for motor-operator gate valves that fail to close. You are a new user of the NUCLARR system. The first thing you must do is start the NUCLARR program.

- Type CD\NUCLARR, then press <ENTER>.

---

[5] In cases where you have more than 75 data points, NUCLARR will automatically generate multiple log plot screens for you. You access them by simply pressing <ENTER>.

- Type NUCLARR, then press <ENTER>.

Since you want to obtain hardware data, press <2> to select the Hardware Failure Data option.

The Descriptive Search is easiest for a novice user of NUCLARR, as it guides you through a search. Press <2> to begin the Descriptive Search.

You must now tell NUCLARR what to search on.

- Highlight "mechanical" to start searching through the mechanical data, then press <ENTER>.
- Use the down arrow key to locate and highlight VLM (valves, motor operator), then press <ENTER>.
- Use the down arrow key to highlight VLMGT (gate valves), then press <ENTER>.
- Use the down arrow key to highlight FTC (fail to close), then press <ENTER>.
- Highlight ALL (all valid normal states), then press <ENTER>.

You have now retrieved the records of interest. They are in computer memory and ready to be viewed.

- Use <N>ext and <P>revious to view failure rates for additional records.
- Use <U>nselect to delete individual data records from your data set.
- Use <V>iew to view raw data.
- Use <TAB> or the arrow keys to highlight any of the information fields on the screen, then press <F1> to get information about the highlighted field.
- Press <ENTER> to return to the Data Record Summary screen.

After viewing the data records, you are satisfied with your search. You may now return to the Hardware Main Retrieve Menu to perform additional operations on your data.

- Type <E>, for Exit, in the COMMAND box and press <ENTER>.
- Press <ESC> to return to the Hardware Main Retrieve Menu.

You now want to aggregate the located data. Press <5> and NUCLARR will preform an aggregation of your data.

Now that you have aggregated your data, you would like to see it plotted.

- Press <7> to plot the located failure probabilities.
- If you have a color monitor, accept the default of "color" for Display

monitor. (If you have a monochrome monitor, type <S> in the COMMAND box to set the display type, then press <ENTER>. Use the down arrow to highlight "monochrome", then press <ENTER>.)

- Use <TAB> and type a title for your data plot (e.g., Motor-Operator Gate Valves).
- Press <TAB> and type <A> to view a plot of aggregated data, then press <ENTER>.
- Your first plot presents demand data. Press <ENTER> to view the next plot (hourly failure rate data).[6]
- Follow the instructions on the screens to return to the Hardware Main Retrieve Menu.

---

[6] In cases where you have more than 75 data points, NUCLARR will automatically generate multiple log plot screens for you. You access them by simply pressing <ENTER>.

APPENDIX B - HEP CODES

CONTENTS

1. DOCUMENTS

Each individual data record in NUCLARR includes source document information. The document identification number is coded as XX-YR, where XX is a unique identification number and YR is the last two digits of the calendar year in which the data were collected or published.

Document ID	Document
1-62.	Munger, S.J., Smith, R.W., Payne, D. An Index of Electronic Equipment Operability: Data Store. January 1962, AIR-C43-1/62-RP(1).
1-64.	Irwin, I., Levitz, J., Freed, A. Human Reliability in the Performance of Maintenance. May 1964, LRP 317/TDR-63-218.
1-67.	Meister, D. in Hornyak, S.J. Effectiveness of Display Subsystems Measurement and Predictive Techniques. September 1967, RADC Report TR-67-292.
1-75.	U.S. Nuclear Regulatory Commission Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants (WASH 1400). October 1975, NUREG-75/014.
1-81.	Carlson, D.D., et al. Reactor Safety Study Methodology Applications Program: Sequoyah #1 PWR Power Plant. February 1981, NUREG/CR-1659.
1-82.	Topmiller, D.A., Eckel, Kozinsky Human Reliability Data Bank for Nuclear Power Plant Operations Volume 1: A Review of Existing Human Reliability Data Banks. December 1982, NUREG/CR-2744.
1-83.	Swain, A.D. & Guttman, H. E. Handbook of Human Reliability Analysis with Emphasis on Nuclear Power Plant Applications. August 1983, NUREG/CR-1278.
1-84.	Beare, A.N., Dorris, R.E., et al. A Simulator Based Study of Human Errors in Nuclear Power Plant Control Room Tasks. January 1984, NUREG/CR-3309.
2-84.	Comer, Seaver, Stillwell, Gaddy Calculating Human Reliability Estimates Using Expert Judgement: Volume 2. November 1984, NUREG/CR-3688.
3-84.	Sugnet, W.R., Boyd, G.J., Lewis, S.R. Oconee PRA: Volume 1. June 1984, NSAC-60.

Document ID	Document
4-84.	Payne, A.C., et al. Interim Reliability Evaluation Program: Analysis of the Calvert Cliffs Unit 1 Nuclear Power Plant (Main Report & Appendices A, B, & C). August 1984, NUREG/CR-3511, 1 & 2.
5-84.	Siegel, A.I., et al. Maintenance Personnel Performance Simulation Model (MAPPS): Summary Description. May 1984, NUREG/CR-3626.
1-85	Luckas, O'Brien, Perline, Spettel Operator Actions in Anticipated Transient Without Scram (ATWS-TC) Sequence for Peach Bottom Plant. October 1985, unpublished report.
2-85.	O'Brien, J.N., & Spettell, C.M. Uses of Human Reliability Analysis Probabilistic Risk Assessment Results to Resolve Personnel Performance Issues That Could Affect Safety. October 1985, NUREG/CR-4103.
3-85.	Kopstein, F.F. & Wolf, J.J. Maintenance Personnel Performance Simulation (MAPPS) Model: User's Manual. September 1985, NUREG/CR-3634.
1-86.	Spettel, D.E., et al. Application of SLIM-MAUD: A Test of An Interactive Computer-Based Method for Organizing Expert Assessment of Human Performance & Reliability. October 1986, NUREG/CR-4016, Volume II.
2-86.	Bertucio, Quilici, Young Analysis of Core Damage Frequency From Internal Events: Surry Unit 1. November 1986, NUREG/CR-4550, Volume III.
3-86.	Kolaczkowski, et al. Analysis of Core Damage Frequency From Internal Events: Peach Bottom, Unit 2. October 1986, NUREG/CR-4550, Vol. IV.
1-87.	Drouin,M.T., .et al. Analysis of Core Damage Frequency From Internal Events: Grand Gulf, Unit 1. April 1987, NUREG/CR-4550, Vol. VI.
2-87.	Bertucio, R.C., et al. Analysis of Core Damage Frequency From Internal Events: Sequoyah, Unit 1. February 1987, NUREG/CR-4550, Vol. V.
3-87.	Diesel Generator Study, 1987, NUREG-1032
4-87.	Swain, A. D. Accident Sequence Evaluation Program Human Reliability Analysis Procedure. February 1987, NUREG/CR-4772.

Document ID	Document
5-87.	Weston, Whitehead, & Graves Recovery Actions in PRA for the Risk Methods Integration & Evaluation Program (RMIEP), Volumes 1 and 2. June 1987, NUREG/CR-4834.
1-88.	Gertman, D., et al. Steam Generator Tube Rupture, Task 35 MAPPS Computer Run. July 1988.
2-88.	Haney, L., et al. SLIM-MAUD simulation, 6 groups of data. July 1988.
3-88.	Gertman, D., et al. Test Steam Line Isolation, Task 2 MAPPS Computer Run. July 1988.
5-88.	Bertucio, R., and Julius, J. Analysis of Core Damage Frequency From Internal Events: Surry Unit 1. September 1988, NUREG 4550, REV.1, Vol III.
2-90.	Gertman, D.I., et al. INTENT: A Method for Estimating Human Error Probabilities for Errors of Intention (Revision 1). November 1990, EGG-SRE-9178.
3-90.	NUS Corporation Operator Reliability Experiments Using Power Plant Simulators. Volumes 1, 2. July 1990, EPRI-NP-6937.
1-91.	Reece, W., et al., 3/91 HHRAG Nuclear Plant Reliability Data System Search of B&W Plant Circuit Breaker System Data. November 1991, NPRDS Search.
2-91.	NUS Corporation Probabilistic Risk Assessment for the Individual Plant Examination Final Report: Surry Units 1 & 2. September 1991, Surry IPE.
1-92.	Galyean, W., et al. Assessment of ISLOCA Risks - Methodology & Application: Babcock and Wilcox Nuclear Power Station. February 1992, NUREG/CR-5604.
2-92.	Kelly, D., Auflick, J., Haney, L. Assessment of ISLOCA Risks - Methodology & Application: Babcock and Combustion Engineering Plant. February 1992, NUREG/CR-5745.
3-92.	Kelly,D., Auflick, J., Haney, L. Assessment of ISLOCA Risks - Methodology & Application: Westinghouse Four-Loop Ice Condenser Plant. February 1992, NUREG/CR-5744.

2. EQUIPMENT/HUMAN ACTION COMBINATIONS

The equipment and human action combinations available in NUCLARR are shown in the following pages in a series of sixteen charts. Actions on a specific piece of equipment can be divided into the following three major categories:

1 - system level, which is dependent on vendor and job title

2 - component level, which is dependent only on job title

3 - instrument/display level, which is not dependent on vendor or job title

The top section of the box located in the upper left corner at the beginning of each chart shows the following information:

- system, component, or instrument level of equipment
- vendor (GE, Westinghouse, CE, B&W) if the chart is for systems
- job title (CRO, EO, MT) if the chart is for systems or components

The equipment available is shown by the rows at the left of each chart. Available actions are shown in columns at the top. At the intersection of each row and column (i.e., an action for a piece of equipment), one of the following will be shown:

- a number indicating the number of data points currently in NUCLARR for the stated combination
- a symbol (▉) indicating that the stated combination is not valid
- a symbol (*) indicating that there are more than 99 data points available for the stated combination
- a double dash (--) indicating that there is no data for the stated combination

Systems

General Electric

CRO

KEY
■ = Invalid Combination
* = Valid Cell > 99 Data Points
- = Valid Cell, Currently Empty

ID	Equipment Description	TESTS 001	OPERATES 002	MONITORS 003	DIAGNOSES 004
000	SUMMARY OF AIR SYSTEMS	--	1	1	1
002	Instrument Air System	--	1	1	1
020	SUMMARY OF COMMUNICATION SYSTEMS	--	1	--	--
021	Communication Systems	--	1	--	--
040	SUMMARY OF CONDENSATE SYSTEMS	--	1	--	--
041	Condensate Systems	--	1	--	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	31	1	1
051	Containment Systems	--	19	--	1
054	Containment Penetration/Isolation System	--	2	--	--
055	Containment Spray (RHR) System	--	1	--	--
056	Standby Gas Treatment System	--	--	1	--
057	Suppression Pool Support System	--	10	--	--
070	SUMMARY OF CONTROL ROD DRIVE SYSTEMS	--	10	--	1
071	Control Rod Drive Systems	--	10	--	1
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	21	--	--
081	Electrical Distribution Systems	--	19	--	--
084	Plant AC Distribution System	--	2	--	--

ID	Equipment Description	0 0 0 0 0 1 2 3
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	-- 23 2 2
095	Emergency Core Cooling Systems	-- 15 -- 2
096	High Pressure Coolant Injection System	-- 1 1 --
097	High Pressure Core Spray System	-- 1 -- --
098	Low Pressure Core Spray System	-- 4 1 --
099	Residual Heat Removal/Low Press Coolant Inject Syst	-- 2 -- --
130	SUMMARY OF GENERATOR SYSTEMS	-- 3 -- --
133	Generator H2 Cooling/CO2 Purge System	-- 3 -- --
140	SUMMARY OF HEATING, VENTILATION & AIR COND SYST	-- 2 -- --
141	Heating, Ventilation & Air Conditioning Systems	-- 2 -- --
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	-- 9 -- --
161	Reactor Protection System	-- 1 -- --
169	Neutron Monitoring System	-- 1 -- --
179	Automatic Depressurization System	-- 3 -- --
182	Feedwater Control System	-- 4 -- --
230	SUMMARY OF WATER SYSTEMS	-- 6 -- 2
231	Water Systems	-- 5 -- --
232	Circulating Water System	-- -- -- 2
241	Station Service Water System	-- 1 -- --
250	SUMMARY OF REACTOR COOLANT SYSTEM/CONNECTED SYSTEM	-- 22 -- --
251	Reactor Coolant Systems and Connected Systems	-- 1 -- --
254	Reactor Core Isolation Cooling System	-- 19 -- --
257	Standby Liquid Control System	-- 2 -- --

ID	Equipment Description	0 0 0 0 0 1 2 3
260	SUMMARY OF STANDBY DIESEL GENERATOR SYSTEMS	-- 8 -- --
261	Standby Diesel Generator Systems	-- 8 -- --
270	SUMMARY OF STEAM SYSTEMS	-- 4 -- --
273	Main Steam System	-- 4 -- --

Systems

General Electric

EO

KEY
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ID	Equipment Description	10 TESTS	11 OPERATES	12 DIAGNOSES	13 MAINTAINS	14 INSPECTS
000	SUMMARY OF AIR SYSTEMS	--	1	--	--	--
002	Instrument Air System	--	1	--	--	--
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1	--
041	Condensate Systems	--	--	--	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	32	--	2	--
051	Containment Systems	--	24	--	1	--
054	Containment Penetration/Isolation System	--	--	--	1	--
055	Containment Spray (RHR) System	--	--	--	1	--
057	Suppression Pool Support System	--	8	--	--	--
070	SUMMARY OF CONTROL ROD DRIVE SYSTEMS	--	8	--	--	--
071	Control Rod Drive Systems	--	8	--	--	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	30	--	12	1
081	Electrical Distribution Systems	--	21	--	5	--
083	DC Power System	--	6	--	4	1
084	Plant AC Distribution System	--	4	--	5	1
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	25	--	2	--
095	Emergency Core Cooling Systems	--	13	--	2	--

ID	Equipment Description	10	11	12	13	14
096	High Pressure Coolant Injection System	--	1	--	2	--
097	High Pressure Core Spray System	--	1	--	2	--
098	Low Pressure Core Spray System	--	5	--	2	--
099	Residual Heat Removal/Low Press Coolant Inject Syst	--	5	--	2	--
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	--	1	--	1	--
179	Automatic Depressurization System	--	--	--	1	--
181	Containment Atmosphere Monitoring System	--	--	--	1	--
182	Feedwater Control System	--	1	--	--	--
250	SUMMARY OF REACTOR COOLANT SYSTEM/CONNECTED SYSTEM	--	13	--	1	--
252	Feedwater System	--	--	--	1	--
254	Reactor Core Isolation Cooling System	--	13	--	1	--
260	SUMMARY OF STANDBY DIESEL GENERATOR SYSTEMS	--	7	--	--	--
261	Standby Diesel Generator Systems	--	7	--	--	--
270	SUMMARY OF STEAM SYSTEMS	--	4	--	5	--
273	Main Steam System	--	4	--	5	--
310	SUMMARY OF PROCESS SAMPLING SYSTEMS	--	--	--	--	1
311	Process Sampling Systems	--	--	--	--	1

Systems

General Electric

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■ = Invalid Combination
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ID	Equipment Description	TESTS	CHECKS	DIAGNOSES	MAINTAINS
		2020	2021	2022	2023
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1
041	Condensate Systems	--	--	--	1
050	SUMMARY OF CONTAINMENT SYSTEMS	1	--	--	2
051	Containment Systems	--	--	--	1
054	Containment Penetration/Isolation System	--	--	--	1
055	Containment Spray (RHR) System	--	--	--	1
057	Suppression Pool Support System	1	--	--	--
070	SUMMARY OF CONTROL ROD DRIVE SYSTEMS	1	--	--	--
071	Control Rod Drive Systems	1	--	--	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	4	--	--	4
083	DC Power System	4	--	--	4
084	Plant AC Distribution System	4	--	--	4
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	--	--	6
095	Emergency Core Cooling Systems	--	--	--	2
096	High Pressure Coolant Injection System	--	--	--	2
097	High Pressure Core Spray System	--	--	--	4
098	Low Pressure Core Spray System	--	--	--	3

ID	Equipment Description	2 0	2 1	2 2	2 3
099	Residual Heat Removal/Low Press Coolant Inject Syst	--	--	--	2
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	1	--	--	2
151	Instrumentation and Control Systems	1	--	--	1
179	Automatic Depressurization System	--	--	--	1
181	Containment Atmosphere Monitoring System	--	--	--	1
230	SUMMARY OF WATER SYSTEMS	--	--	--	1
241	Station Service Water System	--	--	--	1
250	SUMMARY OF REACTOR COOLANT SYSTEM/CONNECTED SYSTEM	3	--	--	1
252	Feedwater System	--	--	--	1
254	Reactor Core Isolation Cooling System	--	--	--	1
257	Standby Liquid Control System	3	--	--	--

