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Residential Solar Data Center MIRADS User's Guide

Patricia M. Christopher
Michael Vogt
Douglas Hall

Center for Building Technology
National Engineering Laboratory
National Bureau of Standards
U.S. Department of Commerce
Washington, DC 20234

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U.S. DEPARTMENT OF COMMERCE, Philip M. Klutznick, *Secretary*

Luther H. Hodges, Jr., *Deputy Secretary*
Jordan J. Baruch, *Assistant Secretary for Productivity, Technology, and Innovation*

NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

FOREWORD

The Residential Solar Data Center of the National Bureau of Standards (NBS) has prepared this MIRADS (Marshall Information Retrieval and Display System) User's Guide as a supplement to the MIRADS User's Manual [1]* published by the National Aeronautics and Space Administration (NASA). While the NASA manual provides detailed documentation of the overall MIRADS package, the present publication is intended for use exclusively by those who employ the MIRADS system for retrieving data from the Solar Data Base maintained by the Residential Solar Data Center.

This User's Guide supercedes User's Manual for Online Retrieval of Grant Application Data [2] and User's Manual for Online Retrieval of Grantee Report Data [3].

* Numbers in brackets [] refer to references on page 134.

ACKNOWLEDGMENTS

Brenda B. Eidson, technical writer, Rehab Group, Inc.,* has done an excellent job in assisting the authors in structuring this material into a self-teaching manual.

The Solar Data Dictionary/Directory in appendix B was produced by computer programs written by Mrs. Fran Knisley of Old Dominion Systems, and modified by George Yu of the Solar Data Base project staff, Solar Technology Program, Building Economics and Regulatory Technology Division, CBT.

The authors would like to express their appreciation to Mrs. Ann Pararas for her patience in preparing the final drafts of this document.

*The name of this company derives from their dedication to the employment and training of the handicapped.

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MIRADS USER'S GUIDE

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RESIDENTIAL SOLAR DATA CENTER
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ABSTRACT

The Residential Solar Data Center project staff in the Center for Building Technology, National Bureau of Standards, maintains a computerized data base containing non-instrumented residential data from the DoE/HUD Solar Heating and Cooling Demonstration Program. Data contained in the solar data base are accessible online to users of the NBS Central Computer via remote terminals with a data base retrieval software package called MIRADS (Marshall Information Retrieval and Display System). This document is a self-teaching user's guide to the solar data base. It is complete with the basic MIRADS language rules, examples of use, and a step-by-step walk-through of a typical interactive session. Appendices contain all the data element names and coded values needed to use the solar data with MIRADS, as well as many examples of actual computer sessions.

Key Words: Automatic data processing; computer retrieval; data base retrieval; residential buildings; solar data base; solar energy system; solar heating and cooling.

1. INTRODUCTION

1.1 Background

The Residential Solar Data Center (SDC) of the National Bureau of Standards is responsible for the establishment and operation of an automated data base containing non-instrumented (i.e., not collected by instruments, but through interviews and forms), residential solar data collected from the Residential Solar Heating and Cooling Demonstration Program which is managed by the Department of Housing and Urban Development. (HUD).

Data collection contractors to HUD collect and forward data to the SDC where a solar data base (shown in figure 1, page 2) is stored on the NBS Univac 1108 computer. This data base consists of the following files:

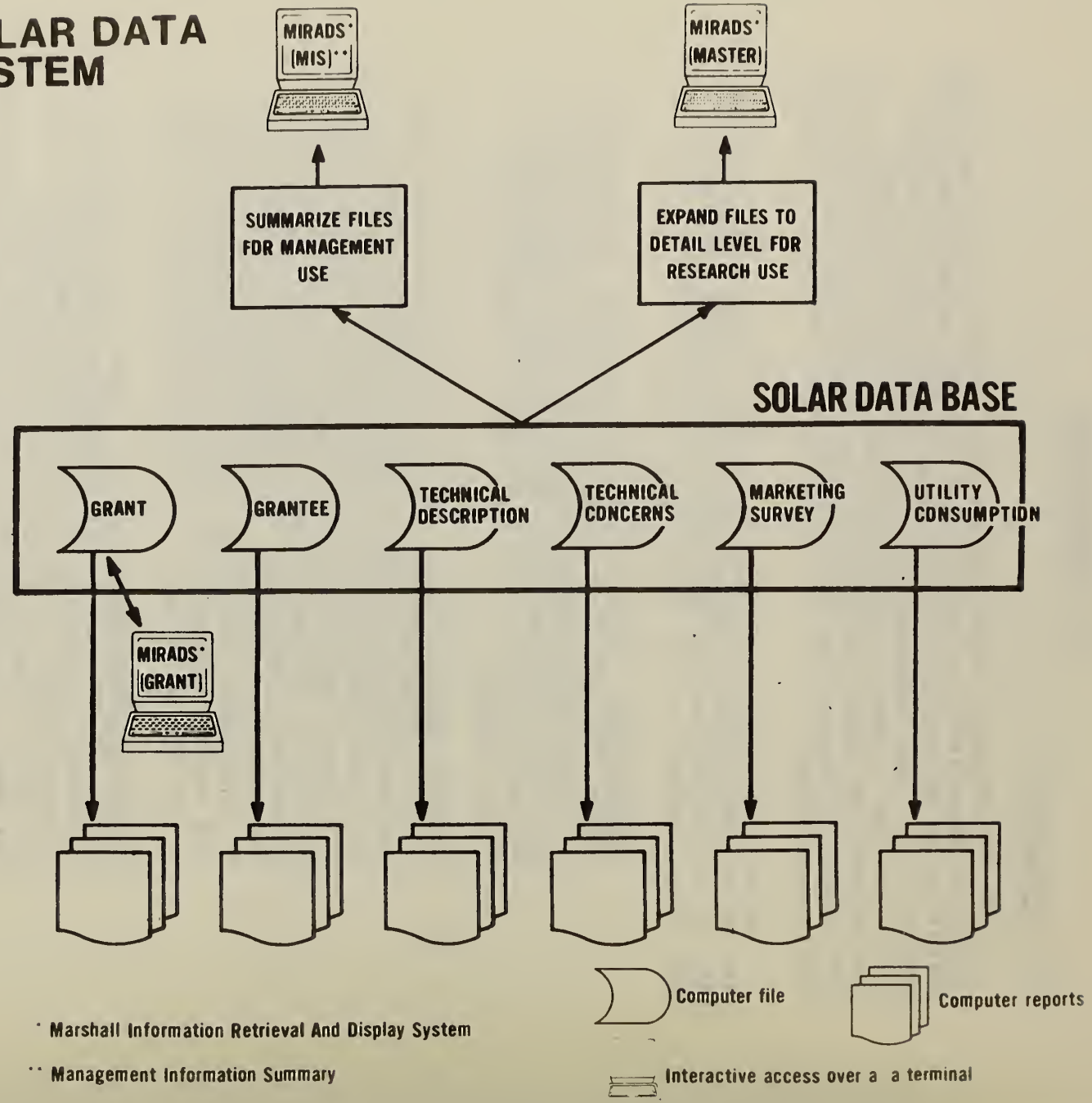
a. Grant File: This file contains basic information about the building project and the solar systems for each application funded by HUD. These data are derived from grant applications submitted to HUD and updated with information from periodic field reports.

b. Grantee Report File: Data in this file are based upon reports submitted by each grantee (the builder/designer who is awarded a grant) to Boeing Aerospace Corporation describing the progress of the grant from design and award of construction financing through actual construction, sale, and permanent financing. The grantee's perception of the ease or difficulty in obtaining construction or permanent financing, and in obtaining building and zoning approval, as well as problems with construction, equipment, or installation are included.

c. Technical Description File: This file contains basic system design and predicted performance data collected for HUD by Dubin-Bloome Associates from a large number of selected non-instrumented systems. A more detailed set of data is collected for HUD by the American Institute of Architects/ Research Corporation for those systems which are to be instrumented.

d. Technical Concerns File: Contained in this file are data on problems found during the design, construction, or operational phase which were recorded in field activity reports submitted by

Figure 1: **SOLAR DATA SYSTEM**



Dubin-Bloome and Boeing field representatives. It also contains data on problems found after construction, as recorded by the grantee.

e. Marketing Survey File: This file contains extensive survey questionnaire results collected for HUD by the Real Estate Research Corporation from selected builders, lenders, homebuyers, code officials, utility companies, and other market participants. The data sample includes representatives of those who chose to build, lend, or buy a funded solar house and "comparatives" who did not become involved. Data are also collected after the sale to gauge builder and consumer reactions over a period of time.

f. Utility Consumption File: This file contains information on auxiliary or "back-up" fuel consumed for selected solar projects. The data are collected from utility companies (with purchaser agreement). "Comparative" data are also collected (i.e., utility bills for similar, but non-solar, homes).

A series of computer reports (shown in figure 1, page 2) produced from the solar data base are available to solar researchers.* These reports range from complete listings of all data in a file to more detailed "custom" computer reports. Custom reports are produced to meet specific user requirements and may print only selected data from a file and may re-sort the selected data into a new sequence.

The computer reports are either listings of all the data in a file or a prespecified subset of these data. To provide flexibility in satisfying requests for other subsets of the data, some of the data base files are available interactively (i.e., with interaction by the data base user over a computer terminal). The interactive user can formulate an inquiry (also called a query) to the data base, select his own subset of the data, request it to be sorted into a particular sequence, and then request only desired pieces of data (also called data elements or data fields) to be printed.

*References [4] and [5] describe these reports in detail and explain how to obtain copies of individual reports.

There are many computer programs available which allow an inexperienced computer user to reference a data base interactively. These programs are generically referred to as information retrieval packages. An experienced computer professional is usually needed to "load" the data base onto the computer in a format (i.e., an arrangement of the data on the computer storage device) acceptable to the package and to "define" the data elements that are in the data base: their names, their locations in the data base records, their sizes, etc. This "definition of data" becomes known as the data map or data dictionary/directory.

The information retrieval package used by the SDC to reference the solar data base on the NBS Univac 1108 Computer is called MIRADS (Marshall Information Retrieval and Display System). MIRADS is a large computer program (actually a series of many computer programs) which was written by contractors for the National Aeronautics and Space Administration (NASA) at the George C. Marshall Space Flight Center in Alabama. An official MIRADS User's Manual [1] is published by NASA as well as a MIRADS Implementation Manual [7]*. Both MIRADS manuals are available to NBS computer account holders from the NBS Computer Services Division.

Three solar files are available interactively with MIRADS, as shown in figure 1, page 2:

a. the GRANT File;

b. the MASTER File - a combination of other files expanded to a common of detail;

c. the MIS (Management Information Summary) File - a combination of data from other files, summarized to the highest common level.

The MASTER File was created to aid solar researchers who needed a file which would allow them to count similar "items" of data. The MIS File was created to aid HUD project managers and other data collection managers who needed data in summary form to make management decisions.

Chapters 6, 7, 8, and 9 contain a further explanation of why these three files are available interactively.

*This manual is for the use of the computer professional in loading and defining the data base.

1.2 Purpose

This user's guide has three purposes;

a. to give current users of the solar data base a reference guide for the MIRADS commands and an up-to-date, concise data dictionary/directory to the data element names;

b. to give potential users of the solar data base a self-teaching guide to the MIRADS commands and rules for formulating a query to the data base; also to offer a detailed description of the interactive files available and examples of how to use them effectively;

c. to present a model for a MIRADS user's guide for use by anyone with a MIRADS data base.

1.3 Organization and Approach

This user's guide is organized into two parts:

a. PART I - USING MIRADS presents in chapters 2 through 5 a step-by-step approach to using the computer interactively, from dialing the computer and signing on (shown in chapter 2) to a sample MIRADS session (shown in chapter 4). PART I is supported by appendix D which contains 17 actual interactive sessions using MIRADS commands discussed in chapter 3. A summary of MIRADS commands is given in appendix A and a one-page list of "things to remember" about using MIRADS is given in chapter 5.

b. PART II - USING THE DATA presents in chapters 6 through 9 a discussion of the structure of the three solar files available interactively with MIRADS: the GRANT, MASTER, and MIS Files. A knowledge of the data structure is necessary to make queries about the data and to interpret the results of the queries. These chapters should be read carefully and thoroughly by any user unfamiliar with the solar data. Chapter 6 covers the GRANT File structure; chapter 7 covers the MASTER File structure; chapter 8 covers the MIS File structure; and chapter 9 analyzes the difference in using the three files with MIRADS.

Current users of the solar data base might use the following outline in reviewing this guide:

a. chapters 6, 7, 8, and 9 -- read carefully;

b. chapters 3 and 5 -- scan briefly;

c. appendix D -- read through list of examples in the table of contents and review any examples which might be useful.

d. all other chapters and appendices -- scan to become familiar with contents.

New users of the solar data base might use the following outline in reading this guide:

a. chapters 2 and 4 -- read and follow carefully;

b. if necessary, obtain a NBS UNIVAC 1108 sign-on protocol* and duplicate the interactive session shown in chapters 2 and 4.

c. chapters 3 and 5 -- read;

d. chapters 6, 7, 8, and 9 -- read and study carefully;

e. appendix D -- read and study, referring to chapter 3 to understand commands;

f. appendices A, B, and C -- read to become familiar with contents.

*A valid account number and a USERID/password are necessary. Contact Computer Services Division, National Bureau of Standards, Room A221, Administration Building, Washington, D.C. 20234, or phone (301) 921-3424 for more information.

For those interested in using this document as a model for their own user's guide to MIRADS data files, the following advice is offered:

a. PART I can be used in its entirety as a model. Some paragraphs will require changes to reference your MIRADS data base and the examples changed to reflect your data.

b. PART II needs to be replaced with chapters which describe the structure of your data files.

c. appendices B and C need to be replaced with directories and value code lists for your data files.*

*Computer programs and data formats which will allow you to automate your data description are available from the Solar Data Center.

2. THE BASICS OF GETTING ON AND OFF THE COMPUTER

2.1 Connecting the Terminal

The user's terminal accesses computer-stored data on the central UNIVAC 1108 computer at the National Bureau of Standards through telephone lines. The following procedure will result in connecting the terminal to the computer:

a. Turn terminal on.

b. Make sure the switches on the terminal are set:

DUPLEX: HALF

PARITY: EVEN

TRANSMISSION RATE: 30 characters/second
(300 BAUD - High Speed)

c. Dial: Area Code (301) 840-1610, -1620, -1580 or 840-1536 (VADIC modem only).

d. Wait for carrier tone on telephone receiver.

e. Place receiver into coupler device.

f. Wait for carrier light to turn on.

g. Press return key.

The system will respond:

PLEASE ENTER HOST ID (I/B)>

IMPORTANT: Whenever > ("greater than") symbol appears, the computer will wait for some response from the user. This is the "prompt" message from computer to user.

To the question of host ID, the user should respond with either "I" (for Interactive) or "B" (for Batch) followed by a carriage return. A carriage return (shown in this document as "CR")used alone is the same as entering an "I", because I is the default response.

IMPORTANT: A carriage return (CR) must be entered by the user at the end of each message. Essentially, the (CR) is the "prompt" message from user to computer.

Next the computer prints:

OMNUS PORT NN. PARITY (E/O/N)?>

In response to the parity question, the user enters either:

a. E - Indicating EVEN parity (a CR may be entered to indicate EVEN also, since the computer defaults to EVEN);

b. O - indicating ODD parity;

c. N - indicating NO checking for parity.

Thus far the display should read:

PLEASE ENTER HOST ID (I/B)>I or (CR)

OMNUS PORT NN. PARITY (E/O/N)?>E or (CR)

2.2 Logging on the System

When the question of parity has been answered (by CR in most cases), the computer will request user's identification/password, as follows:

ENTER USERID/PASSWORD:>

The user should respond with a valid user ID in the format indicated in the request message. (These are assigned to NBS computer users by the Computer Services Division. Solar Data Program participants who do not have a user ID/PASSWORD may contact the Solar Data Center.) The display now should read:

ENTER USER ID/PASSWORD:> (valid user ID/password)

A message will appear reminding the user to tear off and destroy this portion of printed display in order to protect against user ID/PASSWORD misuse.

If there are any operator messages on the status of the computer, they will appear at this point, followed by the current date and time.

The computer assumes that the user's terminal has a 80-character width. For 80-character width, user makes no entry and proceeds to the next step. If this is not the case, the user must instruct the computer as follows:

a. For 72-character width, enter @@TTY W,72

b. For 132-character width, enter @@TTY W,132,D,8 (The entry "D,8" requests a delay at the end of each line to allow for carriage return.)

IMPORTANT: If carriage width information is entered, it will be acknowledged by "***@@ PROCESSING COMPLETE***".

The display should read:

```
DATE:  012279  TIME:  155401

>@@TTY W,132,D,8                 } Users of 80-character
                                 } width terminals may dis-
***@@ PROCESSING COMPLETE***     } regard these two lines.
```

2.3 Activating MIRADS

When date and time have been posted, the MIRADS program may be activated by entering "@MIRADS,NB". The display should read:

```
>@MIRADS,NB
```

The computer will ask for instructions as to which MIRADS-formatted file the user wishes to access:

```
ENTER QUALIFIER*FILENAME

>
```

The user responds as follows:

a. For GRANT File: SOLAR*GRANT

b. For MIS File: SOLAR*MIS

c. For MASTER File: SOLAR*MASTER

The computer will determine the availability of the file required for the MIRADS program. A "READY" message will appear if the file requested is available for use. (If the file requested is not available for use, MIRADS will ask the user to sign off and try again later.) When the display reads:

```
ENTER QUALIFIER*FILENAME

>SOLAR*GRANT (or SOLAR*MIS or SOLAR*MASTER)

READY
```

the system is ready to accept the first MIRADS query set to define and process a query. (These steps are described in the next chapter.)

2.4 Terminating the Session

When the processing is complete, or when the user desires to terminate the MIRADS session, the one-word command "STOP" should be entered. The computer will indicate that the session is terminated, to which the user should respond "@FIN", as shown:

```
>STOP

MIRADS FXECUTION NORMALLY TERMINATED

>@FIN
```

Cost accounting information will be displayed followed by the message "*TERMINAL INACTIVE*". It is important for the user to understand that although the session is terminated and the terminal has displayed an "inactive" message, further action is required to disconnect the terminal. This is accomplished by entering "@@TERM". The final display should read:

"*TERMINAL INACTIVE*"

@@TERM

IMPORTANT: User responses to the computer may be in either upper or lower case.

IMPORTANT: USER MUST NOT ENTER A SPACE BEFORE THE FIRST TYPED CHARACTER OF RESPONSE.

IMPORTANT: Incorrect entries: To cancel an entire line, press letter "X" (labeled "CANcel" on some keyboards) while holding down control key (labeled "CTRL" on some keyboards). To cancel individual characters, press letter "Z" (labeled "SUBstitute" on some keyboards) while holding down control key.

3. THE BASICS OF USING MIRADS

3.1 General

MIRADS is an online data storage and retrieval system that allows the user to extract and process information from any file which has been specifically defined in a MIRADS format. Currently, these include the GRANT File, the MIS (Management Information Summary) File and the MASTER File (see figure 1, page 2).

The GRANT File, one of the files which comprises the solar data base, contains basic descriptive information about each grant, the building project(s), the residential model(s) being built, and the solar system(s) being installed in the model types.

The MIS File contains data from the other data base files which have been summarized to the grant level. For example, one grant may fund four systems in four types of housing models (e.g. they may be sized differently--one being a two-bedroom model and one being a three-bedroom model). The MIS File would summarize (e.g. by averaging, summing, etc.) the data about the four models and systems into one set of data at the grant level.

The MASTER File contains data from the other data base files which have been expanded to reflect as much detail as possible about each unit (e.g. dwelling unit) and system funded by the grant.

Chapters 6, 7 and 8, respectively, contain a more in-depth discussion of the GRANT, MASTER and MIS Files -- their contents, data structures, and intended uses and users.

Once the proper file has been selected, appendices B and C can be referenced for the data element names and value codes needed to formulate an inquiry (i.e. a query) to MIRADS. Users can then use commands described in this chapter to initiate searches for specific solar data, sort the data, perform computations, and finally, print the results.

This section covers the most commonly used MIRADS commands and their options. It is intended that the beginning user review these commands and options to gain a basic understanding of the commands and their formats, then proceed to section 4 - A SAMPLE MIRADS SESSION, which guides the user through an actual MIRADS query session. The actual query session will demonstrate command relationships not apparent in section 3. All examples of command options used in this section are shown in actual MIRADS terminal sessions in appendix D.

Having gained access to the MIRADS program through the sign-on procedure outlined in the previous chapter, a user may begin to formulate commands which comprise the MIRADS BASIC QUERY SET and which will result in the processing of information according to his specific requirements. This BASIC QUERY SET may consist of up to four different types of commands.

a. a QUERY command, which identifies the data elements which are to be selected;

b. a SORT command, which specifies the sequence in which the data selected by the QUERY are to be sorted;

c. one or more COMPUTE commands which provide the capability of performing calculations on data elements extracted by the QUERY command; and

d. a PRINT command which directs the printing of the results.

The order of this BASIC QUERY SET is first QUERY, then SORT, then COMPUTE, and last PRINT. The QUERY and PRINT commands are required in every query set, whereas the SORT and COMPUTE commands are optional. The commands are edited and verified for correctness by the MIRADS program as they are transmitted.

Some of the major options available to operators using MIRADS include the ability to review and edit commands which have been formulated but not yet processed; the ability to store a basic query set or a fragment thereof for later processing and/or editing; the ability to print locally (at the terminal being used) or remotely (at a high-speed printer in the computer facility); and the ability to interrupt or suppress printing altogether.

3.2 The Query Command

Command Identifier	+ Data Element Name	+ Rela- tional	+ Criterion (or "Value")	+ Connector

Select all records with the specified field (ENDSALEPRICE) present.

```
>Q ENDSALEPRICE P
```

(See appendix D, example 1, for an actual terminal session which uses this command.)

a. Command Identifier: The letter Q identifies the command as a QUERY.

b. Data Element Name: The computer name for the piece of data about which inquiry is being made. Valid Data Element Names are contained in the Solar Data Dictionary/Directory in appendix B.

c. Relational: This element instructs the computer how the selection of records is to be made with regard to the Data Element Name entered. A simple QUERY might request the selection of all records with the specified Data Element Name present (P) (i.e. a Data Element Name would be present if it was not equal to spaces), while another might request selection of those with the specified Data Element Name not present (NP) (i.e. a data element name would not be present if it was equal to spaces). Other relationals are used to indicate the relationship of the general field named to a specific qualitative or quantitative value (or criterion) which will be named. MIRADS relationals include:

P or PRESENT - Data Element Name present (not equal to spaces)
NP or NOT PRESENT - Data Element Name not present (equal to spaces)
EQ or = or EQUAL - Data Element Name value equal to Criterion
GE or > or GREATER - Data Element Name value Greater than Criterion
GE or GREATER-EQUAL - Data Element Name value greater than or equal to Criterion
LT or < or LESS - Data Element Name value less than Criterion
LE or LESS-EQUAL - Data Element Name value greater than or equal to Criterion
NE or UNEQUAL - Data Element Name value not equal to Criterion

d. Criterion: This element represents the value with which Data Element Name will be compared. It is manatory for all relationals except P (PRESENT) and NP (NOT PRESENT). A Criterion element may contain up to 48 numeric or alphanumeric characters. If the Criterion element represents a range of possible values for a particular Data Element Name, these values will be included in the Solar

Data Dictionary/Directory in appendix B or in appendix C if the range was too long to list in appendix B. For example, for the Data Element Name "NEWRET", only two values are available: N (for new) and R (for retrofit).

