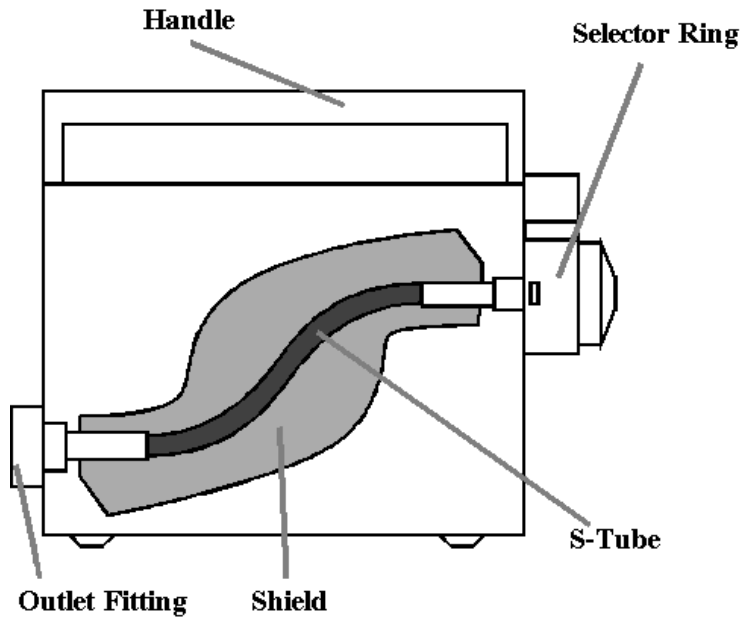


RADIOGRAPHY CROSS-REFERENCE

PROGRAM MANUAL (Rev. 1 - 06/26/02)



Version:
2.0a
October
1995

Courtesy
of
U.S.
Nuclear Regulatory Commission

ABSTRACT

The purpose of this program is to provide an efficient means for cross-referencing the compatibility of industrial radiography sources, cameras, and changers. Current information for all known compatible sources, cameras, and changers is in the database system. This version is an enhancement of version 2.0 and includes and identifies new sources, cameras, and changers that meet the requirements of Section 34.20, 10 CFR Part 34.

WARNINGS AND STATEMENTS

This cross-reference program is intended as a licensing guide for compatible models in industrial radiography, as indicated by current registration sheets or appropriate letters from the licensing authority. The registration certificates should be reviewed for more specific information about sources, cameras, or changers that are not contained in this program.

The program and associated files are controlled copies. Please do not distribute copies of the program to other persons. We need to control copies to enable us to contact all registered users and provide them with periodic updates and corrections. If additional copies are needed, please send your request to the address below. Include your name, mailing address, and phone number. When applicable, updated information and corrections will be sent periodically to all registered users of the program.

Please do not attempt to alter file contents or structure. This may adversely affect the integrity of the program and file system. Should errors or discrepancies be found within the program or files, please contact the following to initiate corrective action:

Division of Industrial and
Medical Nuclear Safety, NMSS.
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(301) 415-7000

This version supersedes all previous versions. All previous versions should be removed from your hard drive, and all manuals and disks should be destroyed. The information contained within the databases has been checked against what is stated in a registration certificate or has been verified in a letter from an licensing authority.

Throughout this manual, figures representing what is displayed on the computer screen are presented. These screens and examples of printouts are for reference and for clarifying instructions for the user. By no means are these screens or example printouts intended to endorse or show biases toward any manufacturer or product.

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NOTE: We would like to thank all users of Version 2.0 and the draft Version 1.0 of RADXREF who supplied comments and corrections and all manufacturers of radiographic equipment for their support.

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1. WHAT'S NEW IN VERSION 2.0a

Version 1.0 of RADXREF was distributed as a pilot to determine the usefulness of this type of program. The program is intended to be used by license reviewers, inspectors, licensees, and other personnel involved with radiography. A small number of copies were sent out for review to the manufacturers and key personnel in the Agreement States and the NRC regional offices. However, once other personnel became aware of the usefulness of the program, more and more requests were made for the program. Approximately 50 copies were distributed throughout the United States, Canada, and International Atomic Energy Agency (IAEA).

Version 2.0 was given a facelift. Routines were added to ease retrieval of data. More reports, easier sorts, and two new fields were added. The new fields relate to how the devices and sources are registered (registered/not registered/meets Part 34) and if a particular combination of models are approved for use according to registration certificates (source and device, or source and changer).

Version 2.0a includes new cameras, changers and sealed sources that have been registered after Version 2.0 was released and any modifications and corrections to version 2.0's data.

Significant effort has been made to ensure data integrity. The data was cross-referenced against the radiography registration certificates, and letters received from the manufactures, and Agreement States.

In version 1.0, several comments were made about the number of data files associated with the program. In the draft version, it was set up this way to reduce the access time to the data. In the new version, we changed the data structures and reduced the number of files.

Comments were also made that too many keystrokes were required to search a record, and that you should be able to access the compatible changers and compatible cameras should be able to be performed with minimal interaction from the user. The program was modified accordingly. In addition, pop-up help screens, key assignments, and other features have been added to assist the user in operating the program.

The program has undergone significant testing. As with many programs, it is impossible to test every path, branch, or control loop. Therefore, if you do find an error in the program, other than those listed in the appendix, please notify us so that, if possible, we can fix the problem. Also, notify us if you find errors with the data.

In the future, RADXREF may include not only the cameras, changers, and sealed sources used in radiography, but also the associated registered equipment (i.e., guide tubes, control tubes, collimator, etc.). There is a need for this data due to the equipment requirements of 10 CFR Part 34. Also, to help ensure that all users have access to the most recent program and have the most accurate and complete data, the program is installed on a local area network (LAN) within the NRC. The users will be able to read and print the data locally.

RADXREF will soon be available on the FedWorld Bulletin Board System (BBS). The files on FedWorld will be found in the Sealed Source & Device BBS and will be updated periodically to accommodate data and program changes. The main number to FedWorld is 703-321-3339. In addition, a toll-free number (1-800-303-9672) has been established for the NRC portion of FedWorld. Users using this toll-free number will be able to access only the NRC portion. For information on using the FedWorld Systems and general commands, please contact the FedWorld help desk at 703-487-4608.