Systems

Westinghouse

CRO

KEY
■ = Invalid Combination
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ID	Equipment Description	TESTS 001	OPERATES 002	MONITORS 003	DIAGNOSES 004
000	SUMMARY OF AIR SYSTEMS	--	3	1	1
001	Air Systems	--	1	--	--
002	Instrument Air System	--	2	1	1
020	SUMMARY OF COMMUNICATION SYSTEMS	--	1	--	--
021	Communication Systems	--	1	--	--
040	SUMMARY OF CONDENSATE SYSTEMS	--	5	1	--
041	Condensate Systems	--	5	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	1	9	1	1
051	Containment Systems	--	2	--	1
063	Containment Isolation System	--	2	--	--
064	Containment Spray System	1	6	1	--
070	SUMMARY OF CONTROL ROD DRIVE SYSTEMS	--	1	--	1
071	Control Rod Drive Systems	--	1	--	1
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	2	2	--
081	Electrical Distribution Systems	--	1	2	--
084	Plant AC Distribution System	--	1	--	--
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	2	39	2	5
091	Emergency Core Cooling Systems	2	13	2	3

ID	Equipment Description	0 0 0 0 0 1 2 3
092	High Pressure Safety Injection System	-- 22 -- --
093	Residual Heat Removal/Low Press Safety Inject Syst	-- 4 -- 2
110	SUMMARY OF FEEDWATER SYSTEMS	-- 18 2 2
111	Feedwater Systems	-- 6 1 1
112	Auxiliary Feedwater System	-- 10 1 1
113	Main Feedwater System	-- 3 1 --
140	SUMMARY OF HEATING, VENTILATION & AIR COND SYST	-- -- -- 1
141	Heating, Ventilation & Air Conditioning Systems	-- -- -- 1
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	-- 29 9 8
151	Instrumentation and Control Systems	-- 7 6 6
152	Electrohydraulic Control (Turbine Control) System	-- 1 -- --
153	Engineered Safeguards Actuation and Logic System	-- 10 -- --
157	Pressurizer Level Control System	-- 2 -- --
158	Pressurizer Pressure Control System	-- 5 1 --
161	Reactor Protection System	-- 3 -- --
166	Steam Generator Water Level Control System	-- 1 2 2
200	SUMMARY OF REACTOR COOLANT SYSTEMS	-- 16 5 3
201	Reactor Coolant Systems	-- 12 5 2
203	Chemical And Volume Control System	-- 4 -- 1
210	SUMMARY OF REFUELING SYSTEMS	-- 1 -- --
213	Spent Fuel Pit Cooling System	-- 1 -- --
220	SUMMARY OF TURBINE SYSTEMS	-- 1 1 1
221	Turbine Systems	-- 1 -- 1
222	Extraction Steam System	-- -- 1 --

ID	Equipment Description	0 0 0 0 0 1 2 3
230	SUMMARY OF WATER SYSTEMS	-- 4 -- --
233	Component Cooling Water System	-- 3 -- --
235	Nuclear Service Water System	-- 1 -- --
290	SUMMARY OF MAIN STEAM SYSTEMS	-- 8 1 --
291	Main Steam System	-- 8 1 --

Systems

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ID	Equipment Description	TESTS 10	OPERATES 11	DIAGNOSES 12	MAINTAINS 13	INSPECTS 14
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1	--
041	Condensate Systems	--	--	--	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	--	--	1	--
051	Containment Systems	--	--	--	1	--
061	Containment/Reactor Building Penetration System	--	--	--	1	--
062	Containment Fan Cooling System	--	--	--	1	--
063	Containment Isolation System	--	--	--	1	--
064	Containment Spray System	--	--	--	1	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	3	--	4	1
083	DC Power System	--	2	--	3	1
084	Plant AC Distribution System	--	3	--	4	1
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	2	--	2	--
091	Emergency Core Cooling Systems	--	2	--	2	--
092	High Pressure Safety Injection System	--	--	--	2	--
093	Residual Heat Removal/Low Press Safety Inject Syst	--	--	--	2	--
110	SUMMARY OF FEEDWATER SYSTEMS	--	--	--	1	--
111	Feedwater Systems	--	--	--	1	--

ID	Equipment Description	10	11	12	13	14
112	Auxiliary Feedwater System	--	--	--	1	--
113	Main Feedwater System	--	--	--	1	--
200	SUMMARY OF REACTOR COOLANT SYSTEMS	--	1	--	--	--
201	Reactor Coolant Systems	--	1	--	--	--
310	SUMMARY OF PROCESS SAMPLING SYSTEMS	--	--	--	--	1
311	Process Sampling Systems	--	--	--	--	1

Systems

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KEY
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ID	Equipment Description	TESTS	CHECKS	DIAGNOSES	MAINTAINS
		2020	2021	2022	2023
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1
041	Condensate Systems	--	--	--	1
050	SUMMARY OF CONTAINMENT SYSTEMS	1	--	--	2
051	Containment Systems	--	--	--	1
061	Containment/Reactor Building Penetration System	--	--	--	1
062	Containment Fan Cooling System	--	--	--	1
063	Containment Isolation System	--	--	--	1
064	Containment Spray System	1	--	--	2
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	4	--	--	4
083	DC Power System	4	--	--	4
084	Plant AC Distribution System	4	--	--	4
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	1	--	--	4
091	Emergency Core Cooling Systems	--	--	--	4
092	Hign Pressure Safety Injection System	--	--	--	2
093	Residual Heat Removal/Low Press Safety Inject Syst	1	--	--	2
110	SUMMARY OF FEEDWATER SYSTEMS	--	--	--	2
111	Feedwater Systems	--	--	--	2

ID	Equipment Description	2 0	2 1	2 2	2 3
112	Auxiliary Feedwater System	--	--	--	1
113	Main Feedwater System	--	--	--	1
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	--	--	--	2
153	Engineered Safeguards Actuation and Logic System	--	--	--	2
230	SUMMARY OF WATER SYSTEMS	3	--	--	--
233	Component Cooling Water System	1	--	--	--
235	Nuclear Service Water System	2	--	--	--

Systems

Combustion Engineering

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ID	Equipment Description	TESTS 000	OPERATES 001	MONITORS 002	DIAGNOSES 003
000	SUMMARY OF AIR SYSTEMS	--	1	1	1
002	Instrument Air System	--	1	1	1
010	SUMMARY OF ANNUNCIATOR SYSTEMS	--	--	5	--
011	Annunciator Systems	--	--	5	--
020	SUMMARY OF COMMUNICATION SYSTEMS	--	1	--	--
021	Communication Systems	--	1	--	--
040	SUMMARY OF CONDENSATE SYSTEMS	--	1	1	--
041	Condensate Systems	--	1	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	2	1	1
051	Containment Systems	--	1	1	1
064	Containment Spray System	--	2	--	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	1	--	--
085	Plant AC Power System	--	1	--	--
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	1	14	1	3
091	Emergency Core Cooling Systems	1	4	1	3
092	High Pressure Safety Injection System	--	2	--	--
101	Low Press Safety Injection/Shutdown Cooling Sys	--	8	--	--

ID	Equipment Description	0 0 0 0 0 1 2 3
110	SUMMARY OF FEEDWATER SYSTEMS	-- 4 1 --
111	Feedwater Systems	-- 2 1 --
113	Main Feedwater System	-- 1 1 --
114	Auxiliary/Emergency Feedwater System	-- 3 -- --
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	-- -- 5 --
157	Pressurizer Level Control System	-- -- 2 --
158	Pressurizer Pressure Control System	-- -- 2 --
166	Steam Generator Water Level Control System	-- -- 1 --
190	SUMMARY OF RADWASTE SYSTEMS	-- -- 1 --
193	Liquid Radwaste System	-- -- 1 --
200	SUMMARY OF REACTOR COOLANT SYSTEMS	-- 1 -- --
203	Chemical And Volume Control System	-- 1 -- --
220	SUMMARY OF TURBINE SYSTEMS	-- -- 1 --
222	Extraction Steam System	-- -- 1 --
230	SUMMARY OF WATER SYSTEMS	-- 1 -- --
231	Water Systems	-- 1 -- --
290	SUMMARY OF MAIN STEAM SYSTEMS	-- 1 1 --
291	Main Steam System	-- 1 1 --

Systems

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ID	Equipment Description	10 TESTS	11 OPERATES	12 DIAGNOSES	13 MAINTAINS	14 INSPECTS
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1	--
041	Condensate Systems	--	--	--	1	--
044	Condensate Storage System	--	--	--	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	--	--	1	--
051	Containment Systems	--	--	--	1	--
063	Containment Isolation System	--	--	--	1	--
064	Containment Spray System	--	--	--	1	--
067	Containment Cooling System	--	--	--	1	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	4	--	4	1
083	DC Power System	--	2	--	3	1
085	Plant AC Power System	--	4	--	4	1
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	2	--	2	--
091	Emergency Core Cooling Systems	--	2	--	1	--
092	High Pressure Safety Injection System	--	--	--	2	--
101	Low Press Safety Injection/Shutdown Cooling Sys	--	--	--	1	--
110	SUMMARY OF FEEDWATER SYSTEMS	--	--	--	2	--
111	Feedwater Systems	--	--	--	2	--

ID	Equipment Description	10	11	12	13	14
113	Main Feedwater System	--	--	--	1	--
114	Auxiliary/Emergency Feedwater System	--	--	--	1	--
200	SUMMARY OF REACTOR COOLANT SYSTEMS	--	1	--	--	--
201	Reactor Coolant Systems	--	1	--	--	--
290	SUMMARY OF MAIN STEAM SYSTEMS	--	--	--	1	--
291	Main Steam System	--	--	--	1	--
310	SUMMARY OF PROCESS SAMPLING SYSTEMS	--	--	--	--	1
311	Process Sampling Systems	-	--	--	--	1

Systems

Combustion Engineering

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ID	Equipment Description	TESTS	CHECKS	DIAGNOSES	MAINTAINS
		2020	2021	2022	2023
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1
041	Condensate Systems	--	--	--	1
044	Condensate Storage System	--	--	--	1
050	SUMMARY OF CONTAINMENT SYSTEMS	--	--	--	1
051	Containment Systems	--	--	--	1
063	Containment Isolation System	--	--	--	1
064	Containment Spray System	--	--	--	1
067	Containment Cooling System	--	--	--	1
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	5	--	--	5
083	DC Power System	4	--	--	5
085	Plant AC Power System	5	--	--	5
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	--	--	2
091	Emergency Core Cooling Systems	--	--	--	1
092	High Pressure Safety Injection System	--	--	--	2
101	Low Press Safety Injection/Shutdown Cooling Sys	--	--	--	1
110	SUMMARY OF FEEDWATER SYSTEMS	1	--	--	3
111	Feedwater Systems	--	--	--	1

ID	Equipment Description	2020	2021	2022	2023
113	Main Feedwater System	--	--	--	1
114	Auxiliary/Emergency Feedwater System	1	--	--	3
290	SUMMARY OF MAIN STEAM SYSTEMS	--	--	--	1
291	Main Steam System	--	--	--	1

Systems

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ID	Equipment Description	TESTS 000	OPERATES 001	MONITORS 002	DIAGNOSES 003
000	SUMMARY OF AIR SYSTEMS	--	8	1	1
001	Air Systems	--	4	--	--
002	Instrument Air System	--	4	1	1
020	SUMMARY OF COMMUNICATION SYSTEMS	--	1	--	--
021	Communication Systems	--	1	--	--
040	SUMMARY OF CONDENSATE SYSTEMS	--	1	1	--
041	Condensate Systems	--	1	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	2	--	1
051	Containment Systems	--	1	--	1
068	Reactor Building Spray System	--	1	--	--
070	SUMMARY OF CONTROL ROD DRIVE SYSTEMS	--	--	--	1
071	Control Rod Drive Systems	--	--	--	1
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	1	--	--
085	Plant AC Power System	--	1	--	--
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	1	20	5	4
091	Emergency Core Cooling Systems	1	4	1	2
092	High Pressure Safety Injection System	--	9	2	1

ID	Equipment Description	0 0 0 0 0 1 2 3
093	Decay Heat Removal/Core Flooding System	-- 1 -- --
094	Decay Heat Removal/Low Press Safety Inject System	-- 6 2 1
110	SUMMARY OF FEEDWATER SYSTEMS	-- 7 1 --
111	Feedwater Systems	-- 5 1 --
113	Main Feedwater System	-- 1 1 --
114	Emergency Feedwater System	-- 2 -- --
230	SUMMARY OF WATER SYSTEMS	-- 2 -- --
231	Water Systems	-- 1 -- --
236	Low Pressure Service Water System	-- 1 -- --
300	SUMMARY OF STEAM SYSTEMS	-- 1 1 --
303	Main Steam System	-- 1 1 --

Systems

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▉ = Invalid Combination
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- = Valid Cell, Currently Empty

ID	Equipment Description	TESTS	OPERATES	DIAGNOSES	MAINTAINS	INSPECTS
		110	111	112	113	114
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1	--
041	Condensate Systems	--	--	--	1	--
050	SUMMARY OF CONTAINMENT SYSTEMS	--	--	--	1	--
051	Containment Systems	--	--	--	1	--
063	Containment Isolation System	--	--	--	1	--
068	Reactor Building Spray System	--	--	--	1	--
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	--	3	--	4	1
083	DC Power System	--	2	--	3	1
085	Plant AC Power System	--	3	--	4	1
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	1	3	--	2	--
091	Emergency Core Cooling Systems	--	2	--	2	--
092	High Pressure Safety Injection System	1	--	--	2	--
093	Decay Heat Removal/Core Flooding System	--	--	--	1	--
094	Decay Heat Removal/Low Press Safety Inject System	--	1	--	1	--
110	SUMMARY OF FEEDWATER SYSTEMS	--	--	--	1	--
111	Feedwater Systems	--	--	--	1	--
113	Main Feedwater System	--	--	--	1	--

ID	Equipment Description	10	11	12	13	14
114	Emergency Feedwater System	--	--	--	1	--
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	--	--	--	1	--
183	Safety Features Actuation System	--	--	--	1	--
200	SUMMARY OF REACTOR COOLANT SYSTEMS	--	1	--	--	--
201	Reactor Coolant Systems	--	1	--	--	--
300	SUMMARY OF STEAM SYSTEMS	--	--	--	1	--
301	Steam Systems	--	--	--	1	--
310	SUMMARY OF PROCESS SAMPLING SYSTEMS	--	--	--	--	1
311	Process Sampling Systems	--	--	--	--	1

Systems

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KEY
■ = Invalid Combination
* = Valid Cell > 99 Data Points
- = Valid Cell, Currently Empty

ID	Equipment Description	TESTS	CHECKS	DIAGNOSES	MAINTAINS
		2020	2021	2022	2023
040	SUMMARY OF CONDENSATE SYSTEMS	--	--	--	1
041	Condensate Systems	--	--	--	1
050	SUMMARY OF CONTAINMENT SYSTEMS	--	--	--	2
051	Containment Systems	--	--	--	1
063	Containment Isolation System	--	--	--	1
068	Reactor Building Spray System	--	--	--	1
080	SUMMARY OF ELECTRICAL DISTRIBUTION SYSTEMS	4	--	--	4
083	DC Power System	4	--	--	4
085	Plant AC Power System	4	--	--	4
090	SUMMARY OF EMERGENCY CORE COOLING SYSTEMS	--	--	--	2
091	Emergency Core Cooling Systems	--	--	--	2
092	High Pressure Safety Injection System	--	--	--	2
093	Decay Heat Removal/Core Flooding System	--	--	--	1
094	Decay Heat Removal/Low Press Safety Inject System	--	--	--	1
110	SUMMARY OF FEEDWATER SYSTEMS	--	--	--	1
111	Feedwater Systems	--	--	--	1
113	Main Feedwater System	--	--	--	1

ID	Equipment Description	2 0	2 1	2 2	2 3
114	Emergency Feedwater System	--	--	--	1
150	SUMMARY OF INSTRUMENTATION AND CONTROL SYSTEMS	--	--	--	1
183	Safety Features Actuation System	--	--	--	1
300	SUMMARY OF STEAM SYSTEMS	--	--	--	1
301	Steam Systems	--	--	--	1