The user has the option to use alpha and numeric qualifiers to compare against the Data Element Name.

(1) Alpha: If the general field is a city where a solar project is located (PJCITY), the user would need to spell out the name of the city for which he desired information. Thus:

>Q PJCITY EQ BALTIMORE

would result in the selection of records of project(s) located in Baltimore. (See appendix D, example 2, for an actual session which uses this command.)

(2) Numeric: In a general category such as average collector area (COLSQFT-G), the user might designate the specific size range desired. He would enter Data Element Name plus Relational plus square footage in numeric terms. Thus:

>Q COLSQFT-G GE 10000

would result in the selection of records which refer to buildings with an average collector area equal to or greater than 10,000 square feet. See appendix D, example 3, for an actual terminal session which uses this command.)

In some cases a Criterion may be another Data Element Name such as in the query:

>Q CFIN-YM = *MTGAPP AND GT 0

In such an instance, the selection of records is based on a comparison of two Data Element Names where the second Data Element Name must be preceded by an asterisk (*) because it does not represent a data value. (See appendix D, example 4, for an actual terminal session which uses this command.)

e. Connectors: A Connector is used for joining together simple queries to form more complex queries. More than one Connector may be used in a query. Two Connectors are available for use:

(1) AND is used when the operator desires to be more selective; that is, he requires that more than one Criterion be met in order for a record to be selected. For example:

```
>Q PJSTATE EQ VA AND COLSQFT-G GT 500 AND
LT 10000
```

specifies the selection of only those records which indicate units built in Virginia with an average collector area greater than 500 and less than 10,000 square feet. (See appendix D, example 5, for an actual terminal session which uses this command.)

(2) OR is used when the operator wishes to be expansive; that is, when he will accept records meeting either (or any) of the criteria named.

3.3 The Sort Command

The SORT command consists of the following elements:

Command Identifier + Data Element Name + Order of Sort

a. Command Identifier: The letter "S" identifies the command as a SORT command.

b. Data Element Name: The computer name as shown in the Solar Data Dictionary/Directory, appendix B (or $New-Variable if the SORT command follows a COMPUTE command) which is to be used as a key to sort the records selected by the QUERY.

c. Order of Sort:

A (ASCENDING) - The SORT command uses the standard sorting sequence commonly referred to as the commercial sequence. This sort sequence is as follows: @, [,], #, Δ, space, A through Z,), -, +, <, =, >, &, $, *, (, %, :, ?, !, comma, 0 through 9, quote, ;, /, ., ¤, ≠.

D (DESCENDING) - This option causes the sorting sequence to be reversed.

(NOTE: If no option is specified, this element will default to A.)

The SORT command is optional and may be omitted; however, if it is used, is should follow the QUERY command and/or COMPUTE command. It must follow the COMPUTE command if a $New-Variable is to be used.

To sort average selling prices in descending order, enter:

```
>S ENDSALEPRICE D
```

(See appendix D, example 6, for an actual terminal session which uses this command.)

Compound SORT commands are possible, for example in:

```
>S CYCLE A PJNO D
```

the user requests that records selected be printed first, by CYCLE in ascending order and second, by project number (PJNO) in descending order. The project number (PJNO) will be sorted within each CYCLE number. (See appendix D, example 7, for an actual terminal session which uses this command.)

3.4 The COMPUTE Command

Command Identifier	+ Break-Field	+ $New Variable	+ Equal Sign	+ Calculation Request	+ Period

Compute after all records have been processed, the sum of all average selling prices.

```
>C NONE $TOTPRICE = SUM ENDSALEPRICE.
```

(See appendix D, example 8, for an actual terminal session which uses this command.)

a. Command Identifier: The letter "C" identifies the command as a COMPUTE command.

b. Break-Field: This element directs when the $New-Variable is to be printed and its computed value reset to zero. Three options are available:

(1) ALL directs the COMPUTE module to report the specified calculation for each record selected by the QUERY. For example, in:

```
>C ALL $TOTPRICE SUM ENDSALEPRICE.
```

the $TOTPRICE is listed for each record selected. (See appendix D, example 9, for an actual terminal session which uses this command.)

(2) NONE directs that the specified calculation be reported after all selected records have been processed.

(3) NAME specifies the Data Element Name which is to be used to direct the COMPUTE module to report the specified calculation and reset to zero when the value of that field changes. It is important to SORT the Data Element Name selected to be the break-field before using this option of the COMPUTE command (see appendix D, example 10). In the above example using the "NONE" break-field, the total of all average selling prices was requested. That total could be broken down by CYCLE, for example, by using the NAME option of the Break-Field:

```
>C CYCLE $TOTPRICE = SUM ENDSALEPRICE.
```

(See appendix D, example 10 for an actual terminal session which uses this command.)

c. $New-Variable: The user establishes a reference name for the results of the requested computation. This name may consist of up to thirty (30) characters and must be preceded by a dollar sign ($). A $New-Variable must have no embedded blanks.

d. Equal Sign: The $New-Variable must be separated from the Calculation Request element by an equal sign (=).

e. Calculation Request: There are three categories of calculation requests:

(1) SUM requests a running total of Data Element Name values.

(2) COUNT tallies the number of Data Element Name occurences.

(3) ALGEBRAIC EXPRESSIONS permit the performance of addition, subtraction, multiplication and division by entry of appropriate symbol:

Addition - (+)
Subtraction - (-)
Multiplication - (*)
Division - (/)

To compute the average selling price ($AVGPRICE) of a unit by dividing the total price ($TOTPRICE) by the number of units ($CNTPRICE), both $TOTPRICE and $CNTPRICE must be calculated prior to determining $AVGPRICE. Enter:

```
>C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
```

(See appendix D, example 11, for an actual terminal session which uses this command.)

f. Period: Each COMPUTE command must be terminated by a period. A series of COMPUTE commands may be used in a single basic query set, each producing a $New-Variable which may then be used in ensuing COMPUTE commands.

3.5 The PRINT Command

The PRINT command consists of the following elements:

Command Identifier + Output Limit + Data Element Names or $New-Variables

a. Command Identifier: The letter "P" identifies the command as a PRINT command.

b. Output Limit: This element indicates the number of lines of printed output desired. If omitted, the named categories of all selected records will be printed. This element restricts data base searching; the QUERY module will search only until the specified number of records has been selected. This permits the operator to sample the results of his basic query set and to make adjustments as necessary through the MIRADS EDIT capability. Two options are available with the Output Limit element:

(1) NUMBER: The operator may specify any number of output lines up to 999999, as in the following:

```
>P 10 PJSTATE PJNO CONST-YM ENDSALEPRICE
```

(See appendix D, example 12, for an actual terminal session which uses this command.)

(2) SUM: Used in conjuction with the COMPUTE command (see "NAME" option of Break-Field element, page 19) the SUM option will suppress the printing of all selected records except for the record at the time a $New-Variable is to be printed.

To print the results of a computation to find the sum of all average selling prices by cycle (this sum assigned $New-Variable name $TOTPRICE), listing not each record per cycle, but the total for each cycle, enter:

```
>P SUM CYCLE $CNTPRICE $TOTPRICE
```

(See appendix D, example 13, for an actual terminal session which uses this command.)

c. Data Element Names or $New-Variables: This element indicates which Data Element Names or $New-Variables are to be printed in the output; (e.g. PJSTATE, $TOTPRICE).

4. A SAMPLE MIRADS SESSION

4.1 Processing a Query

A Solar Data Base user has decided to solve the following problem through MIRADS:

> What is the average selling price for solar demonstration project units selling over $50,000 whose construction was completed in 1979?

Having signed onto the NBS computer as directed in chapter 1, he activates the MIRADS program:

```
DATE:  012279  TIME:  112443

>@MIRADS,NB
```

By referring to the Solar Data Dictionary/Directory in appendix B, the user determines that the information necessary for solving the problem is contained in the MIS (Management Information Summary) File. Thus, he enters the MIS File qualifier/filename:

```
ENTER QUALIFIER*FILENAME

>SOLAR*MIS
```

While the computer determines the availability of the file, the user begins to formulate his query command. He needs to access only those records which indicate the average selling price (ENDSALEPRICE) of units whose construction was completed (CONST-YM) between January and December of 1979. From the MIS dictionary entry for CONST-YM (page 72), the user knows this data element is four numeric digits and is coded as YR MO. (For example, January of 1980 would be coded as 8001.) The dictionary entry for ENDSALEPRICE (page 73), reveals that this data element is coded in dollars ($) and the numeric length of the data element is a maximum of seven positions. The user has chosen a final sales price greater than $50,000 and enters it in the query statement as ENDSALEPRICE > 50000.

It is important to note that in a numeric Criterion (or value) element, no punctuation may be used. Dollar signs ($) and commas are omitted, and there may be no embedded blanks.

When the computer is ready, the user enters the QUERY command:

```
READY

>Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
```

Next, the user instructs that the records which will be selected by the QUERY command should be sorted by the average final sales price, and that the most expensive average prices should be listed first:

```
READY

>S ENDSALEPRICE D
```

Three separate mathematical functions will have to be performed upon the records selected in order to obtain the average price for all grants. Each of these functions must be entered via a separate COMPUTE command.

First, compute with no breaks (that is, do it <u>once</u> at the end of all processing) a total (which will be designated $TOTPRICE) equal to the sum of all sales prices in the records selected:

```
READY

>C NONE $TOTPRICE = SUM ENDSALEPRICE.
```

IMPORTANT: It is important to remember that a $New-Variable (the user-selected name for the result of a computation) <u>always</u> be preceded by a dollar sign ($). It may contain up to 35 characters and must have no embedded blanks. Hyphens may be used.

IMPORTANT: A period must be used at the end of a COMPUTE command.

Second, compute with no breaks another total (this one to be called $CNTPRICE) which is equal to the total number of grants with average selling prices available:

```
READY

>C NONE $CNTPRICE = COUNT ENDSALEPRICE.
```

Third, compute with no breaks, another total (to be called $AVGPRICE) which is equal to the sum of average selling prices ($TOTPRICE) divided by the number of grants with average selling prices available ($CNTPRICE):

```
READY

>C NONE $AVGPRICE + $TOTPRICE/$CNTPRICE.
```

When the COMPUTE commands have been entered, the user must instruct the computer as to how the requested information should be displayed. He decides that the information most useful for his purposes includes the project number (PJNO), construction completion date (CONST-YM), and average selling price (ENDSALEPRICE), in addition to the results of the computation requested:

```
READY

>P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE
$AVGPRICE
```

Because the user knows that he will also want to later determine the average selling price for units selling over $70,000, he elects to SAVE the query set he has just entered. Thus, later, he can recall the query set, change the average selling price (ENDSALEPRICE), and process again without having to reformulate the entire query set. (See section 4.2 for more information on how to list all query set names, display a query set, and edit a query set.) The query set is saved by assigning a user-defined reference name to the query set (in this case "AVGPRICE") and instructing the computer simply:

```
READY

>SAVE AVGPRICE
```

The save query command, SAVE, stores the entire query set from QUERY command to PRINT command in a special MIRADS save file. The save fragment command, SAVEC, (discussed later in section 4.3) operates identically to the SAVE command. The difference between the two commands is that SAVEC can save a single command or several commands which make up a partial query set. The SAVE command retains the entire QUERY set for later execution while the SAVEC retains a command (or commands) for insertion into a query set at a later time

Now is the time to process the query set. The one-word system command "RUN" initiates processing, and there is a pause while the computer selects the records requested:

```
READY

>RUN

QUERY NOW PROCESSING
```

When the records have been selected, the computer will report the total number of records in the file and the number of those records which meet the criteria indicated by the user. At this point the user must decide if the volume of the output warrants printing locally (on the terminal he is using) or if it should be processed on a high-speed printer at another location:

```
FILE CONTAINS    678 RECORDS

QUERY SELECTED     8 RECORDS

ENTER OUTPUT SITE ID

>(CR)
```

Since there were so few records selected, the operator decides to print locally. He enters a carriage return (CR), because local production is the default option. Any other production site would have required a specific

entry, (i.e. the entry "PR" would request production on the high speed, wide-carriage printer at the NBS Central Computer.)

> IMPORTANT: If the volume of output appears to be much more than the user anticipated, or if for any reason he decides not to print the results of a query set, he may enter the one-word command "NONE" in response to the computer's "ENTER OUTPUT SITE ID" request. He may also, at this point, specify that he would like to see only the first N (number) of lines printed by entering the command "PRINT N" (substituting for the letter N the specific number of lines, e.g. PRINT 10). Since he has saved the query set, he can later amend this request.

When the output site ID has been entered, the computer prints the basic query set followed by the requested output. Example 14, page 129 is an actual computer session which reflects the sample session discussed in this section.

4.2 Editing and Processing a Saved Query Set

A Solar Data Base user wishes to recall a basic query set which he has requested the MIRADS program to save under a name which was designated at the time the set was entered. To be certain that the name of the saved query set is entered exactly as it was originally specified, the user first instructs the program to list all saved query set names:

```
READY

>LIST

AVGPRICE STANDARD
```

> IMPORTANT: The last query set executed is always saved under the unique name, STANDARD. It is always included in the list of saved query set names unless previously deleted.

The saved query set name he needs is "AVGPRICE". If he wished simply to process this query as it was originally

entered, he would at this point enter the command "DO AVGPRICE". However, for purposes of this example, the user needs to amend the original query. He first may want to review the query set as it was entered originally. The DISPLAY command is then used to generate a line-by-line listing of the commands contained within his saved query set, AVGPRICE:

```
READY

>DISPLAY AVGPRICE

Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
S ENDSALEPRICE D
C NONE $TOTPRICE = SUM ENDSALEPRICE.
C NONE $CNTPRICE = COUNT ENDSALEPRICE.
C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE
  $AVGPRICE
```

In order to change the original query set, the EDIT command is entered:

```
READY

>EDIT AVGPRICE (or ED AVGPRICE)
```

At this point, the user must specify the editor functions which will result in the modifications he desires: There are three main functions:

a. Positioning
b. Editing
c. Exit

The user must first position the editor at the point where a modification is to be made. He may do this in one of three ways: (1) by beginning at the top of the query and advancing line by line; (2) by advancing to a specific line number if it is known; or (3) by indicating the specific element which is to be modified, in which case the editor will search and position itself at the first line found to contain that element.

In the present example, the user elects to position the editor at the TOP ("T") of the query (that is, one line) to begin his positioning sequence:

```
ENTER EDIT COMMAND

>T

000:
```

Next, by referring to the displayed saved query set, the user selects the line containing the element to be amended. He may position the editor at that line by entering one of the following commands:

N
Positions the editor at the beginning of the NEXT LINE.

n
Specifies the line number at which the editor should be positioned. For example, if the value of "n" is 2, the editor will be positioned at line 2.

N n
Advances the editor "n" lines below the present line. For example, if the editor is at line 3 and line 5 is desired, the command "N 2" should be entered.

N - n
Specifies that the editor will be positioned "n" lines above the present position. For example, if the present line is 3 and "n - 1" is entered, the editor will then be positioned at line number 2.

L (for "LOCATE") "ELEMENT-NAME"
Causes the editor to search each line for a value matching the element name entered (up to 82 alphanumeric characters enclosed in quotation marks) beginning with the line at which the editor is positioned. Lines below that point will be searched, but not lines above.

The user, wishing to amend the first line of the saved query set in the present example, may position the editor either by entering the numeral "1" (since the line number is obvious); or he may enter the letter "N" for NEXT (since the editor is presently positioned at "TOP"), one line above the first line:

```
READY

>N

Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000

001:
```

With the editor properly positioned, the user is now ready to enter specific editing commands. There are three types of modifications which may be made: CHANGE, INSERT, and DELETE.

CHANGE commands include:

C /OLD-VALUE/NEW-VALUE/
Replaces old value with new value for the first occurence of old value on the line indicated.

C /OLD-VALUE/NEW-VALUE/ALL
Replaces old value with new value for each occurrence of old value on specified line and every line thereafter.

The INSERT command is:

I INSERT-LINE
The new line will be inserted immediately after the line at which the editor is positioned. It may contain up to 82 characters and must be separated from the "I" by one space.

The DELETE Command is:

D
This causes the line at which the editor is positioned to be deleted and the editor repositioned at the line immediately preceding the deleted line. The line at which the editor is repositioned will print out.

In this example, the user wishes to CHANGE the original QUERY command by increasing the "VALUE" element from 50000 to 70000. Thus:

```
READY

>C /50000/70000/
```

In order that the user may check that the change entered agrees with his intention, the computer automatically prints the line just edited. The user may request that any line or lines be printed. He must first position the editor as previously instructed to the line at which he wishes to begin. He then enters "P" to print that one line; or he may enter "P n", assigning "n" to value of the number of lines of print desired, (e.g. "P 5" would result in the printing of five lines).

The user must EXIT from the EDIT program before the amended saved query set can be processed:

```
READY

>EXIT
```

The command "DO SAVED-QUERY-SET-NAME" initiates processing. The saved query set (as amended) is printed following the MIRADS request for the user to designate the output site.

4.3 Saved Fragments

If the user desires to save only a fragment of his query set to use at a later time, he may do so by creating a reference name (e.g. PRICERANGE) and entering the save fragment command, SAVEC, after his query statement. The reference name will be stored in the saved query file with other saved query set names and saved fragment names which can then be LISTed, DISPLAYed,and EDITed by the user. Fragment names may contain from one to twelve alphanumeric characters (A - Z, 0 - 9 plus the hyphen character).

```
READY

>Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE >
50000

READY

>SAVEC PRICERANGE
```

Since the SAVEC command immediately follows the QUERY command, only that portion of the query set is saved. If the SAVEC command had followed a SORT command, both the QUERY command and the SORT command would have been saved.

The saved fragment may be inserted into a new query set by the command "ADD SAVED-FRAGMENT-NAME". Because the saved fragment in this example contains a QUERY command, it must be "added" prior to any other command. Thus:

```
READY

>ADD PRICERANGE

READY

>S ENDSALEPRICE

READY

>P PJNO PJSTATE ENDSALEPRICE CONST-YM
```

An important feature of the saved fragment capability is the facility for adding to the saved fragment when it is open ended - that is, when there is no period at the end of the original command. For example, the QUERY command: "Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000" might be altered, when added to a new query set, to reflect the results of selection of grants whose average selling price of units is less than or equal to $95,000 as shown below:

```
READY

>ADD PRICERANGE

READY

>AND LE 95000

READY

>S ENDSALEPRICE D

READY

>P PJNO PJSTATE ENDSALEPRICE CONST-YM
```

Fragments may be saved and recalled other than during the formation of an entire query set. For example, a report format may be designed and a complicated PRINT command entered and saved independent of other commands. All

that is required is:

a. that the user position himself at the TOP of the "workspace" by entering the one-word system command "TOP";

b. that the command be entered in accordance with all rules for entering the same command in a normal query set; and

c. that a SAVEC SAVED-FRAGMENT-NAME be entered immediately following the last line of commands which are to be saved. All the commands entered since the user positioned himself at the TOP of the workspace will be saved.

Other special rules which apply to saved fragments include:

a. All COMPUTE commands must be grouped together. If the saved fragment consists of one or more COMPUTE commands, and more computations are required, then new COMPUTE commands must be entered immediately preceding the added fragment, or immediately following the added fragment, according to the logic of the overall query set.

b. One and only one QUERY command, and one and only one PRINT command can be present in any query set. If a saved query fragment which is to be added in a new query set contains a QUERY or PRINT command, no other QUERY or PRINT command may be used.

c. As was previously noted, MIRADS commands are held in a "workspace" until an execute command (RUN or DO) is entered. It is important for the user to remember that this workspace should be cleared - that is, the user should position himself at the beginning or TOP of this workspace prior to formulating a new query set which will include a saved fragment. This is done simply by entering the system command "TOP".

d. To DELETE a saved fragment enter "DELETE [saved fragment name]".

e. To DISPLAY a saved fragment enter "DISPLAY [saved fragment name]".

5. THINGS TO REMEMBER ABOUT USING MIRADS

1. The section on MIRADS commands discusses only those frequently used command elements. More sophisticated command construction is contained in the MIRADS User's Manual.[1]

2. Command statements which cannot be contained on one line may be continued on the following line beginning in any position.

3. Elements such as Data Element Names, Relationals, Criteria, Negations, and Connectors cannot be broken and continued on the following line.

4. A comma or any number of spaces must separate the elements which comprise a command.

5. A COMPUTE command MUST end with a period.

6. When designating names for Saved-Query-Sets or for Saved-Fragments (up to 12 alphanumeric characters including hyphen character), it is wise to individualize entries with the user's initials or department code, etc. When asked to LIST, the system will print not only the present user's but all saved names. Saved-Query-Set names and Saved-Fragment names are all listed for each LIST request. Without a naming convention, it can be difficult to tell them apart. Therefore, it may also be wise to differ the individual code for names in each category.

   EXAMPLE: John Smith saves a query set regarding system type under the name JS-Q-SYSTYPE (John Smith, Saved-Query-Set - SYSTYPE). He also saves a fragment of that query under the name: JS-F-SYSTYPE (John Smith, Saved-Fragment - SYSTYPE).

7. A user may recall and edit his query set under the name STANDARD if he had not saved it previously. The query set may be edited according to the EDIT procedures outlined in section 4.2. The command "EDIT STANDARD" should be used. The present query set is saved under STANDARD until another query set is executed using the RUN or DO commands.

6. USING MIRADS WITH THE GRANT FILE

The GRANT File is one of the six computer files comprising the HUD Residential Solar Data Base. Figure 1 on page 2 shows this file in relation to the other files of the data base. For more background on the GRANT File and its contents, see references [4 and 5].

There are four reasons why the GRANT File is available with MIRADS: (1) its completeness -- all data which were to be collected, have been collected; (2) its quality-- the data is kept up-to-date by frequent updates as the status of the grant changes; (3) its scope -- each grant awarded by HUD has a corresponding entry on the GRANT File; (4) its generality -- the most frequently questioned data concerning a grant, unit, system or building are contained on the GRANT File.

In order to use MIRADS with the GRANT File, the structure of the grant data must be understood. Grants were awarded to builders of homes. A typical grant might include 5 single-family, detached units, each with its own solar system. The homes are all in the same subdivision. The separate units can usually be grouped according to their size; 3 units may have 2000 sq. ft. of livable space and 2 units may have 2500 sq. ft. of livable space, as shown below in figure 2.

