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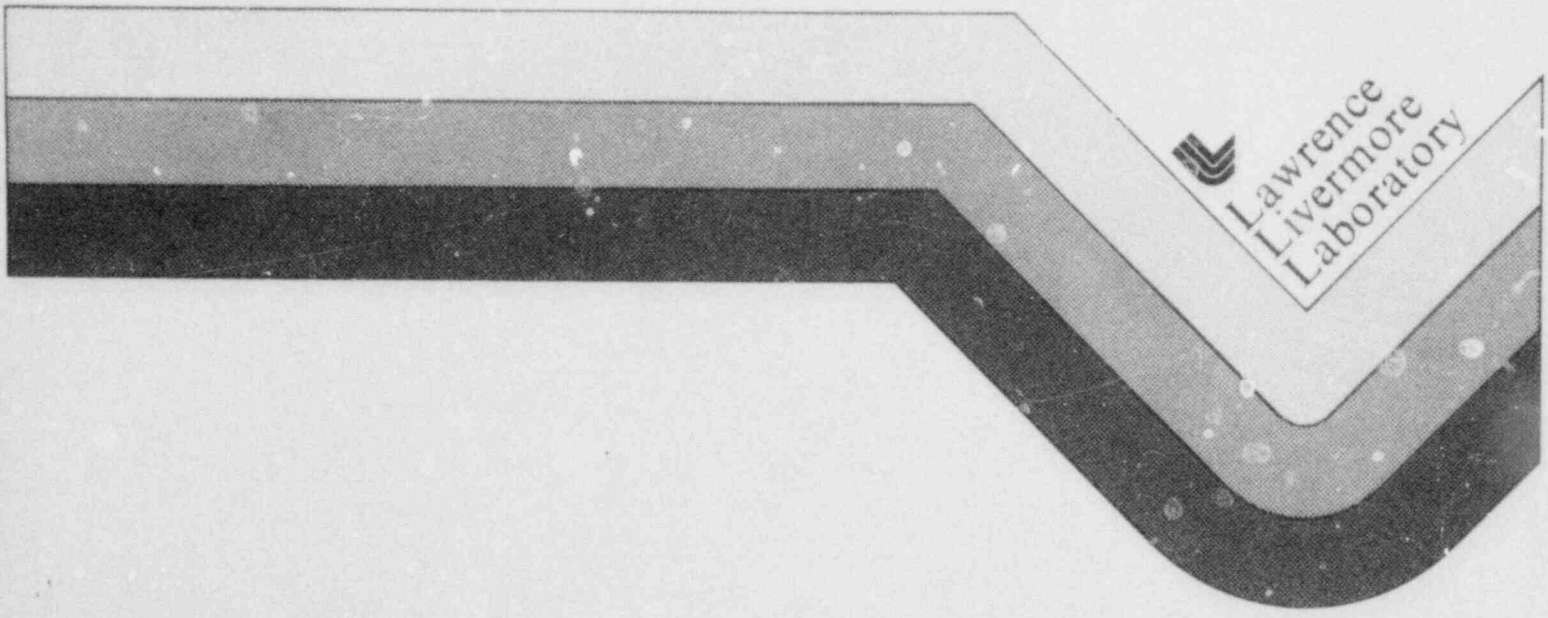
Safeguard Vulnerability Analysis Program (SVAP) User's Manual

W. J. Orvis

May 1980



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Safeguard Vulnerability Analysis Program (SVAP) User's Manual

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ABSTRACT

The operation and use of the Safeguards Vulnerability Analysis Program (SVAP) Input/Output programming written for a Tektronix 4050 series computer is described. The programming consists of the Facility Description Program and its continuation, the Accounting System Program, plus several service routines. These programs generate the input files that will be used by the SVAP codes in a main frame computer, such as the CDC 7600 at Lawrence Livermore Laboratory.

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FOREWORD

This document is one in a set of four that serve to describe the Safeguards Vulnerability Analysis Program (SVAP) developed at Lawrence Livermore Laboratory (LLL).* A fifth report, to be published, runs through an application of SVAP on a real nuclear facility.

SVAP addresses one class of safeguards threat: theft or diversion of special nuclear material (SNM) by nonviolent insiders, acting individually or in collusion. This user's manual will assist the NRC analyst in implementing SVAP applications; it is the principal guide to computer use in SVAP.

The SVAP work was supported by the U.S. Nuclear Regulatory Commission under a Memorandum of Understanding with the United States Department of Energy. The NRC FIN number is A-0115.

*The reader is referred to the Executive Summary,[1] an overview of SVAP, and the SVAP Data-Gathering Handbook, Volume I[2] and Volume II.[3]

1.0 INTRODUCTION

The Safeguard Vulnerability Analysis Program (SVAP) was designed to analyze the physical security and material accounting systems in nuclear facilities. Of primary concern to the program is the location of diversion paths along which an individual or a small group of knowledgeable insiders could divert special nuclear material (SNM).

The SVAP scheme calls for sending a safeguards analyst to the facility in question to collect data. The analyst achieves this by consulting facility architectural drawings and other documents; he also inspects the facility. The collected data are entered into the SVAP data-gathering handbook, reordered in the second part of the handbook, and entered in a Tektronix 4050 series computer, either at the facility site or at NRC headquarters. The Tektronix computer prepares the data for processing in a main frame computer, such as a CDC 7600.

This careful preparation of data is necessary because the powerful SVAP codes in the main frame computer need specific and detailed sets of inputs. This operator's manual describes how the input data sets are generated. They consist of the Facility Description Program and its continuation, the Accounting System Program, plus several service routines. All of these input data sets operate on a Tektronix 4050 series computer and generate data tapes that can be transmitted to or fed to a main frame computer.

In the main frame computer the data delivered by the Tektronix is analyzed by the SVAP codes and a SVAP output tape is generated. This tape can be transmitted back to the Tektronix where the outputs can be printed and reviewed. The input and output programming has all been put on the Tektronix computer so that data entry and output can be done remotely. In this way, if the NRC so decides, questions and problems with the input data can be ironed out while still at the facility being evaluated. The reader should consult the SVAP Executive Summary[1] and the SVAP Data-Gathering Handbook, Vol. I,[2] for a full description of the SVAP operating procedure.

This manual is also located on the SVAP Program Disk as an interactive program. It is located in 48 disk files named @SVAPLIB/MANUAL1 through @SVAPLIB/MANUAL48. The program can be accessed from the disk menu (see Section 2) or directly by loading and running @SVAPLIB/MANUAL1.

2.0 CODE START-UP AND OPERATION

2.1 SYSTEM INITIALIZATION

Before any programming can be run, the system must be initialized and the disk bootstrapped. To initialize the system, turn on the Tektronix computer components in the following order: disk drive 1, disk drive 0, 4050 series computer and any other components. Insert the SVAP program tape and press AUTO-LOAD. This will load and run the tape menu.

From the tape menu, select the Disk Bootstrap Program and run it. The program will check the system clock and, if it is not set, request the current date and time. The date and time must be input in the following format:

```
DD-MMM-YY HH:MM:SS
```

where

```
 DD = DAY
MMM = MONTH
 YY = YEAR
 HH = HOUR
 MM = MINUTE
 SS = SECOND.
```

For example:

```
03-JUL-79 14:32:00
```

After the clock has been set, the program mounts the SVAP program disk in disk drive 0. If, for some reason, the disk is removed from the drive but the drive has not been turned off (i.e., the clock is still set) the disk may be remounted by inserting it into the drive and executing the command

```
CALL "MOUNT", 0, A$
```

Pressing RETURN at the end of the Bootstrap program loads and runs the disk menu. It can also be accessed with the following commands:

```
OLD "@SVAPLIB/MENU"
RUN
```

The system is now ready to run disk programs. You may execute the operator's manual which parallels this manual.

2.2 PREPARATION OF DATA DISKS AND TAPES

Before running the facility description program, a data disk and data tape must be made. The programs to do this are accessible from the disk menu and are named: @SVAPLIB/PREPDISK and @SVAPLIB/MAKETAPE.

From the disk menu, access the program Make a New Data Disk and follow the directions given. If you are using a new disk, you must cover the write protect notch with a piece of tape. Special strips of tape are generally provided for this function. The write protect notch is located on the bottom edge of the disk, halfway between the center and right edge. Attach a stick-on label along the upper edge of the disk and write any identification information on it. Write softly with a soft-tipped pen. Be sure to mark it as a SVAP Data Disk, to keep it separate from the SVAP Program Disk.

After the data disk has been completed, access the program Make a New Data Tape and follow the directions. If you are using a new tape, attach the stick-on labels and write any identification data on them. Be sure that the label on the upper edge (where it can be seen when the tape is in the tape drive) clearly identifies this as a data tape to keep it separate from a program tape.

Once the data tapes and data disks have been made, they can be reused for different data without having to be remade with the two programs above.

3.0 FACILITY DESCRIPTION PROGRAM

3.1 START-UP

The Facility Description Program is used to input the physical security data. The program is accessible from the disk menu or with the command:

```
OLD "SVAPLIB/FACDESPRG4"
```

Load the program and follow the directions. In the beginning, you will be asked the following question:

```
1 - NEW DATA FILE
2 - OLD DATA DISK FILE
3 - OLD DATA TAPE FILE
    INPUT NUMBER: ?
```

Input a one (1) if this is a new set of data. This will tell the program to begin a new data set, and to ignore any old data on the disk.

If you have previously put data on this disk, and want to add more or make corrections, then input a two (2). The program will load the old data files and run the restart program.

If you have data files on a tape that you want to add to or correct, then input a three (3). The program will read the tape and write the tape files onto the disk.

3.2 CONTROL OF THE OPERATING PROGRAM

Control of the operating program is through keyboard commands and the user definable keys (UDK). The user definable keys are located on the upper left corner of the keyboard and are numbered from 1 to 20. Only the upper keys are used with the Facility Description Program and the Accounting System Program (UDK 1-5, 11, 12 and 13). The functions of the keys are listed in Table 1. Figure 1 is an example of the SVAP program's overlay. The lower keys (numbers 6 through 10) are used with the interactive user manual and are described there. Do not press a UDK when files are being read from or written

TABLE 1. The functions of the user definable keys (UDK).

UDK(1)	- RESTART. Runs the restart file, to start data input at a location other than file 2.
UDK(2)	- STOP INPUT. Stops input after the last element of a list.
UDK(3)	- CORRECT DATA. Runs the correction program for correcting, deleting or adding to a file.
UDK(4)	- PRINT FILE. Prints a selected data file from the disk.
UDK(5)	- TEXT FILE. Allows input to the text file. This can also be accessed from the restart program.
UDK(11)	- RETURN TO MENU. (SHIFT 1); loads and runs the disk menu.
UDK(12)	- CONTINUE A LINE. (SHIFT 2); used with matrix inputs longer than 1 line.
UDK(13)	- REDO LAST LINE. (SHIFT 3); used during matrix or list input to immediately redo a line after RETURN has been pressed.

to disk, as that may cause a loss of data. Occasionally, you will get FILE OPEN type errors after pressing a key. Type CLOSE and you should be able to continue.

The program will automatically step through the files in the correct order. If you should use the RESTART key, be sure to restart where you previously left off inputting data. Printing the constant file (0) with UDK

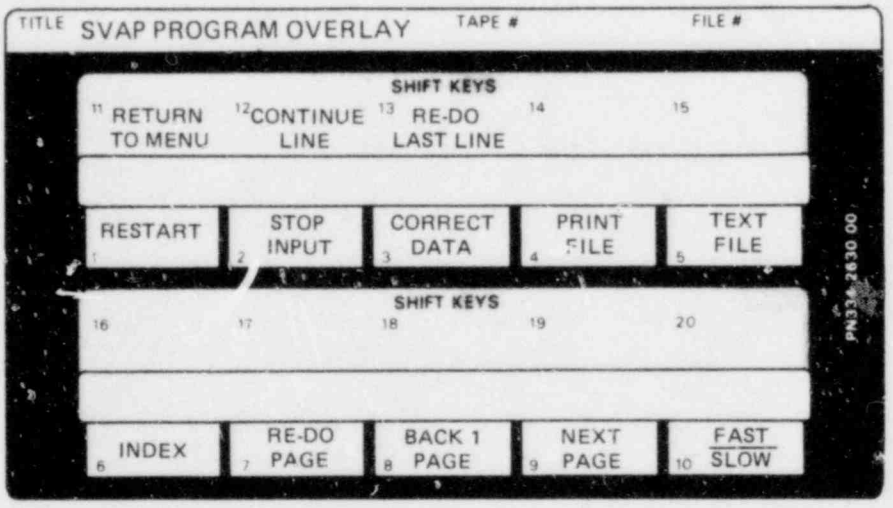


FIG. 1. SVAP program's overlay.