2. BACKGROUND

Due to the nature of radiography and its associated health and safety risks, it is crucial when licensing cameras, changers and sources that these units have been approved and are compatible with their counterpart items (i.e., source/camera). Improper matching between units can lead to a source becoming left out in an exposed position (disconnect, misconnect, or failure of the source attachment), allowing the possibility for severe radiation overexposure to individuals. The large numbers of existing cameras, changers, and sources made a systematic approach necessary to maintain a cross-reference list.

As of December 1986, the cross-reference consisted only of a hand-typed table. The format was easy to read, but it was difficult to update. When the cross-reference was revised in June 1989, a database structure was attempted. In this first attempt, the structure was inflexible and provided data only on compatible changers and cameras for active source models. Printout readability and file update were difficult at best.

In June 1991, the cross-reference was revised again. It combined an easy to read format with a file system that was easier to update. The design of the file system allowed for increased flexibility in data management and expansion and provided direct data retrieval for sources, cameras, and changers. This version was sent out in draft form to test its overall usefulness.

In March 1993, the cross-reference program Version 2.0 was completed. It incorporated many new features to improve ease of use and decrease required storage space. In addition, version 2.0 included information on whether or not the model is currently registered, whether or not the compatible pair can be traced through registration sheets currently on file at NRC Headquarters, and whether or not the model meets the requirements of Section 34.20, 10 CFR Part 34. Version 2.0a includes any new or modified information since Version 2.0 was released.

3. GETTING STARTED

As with most programs, there are notations and conventions particular to the program. This section defines those used in RADXREF. We suggest that all chapters be read regardless of the level of computer proficiency of the user. Reading the entire manual enables the user to better understand the capabilities and limitations of the program.

The manual is divided into six sections and three appendices. Section 1 gets the user started and defines terms used throughout the manual and program. Section 2 provides the background and development of the program and details advantages over the previous versions of the program. Section 3 is included for those users who desire a more thorough understanding of the program, files, and their structure. Section 4 outlines the material required to support the program. Section 5 provides detailed instructions on using the program. Section 6 supplies example pages from all available printout options. Appendix A lists error messages encountered in the program along with suggested corrective actions. Appendix B contains all tables referred to in the manual. Appendix C contains information on configuring a printer. Refer to that appendix if boxes or frames do not print correctly on the printer.

3.1 Key Terms

The following are definitions of common terms found in the program and manual.

camera - a radiographic exposure device.

changer - a shield in the form of a container used to transport sources and to facilitate the removal or installation of a source in an exposure device.

exposure device - a shield in the form of a container designed to contain and allow the controlled use of one or more sources for the purpose of making radiographic exposures.

field - an item of information within a record.

record - an entry in the database file (may contain one or more fields).

source - radioactive material packaged in one or more capsules sealed to prevent escape of radioactive material; the capsule or capsules are essentially transparent to the desired radiation.

compatible - a sealed source, camera, or changer that can be safely used and is designed to be used with its counterpart sealed source, camera, or changer.

Approval Codes

Y - The combination of source, camera, or changer is compatible and approved for use as stated in a Sealed Source and Device Registration Certificate. It may be stated on the source, changer, or camera certificate.

N - The combination is not approved for use, due to lack of documentation, or generic problems. This data exists merely to show what may have been licensed in the past. If a combination is known to be compatible and can be safely used, provide documentation from the manufacturer to the licensing authority so that the approval code can be changed in the database.

License Codes

R - A Sealed Source and Device Registration Certificate exists for the model (registered).

U - It is unknown if this model was registered or not. Not recommended to be licensed until the model has been properly registered with the NRC or Agreement State.

C - A determination has been made by a licensing authority that the model meets Section 34.20, 10 CFR Part 34 requirements. The model is registered, or is in the process of being registered (administrative only, technical review complete and acceptable).

It is possible that a source, changer, or camera may not be registered ("U"), but be approved to be used with its counterpart source, changer, or camera. This is possible due to statements in a Sealed Source and Device Registration Certificate allowing the combination to be used. However, the referenced counterpart item has not been formerly registered. If you are going to license one of these models, please provide to the appropriate licensing authority documentation from the manufacturer so that a safety evaluation can be performed. If the item is found acceptable for licensing purposes, then the item will be registered and corrected in the database.

3.2 Keystroke Commands

Keystroke commands are single keys or combinations of keys that are used to manipulate text on the screen. Throughout the text, any boldface letters enclosed in brackets indicates that the user should press the key indicated in the brackets and not type out the contents of the brackets (ex., <F7> indicates that the user should press the F7 function key).

The following is a list of common keystrokes and their functions.

<u>Editing Keys</u>	<u>Function</u>
left arrow (7) or CTRL-S	left one character
right arrow (6) or CTRL-D	right one character
up arrow (8) or CTRL-E	up one field
down arrow (9) or CTRL-X	down one field
CTRL-(7) or CTRL-A	left one word
CTRL-(6) or CTRL-F	right one word
PAGE UP or CTRL-R	up one page (one screen or partial screen of data)
PAGE DOWN or CTRL-C	down one page " "
DELETE or CTRL-G	delete character at cursor
BACKSPACE	delete character to left of cursor
ENTER/RETURN	down one field
TAB	next field in sequence
ESCAPE	return to previous screen, or quit current print job

<u>Function Keys</u>	<u>Function</u>
<F1>	help screens
<F2>	locate record containing given information
<F3>	perform new search
<F4>	return to previous screen
<F5>	list compatible sources
<F6>	list compatible cameras
<F7>	list compatible changers
<F8>	return to main menu
<F9>	Quit
<F10>	list key assignments

Not all function keys are available throughout the program. When using the program, read the bottom portion of screen to find which function keys are available, or press <F10> for a list of key assignments.

4. HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE

- any IBM or compatible system having one floppy drive and a hard drive with approximately 1.2 megabytes of free disk space
- color or monochrome monitor
- approximately 344 kilobytes of free memory (after DOS, TSR's and drivers have been loaded)
- optional laser or dot matrix printer

SOFTWARE

- DOS 3.2 or higher installed on computer
- Program and data disk (contained on one 3½" HD floppy diskettes located in the binder).

5. USING THE PROGRAM

Once the program and associated files have been installed on the computer, the program is ready to be used.

To begin running the program, make sure the computer system is logged onto the drive containing the program files (typically C:), and that the current directory is XREF, or that the autoexec.bat file references this path. If needed, change to this directory by typing **CD\XREF** at the DOS prompt. Type **XREF** to start the program. The main menu screen of the program will appear (Figure 5.1).¹ It is always a good idea to read the bottom of the screen. Most directions for the user appear there.

