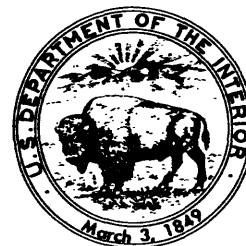A COMPUTERIZED DATA-BASE SYSTEM FOR LAND-USE AND LAND-COVER

DATA COLLECTED AT GROUND-WATER SAMPLING SITES IN THE PILOT

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

by Jonathon C. Scott

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UNITED STATES GEOLOGICAL SURVEY

Dallas L. Peck, Director

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CONVERSION FACTORS

For the use of readers who prefer to use International System (SI) units, rather than inch-pound terms used in this report, the following conversion factors may be used.

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
acre	4,047.	square meter (m^2)
acre	0.4047	hectare

Convert temperature in degrees Fahrenheit ($^{\circ}$F) to temperature in degrees Celsius ($^{\circ}$C) as follows.

$$^{\circ}C = 5/9 \times (^{\circ}F - 32)$$

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ABSTRACT

Data-base software has been developed for the management of land-use and land-cover data collected by the U.S. Geological Survey as part of a pilot program to test and refine concepts for a National Water-Quality Assessment Program. This report describes the purpose, use, and design of the land-use and land-cover data-base software.

The software provides capabilities for interactive storage and retrieval of land-use and land-cover data collected at ground-water sampling sites. Users of the software can add, update, and delete land-use and land-cover data. The software also provides capabilities to group, print, and summarize the data.

The land-use and land-cover data-base software supports multiple data-base systems so that data can be accessed by persons in different offices. Data-base systems are organized in a tiered structure. Each data-base system contains all the data stored in the data-base systems located in lower tiers of the structure. Data can be readily transmitted from lower tiers to higher tiers of the structure. Therefore, the data-base system at the highest tier of the structure contains land-use and land-cover data for the entire pilot program.

CHAPTER ONE
INTRODUCTION

In 1986, the U.S. Geological Survey began a pilot National Water-Quality Assessment (NAWQA) Program to study the quality of the Nation's ground-water and surface-water resources (Hirsch, Alley, and Wilber, 1988). The pilot NAWQA Program is organized into study units on the basis of known hydrologic systems (major river basins and aquifers or aquifer systems). The approaches used in the NAWQA projects are coordinated at a national level in several ways.

Two requirements of the coordination effort are (1) storage of project data in national data files, and (2) consistent records of ancillary information from project to project. One component of the ancillary information in the ground-water pilot projects includes land-use and land-cover data for every well where a water-quality sample is collected. The land use and land cover surrounding the sampled well are recorded on a paper field sheet used by all the ground-water NAWQA pilot projects.

PURPOSE

This report describes a computerized data-base system for the storage and retrieval of land-use and land-cover information recorded on field sheets by the ground-water NAWQA project personnel. The data-base software provides (1) easy data entry from the paper field sheets, (2) iterative retrieval of field sheets having features in common by means of conditional testing of data values, (3) printed facsimiles of the field sheets, and (4) record-keeping and maintenance of a hierarchical data-base structure to provide a national data base.

The U.S. Geological Survey is compiling land-use and land-cover data for the entire United States on maps of 1:100,000 or 1:250,000 scales. The data are obtained from remote sensing equipment on aircraft and satellites, earlier maps, and field surveys. The smallest area depicted on the new maps is ten acres (U.S. Geological Survey, 1987). These maps have been digitized and incorporated into a national computerized data base (Fegeas, 1984).

Land-use and land-cover maps have many uses, but do not provide detailed information about specific locations, or a good record of land-use changes. These data are needed for ground-water wells that are selected for water-quality sampling during the NAWQA Program. This report describes a computerized data-base system that is used to store this information.

OVERVIEW AND DEFINITIONS

Land-use and land-cover data collection begins with field observations made at wells. These observations are divided into six topics and are recorded on a paper field sheet (fig. 1 and 2).

DATE FIELD CHECK ___/ ___/ ___ PERSON CONDUCTING FIELD INSPECTION _____
WELL STATION ID _____ LATITUDE _____ LONGITUDE _____
LOCAL NUMBER _____ T ___ N/S R ___ E/W ___ _____ PROJECT ID _____

1. TOPOGRAPHIC SETTING OF WELL _____ (alluvial fan; playa;
   stream channel; local depression; dunes; flat surface; flood plain; hilltop; sinkhole; lake,
   swamp, or marsh; mangrove swamp; offshore (estuary); pediment; hillside (slope); alluvial or
   marine terrace; undulating; valley flat; upland draw - descriptions in Watstore Manual v. 2,
   chap. II, p. B-19)

2. LAND USE AND LAND COVER CLASSIFICATION - (modified from Anderson and others, 1976, p. 8)
   Check all land uses that occur within each approximate distance range from the sampled well.
   Identify the predominant land use within each distance range and estimate its percent of the
   total area (0-25, 26-50, 51-75, or 76-100%) within a 1/4 mile radius of the well.

Land use and land cover	<100 ft	100 ft to 1/4 mile	Comments
I. URBAN OR BUILT-UP LAND			
--Residential			
--Commercial			
--Industrial			
--Other urban land (specify)			
II. AGRICULTURAL LAND			
--Cropland			
-nonirrigated			
-irrigated			
--Pasture			
--Orchard, grove, vineyard, or nursery			
--Confined feeding operation			
--Other agricultural land (specify)			
III. RANGELAND			
IV. FOREST LAND			
V. WATER			
VI. WETLAND			
VII. BARREN LAND			

3. AGRICULTURAL PRACTICES - Describe agricultural practices within 1/4 mile of the sampled well.

   a. EXTENT OF IRRIGATION - Circle applicable statement.

      nonirrigated, supplemental irrigation in dry years only, irrigated

   b. METHOD OF IRRIGATION - Circle those that apply.

      spray, flood, furrow, drip, chemigation, other (specify) _____

   c. SOURCE OF IRRIGATION WATER - Circle those that apply.

      Ground water, surface water, spring, sewage effluent (primary, secondary, or tertiary
                                                                          treatment)

   d. PESTICIDE AND FERTILIZER APPLICATION - Provide information about present and past
      pesticides and fertilizers used, application rates, and application methods.

   e. CROP AND ANIMAL TYPES - Provide information about present and past crop and animal types,
      and crop rotation practices.

Figure 1.--Land-use and land-cover field sheet, page 1.

4. LOCAL FEATURES - Check all local features that may affect ground-water quality which occur within each approximate distance range from the sampled well.

Feature	<100 ft	100 ft to 1/4 mile	Comments
Gas station			
Dry cleaner			
Chemical plant or storage facility			
Airport			
Military base			
Road			
Pipeline or fuel storage facility			
Septic field			
Waste disposal pond			
Landfill			
Golf course			
Stream, river, or creek (perennial/ephemeral)			
Irrigation canal (lined/unlined)			
Drainage ditch (lined/unlined)			
Lake (natural/man-made)			
Reservoir (lined/unlined)			
Bay or estuary			
Spring (geothermal (>25°C)/ nongeothermal)			
Salt flat or playa (dry/wet)			
Mine, quarry, or gravel pit (commodity mined, active/abandoned)			
Oil well			
Major withdrawal well			
Waste injection well			
Recharge injection well			
Other			

5. LAND-USE CHANGES - Have there been major changes in the last 10 years in land use within 1/4 mile of the sampled well? Yes__ Probably__ Probably not__ No__ If yes, describe major changes.

6. ADDITIONAL COMMENTS - Emphasize factors that might influence local ground-water quality.

Figure 2.--Land-use and land-cover field sheet, page 2.

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The computer programs (referred to in this report as the "data-base software") are used with a video-display terminal (referred to as the "terminal") with a 24-line by 80-column display. The collection of computerized field sheets stored using the data-base software on a computer system are referred to as a "data base". The combination of both (data and software) are referred to as a "data-base system".

Nearly all operations performed with the land-use and land-cover data-base software are "interactive". Interactive computer systems use two-way communication between the user in the form of entries on the terminal keyboard, and the software in the form of displays on the terminal screen.

The interactive operations are controlled by typing a number on the terminal keyboard that corresponds to one of a list of possible operations displayed on the terminal screen. Software controlled in this manner is referred to as "menu-driven" software. The list of possible operations displayed on the screen is called a "menu". The first menu displayed is called the "main menu".

Selection of an operation on a menu causes the software to perform the desired operation, or causes the software to display another menu that lists additional options concerning the selected operation. Some operations logically follow other operations. Thus, there is a logical sequence to the possible operations. Within the software, operations that are in the same position of the sequence are grouped together on a menu. Menus available in the land-use and land-cover data-base software are described in chapter 2 of this report. The sequence of menus in the land-use and land-cover data-base software is shown in figure 3. Some options selected from the primary grouping-options menu cause additional menus to be displayed that are not shown in figure 3.

The data-base system uses file-management software that can provide access to only one user at any given time. This may be inconvenient to project personnel, if it is necessary to have more than one person using the data-base system simultaneously. Therefore, the data-base software can support multiple data-base systems, for simultaneous use by more than one person.

One of the specifications of the pilot NAWQA Program requires that data be stored in national files. National NAWQA coordinating personnel will maintain a national data-base system for land-use and land-cover data collected by all NAWQA projects.

These multiple data-base systems are organized into a logical hierarchy (fig. 4). Different levels of the hierarchy are referred to in this report as tiers. A data-base system at the bottom level of the hierarchy is in tier one. A data-base system in tier one is used for data entry and retrieval by a project member. The national data-base system at the top level of the hierarchy is in tier three. Data-base systems at any intermediate level of the hierarchy are in the second tier. Data-base systems in the second tier can be used to store and retrieve data for an entire project, or other convenient aggregation of data bases.