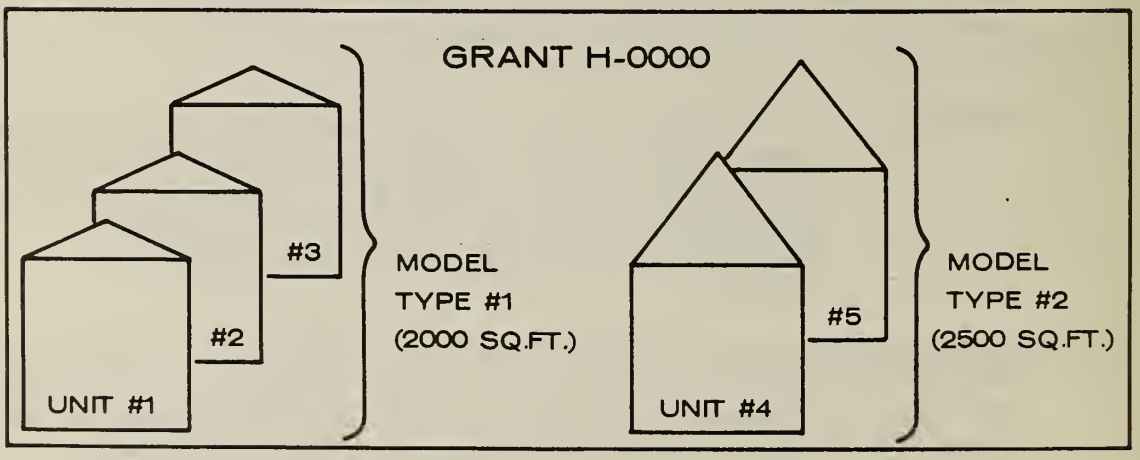


Figure 2: Typical Residential Solar Grant

The way these data are structured for computer storage as the GRANT File is shown below in figure 3.

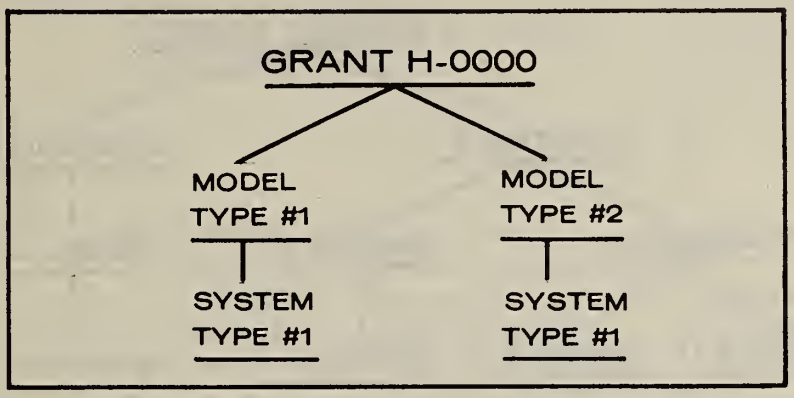


Figure 3: Tree Diagram of Typical Grant

For a hypothetical grant number H-0000, two model types are shown: model # 1 describes units 1, 2, and 3; model # 2 describes units 4 and 5. For each model, one system type is described. (More than one system type will occur for the same model when, for example, there is an active and a passive system for that model.) The system types shown in figure 3 may be alike for the five units (i.e., all active systems furnishing heat with flat plate, water collectors made by Solaron), but usually they are sized differently due to the difference in model sizes. At any rate, because there are two models, there have to be two system descriptions. There is no provision in this computer file structure to allow a common system description.

There is one additional level to the GRANT File structure which occurs infrequently. It is best illustrated, as in figure 4.

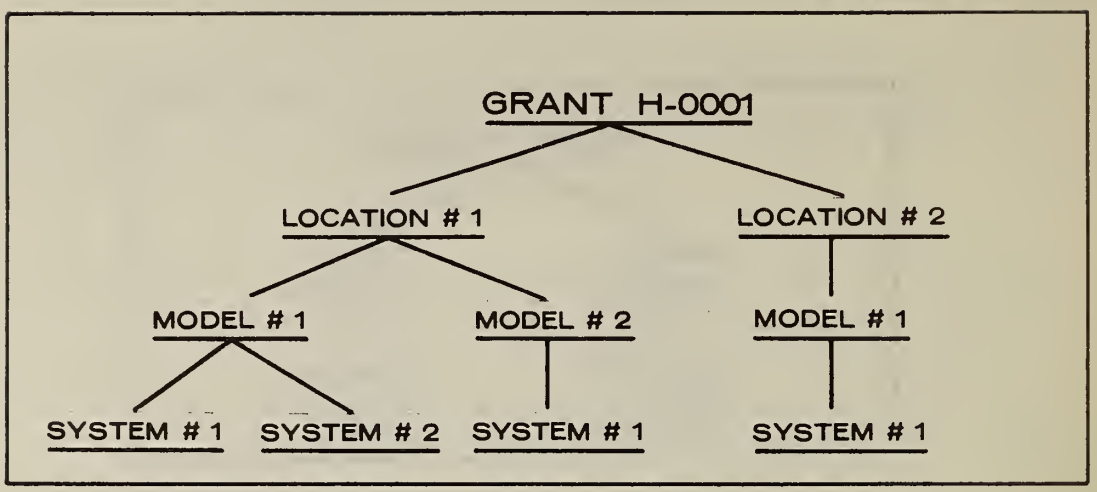


Figure 4: Tree Diagram of Grant with Multiple Locations

The new level is called the "location" or "project location" level. It occurs only for grants where the building projects are not in the same subdivisions, but are in different locations: across town, across the state, or even in different states.

The data elements (described in appendix B) which are accessible with MIRADS, are each associated with a level of the tree shown in figures 3 and 4. Appendix B is annotated to show the level (grant, location, model or system) for each of data elements. Figure 5 shows some of the GRANT File data elements and typical values, broken down at each level. It also shows in the right-hand column the actual data element name and value that might occur for this grant.

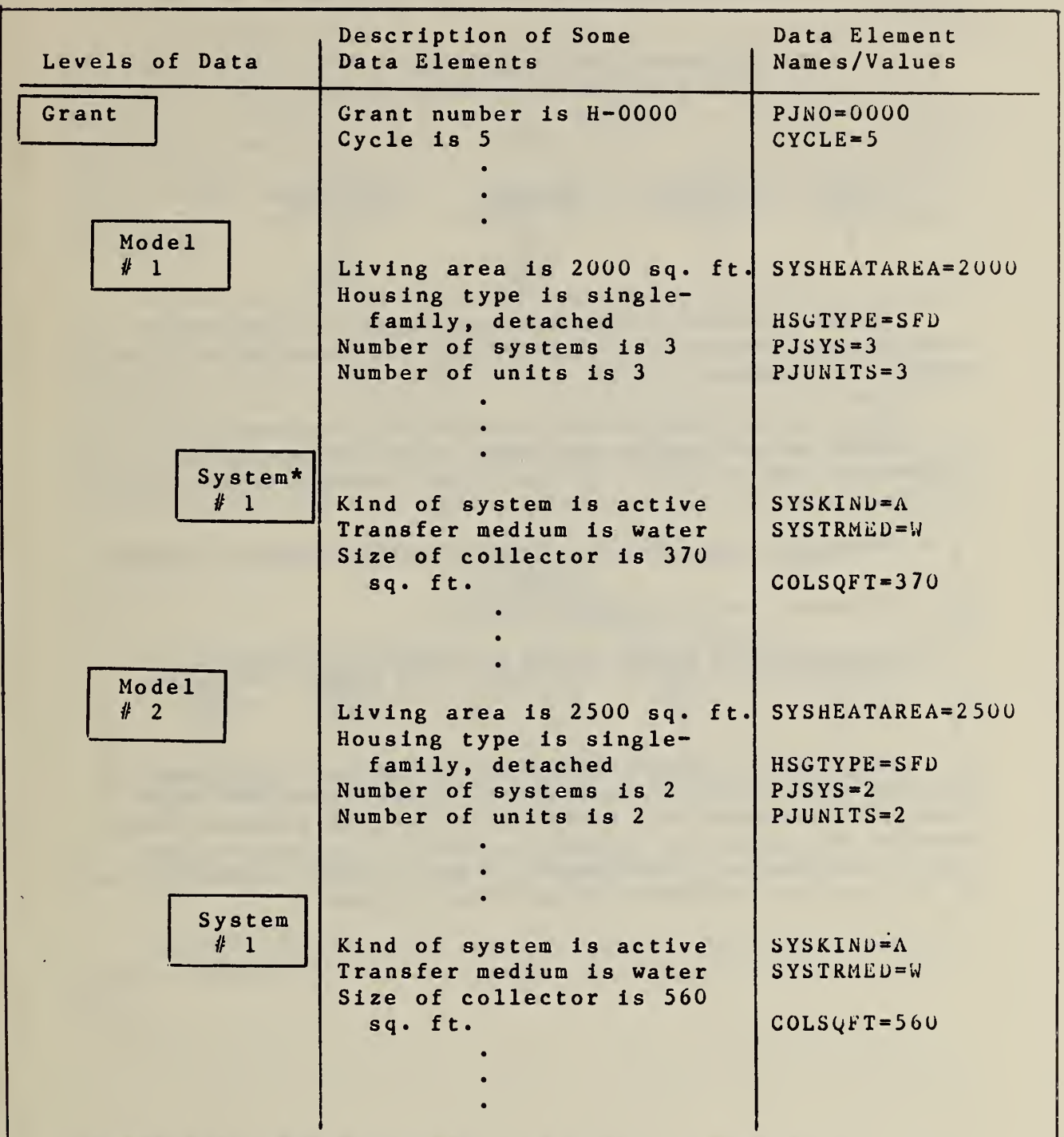


Figure 5: Some GRANT File Data Elements Shown at Different Levels

It should now be easy to understand the results of a MIRADS query to the GRANT File. For example, the statements:

```
Q SYSTRMED=W AND PJNO=0000
P CYCLE SYSKIND HSGTYPE COLSQFT
```

would print:

CYCLE	SYSKIND	HSGTYPE	COLSQFT
5	A	SFD	370
5	A	SFD	560

Since the query criteria contained a request for a data element from the system level, all non-system data would be repeated.

You can, if you prefer, request the location number (PJLOCNO), model number (MODSEQ), and system number (SYSNO) to be printed. If the PRINT command above were modified to:

```
P PJLOCNO MODSEQ SYSNO CYCLE SYSKIND HSGTYPE COLSQFT
```

the following would print:

PJLOCNO	MODSEQ	SYSNO	CYCLE	SYSKIND	HSGTYPE	COLSQFT
1	1	1	5	A	SFD	370
1	2	1	5	A	SFD	560

The GRANT File is used not only as a project management tool but is also valuable to researchers who might look, for example, for trends in types and kinds of solar systems which HUD has awarded grants to build over the last three years. See chapter 9 for a comparative analysis of the use of the three solar MIRADS files.

7. USING MIRADS WITH THE MASTER FILE

The MASTER File is a concatenation of the GRANT, Technical Description, Grantee (Reports 1, 3 and 4), Technical Concerns, and Utility Consumption files of the Solar Data Base* (see figure 1 on page 2). Designator data are also included in the MASTER File. These are a special set of data which "map" the GRANT File structure to the data structure in the other solar files. More information on these individual files and their contents is contained in references [4 and 5].

There are two reasons why the MASTER File was created: (1) to link all files so queries across files could be made: and (2) to give the researcher a tool for counting "things" relating to units (i.e., dwelling units -- houses or apartments) and systems. The file structure necessary to do this required the data to be expanded so that all data elements relating to units and systems of a grant would be accessible. Figure 6 shows the MASTER File tree structure for the same grant referenced in chapter 6.

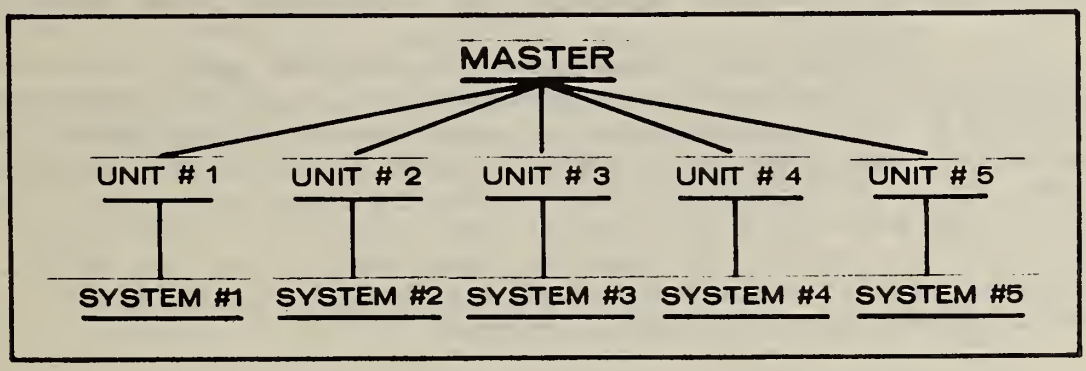


Figure 6: Tree Diagram of MASTER File Representation of Typical Grant

Instead of grouping similar units into models, one branch (equivalent to a computer record) exists for each unit.

*Marketing Survey data, which contains 2500 separate data elements for each unit of a grant surveyed, was considered too voluminous to include in the MASTER File -- these data are rarely looked at item-by-item but are analyzed statistically as "sets" of "like items."

In the case where there are more systems than units in a grant (about 5 percent of all grants), there would be one computer record corresponding to each system, as shown in figure 7.

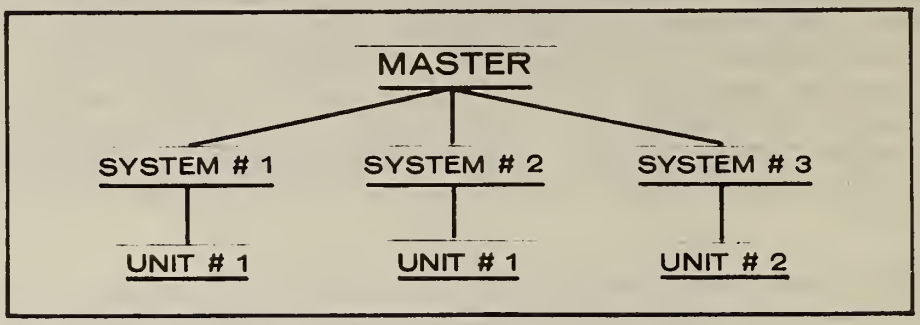


Figure 7: Tree Diagram of MASTER File Representation of Grant with More Systems Than Units

Unit # 1 has two systems, usually one active and one passive. In the computer representation, the data elements for unit # 1 would be repeated for systems # 1 and # 2.

In order to use MIRADS with the MASTER File, the structure of the resulting combined file must be understood. This is a file expanded to its greatest level of detail (usually, the individual units of the grant). Although a great deal of repetition was caused in that expansion, the resulting structure is simple. For example, if you query for all "hot water" systems in "Maryland," you can print everything that exists in the data base for each unit in Maryland that has such a system.

The researcher typically uses MIRADS with this file for one of the following reasons: (1) to save the "subset" of the original MASTER File which was selected when the query was executed* for later processing on the computer with another program; or (2) to count, sum, and make other calculations on individual data elements.

The repetition which benefits the researcher accounts for the MASTER File's size -- approximately 3 million bytes (characters) of storage, 10 times larger than either the GRANT File or the MIS File. Because of its size and repetitious format, the MASTER File is rarely accessed by the casual user.

*This is accomplished by using the "DRUM=fn" statement in response to the "ENTER OUTPUT SITE ID" message (see page 47).

8. USING MIRADS WITH THE MANAGEMENT INFORMATION SUMMARY (MIS) FILE

The Management Information Summary (MIS) File is a concatenation of data from five individual solar files which have been summarized to the grant level. The five files used to construct the MIS File are: GRANT, Grantee, Technical Concerns, Utility Consumption, and Market Survey* (see figure 1 on page 2).** Designator data are also included in the MIS File. These are a special set of data which "map" the GRANT File structure to the data structure in the other solar files. More information on these individual files and their contents is contained in references [4 and 5].

In order to use MIRADS with the MIS FILE, the way the file was created must be understood. The data were all summarized to the grant level, using one of the following five rules: (1) average -- numeric data element values for individual units or systems of a grant were averaged; (2) equal value -- if data element values for individual units or systems of a grant were equal, they were used; if unequal, "*" was used; (3) earliest -- the chronologically earliest data associated with a data element for individual units or systems of a grant was used; (4) combine -- data element values for individual units or systems of a grant were combined (i.e., value A and value B became value AB); and (5) total -- numeric data element values for individual units or systems of a grant were summed together.

*The data elements themselves were not summarized for the Market Survey File, but the availability of data (a count of market questionnaries) for each grant was used in the MIS File.

**Technical Description data are not currently included in the MIS File.

Table 1 below lists the five summary rules and the MIS data elements to which they were applied.

SUMMARY RULES	MIS DATA ELEMENTS
(1) average	Utility Consumption numeric data, ENDSALEPRICE.
(2) equal value	All data elements in MIS Directory (appendix B) which can have a value of "*."
(3) earliest	All dates from the Grantee file.
(4) combine	All problem codes from the Grantee File, SYSTYPE-G.
(5) total	Marketing Survey data, Technical Concerns data, SYSHEATAREA, COLSQFT-G, MODMBTU-G, SYSMBTU-G.

Table 1

Some data elements from the GRANT File are already at the grant level (such as grant award amount) and, therefore, not referenced in table 1.

The MIS File was created for one reason: to give all Solar Data Base users the ability to access the whole data base at once and produce short, summary query results. The MIS tree structure corresponding to the GRANT and MASTER structures (see figs. 3 and 6) is shown in figure 8.

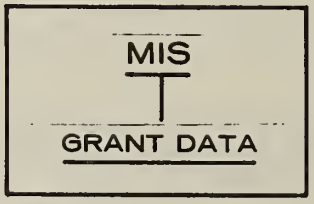


Figure 8: Tree Diagram of MIS File Representation of Typical Grant

The MIS File is easy to use and the results are easy to understand. The MIS user needs only to keep in mind the summary rules used for creating the file and that all data elements of the MIS File represent grant level data.

9. A COMPARATIVE ANALYSIS OF THE USE OF MIRADS WITH THE DIFFERENT SOLAR FILES

The previous three chapters described the use of MIRADS with the three solar interactive files: GRANT, MASTER and MIS.

Deciding which of these files to use to answer questions is sometimes straightforward -- the data elements from the Technical Description file only occur in the MASTER interactive file -- but is frequently not straightforward. For example, the data element SYSTYPE, describing the type (heating, cooling, or domestic hot water) of solar system, occurs in all three interactive files. Approximately 30 percent of all data elements occur in all three interactive files. In many cases, however, the data element in the MIS file has been summarized to the grant level and its original value may have been lost.

One reason for choosing one solar interactive file over another for a query may be influenced by the level of data in each of the three files. GRANT File data are at various levels: grant, project location, model, and system; MASTER File data are at unit and system level; and MIS File data are at grant level.

Other reasons for choosing one solar interactive file over another are shown in table 2. This table shows which of the three interactive MIRADS files are "best" and which are "worst" when viewed as to their usage characteritics, i.e., time required for computer to respond, level of detail in the query results, the range of data elements the user can choose from, ease of use of the query results, length of query results generated, and the completeness of the data values.

USAGE CHARACTERISTICS	INTERACTIVE SOLAR FILES		
	GRANT	MASTER	MIS
RESPONSE TIME	2	3	1
LEVEL OF DETAIL	2	1	3
RANGE OF DATA AVAILABLE	2	1	3
EASE OF USE	2	3	1
AMOUNT OF OUTPUT GENERATED	2	3	1
COMPLETENESS OF DATA	1	2	3
1 2 3 BEST WORST			

Table 2

APPENDIX A

MIRADS LANGUAGE SUMMARY

COMMAND	EXAMPLE	DESCRIPTION
	BASIC QUERY SET	
Q (QUERY)	Q PJSTATE = "DC" or "VA"	Requests search for records of projects located in Washington, D.C. or in Virginia.
S (SORT)	S PJSTATE, GRNO	Requests that selected records be sorted first by location and then by identication number in ascending sequence.
C (COMPUTE)	C NONE GRAWARD = SUM.	Requests a running total of grant amounts for projects selected in initial query.
P (PRINT)	P PJSTATE, GRNO, PJCITY, GRAWARD	Requests the printing of fields identified along with appropriate headings.
	SYSTEM COMMANDS	
RUN	RUN	Begin processing query set just entered.
CHECK	CHECK	List statements entered in current query set.

APPENDIX A

MIRADS LANGUAGE SUMMARY (Continued)

COMMAND	EXAMPLE	DESCRIPTION
	SYSTEM COMMANDS (Continued)	
TOP	TOP	Erase current query set and begin again.
NEW	NEW	Switch to another file (System will respond: "ENTER QUALIFIER*FILE-NAME")
TO CONTROL PRINTING OF QUERY RESULTS	DRUM=fn	Results written to mass storage file fn.
	NONE	Do not print results.
	PRINT N	Print only N lines of results.
	(CR)	Print all results at terminal.
	PR	Print all results at printer in computer room.
	SAVED QUERY SET	
SAVE SAVED-QUERY-SET-NAME	SAVE AVGRATE	User creates reference name for query set just entered and instructs system to save and recall it upon demand.
LIST	LIST	One-word command requesting list of all saved query set names.

APPENDIX A

MIRADS LANGUAGE SUMMARY (Continued)

COMMAND	EXAMPLE	DESCRIPTION
	SAVED QUERY SET (Continued)	
DO SAVED QUERY-SET-NAME	DO AVGRATE	Recalls specified saved query set and causes it to be executed.
DISPLAY SAVED-QUERY-SET-NAME	DISPLAY AVGRATE	Prints specified saved query set.
DELETE SAVED-QUERY-SET-NAME	DELETE AVGRATE	Deletes saved query set from the system.
	SAVED FRAGMENTS	
SAVEC SAVED-FRAGMENT-NAME	SAVEC PRICERANGE	User creates reference name for portion of query set just entered and instructs computer to save and recall it upon demand.
ADD SAVED-FRAGMENT-NAME	ADD PRICERANGE	Causes the fragment previously formulated to be recalled and inserted at this point in the entry of a new query set.

APPENDIX A

MIRADS LANGUAGE SUMMARY (Continued)

COMMAND	EXAMPLE	DESCRIPTION
	EDIT COMMANDS	
EDIT (or ED) SAVED-QUERY-SET-NAME (or ED STANDARD)	ED AVGRATE (or ED STANDARD)	Invokes EDITOR mode which permits alternation of current query set (in STANDARD) or of saved query set.
T (TOP)	T	To locate editor above top line of query set.
N	N	Positions editor below present position.
N n	N 3	Positions editor three lines below present position.
N - n	N - 2	Subtracts two lines from present position.
n	2	Positions editor on line 2.
L (LOCATE) "Value"	L "OR MD"	Causes editor to search for and to advance to first line found to contain value "OR MD".

APPENDIX A

MIRADS LANGUAGE SUMMARY (Continued)

COMMAND	EXAMPLE	DESCRIPTION
	EDIT COMMANDS (Continued)	
C (CHANGE) /FROM/TO/	C /OR MD/ / or C /OR MD/ /ALL	Change from old value "OR MD" to new value ' ' (blank) on the line where presently positioned. "ALL" option requests same change from present position throughout remaining lines.
I (INSERT) ADDITIONAL ELEMENTS	I AND GRAWARD GT 30000	Inserts a new line "AND GRAWARD GT 30000" immediately following present position of editor.
D (DELETE	D	Commands the deletion of the line at which the editor has been positioned. Line above will print out.
P (PRINT) n	P 5	Causes the present line and next four lines to print for user review.
P!	P!	Causes all lines in query set to print.