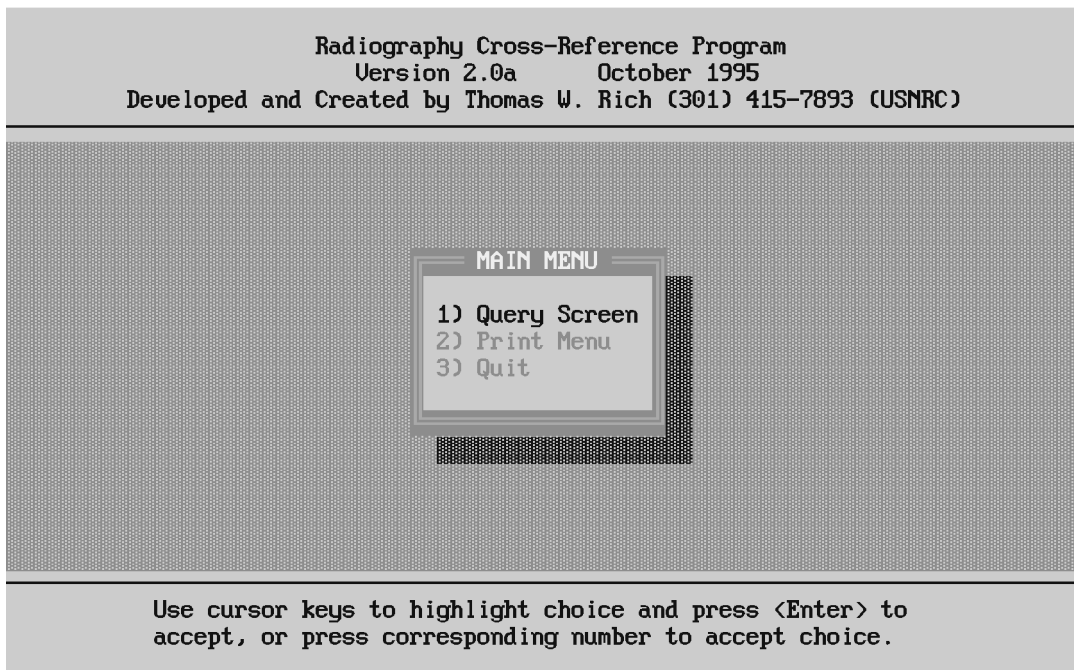


Figure
5.1 - Main Menu Screen, Option 1 highlighted

To choose one of the main menu options, highlight the correct choice by using the arrow keys then press **<Enter>**, or type the corresponding option number (in this case you do not need to press enter). The following briefly describes each option:

- Option 1) **QUERY SCREEN** allows the user to access model information and compatible items for a specific model. The information is displayed on the

Note: Figures are not to scale and are provided only as reference.

screen although there is an option to send the contents of the screen to a printer.

Option 2) **PRINT MENU** accesses a secondary menu providing several printing formats. Also see Section 6, Examples of Printouts.

Option 3) **QUIT** exits the program and returns the user to the DOS prompt.

Throughout most of the program, pressing <F8> returns the program to the Main Menu and <F9> quits the program and returns to the DOS prompt. Where available, pressing <F1> accesses a help screen that defines codes and terms and to provide additional information about the program.

The entire manufacturer's name, model number, or approval code are not always known. The program enables the user to type in as many of the beginning characters known to be correct and the program will search the files for the first entry that begin with those characters. The program allows the user to scroll through the remaining data for more matches, or other information.

Example: If you are looking for model 404 but can only remember that it begins with 4. When you enter 4 as the model number, it will bring up the first model number beginning with the character 4. You can continue to scroll through the list until the correct one is located. This search method also works for manufacturer's names and approval codes. Appendix B - Table 1 contains a listing of all manufacturer names found in the file system. Use the abbreviation (the database file contains the abbreviation, not the full name) of the name of the manufacturer when searching. The program may not recognize other forms or abbreviations.

This search method can also be used when a known item cannot be located. Due to the nature of this database, the data must be typed in exactly as it is found in the databases (program allows upper or lower case). This includes spaces and punctuation. If a known item cannot be located, there are two ways to attempt to find the data. The first is to alter the punctuation. For example, add or remove dashes and spaces. The second is to enter only the first character and perform a search. Note that numerical order is determined starting with the left digit not by the magnitude of the number (i.e., 11 shows up in a search before 2, although 2 has the smaller magnitude.)

Due to several company mergers, various cases exist where the model naming convention of the old company was changed to reflect the new company's convention. This resulted in several cases where a model is known by more than one name or model number. To aid in identifying these models, a list of all such models can be found in Appendix B - Table 2. Any model not included in that table probably only has one model name. For example, take 41708 (C2) and 41708 (C3) from the chart. The number in parentheses is the old model number. The new names are represented in the data as 41708 (C2) and 41708 (C3) to avoid confusion between the two. If the user searches on 41708, the program will find the first model which begins with 41708 and display it along with its description. If that is not the correct one, the user can continue the search through the remaining models

beginning with 41708 until the correct one is located.

In cases where the old model name has been retained through a company changeover or purchase, the database will reflect the new company as the manufacturer.

Example: Company A once manufactured the Model 1 source. Company B now has the rights to the source. Therefore, the manufacturer in the database has been changed from Company A to Company B.

In searching, when more than one data item is supplied by the user (i.e., manufacturer and model number), the database is searched by model number (program uses model number index as the default).

Appendix B - Table 3 contains a listing of all isotope abbreviations found within the file system.

Appendix C contains information on configuring a printer. Refer to Appendix C if boxes or frames do not print correctly on the printer.

6.1 Query Screen

Highlight option **1) QUERY SCREEN** on the main menu and press **<Enter>**, or press **<1>**. The query screen is displayed (Figure 5.2).

Pressing **<F8>** will return you to the main menu (Figure 5.1). Pressing **<F1>** will access the help screens (Figure 5.3). Pressing the **<F10>** function key will display a listing of key assignments (Figure 5.5). To begin a search, use the arrow, backspace and delete keys as necessary to type in all known data. If only part of the manufacturer or the model number is known, type in as many of the known characters as possible. Refer to the general information in the beginning of Section 5 for additional information about searches. Press the **<Enter>**, or the **<Tab>** key to move to the next field. After the known data has been entered, press **<F2>** to locate the desired information.