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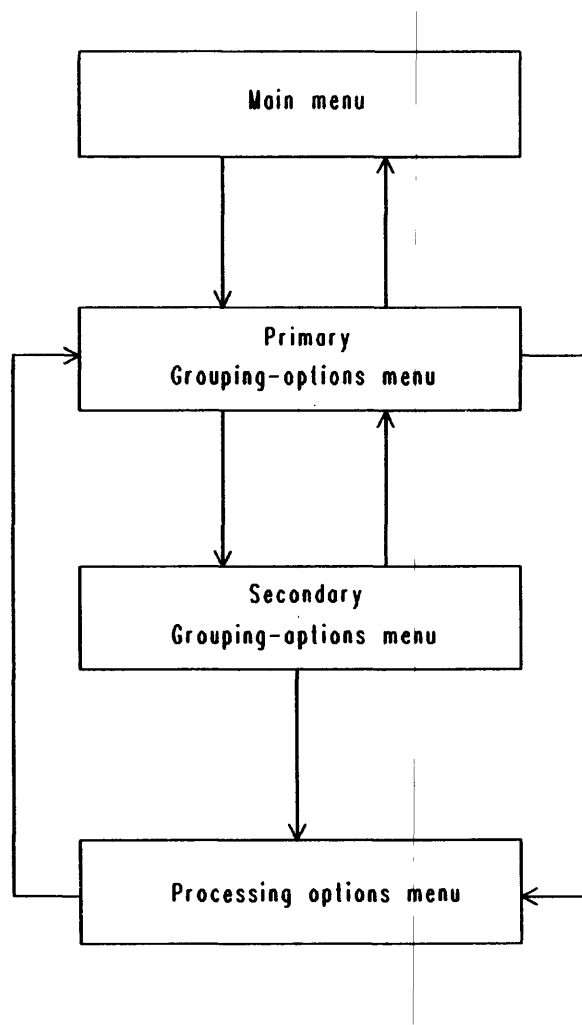
Figure 3.—Sequence of menus.
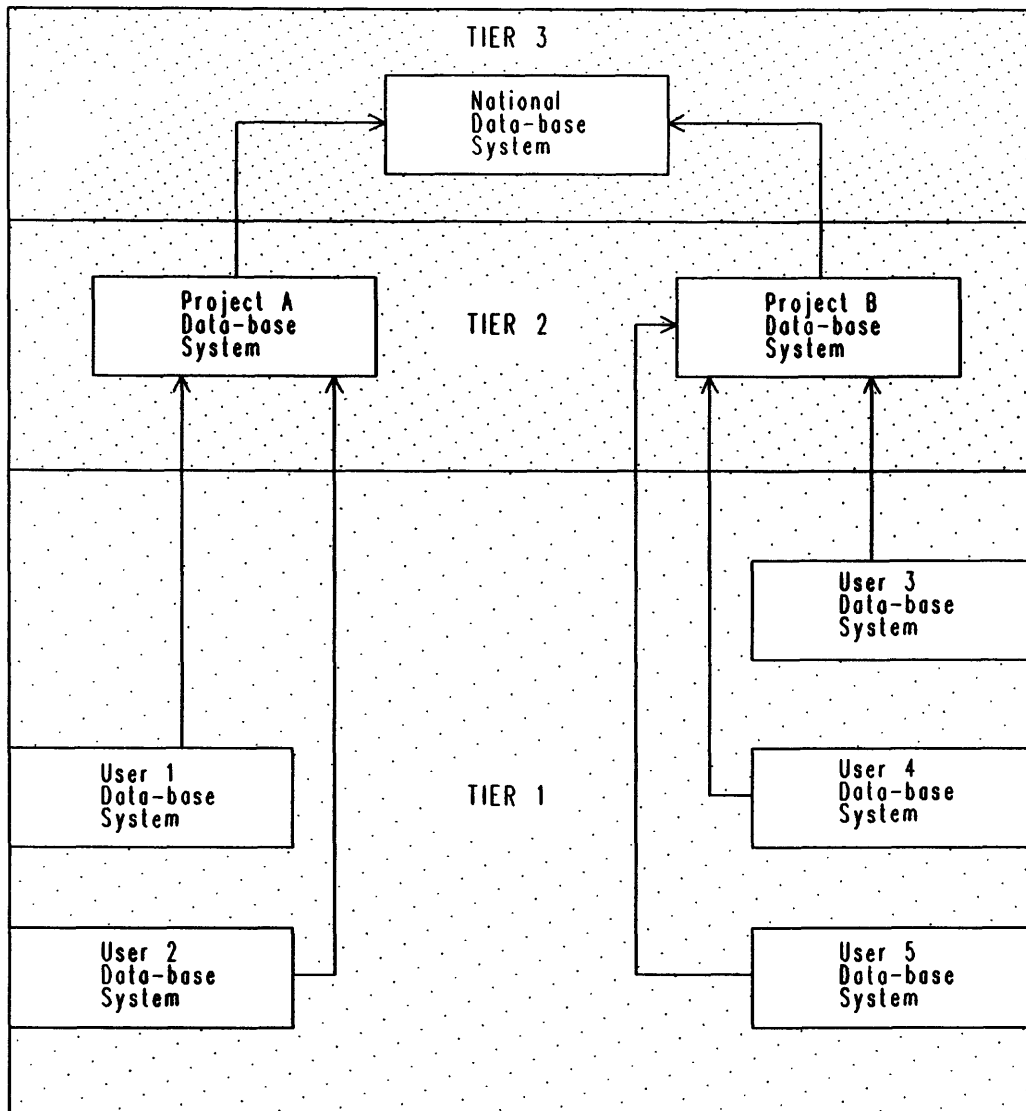
Figure 4.—Hierarchy of data-base systems.

The capability of transferring information from one data-base system to another data-base system has been incorporated into the design of the software. Data stored in any data-base system can be transmitted for storage and processing at a data-base system located in a higher tier. There is no provision for transfers of data downward through the hierarchy nor across to data-base systems located in the same tier.

HARDWARE AND SOFTWARE REQUIREMENTS

The land-use and land-cover data-base system was developed on a Prime minicomputer 1/ using the Primos operating system, revision 21. The interaction between the user of the data-base system and the data-base software is handled by a computer program written in the Command Procedure Language (CPL) (Landy, 1982), which is available only for the Primos operating system. Most of the data files were constructed with revision 9.42 of the INFO proprietary file-management software (Henco Software, Inc., 1983). Use of the data-base system as written requires a license for the INFO file-management software. Most of the computer programs that manipulate these data files were written using a programming language that is a part of the INFO software.

The computer programs that format and read transactions for updating the hierarchical data bases are written in Fortran 77 (Johnson, 1983) and utilize some subroutines in the ARC/INFO subroutine library, revision 4.0.1 (Lupien, 1988). Field-sheet data are transferred between data-base systems using the File Transfer Service, revision 5.1 (Venne and Fulchino, 1985). One ancillary computer program for determining user-identification utilizes a subroutine in the Primos operating system (Spencer, 1986).

The land-use and land-cover data-base system is dependent on the hardware and software currently used by the U.S. Geological Survey. Modifications are necessary to use the land-use and land-cover data-base system with a different configuration of hardware and software. A description of the data files and the computer programs that comprise the data-base system is provided in chapter 3 of this report.

1/ Use of brand, firm, and trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

CHAPTER TWO
SYSTEM USE

INTERACTIVE STORAGE AND RETRIEVAL

The user initiates a session with the data-base system by issuing the following command to the computer-operating system.

R LULC

After the command is entered, the main menu of the data-base software is displayed (fig. 5) and interactive processing of data begins.

Interactive operations can be divided into three classes: Menu operations, input-form operations, and ancillary data-entry operations. The nature of these three classes of operations is described in the subsequent paragraphs.

Menu Operations

The menus displayed by the data-base software have several common features. The first line displayed is the name given to the menu. Next, a table is displayed that lists numeric codes and descriptions of the associated operations (options). The last option displayed on every menu is "Exit from data-base software" which always corresponds to code number 99. In order to stop processing land-use and land-cover data, the number 99 is entered. Every menu, except the main menu, also displays an option to return to the previous menu, which always corresponds to code number 98. This option exits from the current menu, and displays the menu located one level higher in the sequence of menus (fig. 3). The last line displayed on every menu is a message prompting the user to enter the code that corresponds to the desired option.

Every menu in the land-use and land-cover data-base software also has an option with the numeric code -1, although it is never displayed on the terminal screen. Selection of this option allows the user to give commands directly to the INFO file-management software. This option is provided for users who need to perform a special retrieval of land-use and land-cover data. There are several guidelines that should be followed when this option is selected.

(1) The user should be proficient in the use of INFO commands. The option is not displayed on any menu in order to keep an uninformed but inquisitive user from accidentally selecting this option.

(2) Data should not be added, modified, or deleted while the user is operating with INFO commands. The data-base software maintains information about modified and deleted data for updating data-base systems in higher tiers. If data are changed with INFO commands, the data-base software cannot send the necessary information to the data-base system in the next higher tier. Thus, differences could occur between the data stored in different tiers of the hierarchy.

```
Land-use and land-cover data base main menu

Code    Option
----    ------------------------------------------------
  1     Enter new field sheets from terminal
  2     Select and process field sheets from data base

 99     Exit from data-base software

Enter code for the option desired:  _
```

Figure 5.--Main menu.

(3) When the user has finished using INFO commands with the data base, the INFO commands "QUIT" and "STOP" should be entered. These commands cause the software to stop and return the user to the computer-operating system.

Input-form Operations

The data-base software uses fill-in-the-blank data-entry screens known as "input forms" to add and modify land-use and land-cover information. The input forms consist of one or more screen displays used for entering data from the field sheets. There are several input forms in the data-base software, all of which have several common features. A facsimile of part of the land-use and land-cover field sheet is displayed on the screen. When the cursor is positioned next to the text describing the data to be entered, the user may perform one of several actions.

(1) The user can enter the requested data and press the carriage return key on the terminal keyboard. If the data are acceptable, the cursor moves to the next position on the terminal screen where data are needed. If the data are not acceptable, an error message is displayed at the bottom of the screen, and the cursor is positioned for re-entering the data. All textual data should be entered with upper-case letters.

(2) The user can press the carriage return key on the terminal keyboard without entering any data. If the user is entering new data and an entry for the data is not required, the cursor moves to the next field. If an entry is required, a message is printed at the bottom of the screen and the cursor is positioned for entry of the required data. WARNING: <u>If the user is updating existing data and the carriage return key is pressed without entering new data, the existing data are deleted before the cursor moves to the next field</u>.

(3) When entering new data, the user can skip entering non-mandatory data by pressing the tab key on the terminal keyboard (equivalent to pressing the carriage return key). When updating existing data and the tab key is pressed without entering new data, the existing data are retained and the cursor moves to the next field.