APPENDIX A

MIRADS LANGUAGE SUMMARY (Continued)

COMMAND	EXAMPLE	DESCRIPTION
	OTHER COMMANDS	
CTRL/X		Cancels an entire line.
CTRL/Z		Cancels an individual character.
EXIT	EXIT	Terminates the editor and rewrites the query set with all changes.

APPENDIX B

SOLAR DATA DICTIONARY/DIRECTORY

Introduction

Appendix B contains a directory for each interactive solar file available with MIRADS: the GRANT, MASTER, and MIS. These directories give the data element name which is needed by a MIRADS user to reference the data along with several attributes (descriptive items) about the data element, such as its size, data type (numeric or alphabetic), and the codes/values it can have. One important attribute missing in this version of the data dictionary/directory is a definition of the data element. Another publication [6] currently being revised into a final draft will contain complete definitions.

The following is an explanation of the columns of information which are in these directories:

NUM: An "X" in this column means the data element being described is numeric and will always have a numeric value of zero or greater. A number after the "X" shows the number of places from the right the decimal is assumed to be. A blank in this column means the data element is alphabetic and will always contain blanks or numbers and/or letters.

DATA LENGTH: The length in characters (letters, numbers or blanks) of the data element being decribed.

DATA ELEMENT DESCRIPTION: A brief description of the data element.

DATA ELEMENT MIRADS NAME: The name used to reference this data element in a MIRADS QUERY, SORT, COMPUTE, or PRINT statement. (Note that the data element itself is a value stored on the computer. This is the official name which can retrieve that value.)

UNITS: When appropriate, the terms of measure by which the data element is recorded.

CODES/VALUES: Codes and their interpretations (or values) for those data elements which are coded. In cases where lists of codes and values are long (half a page or more), a reference is made here to appendix C where the complete list is shown.

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
GRANT FILE

DATE: JUN 03, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	01		CYCLE	CYCLE		CYCLES ARE 1-5, 4A, P1 (PASSIVE), AND 6 (SITE SYSTEMS)
	01		CYCLE	CYC-MRG		
	04		APPLICATION NUMBER	APNO		
	32		DESIGNER NAME	DSGNAME		
	01		DESIGNER ORG	DSGORG		A = NON-PROFIT COMMUNITY GROUP B = BUILDER/DEVELOPER
	10		DESIGNER PHONE	DSGPHONE		
	05		DESIGNER GRANT NUMBER	DSGHGRNO		
	32		DESIGNER STREET ADDRESS	DSGSTREET		
	16		DESIGNER CITY	DSGCITY		
	02		DESIGNER STATE	DSGSTATE		
	05		DESIGNER ZIP	DSGZIP		
	56		DESIGNER FULL ADDRESS	DSGADDRESS		
X	07		DESIGNER GRANT AWARD AMOUNT -ALL SYS	DSGRAWARD	$	
	32		DESIGNER CONTACT NAME	DSGCNAME		
	10		DESIGNER CONTACT PHONE	DSGCPHONE		
	05		DESIGNER CONTACT EXT	DSGCEXT		
X	07		$ REQUESTED BY DESIGNER FOR ALL SYS	DSGRCOST	$	
	32		BUILDER NAME	BLDNAME		
	01		BUILDER ORGANIZATION	BLDORG		B = BUILDER/DEVELOPER C = GOVERNMENT I = INDIAN TRIBE N = NON-PROFIT COMMUNITY GROUP U = UTILITIES L = LOCAL HOUSING AUTH E = EDUCATIONAL INST O = OTHER GROUPS
	10		BUILDER ORG-OTHER	BLDORGOTH		
	03		BUILDER FINANCING	BLDFIN		
	10		BUILDER PHONE	BLDPHONE		
	06		BUILDER GRANT NUMBER	BLDHGRNO		
	06		BUILDER GRANT NUMBER	HGRNO		
	32		BUILDER STREET ADDRESS	BLDSTREET		
	16		BUILDER CITY	BLDCITY		
	02		BUILDER STATE	BLDSTATE		
	05		BUILDER ZIP	BLDZIP		
	56		BUILDER FULL ADDRESS	BLDADDRESS		
X	07		BUILDER GRANT AWARD AMOUNT - ALL SYS	BLDGRAWARD	$	
X	07		BUILDER GRANT AWARD AMOUNT - ALL SYS	GRAWARD	$	
	32		BUILDER CONTACT NAME	BLDCNAME		
	10		BUILDER CONTACT PHONE	BLDCPHONE		
	05		BUILDER CONTACT EXT	BLDCEXT		
X	07		BUILDER ESTIMATED $ OF ALL SYS	SYSCOSTEST	$	

GRANT LEVEL DATA

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
GRANT FILE

DATE: JUN 03, 1980

	DATA NUM	LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES	
X	07		$ REQUESTED BY BUILDER FOR ALL SYS	GRREQUEST	$		GRANT LEVEL DATA (Continued)
	02		LOCATION NUMBER	PJLOCNO			PROJECT LOCATION LEVEL DATA
	32		PROJECT STREET ADDRESS	PJSTREET			
	16		PROJECT CITY	PJCITY			
	16		PROJECT COUNTY	PJCNTY			
	02		PROJECT STATE	PJSTATE			
	05		PROJECT ZIP	PJZIP			
	01		MODEL NUMBER (PER LOCATION)	MODSEQ			MODEL SEQUENCE LEVEL DATA
	03		BUILDING TYPE	HSGTYPE		SFA = SINGLE FAMILY ATTACHED SFD = SINGLE FAMILY DETACHED MOB = MOBILE HOME GAL = GARDEN LOWRISE APARTMENTS MFM = MULTI-FAMILY MIDRISE MFH = MULTI-FAMILY HIGHRISE OTH = OTHER	
	01		DESIGN GRANT	DSGRANT			
	01		CONSTRUCTION GRANT	CNSTGRANT			
	01		RETROFIT GRANT	RETGRANT			
	03		PROJECT TYPE	PJCAT			
	01		NEW OR RETROFIT CONSTRUCTION	NEW-RET		N = NEW R = RETROFIT	
	01		DISPOSITION - PRIVATE	PRIVATE			
	01		DISPOSITION - OPEN MARKET	OPENMKT			
	01		DISPOSITION - CONCEPT	CONCEPT			
	03		DISPOSITION	DISP		ANY COMBINATION OF P, O, AND C TO DESCRIBE THE DISPOSITION OF THE PROJECT WHERE P = PRIVATE O = OPEN MARKET C = CONCEPT	
	04		NUMBER OF UNITS	PJUNITS			
	04		NUMBER OF BUILDINGS	PJBLDGS			
	04		NUMBER OF SOLAR SYSTEMS	PJSYS			
X	06		CONDITIONED AREA PER BLDG	SYSHEATAREA	SQ FT		
	03		SEA (STANDARD ECONOMIC AREA)	PJSEA			
	01		SYSTEM NUMBER (PER MODEL)	SYSNO			SYSTEM LEVEL DATA
	01		SYSTEM - HEAT	SYSHEAT			
	01		SYSTEM - COOL	SYSCOOL			
	01		SYSTEM - DHW	SYSWATER			
	03		SYSTEM FUNCTION	SYSTYPE		ANY COMBINATION OF H, C AND W WHERE H = HEATING C = COOLING W = DOMESTIC HOT WATER	
	01		SYSTEM KIND	SYSKIND		A = ACTIVE P = PASSIVE	

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
GRANT FILE

DATE: JUN 03, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	01		SYSTEM KIND	SYSKIND		H = HYBRID
	01		TRANS MEDIUM - RADIANT	SYSTRMEDR		
	01		TRANS MEDIUM - AIR OR LIQUID	SYSTRMEDAL		
	02		SYSTEM TRANSFER MEDIUM	SYSTRMED		A = AIR L = LIQUID
	04		SYSTEM MANUFACTURER (ALPHA CODE)	SYSMFGR-A		SEE APPENDIX C
	04		SYSTEM MANUFACTURER (NUMERIC CODE)	SYSMFGR-N		
	05		DEGREE DAYS	DEGDAYS		
	03		COLLECTOR TYPE	COLTYPE		EVT = EVALUATED TUBE FLP = FLAT PLATE CNC = CONCENTRATING OTH = OTHER OR ANY COMBINATION OF D, N, AND/OR I WHERE D = DIRECT N = INDIRECT I = ISOLATED
	01		DIRECT	DIRECT		
	01		INDIRECT	INDIRECT		
	01		ISOLATED	ISOLATED		
X	05		COLLECTOR APERATURE AREA	COLSQFT	SQ FT	
X	07		INDIVIDUAL SYSTEM COST	INDSYSCOST	$	
X	07		COST OF ONE SYS TO GOVT	SYSCOSTGVT	$	
X	07		TOTAL HEATING LOAD FOR THIS MODEL	MODMBTU	MBTU	
X	07		SOLAR ENERGY SUPPLIED PER YR BY SYS	SYSMBTU	MBTU	
X	07		ENERGY SUPPLIED PER DEG DAYS BY SYS	SYSMBTUDD	MBTU	
X	07		ENERGY SUPPLIED PER NON SOLAR SYSTEM	SYSMBTUAUX	MBTU	

SYSTEM LEVEL DATA (Continued)

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANT DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
		32	APPLICANT NAME	DSGBLDNAME		
		01	APPLICANT ORGANIZATION	DSGBLDORG		A= NON-PROFIT COMMUNITY GROUP B= BUILDER/DEVELOPER G= GOVERNMENT I= INDIAN TRIBE N= NON-PROFIT COMMUNITY GROUP U= UTILITIES L= LOCAL HOUSING AUTH E= EDUCATIONAL INST O= OTHER GROUPS
		10	APPLICANT ORG-OTHER	DSGBLDORGOTH		
		10	APPLICANT PHONE	DSGBLDPHONE		
		01	GRANT TYPE	GRTYPE		
		32	APPLICANT STREET ADDRESS	DSGBLDSTREET		
		16	APPLICANT CITY	DSGBLDCITY		
		02	APPLICANT STATE	DSGBLDSTATE		
		05	APPLICANT ZIP	DSGBLDZIP		
X		07	GRANT AWARD AMOUNT - ALL SYS	DSGBLDAWARD		
		32	CONTACT NAME	DSGBLDCNAME		
		10	CONTACT PHONE	DSGBLDCPHONE		
		05	CONTACT EXT	DSGBLDCEXT		
X		07	BUILDER ESTIMATED $ OF ALL SYS	SYSCOSTEST		
X		07	$ REQUESTED BY BUILDER FOR ALL SYS	GRREQUEST		
		32	PROJECT STREET ADDRESS	PJSTREET		
		16	PROJECT CITY	PJCITY		
		16	PROJECT COUNTY	PJCNTY		
		02	PROJECT STATE	PJSTATE		
		05	PROJECT ZIP	PJZIP		
		03	BUILDING TYPE	HSGTYPE		SFA= SINGLE FAM ATTACH SFD= SINGLE FAM DETACH MOB= MOBILE HOME GAL= GARDEN LOWRISE MFM= MULTI-FAM MIDRISE MFH= MULTI-FAM HIRISE OTH= OTHER
		01	DESIGN GRANT	DSGRANT		
		01	CONSTRUCTION GRANT	CNSTGRANT		
		01	RETROFIT GRANT	RETGRANT		
		03	PROJECT TYPE	PJCAT		
		01	NEW OR RETROFIT CONSTRUCTION	NEW-RET		N= NEW R= RETROFIT
		01	DISPOSITION - PRIVATE	PRIVATE		
		01	DISPOSITION - OPEN MARKET	OPENMKT		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANT DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	01		DISPOSITION - CONCEPT	CONCEPT		
	03		DISPOSITION	DISP		ANY COMB OF P, O, AND C TO DESCRIBE THE DIS POSITION OF THE PROJECT WHERE P= PRIVATE O= OPEN MARKET C= CONCEPT
X	04		NUMBER OF UNITS IN THIS MODEL	PJUNITS		
X	04		NUMBER OF BLDGS IN THIS MODEL	PJBLDGS		
X	04		NUMBER OF SYSTEMS IN THIS MODEL	PJSYS		
X	06		CONDITIONED AREA PER BLDG	SYSHEATAREA		
	03		SEA (STANDARD ECONOMIC AREA)	PJSEA		
	01		SYSTEM - HEAT	SYSHEAT		
	01		SYSTEM - COOL	SYSCOOL		
	01		SYSTEM - DHW	SYSWATER		
	03		SYSTEM FUNCTION	SYSTYPE		ANY COMB OF H, C AND W WHERE H= HEATING C= COOLING W= DHW
	01		SYSTEM KIND	SYSKIND		A= ACTIVE P= PASSIVE
	01		TRANS MEDIUM - RADIANT	SYSTRMEDR		
	01		TRANS MEDIUM - AIR OR LIQUID	SYSTRMEDAL		
	02		SYSTEM TRANSFER MEDIUM	SYSTRMED		A= AIR L= LIQUID
	04		SYSTEM MANUFACTURER (ALPHA CODE)	SYSMFGR-A		SEE APPENDIX C
X	04		SYSTEM MANUFACTURER (NUMERIC CODE)	SYSMFGR-N		
X	05		DEGREE DAYS	DEGDAYS		
	03		COLLECTOR TYPE	COLTYPE		EVT= EVACUATED TUBE FLP= FLAT PLATE CNC= CONCENTRATING OTH= OTHER OR ANY COMBINATION OF D, N, AND/OR I WHERE D= DIRECT N= INDIRECT I= ISOLATED
	01		DIRECT	DIRECT		
	01		INDIRECT	INDIRECT		
	01		ISOLATED	ISOLATED		
X	05		COLLECTOR APERATURE AREA	COLSQFT		
X	07		INDIVIDUAL SYSTEM COST	INDSYSCOST		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANT DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	07	COST OF ONE SYS TO GOVT	SYSCOSTGVT		
X	07	PRED LOAD FOR ALL SYS IN THIS MODEL	MODMBTU		REFERS TO TOT HEAT LOAD ONLY FOR THE MODEL.
X	07	PREDICTED SOLAR USAGE FOR THIS SYS	SYSMBTU		
X	07	DEGREE DAYS/YR FOR SYSTEM	SYSMBTUDD		
X	07	PREDICTED BACKUP USAGE FOR THIS SYS	SYSMBTUAUX		
	02	CYCLE	CYCLE		CYCLES ARE 1-5, 4A, P1 (PASSIVE)

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANTEE REPORT 1 DATA

DATE: MAY 22, 1980

DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	06	GRANT AWARD DATE	AWARDDATE		
	06	GRANTEE REPORT 1 SUBMISSION DATE	GR1DATE		
	02	PROJECT INSTR	PJINSTR		I= INSTR. N= NOT INSTR.
	02	NEW OR RETROFIT CONSTRUCTION	NEWRET		N= NEW R= RETROFIT
	16	PROJECT CITY	PJCITY-RPT1		
	16	PROJECT CNTY	PJCNTY-RPT1		
	02	PROJECT STATE	PJSTATE-RPT1		
	05	PROJECT ZIP	PJZIP-RPT1		
	02	CONSTRUCTION FINANCING STATUS	CFINSTAT		YE= YES NO= NO PE= PENDING
	06	CONSTRUCTION FINANCING PROB	CFINPROB		SEE APPENDIX C

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANTEE REPORT 3 DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	06	GRANTEE REPORT 2 SUBMISSION DATE	GR2DATE		
	06	GRANTEE REPORT 3 SUBMISSION DATE	GR3DATE		
	06	FINAL - DESIGN COMPLETION DATE	DSCDATE		
	06	CONSTRUCTION BEGINNING DATE	CONSTBEGDATE		
	06	BEGIN SOLAR INSTALLATION DATE	BEGINSTLDATE		
	06	SOLAR ENERGY SYSTEM TEST DATE	TESTCOMPDATE		
	06	CONSTRUCTION COMPLETION DATE	CONSTDATE		
	06	BUILDING PERMIT APPROVAL DATE	BPERDATE		
	39	BUILDING PERMIT AUTHORITY	BPERAUTH		
	06	BUILDING PERMIT PROBLEMS	BPERPROB		SEE APPENDIX C
	32	BUILDING PERMIT AUTHORITY STREET	BPERSTREET		
	16	BUILDING PERMIT AUTHORITY CITY	BPERCITY		
	02	BUILDING PERMIT AUTHORITY STATE	BPERSTATE		
	05	BUILDING PERMIT AUTHORITY ZIP	BPERZIP		
	06	OCCUPANCY PERMIT APPROVAL DATE	OPERDATE		
	39	OCCUPANCY PERMIT AUTHORITY	OPERAUTH		
	06	OCCUPANCY PERMIT PROBLEMS	OPERPROB		SEE APPENDIX C
	32	OCCUPANCY PERMIT AUTHORITY STREET	OPERSTREET		
	16	OCCUPANCY PERMIT AUTHORITY CITY	OPERCITY		
	02	OCCUPANCY PERMIT AUTHORITY STATE	OPERSTATE		
	05	OCCUPANCY PERMIT AUTHORITY ZIP	OPERZIP		
	06	ZONING PERMIT AUTHORITY DATE	ZONDATE		
	39	ZONING PERMIT AUTHORITY	ZONAUTH		
	06	ZONING PERMIT PROBLEMS	ZONPROB		SEE APPENDIX C
	32	ZONING PERMIT AUTHORITY STREET	ZONSTREET		
	16	ZONING PERMIT AUTHORITY CITY	ZONCITY		
	02	ZONING PERMIT AUTHORITY STATE	ZONSTATE		
	05	ZONING PERMIT AUTHORITY ZIP	ZONZIP		
	02	CODE BASED OR NOT	CODEBASED		BA= BASED ON NATIONAL CODES NO= NOT BASED ON NATIONAL CODES
	12	CODE-NATIONAL	CODENATL		
	51	CODE-LOCAL	CODELOCAL		
	06	CONSTRUCTION FINANCING DATE	CFINDATE		
	02	CONSTRUCTION FINANCING TYPE	CFINTYPE		NO= NORMAL SE= SELF PR= PRIVATE PU= PUBLIC LOAN (GRANT) OT= OTHER
X	07	CONSTRUCTION FINANCING AMNT	CFINAMNT		
X2	05	CONSTRUCTION FINANCING RATE	CFINRATE		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANTEE REPORT 3 DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	03	CONSTRUCTION FINANCING PERIOD	CFINPERIOD		
	39	CONSTRUCTION FINANCING ORG	CFINORG		
	32	CONSTRUCTION FINANCING STREET	CFINSTREET		
	16	CONSTRUCTION FINANCING CITY	CFINCITY		
	02	CONSTRUCTION FINANCING STATE	CFINSTATE		
	05	CONSTRUCTION FINANCING ZIP	CFINZIP		
	10	CONSTRUCTION FINANCING PHONE	CFINPHONE		
	06	DELIVERY PROBLEMS	CPROBDEL		SEE APPENDIX C
	06	BREAKAGE PROBLEMS	CPROBBRK		SEE APPENDIX C
	06	LABOR PROBLEMS	CPROBLAB		SEE APPENDIX C
	06	SOLAR INTERFACE PROBLEMS	CPROBINTF		SEE APPENDIX C
	06	OTHER PROBLEMS	CPROBOTH		SEE APPENDIX C
	02	SOLAR WARRANTY	SOLWARR		WA= WARRANTY ON FILE NO= NOT ON FILE
	02	SOLAR OWNER'S MANUAL	SOLOWN		OW= OWNER'S MANUAL ON FILE NO= OWNER'S MANUAL NOT ON FILE
	02	SALES/RENTAL TERMS FOR UNIT	SRTERMS		SA= SALES/RENT AGREEMENT ON FILE NO= SALES/RENT AGREEMENT NOT ON FILE
	02	HUD ACCESS TERMS FOR UNIT	HTERMS		HU= HUD ACCESS TERMS ON FILE NO= HUD ACCESS TERMS NOT ON FILE
	02	AUXILIARY ENERGY TYPE	AUXTYPE-RPT3		GA= GAS EL= ELECTRIC OI= OIL WO= WOOD PR= PROPANE OT= OTHER
	13	AUXILIARY ENERGY TYPE - OTHER	AUXOTH		
	65	COMMENT (PART 1)	COMMENT1		
	65	COMMENT (PART 2)	COMMENT2		
	65	COMMENT (PART 3)	COMMENT3		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANTEE REPORT 4 DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	02		UNIT STATUS	UNITSTATUS		SO= SOLD RE= RENTED MO= MODEL
	06		GRANTEE REPORT 4 SUBMISSION DATE	GR4DATE		
X	07		INITIAL BUYING PRICE	INITSALPRICE		
X	07		FINAL BUYING PRICE	ENDSALEPRICE		
X	04		INITIAL RENT - 1 BEDRM	INITRENT1		
X	04		INITIAL RENT - 2 BEDRM	INITRENT2		
X	04		INITIAL RENT - 3 BEDRM	INITRENT3		
X	04		INITIAL RENT - STUDIO	INITRENTST		
X	04		INITIAL RENT - OTHER	INITRENTOTH		
X	04		FINAL RENT - 1 BEDRM	ENDRENT1		
X	04		FINAL RENT - 2 BEDRM	ENDRENT2		
X	04		FINAL RENT - 3 BEDRM	ENDRENT3		
X	04		FINAL RENT - STUDIO	ENDRENTST		
X	04		FINAL RENT - OTHER	ENDRENTOTH		
	02		SOLAR ENERGY SYSTEM INSTRUMENTATION	UNITINSTR		I= INSTRUMENTED N= NOT INSTRUMENTED
	06		MORTGAGE APPROVAL DATE	MTGAPPDATE		
	02		MORTGAGE TYPE	MTGTYPE		NO= NONE CO= CONVENTIONAL FH= FHA VA= VA PR= PRIVATE OT= OTHER
X	07		MORTGAGE AMNT	MTGAMNT		
X	03		MORTGAGE PERIOD	MTGPERIOD		
X2	05		MORTGAGE RATE	MTGRATE		
X2	05		MORTGAGE FEES	MTGFEES		
	37		MORTGAGOR	MORTGAGOR		
	32		MORTGAGOR STREET	MTGSTREET		
	16		MORTGAGOR CITY	MTGCITY		
	02		MORTGAGOR STATE	MTGSTATE		
	05		MORTGAGOR ZIP	MTGZIP		
	10		MORTGAGOR PHONE	MTGPHONE		
	02		MORTGAGE ARRANGED BY	MTGARRANGE		BU= BUYER PU= PURCHASER GR= GRANTEE
	06		MORTGAGE PROBLEMS	MTGPROB		SEE APPENDIX C
	06		UNIT FIRST OFFERED DATE	OFFERDATE		
	06		SALES CONTRACT DATE	CONTRDATE		
	06		OCCUPANCY DATE	OCCDATE		
X	03		MARKETING PERIOD	MKTPERIOD		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - GRANTEE REPORT 4 DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	05	NO OF VISITORS	MKTVNO		
X	05	NO OF BUYERS	MKTBNO		
	06	MARKETING PROBLEMS	MKTPROB		SEE APPENDIX C
	06	PUBLIC INTEREST IN BUYING SOLAR	MKTPUBLIC		SEE APPENDIX C