(4) will indicate where there is data. The numbers printed are the number of entries in each file in numerical order starting with file 1. A zero indicates no data in that file.

3.3 DATA CORRECTION, DELETION, OR ADDITION

3.3.1 Text File

There are two ways to make changes to the text file. After pressing the key TEXT FILE (UDK(5)) the old file will be printed along with the question

1 - NEW TEXT
2 - TEXT OK
3 - ADD TEXT
INPUT NUMBER: ?

At this point, you can either reinput the whole file (1), accept it as it is (2), or add more text to the end (3).

3.3.2 List Files

Pressing the key CORRECT DATA (UDK(3)) allows you to make corrections to the list files. There are three types of corrections allowed to these files:

1 - Changing an entry
2 - Adding entries
3 - Deleting an entry

When changing an entry, you will be requested to give the old entry name and new entry name. The program will then search the current file and all subsequent files for the old name and replace it with the new name.

Adding entries to a list file restarts the program at the file, prints out the existing file, and then waits for more entries. When you have added the new variables to the list, press STOP ENTRY. The program will write the new list file and then scan subsequent files for locations where data is lacking, due to the additions. Do not press any of the user definable keys (except for UDK(12) and UDK(13) used during data entry) until the word DONE is displayed.

Deleting an entry works in a similar manner to changing an entry. You will be requested to input the ID code to be deleted. The program will then delete that entry from the current file and from all subsequent files. If the entry is located in a subsequent file on the right-hand side of a Boolean equation then the program will prompt you to reinput that line. Do not press any of the user definable keys (except for UDK(12) and UDK(13) used during data entry) until the word DONE is displayed.

A fourth way to correct a list file is to use the RESTART key (UDK(1)) and reinput the list from the beginning. However, if this is done, all subsequent files that use those list variables should be reinput even if they have been input previously. This is necessary to insure that the order and spelling of the entries is the same in all files that use those entries.

3.3.3. Matrix Files

Pressing the key CORRECT DATA (UDK(3)) allows you to make corrections to the matrix files. In this mode, you will only be able to change an entry set. Sets may only be added or deleted in the list files.

You may also correct these files by pressing the RESTART key (UDK(1)) and completely reinputting the file. This can be done at any time and will not affect any of the subsequent files.

3.3.4 Constant File

The constant file should never have to be corrected. It is automatically updated by the system. However, if processing should be stopped in some manner (pressing BREAK, encountering an error, etc.) before the file can be updated then it may have incorrect values. See Section 3.4.4 for the details of updating this file.

3.4 PROGRAMMING INFORMATION

The following information is primarily directed toward individuals with some programming experience on Tektronix 4050 series computers. It is intended to be used when corrections or changes must be made to the program. Most users can skip over this to Section 4.0. Detailed information relating to the computer's operation can be found in the various user manuals that come with the system.

3.4.1 Types of Data Files

There are seven (7) kinds of disk data files used with these programs. They all exist on the data disk in files named @SVAPLIB/DATA0 through @SVAPLIB/DATA37. There is one other file on the disk named @SVAPLIB/SCRATCH, which is a data scratch file. The data files all have a similar format. Records one, two, and three contain the file name, file number, and a less than (<) symbol, respectively. Lines of data are separated with less than symbols (<) (except for the constant and text files), and a double less than symbol (<<) is placed in the last record of the file.

The first type of file is the constant file (file = 0). It contains the number of lines of entries in each file, listed in the numeric order of the file numbers, starting with file 1.

The next type of file is a type 0 file. This is the text file (file 1) which can contain any alphanumeric data.

Type one (1) data files are the list files. Beginning with record 4, they contain the alphanumeric ID codes input as the list variables. The ID codes are limited to 8 characters in length with no spaces. Separating each ID code is a less than symbol (<).

Type two (2) data files are the matrix files without and/or logic. Data from one list file (the row of a matrix) is equated to data from another list file (the columns of the matrix). Beginning with record 4, an ID code from the first list file is written, followed by the ID codes from the second list that were equated to it. Groups of this type are separated with less than symbols (<).

Type three (3) data files are matrix files with and/or logic. They are in the form of Boolean equations (i.e., ID codes separated with AND or OR) with parenthesis symbols (()) allowed. The symbols * and + may be used in place of AND and OR, respectively.

Type four (4) data files take the ID codes from one list file and equate it to an input numeric variable. The numeric variable is limited to the range 0 to 1. Beginning with record 4, the ID code is written, then the numeric value, followed by a less than symbol (<).

Type five (5) data files are the same as type four, except that the values of the numeric variables are not restricted.

3.4.2 Program Variables

Table 2 contains a list of the program variables and their general functions.

TABLE 2. Program variables.

ASCII Arrays:

A$ - Scratch and matrix print data.
B$ - Matrix print data.
C$ - File name.
E$ (1000) - Variable name list for checking input variable names.
N$ (100) - Input target and row ID codes in the matrix input.
Z$ - Scratch and list input target.

Numeric Array:

M(Q5,5) File Type Data

M(I,1) = Location (file) of row ID codes
M(I,2) = Location (file) of column ID codes
M(I,3) = Data file number
M(I,4) = Number of lines of data
M(I,5) = Data file type
1 - List file
2 - Matrix file
3 - Matrix with and/or
4 - Probability matrix
5 - Numeric matrix

Counters and Loops:

I
I1
J
M1
N1
N2

TABLE 2. (Continued.)

Numeric Variables and Flags:

F1 -	Back-up flag	1 - Normal input 2 - Reinput last
F2 -	Write disk file	1 - Write data and constants 2 - Write data only 3 - Do not write
F3 -	Current file number	
F4 -	Stop flag	1 - Continue input 2 - Stop input
F5 -	Number of the first file to be corrected	
F6 -	Ignore back-up flag (F1)	1 - Normal 2 - Ignore
I2 -	Current scratch file record number	
I3 -	Current read file record number	
Q1 -	Plot address (not used)	
Q2 -	Print address	
Q3 -	Print file address	
Q5 -	Number of files	
S1-S9 -	Scratch	
U1 -	Correcting flag	1 - Normal input 2 - Adding to list
U2 -	Correcting flag	2 - During first list to be added to 1 - After first list
U5 -	Continue line flag	1 - End a line 2 - Continue a line
U6 -	Continued line flag	1 - Normal and first continued line 2 - Second continued line

3.4.3 Program and Subroutines

The Facility Description Program consists of a driver program (lines 1 to 1995) and several subroutines. Table 3 lists the subroutines and their functions. Beware when making changes, as the subroutines call each other.

TABLE 3. Program subroutines.

Line numbers	Function
1 to 1995	Driver program.
2000 to 2450	Inputs list file data onto the scratch file.
2500 to 2670	Checks list ID codes.
2700 to 3060	Inputs and adds to the text file.
3100 to 3230	Write the current constant file to disk.
3240 to 3350	Read the current constant file from disk.
3400 to 3600	Write the contents of the scratch file to the current data file (file = F3).
3700 to 3900	Read the data in the column disk file (file = M(F3,2)) into the array E$.
4000 to 4465	Check the matrix input in array U$ for correct form. See if each ID code is in array E$.
4470 to 4600	Replace AND, OR, and ALL with *, +, and OMEGA, respectively.
5000 to 5965	Input matrix file data onto the scratch file.
6000 to 6340	Restarts input at a selected point in the driver program.
6500 to 6700	Print the contents of a data file.
7000 to 7360	Read a data tape into a disk.
8000 to 9670	Correct data:
	8140 to 8890 — Change an input.
	8900 to 8960 — Add to a list.
	8970 to 9670 — Delete from a list.

3.4.4 Constant File Errors

Occasionally, errors will crop up where the number in the constant file does not match the number of elements in the list or matrix that it represents. This can be caused by stopping or altering the program's execution before the file has been updated after a change. For example, pressing the BREAK key or encountering an input error.

Use the following sequence to make changes to the values in the constant file.

Type:

USER:	M(<file number>,4)	
PROGRAM:	<Number currently in the file>	Old value.
USER:	M(<file number>,4) = <Correct number in the file>	Put in the correct number.

go back to the first step to make more changes, otherwise type:

USER:	RUN 3100	Write the corrected file to disk.

3.4.5 Tape Read, Write Errors

The tape is written in a special format that makes it compatible with the SVAP codes in the main frame computer. There is no header, there are 128 byte records (rather than 256), and there is no checksum. The system is set up by the program with the following command:

```
PRINT @ 33, 0 : 1, 1, 1
```

It is reset to normal operation with

```
PRINT @ 33,0 : 0, 0, 0
```

Reading a tape with the wrong parameters set will generate a tape error.

4.0 ACCOUNTING SYSTEM PROGRAM

4.1 START-UP

The Accounting System Program is used to input the facility material control and accounting data. It operates in exactly the same manner as the Facility Description Program.

First, the Facility Description Program must be run and completed. Then, the Accounting System Program can be loaded and run from the disk menu. The Accounting System Program is located on a disk file named @SVAPLIB/FACACTSYS4. It can alternately be loaded with the command

```
OLD "@SVAPLIB/FACACTSYS4"
```

At the start of the program you will be asked the following question:

```
1 - OLD DATA DISK FILE
2 - OLD DATA TAPE FILE
    INPUT NUMBER: ?
```

Input a one (1) if the data from the Facility Description Program is on the data disk, or if you have previously put accounting data on this disk and want to add to or modify it. If your old data is in a data tape then input a (2) and the program will request the data tape and then load it onto a data disk.

4.2 CONTROL OF THE OPERATING PROGRAM

The control of the operating program is identical to that used with the Facility Description Program. See Section 3.2.

4.3 DATA CORRECTION, DELETION, OR ADDITION

See Section 3.3.

4.4 PROGRAMMING INFORMATION

See Section 3.4.

5.0 DATA INPUT FILES

5.1 TEXT FILE

Pressing user definable key number five (5) will access the text file. The contents of the file will be printed out and you will be asked to answer the following question:

1 - NEW TEXT
2 - TEXT OK
3 - ADD TEXT
INPUT NUMBER: ?

Inputting a one (1) will delete any existing text and allow you to begin inputting new text. A two (2) will close the file and keep it as is. Inputting a three (3) will allow you to add more text below the existing lines of text.

When requested, input the new text, ending each line with a return. The INPUT is free format, with all characters allowed except control characters. After the last return, press STOP INPUT (UDK(2)). This will end the data entry and close the file.

5.2 LIST FILES

List files contain lists of ID codes. ID codes can be up to 8 characters in length and there can be no internal blanks.

The program will print the name of the list file, give some simple directions and then request data. Input the ID codes one at a time, pressing RETURN after each ID code. After the last RETURN, press STOP INPUT (UDK(2)) to end data entry, write the disk file, and close it.

5.3 MATRIX FILES

Matrix files relate data from one list file to data in another list file. After printing the headings and simple directions, the program will print the first ID code from one file followed with an equal sign (=). You are then requested to input the ID codes from another file that are to be

related to it. The ID codes are separated with spaces and a completed line is ended with a return. The code will check for errors, and then respond with the error to be corrected or with the next ID code. If the input requires more than one line per ID code, press CONTINUE A LINE (UDK(12)). You can continue a line as many times as is needed to complete an entry. Press RETURN to end the entry.