(4) A backslash character ("\") typed in the first column where data are entered, causes the cursor to move backward for re-entry of the previous data on the input form. The data stored by the data-base software are not modified where the backslash is typed, although a backslash character appears on the screen. There is a situation where the backslash character does not move the cursor, and this exception is described in the section, "Initial data entry."

(5) When either the "A" key or the "B" key is pressed at the same time as the control key (referred to in this report as "control-A" and "control-B"), the data-base software stops processing the input form. Any data previously entered for the field sheet being processed with the input form are discarded. A message indicating that processing has been interrupted

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is displayed at the bottom of the terminal screen, then the menu that began input-form processing is displayed.

Ancillary Data-entry Operations

Selection of some menu options requires that the user provide ancillary data. For example, when retrieving data for a range of latitudes, the user needs to specify the minimum and maximum latitudes desired. A message is written to the terminal screen describing the ancillary data that are needed. The software waits for the data to be entered, followed by a carriage return. None of the five features of input forms described previously may be used when entering ancillary data. The ancillary data requirements of various menu options are described later in this chapter.

Initial data entry

Data not previously entered into the data base can be entered by selecting the first main-menu option, "Enter new field sheets from terminal". The first page of the input form for data entry is displayed on the screen (fig. 6), and the cursor is positioned after the words "DATE FIELD CHECK". The date of the visit to the site is entered using the following format: the last two digits of the year, a hyphen ("-"), the number of the month, a hyphen, the day of the month, and then a carriage return. It is not necessary to enter leading zeros or spaces when entering the date. An entry for the date is required and the data-base software checks for a valid date. If an invalid date is entered, an error message is displayed at the bottom of the screen, and the cursor is repositioned after the words "DATE FIELD CHECK".

After an acceptable date is entered, the cursor is positioned after the words "PERSON CONDUCTING INSPECTION". The user should enter the name of the person who visited the site. The name cannot exceed ten characters, and entry of a name is required. If the user attempts to skip entering the name with the tab or carriage return key, an error message is displayed at the bottom of the screen and the cursor is positioned for re-entry of the name.

After a name has been entered, the cursor is positioned after "WELL STATION-ID". The user should enter the 15-digit site-identification number, which is the National Water Information System (NWIS) unique identifier for the data-collection site (L.W. Lenfest, written commun., 1989). The software does not check the validity of the site-identification number entered, but an entry is required.

After the site-identification number has been entered, the software performs one of the following actions:

(1) If data with the same site-identification number and date are in the data base, the following message is displayed at the bottom of the screen.

Field sheet already entered. Enter new station id and date? (Y/N):

```
LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 1, Topic 1

DATE FIELD CHECK yr-mo-dy    PERSON CONDUCTING INSPECTION _____
WELL STATION ID _____        LATITUDE _____ LONGITUDE _____
LOCAL NUMBER __  _      __    _ __ __ _    PROJECT ID _____

PREDOMINANT LAND USE:
    WITHIN 100 FEET OF WELL                    (Enter code):  __
    WITHIN 100 FEET TO 1/4 MILE OF WELL        (Enter code):  __
    PERCENTAGE OF AREA WITHIN 1/4 MILE OF WELL (Enter percent): ___

                        Codes for land uses


    1A = Residental      2A = Non-irrigated cropland   3 = RANGELAND
    1B = Commercial      2B = Irrigated cropland        4 = FOREST LAND
    1C = Industrial      2C = Pasture                   5 = WATER
    1D = Other urban land 2D = Orchard, grove,          6 = WETLAND
                              vineyard, or nursery      7 = BARREN LAND
                         2E = Confined feeding
                         2F = Other agricultural land
```

Figure 6.--Land-use and land-cover field sheet input-form screen 1.

If the letter "Y" is entered, the screen clears and the cursor is positioned for re-entry of the date. If any other letter is entered, processing is stopped and the main menu is displayed. This prevents duplicate enteries of a field sheet in the data base.

Updating of field sheets stored in the data base is performed using options described later in this chapter, in the section Grouping and processing.

(2) If data with the same site-identification number and a different date than was entered on the input form are in the data base, the following two messages are displayed at the bottom of the screen.

Copying data from previous site visit...please wait
Previous site-visit data copied.....................

The field-sheet data that were entered for the previous site visit are displayed on the screen, with the new date of visit and person visiting the site. The user can update the data by using methods described in the section "Entry of data for previously visited sites".

(3) If no data with the same site-identification number are in the data base, the following message is displayed at the bottom of the screen.

New site

The user can then enter data as the cursor moves to each new position.

If either of the last two actions are taken by the software, the cursor is positioned to the right of the word "LATITUDE". After the software has determined that the data are for another visit to a previously visited site or for a new site, the backslash character cannot be used to backup a field and alter the values entered for DATE FIELD CHECK, PERSON CONDUCTING INSPECTION, or WELL STATION-ID. Prior to this determination, the backslash character can be used for altering the contents of these fields.

If one of these three fields were entered erroneously before the entire field sheet has been entered, the processing of the input form can be interrupted by entering control-A or control-B. If erroneous data have been entered after completing the input form for the entire field sheet, the field sheet can either be deleted or updated as described later in this chapter in the section Grouping and processing.

The process for entering the remaining data on the land-use and land-cover field sheet depends upon whether the information is for a new site or for an existing site in the data base. The data-entry process for each case is similar, but differs in some important respects. Therefore, the process for entering data for a new site is described first in this report, followed by the process for entering data for an existing site.

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Entry of Data for New Sites

The latitude of the data collection site should be entered in degrees, minutes, and seconds. The digits should be joined together without intervening spaces or characters between degrees and minutes, or minutes and seconds. It is not necessary to enter zeroes before the degrees. However, it is important to enter two digits for minutes and seconds. If the value for minutes or seconds to be entered is less than 10, prefix the value with a zero, to make two digits. For example, if the latitude to be entered is 36 degrees, 45 minutes, 4 seconds, the value should be entered as 364504. The software does not check the validity of the latitude entered.

After the latitude has been entered, the cursor is positioned to the right of the word "LONGITUDE". The longitude should be entered in the same manner as the latitude. The software does not check the validity of the longitude entered.

The next data to be entered are the public-land survey coordinates (fig. 7). The software requires each part of the public-land survey coordinates to be entered separately, followed by carriage return. Each part of the coordinates is validated, before the cursor moves on to the next portion of the public-land survey coordinates. Some areas of the country do not have a public-land survey coordinate system. Project personnel in these areas may enter a carriage return for each portion of the public-land survey coordinates.

After the longitude has been entered, the cursor moves to the right of the letters "LOCAL NUMBER". The first part of the public-land survey coordinates to be entered is the number of townships north or south of the local base line. The software checks if a numeral has been entered. If the project chief desires values less then 10 be prefixed by a zero, it is necessary to enter the numbers in this manner. The next part of the coordinates to be entered is either the letter "N" or the letter "S", indicating whether the township is north or south of the local base line. The software checks if the letter is "N" or "S". Next, the number of ranges east or west of the local meridian is entered, followed by the either the letter "E" or "W", in the same manner as the township was entered. The fifth part of the coordinates is the section number; the software checks to determine that the number is between 1 and 36, inclusive. Next, the quarter-section part of the coordinates is entered as a group of three characters. The software checks that the quarter-section section part of the coordinates consists of only the letters "A", "B", "C", "D", or a blank character. Finally, the cursor is positioned for entry of a sequence number used to distinguish multiple sites with the same public-land survey coordinates.

The project id is not entered by the user during entry of a new field sheet. The value for the project id is automatically set by the software.

The next entry on the paper field sheet (fig. 1) is the topographic setting of the site. The land-use and land-cover data-base system does not store topographic setting, rather these data are stored in the NWIS (W.M. Alley, written commun., 1989).

The standard method for describing the location of a data-collection site by fractional section, section, township, and range, usually referred to as the legal description, is replaced in this report by a local number, illustrated in the diagram below. By the legal method, the location of the site indicated by the dot would be described as NE1/4 SW1/4 NW1/4, sec. 15, T. 01 N., R. 05 E. The method used in this report changes the order and indicates quarter sub-divisions of the sections by letters. A sequence number is added to provide a unique local number for each site. By this method, the location of the site is given as 01N-05E-15 BCA 1.
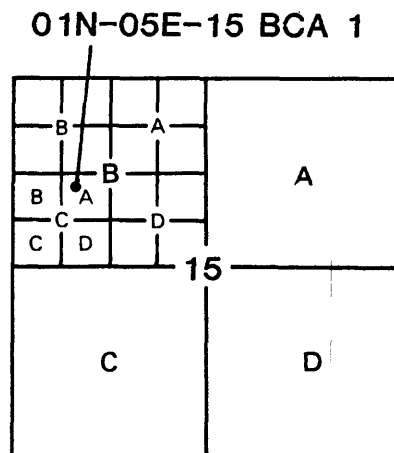
Figure 7.--Example of the public-land survey coordinate system.

Next, the user enters data for three items pertaining to the predominant land use around the sampled well. The cursor is positioned to the right of the words "WITHIN 100 FEET OF WELL (Enter code)". A table of valid codes (modified from Anderson and others, 1976) is displayed on the bottom half of the screen. After a code is entered, the cursor moves to the right of the words "WITHIN 100 FEET TO 1/4 MILE OF WELL (Enter code)" for entry of another code from the table. The software checks that a code from the table is entered for each of these items.

The last entry on the first input-form screen occurs with the cursor positioned to the right of the words "PERCENTAGE OF AREA WITHIN 1/4 MILE OF WELL (Enter percent)". A number between 1 and 100 should be entered which is the percentage of area within one-fourth of a mile of the well, that has the land use previously entered as the predominant land use within one-fourth of a mile.

The second screen of the input form (fig. 8) corresponds to the second topic on the first page of the land-use and land-cover field sheet (fig. 1). On this screen, a table is displayed with four columns, similar to the table presented on the field sheet. Land uses and covers are listed in first column of the table. The user has the option to describe "Other urban" and "Other agricultural" land-use categories in the first column. The second column is used to mark the existence of a specified land use or cover within 100 feet of the sampled well. The third column is used to mark the existence of a specified land use or cover within 100 feet to one-fourth of a mile of the sampled well. The final column is used for comments. The cursor moves to each column in a row before proceeding to the next row.