Components

Non-Specific Vendor

CRO

KEY
■ = Invalid Combination
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- = Valid Cell, Currently Empty

ID	Equipment Description	DIAGNOSES 30	MONITORS 31	OPERATES 32	FILLS/DRAINS 33	OPENS/CLOSES 34	STARTS/STOPS 35
040	SUMMARY OF CIRCUIT CLOSURES/INTERRUPTERS	--	--	3	■	7	■
042	Circuit Breaker	--	--	1	■	6	■
046	Switch	--	--	2	■	--	■
047	Switchgear	--	--	--	■	1	■
060	SUMMARY OF CONTROL INSTRUMENTS	6	1	4	■	■	■
062	Flow Control Instrument	2	1	4	■	■	■
063	Flux Control Instrument	--	1	--	■	■	■
064	Level Control Instrument	4	1	--	■	■	■
066	Pressure Control Instrument	--	1	--	■	■	■
090	SUMMARY OF CONTROL ROD DRIVE MECHANISMS	--	--	2	■	■	■
091	Control Rod Drive Mechanisms	--	--	2	■	■	■
220	SUMMARY OF PUMPS	--	--	5	■	■	3
221	Pumps	--	--	5	■	■	2
222	Centrifugal Pump	--	--	--	■	■	1
240	SUMMARY OF SENSORS	--	3	--	■	■	■
251	Pressure Sensor	--	2	--	■	■	■
252	Radiation Sensor	--	1	--	■	■	■

ID	Equipment Description	30	31	32	33	34	35
270	SUMMARY OF STEAM GENERATORS	--	--	1	--	[redacted]	[redacted]
271	Steam Generators	--	--	1	--	[redacted]	[redacted]
280	SUMMARY OF TURBINES	--	--	3	[redacted]	[redacted]	[redacted]
281	Turbines	--	--	3	[redacted]	[redacted]	[redacted]
290	SUMMARY OF VALVES	--	1	4	[redacted]	7	[redacted]
291	Valves	--	1	4	[redacted]	6	[redacted]
302	Relief Valve	--	--	--	[redacted]	1	[redacted]
310	SUMMARY OF VALVE OPERATORS	--	--	14	[redacted]	[redacted]	[redacted]
311	Valve Operators	--	--	1	[redacted]	[redacted]	[redacted]
312	Electric Motor-AC	--	--	13	[redacted]	[redacted]	[redacted]

Components

Non-Specific Vendor

EO

KEY
■ = Invalid Combination
* = Valid Cell > 99 Data Points
- = Valid Cell, Currently Empty

ID	Equipment Description	40 DIAGNOSES	41 INSPECTS	42 OPERATES	43 FILLS/DRAINS	44 OPENS/CLOSES	45 STARTS/STOPS
040	SUMMARY OF CIRCUIT CLOSURES/INTERRUPTERS	--	--	5	■	1	■
042	Circuit Breaker	--	--	5	■	--	■
044	Disconnect	--	--	--	■	1	■
060	SUMMARY OF CONTROL INSTRUMENTS	--	--	1	■	■	■
062	Flow Control Instrument	--	--	1	■	■	■
064	Level Control Instrument	--	--	1	■	■	■
066	Pressure Control Instrument	--	--	1	■	■	■
068	Temperature Control Instrument	--	--	1	■	■	■
130	SUMMARY OF ELECTRICAL EQUIPMENT	--	--	4	■	■	■
131	Electrical Equipment	--	--	4	■	■	■
140	SUMMARY OF ELECTRIC GENERATORS	--	--	1	■	■	--
144	Generator	--	--	1	■	■	--
220	SUMMARY OF PUMPS	--	1	--	--	■	--
222	Centrifugal Pump	--	1	--	--	■	--
240	SUMMARY OF SENSORS	--	2	--	■	■	■
248	Level Sensor	--	1	--	--	■	■
251	Pressure Sensor	--	1	--	--	■	■

ID	Equipment Description	40	41	42	43	44	45
290	SUMMARY OF VALVES	--	1	1	[redacted]	3	[redacted]
291	Valves	--	1	1	[redacted]	3	[redacted]
310	SUMMARY OF VALVE OPERATORS	--	--	2	[redacted]	[redacted]	[redacted]
312	Electric Motor-AC	--	--	1	[redacted]	[redacted]	[redacted]
316	Pneumatic	--	--	1	[redacted]	[redacted]	[redacted]
330	SUMMARY OF VESSELS/TANKS	--	1	[redacted]	--	[redacted]	[redacted]
331	Vessels/Tanks	--	1	[redacted]	--	[redacted]	[redacted]
333	Tank	--	1	[redacted]	--	[redacted]	[redacted]

Components

Non-Specific Vendor

MT

KEY
■ = Invalid Combination
* = Valid Cell > 99 Data Points
- = Valid Cell, Currently Empty

ID	Equipment Description	CALIBRATES 50	DIAGNOSES 51	MAINTAINS 52	REPAIRS 53	TESTS 54
040	SUMMARY OF CIRCUIT CLOSURES/INTERRUPTERS	--	--	5	4	8
042	Circuit Breaker	■	--	4	3	4
044	Disconnect	■	--	1	1	1
046	Switch	--	--	--	--	3
060	SUMMARY OF CONTROL INSTRUMENTS	2	2	--	--	--
062	Flow Control Instrument	1	1	--	--	--
064	Level Control Instrument	1	--	--	--	--
066	Pressure Control Instrument	2	--	--	--	--
068	Temperature Control Instrument	1	--	--	--	--
069	Voltage Control Instrument	--	1	--	--	--
130	SUMMARY OF ELECTRICAL EQUIPMENT	1	2	--	--	3
131	Electrical Equipment	1	2	--	--	3
140	SUMMARY OF ELECTRIC GENERATORS	--	--	--	--	1
144	Generator	--	--	--	--	1
160	SUMMARY OF EQUIPMENT - NONSPECIFIC	--	--	--	--	10
161	Equipment - Nonspecific	--	--	--	--	10
220	SUMMARY OF PUMPS	--	--	3	--	--
221	Pumps	--	--	3	--	--

ID	Equipment Description	5 0	5 1	5 2	5 3	5 4
240	SUMMARY OF SENSORS	8	--	--	--	1
241	Sensors	3	--	--	--	1
248	Level Sensor	3	--	--	--	--
251	Pressure Sensor	4	--	--	--	--
290	SUMMARY OF VALVES	[redacted]	1	4	--	16
291	Valves	[redacted]	1	4	--	16
310	SUMMARY OF VALVE OPERATORS	[redacted]	--	--	--	2
316	Pneumatic	[redacted]	--	--	--	2

Displays/Instruments/Controls Non-Specific Vendor Non-Specific Job Title	POSITIONS	USES	ADJUSTS	SELECTS	IDENTIFIES	VERIFIES	READS	MONITORS	REMEMBERS	DIAGNOSES	CALCULATES	RECEIVES	WRITES	MAINTAINS	CALIBRATES
KEY ■ = Invalid Combination * = Valid Cell > 99 Data Points - = Valid Cell, Currently Empty															
ID Equipment Description	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
000 SUMMARY OF QUALITATIVE DISPLAYS	■	■	■	--	16	--	14	16	--	13	■	■	■	--	--
001 Qualitative Displays	■	■	■	--	--	--	14	--	--	--	■	■	■	--	--
002 Indicator Light	■	■	■	--	16	--	■	--	--	--	■	■	■	--	--
003 Legend Light	■	■	■	--	15	--	--	--	--	--	■	■	■	--	--
005 Annunciator	■	■	■	--	--	--	--	--	--	13	■	■	■	--	--
006 CRT Text	■	■	■	--	--	--	--	16	--	--	■	■	■	■	■
010 SUMMARY OF QUANTITATIVE DISPLAYS	■	■	■	--	--	--	37	23	--	--	--	■	■	--	--
011 Quantitative Displays	■	■	■	--	--	--	2	--	--	--	--	■	■	--	--
012 Counter-Digital Readout	■	■	■	--	--	--	16	--	--	--	--	■	■	--	--
013 Meter	■	■	■	--	--	--	17	3	--	--	--	■	■	--	--
015 Chart Recorder	■	■	■	--	--	--	2	2	--	--	--	■	■	--	--
016 CRT Graphic Display	■	■	■	--	--	--	--	2	--	--	--	■	■	■	■
017 CRT Alphanumeric Display	■	■	■	--	--	--	--	16	--	--	--	■	■	■	■
030 SUMMARY OF TWO-POSITION SWITCHES	5	■	■	74	--	--	--	■	--	--	■	■	■	--	■
031 Two-Position Switches	4	■	■	3	--	--	--	■	--	--	■	■	■	--	■
032 Push-Button (Illuminated Legend)	--	■	■	19	--	--	--	■	--	--	■	■	■	--	■
033 Push-Button (Other)	--	■	■	21	--	--	■	■	--	--	■	■	■	--	■
034 Toggle Switch/Two-Position	--	■	■	16	--	--	■	■	--	--	■	■	■	--	■

ID	Equipment Description	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
035	Knob	1	▮	▮	--	--	--	▮	▮	--	--	▮	▮	▮	--	▮
037	Keylock	--	▮	▮	18	--	--	▮	▮	--	--	▮	▮	▮	--	▮
050	SUMMARY OF MULTIPOSITION SELECTORS	9	▮	▮	--	--	--	▮	▮	--	--	▮	▮	▮	--	▮
051	Multiposition Selectors	3	▮	▮	--	--	--	▮	▮	--	--	▮	▮	▮	--	▮
052	J-Handle Switch	1	▮	▮	--	--	--	▮	▮	--	--	▮	▮	▮	--	▮
053	Rotary Switch	5	▮	▮	--	--	--	▮	▮	--	--	▮	▮	▮	--	▮
060	SUMMARY OF CONTINUOUSLY VARIABLE CONTROLS	▮	▮	2	--	--	--	▮	▮	--	--	▮	▮	▮	--	--
061	Continuously Variable Controls	▮	▮	2	--	--	--	▮	▮	--	--	▮	▮	▮	--	--
070	SUMMARY OF KEYBOARDS	▮	--	▮	▮	▮	▮	▮	▮	--	--	4	▮	▮	--	--
072	Calculator	▮	--	▮	▮	▮	▮	▮	▮	--	--	4	▮	▮	▮	▮
150	SUMMARY OF PRINTED COMMUNICATIONS	▮	6	▮	4	--	4	14	▮	--	--	--	--	2	▮	▮
151	Printed Communications	▮	2	▮	--	--	--	--	▮	--	--	--	--	2	▮	▮
152	Tag	▮	--	▮	--	--	--	--	▮	--	--	▮	--	2	▮	▮
153	Log Book	▮	--	▮	--	--	--	--	▮	--	--	▮	--	2	▮	▮
154	Administrative Procedure	▮	--	▮	--	--	--	--	▮	--	--	▮	--	2	▮	▮
155	Operating Procedure	▮	2	▮	4	--	4	--	▮	--	--	--	--	2	▮	▮
156	Maintenance Procedure	▮	1	▮	--	--	--	--	▮	--	--	--	--	2	▮	▮
157	Test Or Calibration Procedure	▮	1	▮	--	--	--	--	▮	--	--	--	--	2	▮	▮
158	Graph	▮	--	▮	--	--	--	1	▮	--	--	--	--	--	▮	▮
161	Label	▮	--	▮	--	--	--	13	▮	--	--	▮	--	--	▮	▮
180	SUMMARY OF EQUIPMENT - NONSPECIFIC	18	--	--	--	--	--	--	--	--	--	--	--	--	--	--
181	Equipment - Nonspecific	18	--	--	--	--	--	--	--	--	--	--	--	--	--	--

3. HUMAN ACTIONS

Below is a listing of all of the human actions that are available in NUCLARR. Not every action is available for every person. Appendix B, Section 2, gives detailed information about human actions and equipment that are appropriate for different combinations of vendor and job title.

ADJUSTS
CALIBRATES
CHECKS
DIAGNOSES
FILLS/DRAINS
IDENTIFIES
INSPECTS
MAINTAINS
MONITORS
OPENS/CLOSES
OPERATES
POSITIONS
READS
RECEIVES
REMEMBERS
REPAIRS
SELECTS
STARTS/STOPS
TESTS
USES
VERIFIES
WRITES

4. PERFORMANCE SHAPING FACTORS

Performance Shaping Factors (PSFs) are the factors which effect human performance. They may be related to personal characteristics or elements of a situation such as level of experience, training, and general resistance to fatigue or stress. They may also be related to the immediate work environment, such as conditions of staffing or tagging, or the type and quality of procedures available to aid the person in the proper execution of his or her task. Although there are many PSFs available for analysis, only a limited number have been selected for inclusion in the NUCLARR system. Any other PSFs identified in the original source of data (including those relating to the quality of human factors engineering design) are included in the task description.

When available in the source document, the PSFs are ranked on ordinal scales. This ranking scheme allows analysts to evaluate individual NUCLARR data records relative to the characteristics of their own analysis problems. Fields are provided for time factor information and eight PSFs.

The following is a description of the PSFs coded in NUCLARR:

ATime (Time Available)--Refers to the total time available for successful completion of the task. This time is often dependent on plant conditions and system response to phenomenological factors.

PTime (Performance Time)--This term refers to the average time spent by the operator or crew in performing the task.

Experience--The total time an individual has performed in his/her current job classification in a commercial nuclear power plant. Related experience in other types of plants (e.g., Navy, fossil) or in other job classifications is generally not included. The valid experience levels include:

U - Insufficient information available to evaluate this PSF

N - No commercial nuclear power plant experience

1 - Ten or more years job experience

2 - More than five years but less than ten years job experience

3 - More than six months but less than five years job experience

4 - Less than six months job experience

Feedback--The knowledge of results that a person receives about the status or adequacy of his actions. In general, feedback refers to how the operator knows the appropriate control action has been taken, or how he is informed regarding the nature of general plant conditions. Feedback provides a person with objective information on what should be done, whether it has been

performed correctly, and with detailed information on when and how a failure occurred. The level of systems feedback a person would experience in the performance of a task can range from superior to inadequate, as described below.

U - Insufficient information available to evaluate this PSF

1 - Feedback superior: Extremely satisfactory, well above average--significantly helped performance

2 - Feedback more than satisfactory but less than superior: Better than average--helped performance

3 - Feedback satisfactory: About average--did not help or hinder performance

4 - Feedback somewhat satisfactory: Below average--hindered performance

5 - Feedback NOT adequate: Well below average--significantly hindered performance.

Procedure--In the performance of a task, the type and availability of procedures used will often influence its final outcome. In assessing operator error, it is often desirable to know if a procedure was used at all and, if so, what type. Secondly, if a procedure was used, it is of interest to understand how it was applied toward accomplishing the task. For example, was a procedure followed in its entirety or were parts of the procedure given to crew members? Categories for procedure use are a primary factor when measuring task performance. The valid categories include:

U - Insufficient information available to evaluate this PSF.

1 - A written procedure with step checkoffs was used; checkoff was performed by a second person observing the work.

2 - A written procedure with step checkoffs was used; checkoff was performed by the person performing the work.

3 - A written procedure was used.

4 - Oral instructions directed actions.

5 - A written procedure was available but not used. Contents were recalled from memory.

6 - No procedures or instructions were available.

Staffing--The number of qualified personnel who were directly involved in the performance of the task. Involvement implies actual assistance the primary crew member receives from other individuals in the operating area. If the staffing needs (or manning parameters) are inadequate, the potential for error is increased due to higher stress and workload demands placed on the primary operator. Staffing levels are generally explicitly measured as the total

number of crew members participating in the task. Valid categories include:

U - Insufficient information available to evaluate this PSF

1 - One person participated in the performance of the task

2 - Two people participated in the performance of the task

3 - Three people participated in the performance of the task

4 - Four people participated in the performance of the task

5 - Five people participated in the performance of the task

Stress--The extent to which stress either hindered or helped performance. Personnel may be stressed as a function of fatigue as well as workload demand, or just by virtue of responding to an emergency. The valid stress levels include:

U - Insufficient information available to evaluate this PSF.

1 - Optimum stress: The normal or facilitative level of stress. An optimum level of stress is associated with an optimum task load and is characterized by an active interaction between the person and the environment at a pace that can be managed comfortably.

2 - Very low stress: Insufficient arousal to maintain alertness. A very low stress level is associated with a very low task load and is characterized by routine, passive activities in which a lack of sufficient stimulation can cause boredom or inattention.