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - TECHNICAL DESCRIPTION DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	32	COLLECTOR MANUFACTURER NAME	COLMFGR		
	02	COLLECTOR ORIENTATION 1	COLSOUTH		SO= COLLECTOR FACES SOUTH OT= COLLECTOR FACES OTHER DIRECTION
X	02	COLLECTOR ORIENTATION 2	COLDEG	DEGREES	
	02	COLLECTOR ORIENTATION 3	COLDIRE		EA= EAST OF SOUTH WE= WEST OF SOUTH
X	02	COLLECTOR TILT	COLTILT	DEGREES	
	02	COLLECTOR TYPE	COLTYPE-DBA		AT= ATTIC CO= CONCENTRATOR FL= FLAT PLATE GH= GREENHOUSE HO= HOMEMADE OT= OTHER
X	04	COLLECTOR GROSS AREA	COLGAREA	SQ FT	
X	04	COLLECTOR NET AREA	COLNAREA	SQ FT	
X	04	COLLECTOR AREA PER DWELLING UNIT	COLAREAPERU	SQ FT	
	30	ABSORBER MATERIAL	ABSMATL		
	25	CASING MATERIAL	COLCASING		
	02	ABSORBER COATING	ABSCOAT		FL= FLAT BLACK SE= SELECTIVE
	30	COLLECTOR INSULATION	COLINSUL		
	29	COVER PLATE	COLCP		
X1	04	COLLECTOR PERFORMANCE	COLPERF	PERCENTAGE	
	02	FREEZE PROTECTION	COLFRPROT		AN= ANTIFREEZE DR= DRAIN DOWN RE= RECIRCULATION OT= OTHER
X	04	STORAGE VOLUME - HEAT OR DHW	STORHORW		
	01	STORAGE VOLUME - UNITS	STORUNITS		C= CU. FT. C= GALLONS
X	05	STORAGE PERFORMANCE	STORPERF	BTU/F	
X1	05	HEAT EXCHANGER EFFECTIVENESS	HEXEFF	PERCENTAGE	
	25	TRANSFER MEDIUM	TMED		
X2	05	SPECIFIC HEAT OF TRANSFER MEDIUM	TMSPECHEAT	BTU/LB/F	
X1	07	TRANSFER MEDIUM FLOW RATE	TMFLOW		
	01	FLOW RATE - UNITS	TMFLOWUNITS		C= CU. FT. C= GALLONS
	02	BACK-UP SYSTEM TYPE	AUXTYPE-DBA		CO= COAL EL= ELECTRIC

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - TECHNICAL DESCRIPTION DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
		02	BACK-UP SYSTEM TYPE	AUXTYPE-DBA		GA= GAS HP= HEATPUMP OI= OIL OT= OTHER
X		07	BACK-UP SYSTEM THERMAL INPUT	AUXINPUT	BTU/HR	
X1		05	BACK-UP SYSYTEM EFFICIENCY	AUXEFF	PERCENTAGE	
X		05	DHW STORAGE VOLUME	DHWCAP	GAL	
X		04	DHW USED	DHWUSAGE	GAL/DAY	
		02		MONTH		1= JAN 2= FEB ETC.
X2		06	MONTHLY AVAILABLE INSOLATION	SUN-MO	MMBTU/MO	
X1		04	MONTHLY PERFORMANCE RATIO	PREDPERF	PERCENTAGE	
X2		06	MONTHLY SOLAR FRACTION	SOLDELMO	MMBTU/YR	
X2		06	MONTHLY COOLING LOAD	CLOADMO	MMBTU/MO	
X2		06	MONTHLY HEATING LOAD	HLOADMO	MMBTU/MO	
X2		06	MONTHLY DHW LOAD	DHWLOADMO	MMBTU/MO	
X2		06	MONTHLY COMBINED LOAD	TOTLOADMO	MMBTU/MO	
X2		06	MONTHLY SOLAR COLLECTED	SOLSTOMO	MMBTU/MO	
X1		05	MONTHLY SOLAR FRACTION	SOLPARTYR	PERCENTAGE	
X1		04	VENTILATION	VENT	AIRCHNGS/HR	
X1		06	BUILDING HEAT LOSS FACTOR	HEATLOSS	MMBTU/HR/F	
X2		07	ANNUAL SOLAR COLLECTED	SOLDELYR	MMBTU/YR	
X2		07	ANNUAL COOLING LOAD	CLOADYR	MMBTU/YR	
X2		07	ANNUAL HEATING LOAD	HLOADYR	MMBTU/YR	
X1		06	ANNUAL DHW LOAD	DHWLOADYR	MMBTU/YR	
X2		07	ANNUAL COMBINED LOAD	TOTLOADYR	MMBTU/YR	
X1		05	ANNUAL SOLAR FRACTION	SOLPARTYRDBA	PERCENTAGE	
		65	COMMENTS (1ST PART)	COMMENT-1		
		65	COMMENTS (2ND PART)	COMMENT-2		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - TECHNICAL CONCERNS DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	06		DATE SERVICE PERFORMED	ACTDATE	MO/DAY/YR	
	07		HARDWARE ELEMENT SERVICED	HARDELEM		SEE APPENDIX C
	07		REPAIR PERFORMED	ACTIONS		SEE APPENDIX C
	07		REASON FOR SERVICE	EVENT1		SEE APPENDIX C
	07		REASON FOR SERVICE	EVENT2		SEE APPENDIX C
	07		REASON FOR SERVICE	EVENT3		SEE APPENDIX C
	07		REASON FOR SERVICE	EVENT4		SEE APPENDIX C
	07		REASON FOR SERVICE	EVENT5		SEE APPENDIX C
	04		PERFORMANCE AREA SERVICED	PERFAREA		MAIN= MAINTAINABILITY THER= THERMAL STRU= STRUCTURAL DURA= DURABILITY GENE= GENERAL MECH= MECHANICAL SAFE= SAFETY
	04		PROJECT PHASE	PHASE		CONS= CONSTRUCTION OPER= OPERATIONAL DESI= DESIGN
X	03		NUMBER OF SIMILAR PROBLEMS	FREQ		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - UTILITY CONSUMPTION DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	02		DESIGNATOR NO (UNIT OR BUILDING)	AUXDESNO		
	01		COMPARATIVE NUMBER	COMPNO		
	01		BACKUP ENERGY TYPE	AUXTYPE		E= ELECTRIC O= OIL G= GAS W= WOOD P= PROPANE T= OTHER
	01		METER NUMBER	AUXMETER		
	06		START OF BILLING PERIOD	AUXSTDATE	MO/DAY/YR	
	06		END OF BILLING PERIOD	AUXENDDATE	MO/DAY/YR	
	05		UTILITY COMPANY CODE	AUXSUPPLIER		SEE APPENDIX C
	01		BILLING FREQUENCY	AUXFREQ		M= MONTHLY E= EVERY OTHER MONTH Q= QUARTERLY S= SEMI-ANNUALLY A= ANNUALLY I= IRREGULARLY X= NO LONGER PROVIDED C= COMP. UNIT SOLD
X	06		PRESENT METER READING	AUXSTMETER		
X	06		PREVIOUS METER READING	AUXENDMETER		
X	06		ENERGY CONSUMED	AUXCONSUMED	RE AUXUNITS	
	01		UNITS OF MEASURE	AUXUNITS		KW= KWH CC= CCF TH= THERMS
	05		RATE CODE	AUXRATECODE	$	
X2	07		ENERGY COST	AUXCOST	$	
X2	07		SURCHARGE	AUXSURCHARGE	$	
X2	06		TAX	AUXTAX	$	
X2	07		TOTAL COST THIS PERIOD	AUXTOTCOST	$	

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MASTER FILE - DESIGNATOR DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	05	PROJECT ID NUMBER	PJNO		
X	02	DESIGNATOR NUMBER	DESNO		
X	01	LOCATION NUMBER	LOCNO		
	01	MODEL NUMBER	MODSEQNO		
X	01	SYSTEM SEQUENCE NUMBER - GRANT FILE	G-SYSNO		
X	02	BUILDING NUMBER	BLDGNO		
	01	SUB-BUILDING NUMBER	SBLDGNO		
X	02	UNIT NUMBER	UNITNO		
X	03	NUMBER OF UNITS IN GRANT	NUM-UNITS		
X	02	SYSTEM SEQUENCE NUMBER	SYSNO		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
GRANT DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
		32	GRANTEE NAME	DSGBLDNAME		
		02	CYCLE	CYCLE		1-5, 4A OR P1
		01	GRANT TYPE	GRTYPE		B= BUILD GRANT D= DESIGN GRANT C= COMB. D/B GRANT
X		07	GRANT AWARD AMOUNT - ALL SYS	GRAWARD	$	
X		07	BUILDER ESTIMATED $ OF ALL SYS	SYSCOSTEST	$	
X		07	$ REQUESTED BY BUILDER FOR ALL SYS	BLDGRCOST	$	
		16	PROJECT CITY	PJCITY		'*'= MORE THAN ONE CITY FOR GRANT
		16	PROJECT COUNTY	PJCNTY		'*'= MORE THAN ONE CNTY FOR GRANT
		02	PROJECT STATE	PJSTATE		'*'= MORE THAN ONE STATE FOR GRANT
		05	PROJECT ZIP	PJZIP		'*'= MORE THAN ONE ZIP FOR GRANT
		03	BUILDING TYPE	BSGTYPE		SFA= SINGLE FAM ATTCH SFD= SINGLE FAM DETACH MFM= MULTI-FAM MIDRISE MFH= MULTI-FAM HIRISE GAL= GARDEN LORISE '*'= TWO OR MORE OF ABOVE
		01	NEW OR RETROFIT CONSTRUCTION	NEW-RET		N= NEW R= RETROFIT
X		07	CONDITIONED AREA PER BLDG	SYSHEATAREA	SQ FT	
		03	SEA (STANDARD ECONOMIC AREA)	PJSEA		
		01	SYSTEM - HEAT	SYSHEAT-G		
		01	SYSTEM - COOL	SYSCOOL-G		
		01	SYSTEM - DHW	SYSWATER-G		
		03	SYSTEM FUNCTION	SYSTYPE-G		ANY COMB OF H, C AND W WHERE H = HEATING C = COOLING W = DHW
		01	SYSTEM KIND	SYSKIND-G		A= ACTIVE P= PASSIVE '*'= BOTH
		02	SYSTEM TRANSFER MEDIUM	SYSTRMED-G		A= AIR

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
GRANT DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	02		SYSTEM TRANSFER MEDIUM	SYSTRMED-G		L= LIQUID '*'= BOTH
	04		SYSTEM MANUFACTURER	SYSMFGR-G		SEE APPENDIX C '*'= MORE THAN ONE MFGR FOR GRANT
X	05		DEGREE DAYS	DEGDAYS-G		'*'= MORE THAN ONE VALUE FOR GRANT
	03		COLLECTOR TYPE	COLTYPE-G		EVT= EVACUATED TUBE FLP= FLAT PLATE CNC= CONCENTRATING OTH= OTHER OR ANY COMB OF D, N, AND/OR I WHERE D= DIRECT N= INDIRECT I= ISOLATED OR '*'= MORE THAN ONE COL TYPE FOR GRANT
X	06		SUM OF COL APERATURE AREAS - ALL SYS	COLSQFT-G	SQ FT	
X	08		TOTAL LOAD FOR ALL SYSTEMS	MODMBTU-G	MBTU	
X	08		SOLAR ENERGY USED BY ALL SYSTEMS	SYSMBTU-G	MBTU	
	32		DESIGNER/BUILDER CONTACT NAME	DSGBLDCNAME		
	10		DESIGNER/BUILDER CONTACT PHONE	DSGBLDCPHONE		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
GRANTEE DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	04	GRANT AWARD DATE	AWARD-YM	YR MO	
X	04	GRANTEE REPORT 1 SUBMISSION DATE	GR1-YM	YR MO	
X	04	GRANTEE REPORT 3 SUBMISSION DATE	GR3-YM	YR MO	
X	04	FINAL DESIGN COMPLETION DATE	DSC-YM	YR MO	
X	04	CONSTRUCTION BEGINNING DATE	CONSTBEG-YM	YR MO	
X	04	BEGIN SOLAR INSTALLATION DATE	BEGINSTL-YM	YR MO	
X	04	SOLAR ENERGY SYSTEM TEST DATE	TESTCOMP-YM	YR MO	
X	04	CONSTRUCTION COMPLETION DATE	CONST-YM	YR MO	
X	04	BUILDING PERMIT APPROVAL DATE	BPER-YM	YR MO	
X	04	OCCUPANCY PERMIT APPROVAL DATE	OPER-YM	YR MO	
X	04	ZONING PERMIT APPROVAL DATE	ZON-YM	YR MO	
X	04	CONSTRUCTION FINANCING DATE	CFIN-YM	YR MO	
X	04	GRANTEE REPORT 4 SUBMISSION DATE	GR4-YM	YR MO	
X	04	MORTGAGE APPROVAL DATE	MTGAPP-YM	YR MO	
X	04	UNIT FIRST OFFERED DATE	OFFER-YM	YR MO	
X	04	SALES CONTRACT DATE	CONTR-YM	YR MO	
X	04	OCCUPANCY DATE	OCC-YM	YR MO	
	02	UNIT STATUS	UNITSTATUS		S= ALL UNITS SOLD R= ALL UNITS RENTED M= ALL UNITS MODEL '*'= MIXTURE
	06	CONSTRUCTION FINANCING PROBLEMS	CFINPROB		SEE APPENDIX C
	06	BUILDING PERMIT PROBLEMS	BPERPROB		SEE APPENDIX C
	06	OCCUPANCY PERMIT PROBLEMS	OPERPROB		SEE APPENDIX C
	06	ZONING PERMIT PROBLEMS	ZONPROB		SEE APPENDIX C
	06	DELIVERY PROBLEMS	CPROBDEL		SEE APPENDIX C
	06	BREAKAGE PROBLEMS	CPROBBRK		SEE APPENDIX C
	06	LABOR PROBLEMS	CPROBLAB		SEE APPENDIX C
	06	SOLAR INTERFACE PROBLEMS	CPROBINTF		SEE APPENDIX C
	06	OTHER PROBLEMS	CPROBOTH		SEE APPENDIX C
	06	MORTGAGE PROBLEMS	MTGPROB		SEE APPENDIX C
	06	MARKETING PROBLEMS	MKTPROB		SEE APPENDIX C
	06	PUBLIC INTEREST IN BUYING SOLAR	MKTPUBLIC		SEE APPENDIX C
	02	SOLAR ENERGY SYSTEM INSTRUMENTATION	PJINSTR		IN= INSTRUMENTED SYS FOR THIS GRANT

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
GRANTEE DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
		02	SOLAR ENERGY SYSTEM INSTRUMENTATION	PJINSTR		NO= NO INSTRUMENTED SYSTEM
X		07	AVERAGE FINAL BUYING PRICE	ENDSALEPRICE	$	
X		04	GRANTEE REPORT 2 SUBMISSION DATE	GR2-YM	YR MO	

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
TECHNICAL CONCERNS DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	02	NUMBER OF MAINTAINABILITY PROBLEMS	MAIN		
X	02	NUMBER OF THERMAL PROBLEMS	THER		
X	02	NUMBER OF STRUCTURAL PROBLEMS	STRU		
X	02	NUMBER OF DURABILITY PROBLEMS	DURA		
X	02	NUMBER OF GENERAL PROBLEMS	GENE		
X	02	NUMBER OF MECHANICAL PROBLEMS	MECH		
X	02	NUMBER OF SAFETY PROBLEMS	SAFE		
X	02	NUMBER OF CONSTRUCTION PHASE PROBS	CNST		
X	02	NUMBER OF OPERATIONAL PHASE PROBS	OPER		
X	02	NUMBER OF DESIGN PHASE PROBS	DSGN		
X	02	NUMBER OF BLDG SUBSYSTEM PROBS	BLDG		
X	02	NUMBER OF COLLECTOR SUBSYSTEM PROBS	COLL		
X	02	NUMBER OF STORAGE SUBSYSTEM PROBS	STOR		
X	02	NUMBER OF TRANSPORT SUBSYSTEM PROBS	TRAN		
X	02	NUMBER OF CONTROLS SUBSYSTEM PROBS	CONT		
X	02	NUMBER OF AUXILIARY SUBSYSTEM PROBS	AUX		
X	02	NUMBER OF DISTRIBUTION SUBSYS PROBS	DIST		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
UTILITY CONSUMPTION DATA

DATE: MAY 22, 1980

NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
X	02	NO UNITS USED IN AVG MONTHLY ELEC	AUXDES-E		
X2	06	AVG MONTHLY COST FOR ELECTRICITY	AUXCOSTMO-E	$	
X	06	AVG MONTHLY ELECTRIC USE	AUXCONSMO-E	BTU	
X	01	NO UNITS USED IN AVG MONTHLY GAS	AUXDES-G		
X2	06	AVG MONTHLY COST FOR GAS	AUXCOSTMO-G	$	
X	06	AVG MONTHLY GAS USE	AUXCONSMO-G		
	01	UNITS OF GAS USAGE	AUXUNITS		C= CU FT T= THERMS M= MILLION THERMS
X	02	NO UNITS USED IN AVG MO ELEC (COMP)	AUXDES-CE	BTU	
X2	06	AVG MONTHLY COST FOR ELEC (COMP)	AUXCOSTMO-CE	$	
X	06	AVG MONTHLY ELEC USE (COMP)	AUXCONSMO-CE	BTU	
X	02	NO UNITS USED IN AVG MO GAS (COMP)	AUXDES-CG		
X2	06	AVG MONTHLY COST FOR GAS (COMP)	AUXCOSTMO-CG	$	
X	06	AVG MONTHLY GAS USE (COMP)	AUXCONSMO-CG		
	01	UNITS OF GAS USAGE (COMP)	AUXUNITS-C		C= CU FT T= THERMS M= MILLION THERMS

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
DESIGNATOR DATA

DATE: MAY 22, 1980

	DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	05		PROJECT NUMBER	PJNO		
X	01		NUMBER OF PROJECT LOCS IN THIS GRANT	GRLOCS		
X	03		NUMBER OF UNITS IN THIS GRANT	GRUNITS		
X	02		NUMBER OF SYSTEMS IN THIS GRANT	GRSYS		
X	02		NUMBER OF BLDGS IN THIS GRANT	GRBLDGS		
	18		DESCRIPTION OF SYS IN THIS GRANT	SYSDESC		
	18		DESCRIPTION OF BLDGS IN THIS GRANT	BLDGDES		

APPENDIX B
SOLAR DATA DICTIONARY/DIRECTORY
MIS (MANAGEMENT INFORMATION SUMMARY) FILE
MARKET SURVEY

DATE: MAY 22, 1980

DATA NUM	DATA LENGTH	DATA ELEMENT DESCRIPTION	DATA ELEMENT MIRADS NAME	UNITS	CODES/VALUES
	02	NO. SINGLE FAMILY BUILDER SURVEYS	RA		
	02	NO. SING FAM. BUILDER (COMP) SURVEYS	RB		
	02	NO. MULTI FAMILY BUILDER SURVEYS	RC		
	02	NO. MULT FAM. BUILDER (COMP) SURVEYS	RD		
	02	NO. PURCHASER SURVEYS	RE		
	02	NO. PURCHASER (COMPARATIVE) SURVEYS	RF		
	02	NO. PROSPECTIVE PURCHASER SURVEYS	RGG		
	02	NO. RENTER SURVEYS	RH		
	02	NO. RENTER (COMPARATIVE) SURVEYS	RJJ		
	02	NO. BUILDING MANAGER SURVEYS	RK		
	02	NO. CONSTRUCTION LENDER SURVEYS	RL		
	02	NO. PERMANENT LENDER SURVEYS	RM		
	02	NO. NON-PARTICIPATING LENDER SURVEYS	RN		
	02	NO. PART INSURANCE CO. SURVEYS	RO		
	02	NO. AUXILIARY UTILITY CO. SURVEYS	RP		
	02	NO. ALTERNATIVE UTILITY CO. SURVEYS	RQ		
	02	NO. LOCAL PLAN/ZONE OFFICIAL SURVEYS	RR		
	02	NO. LOCAL BUILDING CODE OFF. SURVEYS	RS		
	02	NO. LOCAL TAX ASSESSOR SURVEYS	RT		
	02	NO. FOLLOW-UP PART LENDER SURVEYS	RU		
	02	NO. FOLLOW-UP (COMP) BUILDER SURVEYS	RV		
	02	NO. FOLLOW-UP PURCHASER SURVEYS	RW		
	02	NO. FOLLOW-UP (COMP) PURCHASER SUR.	RX		
	02	NO. FOLLOW-UP RENTER SURVEYS	RY		
	02	NO. FOLLOW-UP (COMP) RENTER SURVEYS	RZ		
	02	NO. HOUSE-SITE SURVEYS	SI		

APPENDIX C

CODES/VALUES FOR CERTAIN DATA ELEMENTS

Introduction

Codes and their values are associated with certain data element names. For example, data element PJINSTR can be coded in two ways: "IN" or "NO". The "values" or "meanings" of these two codes are: "IN" means "instrumented" and "NO" means "not instrumented." Appendix C contains all those codes and values which were too long to fit into the SOLAR DATA DICTIONARY/DIRECTORY, appendix B. One characteristic of these longer codes and value lists is that they are dynamic--additions are frequently made to them.

The following pages contain a data element name at the top of the page, followed by the name of the interactive file or files, which reference this data element, followed by the codes and their corresponding values. The data elements are in alphabetical order. The codes/values lists are usually alphabetical with the exception of EVENTS and HARDELEM. The number(s) in parentheses at the top of the page references the page(s) of appendix B, the SOLAR DATA DICTIONARY/DIRECTORY, where the data element and its attributes are defined.