The software does not check any of the responses provided by the user in this table. Any data may be entered, however, it is recommended that the entries for marking the existence of a specific land use or land cover within a given distance range consistently use the same character, such as the letter "X".

In most cases, the user will not be placing an entry on every line of the table. Therefore, the software has been written so the user can skip to the next screen by entering the letter "Q" in the comments column. Entering "Q" causes the software to skip the remaining entries on the screen, clear the screen, and proceed to the third topic on the the field sheet.

Care should be taken when entering comments in the fourth column of the table. The input form provides space for 41 characters of comments. If more than 41 characters are entered, the software clears the screen, and displays the third screen of the input form.

When the entries for the second topic from the field sheet are completed, the software displays the third screen of the input form (fig. 9). The third topic of the field sheet pertains to agricultural practices within one-fourth of a mile of the sampled well, and is divided into five questions. Answers to all of the questions for the third topic are non-mandatory.

```
 ┌─────────────────────────────────────────────────────────────────────────┐
 │                                                                           │
 │      LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 1, Topic 2       │
 │                                                                           │
 │ Land use and land cover|within|100 ft|                                    │
 │                        |100 ft|1/4 mi|              Comments              │
 │   I. URBAN LAND         |      |      |                                   │
 │    --Residential        |  _   |  _   | _____  │
 │    --Commercial         |  _   |  _   | _____  │
 │    --Industrial         |  _   |  _   | _____  │
 │    --Other _____     |  _   |  _   | _____  │
 │  II. AGRICULTURAL LAND  |      |      |                                   │
 │    --Cropland           |      |      |                                   │
 │     -nonirrigated       |  _   |  _   | _____  │
 │     -irrigated          |  _   |  _   | _____  │
 │    --Pasture            |  _   |  _   | _____  │
 │    --Orchard, grove,    |      |      |                                   │
 │        vineyard, nursery|  _   |  _   | _____  │
 │    --Confined feeding   |  _   |  _   | _____  │
 │    --Other _____     |  _   |  _   | _____  │
 │ III.RANGELAND           |  _   |  _   | _____  │
 │  IV. FOREST LAND        |  _   |  _   | _____  │
 │   V. WATER              |  _   |  _   | _____  │
 │  VI. WETLAND            |  _   |  _   | _____  │
 │ VII.BARREN LAND         |  _   |  _   | _____  │
 │                                                                           │
 └─────────────────────────────────────────────────────────────────────────┘
```

Figure 8.--Land-use and land-cover field sheet input-form screen 2.

```
LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 1, Topic 3

3. AGRICULTURAL PRACTICES within 1/4 mile of the sampled well.

   a. EXTENT OF IRRIGATION - mark applicable statement(s).
      _ nonirrigated,  _ supplemental irrigation in dry years only,  _ irrigated

   b. METHOD OF IRRIGATION - mark those that apply.
      _ spray, _ flood, _ furrow, _ drip, _ chemigation, _ other _____

   c. SOURCE OF IRRIGATION WATER - mark those that apply.
      _ ground water, _ surface water, _ spring, _ sewage effluent,
      _ primary treatment, _ secondary treatment, _ tertiary treatment

   d. PESTICIDE AND FERTILIZER APPLICATION - Describe past and present chemicals
      used, application rates, and application methods.
      _____
      _____

   e. CROP AND ANIMAL TYPES - Describe past and present crop and animal types
      and crop rotation practices.
      _____
      _____
```

Figure 9.--Land-use and land-cover field sheet input-form screen 3.

For the first question on the third screen, "EXTENT OF IRRIGATION", the user can mark any combination of the three responses. The cursor is positioned to the left of each choice and the user may enter a single character, such as the letter "X", to indicate that the choice is applicable to the sampled well.

The second question, "METHOD OF IRRIGATION", has six possible responses. As with the first question, any combination of choices may be marked by the user. If the user indicates, "other", whatever character typed is replaced with the letter "X" by the software, then the cursor is positioned to the right of the word "other", for entry of text (up to ten characters) describing the irrigation method. After the descriptive text is entered, or if the user does not mark "other", the cursor moves to the third question.

The third question, "SOURCE OF IRRIGATION WATER", provides the user the option of marking any combination of four responses. If the user marks "sewage effluent", whatever character typed is replaced with the letter "X" by the software, then the cursor moves to the next line which provides three possible responses to describe the type of treatment. The user may mark any combination of primary, secondary, or tertiary treatment. After the type of sewage treatment has been described, or if the user has not marked "sewage effluent", the cursor moves to the fourth question.

The fourth question asks the user to describe "PESTICIDE AND FERTILIZER APPLICATION" practices. The input form provides two lines for entering text. If information is typed by the user on the first line, the cursor moves to the second line. After the second line has been entered, or if the user does not type a response on the first line, the cursor moves to the fifth question.

The fifth question asks the user to describe "CROP AND ANIMAL TYPES". The input form provides two lines for entering text. If information is entered on the first line, the cursor moves to the second line. After the second line has been entered, or if the user does not type a response on the first line, the fourth screen of the input form is displayed.

The fourth and fifth screens of the input form (fig. 10 and 11) correspond to the fourth topic of the field sheet, "LOCAL FEATURES" (fig. 2). The fourth topic presents a table with four columns, similar to the second topic of the field sheet. The first column of the table lists local features that may be present near the sampled well. Space is provided for qualifying some of the local features listed in the first column. An example of such a local feature is "Stream, river, or creek". When the cursor reaches this line in the table, the user may mark the feature as perennial, ephemeral, or both by entering a single character (such as the letter "X") next to the applicable word(s).

The last line of the table, at the bottom of the fifth screen of the input form, provides the user with the capability to indicate a local feature that is not specifically named in the first column. When the line labelled "Other" is reached, the cursor is positioned to the right of the word "Other" and the user is given the opportunity to enter a short description of the local feature (up to 15 characters).

```
+--------------------------------------------------------------------------------+
|                                                                                |
|        LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 2, Topic 4          |
|                                                                                |
|                          |within|100 ft|                                      |
|   Feature                |100 ft|1/4 mi|            Comments                   |
|   Gas station            |  _   |  _   |  _____|
|   Dry cleaner            |  _   |  _   |  _____|
|   Chemical plant or      |      |      |                                       |
|     storage facility     |  _   |  _   |  _____|
|   Airport                |  _   |  _   |  _____|
|   Military base          |  _   |  _   |  _____|
|   Road                   |  _   |  _   |  _____|
|   Pipeline or fuel       |      |      |                                       |
|     storage facility     |  _   |  _   |  _____|
|   Septic field           |  _   |  _   |  _____|
|   Waste disposal pond     |  _   |  _   |  _____|
|   Landfill               |  _   |  _   |  _____|
|   Golf course            |  _   |  _   |  _____|
|   Stream, river, or      |      |      |                                       |
|     creek  _ Perennial   |      |      |                                       |
|            _ Ephemeral   |  _   |  _   |  _____|
|   Irrigation canal       |      |      |                                       |
|   _ Lined _ Unlined      |  _   |  _   |  _____|
|                                                                                |
+--------------------------------------------------------------------------------+
```

Figure 10.--Land-use and land-cover field sheet input-form screen 4.

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```
LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 2, Topic 4 continued

                          |within|100 ft|
Feature                   |100 ft|1/4 mi|              Comments
Drainage ditch            |      |      |
_ Lined   _ Unlined       |  _   |  _   |  _____
Lake        _ Natural     |      |      |
            _ Man-made     |  _   |  _   |  _____
Reservoir _ Lined         |      |      |
            _ Unlined      |  _   |  _   |  _____
Bay or estuary            |  _   |  _   |  _____
Spring                    |      |      |
_ Geothermal (> 25 C)     |      |      |
_ Nongeothermal           |  _   |  _   |  _____
Salt flat or playa        |      |      |
_ Dry      _ Wet          |  _   |  _   |  _____
Mine, quarry, or pit      |      |      |
_ Active _ Abandoned      |  _   |  _   |  _____
Oil well                  |  _   |  _   |  _____
Major withdrawal well     |  _   |  _   |  _____
Waste injection well      |  _   |  _   |  _____
Recharge injection well   |  _   |  _   |  _____
Other _____    |  _   |  _   |  _____
```

Figure 11.--Land-use and land-cover field sheet input-form screen 5.

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The second column is used to mark the existence of a local feature within 100 feet of the sampled well. The third column is used to mark the existence of a local feature within 100 feet to one-fourth of a mile of the sampled well. The fourth column is used for entering comments. Often, data will not be entered for every line. To speed the data-entry process, the software responds to the entry of the letter "Q" in the fourth column by displaying the next screen of the input form. Care should be taken when entering comments in the fourth column. The input form provides space for entering 41 characters for comments. If more than 41 characters are entered, the software displays the next screen of the input form.

The sixth screen of the input form (fig. 12) corresponds to the fifth and sixth topics on the field sheet (fig. 2). The fifth topic pertains to "LAND-USE CHANGES". There are two parts to this topic. The first part is a question asking if there have been "major changes in the last 10 years in land use within one-fourth of a mile of the sampled well". The software checks that the user marks one of the four responses: "Yes", "Probably", "Probably not", or "No". Any character used to mark one of these answers is replaced with the letter "X" by the software. If "Yes" or "Probably" is marked, the cursor is positioned to the first of four lines for entry of a description of the major changes. An entry is mandatory. If the user attempts to skip the entry, an error message is displayed at the bottom of the screen, and the cursor is repositioned on the first line. After the description of the major changes has been entered, with one or more lines of text, the cursor is positioned for entry of data for the sixth topic. If either of the responses "Probably not" or "No" are marked for the question in the first part of the fifth topic, the software skips entry for the second part of the topic.

The sixth topic on the field sheet provides the user with six lines (74 characters per line) to describe "factors that might influence local ground-water quality". The software stops positioning the cursor for additional lines of text as soon as the user fails to make an entry on one of the lines. Entry of data for the sixth topic is optional.

The seventh and final screen of the input form (fig. 13) displays a message prompting the user to enter a data-disposition code. The user should type one of the letters "Q", "C", or "D". The first two responses cause the data entered for the current field sheet to be stored in the data base. If "D" is entered, the software does not store the data in the data base, and the data will be unavailable for future use with the software.

If "C" is entered, the software displays the first screen of the input form so that data for another field sheet can be entered. If either "Q" or "D" is entered, the software displays the main menu. If any other letter is entered, the software prints an error message and re-positions the cursor for entry of a data-disposition code.

Entry of Data for Previously Visited Sites

The process of entering data for previously visited sites is similar to the process of entering data for new sites. However, the software moves the

```
┌─────────────────────────────────────────────────────────────────────────┐
│                                                                           │
│      LAND-USE / LAND-COVER FIELD SHEET - GW NAWQA - Page 2, Topics 5 and 6 │
│                                                                           │
│   5. LAND-USE CHANGES - Have there been major changes in the last 10 years in land │
│      use within 1/4 mile of the sampled well?                             │
│                                                                           │
│      Yes _        Probably _        Probably not _        No _            │
│                                                                           │
│      If yes, describe major changes:                                      │
│      _____ │
│      _____ │
│      _____ │
│      _____ │
│                                                                           │
│                                                                           │
│   6. ADDITIONAL COMMENTS - Emphasize factors that might influence local   │
│      ground-water quality.                                                │
│      _____ │
│      _____ │
│      _____ │
│      _____ │
│      _____ │
│      _____ │
│      _____ │
│                                                                           │
│                                                                           │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 12.--Land-use and land-cover field sheet input-form screen 6.