5.4 MATRIX FILES WITH AND/OR LOGIC

In some cases, there are particular relationships between variables that must be specified with and/or type logic. Data is input as a Boolean equation in the same manner as for matrix files, except that now the words AND or OR must separate each ID code. Also available are parentheses (()) to help simplify the input. Use them as if AND were multiply and OR were add.

5.5 PROBABILITY MATRIX

The probability matrix is used to associate numerical probabilities with ID codes. After printing the headings and instructions, the program will print an ID code and an equal sign (=). You are requested to input the numerical probability and press RETURN. The number must be between zero (0) and one (1). The code will check it and then respond with the next ID code.

5.6 NUMERICAL MATRIX

The numerical matrix operates in exactly the same manner as the probability matrix, except that there is no restriction on the range of the numerical data. See Section 5.5.

6.0 DATA PREPARATION AND INPUT

Table 4 contains a list of all of the data files generated by the Facility Description Program and the Accounting System Program. Appendix A contains examples of each data input. The following is a description of each data type in the order that they will be requested by the programs.

TABLE 4. Data files generated by the Facility Description Program and the Accounting System Program.

File number	Order of entry	File name
0	*	Constant File
1	†	Text File
2	1	Area-Portal List
3	2	Adjacency Matrix
4	3	Monitor-Lock List
5	4	Area/Monitor-Lock Matrix
6	5	Authorization List
7	7	Monitor-Lock/Authorization Matrix
8	8	Monitor-Lock/Failure Probability Matrix
9	9	Transmission Line List
10	10	Monitor-Lock/Transmission Line Matrix
11	11	Utilities List
12	12	Monitor-Lock/Utilities Matrix
	13	Transmission Line/Authorization Matrix
	14	Utility/Authorization Matrix
15	15	Area/Authorization Matrix
16	16	Monitor-Lock/Response Matrix
17	17	Response/Authorization Matrix
18	18	Document List
19	19	Monitor-Lock/Document Matrix
20	20	Document/Authorization Matrix
21	21	SNM Source List

TABLE 4. (Continued.)

File number	Order of entry	File name
22	22	SNM Source/Quantity Matrix
23	23	Loss Detection Methods List
24	25	SNM Source/Loss Detection Methods Matrix
25	26	Records List
26	27	Loss Detection Methods/Records Matrix
27	28	Records/Records Matrix
28	29	Forms List
29	30	Records/Forms Matrix
30	31	Loss Detection Method/Authorization Matrix
31	32	Records/Authorization Matrix
32	33	Forms/Authorization Matrix
33	34	SNM Source/Exit Point Matrix
34	24	Detection Time Matrix
35	*	Time Codes
36	*	Probability Codes
37	6	Probability Value Matrix

*Not input by the user.

†Arbitrary. Can be input or added to at any time.

6.1 PLANT LAYOUT

As a first step, generate a plant layout. This is effectively a floor plan of the facility broken up into areas and portals (doors and gates). In general, separate areas are defined by barriers (walls and fences), monitor coverage areas, and monitored and/or locked doors. Each area and portal is given a unique descriptive name.

As an example, consider the facility in Fig. 2. It consists of a building with two rooms and a hallway. Both rooms have monitored and lockable doors. The room on the right contains a safe. The building is surrounded with a fence and a fence intrusion area. There are two gates in the fence, both of which are monitored and lockable. There is a guard station next to the front gate.

The facility would be broken down into areas and portals in the following manner:

- Area-01 is all the area outside the fence.
- Area-02 is the area between the fence and the fence intrusion area.
- Area-03 is between the fence intrusion area and the building. Area-03 also contains the hallway in the building because there is free access through the outside door.
- Area-04 is inside the left room.
- Area-05 is inside the right room.
- Area-06 is inside the guard station.
- FIA is the fence intrusion area.
- Port-01 is the front gate.
- Port-02A and Port-02B. The door on the left room has panic hardware, so that no key is required to get out, but one is required to get in. This is handled by breaking it into two one-way doors; one going out with the free access (A) and one going in that is locked (B).
- Port-03. The door to the right room.
- Port-04. The back gate.
- Fence. The fence is considered a portal because, in most cases, a fence is a poor barrier.

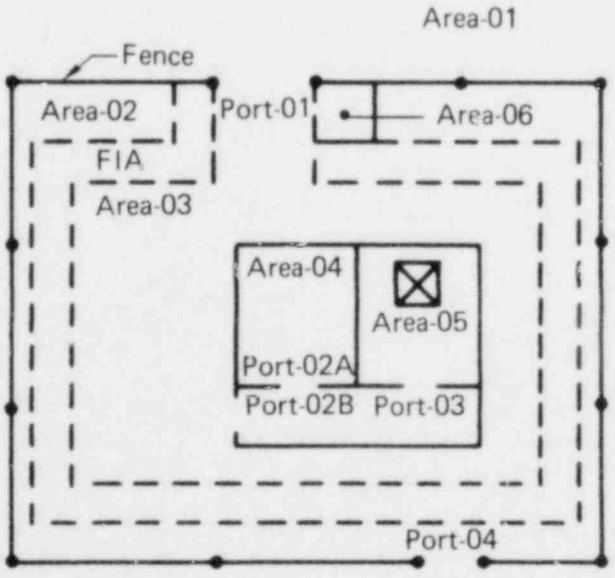


FIG. 2. Example plant layout with areas and portals marked.

6.2 AREA-PORTAL LIST (FILE = 2)

The Area Portal List is a list file of all of the areas and portals on the plant layout.

6.3 ADJACENCY MATRIX (File = 3)

The Adjacency Matrix connects areas and portals. You will be given an area and are requested to input the areas that you can go to. Beware of one-way doors (e.g., a turnstile); if you cannot go through them from the area given, then do not list them.

Note especially how portal two is handled. It is a door that is locked in one direction and has panic hardware in the other. To handle this, it is considered to be two one-way doors.

6.4 MON[illegible]-LOCK LIST (FILE = 4)

As with the areas and portals, all of the monitors and locks are located on the drawing (Fig. 3). The program will then request a list of those ID codes just assigned.

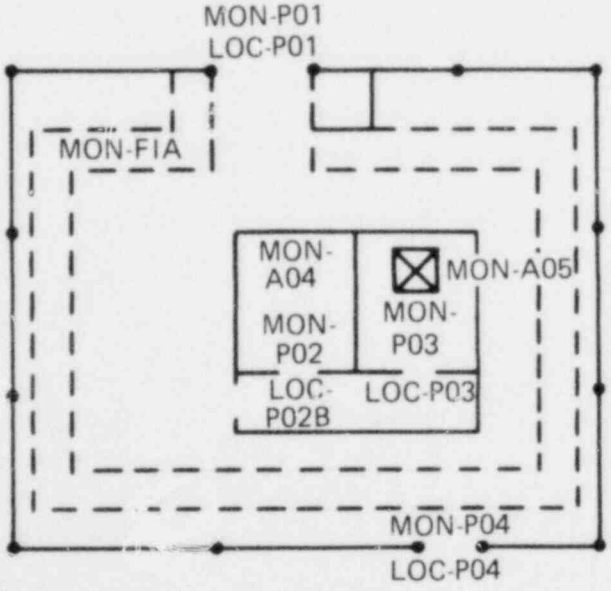


FIG. 3. Example facility with monitors and locks listed.

MON-P = Portal monitor
MON-A = Area monitor
LOC-P = Lock

6.5 AREA/MONITOR-LOCK MATRIX (FILE = 5)

The Area/Monitor-Lock Matrix connects the areas and portals with the monitors and locks that cover them. For each area given, you are to input the monitors and locks, separated with AND or OR.

6.6 AUTHORIZATION LIST (FILE = 6)

The Authorization List contains the ID codes for the plant personnel. Break them down according to job function and security authorization. Include enough of each type to cover any security situation (e.g., two-man rule for opening a sealed door). For example, if there are two kinds of engineers in a facility--those allowed in the whole facility, and those not allowed in Area-05--and the two-man rule is followed in Area-05, then the list could contain: ENG-11, ENG-21, and ENG-22, where all the ENG-20s are those allowed in Area-05 and the ENG-10s are those not allowed in Area-05.

6.7 PROBABILITY VALUE MATRIX (FILE = 37)

In this matrix, the value of the four probability ID codes (PROB1 to PROB4) are given numerical values. These can be used with any and/or type matrix to define a situation where the probability of occurrence is less than 1. For example, if people who do inventory are chosen randomly from a group of ten, then set PROB1 to 0.1 and put AND PROB1 after the randomly chosen person's name in the matrix. Unused ID codes can be set to anything.

6.8 MONITOR-LOCK/AUTHORIZATION MATRIX (FILE = 7)

The Monitor-Lock/Authorization Matrix connects the monitors and locks with the plant personnel who have access to them. The input uses the and/or scheme to describe the various situations where access to a monitor or lock has been obtained. People required in a particular situation are separated with ANDs, different situations are separated with ORs. Use AND PROB1 through AND PROB4 if a particular situation has a probability of less than 1 of happening.

6.9 MONITOR-LOCK/FAILURE PROBABILITY MATRIX (FILE = 8)

The Monitor-Lock/Failure Probability Matrix connects the monitor ID codes with the probability of random failure for that particular monitor. The probabilities must be between 1.0 and 0.000001, inclusive. An E-type format may be used (e.g., 0.001 = 1E-3).

6.10 TRANSMISSION LINE LIST (FILE = 9)

The Transmission Line List contains the ID codes of all of the transmission elements (cable runs, junction boxes, etc.) that carry signals from the monitors to the guard station (see Fig. 4). Only those junction boxes at splits in a cable run need be listed. All others can be considered part of a single cable run. Split cable runs and junction boxes with the same accessibility (e.g., all connected runs on the roof of one room) can be considered as single cable runs.

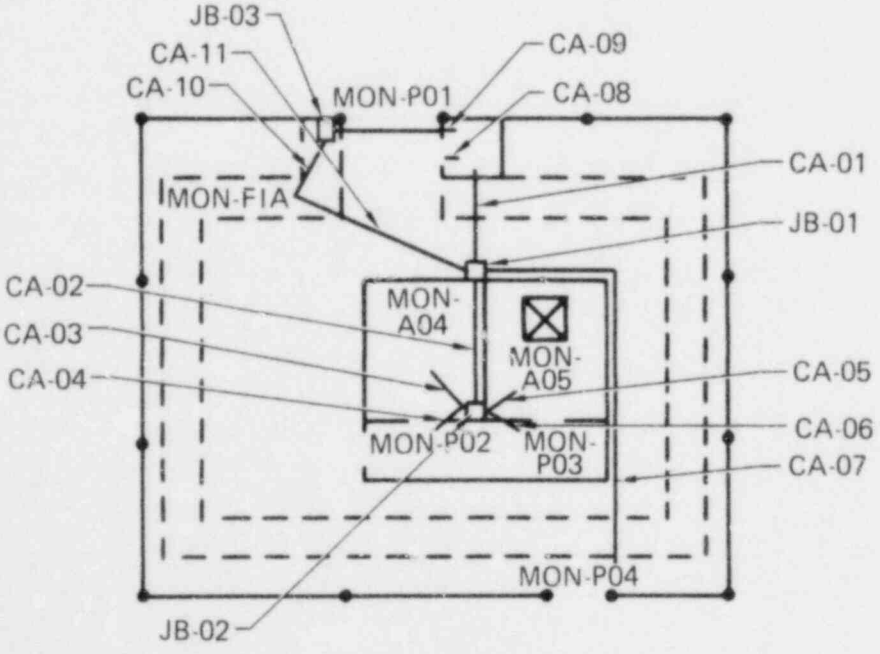


FIG. 4. Example facility with signal transmission lines marked. The transmission lines go from the monitors to the guard station.

6.11 MONITOR-LOCK/TRANSMISSION LINE MATRIX (FILE = 10)

This matrix inputs the transmission line components that connect a monitor (or lock, in the event that it has some electrical sense lines) to the guard station. Use ANDs between continuous line components and ORs between alternate line components. No entry indicates no connections (e.g., most locks).