3 - Moderately high stress: A moderately high stress level is associated with a heavy task load and is characterized by a requirement to perform at a faster pace than a person is capable of, or by a large number of stimuli competing for attention. This stress level is assumed for situations in which special protective clothing must be worn, for single transients involving shutdown of the turbine or reactor, or for critical tasks performed under time constraints.

4 - Extremely high stress: An extremely high level of stress is characterized by the perception of an immediate threat to one's physical well-being, self-esteem, or professional status. This level of stress is infrequently encountered, and this rating should be used only in connection with catastrophic events such as a large break loss-of-coolant accident (LOCA), multiple transients, or situations where significant hazard to the individuals involved is clearly present and known to them (e.g., fires or very high radiation levels).

Supervision--The degree of direction and managerial responsibility taken by senior personnel during performance of a task. The amount of supervision to oversee and monitor task activities can influence task performance. The range of supervision can range from formal approval and verification to ensure the

successful completion of a task within a given standard to no supervision at all. The scaled values for this PSF are:

U - Insufficient information available to evaluate this PSF.

1 - Senior supervisor provides approval to initiate the task and verifies whether or not it has been successfully accomplished within a given standard of performance.

2 - Other operator (not a supervisory position) formally monitors and verifies satisfactory completion of task (e.g., worker sign off, checklist). Verification is explicitly stated in a procedure and/or standards and practices documents.

3 - Other operator (not a supervisory position) informally monitors and verifies satisfactory completion of task (e.g., verbal notification, ad hoc protocol). Verification not specified in a procedure or standards and practices document.

4 - No supervision provided; operator performs task independent of any direct verification from other personnel.

Tagging--This term encompasses the total tagging system and includes all administrative controls that ensure (a) awareness of any valves or other items of equipment that are in a normal state or a protected normal state, and (b) prompt restoration of this equipment to the normal or unprotected state after completion of review or maintenance operations. Thus, a tagging system includes the use of (a) tags; (b) chains, locks, and keys; and (c) logs, suspense forms, and other techniques that provide a record of the above. The adequacy of the tagging system can vary significantly in its overall sophistication and completeness from a formal system, consisting of a high degree of administrative controls, to no tagging system at all, as described below.

N - Tagging system is not applicable to this task.

U - Tagging system is available, but information is insufficient to determine the level of tagging.

1 - A specific number of tags are used for each job. Each tag is uniquely numbered or otherwise identified. A record is kept of each tag.

2 - Tags are not accounted for individually. The operator may take an unspecified number and use accordingly. The record-keeping does not provide a thorough checking for errors of omission or selection.

3 - Tags are used, but record-keeping is inadequate to provide the shift supervisor with adequate knowledge of every item or equipment that should be restored. Also in this category, keys are available to users without logging requirements.

4 - No tags. A tagging system is applicable to the task but no tags are used.

Training--The amount of relevant training provided can significantly affect the outcome of task performance. Training adequacy can be satisfied through one or more of the following modes: on-the-job training (OJT); simulation/mockup; drill; and/or classroom. The measure of training is typically selected from the lowest level of training adequacy represented for which the HEP occurred. The valid training adequacy levels include:

U - Insufficient information available to evaluate this PSF.

1 - Training very adequate--formal training provided as well as maintaining a high level of state of current practice or skill for successful performance of the task.

2 - Training adequate, but could be improved--additional instruction and/or practice (e.g., classroom, OJT, drill, etc.) would be beneficial.

3 - Training somewhat adequate, but sorely lacking in specific areas--significant improvement to upgrade the adequacy of training is needed.

4 - Training NOT adequate--training is either not provided at all or is totally inappropriate (or irrelevant) for performing the task.

6 - Six (or more) persons participated in the performance of the task.

5. PLANTS

Each individual data record in NUCLARR includes a code for the plant from which the data was collected. In the case of proprietary data, special codes have been assigned to provide plant anonymity.

Plant Code	Plant Name
ALLP	ALL PLANTS
ANO1	ARKANSAS 1
ANO2	ARKANSAS 2
APRA	PROPRIETARY PRA "A"
AREL	PROPRIETARY REL "A"
ATR	ADV.TEST REACT.-INEL
AWV1	VOGTLE 1
B&W	BABCOCK & WILCOX
BEP	ALL BRUNSWICK
BEP1	BRUNSWICK 1
BEP2	BRUNSWICK 2
BPRA	PROPRIETARY PRA "B"
BREL	PROPRIETARY REL "B"
BRF1	BROWNS FERRY 1
BRF2	BROWNS FERRY 2
BRF3	BROWNS FERRY 3
BRP1	BIG ROCK POINT
BRS1	BRAIDWOOD 1
BVS1	BEAVER VALLEY 1
BWR	ALL BWR PLANTS
BYS1	BYRON 1
BYS2	BYRON 2
CAY1	CALLAWAY
CCN	ALL CALVERT CLIFFS
CCN1	CALVERT CLIFFS 1
CCN2	CALVERT CLIFFS 2
CE	COMBUSTION ENGINEER.
CNS1	CATAWBA 1
CNS2	CATAWBA 2
CPP1	CLINTON 1
CPR1	COOPER STATION
CPRA	UNPUBLISHED PRA "C"
CPS	ALL COMANCHE PEAK
CRP3	CRYSTAL RIVER 3
DAC1	DUANE ARNOLD
DBS1	DAVIS-BESSE
DCC1	COOK 1
DCC2	COOK 2
DCP1	DIABLO CANYON 1
DCP2	DIABLO CANYON 2
DPRA	UNPUBLISHED PRA "D"
DRS	ALL DRESDEN
DRS1	DRESDEN 1
DRS2	DRESDEN 2
DRS3	DRESDEN 3
EFP2	FERMI 2
EIH1	HATCH 1
EIH2	HATCH 2
EPRA	UNFINISHED PRA "E"
EUR	EUROPEAN COMM (SAIC)
FCS1	FORT CALHOUN
FFTF	FAST FLUX TEST FAC.
FPRA	PROPRIETARY PRA "F"
FSV1	FORT ST. VRAIN
GE	GENERAL ELECTRIC
GGS1	GRAND GULF
GPRA	UNFINISHED PRA "G"
HBR2	ROBINSON 2
HCS1	HOPE CREEK
HMB1	HUMBOLDT BAY
HNP1	HADDAM NECK
IP1	IPRDS PLANT 1
IP2	IPRDS PLANT 2
IP3	IPRDS 3, UNITS 1-3
IP4	IPRDS PLANT 4
IP5	IPRDS 5, UNITS 1-3
IPS2	INDIAN POINT 2
IPS3	INDIAN POINT 3
JAF1	FITZPATRICK
JMF	ALL FARLEY
JMF1	FARLEY 1
JMF2	FARLEY 2
KNP1	KEWAUNEE
LBR1	LA CROSSE
LGS1	LIMERICK
LSC	ALL LASALLE
LSC1	LASALLE 1
LSC2	LASALLE 2
LSC3	LASALLE 3
MGS1	MCGUIRE 1
MGS2	MCGUIRE 2
MNP1	MONTICELLO
MNS1	MILLSTONE 1
MNS2	MILLSTONE 2
MNS3	MILLSTONE 3
MYP1	MAINE YANKEE
NAS1	NORTH ANNA 1
NAS2	NORTH ANNA 2

Plant Code	Plant Name
NEE1	OCONEE 1
NEE2	OCONEE 2
NEE3	OCONEE 3
NMP1	NINE MILE PT. 1
NMP2	NINE MILE PT. 2
NONP	NON-PLANT SPECIFIC
OCP1	OYSTER CREEK
PAL1	PALISADES
PAV1	PALO VERDE 1
PAV2	PALO VERDE 2
PBH	ALL POINT BEACH
PBH1	POINT BEACH 1
PBH2	POINT BEACH 2
PBS	ALL PEACH BOTTOM
PBS2	PEACH BOTTOM 2
PBS3	PEACH BOTTOM 3
PIN	ALL PRAIRIE ISLAND
PIN1	PRAIRIE ISLAND 1
PIN2	PRAIRIE ISLAND 2
PNP1	PERRY
PPS1	PILGRIM
PWR	ALL PWR PLANTS
QAD	ALL QUAD CITIES
QAD1	QUAD CITIES 1
QAD2	QUAD CITIES 2
RBS1	RIVER BEND
REG1	GINNA
RGLS	RINGHALS 2 (SWEDISH)
RSS1	RANCHO SECO
SBK1	SEABROOK
SES	ALL SUSQUEHANNA
SES1	SUSQUEHANNA 1
SES2	SUSQUEHANNA 2
SGS1	SALEM 1
SGS2	SALEM 2
SHS1	HARRIS 1
SLS1	ST. LUCIE 1
SLS2	ST. LUCIE 2
SNP1	SEQUOYAH 1
SNP2	SEQUOYAH 2
SNS1	SHOREHAM
SOS1	SAN ONOFRE 1
SOS2	SAN ONOFRE 2
SOS3	SAN ONOFRE 3
SPS	ALL SURRY
SPS1	SURRY 1
SPS2	SURRY 2
SVR1	SAVANNAH RIV. K REACT
TMI1	THREE MILE ISL. 1
TMI2	THREE MILE ISL. 2
TNP1	TROJAN
TPS	ALL TURKEY POINT
TPS3	TURKEY POINT 3
TPS4	TURKEY POINT 4
VCS1	SUMMER
VYS1	VERMONT YANKEE 1
WCS1	WOLF CREEK
WEST	WESTINGHOUSE
WGS3	WATERFORD 3
WNP2	WASH. NUCLEAR 2
X	PLANT X (SAIC DATA)
Y1	PLANT Y,(1ST U) SAIC
Y2	PLANT Y,(2ND U) SAIC
YKR1	YANKEE-ROWE
ZIS	ALL ZION
ZIS1	ZION 1
ZIS2	ZION 2

6. SYSTEMS/COMPONENTS/INSTRUMENTS

Below is a listing of all the systems, components, and instruments that are available in NUCLARR. Not every piece of equipment is available for every person. Appendix B, Section 2, gives detailed information about human actions and equipment that are appropriate for different combinations of vendor and job title.

Systems:

AIR SYSTEMS
ANNUNCIATOR SYSTEMS
COMMUNICATION SYSTEMS
COMPRESSED GAS SYSTEMS
CONDENSATE SYSTEMS
CONTAINMENT SYSTEMS
CONTROL ELEMENT ASSEMBLY SYSTEMS
CONTROL ROD DRIVE SYSTEMS
ELECTRICAL DISTRIBUTION SYSTEMS
EMERGENCY POWER SYSTEMS
EMERGENCY CORE COOLING SYSTEMS
FEEDWATER SYSTEMS
FIRE PROTECTION SYSTEMS
GENERATOR SYSTEMS
HEATING, VENTILATION & AIR COND SYST
HI PRESS CORE SPRAY DIESEL GEN SYST
INSTRUMENTATION AND CONTROL SYSTEMS
MAIN STEAM SYSTEMS
PROCESS SAMPLING SYSTEMS
RADWASTE SYSTEMS
REACTOR COOLANT SYSTEM/CONNECTED SYSTEM
REACTOR COOLANT SYSTEMS
REFUELING SYSTEMS
STANDBY DIESEL GENERATOR SYSTEMS
STEAM SYSTEMS
TURBINE SYSTEMS
WATER SYSTEMS

Components:

ACCUMULATORS
AIR/GAS DRYERS
BATTERIES
BATTERY CHARGERS
CIRCUIT CLOSURES/INTERRUPTERS
COMPUTERS
CONTROL INSTRUMENTS
CONTROL ROD DRIVE MECHANISMS
CONTROL RODS
DEMINERALIZERS
EDUCTORS
ELECTRIC GENERATORS
ELECTRIC HEATERS
ELECTRICAL CONDUCTORS
ELECTRICAL EQUIPMENT
EQUIPMENT - NONSPECIFIC
FANS/VENTILATORS
FILTERS/STRAINERS
HEAT EXCHANGERS
MOTORS
PIPES
PUMPS
RECOMBINERS
SENSORS
STEAM GENERATORS
TURBINES
VALVE OPERATORS
VALVES
VESSELS/TANKS

Displays, Instruments, and Controls)

CONTINUOUSLY VARIABLE CONTROLS
ELECTRICAL TEST EQUIPMENT
EQUIPMENT - NONSPECIFIC
KEYBOARDS
LIFTING/MOVING DEVICES
MEASUREMENT TEST EQUIPMENT
MULTIPOSITION SELECTORS
PRINTED COMMUNICATIONS
QUALITATIVE DISPLAYS
QUANTITATIVE DISPLAYS
TOOLS
TWO-POSITION SWITCHES
VERBAL COMMUNICATIONS

APPENDIX C - HARDWARE CODES

CONTENTS

1. APPLICATIONS

The following is a list of the applications that are valid in NUCLARR. The code is in the form of XXXXYY, with XXXX being the general application and YY indicating a specific subset.

Code	Description
DRIV	DRIVER APPLICATIONS
DRIVDM	Damper Driver
DRIVGN	Generator Driver
DRIVPM	Pump Driver
DRIVVL	Valve Driver
DRIVXX	Unknown Driver
DRIVZZ	Other Driver
ENCL	ENCLOSURE TYPE APPLICATIONS
ENCLEC	Enclosed in Conduit
ENCLED	Enclosed in Duct
ENCLES	Enclosed in Sealed Enclosure
ENCLET	Enclosed in Cable Tray
ENCLEX	Enclosed in Unknown
ENCLEZ	Enclosed in Other
ENCLNE	Not Enclosed
ENCLXX	Unknown Enclosure
EXTE	EXTERNAL ENVIRONMENT APPLICATION
EXTEBN	Benign (within NEMA MG-1 envelope) Ext.
EXTECL	Cold External Environment
EXTECO	Corrosive External Environment
EXTEDT	Dirty/Dusty/Greasy External Environment
EXTEHD	Humid/Damp External Environment
EXTEHR	High Radiation External Environment
EXTEHT	Hot (> 40 degrees C) Ext. Environment
EXTEVB	Vibration External Environment
EXTEWF	Wet (fresh water) External Environment
EXTEWS	Wet (salt water/other electrolyte) Ext.
EXTEXX	Unknown External Environment
EXTEZZ	Other External Environment
EXTL	EXTERNAL LOCATION APPLICATION
EXTLNB	Control Building/Control Complex
EXTLNC	Emergency Onsite Power Supply Building
EXTLND	Emergency Operations Facility (Offsite)
EXTLNE	Fuel Building
EXTLNF	Radwaste Building
EXTLNG	Auxiliary Building
EXTLNH	Reactor Building (BWR)
EXTLNM	Reactor Containment Building
EXTLNN	Turbine Building
EXTLNO	Circulating Water Structures
EXTLNP	Primary Containment
EXTLNS	Secondary Containment

Code	Description
EXTLXT	External to Buildings
EXTLXX	Unknown
EXTLZZ	Other
FACL	FACILITY APPLICATIONS
FACLAC	Allis-Chalmers Facility
FACLBW	Babcock-Wilcox Facility
FACLCE	Combustion Engineering Facility
FACLGA	General Atomic Facility
FACLGE	General Electric Facility
FACLWH	Westinghouse Facility
FACLXX	Unknown Facility
FACLZZ	Other Facility
INST	INSTRUMENTATION APPLICATIONS
INSTAC	Acceleration Instrumentation
INSTAN	Analysis Instrumentation
INSTCD	Conductivity Instrumentation
INSTCU	Current Instrumentation
INSTDP	Differential Pressure Instrumentation
INSTFL	Flow Instrumentation
INSTFN	Flux/Neutron Level Instrumentation
INSTFQ	Frequency Instrumentation
INSTFS	Fire/Smoke Instrumentation
INSTGD	Ground Instrumentation
INSTIN	Intrusion Instrumentation
INSTLM	Limit Instrumentation
INSTLV	Level Instrumentation
INSTMG	Magnetism Instrumentation
INSTMH	Moisture/Humidity Instrumentation
INSTMV	Multi-variable Instrumentation
INSTPD	Speed Instrumentation
INSTPR	Pressure Instrumentation
INSTPW	Power Instrumentation
INSTPX	Proximity Instrumentation
INSTRD	Radiation Instrumentation
INSTRS	Resistance Instrumentation
INSTTF	Torque/Force Instrumentation
INSTTG	Toxic Gas Instrumentation
INSTTI	Time Instrumentation
INSTTP	Temperature Instrumentation
INSTVB	Vibration Instrumentation
INSTVT	Voltage Instrumentation
INSTXX	Unknown Instrumentation
INSTZZ	Other Instrumentation
INTE	INTERNAL ENVIRONMENT APPLICATIONS
INTEAR	Air Internal Environment
INTECG	Compressed Gas Internal Environment
INTECL	Chlorine Internal Environment
INTECS	Chemical Solution other than Boric Acid
INTEHG	Hydrogen Internal Environment
INTEIG	Inert Gas Internal Environment