If there is no match for the entered information in the data file, the screen will display ***** Record Not Found ***** (Fig. 5.4). Press any key to return to the Query Screen. Reenter the model and manufacturer information and search again. If this message is obtained for a model known to exist, refer to Appendix A, Explanations of Error Messages, for instructions on how to handle the problem.

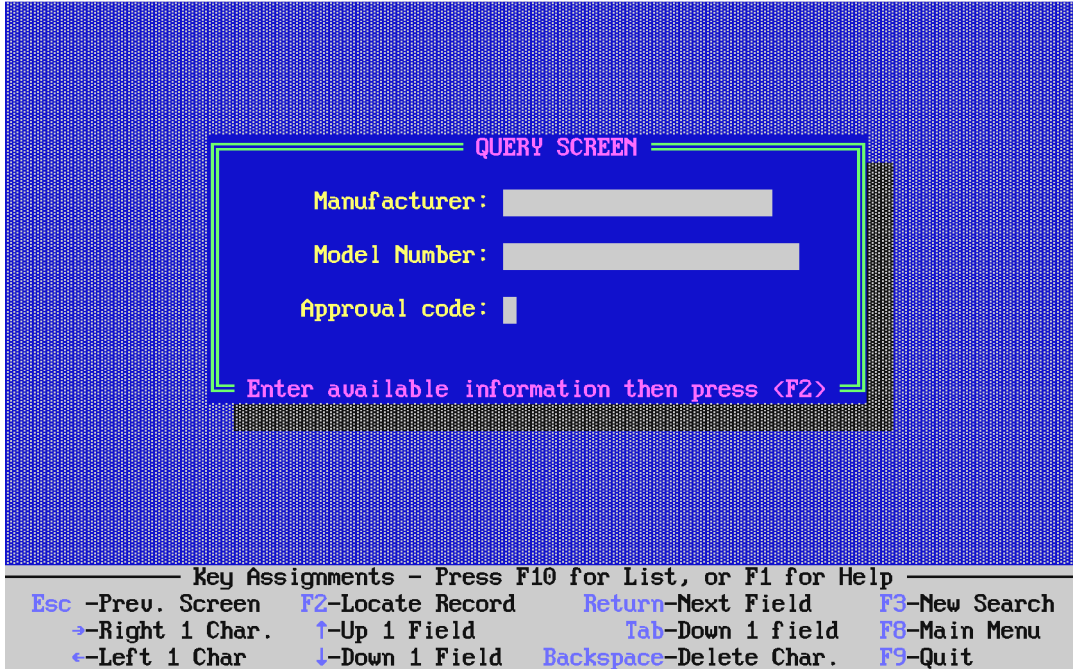


Figure 5.2 - Query Screen (blank)