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│  Entry complete for station id:  ..............    visit on:  ........ │
│                                                                       │
│  CODE       DATA DISPOSITION    ·                                     │
│                                                                       │
│   Q  =     Store data, exit data entry                               │
│   C  =     Store data, continue data entry                           │
│   D  =     Discard data, exit data entry                             │
│                                                                       │
│  Please select a data-disposition code:  _                           │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 13.--Land-use and land-cover field sheet input-form screen 7.

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cursor for entry of data that might have been skipped when processing a new site. The software moves the cursor for entry of every item on the input form, with the following two exceptions.

When the user reaches the fifth topic, "LAND-USE CHANGES", the input form displays the previously entered response to the question. If the user marks either "Yes" or "Probably", the software removes a mark from any other response and positions the cursor for entry or updating of the description of land-use changes. If the user marks either "Probably not" or "No", the software removes a mark from any other response, removes any description of the land-use changes, and positions the cursor for an entry on the sixth topic.

When processing data for a previously visited site, the user should be careful to use the tab key to skip over data that remained constant between the two visits. Using the carriage return key erases stored data from the computerized field sheet, as explained at the beginning of this chapter.

To skip the remaining entries on screens two, four, and five of the input form, the letter "Q" can be entered in the comments column. However, "Q" should not be entered on a line with comments from a previous site visit. Entry of a "Q" causes the previous comments to be erased before the next screen of the input form is displayed.

Grouping and Processing

To use field sheets stored in the data base, the user must first identify which field sheets are to be retrieved, and, second, specify what processing is to be performed with the data. The first step, identifying which data are to be retrieved, is called grouping. A group can consist of any subset of field sheets stored in the data base. The software provides several methods for grouping field sheets. These methods are described in the next section of this report. After the desired field sheets have been collected in a group, the user is ready to proceed to the second step, processing, described in a later section of this chapter. The second step uses only those field sheets in the group created in the first step.

Grouping

Grouping of field sheets in the data base is performed iteratively in order to collect the desired field sheets into the subset. On each iteration of the grouping process, field-sheet data can be added to or removed from the current group. There are two parts of the grouping process, and thus there are two grouping menus. The first menu presents options for selecting field sheets, and is called the primary grouping-options menu (fig. 14). The second menu, the secondary grouping-options menu (fig. 19), presents options for reducing, enlarging, or starting the processing of the field sheets in the current group.

```
Primary grouping-options menu

Code   Option
----   ------------------------------------------------------------------
  1    Process current group: ..... selected of ..... total field sheets
  2    Group by site-identification number
  3    Group by range of site-visit date
  4    Group by name of person visiting site
  5    Group by range of latitude
  6    Group by range of longitude
  7    Group by project number
  8    Group by predominant land use
  9    Group by occurrence of a land use
 10    Group by occurrence of a local feature
 11    Group by record status
 12    Group by source data-base-system name
 13    Save current group for later use
 14    Retrieve previously saved group

 98    Return to main menu
 99    Exit from data-base software

Enter code for the grouping option desired:  _
```

Figure 14.--Primary grouping-options menu.

Selection of option two from the main menu (fig. 5), "Select and process field sheets from data base", causes the software to display the primary grouping-options menu. Selection of options 2 through 14 from the primary grouping-options menu causes the software to display the secondary grouping-options menu after any ancillary data-entry tasks or additional menus have been processed. The user may continue to select options from the primary and secondary grouping menus in order to create the desired collection of field sheets to be processed.

Primary-grouping options

The primary grouping-options menu displays three types of options. The first type, selected by option one, causes the software to use the current group and display the processing options. The second type, selected by options 2 through 14, causes the software to modify the contents of the current group and display the secondary grouping-options menu. The third type of operation, selected by entering "98" or "99", causes the software to stop grouping.

Processing current group.-- Option one of the primary grouping-options menu allows the user to process the current group. When the primary grouping-options menu is displayed, the periods "....." shown in figure 14 are replaced by numbers. The first number displays the number of field sheets in the current group, and the second number displays the number of field sheets in the data base.

When the primary grouping-options menu is displayed for the first time during grouping, the number of field sheets in the current group equals the total number of field sheets stored in the data base. When the primary grouping-options menu is displayed on subsequent iterations, through use of the secondary grouping-options menu, the number of field sheets in the current group is affected by the previous grouping operations.

Grouping by site-identification number.-- All field sheets stored for a specific site (well station-id) can be retrieved by selecting primary-grouping option two. When this option is selected, a message is displayed prompting the user to enter a 15-digit site-identification number. After the site-identification number is entered, the secondary grouping-options menu is displayed.

Grouping by site-visit date.-- Field sheets for sites visited within a range of dates (date field check) can be retrieved by selecting primary-grouping option three. When this option is selected, a message is displayed prompting the user to enter the earliest and latest dates to be retrieved. Both dates are entered by typing the last two digits of the year, followed by a hyphen, the number of the month, followed by a hyphen, and the number of the day. It is not necessary to enter leading zeroes or spaces when entering dates. For example, enter January 5, 1989 as 89-1-5.

If the user enters a carriage return for the earliest date to be retrieved, the data-base software retrieves all field sheets prior or equal to the latest date. If the user enters a carriage return for the latest date, the data-base software sets the latest date to be retrieved to the current date.

The current date is retrieved by the INFO file-management software from the computer-operating system. The current date is set by the personnel that operate the computer system.

If an invalid calendar date is entered, the data-base software displays the message "INVALID DATE", and waits for an acceptable response. After the earliest and latest dates have been entered the secondary grouping-options menu is displayed.

Grouping by name of person visiting site.-- Option four of the primary grouping-options menu allows the user to group field sheets using the name of the person that visited a site. When this option is selected, a message is displayed prompting the user to enter a name or part of a name. The current group is modified to include those field sheets stored in the data base where any part of the name of the "PERSON CONDUCTING INSPECTION" matches the characters entered.

If data for "PERSON CONDUCTING INSPECTION" were entered using upper- and lower-case letters, it may be difficult to create the desired group using this option. For example, if the data base contains five field sheets with the following entries for "PERSON CONDUCTING INSPECTION"

Tom Morgan
T. MORGAN
MORGAN
TOM MORGAN
Morgan

and the user attempts to retrieve data for sites visited by Tom Morgan by entering the characters MORGAN, the group would include only the second, third, and fourth field sheets.

Grouping by range of latitude.-- The latitude of sampled sites can be used to modify the current group by using the fifth option of the primary grouping-options menu. When this option is selected, a message is displayed on the screen prompting the user to enter the minimum latitude degrees. The software next displays messages prompting the user to individually enter the minimum latitude minutes and the minimum latitude seconds. After these values have been entered, the software displays similar messages for the degrees, minutes, and seconds of the maximum latitude. Leading zeroes are not needed when entering these data.

The minimum and maximum latitudes restrict the grouping process to sites located in a band parallel to the equator. Field sheets for sites located within or on the edges of the band are included in the current group. After the grouping has been completed, the secondary groupingoptions menu is displayed.

Grouping by range of longitude.-- The user may adjust the current group using the longitude of sampled sites by selecting option six of the

primary-grouping options menu. The procedure is similar to grouping by range of latitude, except that the software displays messages prompting the user for longitude degrees, minutes, and seconds.

The minimum and maximum longitudes restrict the grouping process to sites located in a range of longitude lines measured from the prime meridian. Field sheets for sites located within or on the edges of the range are included in the current group. After the grouping has been completed, the secondary grouping-options menu is displayed.

Grouping by project number.-- One or more data bases in the hierarchy of data-base systems will contain data for more than one project. Primary-grouping option seven adjusts the current group using the project number (project id) stored with each field sheet. When this option is selected, a message is displayed prompting the user to enter all or part of a project number. After the current group has been adjusted, the secondary grouping-options menu is displayed.

Grouping by predominant land use.-- Each field sheet is stored with codes for the predominant land use within 100 feet and 100 feet to one-fourth of a mile of the sampled well. The user can adjust the current group using these data with primary-grouping option eight. When this option is selected, another menu (fig. 15) is displayed with a table of land-use and land-cover codes and a message prompting the user to enter a code.

Two additional codes are present in the table that are not present in the table displayed when field sheets are entered. These codes are 1 for "ANY URBAN" land use and 2 for "ANY AGRICULTURAL" land use. Use of these two codes allows the user to select field sheets that have been stored with any of the urban or agricultural land-use codes.

The user should enter a code from the table, or "98", or "99". If any other data are entered, the software displays an error message at the bottom of the screen and displays the menu again. After an acceptable code has been entered, the distance-range menu is displayed (fig. 16). The user should enter a code from the table, or "98", or "99". If the user does not enter one of these codes, an error message is displayed at the bottom of the screen and the menu is displayed again. After an acceptable code has been entered, the secondary grouping-options menu is displayed.