Code	Description
INTEOL	Oil Internal Environment
INTEST	Steam Internal Environment
INTEWB	Water, Borated Internal Environment
INTEWC	Water, High Purity/Demineralized - Int.
INTEWD	Water, Silt/Particle Entrained - Int.
INTEWS	Water, Brackish Sea Internal Environment
INTEXX	Unknown Internal Environment
INTEZZ	Other Internal Environment
RELY	RELAY FUNCTION APPLICATIONS
RELY02	Time Delay, starting/closing relay func.
RELY03	Checking or Interlocking relay function
RELY12	Overspeed relay function
RELY14	Underspeed relay function
RELY15	Speed/Frequency, matching relay function
RELY23	Temperature Control Relay Function
RELY27	Undervoltage Relay Function
RELY32	Directional Power Relay Function
RELY40	Field Relay Function
RELY46	Phase Balance Negative Sequence Relay
RELY47	Phase Sequence Voltage Relay Function
RELY48	Incomplete Sequence Relay Function
RELY49	Thermal Relay Function
RELY50	Instantaneous Overcurrent Relay Function
RELY51	AC Time Overcurrent Relay Function
RELY59	Overvoltage Relay Function
RELY62	Time Delay, stopping Relay Function
RELY63	Pressure Relay Function
RELY64	Ground Protective Relay Function
RELY67	AC Directional Overcurrent Relay Functn.
RELY81	Frequency Relay Function
RELY86	Locking-out Relay Function
RELY87	Differential Protective Relay Function
RELY98	Overload Relay Function
RELY99	Unknown Relay Function
TYPE	INSTRUMENTATION TYPE APPLICATION
TYPEAN	Analog Instrumentation Type
TYPEDG	Digital Instrumentation Type
TYPEXX	Unknown Instrumentation Type
TYPEZZ	Other Instrumentation Type
VALV	VALVE APPLICATIONS
VALVAN	Angle Valve
VALVBF	Butterfly Valve
VALVBL	Ball Valve
VALVDP	Diaphragm Valve
VALVGL	Globe Valve
VALVGT	Gate Valve
VALVND	Needle Valve
VALVPL	Plug Valve
VALVXX	Unknown Valve
VALVZZ	Other Valve

Code	Description
VTAC	VOLTAGE LEVEL APPLICATIONS - AC
VTACAA	< 125 VAC (single voltage)
VTACAB	< 249 VAC (voltage range)
VTACAC	< 599 VAC (voltage range)
VTACAD	< 4.74 kVAC (voltage range)
VTACAI	< 125 VAC - > 169 kVAC (voltage range)
VTACBB	125 - 249 VAC (single voltage)
VTACBC	125 - 599 VAC (voltage range)
VTACCC	250 - 599 VAC (single voltage)
VTACCD	250 VAC - 4.74 kVAC (voltage range)
VTACDD	600 VAC - 4.74 kVAC (single voltage)
VTACDE	600 VAC - 8.24 kVAC (voltage range)
VTACDI	> 600 VAC (voltage range)
VTACEE	4.75 - 8.24 kVAC (single voltage)
VTACEF	4.75 - 14.9 kVAC (voltage range)
VTACFF	8.25 - 14.9 kVAC (single voltage)
VTACFG	8.25 - 72.4 kVAC (voltage range)
VTACGG	15.0 - 72.4 kVAC (single voltage)
VTACGH	15.0 - 168 kVAC (voltage range)
VTACHH	72.5 - 168 kVAC (single voltage)
VTACHI	> 72.5 kVAC (voltage range)
VTACII	> 169kVAC (230,345kVAC,greater classes)
VTACXX	Voltage level Unknown - AC
VTDC	VOLTAGE LEVEL APPLICATIONS - DC
VTDCAA	< 125 VDC (single voltage)
VTDCAB	< 250 VDC (voltage range)
VTDCBB	125 - 250 VDC (single voltage)
VTDCBC	> 125 VDC (voltage range)
VTDCCC	> 250 VDC (single voltage)
VTDCXX	Voltage level Unknown - DC
VTXX	VOLTAGE LEVEL APPLICATIONS - UNKNOWN
VTXXAA	< 125 V (single voltage)
VTXXAB	< 249 V (voltage range)
VTXXBB	125 - 249 V (single voltage)
VTXXBC	125 - 599 V (voltage range)
VTXXCC	250 - 599 V (single voltage)
VTXXCD	250 V - 4.74 kV (voltage range)
VTXXDD	600 V - 4.74 kV (single voltage)
VTXXDE	600 V - 8.24 kV (voltage range)
VTXXEE	4.75 - 8.24 kV (single voltage)
VTXXEF	4.75 - 14.9 kV (voltage range)
VTXXFF	8.25 - 14.9 kV (single voltage)
VTXXFG	8.25 - 72.4 kV (voltage range)
VTXXGG	15.0 - 72.4 kV (single voltage)
VTXXGH	15.0 - 168 kV (voltage range)
VTXXHH	72.5 - 168 kV (single voltage)
VTXXHI	> 72.5 kV (voltage range)
VTXXII	> 169 kV (single voltage)
VTXXXX	Voltage level Unknown (Unknown VAC/VDC)

2. COMPONENTS/DESIGNS

The following is a list of the component/design codes that are available in NUCLARR. The code is a five-character combination of XXXYY, where XXX is the component and YY is the design. Mechanical codes are listed first, then electrical.

Mechanical Comp/Design Codes	Description
ACC	Accumulators (closed, pressurized)
ACCUM	Accumulators (closed, pressurized)
ACU	Air Conditioning Units/Chillers
ACUCS	Chillers
ACUCU	Air Conditioning Units
ADY	Air Dryers
ADYAB	Absorption
ADYAD	Adsorption
ADYHL	Heatless
ADYHR	Heat Reactivated
ADYRF	Refrigerated
ADYXX	Unknown
ADYZZ	Other
BLC	Blowers/Compressors
BLCBL	Blowers
BLCGC	Gas Circulator
BLCMP	Compressors
BLCSC	Superchargers
BLCTC	Turbochargers
BLCXX	Unknown
BLCZZ	Other
CON	Control Rods
CONRD	Control Rods
CRD	Control Rod Drives
CRDRV	Control Rod Drives
CTM	Controllers, Mechanical
CTMHY	Hydraulic
CTMMC	Mechanical
CTMPN	Pneumatic
CTMXX	Unknown
CTMZZ	Other
DEM	Demineralizers
DEMAN	Anion
DEMCA	Cation
DEMMB	Mixed Bed

Mechanical Comp/Design Codes	Description
DEMPR	Powdered Resin
DEMXX	Unknown
DEMZZ	Other
DPA	Dampers, Pneumatic Operator
DPAOB	Opposed Blade
DPAPB	Parallel Blade
DPAPL	Proportioning Louver
DPASB	Single Blade
DPAXX	Unknown
DPAZZ	Other
DPH	Dampers, Hydraulic Operator
DPHOB	Opposed Blade
DPHPB	Parallel Blade
DPHPL	Proportioning Louver
DPHSB	Single Blade
DPHXX	Unknown
DPHZZ	Other
DPM	Dampers, Motor Operator
DPMOB	Opposed Blade
DPMPB	Parallel Blade
DPMPL	Proportioning Louver
DPMSB	Single Blade
DPMXX	Unknown
DPMZZ	Other
DPN	Dampers, Exclusive of Operators
DPNOB	Opposed Blade
DPNPB	Parallel Blade
DPNPL	Proportioning Louver
DPNSB	Single Blade
DPNXX	Unknown
DPNZZ	Other
DPO	Dampers, Manual Operator
DPOOB	Opposed Blade
DPOPB	Parallel Blade
DPOPL	Proportioning Louver
DPOSB	Single Blade
DPOXX	Unknown
DPOZZ	Other
DPX	Dampers, Unknown Operator
DPXOB	Opposed Blade
DPXPB	Parallel Blade
DPXPL	Proportioning Louver
DPXSB	Single Blade
DPXXX	Unknown
DPXZZ	Other

Mechanical Comp/Design Codes	Description
DPZ	Dampers, Other Operator
DPZOB	Opposed Blade
DPZPB	Parallel Blade
DPZPL	Proportioning Louver
DPZSB	Single Blade
DPZXX	Unknown
DPZZZ	Other
EDJ	Eductors/Ejectors
EDJEC	Ejectors
EDJUC	Eductors
ENG	Engines
ENGDG	Diesel
ENGGE	Gasoline
ENGXX	Unknown
ENGZZ	Other
FCU	Fan Cooler Units
FCUFC	Fan Cooler Units
FIT	Fittings
FITAG	Angle
FITCP	Coupling
FITEL	Elbow
FITFG	Flange
FITNP	Nipple
FITPG	Plug
FITRD	Reducer
FITTB	Tubing
FITTE	Tee (T)
FITUN	Union
FITWL	Well, Process Monitor
FITYE	Wye (Y)
FITZZ	Other
FLT	Filters
FLTCC	Charcoal
FLTHE	HEPA
FLTXX	Unknown
FLTZZ	Other
FUE	Fuel Assemblies (fuel elements)
FUELA	Fuel Assemblies (fuel elements)
FVN	Fans, Ventilators
FVNFN	Fans
FVNVT	Ventilators

Mechanical Comp/Design Codes	Description
HTX	Heat Exchangers
HTXBL	Boiler
HTXCD	Condenser
HTXCO	Cooler
HTXEV	Evaporator
HTXHT	Heater
HTXIC	Ice Condenser
HTXSG	Steam Generator
HTXSH	Superheater
HTXXX	Unknown
HTXZZ	Other
MFI	Mechanical Function Items
MFIBR	Brake
MFICL	Clutch
MFICP	Coupling
MFIGV	Governor
MFITI	Timer
MFIZZ	Other
MPI	Miscellaneous Piping Items
MPIDF	Diaphragm
MPINZ	Nozzle
MPIOR	Orifice
MPIRD	Rupture Disc
MPISL	Sensing Line
MPP	Mechanical Piece Parts
MPPBR	Bearing/Bushing
MPPBT	Belt
MPPFS	Fastener
MPPGR	Gear
MPPHO	Hose
MPPZZ	Other
MTM	Motors, Mechanical
MTMHY	Hydraulic
MTMPN	Pneumatic
PEN	Penetrations
PENAC	Access
PENEL	Electrical
PENEQ	Equipment
PENFU	Fuel
PENHD	Handling
PENIN	Instrument
PENPP	Piping
PENPR	Personnel
PENXX	Unknown
PENZZ	Other

Mechanical Comp/Design Codes	Description
PIP	Pipe
PIPLG	Pipe, >= 3 Inches, ID
PIPSM	Pipe, < 3 Inches, ID
PIPXX	Pipe, unknown size
PPD	Pumps, Diesel Driven
PPDAX	Axial
PPDCF	Centrifugal
PPDDP	Diaphragm
PPDGR	Gear
PPDRD	Radial
PPDRP	Reciprocating
PPDRT	Rotary
PPDVN	Vane
PPDXX	Unknown
PPDZZ	Other
PPE	Pumps, Electromagnetic
PPEMP	Pumps, Electromagnetic
PPJ	Pumps, Jet
PPJMP	Pumps, Jet
PPM	Pumps, Motor Driven
PPMAX	Axial
PPMCF	Centrifugal
PPMDP	Diaphragm
PPMGR	Gear
PPMRD	Radial
PPMRP	Reciprocating
PPMRT	Rotary
PPMVN	Vane
PPMXX	Unknown
PPMZZ	Other
PPN	Pumps, Exclusive of Drivers
PPNAX	Axial
PPNCF	Centrifugal
PPNDP	Diaphragm
PPNGR	Gear
PPNRD	Radial
PPNRP	Reciprocating
PPNRT	Rotary
PPNVN	Vane
PPNXX	Unknown
PPNZZ	Other
PPT	Pumps, Steam Turbine Driven
PPTAX	Axial
PPTCF	Centrifugal
PPTDP	Diaphragm

Mechanical Comp/Design Codes	Description
PPTGR	Gear
PPTRD	Radial
PPTRP	Reciprocating
PPTRT	Rotary
PPTVN	Vane
PPTXX	Unknown
PPTZZ	Other
PPV	Pumps, Vacuum
PPVCP	Cryopump
PPVDP	Diffusion
PPVIP	Ion
PPVMP	Mechanical
PPVSP	Sorption
PPVTM	Turbomolecular
PPVXX	Unknown
PPVZZ	Other
PPX	Pumps, Unknown Driver
PPXAX	Axial
PPXCF	Centrifugal
PPXDP	Diaphragm
PPXGR	Gear
PPXRD	Radial
PPXRP	Reciprocating
PPXRT	Rotary
PPXVN	Vane
PPXXX	Unknown
PPXZZ	Other
PPZ	Pumps, Other Driver
PPZAX	Axial
PPZCF	Centrifugal
PPZDP	Diaphragm
PPZGR	Gear
PPZRD	Radial
PPZRP	Reciprocating
PPZRT	Rotary
PPZVN	Vane
PPZXX	Unknown
PPZZZ	Other
REC	Recombiners
RECCT	Catalytic
RECFL	Flame
RECTM	Thermal
RECXX	Unknown
RECZZ	Other
RES	Reservoirs (open, not pressurized)
RESVR	Reservoirs (open, not pressurized)

Mechanical Comp/Design Codes	Description
SFI	Structural Function Items
SFIAK	Anchors
SFIEJ	Expansion Joints
SFIHG	Hangers
SFISB	Snubbers
SFISU	Supports
SFIXX	Unknown
SFIZZ	Other
STR	Strainers
STRDU	Duplex
STRSC	Self-cleaning
STRSP	Simplex
STRSS	Screens, Stationary
STRST	Screens, Traveling
STRXX	Unknown
STRZZ	Other
TAN	Tanks (closed, not pressurized)
TANKS	Tanks (closed, not pressurized)
TRA	Train (Series of Mech/Elect Components)
TRAIN	Train (Series of Mech/Elect Components)
TRB	Turbines
TRBCB	Combustion
TRBHY	Hydro
TRBST	Steam
TRBXX	Unknown
TRBZZ	Other
VLC	Valves, Check
VLCHY	Hydraulic Operator
VLCMN	Manual Operator (mech handwheel)
VLCMO	Motor Operator
VLCNO	No Operator
VLCNT	No Operator (tilting disk check valve)
VLCPN	Pneumatic Operator
VLCXX	Unknown Operator
VLCZZ	Other Operator
VLD	Valves, Mechanical (dp/spring) Operator
VLDAN	Angle
VLDBF	Butterfly
VLDBL	Ball
VLDDP	Diaphragm
VLDGL	Globe
VLDGT	Gate
VLDND	Needle
VLDPL	Plug
VLDXX	Unknown

Mechanical Comp/Design Codes	Description
VLDZZ	Other
VLE	Valves, Explosive Operator (squib)
VLEAN	Angle
VLEBF	Butterfly
VLEBL	Ball
VLEDP	Diaphragm
VLEGL	Globe
VLEGT	Gate
VLEND	Needle
VLEPL	Plug
VLEXX	Unknown
VLEZZ	Other
VLF	Valves, Float Operator
VLFAN	Angle
VLFBF	Butterfly
VLFBL	Ball
VLFDP	Diaphragm
VLFGL	Globe
VLFGT	Gate
VLFND	Needle
VLFPL	Plug
VLFXX	Unknown
VLFZZ	Other
VLH	Valves, Hydraulic Operator
VLHAN	Angle
VLHBF	Butterfly
VLHBL	Ball
VLHDP	Diaphragm
VLHGL	Globe
VLHGT	Gate
VLHND	Needle
VLHPL	Plug
VLHXX	Unknown
VLHZZ	Other
VLM	Valves, Motor Operator
VLMAN	Angle
VLMBF	Butterfly
VLMBL	Ball
VLMDP	Diaphragm
VLMGL	Globe
VLMGT	Gate
VLMND	Needle
VLMPL	Plug
VLMXX	Unknown
VLMZZ	Other