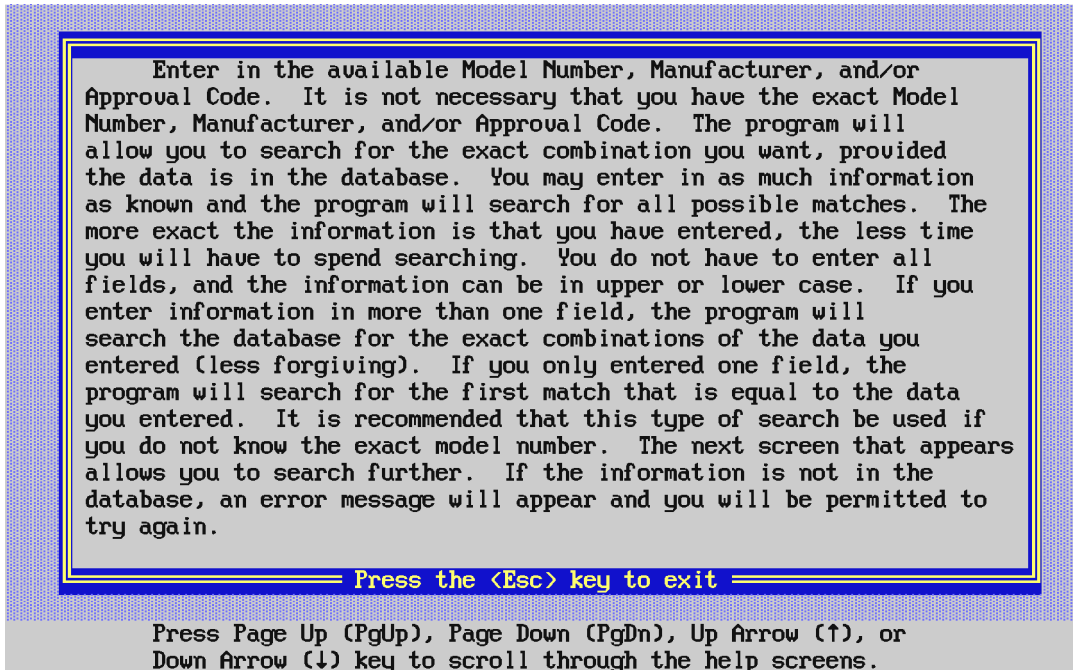


Figure 5.3 - Help screen

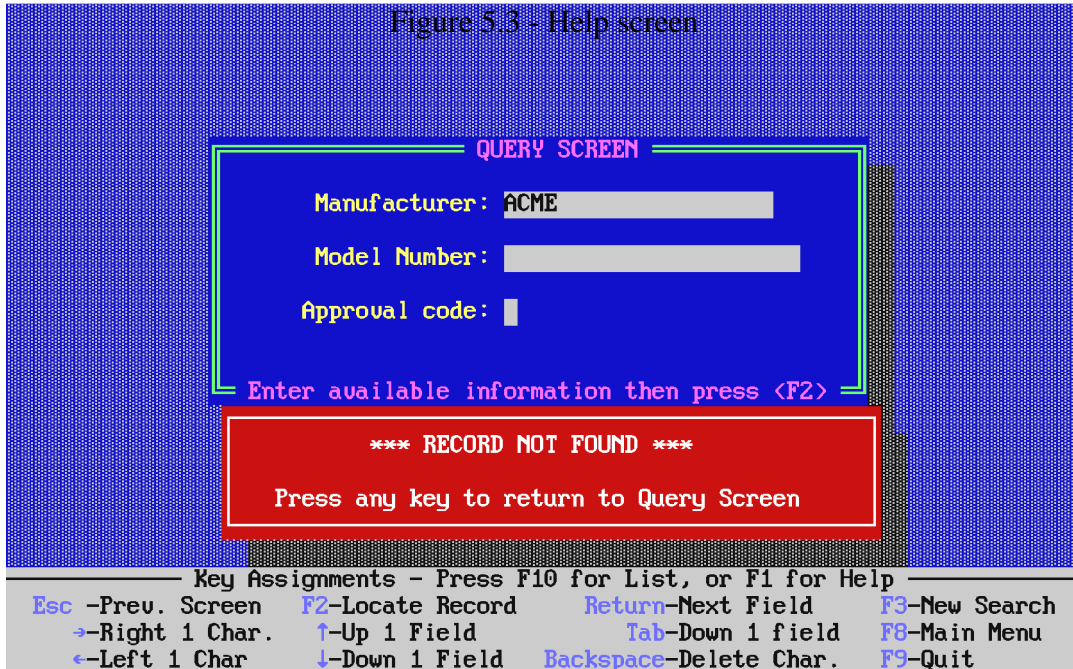


Figure 5.4 - Record not found (Query screen)

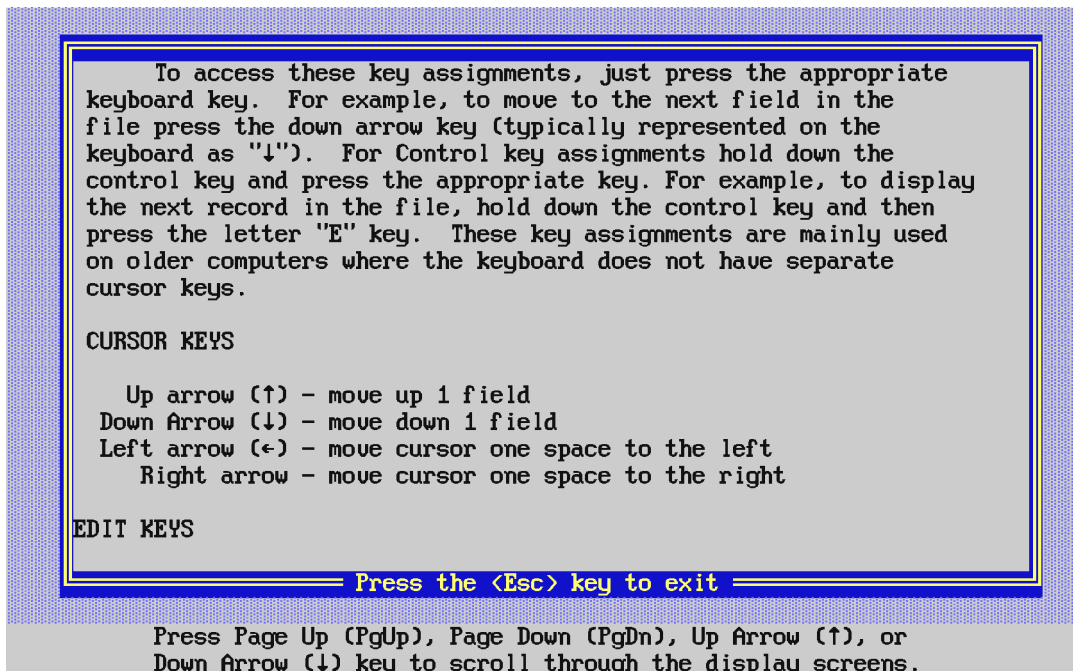
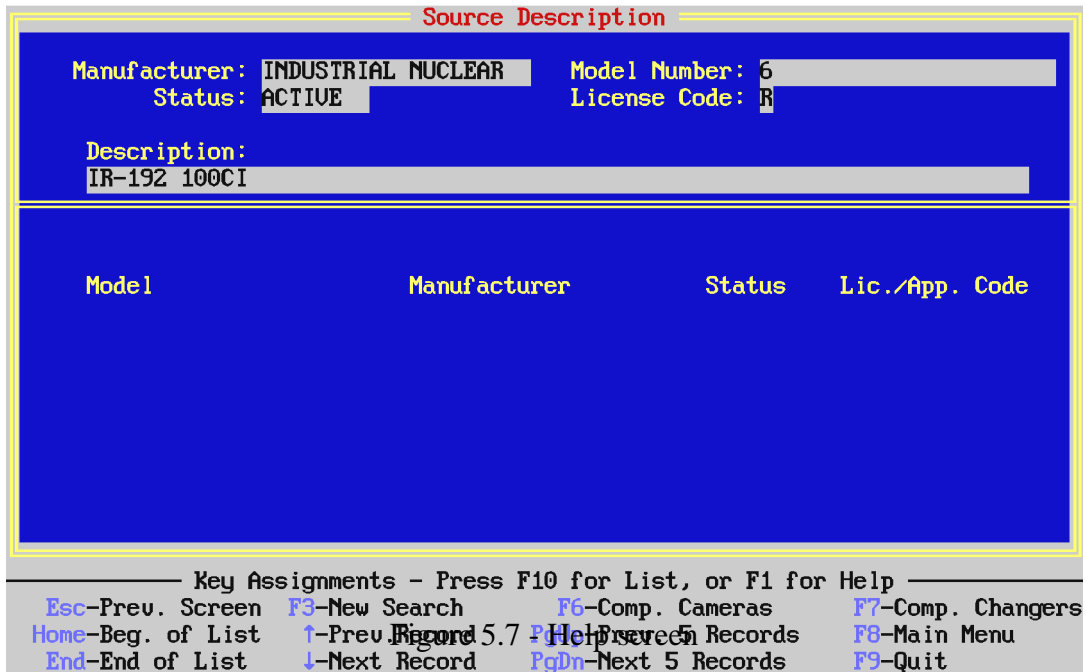


Figure 5.5 - Key definitions and assignments



When the correct model is displayed press the appropriate function key to display the corresponding compatible models (<F5>, <F6>, or <F7>). Compatible source models are sealed sources that can be used in combination with the camera or changer. In the example search on RTS, model number 424, the compatible sources can be listed by pressing function key (<F5>, see Figure 5.6). For the source model number 6 shown in Figure 5.8 both compatible cameras (F6) and compatible changers (F7) can be displayed by pressing the appropriate function key. If the program cannot locate the compatible model item information listed on the top portion of the screen, the user will be informed and allowed to perform another search, scroll, or to quit. If the model exists in the database, the screen will display the number of compatible items found in the database and begin a listing of those items, with the first item highlighted (Figure 5.9).