Grouping by occurrence of a land use.-- The second topic of the land-use and land-cover field sheet includes a table where the occurrence of land uses and land covers within two distances ranges can be marked. Option nine of the primary grouping-options menu adjusts the current group by including field sheets that are marked with a user-specified land-use and land-cover code within a user-specified distance range. When this option is selected, a table of land-use and land-cover codes is displayed. This table is similar to the table described for primary-grouping option eight (fig. 15), except the two additional codes 1 and 2 (as described in the previous section) and the corresponding land uses are not valid options and are not displayed on the screen.

```
Grouping by predominant land use

Code   Category              Code   Category                        Code   Category

1      ANY URBAN             2      ANY AGRICULTURAL                3      RANGELAND
1A     --Residential         2A     --Non-irrigated cropland        4      FOREST LAND
1B     --Commercial          2B     --Irrigated cropland            5      WATER
1C     --Industrial          2C     --Pasture                       6      WETLAND
1D     --Other urban land    2D     --Orchard, grove,               7      BARREN LAND
                                       vineyard, or nursery
                             2E     --Confined feeding
                             2F     --Other agricultural land

Enter one of the codes above:  __
```

Figure 15.--Land-use menu.

```
Grouping by predominant land use

Selecting distance range:

Code    Distance range
----    --------------
  1     Within 100 feet
  2      From  100 feet to 1/4 mile

Enter distance-range code:  _
```

Figure 16.--Distance-range menu.

The user should enter one of the listed codes, or "98", or "99". If a valid code is entered, the distance-range menu is displayed (fig. 16). The user should enter one of these codes, or "98", or "99". After a valid code has been entered, the secondary grouping-options menu is displayed.

Grouping by occurrence of a local feature.-- The fourth topic of the land-use and land-cover field sheet includes a table where the occurrence of local features within two distance ranges can be marked. Option ten of the primary grouping-options menu adjusts the current group by including field sheets that are marked with a user-specified local-feature code within a user-specified distance range. When this option is selected, a table of local-feature codes is displayed (fig. 17).

The user should enter one of the listed codes, or "98", or "99". After a valid code is entered, a menu of distance-range codes is displayed (fig. 16). The user should enter one of the listed codes, or "98", or "99". After a valid code is entered, the secondary grouping-options menu is displayed.

Grouping by record status.-- It may be desirable to review field sheets before forwarding them to the next data-base system in the hierarchy. At other times, it may be useful to review all field sheets that have already been forwarded. Either of these grouping operations can be performed by selecting option 11 from the primary grouping-options menu. When this option is selected, a menu for grouping by record status is displayed (fig. 18). When a valid code is entered, the secondary grouping-options menu is displayed.

Grouping by source data-base-system name.-- Each data-base system is given a unique name when it is installed on a computer system. When a field sheet is entered into a data base, the name of the local data-base system is stored automatically with the field sheet. Field sheets can be grouped using the name of the source data-base system by selecting primary-grouping option 12. When this option is selected, a message is displayed prompting the user to enter the name of the source data-base system. Field sheets stored with a source data-base-system name that matches the name entered are included in the current group, and the secondary grouping-options menu is displayed.

Saving the current group.-- There may be situations where it is desirable to keep a group stored for later use. When a group is stored, the software saves a file with record numbers identifying which field sheets are members of the group. A group is saved by selecting primary-grouping option 13. When this option is selected, the current group is saved, and the secondary grouping-options menu is displayed. Only one group can be stored in a data-base system. Storage of another group will over-write an existing group, making the first group unavailable for use.

A stored group can be retrieved any time after it has been saved. However, the loading of field sheets from a data-base system lower in the hierarchy will remove any group that has been stored, because the record numbers are changed.

Retrieving a previously saved group.-- Primary-grouping option 14 is used to retrieve the group created by option 13. When option 14 is selected, the

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```
Grouping by occurrence of a local feature

Code Local Feature          Code Local Feature          Code Local Feature

  1  Gas station             10  Landfill                 20  Mine, quarry, or
  2  Dry cleaner             11  Golf course                  gravel pit
  3  Chemical plant or       12  Stream, river, or        21  Oil well
     storage facility            creek                    22  Major withdrawal
  4  Airport                 13  Irrigation canal             well
  5  Military base           14  Drainage ditch           23  Waste injection
  6  Road                    15  Lake                         well
  7  Pipeline or fuel        16  Reservoir                24  Recharge injection
     storage facility        17  Bay or estuary               well
  8  Septic field            18  Spring                   25  Other
  9  Waste disposal pond     19  Salt flat or playa

Enter a local-feature code:  _
```

Figure 17.--Local-features menu.

```
Grouping by record status

Code    Grouping option
----    --------------------------------------------------------
  1     All field sheets not sent to higher-tier data base
  2     All field sheets previously sent to higher-tier data base

 98     Exit from menu
 99     Exit from data-base software

Enter code for the option desired:  _
```

Figure 18.--Record-status menu.

current group is set to the previously saved group and the secondary grouping-options menu is displayed.

Secondary-grouping options

After grouping has been performed using the primary grouping-options menu, the secondary grouping-options menu is displayed (fig. 19). On the third line of the screen, a message is displayed indicating how many field sheets are in the group and how many field sheets are in the data base. The current group can be used for processing, or the user may iteratively modify the current group by selecting an appropriate option from the secondary grouping-options menu.

Processing the current group.-- The current group of field sheets may be processed by selecting secondary-grouping option one. When this option is selected, the processing-options menu is displayed (fig. 20).

Reducing the current group.-- When the current group contains more field sheets than the user wants to process, secondary-grouping option two should be selected. When this option is selected, the primary grouping-options menu is displayed again. The option subsequently selected from the primary grouping-options menu will operate only on the current group. Therefore, the current group is adjusted by reducing, or keeping constant, the number of field sheets in the group. This process can be repeated as many times as necessary to retrieve the desired group.

Enlarging the current group.-- When the current group contains some, but not all of the field sheets that the user wants to process, secondary-grouping option three should be selected. When this option is chosen, the primary grouping-options menu is displayed again. The option subsequently selected from the primary grouping-options menu will operate on all field sheets stored in the data base. Therefore, the current group is adjusted by increasing, or keeping constant, the number of field sheets in the group. When the secondary grouping-options menu is displayed again, the software merges the group from the previous iteration of the primary grouping-options menu to create the current group. Duplicate copies of field sheets meeting the grouping criteria of both iterations are not kept. This process can be repeated as necessary to retrieve the desired group.

When data have been stored with upper- and lower-case letters and the user is grouping field sheets by the name of the person visiting the site, it may be necessary to perform several iterations using secondary-grouping option three. Previously, an example was presented of collecting field sheets for sites that were visiting by Tom Morgan. In the example, primary-grouping option four was selected and the characters "MORGAN" were entered to collect three field sheets into the current group. If the third secondary-grouping option was selected to enlarge the group, and the fourth primary-grouping option was selected again; the characters "organ" could be entered to add the remaining two field sheets to the current group.

```
Secondary Grouping-options menu

Group created:  ..... selected of ..... field sheets

Code    Option
----    ------------------------------------------
  1     Process current group
  2     Reduce  current group   (AND condition)
  3     Enlarge current group   (OR  condition)
  4     Exclude current group   (NOT condition)
  5     Include complete set
  6     Return to primary grouping-options menu

 98     Return to main menu
 99     Exit from data-base software

Enter code for the option desired: _
```

Figure 19.--Secondary grouping-options menu.

Excluding the current group.-- Sometimes it is simplest to collect all the field sheets that are not desired in a group, then redefine the group as all field sheets not members of the first group. Selection of option four from the secondary grouping-options menu causes the data-base software to redefine the group then display the primary grouping-options menu.

Including the complete set.-- If the user decides that the previous grouping operation has created a group that is incorrect, secondary-grouping option five should be selected. When option five is selected, all field sheets in the data base are included in the current group, and the primary grouping-options menu is displayed.

Returning to the primary grouping-options menu.-- Sometimes, the user will want to save the current group before ending a session with the data-base software or processing the current group. The primary grouping-options menu can be displayed, in order to save the current group, by selecting secondary-grouping option six.

Processing options

The processing-options menu is displayed as a result of selecting option one from either the primary or the secondary grouping-options menus. Processing options are shown in figure 20. Only those field sheets in the current group as processed, as defined by the grouping process.

Printing a report summarizing field sheets

Selection of processing option one causes preparation of a report that summarizes the field sheets in the current group. A sample of this report is shown in figure 21. The field sheets described in the report are sorted by project number, site-identification number, date, and record status. When option one is selected the screen clears, and messages are displayed describing the data processing that is occurring. When the report has been prepared, a question is displayed asking whether the the report should be printed. If the letter "Y" is entered in either upper- or lower-case, the report is printed. If any other character is entered, the report is not printed. After a response has been entered, the processing-options menu is displayed again.

When the user selects option 99 from any menu, after preparing a report, a question is displayed asking whether the report should be kept. If an affirmative response is entered, a message is displayed prompting the user to enter a file name for the report. If a file with the same name exists, it is overwritten. If more than one report has been created by selecting processing option one more than once in a session, all the reports are placed in the file in the order that the reports were created.

38

```
Processing-options menu

Code   Option
----   ------------------------------------------
  1    Print report summarizing field sheets
  2    Write file of site-identification numbers
  3    Print facsimiles of field sheets
  4    Update field sheets
  5    Delete field sheets