Mechanical Comp/Design Codes	Description
VLN	Valves, Exclusive of Operators
VLNAN	Angle
VLNBF	Butterfly
VLNBL	Ball
VLNDP	Diaphragm
VLNGL	Globe
VLNGT	Gate
VLNND	Needle
VLNPL	Plug
VLNXX	Unknown
VLNZZ	Other
VLO	Valves, Manual Operator (mech handwheel)
VLOAN	Angle
VLOBF	Butterfly
VLOBL	Ball
VLODP	Diaphragm
VLOGL	Globe
VLOGT	Gate
VLOND	Needle
VLOPL	Plug
VLOXX	Unknown
VLOZZ	Other
VLP	Valves, Pneumatic Operator
VLPAN	Angle
VLPBF	Butterfly
VLPBL	Ball
VLPDP	Diaphragm
VLPGL	Globe
VLPGT	Gate
VLPND	Needle
VLPPL	Plug
VLPXX	Unknown
VLPZZ	Other
VLR	Valves, Relief
VLRDA	Direct Acting
VLRPI	Indirect Acting, Pilot Operated
VLRPW	Indirect Acting, Power Operated
VLRPX	Indirect Acting, Unknown Operator
VLRPZ	Indirect Acting, Other Operator
VLRXX	Unknown
VLRZZ	Other
VLS	Valves, Solenoid Operator
VLSAN	Angle
VLSBF	Butterfly
VLSBL	Ball
VLSDP	Diaphragm
VLSGL	Globe

Mechanical Comp/Design Codes	Description
VLSGT	Gate
VLSND	Needle
VLSPL	Plug
VLSXX	Unknown
VLSZZ	Other
VLV	Valves, Vacuum Breakers
VLVBK	Valves, Vacuum Breakers
VLX	Valves, Unknown Operator
VLXAN	Angle
VLXBF	Butterfly
VLXBL	Ball
VLXDP	Diaphragm
VLXGL	Globe
VLXGT	Gate
VLXND	Needle
VLXPL	Plug
VLXXX	Unknown
VLZ	Valves, Other Operator
VLZAN	Angle
VLZBF	Butterfly
VLZBL	Ball
VLZDP	Diaphragm
VLZGL	Globe
VLZGT	Gate
VLZND	Needle
VLZPL	Plug
VLZXX	Unknown
VOP	Valve Operators
VOPDO	Mechanical (dp/spring) Operator
VOPEO	Explosive Operator (Squib)
VOPFO	Float Operator
VOPHO	Hydraulic Operator
VOPMO	Motor Operator
VOPNO	Manual Operator (mechanical handwheel)
VOPPO	Pneumatic Operator
VOPSO	Solenoid Operator
VOPXO	Unknown Operator
VOPZO	Other Operator
VSL	Vessels (closed, pressurized)
VSLCD	Containment/Drywell
VSLPZ	Pressurizer
VSLRV	Reactor Vessel
VSLSP	Suppression Pool/Wetwell
VSLTO	Torus
VSLXX	Unknown
VSLZZ	Other

Electrical Comp/Design Codes	Description
ABT	Automatic Transfer Switches
ABTSS	Solid-state
ABTXX	Unknown
ABTZZ	Other
AMP	Amplifiers
AMPCA	Current
AMPIA	Isolation
AMPPA	Power
AMPVA	Voltage
AMPXX	Unknown
AMPZZ	Other
ANN	Annunciators
ANNAD	Audio
ANNAV	Audiovisual
ANNVS	Visual
ANNXX	Unknown
ANNZZ	Other
BAT	Batteries
BATDC	Dry Cell (e.g., Nickel-cadmium)
BATWC	Wet Cell (e.g., lead-acid)
BATXX	Unknown
BATZZ	Other
BCH	Chargers, Battery
BCHGR	Chargers, Battery
CBM	Circuit Breakers, Molded Case
CBMSS	Solid-state Trip
CBMTM	Thermal-magnetic Trip
CBMXX	Unknown
CBMZZ	Other
CBP	Circuit Breakers, Power
CBPAM	Air-magnetic
CBPOL	Oil
CBPSS	Solid-state
CBPVC	Vacuum
CBPXX	Unknown
CBPZZ	Other
CHA	Channels (Series - Instrumentation Comp)
CHANL	Channels (Series - Instrumentation Comp)
CND	Conductors
CNDBS	Bus
CNDCC	Cable, Control
CNDPC	Cable, Power
CNDWI	Wire

Electrical Comp/Design Codes	Description
CNDXX	Unknown
CNDZZ	Other
COM	Computation Modules
COMAU	Auctioneer
COMAV	Averagers
COMCA	Calculators
COMCN	Converters
COMCR	Comparators
COMDI	Differentiators
COMFG	Function Generators
COMIN	Integrators/Totalizers
COMMD	Modifiers
COMSM	Summers
COMXX	Unknown
COMZZ	Other
CPU	Computers
CPUAN	Analog
CPUDL	Digital, Mainframe
CPUHB	Hybrid
CPUPC	Digital, Micro/PC
CPUXX	Unknown
CPUZZ	Other
CRC	Circuits, Control
CRCNT	Circuits, Control
CTE	Controllers/Regulators, Non-mechanical
CTEEA	Electronic, Analog
CTEED	Electronic, Digital
CTEEL	Electrical
CTEEM	Electromagnetic
CTEHD	Electrohydraulic
CTEMC	Electromechanical
CTEPD	Electronic, Programmable Digital
CTEPN	Electropneumatic
CTEXX	Unknown
CTEZZ	Other
DSP	Displays
DSPCR	Cathode-ray Tube
DSPEL	Electroluminescent
DSPLC	Liquid-crystal
DSPLD	Light-emitting Diode
DSPXX	Unknown
DSPZZ	Other
EFI	Electrical Function Items
EFICA	Card
EFICB	Circuit Board

Electrical Comp/Design Codes	Description
EFICC	Circuit Card Carrier
EFICD	Conduit
EFICN	Connector
EFICR	Contactor
EFICT	Cable Tray
EFIDC	Disconnect
EFIFN	Fan, Cooling
EFILS	Sequencer, Load
EFIMS	Switch, micro
EFIPN	Panel
EFITM	Timer
EFIZZ	Other
EPP	Electrical Piece Parts
EPPCL	Coil
EPPCP	Capacitor
EPPCT	Contacts
EPPDI	Diode/Rectifier
EPPIC	Integrated Circuit (IC)
EPPID	Inductor
EPPRE	Resistor
EPPTI	Transformer, Internal Power
EPPTR	Transistor
EPPTS	Transformer, Signal
EPPTY	Thyristor (SCR, TRIAC, GTO device)
EPPZZ	Other
FUS	Fuses
FUSCN	Fuses, Control
FUSPW	Fuses, Power
GND	Generators, with Diesel Engine Driver
GNDAL	Alternator
GNDAP	Amplidyne
GNDCN	Converter
GNDDY	Dynamotor
GNDGN	Generator
GNDXX	Unknown
GNDZZ	Other
GNG	Generators, with Gasoline Engine Driver
GNGAL	Alternator
GNGAP	Amplidyne
GNGCN	Convertor
GNGDY	Dynamotor
GNGGN	Generator
GNGXX	Unknown
GNGZZ	Other
GNH	Generators, with Hydro Turbine Driver
GNHAL	Alternator

Electrical Comp/Design Codes	Description
GNHAP	Amplidyne
GNHCN	Convertor
GNHDY	Dynamotor
GNHGN	Generator
GNHXX	Unknown
GNHZZ	Other
GNM	Generators, with Motor Driver
GNMAL	Alternator
GNMAP	Amplidyne
GNMCN	Convertor
GNMDY	Dynamotor
GNMGN	Generator
GNMXX	Unknown
GNMZZ	Other
GNN	Generators, Exclusive of Drivers
GNNAL	Alternator
GNNAP	Amplidyne
GNNCN	Convertor
GNNDY	Dynamotor
GNNGN	Generator
GNNXX	Unknown
GNNZZ	Other
GNS	Generators, with Gas Turbine Driver
GNSAL	Alternator
GNSAP	Amplidyne
GNSCN	Convertor
GNSDY	Dynamotor
GNSGN	Generator
GNSXX	Unknown
GNSZZ	Other
GNT	Generators, with Steam Turbine Driver
GNTAL	Alternator
GNTAP	Amplidyne
GNTCN	Convertor
GNTDY	Dynamotor
GNTGN	Generator
GNTXX	Unknown
GNTZZ	Other
GNX	Generators, with Unknown Driver
GNXAL	Alternator
GNXAP	Amplidyne
GNXCN	Convertor
GNXDY	Dynamotor
GNXGN	Generator
GNXXX	Unknown
GNXZZ	Other

Electrical Comp/Design Codes	Description
GNZ	Generators, with Other Driver
GNZAL	Alternator
GNZAP	Amplidyne
GNZCN	Convertor
GNZDY	Dynamotor
GNZGN	Generator
GNZXX	Unknown
GNZZZ	Other
HTR	Heaters
HTRHT	Heat Tracing
HTRIM	Immersion
HTRXX	Unknown
HTRZZ	Other
IND	Indicators
INDAN	Analog
INDDG	Digital
INDXX	Unknown
INDZZ	Other
LOG	Logic Modules
LOGIC	Logic Modules
MOT	Motors, Electrical
MOTCM	Commutator, DC
MOTIS	Induction, Squirrel-cage, AC
MOTIW	Induction, Wound-rotor, AC
MOTPM	Permanent Magnet, DC
MOTSB	Synchronous, Brushless, AC
MOTSR	Synchronous, Reluctance, AC
MOTSS	Synchronous, Slip-ring, AC
MOTXX	Unknown
MOTZZ	Other
MTC	Motor Controls
MTCCE	Controller, AC Wound-rotor, Electromech
MTCCF	Controller, AC Adjustable-frequency
MTCCS	Controller, AC Wound-rotor, Solid-state
MTCCV	Controller, DC Adjustable-voltage
MTCCX	Controller, Unknown
MTCCZ	Controller, Other
MTCSM	Combination Starter, Electromechanical
MTCSS	Combination Starter, Solid-state
MTCSX	Combination Starter, Unknown
MTCSZ	Combination Starter, Other
PWS	Power Electronics (Solid-state)
PWSEX	Exciter
PWSFC	Frequency Converter
PWSIN	Inverter (except motor controllers)

Electrical Comp/Design Codes	Description
PWSRC	Rectifier,Ctrl w/SCR;no exciter/mtr ctlr
PWSRU	Rectifier, Uncontrolled
PWSUP	Uninterruptible Power Supply
PWSXX	Unknown
PWSZZ	Other
RCD	Recorders
RCDEE	Electrical/Electronic
RCDPN	Pneumatic
RCDXX	Unknown
RCDZZ	Other
RLC	Relays, Control
RLCEM	Electromechanical
RLCEP	Electropneumatic
RLCMW	Mercury Wetted
RLCPN	Pneumatic
RLCRD	Reed
RLCSM	Solid-state/Mechanical
RLCSS	Solid-state
RLCXX	Unknown
RLCZZ	Other
RLP	Relays, Protective
RLPEM	Electromechanical
RLPEP	Electropneumatic
RLPMW	Mercury Wetted
RLPPN	Pneumatic
RLPRD	Reed
RLPSM	Solid-state/Mechanical
RLPSS	Solid-state
RLPXX	Unknown
RLPZZ	Other
SEN	Transducers (Detectors/Elements/Sensors)
SENDT	Detectors
SENEL	Elements
SENSN	Sensors
SWC	Switches, Control
SWCKY	Key
SWCPB	Push-button
SWCRT	Rotary
SWCSL	Selector
SWCTW	Thumb-wheel
SWCXX	Unknown
SWCZZ	Other
SWI	Switches, Instrumentation
SWIAC	Acceleration
SWIAN	Analysis

Electrical Comp/Design Codes	Description
SWICD	Conductivity
SWICU	Current
SWIDP	Differential Pressure
SWIFL	Flow
SWIFN	Flux/Neutron Level
SWIFQ	Frequency
SWIFS	Fire/Smoke
SWIGD	Ground
SWIIN	Intrusion
SWILM	Limit
SWILV	Level
SWIMG	Magnetism
SWIMH	Moisture/Humidity
SWIMV	Multi-Variable
SWIPD	Speed
SWIPR	Pressure
SWIPS	Position
SWIPW	Power
SWIPX	Proximity
SWIRD	Radiation
SWIRS	Resistance
SWITF	Torque/Force
SWITG	Toxic Gas
SWITI	Time
SWITP	Temperature
SWIVB	Vibration
SWIVT	Voltage
SWIXX	Unknown
SWIZZ	Other
SWP	Switches, Power
SWPSP	Single-phase
SWPTD	Three-phase Duplex
SWPTG	Three-phase Ganged
SWPXX	Unknown
SWPZZ	Other
SWS	Switches, Solid-state
SWSBI	Bistable
SWSXX	Unknown
SWSZZ	Other
XMT	Transmitters
XMTRS	Transmitters
XTC	Transformers, Control/Instrumentation
XTCCP	Control Power
XTCCR	Current
XTCDR	Differential/Regulating
XTCIS	Isolation
XTCTC	Transducer/Coupling

Electrical Comp/Design Codes	Description
XTCVP	Voltage (potential)
XTCVR	Voltage-regulating
XTCVV	Variable Voltage
XTCXX	Unknown
XTCZZ	Other
XTP	Transformers, Power
XTPGC	Gas-cooled
XTPLC	Liquid-cooled
XTPXX	Unknown
XTPZZ	Other

3. DISTRIBUTION TYPES

Below is a listing of the statistical distribution codes that are used in NUCLARR. This is used for cases where a distribution assumption was required to derive bounds for the failure probability.

Code	Description
ABSN	Absolute Normal(folded normal)
BETA	Beta
BINOM	Binomial
CHISQ	Chi-square
DISCRETE	Unique, non-continuous distrib
EXP	Exponential
F	F (Fisher-Snedecor)
GAMMA	Gamma
GEOM	Geometric
GUMBEL-I	Gumbel-type I (extreme value)
HYPGEOM	Hypergeometric
LOGN	Log-normal
LOGU	Log-uniform
MULTINOM	Multinomial
NEGBINOM	Negative Binomial (Pascal)
NORMAL	Normal
OTHER	Other (describe in comments)
POISSON	Poisson
T	Student's T
UNIF	Uniform
WEIBULL	Weibull (extreme value)

4. DOCUMENTS

The following is a list of the documents in the hardware side of NUCLARR. The ID Code is comprised of five characters in the format of XXX-YY, with XXX being a unique identifier and YY being the year entered into NUCLARR.

ID Code	Document
63-80	W.H. Sullivan, J.P. Poloski Data Summaries of Licensee Event Reports of Pumps at U.S. Nuclear Power Plants: January 1, 1972 to April 30, 1978, NUREG/CR 1205. January 1980, U.S. NRC.
200-81	Consumers Power Co. Big Rock Point Probabilistic Risk Assessment, Utility PRA. March 1981, Consumers Power Co.
212-81	Electric Power Research Instit Oconee-3 PRA: A Probabilistic Risk Assessment of Oconee Unit 3, NSAC-60. June 1984, Nuclear Safety Analysis Center.
213-81	Pickard, Lowe & Garrick, Inc. Zion Probabilistic Safety Study, Utility PRA. September 1981, Commonwealth Edison Co.
62-82	Miller, Hubble, Trojovsky, Brown Data Summaries of Licensee Event Reports of Valves at U.S. Commercial Nuclear Power Plants: January 1, 1976 to December 31, 1980, NUREG/CR 1363 (Rev.1). October 1982, EG&G Idaho, Inc. for U.S. NRC.
63-82	Trojovsky, M. Data Summaries of Licensee Event Reports of Pumps at U.S. Commercial Nuclear Power Plants: January 1, 1972 to September 30, 1980, NUREG/CR 1205 (Rev.1). January 1982, EG&G Idaho, Inc. for U.S. NRC.
129-82	Drago, J. P., et al. The In-plant Reliability Data Base for Nuclear Plant Components: Interim Data Report: The Pump Component, NUREG/CR-2886. December 1982, Oak Ridge National Laboratory.
209-82	Pickard, Lowe, & Garrick, Inc. Indian Point Probabilistic Safety Study, Utility PRA. December 1982.
53-83	Nuclear Power Engineering Commission IEEE Guide to the Collection & Presentation of Electrical, Electronic, Sensing Component, & Mechanical Equipment Reliability Data for Nuclear Power Generating Stations, IEEE Std-500-1984. January 1983, IEEE Power Engineering Society.