Figure 5.8 - Source model search

Camera Description

Manufacturer: SPEC Model Number: SPEC 2-T
 Status: ACTIVE License Code: R

Description:
IR-192 240CI, DU 16KG

Record 1 of 19 -- MORE ↓ --

** Found 19 Compatible Sources **

Model	Manufacturer	Status	Lic./App. Code
2	INDUSTRIAL NUCLEAR	Active	R/Y
8	INDUSTRIAL NUCLEAR	Active	R/N
848	AMERSHAM	Active	C/Y
89911	AMERSHAM	Active	C/Y
89912	AMERSHAM	Active	C/Y

Description for Marked Source
IR-192 200CI

Key Assignments - Display of compatible models for Help

Esc-Prev. Screen	P-Print List	F4-Cont. Search	F8-Main Menu
Home-Beg. of List	↑-Prev. Record	PgUp-Prev. 5 Records	F9-Quit
End-End of List	↓-Next Record	PgDn-Next 5 Records	

The manufacturer, model number, status and license and approval codes are displayed for each compatible item. A description of the highlighted model is displayed in the lower left corner of the screen. The record number referenced is the number of the highlighted model out of the number of compatible items found. For example, in Figure 5.9, the pointer to the left of the model numbers points to number 1 of 19 compatible items. This number is not the record number of the compatible item in the database files. The user is informed that more information is available by observation of the arrows located next to "--MORE" on the right side of the screen. Use the cursor and scroll keys to view the available information.

At this point, the option to print the list is provided. Press **P** for a listing of all the compatible items (Figure 5.10). This option does not require that the computer system to have a print screen key.

If a printer is not available or it is not ready when using this function, the user will be alerted and allowed to correct the problem (Figure 5.11). Refer to Appendix A - Explanations of Error Messages for additional information. If boxes or frames do not print correctly on the printer, see Appendix C - Configuring the Printer.

After the user has corrected the problem, the message is removed and the user is allowed to continue. To end the search, press function key <F4>, <F8>, or <F9> as appropriate.

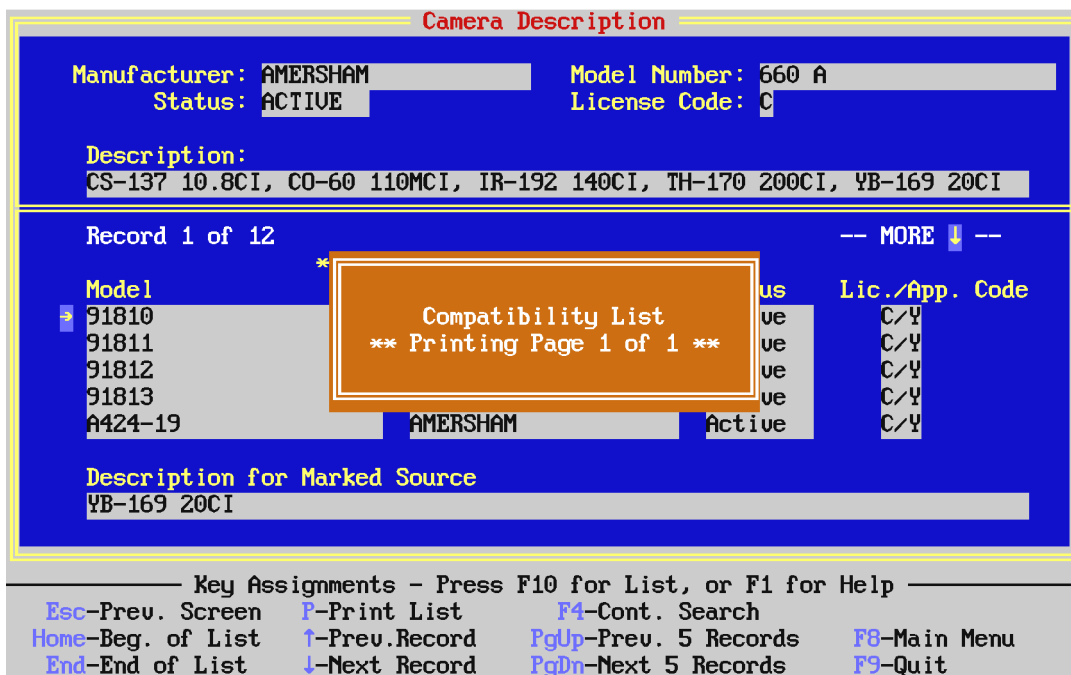


Fig. 5.10 - Compatibility list printout (Query Option)