Updated lists of codes and values are available from the Franklin Research Center.*

*1030 15th Street, N.W.
Suite 720
Washington, D.C. 20005
Telephone: (202) 223-8109

APPENDIX C
CODES/VALUES FOR CERTAIN DATA ELEMENTS

Data Element Name: ACTIONS
Interactive File Where Used: MASTER (67)

ADED	ADDED
ADED1	ANTIFREEZE
ADED2	FLUID
ADED3	INHIBITOR
ADED4	ADDITIONAL HARDWARE
ADED5	ADDITIONAL MEMBERS
ADJT	ADJUST
ADJT1	BLEED
ADJT2	CLEAN
ADJT3	THAW
ADJT4	TIGHTEN
ADJT5	LUBRICATE
BRAZ	BRAZE
ELIM	ELIMINATE
NONE	NONE
NBAR	NONE BUT ACTION REQD
NBAR1	AWAITING SHIPMT OF RPLMT ELEMENTS
MANI	MANFTR INVESTG
OCIN	OCCUPANT INSTRUCTED
OCIN1	ON PROPER USE OF SYS
OCIN2	ON RELSHP-FENES/ECON
RECT	RECOAT
REGR	REGROUTED
REMV	REMOVE
REPK	REPACK
REPA	REPAINT
REPR	REPAIR
RPLI	REPLACE W/ IDENT ITEM
RPLI1	LEVEL 1
RPLI2	LEVEL 2
RPLI3	LEVEL 3
RPLI4	LEVEL 4
RPLS	REPLACE W/SUB ITEM
RPLS1	LEVEL 1
RPLS2	LEVEL 2
RPLS3	LEVEL 3
RPLS4	LEVEL 4
RELO	RELOCATE
RESL	RESEAL
RETP	RETAPE
REWK	REWORK
REWR	REWIRE
RSMA	ROU OR SCHD MAIN
SLDR	SOLDER
WELD	WELD
NBAR2	WAITING OPPORTUNE TIME
REMV1	ISOLATE FROM SYSTEM

Data Element Name: AUXSUPPLIER
Interactive File Where Used: MASTER (68)

AL01 Huntsville Utilities
P.O. Box 2048
Hunstsville, AL 35804

AZ01 Arizona Public Service Co.
P.O. Box 2907
Phoenix, AZ 85062

CA01 Pacific Gas & Electric Co.
111 Almaden Blvd.
San Jose, CA 95198

CA02 Pacific Gas & Electric Co.
314 "F" Street
Davis, CA 95616

CA03 San Diego Gas & Electric Co.
P.O. Box 1831
San Diego, CA 92112

CA04 So. California Gas Co.
340 N. Juanita St.
Hemet, CA 92343

CA05 California Edison Co.
10180 Telegraph Rd.
Ventura, CA 92343

CO01 Public Service Co. of Colorado
P.O. Box 840
550 15th St.
Denver, CO 80202

CO02 Public Service Co. of Colorado
1155 Canyon Blvd.
Box 551
Boulder, CO 80302

CO03 Public Service Co. of Colorado
HWY 74
P.O. Box 640
Evergreen, CO 80439

CO05 Union Rural Electric Assn.
P.O. Box 359
Brighton, CO 80601

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

CO05 Public Service Co. of Colorado
P.O. Box 707
Frisco, CO 80443

CO06 Public Service Co. of Colorado
9722 E. 16th St.
Aurora, CO 80010

CO07 Public Service Co. of Colorado
209 S. Meldrum St.
Box 1668
Fort Collins, CO 80521

CT01 Hartford Electric Light Co.
34 Hopmeadow
Simsburg, CT 06070

CT02 The United Illuminating Co.
80 Temple Street
New Haven, CT 06506

CT03 Hartford Electric Light Co.
P.O. Box 2370
New Haven, CT 06506

CT04 Connecticut Light & Power
King Street
Enfield, CT 06082

FL01 Florida Power Corp.
P.O. Box 33733
St. Petersburg, FL 33152

FL02 Florida Power & Light Company
P.O. Box 529100
9520 W Flager
Miami, FL 33152

FL03 Florida Power & Light Company
P.O. Box 341608
Coral Gables, FL 33134

FL04 City of Gainesville Utilities
200 E. University Ave. Rm 402
Gainesville, FL 32602

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

FL05 Florida Public Utilities Co.
Drawer C
West Palm Beach, FL 33406

GA01 Coweta/Fayette, Inc.
P.O. Box 488
Newnan, GA 30264

GA02 Atlanta Gas Light
89 Annex
Atlanta, GA 30389

GA03 Georgia Power Company
1790 Montreal Circle
Tucker, GA 30084

GA04 Georgia Power Company
96 Annex
Atlanta, GA 30396

GA05 Georgia Power Company
Duluth, GA 30246

GA06 Buford Gas Company
30 Garnett Street
Buford, GA 30518

GA07 Georgia Power Company
P.O. Box 327
Lawrenceville, GA 30246

GA08 Georgia Power Company
P.O. Box 271
Canton, GA 30114

GA09 Jefferson Electric Company
1001 Peachtree Street
Louisville, GA 30434

HI01 Hawaiian Electric Co., Inc.
P.O. Box 3978
Honolulu, HI 96813

IN01 Public Service of Indiana
105 S. Madison
Greenwood, IN 46142

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

MA01 Bay State Gas Co.
2025 Roosevelt Avenue
Springfield, MA 01101

MA02 Boston Edison Company
P.O. Box 488
Boston, MA 02199

MA03 Bay State Gas Company
120 Royall Street
Canton, MA 02021

MA04 Bay State Gas Company
995 Belmont Street
Brocton, MA 02401

MD01 Baltimore Gas & Electric Co.
1508 Woodlawn Drive
Baltimore, MD 21207

MI01 Berrien City Farm Bureau Oil Co.
M-140 &M-62
Eau Claire, MI 41911

MN01 Minnegasco/Minnesota Gas Co.
626 Nicollet Mall
Minneapolis, MN 55402

MN02 Northern States Power
414 Nicollet Mall
Minneapolis, MN 55401

MO01 The Gas Service Co.
2460 Pershing Rd.
Kansas City, MO 64108

MO02 Kansas City Power & Light Co.
13330 Baltimore Avenue
Kansas City, MO 64145

NC01 Duke Power Company
Drawer A D Salem Station
Winston-Salem, NC 27108

NE01 Cengas/Minnesota Gas Co.
1201 N Street
Lincoln, NE 68512

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

NH01 Public Service Co. of New Hampshire
Crystal Avenue
Derry, NH 03038

NH02 Public Service Co. of New Hampshire
370 Amherst Street
Nashua, NH 03061

NH03 New Hampshire Elec. Cooperative, Inc.
Red 2 Tenney Mt. Hwy.
Plymouth, NH 03264

NM01 Gas Co. of New Mexico
P.O. Box 1692
Albuquerque, NM 87103

NM02 Public Service Co. of New Mexico
414 Silver Ave. N.W.
Albuquerque, NM 87103

NM03 Public Service Co. of New Mexico
124 E. Marcy
Santa Fe, NM 87501

NY01 New York State Electric & Gas
5655 South Park Ave.
Hamburg, NY 14075

NY02 National Fuel Gas
455 Main Street
Buffalo, NY 14203

NY03 Orange & Rockland Electric & Gas Co.
One Bluehill Plaza
Peael River, NY 10965

NY04 Niagara Mohawk Power
383 Broadway
Saratoga Springs, NY 12866

NY05 Moore Oil Company
Charlton Road
Ballston Spa, NY 12020

OH01 Cincinnati Gas & Electric Company
139 E. 4th
Cincinnati, OH 45201

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

OH02 Ohio Power Company
Box 630
Canton, OH 44701

OH03 Columbus & Southern Ohio Electric Co.
215 North Front Street
Columbus, OH 44701

OR01 Pacific Power & Light Co.
300 W. Anderson Avenue
Coos Bay, OR 97420

OR02 Ashland Municipal Electric
20 E. Main
Ashland, OR 97420

PA01 Philadelphia Electric Co.
230 Market Street
Philadelphia, PA 19101

SC01 Palmetto Elec Cooperative, Inc.
Box 1218
Hilton Head, SC 29928

SC02 Piedmont Natural Gas Co., Inc.
P.O. Box 1905
Greenville, SC 29602

SC03 South Carolina Electric and Gas
P.O. Box 764
Columbus, SC 29218

TN01 Memphis Light, Gas & Water Co.
P.O. Box 430
Memphis, TN 29218

TX01 El Paso Electric Co.
P.O. Box 982
El Paso, TX 79999

TX03 Lone Star Gas
301 Harwood St.
Dallas, TX 75201

TX04 Dallas Power & Light Co.
1506 Commerce Street
Dallas, TX 75201

Data Element Name: AUXSUPPLIER (Continued)
Interactive File Where Used: MASTER

TX05 West Texas Utilities
106 S. Chadbourne
San Angelo, TX 76901

TX06 Lone Star Gas Company
P.O. Box 471
San Angelo, TX 76902

UT01 Utah Power & Light Company
1407 West North Temple St.
Salt Lake City, UT 84116

UT02 Logan Power & Light Co.
61 W. 100 N.
Logan, UT 84321

UT03 Mountain Fuel
45 E. 200 N.
Logan, UT 84321

VA01 Appalachian Power Company
523 Main Street
Lynchburg, VA 24506

WI01 Wisconsin Power & Light Co.
401 Oak Street
Baraboo, WI 53913

WI02 Northern States Power Company
P.O. Box 1147
Eau Claire, WI 54701

WI03 Wisconsin Electric
231 W. Michigan Street
Milwaukee, WI 53201

Data Element Name: BPERPROB
Interactive Files Where Used: MASTER, MIS (61, 72)

A	NONE
B	BLDG. DEPT. CODE PROHIBIT SOLAR
C	CODES DON'T ADDR SOLAR CAN'T ISSUE
D	BLDG. DEPT. REQ. REDESIGN OF SOLAR
E	WILL NOT ISSUE NON SOLAR CAUSE
F	PERMIT NOT REQ. RETROFIT
G	PERMIT NOT REQ.
H	100% COMPLETION REQ. TO ISSUE
I	BLDG. DEPT. SHOWED INTEREST
J	OTHER SEPARATE PERMITS REQ'D.
K	ADDS/CHANGES TO BLDG. REQ'D.
L	OBTAINED BY OTHER THAN GRANTEE
Z	MORE INFO. IN FILES

Data Element Names: CFINPROB
Interactive Files Where Used: MASTER, MIS (60, 72)

A	NO PROBLEM
B	FIN. ORG. NEG ON SOLAR
C	FIN. ORG. HAS TECH CONCERNS
D	FIN. ORG. HAS MARKET CONCERNS
E	FIN. ORG. NOT MAKING CONST. LOANS
F	INCR. INT. RATE DUE TO SOLAR
G	CONST./MORTGAGE COMBINED
H	HUD FINANCED
I	RETROFIT INTERNAL FIN.
J	APPRAISAL PROBLEMS
K	LOAN LESS THAN APPR. VALUE
L	COND. COMMIT. NON SOLAR
M	COND. COMMIT. SOLAR CAUSED
N	PENDING FHA/VA APPROV.
O	REVOLVING CREDIT LINE
P	INTERNAL FUNDING
Q	RETROFIT NO FIN. REQ.
R	CONST. & PERMANENT FIN.
S	GRANT AMT. INCL. IN SALES PRICE
T	STATE FUNDS
U	LOW INC. HSG LOAN ONLY
Z	MORE INFO. IN FILES

Data Element Name: CPROBBRK
Interactive Files Where Used: MASTER, MIS (62, 72)

A	NONE
B	IMPROPER HANDLING DEL. OR ON SITE
C	EQUIP. TOO FRAGILE
D	FAULTY MANUFACTURE
E	OPERATIONAL FAILURE
F	DAMAGED OR INSTALLED INCORRECTLY
G	FAULTY EQUIP REPLACED
H	DEFECTIVE HOSES/DAMPERS/FANS
I	INST. MANUALS NOT PROVIDED
J	MALFUNCTIONING CONTROLS
K	ALL COLLECTORS/PANELS REPLACED
L	LEAKAGE PROBLEMS
M	MISC. COLLECTOR BREAKDOWNS
N	STORAGE PROBLEMS
O	DAMAGED IN TRANSIT
Z	MORE INFO. IN FILES

Data Element Name: CPROBDEL
Interactive Files Where Used: MASTER, MIS (62, 72)

A	NONE
B	TEMP. PROD. DELAY
C	MAJOR PROD. DELAY CHANGE OF EQUIP.
D	DEL. DELAY DUE TO WEATHER
E	DEL. DELAY CAUSE UNSPECIFIED
F	COMPANY OUT OF BUSINESS
G	MORE LEAD TIME REQ'D ON ORDERS
H	HUD/BOEING INSTR. PACKAGE DELAYED
I	INCOMPLETE ORDER
J	DELAYED AT CUSTOMS
K	DISPUTE CONTRACTORS & MFG.
L	LOCAL SUPPLIER OUT OF MATERIALS
M	MISC. PARTS REORDERED
N	MISC. MATERIALS UNAVAILABLE
O	ORDER REC'D W/WRONG COMPONENTS
P	PLANT SHUTDOWN/STRIKE
Q	REORDER/DAMAGED PARTS REC'D
S	SUPPLIER UNABLE TO SHIP PER SCHED.
T	TRANSPORTATION RELATED DELAY
U	MAJOR PARTS REORDERED
V	FABRICATION DELAY
Z	MORE INFO. IN FILES

Data Element Name: CPROBINTF
Interactive Files Where Used: MASTER, MIS (62, 72)

A	NONE
B	MAJOR STRUCTURAL CHANGES
C	MINOR STRUCTURAL CHANGES
D	WEATHER
E	AESTHESTIC PROBLEMS
F	FURTHER CONST. AFTER COMPL.
G	ADD'L MAT./COMPONENTS REQD.
H	IMPROPER DESIGN ROOF OR COLL.
I	INSULATION RELATED
J	ACQUISITION OF MATERIALS
K	ADD'L DUCT WORK REQD.
L	LEAKS
M	MULTIPLE INTERFACE PROBLEM
N	NEW DESIGN DEV. & INSTALLED
O	ROOF DESIGN CREATED PROBLEMS
P	SOLAR MFG. RECOMMENDS CHANGE
Q	ROOF DESIGN CREATED PROBLEMS
R	SOLAR PLUMB./WIRING RELATED
S	SENORS OMITTED
T	TRUSS DESIGNS ADDED
U	STORAGE TANK MODS.
V	SCHEDULING OF OTHER SUBCONT.
W	WATERPROOFING
Y	SOLAR INSTALL. PROBLEMS
Z	MORE INFO. IN FILES

Data Element Name: CPROBLAB
Interactive Files Where Used: MASTER, MIS (62, 72)

A	NONE
B	NO INTEREST WILL NOT WORK SOLAR
C	LACK OF SKILL
D	JURISDICTIONAL DISPUTE
E	POOR WORKMANSHIP
F	LACKS TECH. COMPETANCE
G	WEATHER RELATED
H	HAD TO TRAIN CO. PERSONNEL
I	INTITAL CONTR. TERMINATED
J	SLOW PYMNT SLOW LAB. RESPONSE
K	EXTRA SUPERVISION REQ.
L	INSTALLATION COSTS OVER ESTIMATE
M	MORE INSTR. FROM SOL. MFG.
N	NOT AVAIL TO COMPL. WORK
O	SUBCONTR. BEHIND SCHEDULE
P	LAB. PRODUCTION DEL. UNSPECFIED
Q	ACQUIRING QUALIFIED LABOR
R	UNSKILLED PROSPECTIVE OWNERS
S	HIGH LABOR COSTS
Z	MORE INFO. IN FILES

Data Element Name: CPROBOTH
Interactive Files Where Used: MASTER, MIS (62, 72)

A	NONE
B	PROB. W/GEN. CONTR. & SUBCONTR.
C	RELATED TO COSTS
D	SUBCONTR. WORKING OTHER JOBS
E	ROOFING COORDINATION
F	MISC. WEATHER RELATED
G	VANDALISM/THEFT
H	MODIFICATIONS AFTER COMPL.
I	OBTAINING GEN. MATERIALS
J	ROCK BOX/FILL/STORAGE
K	INSTRUMENTATION INSTALLATION
L	CONSTRUCTION START DELAY
M	INSTALL. TIME UNDERESTIMATED
N	MAJOR CONSTRUCTION PROBLEMS
O	UNFAMILIAR W/SOLAR COMPONENTS
Z	MORE INFORMATION IN FILES

Data Element Name: EVENTS
Interactive File Where Used: MASTER (67)

GENE	GENERAL
AIRE	AIR ENTRAPMENT
DMBY	DAMAGED
DMBY1	ACCIDENT
DMBY11	IN TRANSIT
DMBY12	DURING INSTALLATION
DMBY2	FREEZING OF LIQUID
DMBY3	LEAKAGE OF MOISTURE OR RAIN
DMBY4	LEAKAGE OF SYSTEM FLUIDS
DMBY41	BETWEEN COMPONENTS
DMBY42	FROM COMPONENTS
DMBY5	LIGHTNING
DMBY6	MAINTENANCE ACTION
DMBY7	SOIL EROSION
DMBY71	OVERFLOW PROVISIONS INADEQUATE
DMBY72	STORM DRAINS INADEQUATE
DMBY8	VANDALISM
DESC	DESIGN CHANGE
FLOP	FAILED TO OPERATE
FLOP1	BROKEN
FLOP2	BURNED OUT
FLOP3	BURST
FLOP4	CLOGGED OR BLOCKED
FLOP7	FAULTY
FLOP6	INCOMPATIBLE
FLOP8	MALF-OTH COMPO
FLOP5	WORN OUT
FLBO	FAILED TO OPERATE BECAUSE OF OUTAGE
FLBO1	ELECTRICITY
FLBO2	GAS
FLBO3	OIL
FLBO4	WATER
OPIM	OPERATING, BUT IMPROPERLY
OPIM6	CONTINUOUSLY
OPIM1	DEPOSITION OF
OPIM11	CONDENSATION PRODUCT
OPIM111	MOISTURE
OPIM112	SOLID
OPIM12	DUST OR DIRT ON EXTERIOR SURFACES
OPIM13	DUST OR DIRT ON INTERIOR SURFACES
OPIM14	GUM OR VARNISH
OPIM15	PRECIPITATED MATTER
OPIM16	SEDIMENTATION
OPIM4	ELEMENT INADEQUACIES
OPIM2	INCORRECT
OPIM21	ADJUSTMENT
OPIM22	ALIGNMENT
OPIM23	CAPACITY
OPIM24	INSTALLATION
OPIM25	MANUFACTURING

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

OPIM26	PART OR COMPONENT
OPIM3	LEAKAGE OF AIR
OPIM5	SOLAR SHADING
OPIM51	OFF-SITE OBSTRUCTION
OPIM52	ON-SITE OBSTRUCTION
RUBN	RESTRAINS USE BECAUSE OF NOISE
RUBN1	FLUID MOVEMENT
RUBN2	VIBRATION
RUBN3	WATER HAMMER
RULS	RESTRICTS USE OF LIVING SPACE
RULS1	ENCROACHMENT
RULS2	EXCESSIVE AIR MOVEMENT
RULS3	LEAKAGE OF AIR
RULS4	ODORS
RULS5	SOLAR REFLECTION
RULS6	THERMAL RADIATION
RUOS	RESTRICTS USE OF OUTDOOR SPACE
RUOS1	FLUIDS ESCAPING
RUOS2	SOLAR REFLECTION
RUOS3	THERMAL RADIATION
SCHD	SCHEDULING INADEQUACIES
SHPM	SHPMT/PARTS & MATERIALS INCOMPLETE
MECH	MECHANICAL
FLIN	FILTRATION INADEQUATE
FLRA	FLOW RATE
FLRA1	HIGHER THAN DESIGN
FLRA2	LOWER THAN DESIGN
FLRG	FLOW REGULATION INADEQUATE
FLRG1	CYCLING EXCESSIVE
FLSD	FLOW SEQUENCING NOT ACCORDING TO DESIGN
FLSD1	DIRECTION
FLSD2	SCHEDULING
FLUN	FLOW UNBALANCED
FLVE	FLUID VOLUME EXCESSIVE
FLVE1	BOILING PROVISIONS INADEQUATE
FLVE2	THERMAL EXPANSION PROVISIONS INADEQUATE
FRIC	FRICTION EXCESSIVE
FRIC1	FOREIGN MATTER
FRIC2	IMPROPER MATERIALS
FRIC3	INADEQUATE BEARING SURFACES
FRIC4	INADEQUATE CLEARANCE
FRIC5	INADEQUATE LUBRICATION
INST	INSTALL DIF
INST1	HARDWARE INADEQUATE
INST2	INSTRUCTIONS INADEQUATE
INST3	BUILDING INADEQUATE
LGRU	LEAKAGE RUNOFF PROVISIONS INADEQUATE
LEAK	LEAKING
OPIN	OVERFLOW PROVISIONS INADEQUATE
OVLD	OVERLOADED

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

OVLD1	ELECTRICALLY
OVLD2	MECHANICALLY
PASS	PASSAGE SIZE
PASS1	LARGER THAN DESIGN
PASS2	SMALLER THAN DESIGN
PBHD	PRESSURE BUILDUP HIGHER THAN DESIGN
PBHD1	DURING NO FLOW CONDITIONS
PBHD2	DURING NORMAL OPERATING CONDITIONS
PROP	PRESSURE DURING OPERATION
PROP1	HIGHER THAN DESIGN
PROP2	LOWER THAN DESIGN
PRIN	PRESSURE REGULATION INADEQUATE
PREF	PRESSURE RELIEF INADEQUATE
SUPI	SUPPORT INADEQUATE
SUPI1	CAUSING IMPROPER DRAINAGE
SUPI2	CAUSING JOINT FAILURE
SUPI3	LOW SPOTS OR SAGGING
TMOV	THERMAL MOVEMENT
TMOV1	CONTRACTION EXCESSIVE
TMOV2	DIFFERENTIAL DISPLACEMENT EXCESSIVE
TMOV3	EXPANSION EXCESSIVE
VHDE	VACUUM HIGHER THAN DESIGN
VHDE1	BECAUSE OF INADEQUATE RELIEF
VLDE	VACUUM LOWER THAN DESIGN
VLDE1	BECAUSE OF OUTGASSING
VLDE2	BECAUSE OF LEAKAGE
VIBE	VIBRATION EXCESSIVE
VIBE1	INADEQUATE/NO VIBRATION ISOLATORS
VIBE2	INADEQUATE/NO WATER HAMMER ARRESTORS
VLIN	VOLUME INSUFFICIENT
VLTL	VOLUME TOO LARGE
MAIN	MAINTAINABILITY
ACRE	ACCESS FOR REPAIRS INADEQUATE
ACRU	ACCESS FOR ROUTINE MAINTENANCE INADEQUATE
BYPA	BY PASSES OR SHUT-OFFS INADEQUATE
FAMA	FACILITIES FOR MAINTENANCE INADEQUATE
FAMA1	USE OF ELECTRICAL MAINTENANCE EQUIPMENT
FAMA2	WASTE DISPOSAL
MAST	MAINTENANCE INSTRUCTIONS
MAST1	INADEQUATE
MAST2	NOT AVAILABLE
MAEP	MAINTENANCE EQUIPMENT
MAEP1	INADEQUATE
MAEP2	NOT AVAILABLE
RERP	REMOVAL AND/OR REPLACEMENT DIFFICULT
RPDR	REPAIR PROCEDURES
RPDR1	ARE CUMBERSOME
RPDR2	REQUIRES UNAVAILABLE SKILLED PERSONNEL
RNAV	REPLACEMENT NOT AVAILABLE
RSNP	ROUTINE SCHEDULED MAINTENANCE NOT PERFORME