6.12 UTILITIES LIST (FILE = 11)

This list inputs the utility components and power sources that supply the monitors and locks (see Fig. 5). The rules are the same as for the Transmission Line List.

6.13 MONITOR-LOCK/UTILITIES MATRIX (FILE = 12)

This matrix connects the monitors and locks with the power sources, using the utility components defined in the utilities list. Input is similar to that used with the transmission line components. Use AND between continuous line components and OR between alternate groups of line components. No entry indicates that no power is required (e.g., locks).

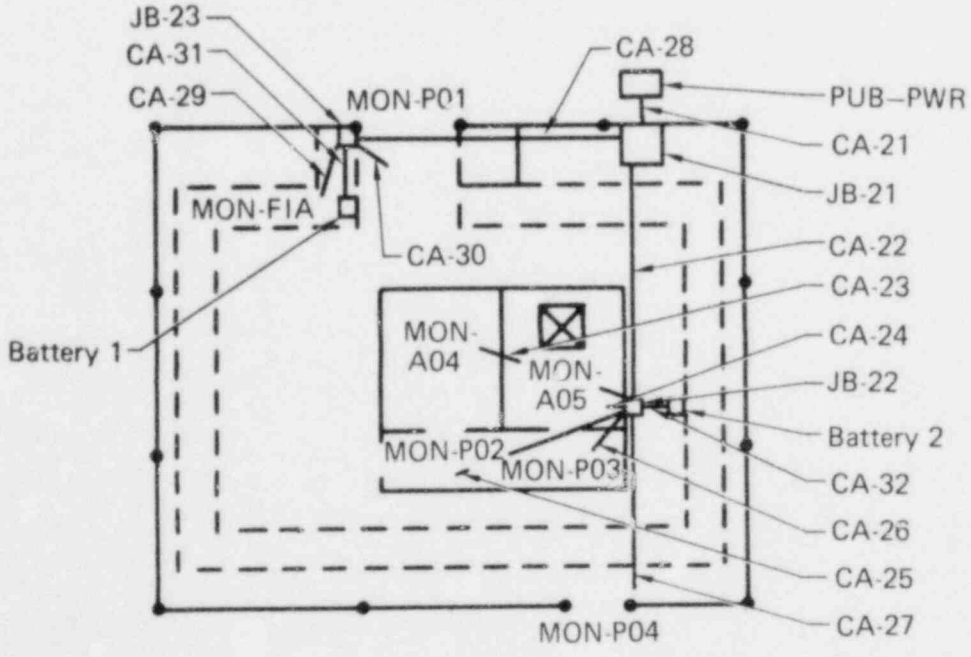


FIG. 5. Example facility with the utilities components marked. The utilities supply power, air, water, etc. to the monitors

6.14 TRANSMISSION LINE/AUTHORIZATION MATRIX (FILE = 13)

The Transmission Line/Authorization Matrix connects the transmission line components with the personnel who have authorized access to those components. The input uses the and/or scheme to describe the various access situations obtainable. People required in a particular situation are separated with AND, and different situations are separated with OR. Use AND PROB1 through AND PROB4 if a particular situation has a probability less than 1 of happening.

6.15 UTILITIES/AUTHORIZATION MATRIX (FILE = 14)

The Utilities/Authorization Matrix connects the utilities components with the personnel who have authorized access to them. The input uses the and/or scheme to describe the various access situations obtainable. People required in a particular situation are separated with AND, and different situations are separated with OR. Use AND PROB1 through AND PROB4 if a particular situation has a probability of less than 1 of happening.

6.16 AREA/AUTHORIZATION MATRIX (FILE = 15)

The Area/Authorization Matrix connects the areas and portals with the personnel who have authorized access to them. The input uses the and/or scheme to describe the various access situations obtainable. People required in a particular situation are separated with AND, and different situations are separated with OR. ALL implies everyone in the Authorization List is separated with the word OR. No input implies that no one is allowed in the area. The program will change the word ALL to the word OMEGA in the output files. Use AND PROB1 through AND PROB4 if a particular situation has a probability of less than 1 of happening.

6.17 MONITOR-LOCK/RESPONSE MATRIX (FILE = 16)

The Monitor-Lock/Response Matrix connects the monitor alarm points with the response locations of security personnel. For each monitor and lock, input the location of the area or portal that will be covered by security personnel. Use the and/or scheme to input the data. No input implies that no response is made to that alarm.

6.18 RESPONSE/AUTHORIZATION MATRIX (FILE = 12)

The Response/Authorization Matrix connects the monitor alarm points with the personnel who respond to them. The location of the response was input in the Monitor-Lock/Response Matrix. We will now input who is actually doing the responding. In most cases this will only consist of the security personnel. The and/or scheme is available for complex situations. No input implies that no one responds.

6.19 DOCUMENT LIST (FILE = 18)

The Document List consists of a list of those documents that allow a person to pass through monitored areas and portals, and to carry SNM through monitored areas and portals without setting off an alarm.

6.20 MONITOR-LOCK/DOCUMENT MATRIX (FILE = 19)

The Monitor-Lock/Document Matrix connects the monitor alarm points with the documents that allow a person to pass through them without setting off an alarm. For each monitor and lock, input the documents that allow you to pass. And/or logic is available if needed. No input implies that no document will change a person's status at an alarm point.

6.21 DOCUMENT/AUTHORIZATION MATRIX (FILE = 20)

The Document/Authorization Matrix specifies who is authorized to have a document in his possession. For each document, input the personnel allowed to possess it. And/or logic is available if necessary. No input implies that no one may possess it. ALL implies that everyone in the Authorization List may possess it. AND PROB1 through AND PROB4 are available for situations where the probability is less than 1 of happening.

6.22 SNM SOURCE LIST (FILE = 21)

The SNM Source List is a list of those areas in the facility (from the Area-Portal List) that contain SNM in a form that could be removed. Essentially, it is a list of poss ble targets in the facility.

6.23 SNM SOURCE/QUANTITY MATRIX (FILE = 22)

In this matrix, the effective amount of SNM in each source area is input. Effective mass of SNM is the number of kilograms of uranium-233 plus the number of kilograms of plutonium, plus (for enrichments greater than or equal to 1%) the number of kilograms of uranium times the square of the enrichment (specified as a fraction), plus (for enrichments less than 1%) the number of kilograms of uranium times 0.0001.

Effective mass of SNM =

$$^{233}U + Pu + U \cdot X^2 \ (X \geq 0.01) + U\ 0.0001 \ (X < 0.01)$$

X = uranium enrichment fraction.

6.24 LOSS DETECTION METHODS LIST (FILE = 23)

The Loss Detection Methods List consists of the accounting and administrative methods that are used to determine that material has not been lost. Some examples are: inventory differences, missing items, incorrect serial numbers, and broken or incorrect seals. Input the ID codes for all of the methods used.

6.25 DETECTION TIME MATRIX (FILE = 34)

In this matrix, the value of the four time ID codes are set. These codes are used in the SNM Source/Loss Detection Methods Matrix to input the amount of time required for detection with each loss detection method. For each ID code input the number of days to be assigned to it.

6.26 SNM SOURCE/LOSS DETECTION METHODS MATRIX (FILE = 24)

This matrix connects the SNM source locations with the loss detection methods that operate there and the time frame for detection. Given the source location, input the loss detection method followed by AND and one of the time codes. Separate other methods with OR. The time codes are listed at the top of the page and were defined previously. The time codes indicate the time required to detect a loss with the given method. For example, if serial numbers are checked once a week then the input would be INC-SER AND TIME1, where TIME1 was set to 7 days in the Detection Time Matrix.

6.27 RECORDS LIST (FILE = 25)

The Records List consists of the ID codes of the records made from the data from the Forms List (see Section 6.30). The records contain the data necessary to determine the amount, type, location, and possible loss of SNM.

6.28 LOSS DETECTION METHODS/RECORDS MATRIX (FILE = 26)

This matrix connects the loss detection methods with the records from the Form List. The records contain the data necessary to determine the amount, type, location, and possible loss of SNM. For each loss detection method, input the required records. And/or logic is available.

6.29 RECORDS/RECORDS MATRIX (FILE = 27)

Records that cross check records are input with this matrix. For each record given, input the other records whose information is used as a cross check against them. No input indicates that there is no cross checking. ALL indicates all of the records in the Records List separated with ORs. And/or logic is available. Use OR to separate sets of records and use AND to separate members of a set.

6.30 FORMS LIST (FILE = 28)

The Forms List consists of the ID codes of the forms that supply the data for the different accounting records in the Records List. Examples are: forms for moving, assay, and disposal of SNM; forms filled out when checking seals, serial numbers, etc.

6.31 RECORDS/FORMS MATRIX (FILE = 29)

The Records/Forms Matrix connects the records with the forms that supply the data to be recorded. For each record given, input the required forms. ALL indicates all of the forms in the Forms List separated with ANDs. And/or logic is available. Use OR to separate sets of forms and use AND to separate members of a set.

6.32 LOSS DETECTION METHODS/AUTHORIZATION MATRIX (FILE = 30)

The Loss Detection Methods/Authorization Matrix connects the loss detection methods with the personnel who could circumvent the alarm generated by the method; i.e., who can make changes in or withhold the data, or who could override the alarm. ALL indicates all of the personnel in the Authorization List separated with ORs. And/or logic is available. Use OR to separate groups of individuals and AND to separate the members of a group. Use AND PROB1 through AND PROB4 for situations whose probability is less than 1 of happening.

6.33 RECORDS/AUTHORIZATION MATRIX (FILE = 31)

This matrix connects the records from the Records List with the personnel authorized to make entries or changes in them. ALL indicates all of the personnel in the Authorization List separated with ORs. And/or logic is available. Use OR to separate the members of a group. Use AND PROB1 through AND PROB4 for situations where the probability is less than 1 of happening.

6.34 FORMS/AUTHORIZATION MATRIX (FILE = 32)

This matrix connects the forms from the Forms List with the personnel authorized to make entries or changes in them. ALL indicates all of the personnel in the Authorization List separated with ORs. And/or logic is available. Use OR to separate groups of individuals and AND to separate the members of a group. Use AND PROB1 through AND PROB4 for situations whose probability is less than 1 of happening.

6.35 SNM SOURCE/EXIT POINT MATRIX (FILE = 33)

This matrix determines where the stopping point of the analysis will be. For each SNM source zone, input the area name where a colluder wants to end up. In most cases this will be the same area for all of the source locations. And/or logic is available if necessary. Use OR to separate groups of areas and AND to separate the members of a group.

6.36 TEXT FILE (FILE = 1)

The Text File is a free format input file for all types of extra information. Examples are identification information and assumptions made. The Text File can be accessed with user definable key five (UDK(5)). First, the contents of the existing text file will be printed. Then, you will be asked if it is OK, or do you want to rewrite it, or do you just want to add to it. Answer the question and then follow the instructions. (See Section 5.1.)

6.37 TIME CODES (FILE = 35)

This file contains the four time ID codes, TIME1 to TIME4, used with the Detection Time Matrix. They are not input by the user.

6.38 PROBABILITY CODES (FILE = 36)

The four probability ID codes PROB1 to PROB4 used in the probability value matrix are contained in this file. They are not input by the user.

7.0 UTILITY ROUTINES

There are several utility routines designed to be used with the Facility Description Program and the Accounting System Program. These routines take care of the preparation and use of data tapes and disks.

7.1 MAKE A NEW DATA TAPE

This program was described previously. Its function is to format data tapes for use with the Facility Description Program. See Sections 2.2 and 3.4.5 for more information.

7.2 MAKE A NEW DATA DISK

This program has also been described previously. Its function is to format the data disk, create the data files, and fill the data files with blanks so that they can be accessed randomly. See Section 2.2 for more information.

7.3 DUPLICATE A DISK

This is a general disk duplication routine. Use it to create multiple copies of data and program disks where necessary. It is usually good practice to keep two copies of the program disk on hand so that if one is accidentally destroyed or is worn out, a backup is available.