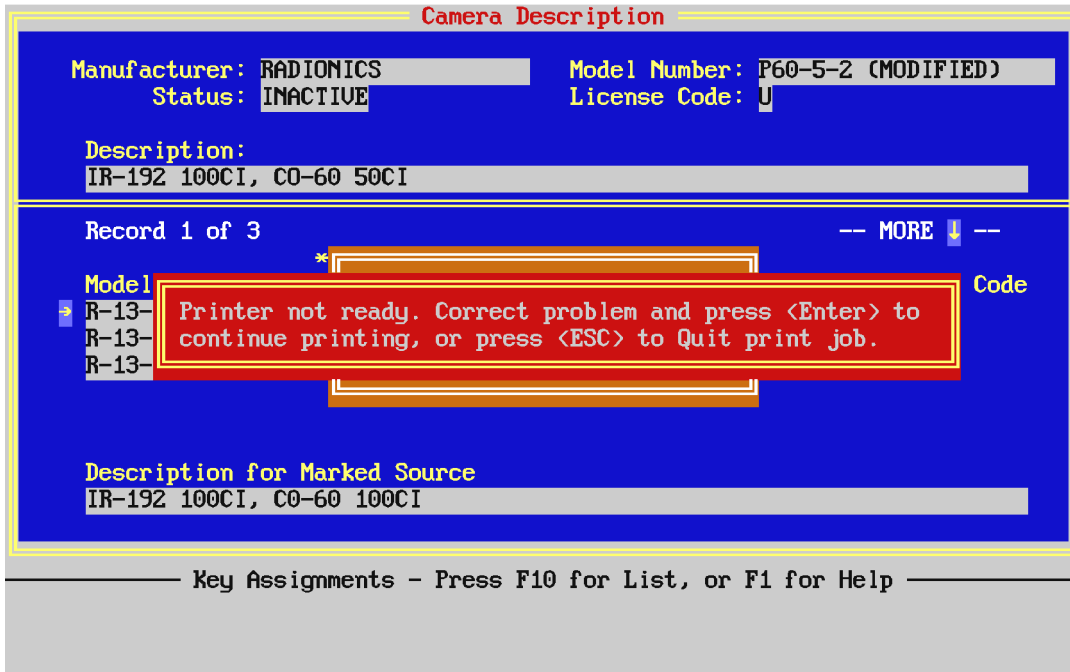
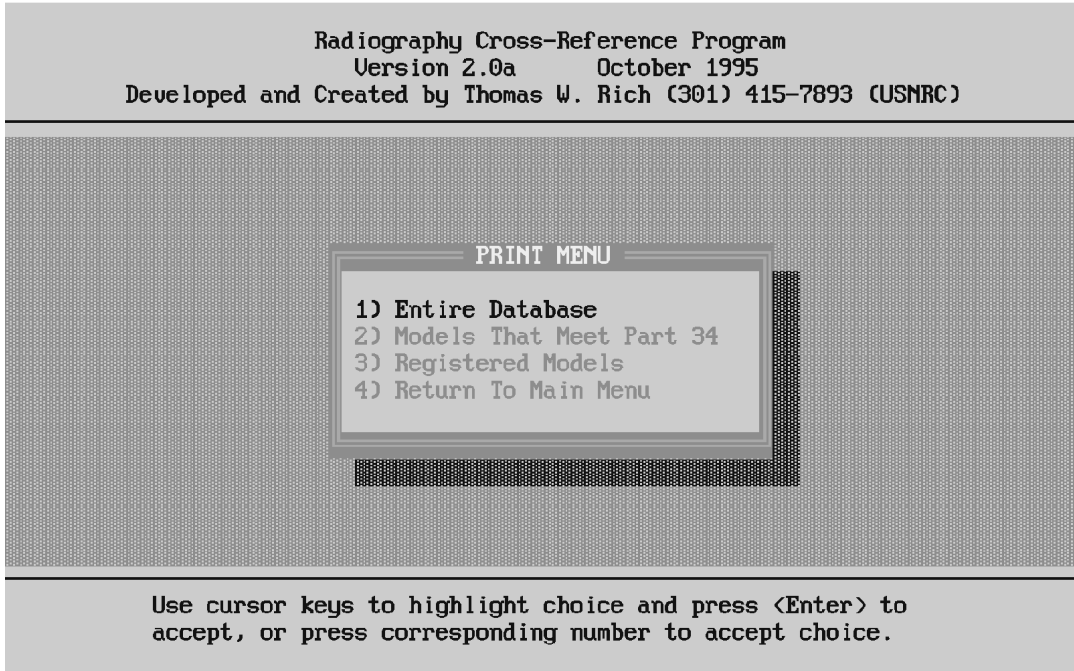


Figure 5.11 - Printing error

5.2 Print Menu

To use the available report options highlight option 2 "Print Menu" on the main menu (Figure 5.1) and press <Enter>.



5.12 Print Menu

To choose one of the printout options, highlight the correct choice and press <Enter>. The following briefly describes each printout option (refer to Section 6 for examples of each printout option):

- Option 1) **ENTIRE DATABASE** - prints a listing of all models in alphanumerical order for each manufacturer. Included is model information and all compatible items for each model.
- Option 2) **MODELS THAT MEET PART 34** - prints a listing of all models that meet Part 34 by model number.
- Option 3) **REGISTERED MODELS** - prints a listing of all registered models by model number. Included in the model information is the manufacturer, the status, and a brief description.
- Option 4) **RETURN TO MAIN DATABASE** - returns the user to the main menu.

If the user attempts to print and the printer is not ready, the screen will display a warning message (Figure 5.13). The user can correct the problem and press <Enter> to continue or press escape to return to the printout options menu. If there is a printer problem during printout, the user will be notified and allowed to correct the problem and continue.

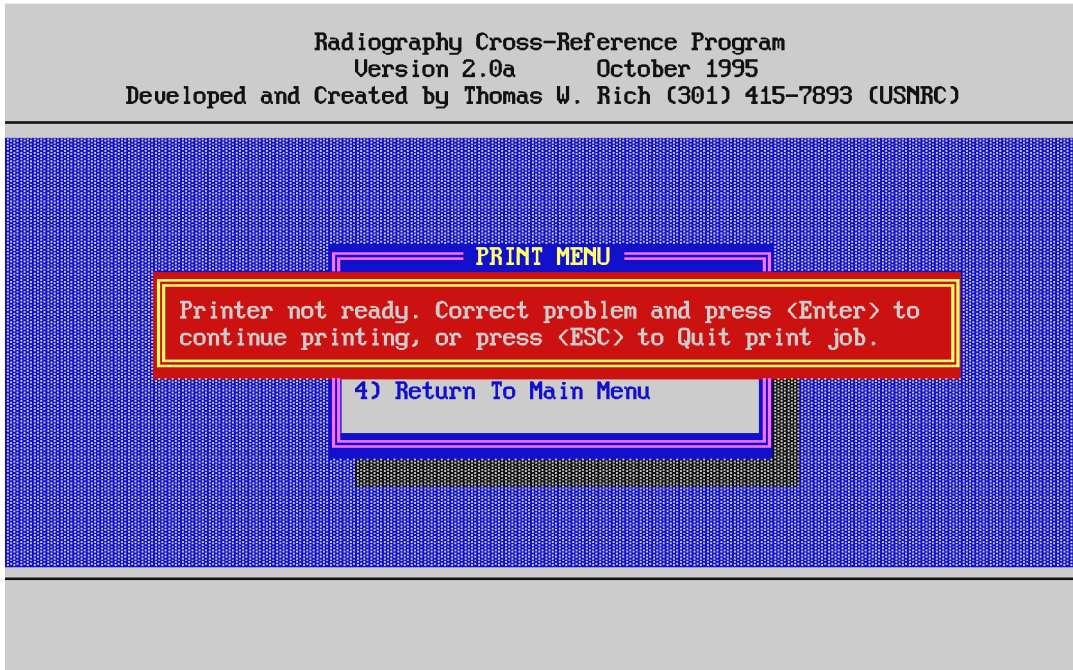


Figure 5.13 - Printing error

At any time during the printout, the user can interrupt the printout by pressing <Esc>. Two long tones signify that the print job is being canceled. The printer will not stop producing pages immediately since the printer buffer must be emptied. Once the printout has been canceled, the program will continue as if the printout was completed.