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

TCHP	TEST CHECK POINTS
TCHP1	INACCESSIBLE
TCHP2	LACKING
DURA	MATERIALS DURABILITY/RELIABILITY
ANTF	ANTIFREEZE DETERIORATION
ATAC	ATTACK BY
ATAC1	AIRBORNE POLLUTANT OF
ATAC11	HYDROGEN CHLORIDE [HCL]
ATAC12	NITROGEN OXIDES [NOX]
ATAC13	OZONE
ATAC14	SALT SPRAY
ATAC15	SULPHUR DIOXIDE
ATAC16	OTHER
ATAC2	FUNGI
ATAC3	SOIL
ATAC4	ULTRA VIOLET RADIATION
ATAC5	VERMIN
CBCB	CORROSION
CBCB1	DECOMPOSITION PRODUCT AND METAL
CBCB2	DISSIMILAR METALS
CBCB3	FLUID + DISSIMILAR METALS
CBCB4	FLUID AND METAL
DETR	DETERIORATION
DETR1	BLOATING
DETR2	BOND FAILURE
DETR3	DEPOSITION OF OUTGASSED VOLATILES
DETR4	EMBRITTLEMENT
DETR5	LOSS OF HOMOGENEITY
DETR51	PRECIPITATION
DETR52	SEGREGATION
DETR53	SHRINKAGE
DETR6	MOISTURE BUILDUP
DETR7	PH CHANGE
DETR8	PLASTIC FLOW
DETR9	SOFTENING
EROD	EROSION
EROD1	BY AIRBORNE PARTICULATE
EROD2	BY FLUID
EROD3	BY FOREIGN MATTER
FAIL	FAILED
FAIL1	CREEP RUPTURE
FAIL2	EXCESSIVE DIMENSIONAL CHANGE
FAIL3	FREEZING
FAIL4	MOISTURE DEGRADATION
FAIL5	THERMAL CYCLING
FAIL6	THERMAL DEGRADATION
FAIL7	THERMAL SHOCK
FAIL71	COLD FLUID ON HOT SURFACE
FAIL72	HOT FLUID ON COLD SURFACE
FAIL73	VIOLENT BOILING

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

FAIL8	WET-DRY CYCLING
FAIL9	OUTGASSING OF VOLITALS
SRDG	SURFACE DEGRADATION
SRDG1	BLISTERING
SRDG2	CRACKING
SRDG3	DISCOLORATION OR STAINING
SRDG4	PITTING
SRDG5	PEELING
VISC	VISCOSITY CHANGE
SAFE	SAFETY
EGEM	EGRESS, EMERGENCY
EGEM1	BLOCKED
EGEM2	INADEQUATE
EGEN3	LACKING
EXED	EXPOSED SHARP EDGES
FIRE	FIRE POTENTIAL FIRE DAMAGE
FIRE1	AUTO IGNITION TEMPERATURE EXCEEDED
FIRE2	ELECTRICAL ARCING AND/OR SHORT
FIRE3	FIRE STOPS INEFFECTIVE OR MISSING
FIRE4	FLASH POINT TEMPERATURE EXCEEDED
FIRE5	INADEQUATE CLEARANCE
FIRE51	BETWEEN COMBUSTIBLES + HOT HARDWARE
FIRE52	BETWEEN FLAMMABLE FLUID AND SPARK SOUR
FIRE6	OVERHEATED EQUIPMENT
PRSL	PERSONAL INJURY
PRSL1	ALLERGY
PRSL2	BROKEN BONE
PRSL3	BURN
PRSL4	CUT
PRSL5	ELECTRIC SHOCK
PRSL6	POISONED
PRSL7	SCRATCH
PRSL8	STRAIN
PRSN	PERSON INJURED
PRSN1	OCCUPANT
PRSN2	MAINTENANCE PERSON
PRSN3	PASSER BY
SAHD	SAFETY HAZARDS [OTHER THAN FIRE]
SAHD1	ACCESS, EMERGENCY
SAHD11	BLOCKED
SAHD12	INADEQUATE
SAHD13	LACKING
SAHD2	CONTACT POSSIBLE WITH
SAHD21	HOT FLUIDS
SAHD22	HOT SURFACES
SAHD23	TOXIC SUBSTANCE
SAHD231	INHALATION
SAHD232	DRINKING
SAHD233	SKIN CONTACT
SHEM	SHUTOFFS, EMERGENCY

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

SHEM1	INACCESSIBLE
SHEM2	INCONSPICUOUS
SHEM3	LACKING
CNSL	SOIL CONTAMINATION
SLRA	SOLAR RADIATION CONCENTRATION
CNSW	WATER SUPPLY, POTABLE, CONTAMINATION
CNSW1	DIRECT CONTACT WITH TOXIC MATERIAL
CNSW2	LACK OF SEPARATION OF CIRCULATION LOOPS
CNSW3	IMPROPER DESIGN OF TOXIC FLUID DISCHARGE
CNSW4	TOXIC FLUID LEAKAGE OR OVERFLOW
MPPR	MOVING PARTS INADEQUATELY PROTECTED
STRU	STRUCTURAL
DEFL	DEFLECTIONS WERE EXCESSIVE
DEFL1	HORIZONTALLY
DEFL2	VERTICALLY
DCHG	DIMENSIONAL CHANGES EXCESSIVE
DCHG1	CREEP
DCHG2	DIFFERENTIAL SETTLEMENT
DCHG3	DRYING/SHRINKAGE
DCHG4	MOISTURE EXPANSION
DCHG5	THERMAL EFFECTS
FDLB	FAILURE
FDLB1	BENDING
FDLB2	BUCKLING
FDLB3	BULGING
FDLB4	FATIGUE
FDLB7	FLOTATION
FDLB5	FRACTURE
FDLB51	BRITTLE
FDLB52	DUCTILE
FDLB6	YIELDING
FDLB61	AXIAL
FDLB62	TRANSVERSE
LLOD	LIVE LOADS
LLOD1	EQUIPMENT [SOLAR HARDWARE]
LLOD2	HAIL
LLOD3	ICE
LLOD4	MAINTENANCE EQUIPMENT OR ACTIONS
LLOD5	PONDING OF WATER
LLOD6	SNOW
LLOD7	VEHICLE
LLOD8	WIND
LLOD81	BUFFETING
LLOD82	HORIZONTAL
LLOD83	UPLIFT
LLOD84	VORTEX SHEDDING
LLOD9	INSTALLATION PERSONNEL
LOBY	OVERLOADED
LOBY1	ACCIDENTAL LOADS
LOBY11	ANIMAL

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

LOBY12	DEBRIS, FALLING
LOBY13	DEBRIS, WIND BLOWN
LOBY14	HUMAN
LOBY15	VEHICLE
LOBY2	DEAD LOADS
LOBY3	EXTREME ENVIRONMENTAL LOADS FROM
LOBY31	EARTHQUAKE
LOBY32	FLOOD
LOBY33	HURRICANE
LOBY34	TORNADO
THER	THERMAL
TCAP	CAPACITY
TCAP1	TOO SMALL
TCAP2	MISMATCHED
TCIR	CIRCULATION OF AIR, INDOOR SPACE
TCIR1	TOO HIGH
TCIR2	TOO SMALL
TCON	CONDUCTION, THERMAL
TCON1	TOO HIGH
TCON2	TOO LOW
TCLG	COOLING INADEQUATE
TERA	ENERGY EXCHANGE RATE
TERA1	TOO HIGH
TERA2	TOO LOW
TSIR	ENERGY, SOLAR
TEAX	ENERGY USE, AUXILIARY, TOO HIGH
TEOH	ENERGY USE, OPERATING, TOO HIGH
TSIR1	CONTRIBUTION TO LOAD TOO LOW
TSIR2	CONVERSION EFFICIENCY TOO LOW
TSIR3	DISSIPATION RATE TOO LOW
HGIN	HEATING INADEQUATE
HWSP	HOT WATER SUPPLY IS INADEQUATE
HWSP1	DRAW RATE TOO HIGH
HWSP2	RECOVERY RATE TOO LOW
HUMD	HUMIDITY, INDOOR AIR
HUMD1	HIGHER THAN DESIGN VALUE
HUMD2	LOWER THAN DESIGN VALUE
OCIM	OCCUPANT USE IMPROPER
OCIM1	INEFFICIENT SCHEDULING OF LOAD DEMANDS
OCIM2	THERMOSTAT SET POINT
OCIM21	TOO HIGH
OCIM22	TOO LOW
OPTP	OPTICAL PROPERTIES INADEQUATE
OPTP1	ABSORPTANCE
OPTP11	TOO HIGH
OPTP12	TOO LOW
OPTP2	EMITTANCE TOO HIGH
OPTP3	REFLECTANCE, SOLAR, TOO HIGH
OPTP4	TRANSMITTANCE TOO LOW
ORAN	ORIENTATION ANGLE

Data Element Name: EVENTS (Continued)
Interactive File Where Used: MASTER

ORAN1	TOO FAR EAST
ORAN2	TOO FAR WEST
RSLR	RADIATION, SOLAR
RSLR1	EXCESSIVE
RSLR2	INADEQUATE CONTROL
RSLR3	INSUFFICIENT
RTHL	RADIATION, THERMAL
RTHL1	TOO HIGH
RTHL2	TOO LOW
THPG	TEMPERATURE, HARDWARE OPERATING,
THPG1	DURING NOCTURNAL OPERATION
THPG11	TOO HIGH
THPG12	TOO LOW
THPG2	DURING NO FLOW CONDITION
THPG21	TOO HIGH
THPG22	TOO LOW
THPG3	DURING NORMAL OPERATION
THPG31	TOO HIGH
THPG32	TOO LOW
THPG4	DURING FILL
THPG41	TOO HIGH
THPG42	TOO LOW
TAIR	TEMPERATURE, OUTDOOR AIR
TAIR1	HIGHER THAN DESIGN VALUE
TAIR2	LOWER THAN DESIGN VALUE
TSTP	TEMPERATURE SET POINTS,
TSTP1	DIFFERENTIAL
TSTP11	TOO HIGH
TSTP12	TOO LOW
TSTP3	HIGHER THAN DESIGN VALUE
TSTP4	LOWER THAN DESIGN VALUE
TLTA	TILT ANGLE
TLTA1	TOO HIGH
TLTA2	TOO LOW
THMOSY	THERMOSYPHONING

Data Element Name: HARDELEM
Interactive File Where Used: MASTER (67)

SBLD	SITE/BUILDING
SITE	SITE
SUDR	SURFACE DRAINAGE
UTIL	UTILITIES
WATR	WATER
ELEC	ELECTRIC
SWER	SEWER
FUEL	FUEL
SOIL	SOIL
PLTR	PLANTS/TREES
ADST	ADJACENT STRUC
BLDG	BUILDING
ROOF	ROOF
ROFG	ROOFING
INSU	INSULATION
STRE	STRUCTURE
CEIL	CEILING
WALL	WALL
INTR	INTERIOR
EXTR	EXTERIOR
FLOR	FLOOR
BSMT	BASEMENT
OPNG	OPENINGS
DOOR	DOOR
WNDW	WINDOW
OTER	OTHER
SHSY	SHS-H/C/HW-ACT/PASS
ACSD	T W/DISC SHS
COLA	COLLECTOR ARRAY
COLU	COLLECTOR UNITS
COVA	COVER ASSY
HTRP	HEAT TRAP
ABAS	ABSORBER ASSY
THRM	THERMAL INSUL
DESA	DESICCANT
INUR	INT UNIT REF
CASA	CASE ASSY
HCON	HEADERS-CONNECTORS
AIRD	AIR DUCT ASSY
LPIP	LIQUID PIPE ASSY
EXRA	EXTR REF ARRAY
REFA	REFLECTOR ARRAY
RINS	INSULATION
MTGS	MOUNTING STRUC
SUPS	SUPTG STRUC
FIXM	FIXED MOUNT
SADJ	SEASON ADJ MOUNT

APPENDIX C
CODES/VALUES FOR CERTAIN DATA ELEMENTS (Continued)

Data Element Name: HARDELEM (Continued)
Interactive File Where Used: MASTER

TKGM	TRACKING MOUNT
ENCL	ENCLOSURE
THST	THERMAL STORAGE
TKCU	TANK/CONTN UNITS
SMCV	STOR MED CONTN VL
VSLC	VESSEL LIN/COAT
GASK	GASKETS/SEALANTS
THIA	INSULATION ASSY
STEL	STRUC ELEMENTS
INRT	INT RACKS/TROUGHS
STMD	STORAGE MEDIUM
STLQ	LIQUID
STRK	ROCK
HTEX	HEAT EXCHANGERS
CLST	COLLECTOR TO STOR
STLD	STORAGE TO LOAD
ENTP	ENERGY TRANSPORT
LISY	LIQUID SYSTEMS
HTRS	HEAT TRANSFER LIQ
PIAS	PIPING ASSY
PUMP	PUMPS
LFIL	FILTERS
VALV	VALVES
ELIN	INSULATION
AIRS	AIR SYSTEMS
DUCA	DUCT ASSY
BLOW	BLOWERS
AFIL	FILTERS
DAMP	DAMPERS
EAIN	INSULATION
CONT	CONTROLS
LSMC	LLD SUP MODE CONT U
LCLS	CONTROL LOGIC SELECTOR
LSEN	SENSORS (L S)
LADV	ACTUATED DEV (L S)
CSFL	COL/STOR FLOW CONT U
CDTC	DIFF THERMOSTAT CONT
CSEN	SENSORS (T C)
CADV	ACTUATED DEV (T C)
ETOR	ENERGY TRANS OPRN REGS
EPRG	PRESSURE REGULATORS
EFRG	FLOW REGULATORS
SFSC	SSVS FAIL-SAFE CONT
SPRV	PRES RELIEF VALVES
STRV	TEMP RELIEF VALVES
SEOP	ELEC OVERLOAD PROTEC
SVRV	VACUUM RELIEF VALVES

Data Element Name: HARDELEM (Continued)
Interactive File Where Used: MASTER

SCVA	CHECK VALVES
SADV	AUTO DRAINDOWN VALVES
SWHA	WATER HAMMER ARRES
SABV	AUTO BACKFILL VALVES
SBFP	BACK FLOW PREVENTORS
CMPC	COMPONENT OPRN CONTS
TMDC	TRACKING MOUNT DRIVE CONTS
STHT	STOR HEATER THERMOSTAT
AUXE	AUXILIARY ENERGY
ARHT	INTERNAL W/STORAGE
ITWS	RESISTANCE HEATER
ILWS	IN LINE W/STORAGE
ILFR	FURNACE
ILHP	HEAT PUMP
ILBR	BOILER
ILRH	RESISTANCE HEATER
ILAC	AIR CONDITIONER
ILWH	HOT WATER HEATER
IPST	IN PARALLEL W/STOR
IPFR	FURNACE
IPHP	HEAT PUMP
IPBR	BOILER
IPRH	RESISTANCE HEATER
IPAC	AIR CONDITIONER
IPDE	DEHUMIDIFIER
IPHW	HOT WATER HEATER
DIST	DISTRIBUTION
CENA	CENTRAL AIR TYPE
CSND	SINGLE DUCT
CDUD	DOUBLE DUCT
CMUL	MULTIZONE
CVAV	VAR AIR VOLUME
HYDR	HYDRONIC/AIR TYPE
HFAN	FAN COIL
HIND	INDUCTION
HRAD	RADIATION
ECON	ENERGY CONSER TYPE
EHRL	HEAT RECOVERY
EHRC	HEAT RECLAIM
EHES	ENERGY STORAGE
EHDL	DEMAND LIMITER
EHVC	VENTILATION CONT
PSYS	T SYS INTG W/BLDG
PCSA	COL/STOR ARRAY
PCPA	COVER PLATE ASSY
PINS	COL HT INSUL ASSY
PABS	ABS/THER STOR UNIT

Data Element Name: HARDELEM (Continued)
Interactive File Where Used: MASTER

PCON	CONTROLS
PACC	AIR CIR CONTROLS
PCOL	COL HT INSUL ASSY
PAUX	AUXILIARY ENERGY
PADI	INTG INTO DIST
PSEP	COMP SEP CONVN SYS
PDIS	DISTRIBUTION
PDUC	DUCTS
PDAM	DAMPERS

Data Element Name: MKTPROB
Interactive Files Where Used: MASTER, MIS (64, 72)

A	NONE
B	MINOR REPAIRS
C	MAJOR REPAIRS
D	REPLACED MISC. PARTS
E	NO MARKETING RETROFIT
F	SOLAR FAILED TO MEET EXPECTATIONS
G	NUMEROUS SYSTEM SHUTDOWNS
H	CONTROL MALFUNCTION
I	MINOR ADJUSTMENTS
J	REPLACED A MAJOR PART
K	OPERATIONAL FAILURE
L	HOUSE SOLD FROM MODEL
M	SYSTEM INOPERATIVE AT OPEN HOUSE
N	INSTALLED AUXILIARY SYSTEM
O	SOLD DURING CONST. NO MKTG
P	PRE SOLD NO MKTG
Q	HOUSE IS MODEL/TO BE SOLD LATER
R	LACK OF INFO AVAILABLE
S	HOUSE/BLDG OCCUPIED DURING RETROFIT
T	PUBLIC UNFAMILIAR WITH SYSTEM
U	INTEREST RATES TOO HIGH
Z	MORE INFO IN FILES

Data Element Name: MKTPUBLIC
Interactive Files Where Used: MASTER, MIS (64, 72)

A FAVORABLE, ENTHUSIASTIC
B FAVORABLE, BUT SKEPTICAL
C HOME NOT AESTHETICALLY PLEASING
D PRICE TOO HIGH
E DONT CARE FOR DEVEL/NEIGHD
F NONE TAKEN
G POSITIVE
H NEGATIVE
I CURIOUS
J MIXED
K SKEPTICAL
L LACKED SOLAR KNOWLEDGE
M CAUTIOUS W/ COST CONCERNS
N CONCERN WITH MAINTENANCE
O HAD SOLAR KNOWLEDGE
P WANT PERFORMANCE ASSURANCE
Q WANT MORE INFORMATION
R LEERY OF SOLAR
S INTERESTED BUT MONEY NOT AVAILABLE
Z MORE INFO IN FILES

Data Element Name: MTGPROB
Interactive Files Where Used: MASTER, MIS (63, 72)

A NONE
B HUD 235 LOAN
C HUD COLLEGE HSG LOAN
D HUD LOW INCOME HSG
E RETROFIT
F LOW INCOME PUB. HSG.
G NO MORTGAGE CASH
H HOUSE RENTED/LEASED AT THIS TIME
I HUD SEC. 8 ELDERLY HOUSING
J SELF HELP HOUSING LOAN/HUD FINANCED
K NO MORTGAGE USED UNIVERSITY FUNDS
L MORTGAGE OBTAINED PRIOR TO GRANT
M GRANTEE HOLDS MORTGAGE
N INT. RATE HIGH/MONEY NOT AVAIL.
Z MORE INFO. IN FILE

Data Element Name: OPERPROB
Interactive Files Where Used: MASTER, MIS (61, 72)

A NO PROBLEM
B WILL NOT ISSUE NON SOLAR CAUSE
C PENDING COMPL. OF CONST.
D PENDING ISSUED WHEN SOLD
F PERMIT NOT REQ. RETROFIT
G PERMIT NOT REQ.
H ADD'L BLDG. MODS REQ.
I INSPECTION VERBAL APPROVAL
Z MORE INFO. IN FILES

APPENDIX C
CODES/VALUES FOR CERTAIN DATA ELEMENTS (Continued)

Data Element Names: SYSMFGR-A, SYSMFGR-G
Interactive Files Where Used: GRANT, MASTER, MIS

(56, 58, 71)

ACRN	ACORN STRUCTURES INC
AIRC	AIR COMFORT INC
ALBQ	ALBUQUERQUE WESTERN
ALSN	ALL SUN POWER INC
ALIB	ALLEN IRA BASS
ALHE	ALTERNATIVE HEAT SYS
ASFE	AMERAUS SYS/FLEETWOO
AMTH	AMERICAN HELIOTHERM
ASHS	AMERICAN SOLAR HEAT
ASKC	AMERICAN SOLAR KING
AMSI	AMERICAN SUN IND.
APOL	APOLLO SOLAR SYSTEMS
ARKL	ARKLA INDUSTRIES
AZTC	AZTEC SOLAR CO
BDPC	BDP COMPANY
BEAS	BEASLEY COMPANY
BRAD	BRADLEY LOREN CO
BRWN	BROWN MANUFACTURING
CDVA	C AND D VALVE
CJAS	C J ASSOCIATES INC
CALM	CALMAC MFG
CPTL	CAPITAL
CARO	CAROLINA SOLAR EQUIP
CASA	CASAGRANDE CONST CO
CBLR	CENTRAL BOILERS LTD
CHBL	CHAMBERLAIN MFG
CHPN	CHAMPION HOME BLDRS
COLE	COLE SOLAR SYSTEMS
COLT	COLT INC OF SO CAL
COLU	COLUMBI CHASE SOL EN
CNSL	CONSOLAR INC
CONS	CONSOLIDATED WESTERN
COEN	CONSUMER ENERGY CORP
CTEM	CONTEMPORARY SYSTEMS
CREP	CREIGHTON SOLAR CONC
CSIS	CSI SOLAR SYSTEMS
DAYS	DAYSTAR
EKSC	E AND K SERVICE CO
ERSB	EDWIN R SANDERS BLDR
ENAL	ENERGY ALTERNATIVES
ENCO	ENERGY CONSERV ENG
ENDY	ENERGY DYNAMICS CORP
ENRG	ENERGY RESEARCH GRP
ELTD	ENGINEERS LTD
FASC	FASCO INC
FERN	FERN ENGINEERING CO

Data Element Names: SYSMFGR-A, SYSMFGR-G (Continued)
Interactive Files Where Used: GRANT, MASTER, MIS

FILN	FILON DIVISION
FLAG	FLAGALA CORP
FLET	FLETCHER MYERS
FLPR	FLOW PRODUCTS INC
FOXS	FOX STEEL CO
FRED	FRED RICE PROD
FRON	FRONTIER DEVELOPMENT
FUSY	FUTURE SYSTEMS INC
GENE	GENERAL ELECTRIC
GEDE	GENERAL ENERGY DEVIC
GNSO	GENERAL SOLARGENIC
GSUN	GENERAL SUN
GNSS	GNS SOLARWALL
GRIP	GRIEP HEATING
GRUM	GRUMMAN ENERGY SYS
GULF	GULF THERMAL
HALS	HALSUN SOLAR ENG
HEFR	HEFRON SOLAR SYSTEMS
HLIO	HELIO THERMICS
HDYN	HELIODYNE
HELP	HELIOPHASE
HTRM	HELIOTHERM INC
HECL	HEX CELL
HYPE	HYPERION INC
ILSE	ILSE ENGINEERING INC
ITEC	INTERTECHNOLOGY
IENV	INTL ENVIRONMENT
ISOL	INTL SOLARTHERMICS
JACK	JACKSON
KALW	KALWALL
KENN	KENNECOTT COPPER
KENW	KENWALL CORPORATION
KTAC	KTA CORP
LARG	LARGO SOLAR SYS INC
LENX	LENNOX-HONEYWELL
LOFC	LIBBY OWENS FORD CO
MIRO	MIROMIT
NENG	NATIONAL ENERGY CORP
NESC	NATIONAL ENERGY SYST
NSOL	NATIONAL SOLAR CORP
NUTS	NATURAL ENERGY CORP
NENW	NATURAL ENERGY WKSHP
NORT	NORTHRUP
NRGL	NRG LTD
NRGM	NRG MANUFACTURING
NPTD	NTL PATENT DEVELOP