 98    Exit from menu
 99    Exit from data-base software

Enter code for the processing option desired:  _
```

Figure 20.--Processing-options menu.

SUMMARY OF LAND USE AND LAND COVER FIELD SHEETS

PROJECT	WELL STATION ID	LOCAL NUMBER	DATE OF VISIT	FIELD PERSON	PREDOMINANT LAND USE WITHIN 100 FEET	PROCESSING STATUS
4640-08200	3500550971254402	06N-01E-05 DDC 1	88-04-18	D.BERGMAN	RANGELAND	NEW
	3525190972222501	11N-02W-14 DDC 1	88-04-26	D. FERREE	—Other urban land	NEW
	3526222097103401	11N-01E-11 CBC 1	88-07-07	CHRISTENSON	—Residential	NEW
	3527050971754401	12N-01W-03 CCA 1	88-05-12	D. BERGMAN	—Pasture	NEW
	3527490971923011	11N-01W-05 AAB 1	88-04-26	D. BERGMAN	FOREST LAND	NEW
	3532270972511011	12N-02W-04 CBD 1	88-06-24	CHRISTENSON	—Residential	NEW
	3532440972255801	12N-02W-05 BDD 1	88-06-24	CHRISTENSON	—Residential	NEW

7 FORMS PROCESSED

4640-08200   7 FORMS PROCESSED

Figure 21.--Sample summary report.

Writing a file of site-identification numbers

Additional data for the sites described in the land-use and land-cover data base will be placed in the NWIS by the NAWQA pilot-project personnel. It is useful to create a file of site-identification numbers to retrieve these additional data from the NWIS. A file of site-identification numbers for the field sheets in the current group can be created by selecting processing option two. When this option is chosen, a question is displayed asking whether the "USGS" agency code should be included. When the letter "Y" is entered in either upper- or lower-case, the file is written with "USGS" in the first four columns and the site-identification numbers in columns 6 through 20. Otherwise, the file is written with the site-identification numbers in columns 1 through 15.

When the user selects option 99 from any menu, after writing a file of site-identification numbers, a message is displayed prompting the user to enter a file name for the site-identification numbers. If a file with the same name exists, it is overwritten. If more than one group of site-identification numbers has been written by selecting processing option two more than once in a session, all the site-identification numbers are placed in the file in the order that the groups were written.

Printing facsimiles of field sheets

Printed forms similar to the field sheets completed at the ground-water sampling sites can be created by selecting processing option three. When the facsimiles have been created, a question is displayed asking whether the facsimiles should be printed. If the letter "Y" is entered in either upper- or lower case, the facsimiles are printed. Sample facsimiles in figures 22 and 23 show data collected for the Central Oklahoma Aquifer, one of the three ground-water projects of the pilot NAWQA Program (Christenson and Parkhurst, 1987). A message is printed at the bottom of each page of the facsimile indicating whether the data for the field sheet have or have not been forwarded to a higher-tier data-base system.

When the user selects option 99 from any menu, after creating facsimiles of field sheets, a question is displayed asking whether the facsimiles should be kept. If an affirmative response is entered, a message is displayed prompting the user to enter a file name. If a file with the same name exists, it is overwritten. If more than one group of field-sheet facsimiles has been created by selecting processing option three more than once in a session, all the facsimiles are placed in the file in the order that the groups were written.

Updating field sheets

When errors have occurred during the entry of field sheets into the data base, the erroneous field sheets should be placed in the current group and processing option four should be selected. When this option is selected, a message is displayed that shows the number of field sheets in the current group

DATE FIELD CHECK 89- 4- 5   PERSON CONDUCTING FIELD INSPECTION: AHREA
WELL STATION-ID: 353223097320501   LATITUDE 353223   LONGITUDE 973205
LOCAL NUMBER: 12N-03W-05 DCA 1   PROJECT ID 464008200

LAND USE AND LAND COVER CLASSIFICATION

```
                          |within|100 ft|
Land use and land cover|100 ft|1/4 mi|               Comments
-----------------------+------+------+----------------------------------------
  I. URBAN LAND         |      |      |
   --Residential        |      |  X   |
   --Commercial         |      |  X   | OFFICE BLDGS   SHOPPING MALL 1/4 MI SE.
   --Industrial         |      |      |
   --Other PARK         |  X   |  X   | PARK FOLLOWS STREAM   GRAND BLVD.
 II. AGRICULTURAL LAND  |      |      |
   --Cropland           |      |      |
    -nonirrigated       |      |      |
    -irrigated          |      |      |
   --Pasture            |      |      |
   --Orchard, grove,    |      |      |
      vineyard, nursery |      |      |
   --Confined feeding   |      |      |
   --Other              |      |      |
III.RANGELAND           |      |      |
 IV. FOREST LAND        |      |      |
  V. WATER              |      |  X   | SMALL INTERMITTANT STREAM
 VI. WETLAND            |      |      |
VII.BARREN LAND         |      |      |
-----------------------+------+------+----------------------------------------
```

    PREDOMINANT LAND USE:
        WITHIN 100 FT: (1D) --Other urban land
        WITHIN 100 FT TO 1/4 MI: (1A) --Residential
        Percentage within 1/4 mile: 70

AGRICULTURAL PRACTICES

    a. EXTENT OF IRRIGATION:

    b. METHOD OF IRRIGATION:

    c. SOURCE OF IRRIGATION WATER:

    d. PESTICIDE AND FERTILIZER APPLICATION:

        MANY WELL-KEPT LAWNS AND GARDENS.

    e. CROP AND ANIMAL TYPES:

        PETS

    THIS FIELD SHEET HAS BEEN SENT TO THE NEXT DATA BASE

Figure 22.--Sample facsimile of page 1 of a field sheet.

LOCAL FEATURES

Feature	within 100 ft	100 ft 1/4 mi	Comments
Gas station		X	
Dry cleaner		X	
Chemical plant or storage facility			
Airport			
Military base			
Road		X	RES. STREETS AND NW 63RD ST, GRAND BLVD.
Pipeline or fuel storage facility			
Septic field			
Waste disposal pond			
Landfill			
Golf course			
Stream, river, or creek Perennial			
X Ephemeral	X		100-FT W., CONCRETE-LINED STREAM BED
Irrigation canal Lined Unlined			
Drainage ditch Lined Unlined			
Lake Natural			
Man-made			
Reservoir Lined			
Unlined			
Bay or estuary			
Spring Geothermal (> 25 C)			
Nongeothermal			
Salt flat or playa Dry Wet			
Mine, quarry, or pit Active Abandoned			
Oil well			
Major withdrawal well			
Waste injection well			
Recharge injection well			
Other METAL SHOP		X	PLATING SHOP AT 69TH AND WESTERN (EAST)

LAND-USE CHANGES - Have there been major changes in the last 10 years in land use
    within 1/4 mile of the sampled well? Probably not

ADDITIONAL COMMENTS - Emphasize factors that might influence local ground-water
    quality.

THIS FIELD SHEET HAS BEEN SENT TO THE NEXT DATA BASE

Figure 23.--Sample facsimile of page 2 of a field sheet.

and asks whether the user wants to update that number of field sheets. If the user does not enter the letter "Y", the updating is not performed and the processing-options menu is displayed again.

When the user proceeds with updating, input-form screens one through seven (figs. 6, 8-13) are displayed for each field sheet in the current group. The procedure for updating an erroneous field sheet is similar to entering data for a previously visited site, described previously in this chapter. The tab key is used to skip data that were entered correctly. When the cursor is positioned at data that are incorrect, the data should be re-entered. An upper-case "Q" entered in the comments column of screens two, four, and five of the input form causes the next screen to be displayed.

There are two differences between updating field sheets and entering data for previously visited sites. The first difference occurs when control-A or control-B is entered and updating of the current group of field sheets is stopped. The data-base software stores only the field sheets that have been processed from screens one through seven.

The second difference is the textual description of the options on screen seven of the input form. The description is different than shown in figure 13. If the letter "Q" is entered, the current and previous field sheets are updated, but the remaining field sheets in the current group are skipped and the processing-options menu is displayed. If the letter "C" is entered, the current and previous field sheets are updated, and the next field sheet is displayed on screen one of the input form for modification. If the letter "D" is entered, the updates for the current field sheet are not stored, the remaining field sheets in the current group are not updated, and the processing-options menu is displayed.

Deleting field sheets

Sometimes it is simpler to delete and re-enter data that have been entered erroneously than it is to update the incorrect data. Undesired field sheets should be placed in the current group and processing option five should be selected. When this option is chosen, a message is displayed prompting the user to enter a password. The correct password is installed in the data-base software at the same time that the software is installed. If the user enters an incorrect password, a message is displayed stating that the password was incorrect, and the processing-options menu is displayed.

If the correct password is entered, a question is displayed asking the user to verify that deletion of the current group of field sheets is really desired. If the user enters the letter "Y", the field sheets are deleted from the data base, a message is displayed indicating successful deletion, and the primary grouping-options menu is displayed. Any other response stops the deletion from occurring. A message is displayed indicating that the deletion did not occur and the processing-options menu is displayed.

TRANSFER OF DATA BETWEEN DATA-BASE SYSTEMS

It is necessary to transfer data periodically from data-base systems on the lower tiers of the hierarchy to data-base systems on the next higher tier of the hierarchy. There are two parts to this process: (1) Forwarding field-sheet data from the lower-tier data-base system, and (2) receiving field-sheet data by the higher-tier data-base system. Each part of the process is independent of the other part. A user of the lower-tier data-base system can forward data at any time. Although the data have been sent, for the changes to affect the contents of the higher-tier data base, a user of the higher-tier data-base system must perform an action to receive the data. The user of the higher-tier data-base system can perform this action at any convenient time.

Forwarding Data

As data from field sheets are entered, updated, and deleted in a data base, the software stores information for updating the next higher data-base system in the hierarchy when data are forwarded. Unlike the menu-driven, interactive portion of the software, the forwarding of data is performed by entering the following command.

R LULC -UNLOAD

This command performs all the necessary operations for sending data that are needed to update the higher-tier data base. Two files are created during the forwarding process in a directory named OUTBOX. The first is a file of updated data that is sent to the higher-tier data-base system, and the second is a log-file of the forwarding process. Neither the file of updated data nor the log-file is deleted after the forwarding process has completed. Disposition of these files is described in a subsequent section, Maintenance of data bases.

Receiving Data

The person responsible for a data-base system located in either the second or third tiers of the hierarchy should periodically process updates forwarded from data-base systems lower in the hierarchy. To process files of updates, the following command is typed.

R LULC -LOAD

Files forwarded from lower-tier data-base systems are placed in the INBOX directory. These files are processed with this command, which performs all the operations needed to update the data base. If no files of updates have been sent to the INBOX directory, the software stops. If more than one file has been sent, the software processes the files in the order that the files were created.

Maintenance of Data Bases

There are a few tasks that should to be performed periodically by the person responsible for each data-base system. The processes of forwarding and receiving data leave some files in the INBOX and the OUTBOX directories. Periodically these files should be reviewed and deleted if no longer needed.

When forwarding data, three files are created in the OUTBOX directory. One of the files is deleted by the software when the process completes normally. The deleted file is named CONTENTS and contains a description of the format of the forwarded data.

The second file is named by joining together the name of the computer system, the characters ".DATA.", the current date, a period, and the current time-of-day. This file contains update transactions sent to the next higher-tier data-base system. If for some reason a file with update data is not received and processed by the higher-tier data-base software, this file can be transferred to the INBOX directory of the higher-tier data-base system for processing. When the data-base administrator is confident that an update file has been successfully transferred and processed by the higher-tier data-base software, the file can be deleted from the OUTBOX directory of the lower-tier data-base system.

The third file in the OUTBOX directory contains a log of operations that occurred during forwarding. The file is named by joining together the characters "UNLOAD.", the current date, a period, the current time, and the characters ".COMO". This file should be reviewed and deleted after it is determined that the forwarding process has completed normally.

During the receiving process, all files that have been forwarded to the data-base system are processed and deleted by the data-base software. A log of operations that occur during the receiving process is written to a file named by joining together the characters "LOAD.", the current date, a period, the current time, and the characters ".COMO". The log file is not deleted by the software, and should be reviewed before it is deleted.

Users may want to compare two data bases to determine if the higher-tier data base has the same data stored for the field sheets stored in the lower-tier data base. To perform the comparison, a method for grouping the field sheets in the two data bases must be determined. When the higher-tier data base is the national data base, containing data for all projects, and the lower-tier data base contains all the data for a project; the necessary groups can be created using option seven (group by project number) of the primary grouping-options menu. When the higher-tier data base contains all field sheets for a project and the lower-tier data base is used for data entry, the grouping process can be performed using option 12 (group by source data-base-system name) of the primary grouping-options menu.

The following steps are used for comparing the contents of two databases.

(1) Ensure that all data in the lower-tier data-base system has been sent to the higher-tier data-base system. Changes made to the lower-tier data-base system should be forwarded to the higher-tier data-base system and processed, as described in the previous section of this report.

(2) Create INFO files of the data to be compared on each data-base system.

    (A) For the higher-tier data-base system, create a group of the field sheets that have been received from the lower-tier data-base system. Normally, the group can be created using primary-grouping option 7 or 12. When the secondary grouping-options menu is displayed, enter "-1", then enter the following INFO commands. (Entries made by the user are shown in bold letters).