When the printout is completed, the user will be notified. A message is displayed on the bottom line on the screen notifying the user that the printout has completed. In addition, if your computer is equipped with an operable internal or external speaker, a two-tone signal will be transmitted indicating that the print job has finished.

6. EXAMPLES OF PRINTOUTS

This section contains the first page of each available printout option. These are provided as reference of each printout format. By no means are these example printouts intended to endorse or show biases toward any manufacturer or product.

-- CODES: -----

Status: I - Inactive, A - Active, U - Unknown

License Code: U - Not Registered (unknown), C - Meets 10 CFR Part 34

R - Registered, Y|N - registered|not registered combination

404A

AMERSHAM

INACTIVE IR-192 100CI, CO-60
50CI

40V

GULF NUCLEAR

ACTIVE IR-192 200CI, DU
15.4KG

* - Meets 10 CFR Part 34 Requirements

Page 1

APPENDIX A - EXPLANATIONS OF ERROR MESSAGES

The following section lists the typical error messages encountered when installing or using the program and provides suggested corrective actions.

*** CORRUPTED OR MISSING FILE ***

??? radxref.dbf ???

Problem: The program cannot locate one of the program or data files.

Cause: Usually this is caused by a corrupted installation disk, or files on your hard drive that have been accidentally overwritten, deleted, or corrupted.

Corrective action: Make note of each file for which the error message appears. The file name is between three question marks. As shown in the example above, the file radxref.dbf was missing or corrupted.

*** RECORD NOT FOUND ***

Problem: The program can not locate a matching record in the main database file for the requested information.

Cause: The user's spelling is different from the spelling in the data files, the model does not exist within the data files, or the main database file is damaged.

Corrective action: Check Appendix B - Table 2 to see if the manufacturer or model number in the database is under a different name than the one you are supplying. If it is not on the table, try a search on the first character of the model number only. If this is not successful, then the model either does not exist or is not in the data files. If the model is known to exist, contact the Sealed Source Safety Section at the address listed on page ii for assistance.

*** NO COMPATIBLE CAMERAS FOUND *** or
*** NO COMPATIBLE CHANGERS FOUND *** or
*** NO COMPATIBLE SOURCES FOUND ***

Problem: During a search no compatible cameras, changers or sources were found in the database.

Cause: Data was not available at the time this version was published, or the compatible items are not listed on a registration certificate.

Corrective action: Supply supporting information to the appropriate regulatory authority. If you are located in an Agreement State, supply information and diagrams supporting that the source/camera or source/changer are compatible. If you are within NRC jurisdiction, provide the above information to the Sealed Source Safety Section at the address listed on page ii.

The provided information will be evaluated by the appropriate authority and if approved will be entered into the database.

Printer not ready

Problem: The program cannot access the printer.

Cause: The printer is turned off, is offline, out of paper, not connected to the computer, or any other printer error that causes a print error.

Corrective action: Make sure the printer is plugged in and turned on. Check to see if it is out of paper or is performing some internal check that takes it offline. Check to see if the connecting cables are in place. If this does not correct the problem, contact the printer's user manual.

APPENDIX B - TABLES

1 - Abbreviations for Manufacturer Names

2 - Amersham Sources with More Than One Model Number

3 - Symbols of Isotopes

TABLE 1 - Abbreviations for Manufacturer Names²

NAME	ABBREVIATION AS ENTERED IN DATABASE	AUXILIARY DATABASE PREFIX
Amersham Corp.	AMERSHAM	AM
Atom Chem Corp.	ATOM CHEM	AC
Atomic Energy of Canada, Ltd.	AECL	AE
Cumberland Research Corp.	CRC	CRC
Curtiss Wright Corp.	CWC	CWC
Gamma Industries	GAMMA INDUSTRIES	GI
Gulf Nuclear, Inc.	GULF NUCLEAR	GN
Industrial Nuclear	INDUSTRIAL NUCLEAR	IN
Magnaflux Corp.	MAGNAFLUX	MX
Noram Testing Technology, Inc.	NORAM	NM
North American X-ray	NAX	NAX
Picker	PICKER	PK
Pittsburgh Testing Laboratory	PTL	PTL
Radionics	RADIONICS	RD
RTS Technology, Inc.	RTS	RTS
Sinco Testing Co.	SINCO	SN
Source Production and Equipment Co.	SPEC	SP
St. Louis Testing Labs	STL	STL

² When entering data in the program, use the abbreviation as entered in the database.

TABLE 2 - Amersham Sources with More Than One Model Number

The following is a listing of all current models known by more than one model number.

39998 (G1)	200520009 (N2)
39998 (G2)	200520010 (N3)
39998 (G3)	200520008 (N3)
39998 (G5)	200520011 (N4)
39998 (G6)	200660009 (T3)
39990 (A10)	200660009 (T6)
41702 (E1)	SR (SR-100P)
41705 (A2)	CR (500120)
41708 (C2)	130013 (A11)
41708 (C3)	36908 (A5)
41703 (D1)	36910 (T1)
41704 (D2)	36910 (T2)
41706 (B2)	36910 (T5)
41706 (B3)	34500 (B5)
41045 (J1)	36501 (C5)
41043 (H3)	34504 (H5)
41044 (H4)	36907 (H6)
41046 (J2)	34345 (H7)
41047 (J3)	34505 (J5)
41048 (J4)	34475 (J7)
41042 (H2)	
41039 (H1)	

TABLE 3 - Symbols of Isotopes

<u>Isotope</u>	<u>Symbol as Defined in the Database</u>
Iridium-192	IR-192
Cobalt-60	CO-60
Ytterbium-169	YB-169
Thulium-170	TM-170
Cesium-137	CS-137

APPENDIX C - Configuring the Printer

In order to make a copy of the Compatibility Search screen or to request a printout, the printer should support IBM graphics characters. Generally, the printer will be capable of producing these characters if the printer is configured correctly. In some cases, the printer will not be able to print the arrows that appear on the screen due to the capabilities of the printer. However, this will not affect the printing operation. The arrows will be omitted and the corresponding line may shift to the left one space.

If the printer does not correctly print borders, the printer must be reconfigured. See the printer manual for information on reconfiguring the printer to print IBM graphic characters. For HP-compatible laser printers, configure the symbol set to **symbol set = IBM-DN**. For most Epson printers, set the dip switches to reflect graphic characters.