Data Element Names: SYSMFGR-A, SYSMFGR-G (Continued)
Interactive Files Where Used: GRANT, MASTER, MIS

OCON	OCON INDUSTRIES INC
OLIN	OLIN BRASS
OVER	OVERLY MANUFACTURING
OWEN	OWENS ILLINOIS
PARK	PARK ENERGY
PAYN	PAYNE AIR CONDITION
PION	PIONEER ENERGY PROD.
PIPR	PIPER HYDRO INC
PLIN	PLEIAD INDUSTRIES
PPGI	PPG INDUSTRIES
PPIE	PPG/INT ENVIR
PRSH	PRACTICAL SOLAR HEAT
RMPR	R M PRODUCTS
RALS	RALEIGH SOLAR SYSTEM
RAYP	RAYPAK
REFR	REFRIGERATION RESERC
REPC	RESEARCH PRODUCTS
REVE	REVERE
REYN	REYNOLDS
RICK	RICKER MANUFACTURING
ROCK	ROCKY MOUNTAIN PROD
ROMA	ROM-AIRE
SATL	SCIENTIFIC-ATLANTA
SEBN	SEECO BINKLEY
SMSP	SEMCO SOLAR PRODUCTS
SHAL	SHALLA CORP
SHEL	SHELDAHL
SITE	SITE BUILT
SKYT	SKYTHERM
SOFA	SOLAFERN LTD
SOHT	SOLAHART
SLAP	SOLAPAK
SACC	SOLAR ACCESS INC
SLCN	SOLAR CENTRAL
SCOM	SOLAR COMFORT INC
SDVL	SOLAR DEVELOPMENT
SDEV	SOLAR DEVICES
SELI	SOLAR ELECTRIC INTL
SENC	SOLAR ENERGY CORP
SENI	SOLAR ENERGY INC
SEPR	SOLAR ENERGY PROD
SERC	SOLAR ENERGY RESEARCH
SEST	SOLAR ENERGY STRUCT
SEEQ	SOLAR ENERGY & EQUIP
SNGY	SOLAR ENERGYTICS INC
SENG	SOLAR ENGINEERING

Data Element Names: SYSMFGR-A, SYSMFGR-G (Continued)
Interactive Files Where Used: GRANT, MASTER, MIS

SENT	SOLAR ENTERPRISES
SFRM	SOLAR FARMS
SLHC	SOLAR HEAT CORP
SLHT	SOLAR HEAT INC
SHST	SOLAR HEATING SYST
SHOM	SOLAR HOMES INC
SHSG	SOLAR HOUSING INC
SLHY	SOLAR HYDRO INC
SINC	SOLAR INC
SIOF	SOLAR IND OF FLORIDA
SINN	SOLAR INNOVATIONS
SLKN	SOLAR KINETICS CORP
SKIN	SOLAR KING
SMFG	SOLAR MANUFACTURING
SOLI	SOLAR ONE
SPAS	SOLAR PACKAGE STRUCT
SPST	SOLAR PROD SUN TANK
SORE	SOLAR RESEARCH
SLRM	SOLAR ROOM CO
SSEV	SOLAR SEVEN IND
SSHL	SOLAR SHELTER
SSTR	SOLAR STOR
SUNS	SOLAR SUN
SSVA	SOLAR SYST OF VA
SSSD	SOLAR SYST SUNDANCE
SSEN	SOLAR SYSTEM ENTERP.
SSII	SOLAR SYSTEMS INT
SOTH	SOLAR THERM
SOUL	SOLAR UNLIMITED INC
SOLA	SOLARA
SRAY	SOLARAY
SCEL	SOLARCELL
SCOA	SOLARCOA INC
SLIN	SOLAREIN
SGEN	SOLARGENICS
SRIS	SOLARIS
SLMR	SOLARMASTER
SMAT	SOLARMATIC
SROL	SOLAROLL
SRON	SOLARON
SOTC	SOLARTEC
SOTR	SOLARTRONICS INC
SAIR	SOLAR-AIRE
SLRA	SOLA-RAY
SOLC	SOLCAN
SRGY	SOLERGY INC

Data Element Names: SYSMFGR-A, SYSMFGR-C (Continued)
Interactive Files Where Used: GRANT, MASTER, NIS

SLOP	SOLOP CORP
SOLP	SOLPOWER INDUSTRIES
SOLW	SOLWIN INDUSTRIES
SWET	SOUTH WEST ENER-TECH
SPEC	SPECTRA ENERGY SYS
SRWI	SRW INC
SSSI	SS SOLAR INC
SSPA	SSP ASSOC
SSCO	STANDARD SOLAR COLL
STIN	STATE INDUSTRIES
STOR	STORAGE ONLY
SCFT	SUN CRAFT
SUDS	SUN DESIGN
SNFL	SUN FLOW
SHAR	SUN HARVESTER CORP
SUPC	SUN PAC
SUPO	SUN POWER CORP
SPIN	SUN POWER INDUSTRIES
SPSY	SUN POWER SYSTEMS
SURE	SUN RAY SOLAR EQUIP
SSYS	SUN SYSTEMS INC
SNBL	SUNBLAZER SOLAR FURN
SBUR	SUNBURST
SNLL	SUNCELL
SEAR	SUNEARTH
SPOW	SUNENERGY POWER LTD
SUFO	SUNFLOWER SOLAR INC
SLPO	SUNLIGHT & POWER CO
SUMA	SUNMASTER CORP.
SNSV	SUNSAV INC
SNSR	SUNSAVER
SNUT	SUNSHINE UTILITY CO
SSTN	SUNSTONE
SNST	SUNSTREAM
SNTP	SUNTAP INC
SUNW	SUNWALL INC
SWAT	SUNWATER
SWOR	SUNWORKS
SUHE	SUN-HEET
TREK	TECHNITREK CORP
TESO	TELLURIDE SOLAR WORK
TECH	THERMAL TECH
TOMS	THOMASON
TRAN	TRANTER
TRSI	TRITEC SOLAR INDUSTR
UNCO	UNION CO CORRECTIONL

Data Element Names: SYSMFGR-A, SYSMFGR-C (Continued)
Interactive Files Where Used: GRANT, MASTER, MIS

USSC	UNITED STATES SOLAR
UNSP	UNSPECIFIED
USIN	US INSTALLATIONS
VEST	VALMONT ENERGY SYSTE
WEAT	WEATHER KING
WEST	WESTERN ENERGY INC
WSDI	WESTERN SOLAR DEVEL
WHIT	WHITE LINE INC
WILX	WILCOX MFG & DISTR
WILC	WILSON CORPORATION
WYSO	WYOMING SOLAR
YING	YING MANUFACTURING
ZIEN	ZIEN
ZORK	ZOMEWORKS
ZZZZ	ZZZZZZ - END OF LIST

APPENDIX C
CODES/VALUES FOR CERTAIN DATA ELEMENTS (Continued)

Data Element Name: ZONPROB
Interactive Files Where Used: MASTER, MIS (61. 72)

A NO PROBLEM
B DOES NOT CONFORM SOLAR CAUSE
C DOES NOT CONFORM NON SOLAR CAUSE
D "SUN RIGHTS"
F PERMIT NOT REQ. RETROFIT
G PERMIT NOT REQ.
H ADD'L BLDG. MODS REQ.
I PREVIOUSLY ZONED
Z MORE INFO. IN FILES

APPENDIX D

MIRADS COMPUTER SESSIONS

Introduction

Appendix D contains actual MIRADS computer sessions. Each example shows how MIRADS commands, discussed in chapters 3 and 4 of the text, are used in the context of actual MIRADS queries. Data elements from the MIS (Management Information Summary) File were used in these examples.

Examples 1 through 13 are discussed in chapter 3 and examples 14 through 17 are discussed in chapter 4 of the text. Page numbers in the right margin of each example reference the page of text that discusses the variation of the MIRADS command being illustrated in the example.

Each computer session was produced directly at a 300 baud, Anderson Jacobson AJ832 terminal using an interchangeable "daisy" print wheel and a carbon ribbon.

APPENDIX D

MIRADS COMPUTER SESSIONS

Example 1.* Simple QUERY Command (14)

```
READY
>Q ENDSALEPRICE P
READY
>P PJNO ENDSALEPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED     505 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 5

Q ENDSALEPRICE P
P PJNO ENDSALEPRICE

PJNO   ENDSALEPRICE

21501      102000
21502       72000
21504           0
21505       78500
21507       76000
```

This is a warning message only and can be ignored. One of the data elements queried was not designated as "indexed" and therefore a sequential search through the file for matches is necessary.

*Refer to Example 14, " Processing a Query and Saving a Query Set ", for computer sign-on procedure.

Example 2. QUERY Command with Alpha Qualifier (16)

```
READY
>Q PJCITY EQ BALTIMORE
READY
>P PJNO PJCITY
READY
>RUN
QUERY NOW PROCESSING
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       2 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q PJCITY EQ BALTIMORE
P PJNO PJCITY

PJNO        PJCITY

23098  BALTIMORE
24043  BALTIMORE
```

Example 3. QUERY Command With Numeric Qualifier (16)

```
READY
>Q COLSQFT-G GE 10000
READY
>P PJNO COLSQFT-G
READY
>RUN
QUERY NOW PROCESSING
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       3 RECORDS
ENTER OUTPUT REPORT SITE ID
>
Q COLSQFT-G GE 10000
P PJNO COLSQFT-G

PJNO   COLSQFT-G

22041    11270
24115    10206
28106    10080
```

Example 4. QUERY Command Using Data Element Qualifier (16)

```
READY
>Q CFIN-YM = *MTGAPP-YM AND GT 0
READY
>P PJNO CFIN-YM MTGAPP-YM
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      14 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 4
Q CFIN-YM = *MTGAPP-YM AND GT 0
P PJNO CFIN-YM MTGAPP-YM

PJNO   CFIN-YM  MTGAPP-YM

21511   7508      7508
21548   7606      7606
22001   7704      7704
22003   7005      7005
```

Example 5. QUERY Command Using `AND` Connector (17)

```
READY
>Q PJSTATE EQ VA AND COLSQFT-G GT 500 AND LT 10000
READY
>P PJNO PJSTATE COLSQFT-G
READY
>RUN
QUERY NOW PROCESSING
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       6 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q PJSTATE EQ VA AND COLSQFT-G GT 500 AND LT 10000
P PJNO PJSTATE COLSQFT-G

PJNO   PJSTATE  COLSQFT-G

21510    VA         640
23133    VA        2743
24034    VA        5713
24153    VA         674
28182    VA         826
28230    VA         508
```

Example 6. Descending SORT Command (18)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>S ENDSALEPRICE D
READY
>P PJNO CONST-YM ENDSALEPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      24 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 10

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
S ENDSALEPRICE D
P PJNO CONST-YM ENDSALEPRICE

PJNO   CONST-YM  ENDSALEPRICE

23087    7908       119900
24153    8001       106703
24040    8002       105000
24032    7904        92185
24143    7905        89400
24136    7906        78500
24196    7908        76000
24025    7908        71900
24192    7906        64500
23147    7905        59500
```

Example 7. Compound SORT Command (18)

```
READY
>Q PJSTATE EQ MD OR VA OR DC
READY
>S CYCLE A PJNO D
READY
>P CYCLE PJNO PJSTATE
READY
>RUN
QUERY NOW PROCESSING
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      39 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 18

Q PJSTATE EQ MD OR VA OR DC
S CYCLE A PJNO D
P CYCLE PJNO PJSTATE

CYCLE  PJNO   PJSTATE

 P1    28231    VA
 P1    28230    VA
 P1    28227    VA
 P1    28205    VA
 P1    28182    VA
 P1    28173    VA
 P1    28123    MD
 P1    28114    VA
 P1    28113    VA
 1     21536    VA
 1     21533    VA
 1     21510    VA
 2     22092    VA
 2     22085    DC
 2     22063    MD
 3     23137    MD
 3     23133    VA
 3     23098    MD
```

Example 8. COMPUTE Command Using 'NONE' Break-Field (18)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>C NONE $TOTPRICE = SUM ENDSALEPRICE.
READY
>P PJNO CONST-YM ENDSALEPRICE $TOTPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      21 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
C NONE $TOTPRICE = SUM ENDSALEPRICE.
P PJNO CONST-YM ENDSALEPRICE $TOTPRICE

PJNO   CONST-YM  ENDSALEPRICE         TOTPRICE

21530    7903        32000
22071    7905        51930
23008    7909        25900
23060    7907        26325
23071    7903        29600
23087    7908       119900
23098    7901        47646
23147    7905        59500
24006    7903        17133
24021    7903        20800
24025    7908        71900
24031    7902        22575
24032    7904        92185
24037    7905        24000
24122    7909        42000
24136    7906        78500
24137    7903        21600
24139    7906        46600
24148    7905        51900
24153    8001       106703
24196    7908        76000                  1064697
```

Example 9. COMPUTE Command Using `ALL` Break-Field (19)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>C ALL $AVGESTCOS = SYSCOSTEST/GRSYS.
READY
>S CYCLE
READY
>P CYCLE PJNO CONST-YM SYSCOSTEST GRSYS $AVGESTCOS
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      24 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 15
Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
C ALL $AVGESTCOS = SYSCOSTEST/GRSYS.
S CYCLE
P CYCLE PJNO CONST-YM SYSCOSTEST GRSYS $AVGESTCOS
```

CYCLE	PJNO	CONST-YM	SYSCOSTEST	#SS	AVGESTCOS
1	21530	7903	12210	3	4070
2	22071	7905	7500	5	1500
3	23008	7909	18198	8	2275
3	23060	7907	38000	5	7600
3	23071	7903	6422	2	3211
3	23087	7908	169453	2	84727
3	23098	7901	95810	15	6387
3	23147	7905	89859	6	14977
4	24006	7903	35496	4	8874
4	24021	7903	8874	1	8874
4	24025	7908	11746	1	11746
4	24031	7902	4241	1	4241
4	24032	7904	27106	2	13553
4	24037	7905	8874	1	8874
4	24040	8002	14875	1	14875

NOTE: The `All` Break-Field element has no real value when using the SUM or COUNT options since the subtotal or COUNT would be reported and reinitialized for each record processed.

Example 10. COMPUTE Command Using Name Break-Field (19)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>C CYCLE $TOTPRICE = SUM ENDSALEPRICE.
READY
>S CYCLE
READY
>P CYCLE PJNO CONST-YM ENDSALEPRICE $TOTPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      24 RECORDS
ENTER OUTPUT REPORT SITE ID
>PRINT 15

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
C CYCLE $TOTPRICE = SUM ENDSALEPRICE.
S CYCLE
P CYCLE PJNO CONST-YM ENDSALEPRICE $TOTPRICE

CYCLE  PJNO   CONST-YM  ENDSALEPRICE        TOTPRICE

 1     21530    7903        32000              32000
 2     22071    7905        51930              51930
 3     23008    7909        25900
 3     23060    7907        26325
 3     23071    7903        29600
 3     23087    7908       119900
 3     23098    7901        47646
 3     23147    7905        59500             308871
 4     24006    7903        17133
 4     24021    7903        20800
 4     24025    7908        71900
 4     24031    7902        22575
 4     24032    7904        92185
 4     24037    7905        24000
 4     24040    8002       105000             353593
```

Example 11. COMPUTE Command Using Algebraic Expression (20)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE GT 0
READY
>C NONE $TOTPRICE = SUM ENDSALEPRICE.
READY
>C NONE $CNTPRICE = COUNT ENDSALEPRICE.
READY
>C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
READY
>P $CNTPRICE $TOTPRICE $AVGPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      24 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
C NONE $TOTPRICE = SUM ENDSALEPRICE.
C NONE $CNTPRICE = COUNT ENDSALEPRICE.
C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
P $CNTPRICE $TOTPRICE $AVGPRICE

      CNTPRICE              TOTPRICE              AVGPRICE

            24                1323597                 55150
```

Example 12. PRINT Command Using Numeric Output Limit (21)

```
READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>P 10 PJSTATE PJNO CONST-YM ENDSALEPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      10 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
P 10 PJSTATE PJNO CONST-YM ENDSALEPRICE

PJSTATE  PJNO   CONST-YM  ENDSALEPRICE

  CA     21530    7903        32000
  NC     22071    7905        51930
  CO     23008    7909        25900
  WI     23060    7907        26325
  NY     23071    7903        29600
  IL     23087    7908       119900
  MD     23098    7901        47646
  NE     23147    7905        59500
  OK     24006    7903        17133
  OK     24021    7903        20800
```

Example 13. PRINT Command Using 'SUM' Output Limit (21)

```
 READY
>Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
READY
>C CYCLE $CNTPRICE = COUNT ENDSALEPRICE.
READY
>C CYCLE $TOTPRICE = SUM ENDSALEPRICE.
READY
>S CYCLE
READY
>P SUM CYCLE $CNTPRICE $TOTPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED      24 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND ENDSALEPRICE > 0
C CYCLE $CNTPRICE = COUNT ENDSALEPRICE.
C CYCLE $TOTPRICE = SUM ENDSALEPRICE.
S CYCLE
P SUM CYCLE $CNTPRICE $TOTPRICE

CYCLE          CNTPRICE                TOTPRICE

 1                      1                   32000
 2                      1                   51930
 3                      6                  308871
 4                      7                  353593
 4A                     9                  577203
```

NOTE: The 'SUM' option in the PRINT command above is used in conjunction with the COMPUTE commands calculating $CNTPRICE and $TOTPRICE. This option will suppress the printing of all records except the record at a time when a new-variable is to be printed ($CNTPRICE or $TOTPRICE). Both $CNTPRICE and $TOTPRICE were computed on the 'Name' break-field, CYCLE, therefore they were computed for each CYCLE only.

Example 14. Processing a Query and Saving a Query Set (25)

```
PLEASE ENTER HOST ID(I/B)>

OMNUS PORT 46.  PARITY (E/O/N)? >
ENTER USERID/PASSWORD:
>@@@@@@@@@@@@@@@@
*DESTROY USERID/PASSWORD ENTRY
*UNIVAC 1100 OPERATING SYSTEM  VER. 33R3A       (RSI)*

                                        NOTE:  The valid userid/
                                               password has been
                                               obscured to maintain
RUN NUMBER  83                                 privacy.

LAST RUN AT: 060480 140801
DATE: 060480      TIME: 141606
>@MIRADS,NB
ENTER QUALIFIER*FILENAME
>SOLAR*MIS
READY
>Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
READY
>SAVEC PRICERANGE
READY
>S ENDSALEPRICE D
READY
>C NONE $TOTPRICE = SUM ENDSALEPRICE.
READY
>C NONE $CNTPRICE = COUNT ENDSALEPRICE.
READY
>C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
READY
> P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE $AVGPRICE
READY
>SAVE AVGPRICE
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       8 RECORDS
ENTER OUTPUT REPORT SITE ID
>
```

Example 14 (continued).

```
Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
S ENDSALEPRICE D
C NONE $TOTPRICE = SUM ENDSALEPRICE.
C NONE $CNTPRICE = COUNT ENDSALEPRICE.
C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE $AVGPRICE
```

PJNO	CONST-YM	ENDSALEPRICE	TOTPRICE	CNTPRICE	AVGPRICE
23087	7908	119900			
24032	7904	92185			
24136	7906	78500			
24196	7908	76000			
24025	7908	71900			
23147	7905	59500			
22071	7905	51930			
24148	7905	51900	601815	8	75227

APPENDIX D

MIRADS COMPUTER SESSIONS (Continued)

Example 15. Editing and Processing a Saved Query Set (26)

```
READY
>DISPLAY AVGPRICE
Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
S ENDSALEPRICE D
C NONE $TOTPRICE = SUM ENDSALEPRICE.
C NONE $CNTPRICE = COUNT ENDSALEPRICE.
C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE $AVGPRICE
READY
>EDIT AVGPRICE
ENTER EDIT COMMAND
>T
000:
>N
Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
001:
>C /50000/70000/
Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 70000
001:
>EXIT
READY
>DO AVGPRICE
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       5 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 70000
S ENDSALEPRICE D
C NONE $TOTPRICE = SUM ENDSALEPRICE.
C NONE $CNTPRICE = COUNT ENDSALEPRICE.
C NONE $AVGPRICE = $TOTPRICE/$CNTPRICE.
P PJNO CONST-YM ENDSALEPRICE $TOTPRICE $CNTPRICE $AVGPRICE

PJNO   CONST-YM  ENDSALEPRICE        TOTPRICE            CNTPRICE
      AVGPRICE

23087    7908       119900
24032    7904        92185
24136    7906        78500
24196    7908        76000
24025    7908        71900                  438485           5
             87697
```

Example 16. Adding a Saved Fragment (31)

```
READY
>ADD PRICERANGE
READY
>S ENDSALEPRICE D
READY
>P PJNO PJSTATE ENDSALEPRICE CONST-YM
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       8 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
S ENDSALEPRICE D
P PJNO PJSTATE ENDSALEPRICE CONST-YM

PJNO   PJSTATE  ENDSALEPRICE  CONST-YM

23087    IL        119900       7908
24032    CT         92185       7904
24136    MN         78500       7906
24196    IN         76000       7908
24025    MA         71900       7908
23147    NE         59500       7905
22071    NC         51930       7905
24148    GA         51900       7905
```

Example 17. Adding To a Saved Fragment (31)

```
READY
>ADD PRICERANGE
READY
>AND LE 95000
READY
>S ENDSALEPRICE D
READY
>P PJNO PJSTATE ENDSALEPRICE CONST-YM
READY
>RUN
QUERY NOW PROCESSING
WARNING - QUERY FORCES SEQUENTIAL SEARCH
 FILE CONTAINS     678 RECORDS
QUERY SELECTED       9 RECORDS
ENTER OUTPUT REPORT SITE ID
>

Q CONST-YM GE 7901 AND LE 7912 AND ENDSALEPRICE > 50000
AND LE 95000
S ENDSALEPRICE D
P PJNO PJSTATE ENDSALEPRICE CONST-YM

PJNO   PJSTATE  ENDSALEPRICE  CONST-YM

24032    CT         92185       7904
24143    IL         89400       7905
24136    MN         78500       7906
24196    IN         76000       7908
24025    MA         71900       7908
24192    AR         64500       7906
23147    NE         59500       7905
22071    NC         51930       7905
24148    GA         51900       7905
```

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[ ] Document describes a computer program; SF-185, FIPS Software Summary, is attached.

16. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

The Residential Solar Data Center Project staff in the Center for Building Technology, National Bureau of Standards, maintains a computerized data base containing non-instrumented residential data from the DoE/HUD Solar Heating and Cooling Demonstration Program. Data contained in the solar data base are accessible online to users of the NBS Center Computer via remote terminals with a data base retrieval software package called MIRADS (Marshall Information Retrieval and Display System). This document is a self-teaching user's guide to the solar data base. It is complete with the basic MIRADS language rules, examples of use, and a step-by-step walk-through of a typical interactive session. Appendices contain all the data element names and coded values needed to use the solar data with MIRADS, as well as many examples of actual computer sessions.

17. KEY WORDS *(six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)*

Automatic data processing; computer retrieval; data base retrieval; residential buildings; solar data base; solar energy system; solar heating and cooling.

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