ID Code	Document
128-83	Borkowski, R. J., et al. The In-Plant Reliability Data Base for Nuclear Power Plant Components: Interim Report--The Valve Component, NUREG/CR-3154. December 1983, Oak Ridge National Laboratory.
65-84	Trojovsky, M., and Brown, S. Data Summaries of Licensee Event Reports of Inverters at U.S. Commercial Nuclear Power Plants: January 1, 1976 to December 31, 1982, NUREG/CR-3867. August 1984, U.S. NRC.
67-84	Trojovsky, M., and Brown, S. Data Summaries of Licensee Event Reports of Selected Instrumentation & Control Components at U.S. Commercial Nuclear Power Plants, January 1, 1976 - December 31, 1981, NUREG/CR-1740 (Rev. 1). July 1984, U.S. NRC.
36-85	Kahl, W. K., and Borkowski, R. J. The In-Plant Reliability Data Base for Nuclear Plant Components: Interim Report--Diesel Generators, Batteries, Chargers, and Inverters, NUREG/CR-3831. January 1985, Oak Ridge National Laboratory.
132-85	Bento, J. P., et al. Reliability Data Book for Components in Swedish Nuclear Power Plants, RKS 85 - 25. 1985, Nuclear Safety Board of Swedish Utilities.
134-85	Rossi, M. J. NonElectronic Parts Reliability Data, NPRD-3. October 1985, Rome Air Development Center, Griffith AFB.
211-85	Northeast Utilities Millstone 1 Probabilistic Safety Study. July 1985.
133-86	Wykoff, H. The Reliability of Emergency Diesel Generators at U.S. Nuclear Power Plants, NSAC/108. September 1986, Electric Power Research Institute.
205-86	Northeast Utilities Connecticut Yankee Probabilistic Safety Study, NUSCO-149, Volume II. February 1986.
135-87	Wright, R. E., et al. Pipe Break Frequency Estimation for Nuclear Power Plants, NUREG/CR-4407. May 1987, EG&G Idaho, Inc. for U.S. NRC.
216-87	Fragola, J. R., et al SAIC review of failure data at a B&W PWR (age = 12 yrs) via plant questionnaires, drawings, FSAR information. January 1987, Science Applications International Corp.

ID Code	Document
217-87	Fragola, J., Appignani, P., et al. Unpublished plant-specific PRA data for European Commercial Nuclear Power Plant: Component Reliability Parameter System (CRPS) sheets. January 1987, Science Applications International Corp.
218-87	Fragola, J., Appignani, P., et al. SAIC review of failure data at a Commercial U.S. GE plant: Handwritten tables, Component Reliability Parameter System (CRPS) sheets. January 1987, Science Applications International Corp.
134-89	Proprietary Reliability study of AFWS of Westinghouse PWR, Units 1 & 2. 1986.
135-89	Proprietary Reliability study of RHR of GE BWR. 1987.
220-89	Proprietary PRA of GE BWR 4/Mark I, Unit 1. 1988.
221-89	Proprietary PRA of GE BWR 4/Mark I, Unit 2. 1988.
222-89	Unpublished PRA of Westinghouse 4-loop PWR, Unit 1. 1988.
223-89	Unpublished PRA of Westinghouse 4-loop PWR, Unit 2. 1988.
224-89	Unfinished PRA of GE BWR 4/Mark 2. 1989.
225-89	Proprietary PRA of CE PWR, Unit 1. 1988.
226-89	Unfinished PRA of CE PWR. 1989.
201-92	NUS Corporation Probabilistic Risk Assessment for the Individual Plant Examination Final Report: Surry Units 1 & 2. September 1991, Virginia Electric & Power Company
301-92	Davis Besse IPE data, December 1992, Toledo Edison
401-92	Reece, W., et al, March 1991 HHRAG Nuclear Plant Reliability Data System or B&W Plant Circuit Breaker System Data. November 1991, HHRAG, Idaho National Engineering Laboratory
402-92	Idaho National Engineering Laboratory Proprietary Probabilistic Risk Assessment. December 1989, U.S. Department of Energy
403-92	Eide, S., et al Component External Leakage and Rupture Frequency Estimates. November 1991, EG&G Idaho, Inc.
601-92	Gesellschaft fur Reaktorsicher Deutsche Risikostudie Kernkraftwerk Phase B. January 1990, Verlag TUV Rheinland

5. EXPOSURE DATA ORIGINS

The general origin of the data used to provide the population size, operating hours, or number of demands for failure rate calculations. This field may contain a blank or any of the following codes:

Code	Description
EXPJ	EXPERT JUDGEMENT
OTHR	OTHER
PLNT	PLANT EXPERIENCE
TCAL	TOTAL CALENDAR HOURS
TCRT	TOTAL CRITICAL HOURS
UNKN	UNKNOWN

6. EXPOSURE DATA RECORD TYPES

Below is a listing of the esposure record type codes used in NUCLARR. These are the records used to provide the population size or number of demands for failure rate calculations.

Code	Description
ADLG	ADMINISTRATIVE LOGS
CRLB	CONTROL ROOM LOG BOOKS
DCCN	DEDICATED CYCLE COUNTERS
EXPJ	EXPERT JUDGEMENT
EXTD	EXTERNAL DOCUMENT
JOBO	JOB ORDERS
MOPR	MONTHLY OPERATING STATUS REPORTS
OTHR	OTHER
PMTR	PLANT MAINTENANCE TEST RECORDS
PMWR	PLANT MAINTENANCE WORK REQUESTS
RHLG	RUN HOUR LOGS
SSLB	SHIFT SUPERVISOR LOG BOOKS
SURV	SURVEILLANCE TESTS
TCAL	TOTAL CALENDAR HOURS
TCRT	TOTAL CRITICAL HOURS
TSTR	TEST RESULTS

7. FAILURE DATA ORIGINS

The general origin of either the number of failures for failure rate calculations or the failure rate itself. This field may contain a blank or any of the following codes:

Code	Description
EXPJ	Expert Judgement
LTST	Laboratory test data
OTHR	Other (provide comment)
PLNT	Plant Experience

8. FAILURE DATA RECORD TYPES

Below are the failure data record type codes are used in NUCLARR. These are the records which supplied the number of failures.

Code	Description
ADLG	ADMINISTRATIVE LOGS
CRLB	CONTROL ROOM LOG BOOKS
DEVR	DEVIATION REPORTS
EXTD	EXTERNAL DOCUMENT (SEE COMMENTS FIELD)
INCD	INCIDENT REPORTS
JOBO	JOB ORDERS
LCOR	LIMITING CONDITION FOR OPERATION RECORDS
LERS	LICENSEE EVENT REPORTS
MFTG	MANUFACTURER'S TESTING
MOPR	MONTHLY OPERATING STATUS REPORTS
OTHR	OTHER (SEE COMMENTS FIELD)
PMLG	PLANT MAINTENANCE LOGS
PMTR	PLANT MAINTENANCE TEST RECORDS
PMWR	PLANT MAINTENANCE WORK REQUESTS
SOCR	SIGNIFICANT OCCURRENCE REPORTS
SSLB	SHIFT SUPERVISOR LOG BOOKS
SURV	SURVEILLANCE TESTS
TSTR	TEST REPORTS
UNKN	UNKNOWN
UTDB	UTILITY DATA BASE

9. FAILURE MODES

The following is a list of the failure mode codes available in NUCLARR. A single character code indicates a failure mode group. A three-character code is a single failure mode.

Code	Description
F	Fails to Operate Group
FTO	Fails to Operate
FTS	Fails to Start
FTR	Fails to Run
FTP	Fails to Open
FTC	Fails to Close
FTE	Fails to Energize
FTD	Fails to De-energize
FTT	Fails to Transfer Elect
S	Spurious Operation Group
SO	Spurious Operation
SS	Spurious Start
SP	Spurious (Transfer) Open
SC	Spurious (Transfer) Close
SE	Spurious Energize
SD	Spurious De-energize
ST	Spurious Transfer Elect
L	Leakage Group
LK	Leakage
LE	External Leakage/Rupture
LI	Internal Leakage
B	Blockage Group
BL	Blockage
BP	Plugged

10. NORMAL STATES

The normal operating state for the component. This field may contain any of the following codes:

Code	Description
NA	Normally Alternating
NC	Normally Closed
ND	Normally De-energized
NE	Normally Energized
NL	Normally Locked-out
NO	Normally Open
NR	Normally Running
NS	Normally Standby
XX	Unspecified

11. PLANTS

Each individual data record in NUCLARR includes a code for the plant from which the data was collected. In the case of proprietary data, special codes have been assigned to provide plant anonymity.

Code	Plants
ALLP	ALL PLANTS
ANO1	ARKANSAS 1
ANO2	ARKANSAS 2
APRA	PROPRIETARY PRA "A"
AREL	PROPRIETARY REL "A"
ATR	ADV.TEST REACT.-INEL
AWV1	VOGTLE 1
B&W	BABCOCK & WILCOX
BEP	ALL BRUNSWICK
BEP1	BRUNSWICK 1
BEP2	BRUNSWICK 2
BIBB	BIBLIS B (GERMANY)
BPRA	PROPRIETARY PRA "B"
BREL	PROPRIETARY REL "B"
BRF1	BROWNS FERRY 1
BRF2	BROWNS FERRY 2
BRF3	BROWNS FERRY 3
BRP1	BIG ROCK POINT
BRS1	BRAIDWOOD 1
BVS1	BEAVER VALLEY 1
BWR	ALL BWR PLANTS
BYS1	BYRON 1
BYS2	BYRON 2
CAY1	CALLAWAY
CCN	ALL CALVERT CLIFFS
CCN1	CALVERT CLIFFS 1
CCN2	CALVERT CLIFFS 2
CE	COMBUSTION ENGINEER.
CNS1	CATAWBA 1
CNS2	CATAWBA 2
CPP1	CLINTON 1
CPR1	COOPER STATION
CPRA	UNPUBLISHED PRA "C"
CPS	ALL COMMANCHE PEAK
CRP3	CRYSTAL RIVER 3
DAC1	DUANE ARNOLD
DBS1	DAVIS-BESSE
DCC1	COOK 1
DCC2	COOK 2
DCP1	DIABLO CANYON 1
DCP2	DIABLO CANYON 2
DPRA	UNPUBLISHED PRA "D"
DRS	ALL DRESDEN
DRS1	DRESDEN 1
DRS2	DRESDEN 2
DRS3	DRESDEN 3
EFP2	FERMI 2
EIH1	HATCH 1
EIH2	HATCH 2
EPRA	UNFINISHED PRA "E"
EUR	EUROPEAN COMM (SAIC)
FCS1	FORT CALHOUN
FFTF	FAST FLUX TEST FACIL
FPRA	PROPRIETARY PRA "F"
FSV1	FORT ST. VRAIN
GE	GENERAL ELECTRIC
GGS1	GRAND GULF
GPRA	UNFINISHED PRA "G"
HBR2	ROBINSON 2
HCS1	HOPE CREEK
HMB1	HUMBOLDT BAY
HNP1	HADDAM NECK
HPRA	PROPRIETARY PRA "H"
IP1	IPRDS PLANT 1
IP2	IPRDS PLANT 2
IP3	IPRDS 3,UNITS 1-3
IP4	IPRDS PLANT 4
IP5	IPRDS 5,UNITS 1-3
IPS2	INDIAN POINT 2
IPS3	INDIAN POINT 3
JAF1	FITZPATRICK
JMF	ALL FARLEY
JMF1	FARLEY 1
JMF2	FARLEY 2
KNP1	KEWAUNEE
LBR1	LA CROSSE
LGS1	LIMERICK
LSC	ALL LASALLE
LSC1	LASALLE 1
LSC2	LASALLE 2
LSC3	LASALLE 3
MGS1	MCGUIRE 1
MGS2	MCGUIRE 2
MNP1	MONTICELLO
MNS1	MILLSTONE 1
MNS2	MILLSTONE 2
MNS3	MILLSTONE 3
MYP1	MAINE YANKEE

Code	Plants
NAS1	NORTH ANNA 1
NAS2	NORTH ANNA 2
NEE1	OCONEE 1
NEE2	OCONEE 2
NEE3	OCONEE 3
NMP1	NINE MILE PT. 1
NMP2	NINE MILE PT. 2
NONP	NON-PLANT SPECIFIC
OCP1	OYSTER CREEK
PAL1	PALISADES
PAV1	PALO VERDE 1
PAV2	PALO VERDE 2
PBH	ALL POINT BEACH
PBH1	POINT BEACH 1
PBH2	POINT BEACH 2
PBS	ALL PEACH BOTTOM 1
PBS2	PEACH BOTTOM 2
PBS3	PEACH BOTTOM 3
PIN	ALL PRAIRIE ISLAND
PIN1	PRAIRIE ISLAND 1
PIN2	PRAIRIE ISLAND 2
PNP1	PERRY
PPS1	PILGRIM
PWR	ALL PWR PLANTS
QAD	ALL QUAD CITIES
QAD1	QUAD CITIES 1
QAD2	QUAD CITIES 2
RBS1	RIVER BEND
REG1	GINNA
RGLS	RINGHALS 2 (SWEDISH)
RSS1	RANCHO SECO
SBK1	SEABROOK
SES	ALL SUSQUEHANNA
SES1	SUSQUEHANNA 1
SES2	SUSQUEHANNA 2
SGS1	SALEM 1
SGS2	SALEM 2
SHS1	HARRIS
SLS1	ST. LUCIE 1
SLS2	ST. LUCIE 2
SNP1	SEQUOYAH 1
SNP2	SEQUOYAH 2
SNS1	SHOREHAM
SOS1	SAN ONOFRE 1
SOS2	SAN ONOFRE 2
SOS3	SAN ONOFRE 3
SPS	ALL SURRY
SPS1	SURRY 1
SPS2	SURRY 2
SVR1	SAVANNAH RIV. K REACT
TMI1	THREE MILE ISL. 1
TMI2	THREE MILE ISL. 2
TNP1	TROJAN
TPS	ALL TURKEY POINT
TPS3	TURKEY POINT 3
TPS4	TURKEY POINT 4
VCS1	SUMMER
VYS1	VERMONT YANKEE 1
WCS1	WOLF CREEK
WEST	WESTINGHOUSE
WGS3	WATERFORD 3
WNP2	WASH. NUCLEAR 2
X	PLANT X (SAIC DATA)
Y1	PLANT Y,(1ST U) SAIC
Y2	PLANT Y,(2ND U) SAIC
YKR1	YANKEE-ROWE
ZIS	ALL ZION
ZIS1	ZION 1
ZIS2	ZION 2

12. SYSTEMS

Below is a listing of the two-character system codes that are used in NUCLARR. A data record may have up to five system codes associated with it.