To operate the program, load it from the disk menu and follow the directions. Make sure that you have the correct disk in the correct disk drive so that you do not destroy data.

7.4 WRITE A DATA TAPE FROM A DISK FILE

Once you have completed inputting data with the Facility Description Program and the Accounting System Program, you can write a data tape. The program takes the data currently residing on the 37 disk files and makes it into a single long tape file. The data is checked as it is being written and all capital letters are changed to lower case. Also, all brackets in the Boolean equations are multiplied out.

To run the program, access it from the disk menu and follow the directions. Be sure that you have a data tape in the tape slot on the 4051 and not a program tape. This program is in the disk file named

@SVAPLIB/WRITETAPE2

7.5 SVAP PROCEDURE OUTLINE

This is a short overview of the SVAP procedure. Access it from the disk menu. It is in nine disk files named @SVAPLIB/OUTLINE1 to @SVAPLIB/OUTLINE9.

7.6 FACILITY DESCRIPTION PROGRAM USER'S MANUAL

This is an online version of the manual that you are reading. It is accessed from the disk menu and is contained in the files @SVAPLIB/MANUAL1 through @SVAPLIB/MANUAL48.

7.7 PRINT SVAP OUTPUT FILES

Once the SVAP output tape has been generated, it can be printed with the program PRINT SVAP OUTPUT. The program is accessible from the disk menu. It is in the disk file named @SVAPLIB/PRINTOUT.

Load the program and follow the directions to print out the output files. There are three forms of the output available. The first is a complete listing of the output data with the explanations and plots. The second is a printout of the data and plots only. The third prints out the plots.

You have a choice of three plot output media. One plots on a Tektronix 4662 plotter. The second plots on the Tektronix 4050 series computer tube face and then sends a copy command to the hard copy device. The third plots on the tube face but does not make a copy.

There is a choice of six printout media. The first prints data on the Tektronix 4662 plotter. This is not recommended, as it is slow and a little rough on the plotter. The second and third use the tube face and the hard copy device in the same manner as is done with the plot media above. The last three choices send the data to one of the two ROM slots or the serial interface on the back of the machine. Some internal changes may be necessary when using the serial interface.

7.8 DISK BOOTSTRAP PROGRAM

This is in a tape file and is accessed from the tape menu. Its purpose is to set the clock in the disk drive and to mount the program disk. This was described previously in Section 2.1.

8.0 GLOSSARY

ALL — A matrix ID code. Meaning everyone or everything in a list. Whether they are assumed to be separated with ANDs or ORs depends on the matrix being input. ALL is changed to the Boolean variable OMEGA after input.

Area — A part of the plant floor plan, usually a room, part of a room, hallway, or yard area. An area is bounded by walls, fences, monitored or locked doors, or the coverage areas of monitors.

Authorizers — This is a list of plant personnel, broken down by job classification and security authorization. Enough authorizers must be listed to cover all security rules (e.g., two-man rule) and alert situations (e.g., how many guards are sent out when an alarm is tripped).

Parentheses — Can be used along with the ANDs and ORs in the matrix input.

Documents List — Those forms and signed notes that allow a person to pass through a monitored portal, or to carry material (e.g., SNM) through a monitored portal without initiating a security response.

Effective Mass of SNM — The number of kilograms of uranium-233, plus the number of kilograms of plutonium, plus (for enrichments greater than or equal to 1%) the number of kilograms of uranium times the square of the enrichment (specified as a fraction), plus (for enrichment less than 1%) the number of kilograms of uranium times 0.0001.

$$\text{Effective mass of SNM} = {}^{233}U + Pu + U \cdot X^2 \quad (X \geq 0.01)$$
$$+ U\ 0.0001 \quad (X < 0.01)$$

X = uranium enrichment fraction.

Forms List	A list of forms that record material transactions, measurements, checked seals, and serial numbers.
Free Passage	An attribute of a portal, meaning that a person can pass through a portal without hindrance or detection.
ID Code	An 8-character or less descriptive alphanumeric identification code. These codes make up the list variables in the SVAP codes and describe the various areas, portals, monitors, personnel, etc., in the facility. Examples are Area-05, Door-A12, Guard-03, Mon-15 and Lock-7.
Loss Detection Methods	Accounting system methods for determining that material has been lost. These include inventory differences, missing items, incorrect serial numbers, broken or incorrect seals, etc.
Monitor	Any device or person that can detect the passage of an individual or material (e.g., SNM) through an area or portal. A monitor does not necessarily have to send an alarm, as in the case of a wire seal that is broken when someone passes through a sealed door.
OMEGA	A Boolean variable meaning "true." (See ALL.)
One-Way Doors	An attribute of a portal, indicating that passage through a portal can only be in one direction, as in a turnstile. Doors with panic hardware (e.g., a crash bar in one direction and a key lock in the other) can be represented as two one-way doors, one as a free access door in one direction, and one as a locked door in the other direction.
Portal	A passage through a boundary, usually monitored or locked. Typically, portals are doors in walls, gates in fences, or monitored passages from one area to another. Portals do not generally have to be considered if they allow free passage from one area to another.
PROB1 to PROB4	Probability value ID codes. These ID codes contain the probability values set by the user. They are used with the word AND in the matrix inputs for those

	situations that have a probability less than 1. For example, if a person is chosen at random from a group of 10 individuals to do inventory, then set PROB1 to 0.1, and AND PROB1 would be inserted after his name in the Forms/Authorization Matrix.
Records List	Those records maintained by the forms in the Forms List that contain the data necessary to determine the amount, type, location, and possible loss of material (SNM). These serve as inputs to the accounting system loss detection methods.
SNM	Special Nuclear Material. The element plutonium, the isotope uranium-233, or the element uranium enriched in the isotopes uranium-233 or uranium-235.
SSNM	Strategic Special Nuclear Material. The element plutonium, the isotope uranium-233, or the element uranium enriched to 20% or more with the isotope uranium-235.
TIME1 to TIME4	Time ID codes set by the user for use in the SNM Source/Loss Detection Methods Matrix. They are used with the word AND to indicate the time interval over which the loss detection methods operate. For example, if inventories are done every month, then let TIME1 equal 30 days and place AND TIME1 after inventory in the matrix.
Transmission Lines	The cable runs and junction boxes that carry the signals from the monitors to the central guard station.
Utilities	The cable runs, junction boxes, power sources (public power, generators, and batteries), air supplies, etc., required for a monitor's operation.

REFERENCES

1. F. M. Gilman, M. H. Dittmore, W. J. Orvis, P. S. Wahler, Safeguard Vulnerability Analysis Program (SVAP) Executive Summary, Lawrence Livermore Laboratory, Livermore, Calif., UCRL-52724 (December 1979); NUREG/CR-1169, ES.*
2. P. S. Wahler, Safeguard Vulnerability Analysis Program (SVAP) Data-Gathering Handbook, Vol. I, Lawrence Livermore Laboratory, Livermore, Calif., UCRL-52731, Vol. I (January 1980); NUREG/CR-1169, Vol I.*
3. P. S. Wahler, Safeguard Vulnerability Analysis Program (SVAP) Data-Gathering Handbook, Vol. II, Lawrence Livermore Laboratory, Livermore, Calif., UCRL-52731, Vol. II (January 1980); NUREG/CR-1169, Vol II.*

FWB/nll

*Available for purchase from the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, and the National Technical Information Service, Springfield, Virginia 22161.

APPENDIX

This appendix contains a complete set of inputs for the example facility. It includes making data tapes and disks and writing the final data tape. All of the pages are listed in the exact order in which they were input. The example facility is described in Section 6.

```
********** TAPE MENU **********

 1-MENU
 2-DISK BOOTSTRAP PROGRAM
 3-GENERATE FACILITY DESCRIPTION TAPES
 4-MARK NEW DATA TAPES
 5-SVAP PROCEDURE OUTLINE
 6-TEKTRONIX 4907 DISK VERIFICATION PROGRAM
 7-FACILITY DESCRIPTION PROGRAM (DISK TYPE)
 8-MAKE A DATA TAPE FROM A DISK FILE
 9-ACCOUNTING SYSTEM PROGRAM (DISK TYPE)
10-MAKE A NEW DATA DISK
11-DUPLICATE A DISK


INPUT NUMBER 2
```

```
********** DISK BOOTSTRAP PROGRAM **********

INSERT `SWAP  DISK INTO DRIVE 0 AND PRESS RETURN:

INPUT DATE AND TIME (DD-MMM-YY HH:MM:SS) :
21-SEP-79 3:02:00

   DISK BOOTSTRAP COMPLETE. PRESS RETURN FOR SWAP MENU:
```

```
********** SVAP DISK MENU **********

 FILES AVAILABLE:

  1-SVAP DISK MENU
  2-SVAP PROCEDURE OUTLINE
  3-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITH HEADINGS)
  4-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITHOUT HEADINGS)
  5-ACCOUNTING SYSTEM PROGRAM (TYPE IV)
  6-MAKE A NEW DATA TAPE
  7-DUPLICATE A DISK
  8-WRITE A DATA TAPE FROM A DISK FILE
  9-FACILITY DESCRIPTION PROGRAM USER MANUAL
 10-MAKE A NEW DATA DISK
 11-PRINT SVAP OUTPUT FILES


                INPUT NUMBER: 6
```

********** MAKE A NEW DATA TAPE **********

MAKE A DATA TAPE FOR USE WITH THE TYPE III OR TYPE IV FACILITY DESCRIPTION PROGRAMS.

IF YOU ARE USING A NEW DATA TAPE, PREPARE THE STICK-ON LABELS WITH THE FACILITY NAME, ANALYST AND DATE. BE SURE TO MARK IT AS A DATA TAPE ALONG THE EDGE SO THAT IT WILL NOT BE MIXED UP WITH THE PROGRAM TAPE OR OTHER DATA TAPES.

CAUTION: ALL OLD DATA ON THIS TAPE WILL BE LOST

INSERT A DATA TAPE AND PRESS RETURN:

DONE

PRESS RETURN TO RETURN TO THE MENU

```
********** SUAP DISK MENU **********

FILES AVAILABLE:

 1-SUAP DISK MENU
 2-SUAP PROCEDURE OUTLINE
 3-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITH HEADINGS)
 4-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITHOUT HEADINGS)
 5-ACCOUNTING SYSTEM PROGRAM (TYPE IV)
 6-MAKE A NEW DATA TAPE
 7-DUPLICATE A DISK
 8-WRITE A DATA TAPE FROM A DISK FILE
 9-FACILITY DESCRIPTION PROGRAM USER MANUAL
10-MAKE A NEW DATA DISK
11-PRINT SUAP OUTPUT FILES


                INPUT NUMBER: 10
```

```
********** MAKE A NEW DATA DISK **********

  IF THIS IS A NEW DISK, COVER THE WRITE PROTECT NOTCH
WITH A PIECE OF THE TAPE SUPPLIED FOR THAT PURPOSE. THE
NOTCH IS LOCATED ON THE BOTTOM EDGE OF THE DISK, HALFWAY
BETWEEN THE CENTER AND THE RIGHT EDGE. ATTACH A STICK-ON
LABEL TO THE UPPER EDGE OF THE DISK AND WRITE ANY DISK
IDENTIFICATION DATA ON IT. WRITE SOFTLY WITH A SOFT TIPPED
PEN.

INSERT A DISK IN DRIVE 1 AND PRESS RETURN,
ALL DATA ON THIS DISK WILL BE DESTROYED;
HAS THE DISK IN DRIVE # 1 BEEN FORMATTED (Y OR N): N

INPUT THE FORMATTING DATA:

  THE VOLUME ID. IS A 1 TO 10 CHARACTER ALPHANUMERIC NAME
ASSIGNED TO THE DISK. THE FIRST CHARACTER MUST BE ALPHABETIC.
VOLUME ID. = CUARDATA

  THE OWNERS NAME CAN CONTAIN UP TO 24 ALPHANUMERIC
CHARACTERS AND SPACES.
OWNERS NAME = LAWRENCE LIVERMORE LAB

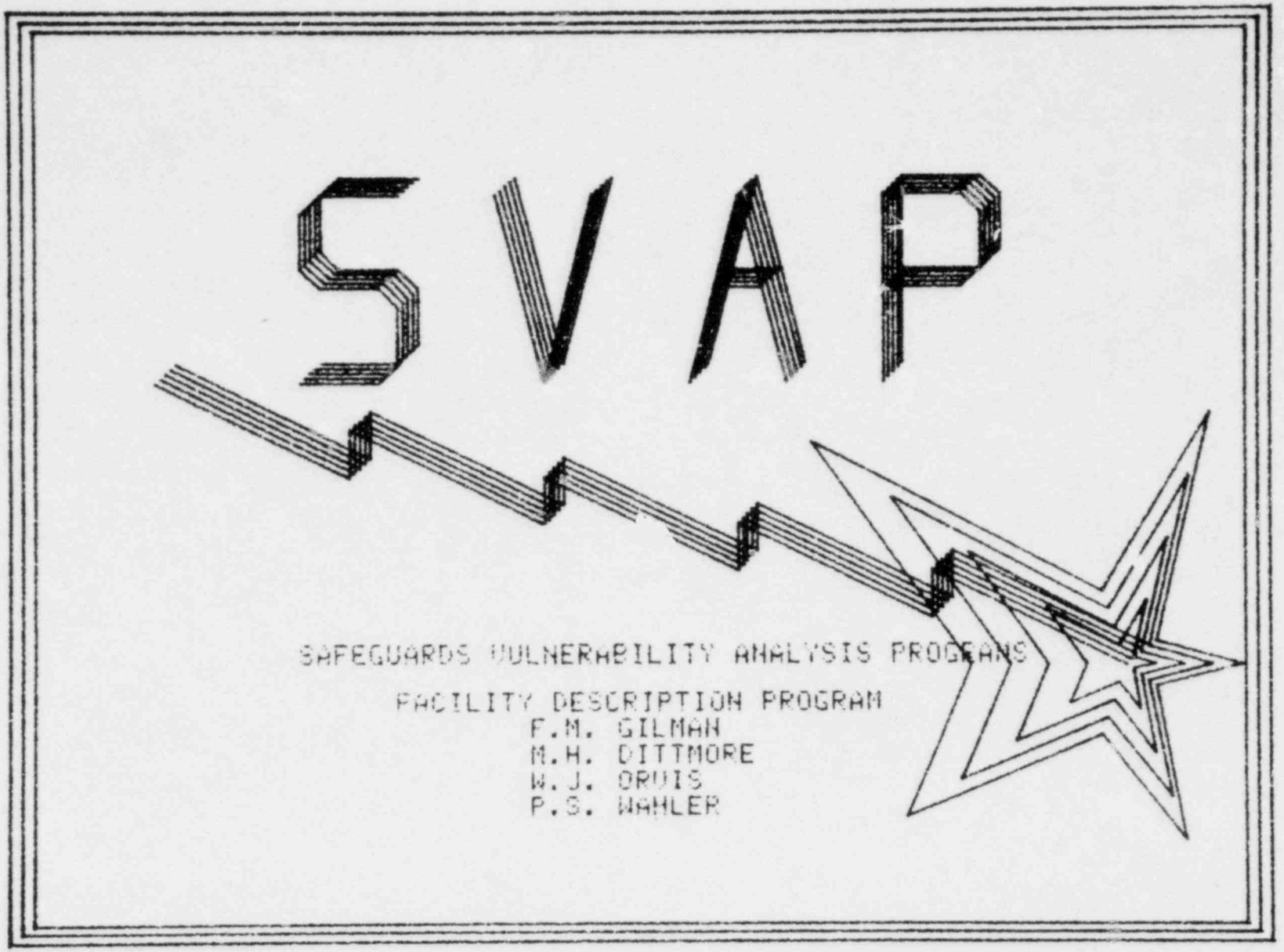
THE MASTER PASSWORD = PASS
          ********** FORMATTING DISK **********
ANSWER YES OR NO
FORMAT REQUESTED. OK TO DESTROY DATA ON DEVICE  1?YES
                  ********** PREPARING DISK **********
                  DONE
PRESS RETURN TO GO BACK TO THE DISK MENU:
```

********** SUAP DISK MENU **********

FILES AUAILABLE:

 1-SUAP DISK MENU
 2-SUAP PROCEDURE OUTLINE
 3-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITH HEADINGS)
 4-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITHOUT HEADINGS)
 5-ACCOUNTING SYSTEM PROGRAM (TYPE IV)
 6-MAKE A NEW DATA TAPE
 7-DUPLICATE A DISK
 8-WRITE A DATA TAPE FROM A DISK FILE
 9-FACILITY DESCRIPTION PROGRAM USER MANUAL
10-MAKE A NEW DATA DISK
11-PRINT SUAP OUTPUT FILES

INPUT NUMBER: 3


SVAP
SAFEGUARDS VULNERABILITY ANALYSIS PROGRAMS
FACILITY DESCRIPTION PROGRAM
F.M. GILMAN
M.H. DITTMORE
W.J. ORVIS
P.S. WAHLER

********** SUAP CODES **********

SUAP HAS BEEN DEVELOPED AT THE LAWRENCE LIVERMORE LABORATORY (LLL) TO ASSESS ANY SAFEGUARDS SYSTEM AGAINST DIVERSION BY ANY COMBINATION OF NON-VIOLENT INSIDERS. THIS WORK HAS BEEN DONE UNDER CONTRACT TO THE U. S. NUCLEAR REGULATORY COMMISSION (NRC). THE PROGRAM YOU ARE ABOUT TO EXECUTE GENERATES THE INPUT TO THE POWERFUL SUAP CODES. THESE CODES ASSESS THE SAFEGUARDS SYSTEMS (MONITORS, GUARDS, DOCUMENTS, ETC.) AND PHYSICAL SECURITY CONTINGENCY PLANS.

THE FOLLOWING SUPPORTING DOCUMENTS DESCRIBING THE SUAP PROCEEDURES ARE AVAILABLE:

1. SUAP OVERVIEW
2. SUAP USER MANUAL
3. SUAP CODE DESCRIPTIONS
4. SUAP EXAMPLES

PRESS RETURN TO CONTINUE

```
********** FACILITY DESCRIPTION PROGRAM **********

INSERT A DATA DISK IN DRIVE 1 AND PRESS RETURN:


                1-NEW DATA FILE
                2-OLD DATA DISK FILE
                3-OLD DATA TAPE FILE

                INPUT NUMBER: 1
```

```
FILE=2                  area-portal list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS  STOP INPUT  AFTER THE LAST RETURN

 1.   AREA-01
 2.   AREA-02
 3.   AREA-03
 4.   AREA-04
 5.   AREA-05
 6.   AREA-06
 7.   FIA
 8.   PORT-01
 9.   PORT-02A
 10.   PORT-02B
 11.   PORT-03
 12.   PORT-04
 13.   FENCE
 14.

                        13 ID. CODES LISTED.
```

```
FILE=3                adjacency matrix
 FOR EACH AREA OR PORTAL
LIST THE AREAS OR PORTALS THAT YOU CAN GO TO
SEPARATED WITH SPACES.
PRESS RETURN TO GET THE NEXT AREA OR PORTAL
PRESS UDK(12) TO CONTINUE A LINE

AREA OR PORTAL = AREAS OR PORTALS THAT YOU CAN GO TO
AREA-01 = PORT-01 PORT-04 FENCE
AREA-02 = FENCE FIA PORT-04
AREA-03 = FIA PORT-02A PORT-03 AREA-06 PORT-01
AREA-04 = PORT-02B
AREA-05 = PORT-03
AREA-06 = AREA-03
FIA = AREA-02 AREA-03
PORT-01 = AREA-01 AREA-03
PORT-02A = AREA-04
PORT-02B = AREA-03
PORT-03 = AREA-05 AREA-03
PORT-04 = AREA-01 AREA-03
FENCE = AREA-01 AREA-02
```

```
FILE=4                  monitor-lock list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS 'STOP INPUT' AFTER THE LAST RETURN

 1.  MON-A04
 2.  MON-A05
 3.  MON-FIA
 4.  MON-P01
 5.  MON-P02
 6.  MON-P03
 7.  MON-P04
 8.  LOC-P01
 9.  LOC-P02B
 10.  LOC-P03
 11.  LOC-P04
 12.

                    11 ID. CODES LISTED.
```

```
FILE=5                  area/monitor-lock matrix
 FOR EACH AREA OR PORTAL
INPUT THE MONITORS AND LOCKS THAT COVER THEM
SEPARATING THEM WITH ` and ' AND ` or ', OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT AREA OR PORTAL
PRESS UDK<12> TO CONTINUE A LINE

AREA OR PORTAL = MONITORS AND LOCKS THAT COVER THEM
AREA-01 =
AREA-02 =
AREA-03 =
AREA-04 = MON-A04
AREA-05 = MON-A05
AREA-06 =
FIA = MON-FIA
PORT-01 = MON-P01 AND LOC-P01
PORT-02A = MON-P02
PORT-02B = MON-P02 AND LOC-P02B
PORT-03 = MON-P03 AND LOC-P03
PORT-04 = MON-P04 AND LOC-P04
FENCE =
```

```
FILE=6                  authorization list
INPUT ALL AUTHORIZED PLANT PERSONNEL

INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS `STOP INPUT' AFTER THE LAST RETURN

 1.  ENG-11
 2.  ENG-21
 3.  ENG-22
 4.  GUARD-01
 5.  ACCT-01
 6.  ACCT-02
 7.  PLA-MGR
 8.  MAINT-01
 9.  PWR-EMP
 10.  VISITOR
 11.

                        10 ID. CODES LISTED.
```

```
FILE=37                probability value matrix
 FOR EACH PROBABILITY ID. CODE
LIST THE PROBABILITY TO BE ASSOCIATED WITH IT
PRESS RETURN TO GET THE NEXT PROBABILITY ID. CODE
PRESS UDK(12) TO CONTINUE A LINE

PROBABILITY ID. CODE = PROBABILITY TO BE ASSOCIATED WITH IT
prob1 = 0.1
prob2 = 0.5
prob3 = 0.5
prob4 = 0.5
```

```
FILE=7                monitor-lock/authorization matrix
 FOR EACH MONITOR OR LOCK
INPUT THE PERSONNEL WITH AUTHORIZED ACCESS
SEPARATING THEM WITH ` and ' AND ` or ' , OR, ` * ' AND ` + ',
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS UDK(12) TO CONTINUE A LINE

MONITOR OR LOCK = PERSONNEL WITH AUTHORIZED ACCESS
MON-A04 = GUARD-01 AND MAINT-01
MON-A05 = GUARD-01 AND MAINT-01 OR ENG-21 AND MAINT-01
MON-FIA = MAINT-01
MON-P01 = MAINT-01
MON-P02 = GUARD-01 AND MAINT-01
MON-P03 = GUARD-01 AND MAINT-01 OR ENG-21 AND MAINT-01
MON-P04 = MAINT-01
LOC-P01 = MAINT-01
LOC-P02B = MAINT-01 AND GUARD-01
LOC-P03 = MAINT-01 AND GUARD-01 OR MAINT-01 AND ENG-21
LOC-P04 = MAINT-01
```

```
FILE=8                    monitor-lock/failure probability matrix
 FOR EACH MONITOR OR LOCK
LIST THE PROBABILITY OF FAILURE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS HOK(12) TO CONTINUE A LINE

MONITOR OR LOCK = PROBABILITY OF FAILURE
MON-A04 = 0.1
MON-A05 = 0.1
MON-FIA = 0.03
MON-P01 = 0.005
MON-P02 = 0.005
MON-P03 = 0.005
MON-P04 = 0.005
LOC-P01 = 1E-6
LOC-P02B = 1E-6
LOC-P03 = 1E-6
LOC-P04 = 1E-6
```

```
FILE=9                  transmission line list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS `STOP INPUT' AFTER THE LAST RETURN

 1.   CA-01
 2.   CA-02
 3.   CA-03
 4.   CA-04
 5.   CA-05
 6.   CA-06
 7.   CA-07
 8.   CA-08
 9.   CA-09
 10.   CA-10
 11.   CA-11
 12.   JB-01
 13.   JB-02
 14.   JB-03
 15.

                        14 ID. CODES LISTED.
```

```
FILE=10                monitor-lock/transmission line matrix
 FOR EACH MONITOR OR LOCK
INPUT THE TRANSMISSION LINES TO THE GUARD STATION
SEPARATING THEM WITH ` and ' AND ` or '. OR. ` * ' AND ` +
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS UDK<12> TO CONTINUE A LINE

MONITOR OR LOCK = TRANSMISSION LINES TO THE GUARD STATION
MON-A04 = CA-03 AND JB-02 AND CA-02 AND JB-01 AND CA-01
MON-A05 = CA-05 AND JB-02 AND CA-02 AND JB-01 AND CA-01
MON-F1A = CA-10 AND JB-03 AND CA-09 OR CA-11 AND JB-01 AND CA-01
MON-P01 = CA-08
MON-P02 = CA-04 AND JB-02 AND CA-02 AND JB-01 AND CA-01
MON-P03 = CA-06 AND JB-02 AND CA-02 AND JB-01 AND CA-01
MON-P04 = CA-07 AND JB-01 AND CA-01
LOC-P01 =
LOC-P02B =
LOC-P03 =
LOC-P04 =
```

```
FILE=11                    utilities list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS `STOP INPUT' AFTER THE LAST RETURN

 1.   CA-21
 2.   CA-22
 3.   CA-23
 4.   CA-24
 5.   CA-25
 6.   CA-26
 7.   CA-27
 8.   CA-28
 9.   CA-29
 10.   CA-30
 11.   CA-31
 12.   CA-32
 13.   JB-21
 14.   JB-22
 15.   JB-23
 16.   PUB-PWR
 17.   BATTERY1
 18.   BATTERY2
 19.

                    18 ID. CODES LISTED.
```

```
FILE=12              monitor-lock/utilities matrix
 FOR EACH MONITOR OR LOCK
INPUT THE UTILITIES THAT FEED IT
SEPARATING THEM WITH ` and ' AND ` or '. OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS UDK(13) TO CONTINUE A LINE

MONITOR OR LOCK = UTILITIES THAT FEED IT
MON-A04 = CA-23 AND JB-22 AND ( CA-22 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-32 AND BATTERY2 )
MON-A05 = CA-24 AND JB-22 AND ( CA-22 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-32 AND BATTERY2 )
MON-FIA = CA-29 AND JB-23 AND ( CA-28 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-31 AND BATTERY1 )
MON-P01 = CA-30 AND JB-23 AND ( CA-28 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-31 AND BATTERY1 )
MON-P02 = CA-25 AND JB-22 AND ( CA-22 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-32 AND BATTERY2 )
MON-P03 = CA-26 AND JB-22 AND ( CA-22 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-32 AND BATTERY2 )
MON-P04 = CA-27 AND JB-22 AND ( CA-22 AND JB-21 AND CA-21 AND
CONTINUE: PUB-PWR OR CA-32 AND BATTERY2 )
LOC-P01 =
LOC-P02B =
LOC-P03 =
LOC-P04 =
```

```
FILE=13                  transmission line/authorization matrix
 FOR EACH TRANSMISSION LINE COMPONENT
INPUT THE PERSONNEL WITH AUTHORIZED ACCESS
SEPARATING THEM WITH ` and ´ AND ` or ´, OR, ` * ´ AND ` + ´.
`AND PROB1´ THROUGH `AND PROB4´ ARE AVAILABLE
PRESS RETURN TO GET THE NEXT TRANSMISSION LINE COMPONENT
PRESS UDK(12) TO CONTINUE A LINE

TRANSMISSION LINE COMPONENT = PERSONNEL WITH AUTHORIZED ACCESS
CA-01 = MAINT-01
CA-02 = MAINT-01 AND GUARD-01
CA-03 = MAINT-01 AND GUARD-01
CA-04 = MAINT-01 AND GUARD-01
CA-05 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-06 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-07 = MAINT-01
CA-08 = MAINT-01
CA-09 = MAINT-01
CA-10 = MAINT-01
CA-11 = MAINT-01
JB-01 = MAINT-01
JB-02 = MAINT-01 AND GUARD-01
JB-03 = MAINT-01
```

```
FILE=14                utilities/authorization matrix
 FOR EACH UTILITY COMPONENT
INPUT THE PERSONNEL WITH AUTHORIZED ACCESS
SEPARATING THEM WITH ' and ' AND ' or ', OR, ' * ' AND ' + '.
'AND PROB1' THROUGH 'AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT UTILITY COMPONENT
PRESS UDK(12) TO CONTINUE A LINE

UTILITY COMPONENT = PERSONNEL WITH AUTHORIZED ACCESS
CA-21 = MAINT-01
CA-22 = MAINT-01
CA-23 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-24 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-25 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-26 = MAINT-01 AND ENG-21 OR MAINT-01 AND GUARD-01
CA-27 = MAINT-01
CA-28 = MAINT-01
CA-29 = MAINT-01
CA-30 = MAINT-01
CA-31 = MAINT-01
CA-32 = MAINT-01
JB-21 = MAINT-01
JB-22 = MAINT-01
JB-23 = MAINT-01
PUB-PWR = PWR-EMP
BATTERY1 = MAINT-01
BATTERY2 = MAINT-01
```

```
FILE=15                  area/authorization matrix
 FOR EACH AREA OR PORTAL
INPUT THE PERSONNEL WITH AUTHORIZED ACCESS
SEPARATING THEM WITH ` and ' AND ` or ', OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT AREA OR PORTAL
PRESS UDK(12) TO CONTINUE A LINE

AREA OR PORTAL = PERSONNEL WITH AUTHORIZED ACCESS
AREA-01 = ALL
AREA-02 = GUARD-01 OR GUARD-01 AND MAINT-01
AREA-03 = GUARD-01 AND ( VISITOR OR PWR-EMP ) OR ENG-11 OR ENG-21
CONTINUE: OR ENG-22 OR GUARD-01 OR PLA-MGR OR MAINT-01 OR ACCT-01
CONTINUE: OR ACCT-02
AREA-04 = ENG-11 OR ENG-21 OR ENG-22 OR MAINT-01 AND GUARD-01 OR
CONTINUE: PLA-MGR OR ACCT-01 OR ACCT-02
AREA-05 = ENG-21 AND ( ENG-22 OR GUARD-01 ) OR PLA-MGR AND GUARD-01
CONTINUE: OR ACCT-01 AND ACCT-02
AREA-06 = GUARD-01 AND ( VISITOR OR PWR-EMP ) OR ENG-11 OR ENG-21
CONTINUE: OR ENG-22 OR GUARD-01 OR PLA-MGR OR MAINT-01 OR ACCT-01
CONTINUE: OR ACCT-02
FIA =
PORT-01 = GUARD-01 AND ( VISITOR OR PWR-EMP ) OR ENG-11 OR ENG-21
CONTINUE: OR ENG-22 OR GUARD-01 OR PLA-MGR OR MAINT-01 OR ACCT-01
CONTINUE: OR ACCT-02
PORT-02A = ENG-11 OR ENG-21 OR ENG-22 OR MAINT-01 AND GUARD-01
CONTINUE: OR PLA-MGR OR ACCT-01
PORT-02B = ENG-11 OR ENG-21 OR ENG-22 OR MAINT-01 AND GUARD-01
CONTINUE: OR PLA-MGR OR ACCT-01
PORT-03 = GUARD-01 AND ( ENG-21 OR PLA-MGR ) OR ENG-21 AND ENG-22
CONTINUE: OR ACCT-01 AND ACCT-02
PORT-04 = GUARD-01 AND ( VISITOR OR PWR-EMP ) OR ENG-11 OR ENG-21
CONTINUE: OR ENG-22 OR GUARD-01 OR PLA-MGR OR MAINT-01 OR ACCT-01
CONTINUE: OR ACCT-02
FENCE =
```

```
FILE=16                monitor-lock response matrix
 FOR EACH MONITOR OR LOCK
INPUT THE AREAS OR PORTALS OF RESPONSE
SEPARATING THEM WITH   and ' AND ' or ', OR, ' * ' AND ' + '.
'AND PROB1' THROUGH 'AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS CTRL(12) TO CONTINUE A LINE

MONITOR OR LOCK = AREAS OR PORTALS OF RESPONSE
MON-A04 = AREA-03
MON-A05 = AREA-03
MON-P1n = AREA-03
MON-P01 = AREA-03
MON-P02 = AREA-03
MON-P03 = AREA-03
MON-P04 = AREA-03
LOC-P01 =
LOC-P02B =
LOC-P03 =
LOC-P04 =
```

```
FILE=17                response/authorization matrix
 FOR EACH MONITOR OR LOCK
INPUT THE PERSONNEL WHO RESPOND TO THAT ALARM
SEPARATING THEM WITH ` and ' AND ` or '. OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS UDK(12) TO CONTINUE A LINE

MONITOR OR LOCK = PERSONNEL WHO RESPOND TO THAT ALARM
MON-A04 = GUARD-01
MON-A05 = GUARD-01
MON-F14 = GUARD-01
MON-P01 = GUARD-01
MON-P02 = GUARD-01
MON-P03 = GUARD-01
MON-P04 = GUARD-01
LOC-P01 =
LOC-P02B =
LOC-P03 =
LOC-P04 =
```

```
FILE=1S                document list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS 'STOP INPUT' AFTER THE LAST RETURN

 1.  F-786
 2.

                    1 ID. CODES LISTED.
```

```
FILE=19                    monitor-lock/document matrix
 FOR EACH MONITOR OR LOCK
INPUT THE DOCUMENTS REQUIRED TO PASS WITHOUT SETTING AN ALARM
SEPARATING THEM WITH ` and ` AND ` or ` , OR, ` * ` AND ` + `.
`AND PROD1` THROUGH `AND PROB4` ARE AVAILABLE
PRESS RETURN TO GET THE NEXT MONITOR OR LOCK
PRESS LOCK(12) TO CONTINUE A LINE

MONITOR OR LOCK = DOCUMENTS REQUIRED TO PASS WITHOUT SETTING AN ALARM
MON-A04 = F-706
MON-A05 = F-706
MON-P1A = F-706
MON-P01 = F-706
MON-P02 = F-706
MON-P03 = F-706
MON-P04 = F-706
LOC-P01 = F-706
LOC-P025 = F-706
LOC-P02 = F-706
LOC-P04 = F-706
```

```
FILE=20                document/authorization matrix
 FOR EACH DOCUMENT
INPUT THE PERSONNEL AUTHORIZED TO POSSESS IT
SEPARATING THEM WITH ` and   AND ` or `, OR,  ` * ` AND ` + `.
`AND PROB1` THROUGH `AND PROB4` ARE AVAILABLE
PRESS RETURN TO GET THE NEXT DOCUMENT
PRESS CONT(12) TO CONTINUE A LINE

DOCUMENT = PERSONNEL AUTHORIZED TO POSSESS IT
F-705 = ENG-11 OR ENG-21 OR ENG-22 OR PLA-MGR
```

```
15 FILES HAVE NO DATA
                    FILE=1
                    FILE=21
                    FILE=22
                    FILE=23
                    FILE=24
                    FILE=25
                    FILE=26
                    FILE=27
                    FILE=28
                    FILE=29
                    FILE=30
                    FILE=31
                    FILE=32
                    FILE=33
                    FILE=34


                    DONE

                    GO TO THE ACCOUNTING SYSTEM PROGRAM
```

********** SUAP DISK MENU **********

FILES AVAILABLE:

 1-SUAP DISK MENU
 2-SUAP PROCEDURE OUTLINE
 3-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITH HEADINGS)
 4-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITHOUT HEADINGS)
 5-ACCOUNTING SYSTEM PROGRAM (TYPE IV)
 6-MAKE A NEW DATA TAPE
 7-DUPLICATE A DISK
 8-WRITE A DATA TAPE FROM A DISK FILE
 9-FACILITY DESCRIPTION PROGRAM USER MANUAL
10-MAKE A NEW DATA DISK
11-PRINT SUAP OUTPUT FILES

INPUT NUMBER: 5

```
********** ACCOUNTING SYSTEM PROGRAM **********

INSERT A DATA DISK IN DRIVE 1 AND PRESS RETURN:


                1-OLD DATA DISK FILE
                2-OLD DATA TAPE FILE

                INPUT NUMBER: 1
```

```
********** RESTART PROGRAM **********
21-SNM SOURCE LIST
22-SNM SOURCE/QUANTITY MATRIX
23-LOSS DETECTION METHODS LIST
34-DETECTION TIME MATRIX
24-SNM SOURCE/LOSS DETECTION METHODS MATRIX
25-RECORDS LIST
26-LOSS DETECTION METHODS/RECORDS MATRIX
27-RECORDS/RECORDS MATRIX
28-FORMS LIST
29-RECORDS/FORMS MATRIX
30-LOSS DETECTION METHODS/AUTHORIZATION MATRIX
31-RECORDS/AUTHORIZATION MATRIX
32-FORMS/AUTHORIZATION MATRIX
33-SNM SOURCE/ESCAPE POINT MATRIX

  INPUT THE NUMBER OF THE RESTART POINT: 21
```

```
FILE=21                 emm source list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS `STOP INPUT` AFTER THE LAST RETURN

  1.  AREA-04
  2.  AREA-05
  3.

                    2 ID. CODES LISTED
```

```
FILE=22                snm source/quantity matrix
 FOR EACH SNM SOURCE LOCATION
LIST THE EFFECTIVE AMOUNT OF SNM PRESENT (KG)
PRESS RETURN TO GET THE NEXT SNM SOURCE LOCATION
PRESS UDK(12) TO CONTINUE A LINE

SNM SOURCE LOCATION = EFFECTIVE AMOUNT OF SNM PRESENT (KG)
AREA-04 = 0.5
AREA-05 = 5.0
```

```
FILE=23                loss detection methods list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS `STOP INPUT` AFTER THE LAST RETURN

  1.   INV-DIF
  2.   MIS-ITM
  3.   INC-SER
  4.   BROKSEAL
  5.   WRNGSEAL
  6.

                        5 ID. CODES LISTED
```

```
FILE=34                detection time matrix
 FOR EACH TIME ID. CODE
LIST THE NUMBER OF DAYS
PRESS RETURN TO GET THE NEXT TIME ID. CODE
PRESS UDK(12) TO CONTINUE A LINE

TIME ID. CODE = NUMBER OF DAYS
time1 =  7.0
time2 =  30.0
time3 =  180.0
time4 =  365.0
```

FILE=24 snm source/loss detection methods matrix

```
AND TIME1
AND TIME2
AND TIME3
AND TIME4
 FOR EACH SNM SOURCE LOCATION
INPUT THE LOSS DETECTION METHODS AND THE TIME FRAME
FOR DETECTION (FROM ABOVE)
SEPARATING THEM WITH ` and ' AND ` or ', OR, ` * ' AND ` + '.
`AND PR081' THROUGH `AND PR084' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT SNM SOURCE LOCATION
PRESS UDK(12) TO CONTINUE A LINE

SNM SOURCE LOCATION = LOSS DETECTION METHODS AND THE TIME FRAME
FOR DETECTION (FROM ABOVE)
AREA-04 = INV-DIF AND TIME2 OR MIS-ITM AND TIME2
AREA-05 = INV-DIF AND TIME2 OR MIS-ITM AND TIME1 OR INC-SER AND TIME1
CONTINUE: OR BROKSEAL AND TIME3 OR WRNGSEAL AND TIME3
```

```
FILE=25                records list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS 'STOP INPUT' AFTER THE LAST RETURN

 1.  ITEMREC
 2.  ASSAYREC
 3.  SEALREC
 4.

                    3 ID. CODES LISTED
```

```
FILE=26                loss detection methods/records matrix
 FOR EACH LOSS DETECTION METHOD
INPUT THE REQUIRED RECORDS
SEPARATING THEM WITH ` and ' AND ` or ', OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT LOSS DETECTION METHOD
PRESS UDK(12) TO CONTINUE A LINE

LOSS DETECTION METHOD = REQUIRED RECORDS
INV-DIF = ITEMREC AND ASSAYREC
MIS-ITM = ITEMREC
INC-SEP = ITEMREC
BROKSEAL = SEALREC
WRNGSEAL = SEALREC
```

```
FILE=27                records/records matrix
 FOR EACH RECORD
INPUT THE RECORDS THAT ARE USED TO CROSS CHECK IT
SEPARATING THEM WITH ` and ' AND ` or ' , OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT RECORD
PRESS UDK(12) TO CONTINUE A LINE

RECORD = RECORDS THAT ARE USED TO CROSS CHECK IT
ITEMREC = ASSAYREC AND SEALREC
ASSAYREC = ITEMREC
SEALREC = ITEMREC
```

```
FILE=28                forms list
INPUT LIST VARIABLES SEPARATED WITH RETURNS
VARIABLES MAY NOT CONTAIN SPACES
PRESS 'STOP INPUT' AFTER THE LAST RETURN

 1.  MOVEFORM
 2.  ASAYFORM
 3.  SEALFORM
 4.  INVNTORY
 5.

                    4 ID. CODES LISTED
```

```
FILE=29                records/forms matrix
 FOR EACH RECORD
INPUT THE FORMS THAT SUPPLY INPUT TO IT
SEPARATING THEM WITH ` and ' AND ` or '. OR, ` * ' AND ` + '.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT RECORD
PRESS UDK(12) TO CONTINUE A LINE

RECORD = FORMS THAT SUPPLY INPUT TO IT
ITEMREC = MOVEFORM AND INVNTORY
ASSAYREC = ASSYFORM
SEALREC = SEALFORM AND INVNTORY
```

```
FILE=30              loss detection methods/authorization matrix
 FOR EACH LOSS DETECTION METHOD
INPUT THE PERSONNEL WHO COULD CIRCUMVENT THE ALARM
SEPARATING THEM WITH ` and ´ AND ` or ´, OR, ` * ´ AND ` + ´.
`AND PROB1´ THROUGH `AND PROB4´ ARE AVAILABLE
PRESS RETURN TO GET THE NEXT LOSS DETECTION METHOD
PRESS UDK(12) TO CONTINUE A LINE

LOSS DETECTION METHOD = PERSONNEL WHO COULD CIRCUMVENT THE ALARM
INV-DIF = PLA-MGR OR ACCT-01 AND ACCT-02
MIS-ITM = PLA-MGR OR ENG-21 AND ENG-22 AND ACCT-01 AND ACCT-02
INC-SER = PLA-MGR OR ENG-21 AND ENG-22 AND ACCT-01 AND ACCT-02
BRKSEAL = PLA-MGR OR GUARD-01
WRNGSEAL = PLA-MGR OR GUARD-01
```

```
FILE=31                records/authorization matrix
 FOR EACH RECORD
INPUT THE PERSONNEL AUTHORIZED TO MAKE ENTRIES OR CHANGES
SEPARATING THEM WITH ` and ´ AND ` or ´, OR, ` * ´ AND ` +
`AND PROB1´ THROUGH `AND PROB4´ ARE AVAILABLE
PRESS RETURN TO GET THE NEXT RECORD
PRESS UDK(12) TO CONTINUE A LINE

RECORD = PERSONNEL AUTHORIZED TO MAKE ENTRIES OR CHANGES
ITEMREC = PLA-MGR OR ACCT-01 OR ACCT-02
ASSAYREC = PLA-MGR OR ACCT-01 OR ACCT-02
SEALREC = PLA-MGR OR GUARD-01
```

```
FILE=32                forms/authorization matrix
 FOR EACH FORM
INPUT THE PERSONNEL AUTHORIZED TO MAKE ENTRIES OR CHANGES
SEPARATING THEM WITH `and' AND `or', OR, `*' AND `+'.
`AND PROB1' THROUGH `AND PROB4' ARE AVAILABLE
PRESS RETURN TO GET THE NEXT FORM
PRESS UDK(12) TO CONTINUE A LINE

FORM = PERSONNEL AUTHORIZED TO MAKE ENTRIES OR CHANGES
MOVEFORM = ENG-21 AND ENG-22 OR PLA-MGR
ASAYFORM = ENG-21 AND ENG-22 OR PLA-MGR
SEALFORM = GUARD-01 OR PLA-MGR
INVNTORY = PLA-MGR OR ACCT-01 AND ACCT-02 AND PROB1
```

```
FILE=33                snm source/exit point matrix
 FOR EACH SNM SOURCE LOCATION
LIST THE AREAS FOR A COLLUDER TO ESCAPE TO
SEPARATED WITH SPACES.
PRESS RETURN TO GET THE NEXT SNM SOURCE LOCATION
PRESS UDK(12) TO CONTINUE A LINE

SNM SOURCE LOCATION = AREAS FOR A COLLUDER TO ESCAPE TO
AREA-04 = AREA-01
AREA-05 = AREA-01
```

```
1 FILES HAVE NO DATA
                    FILE= 1


DONE
```

```
FILE=1                    text file

DO YOU WISH:

1-NEW TEXT
2-TEXT OK
3-ADD TEXT

 INPUT NUMBER: 1
```

INPUT TEXT. PRESS 'STOP INPUT' AFTER THE LAST LINE
SECURITY URANIUM CORP.
ANALYST W. J. GRUIS
DATA: SEPT. 1, 1979

ALL DATA TYPES HAVE BEEN CONSIDERED
CA = CABLE RUN. RUNS 1 TO 11 ARE SIGNAL CABLES. RUNS 21 TO 32 ARE POWER
JB = JUNCTION BOX. BOXES 1 TO 3 CARRY SIGNALS. BOXES 21 TO 23 ARE POWER
PUB-PWR = PUBLIC UTILITY POWER
FIA = FENCE INTRUSION AREA
PWR-EMP = AN EMPLOYEE OF THE PUBLIC UTILITY

DONE

```
********** SWAP DISK MENU **********

FILES AVAILABLE:

 1-SWAP DISK MENU
 2-SWAP PROCEDURE OUTLINE
 3-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITH HEADINGS)
 4-FACILITY DESCRIPTION PROGRAM (TYPE IV, WITHOUT HEADINGS)
 5-ACCOUNTING SYSTEM PROGRAM (TYPE IV)
 6-MAKE A NEW DATA TAPE
 7-DUPLICATE A DISK
 8-WRITE A DATA TAPE FROM A DISK FILE
 9-FACILITY DESCRIPTION PROGRAM USER MANUAL
10-MAKE A NEW DATA DISK
11-PRINT SWAP OUTPUT FILES

                INPUT NUMBER: 8
```

```
********** WRITE A DATA TAPE **********
INSERT A DATA DISK IN DRIVE 1 AND PRESS RETURN:

INSERT A DATA TAPE AND PRESS RETURN:

                    DONE

PRESS RETURN TO GO BACK TO THE DISK MENU:
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We summarize activity for the quarter January through March 1979 in the Material Control Safeguards Evaluation Program, conducted for the U.S. Nuclear Regulatory Commission (NRC) at Lawrence Livermore Laboratory. The computer-assisted methodology for the assessment of Material Control and Accounting (MC&A) systems was completed. Work continues on the full automation and improvement of the System Vulnerability Analysis Methodology (SVAM) and the Structured Assessment Approach (SAA), an alternate more automated methodology. Current work on the development of assessment methodologies is summarized. Monitor characterization work done in support of the assessment methodologies is described. Work continued in assisting the NRC to develop the MC&A upgrade rule. Other areas of activity are aggregated systems model development and adversary modeling. The DYNSYL chemical simulation code and subroutines have been improved and are discussed, as well as the application of signal processing techniques to measure material loss in the nuclear industry.

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