Code	Description
AA	CONTROL ROD DRIVE SYSTEM
AB	REACTOR COOLANT SYSTEM (PWR)
AC	REACTOR CORE SYSTEM
AD	REACTOR RECIRCULATION SYSTEM (BWR)
AE	REACTOR COOLANT SYSTEM - HELIUM (HTGR)
AL	ALL SYSTEM (BALANCE OF PLANT) [SPECIAL NON-EIIS CODE]
AP	PRESSURIZER SYSTEM (PWR) [SPECIAL NON-EIIS CODE]
AS	STEAM GENERATING SYSTEM (PWR) [SPECIAL NON-EIIS CODE]
AV	REACTOR VESSEL SYSTEM [SPECIAL NON-EIIS CODE]
BA	AUXILIARY/EMERGENCY FEEDWATER SYSTEM (PWR)
BB	CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM
BC	CONTAINMENT ICE CONDENSER/REFRIGERATION SYSTEM (PWR)
BD	CONTAINMENT LEAKAGE CONTROL SYSTEM
BE	CONTAINMENT SPRAY SYSTEM (PWR)
BF	CONTAINMENT VACUUM RELIEF SYSTEM
BG	HIGH PRESSURE CORE SPRAY SYSTEM (BWR)
BH	EMERGENCY/STANDBY GAS TREATMENT SYSTEM
BI	ESSENTIAL SERVICE WATER SYSTEM
BJ	HIGH PRESSURE COOLANT INJECTION SYSTEM (BWR)
BK	CONTAINMENT FAN COOLING SYSTEM (PWR)
BL	ISOLATION CONDENSER SYSTEM (BWR)
BM	LOW PRESSURE CORE SPRAY SYSTEM (BWR)
BN	REACTOR CORE ISOLATION COOLING SYSTEM (BWR)
BO	LOW PRESSURE COOLANT INJECTION SYSTEM (BWR)
BP	LOW PRESSURE SAFETY INJECTION SYSTEM (PWR)
BQ	HIGH PRESSURE SAFETY INJECTION SYSTEM (PWR)
BR	STANDBY LIQUID CONTROL SYSTEM (BWR)
BS	ULTIMATE HEAT SINK SYSTEM
BT	SUPPRESSION POOL MAKEUP SYSTEM (BWR)
BU	LOOP ISOLATION/SHUTDOWN (HTGR) [SPECIAL NON-EIIS CODE]
BV	CONTAINMENT PURGE SYSTEM [SPECIAL NON-EIIS CODE]
BW	INTERMEDIATE HEAD INJECTION (PWR) [SPECIAL NON-EIIS CODE]
BX	UPPER HEAD INJECTION (PWR) [SPECIAL NON-EIIS CODE]
BY	AUTOMATIC DEPRESSURIZATION SYSTEM [SPECIAL NON-EIIS CODE]
CA	BORON RECYCLE SYSTEM (PWR)
CB	CHEMICAL AND VOLUME CONTROL/MAKEUP AND PURIFICATION SYSTEM (PWR)
CC	CLOSED/COMPONENT COOLING WATER SYSTEM
CD	CONTROL ROD DRIVE COOLING SYSTEM (PWR)
CE	REACTOR WATER CLEANUP SYSTEM (BWR)
CF	REACTOR SERVICES SYSTEM
CG	SUPPRESSION POOL PURIFICATION SYSTEM (BWR)
CH	RESIDUAL HEAT REMOVAL SYSTEM (BWR) [SPECIAL NON-EIIS CODE]
CI	RESIDUAL HEAT REMOVAL SYSTEM (PWR) [SPECIAL NON-EIIS CODE]

Code	Description
DA	FUEL POOL COOLING AND PURIFICATION SYSTEM
DB	NUCLEAR FUEL SERVICES SYSTEM
DC	DIESEL FUEL OIL SYSTEM
DE	FUEL OIL RECEIVING, STORAGE, AND TRANSFER SYSTEM
DF	NUCLEAR FUEL TRANSFER SYSTEM
EA	MEDIUM-VOLTAGE POWER SYSTEM (601V THROUGH 35 KV)
EB	MEDIUM-VOLTAGE POWER SYSTEM - CLASS 1E
EC	LOW-VOLTAGE POWER SYSTEM (600V AND LESS)
ED	LOW-VOLTAGE POWER SYSTEM - CLASS 1E
EE	INSTRUMENT AND UNINTERRUPTIBLE POWER SYSTEM
EF	INSTRUMENT AND UNINTERRUPTIBLE POWER SYSTEM - CLASS 1E
EI	DC POWER SYSTEM
EJ	DC POWER SYSTEM - CLASS 1E
EK	EMERGENCY ONSITE POWER SUPPLY SYSTEM
EL	MAIN GENERATOR OUTPUT POWER SYSTEM
EX	AC POWER (SPECIAL NON-EIIS CODE)
FA	CABLE RACEWAY SYSTEM
FB	CATHODIC PROTECTION SYSTEM
FC	GROUNDING AND LIGHTNING PROTECTION SYSTEM
FD	HEAT TRACING SYSTEM
FE	HEAT TRACING SYSTEM - CLASS 1E
FF	NORMAL AC LIGHTING SYSTEM
FG	STANDBY AC LIGHTING SYSTEM
FH	EMERGENCY DC LIGHTING SYSTEM
FI	COMMUNICATIONS SYSTEM
FJ	STATION GENERATION TELEMETERING SYSTEM
FK	SWITCHYARD SYSTEM
IA	SECURITY SYSTEM
IB	ANNUNCIATOR SYSTEM
IC	FIRE DETECTION SYSTEM
ID	COMPUTER SYSTEM
IG	INCORE/EXCORE NEUTRON MONITORING SYSTEM
IH	CORE VIBRATION MONITORING SYSTEM
II	LOOSE PARTS MONITORING SYSTEM
IJ	LEAK MONITORING SYSTEM
IK	CONTAINMENT ENVIRONMENTAL MONITORING SYSTEM
IL	RADIATION MONITORING SYSTEM
IM	TEMPERATURE MONITORING SYSTEM
IN	SEISMIC MONITORING SYSTEM
IO	PERFORMANCE MONITORING SYSTEM
IP	POST-ACCIDENT MONITORING SYSTEM
IQ	SEQUENCE OF EVENTS MONITORING SYSTEM
IR	TELEVISION SYSTEM
IS	ENVIRONMENTAL/METEOROLOGICAL MONITORING SYSTEM
IT	MAIN TURBINE INSTRUMENTATION SYSTEM
IU	DISPLAY CONTROL SYSTEM
IV	VIBRATION MONITORING SYSTEM
JA	INTEGRATED CONTROL SYSTEM
JB	FEEDWATER/STEAM GENERATOR WATER LEVEL CONTROL SYSTEM

Code	Description
JC	PLANT PROTECTION SYSTEM
JD	REACTOR POWER CONTROL SYSTEM
JE	ENGINEERED SAFETY FEATURES ACTUATION SYSTEM
JF	TOXIC GAS ISOLATION SYSTEM [SPECIAL NON-EIIS CODE]
JG	SOLID STATE CONTROL SYSTEM/AUXILIARY LOGIC CONTROL SYSTEM
JI	TURBINE STEAM BYPASS CONTROL SYSTEM
JK	FEEDWATER PUMP TURBINE INSTRUMENTATION AND CONTROL SYSTEM
JL	PANELS SYSTEM
JM	CONTAINMENT ISOLATION CONTROL SYSTEM
JN	LOW TEMP/OVERPRESSURE PROTECTION SYSTEM (PWR) [SPECIAL NON-EIIS CODE]
JR	RECIRCULATION ACTUATION SYSTEM [SPECIAL NON-EIIS CODE]
JS	ANTICIPATED TRANSIENT W/O SCRAM SYSTEM (BWR) [SPECIAL NON-EIIS CODE]
JT	STEAM AND FEEDWATER RUPTURE CONTROL SYSTEM (B&W) [SPL NON-EIIS CODE]
JU	FEED ONLY GOOD STEAM GENERATOR SYSTEM (B&W) [SPL NON-EIIS CODE]
KA	CONDENSATE STORAGE AND TRANSFER SYSTEM
KB	TURBINE BUILDING CLOSED COOLING WATER SYSTEM
KC	DEMINERALIZED WATER STORAGE AND TRANSFER SYSTEM
KD	CONDENSATE AND FEEDWATER CHEMISTRY CONTROL SYSTEM
KE	HEAT REJECTION SYSTEM
KF	HEAT REJECTION CHEMICAL TREATMENT SYSTEM
KG	NONESSENTIAL SERVICE WATER SYSTEM
KH	WATER FILTRATION SYSTEM
KI	RAW WATER MAKEUP SYSTEM
KJ	MAKEUP DEMINERALIZER SYSTEM
KK	PORTABLE WATER DISTRIBUTION SYSTEM
KL	REMOVAL CHEMICAL CLEANING SYSTEM
KM	CHILLED WATER SYSTEM
KN	SAMPLING AND WATER QUALITY SYSTEM
KO	GLAND SEAL WATER SUPPLY SYSTEM
KP	FIRE PROTECTION SYSTEM (WATER)
KQ	FIRE PROTECTION SYSTEM (CHEMICAL)
KR	FIRE PROTECTION SYSTEM (PASSIVE) [SPECIAL NON-EIIS CODE]
KS	REACTOR WATER STORAGE TANK [SPECIAL NON-EIIS CODE]
LA	DIESEL LUBE OIL SYSTEM
LB	DIESEL COOLING WATER SYSTEM
LC	DIESEL GENERATOR STARTING AIR SYSTEM
LD	INSTRUMENT AIR SUPPLY SYSTEM
LE	ESSENTIAL AIR SYSTEM
LF	SERVICE AIR SYSTEM
LG	WELDING GAS SYSTEM
LH	BREATHING AIR SYSTEM
LJ	HYDROGEN SUPPLY SYSTEM
LK	NITROGEN SUPPLY SYSTEM
LL	LUBE OIL SYSTEM
LM	LUBE OIL STORAGE AND TRANSFER SYSTEM
LN	INSULATING OIL SYSTEM
LP	LABORATORY GAS SYSTEM
LQ	LABORATORY EQUIPMENT SYSTEM
LR	MATERIAL AND EQUIPMENT HANDLING SYSTEM
LS	PLANT SHOP SYSTEM
LT	RECORD STORAGE SYSTEM

Code	Description
LU	YARD HANDLING AND MAINTENANCE SYSTEM
LV	PLANT HOT WATER SYSTEM
LW	CARBON DIOXIDE SUPPLY SYSTEM
MA	ADMINISTRATION BUILDING
MB	INDUSTRIAL/SANITARY WASTE TREATMENT BUILDING
MC	MAINTENANCE AND WAREHOUSE BUILDING
MD	MAKEUP WATER INTAKE STRUCTURE
MF	SERVICE BUILDING
MG	WASTEWATER OUTFALL STRUCTURE
MH	WATER TREATMENT BUILDING
MJ	VISITORS CENTER
MK	ESSENTIAL SERVICE WATER PUMP BUILDING
MS	MAIN STEAM ISOLATION VALVES [SPECIAL NON-EIIS CODE]
NA	CONTROL BUILDING/CONTROL COMPLEX
NB	EMERGENCY ONSITE POWER SUPPLY BUILDING
NC	EMERGENCY OPERATIONS FACILITY (OFFSITE)
ND	FUEL BUILDING
NE	RADWASTE BUILDING
NF	AUXILIARY BUILDING
NG	REACTOR BUILDING (BWR)
NH	REACTOR CONTAINMENT BUILDING
NM	TURBINE BUILDING
NN	CIRCULATING WATER STRUCTURES
NO	NO SYSTEMS INVOLVED [SPECIAL NON-EIIS CODE]
NP	PRIMARY CONTAINMENT [SPECIAL NON-EIIS CODE]
NS	SECONDARY CONTAINMENT [SPECIAL NON-EIIS CODE]
NT	DRYWELL (SPECIAL NON-EIIS CODE)
PM	PLANT MANAGEMENT [SPECIAL NON-EIIS CODE]
PS	PLANT STAFFING [SPECIAL NON-EIIS CODE]
SA	AUXILIARY STEAM SYSTEM
SB	MAIN/REHEAT STEAM SYSTEM
SD	CONDENSATE SYSTEM
SE	STEAM EXTRACTION SYSTEM
SF	CONDENSATE DEMINERALIZER SYSTEM
SG	CONDENSER SYSTEM
SH	CONDENSER VACUUM SYSTEM
SI	CONDENSER TUBE CLEANING SYSTEM
SJ	FEEDWATER SYSTEM
SK	FEEDWATER PUMP INJECTION AND MISCELLANEOUS SYSTEM
SL	FEEDWATER PUMP TURBINE LUBE OIL SYSTEM
SM	LP HEATER DRAINS AND VENTS SYSTEM
SN	HP HEATER AND MSR DRAINS AND VENTS SYSTEM
TA	MAIN TURBINE SYSTEM
TB	MAIN GENERATOR SYSTEM
TC	TURBINE STEAM SEAL SYSTEM
TD	TURBINE LUBE OIL SYSTEM
TE	MISCELLANEOUS TURBINE VENTS SYSTEM
TF	TURBINE DRAINS AND MISCELLANEOUS PIPING SYSTEM

Code	Description
TG	MAIN TURBINE CONTROL FLUID SYSTEM
TH	MAIN GENERATOR GAS PURGE SYSTEM
TI	MAIN GENERATOR SEAL OIL SYSTEM
TJ	MAIN GENERATOR STATOR COOLING SYSTEM
TK	MAIN GENERATOR HYDROGEN COOLING SYSTEM
TL	MAIN GENERATOR EXCITATION SYSTEM
UA	PUMPING STATION ENVIRONMENTAL CONTROL SYSTEM
UB	WATER TREATMENT BUILDING ENVIRONMENTAL CONTROL SYSTEM
UC	SERVICE BUILDING ENVIRONMENTAL CONTROL SYSTEM
UD	ADMINISTRATION BUILDING ENVIRONMENTAL CONTROL SYSTEM
UE	SECURITY BUILDING ENVIRONMENTAL CONTROL SYSTEM
UF	TECHNICAL SUPPORT CENTER ENVIRONMENTAL CONTROL SYSTEM
UG	EMERGENCY OPERATIONS FACILITY ENVIRONMENTAL CONTROL SYSTEM
UH	VISITORS CENTER ENVIRONMENTAL CONTROL SYSTEM
VA	REACTOR BUILDING ENVIRONMENTAL CONTROL SYSTEM
VB	DRYWELL ENVIRONMENTAL CONTROL SYSTEM (BWR)
VC	SHIELD ANNULUS RETURN AND EXHAUST SYSTEM
VE	ACCESS CORRIDORS ENVIRONMENTAL CONTROL SYSTEM
VF	AUXILIARY BUILDING ENVIRONMENTAL CONTROL SYSTEM
VG	FUEL BUILDING ENVIRONMENTAL CONTROL SYSTEM
VH	RADWASTE BUILDING ENVIRONMENTAL CONTROL SYSTEM
VI	CONTROL BUILDING/CONTROL COMPLEX ENVIRONMENTAL CONTROL SYSTEM
VJ	EMERGENCY ONSITE POWER SUPPLY BUILDING ENVIRONMENTAL CONTROL SYSTEM
VK	TURBINE BUILDING ENVIRONMENTAL CONTROL SYSTEM
VL	PLANT EXHAUST SYSTEM
WA	CASK DECONTAMINATION SYSTEM
WB	SOLID WASTE MANAGEMENT SYSTEM
WD	LIQUID WASTE MANAGEMENT SYSTEM
WE	GASEOUS WASTE MANAGEMENT SYSTEM (PWR)
WF	OFFGAS SYSTEM (BWR)
WG	SANITARY WASTE PROCESSING SYSTEM
WH	WASTEWATER DISPOSAL SYSTEM
WI	STEAM GENERATOR BLOWDOWN SYSTEM (PWR)
WJ	SLUDGE WASTE DEWATERING SYSTEM
WK	EQUIPMENT AND FLOOR DRAIN SYSTEM
XC	ECCS (SPECIAL NON-EIIS CODE)
XX	OTHER KNOWN SYSTEM - SEE COMMENT FIELD [SPECIAL NON-EIIS CODE]
XY	MULTIPLE KNOWN SYSTEM - SEE COMMENT FIELD [SPECIAL NON-EIIS CODE]
ZP	PRIMARY CONTAINMENT - UNDETERMINED SYSTEM [SPECIAL NON-EIIS CODE]
ZS	SECONDARY CONTAINMENT - UNDETERMINED SYSTEM [SPECIAL NON-EIIS CODE]
ZZ	UNKNOWN SYSTEM [SPECIAL NON-EIIS CODE]

APPENDIX D - LAN OPERATION

LAN OPERATION

If you are presently connected to an NRC LAN or will be connected soon, you may be able to use the LAN to update your NUCLARR files on your PC and eliminate the need for having most of the data files on your PC. The LAN access is typically very fast and LAN users can save 3 megabytes or more of hard drive space by have NUCLARR read from the network server for all the data lookup files.

- In order to access these files, your PC must be physically connected to the LAN and the LAN manager must install a few special configuration files on your machine. Once these two prerequisites are taken care, your NUCLARR will automatically update itself whenever there are newly released program or data files.

- With the LAN manager, you can set up your machine to access the data from the network or simply to check online for any new updates each time you start NUCLARR. (If you select the first option, you also get program updates automatically as well.)

Accessing Data on the Network

- If you elect to access the data on the network, you may find that NUCLARR actually runs faster, depending on the access time of your current hard drive and on the traffic on the network at that moment. There may be times when NUCLARR searches will go slower because of network traffic. (NUCLARR, by itself, does not put great demands on the network.)

- When you run NUCLARR in this way, you are actually calling up the programs from your hard drive and executing it on your machine. The program, however, looks at the network server as though it was an attached hard drive (on your desk) and gets all the search and lookup information from the net. Each time you start up NUCLARR it first checks the dates of all your files against those in a master directory on the network. If your files are older, NUCLARR automatically downloads those newer files to your hard drive. When running in this configuration, you will never need any of the read-only data files (that comprise almost 3 megabytes of space).

Using the Network for File Updating Only

- If you elect to use the network for update only, you will actually have all the program and data files on your machine. Each time you run NUCLARR it will check the network files and download any newer data or program files.

- If you already have NUCLARR and want to start running NUCLARR on the net, your LAN manager needs to run a special program called Configur on your PC to create some configuration files that tell NUCLARR where your data resides and where the update files are to be found.

- If you do not have NUCLARR and are already connected to the net, the LAN manager will be able to copy down the needed files from the network to machine and then do the needed configuration.

END

DATE FILMED

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