```
ENTER COMMAND >SAVE BINARY-FORMS INIT
FILE CREATED
ENTER COMMAND >SELECT FORMS-UPDATE.DF
       0 RECORD(S) SELECTED
ENTER COMMAND >GET BINARY-FORMS COPY
    __ RECORD(S) SELECTED
ENTER COMMAND >CALC RECORD# = $RECNO
ENTER COMMAND >SORT SITEID, DATE
ENTER COMMAND >Q STOP
```

    (B) For the lower-tier data-base system, there is no need to create a group of field sheets since all field sheets have been sent to the higher-tier data-base system. When the primary grouping-options menu is displayed, enter "-1", then the INFO commands shown above.

(3) Create sequential files of the data from each data base on both data-base systems. Enter the following commands and data for each data-base system.

```
OK, ARC
Arc: R IULINF
Submitting command to Operating System ...
Directory of INFO data base is  *
INFO username is  LUL
INFO data filename is  FORMS-UPDATE.DF
Field-definition file is  COMPARE.DEF
    __ items defined
    __ bytes / record
Data file is  HIGHER-TIER
Arc: Q
```

(4) If the data-base systems are on two different computer systems, one of the files containing the data is transferred to the other computer system using

the Primos FTR command. In the above example, the data file was named HIGHER-TIER.

(5) When both data files are on the same computer system, the Primos command CMPF (Calvillo, 1985) is used to compare the two files. A sample CMPF command is shown below.

CMPF LOWER-TIER HIGHER-TIER -REPORT DIFF

The sample command compares the data in the two files named LOWER-TIER and HIGHER-TIER and creates a file named DIFF, describing the differences between the two files.

(6) If both data bases contain the same data, no differences will be found. When no differences are found, the only additional actions necessary are described in step 8.

Efforts should be made to determine why two data bases do not have the same information. There are several reasons why differences may be found.

   (A) The field sheets stored in the lower-tier data base may have been modified with INFO commands instead of using the data-base software, causing the software not to forward the altered data.

   (B) One or more update files may not have been processed successfully by the higher-tier data-base software.

   (C) The field sheets may have been modified in the higher-tier data-base system using processing-menu option four, after field sheets were forwarded and received.

   (D) The groups created for each of the two data-base systems may not have been contained the same field sheets.

(7) Corrective actions for updating a higher-tier data base in two possible scenarios are described below.

   (A) If it is determined that field-sheet data in a lower-tier data base contain correct information, but this information is not correct in a higher-tier data base; it is not difficult to rectify the situation. The affected field sheets in the lower-tier data base are placed in a group. The option "-1" is used so the following INFO command can be entered.

MOVE 'X' TO UPDATE-FLAG

   (B) If any field sheets in the higher-tier data base should have been deleted, and are missing from the lower-tier data base, these field sheets can be deleted from the higher-tier data base using the menu options described previously in this chapter.

(8) After a data-base comparison has been performed, the data created during the
    comparison operation should be removed.

    (A) All copies of the files used for the comparison, and the file describing
    the differences should be deleted. In this example, these files were
    named: LOWER-TIER, HIGHER-TIER, and DIFF.

    (B) Data should be removed from the INFO file named FORMS-UPDATE.DF.   NOTE:
    the INFO file should not be deleted. The following INFO commands will
    remove the data from the file.

```
ENTER COMMAND >SELECT FORMS-UPDATE.DF
    __ RECORD(S) SELECTED
ENTER COMMAND >PURGE
THIS COMMAND WILL DELETE SELECTED RECORDS. OK?>Y
        0 RECORD(S) SELECTED
ENTER COMMAND >Q STOP
```

CHAPTER THREE
DATA-BASE SYSTEM DESIGN

DATA FILES

Most of the information processed by the software is stored in data files created for use with the INFO file-management software. Therefore, these files are referred to as INFO files. The INFO files are stored by the computer system using binary code.

Several other files are created, used, and deleted by the software. The reasons for creating these temporary files depend on the operation being performed by the software. The subsequent paragraphs briefly describe the names of the temporary files and the operations that create them.

During many operations in the software, it is necessary to move data from one INFO file to another. The software creates a file named BINARY-FORMS for this purpose.

The software creates a file to indicate when a data-base system is in use. The file is named USERLOCK. When one user is already using a land-use and land-cover data-base system, and another user attempts to access the same data-base system, the software uses the information in the file to inform the second user that the data-base system is already in use.

When a report summarizing field sheets is created using processing option one, a temporary file named SUMMARY-REPORT is created to store the report.

When a list of site-identification numbers for field sheets is created using processing option two, a temporary file named SITEIDS is created to store the site-identification numbers.

When facsimiles of field sheets are created using processing option three, a temporary file named PRINTED-FORMS is created to store the facsimiles.

While forwarding data to a higher-tier data-base system, a file named CONTENTS is created in the directory named OUTBOX . The file contains a description of the format of the data that are forwarded.

During the processing of data forwarded from lower-tier data-base systems, two files are used to store and sort the names of the files containing the data. These files are created in a directory named INBOX and are named UPLOAD.FILES and UPLOAD.ORDER.

INFO files FORM.DF, FORMS-UPDATE.DF and DELETED-FORMS.DF

The format shown in table 1 describes the three INFO files named FORM.DF, FORMS-UPDATE.DF, and DELETED-FORMS.DF. Each of these is used for a different purpose. The file named FORM.DF is used for storing the field sheets in the data base. The file named UPDATED-FORMS.DF is used to store temporarily field-sheet data during the processes of field-sheet data-entry, forwarding

Table 1.—Format of records in INFO files FORM.DF, FORMS-UPDATE.DF, and DELETED-FORMS.DF

[Field-type codes: B = integer stored in binary format, C = character, D = date, I = integer stored in character format; Description: "flag" indicates a field that is marked by the user by entering a non-blank character]

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
RECORD#	1	5	4	B	Unique record-identification number computed by the software
UPDATE-FLAG	5	1	1	C	Set by software (X=updated,D=deleted)
SITEID	6	15	15	C	Site-identification number
DATE	21	8	8	D	Date of site visit
PROJECT	29	10	10	C	Project number
LOCALID	39	16	16	C	Site public-land survey coordinates
LATITUDE	55	7	4	B	Site latitude: degrees, minutes, seconds
LONGITUDE	59	8	4	B	Site longitude: degrees, minutes, seconds
DLU-100FT	63	2	2	C	Code for predominant land use within 100 ft.
DLU-1/4MI	65	2	2	C	Code for predominant land use within 1/4 mi.
PREDOM-PCT	67	3	4	B	Predominant land-use percentage of area within 1/4 mi.
PERSON	71	15	15	C	Name of person visiting site
USE1A-100FT	86	1	1	C	Flag for residential land use within 100 ft.
USE1A-1/4MI	87	1	1	C	Flag for residential land use from 100 ft. to 1/4 mi.
USE1A-COMMENT	88	41	41	C	Comments about residential land use
USE1B-100FT	129	1	1	C	Flag for commercial land use within 100 ft.
USE1B-1/4MI	130	1	1	C	Flag for commercial land use within 100 ft to 1/4 mi.
USE1B-COMMENT	131	41	41	C	Comments about commercial land use
USE1C-100FT	172	1	1	C	Flag for industrial land use within 100 ft.
USE1C-1/4MI	173	1	1	C	Flag for industrial land use from 100 ft. to 1/4 mi.
USE1C-COMMENT	174	41	41	C	Comments about industrial land use
USE1D-DESCRIP	215	10	10	C	Description of other urban land use
USE1D-100FT	225	1	1	C	Flag for other urban land use within 100 ft.
USE1D-1/4MI	226	1	1	C	Flag for other urban land use from 100 ft. to 1/4 mi.
USE1D-COMMENT	227	41	41	C	Comments about other urban land use
USE2A-100FT	268	1	1	C	Flag for non-irrigated cropland within 100 ft.
USE2A-1/4MI	269	1	1	C	Flag for non-irrigated cropland from 100 ft. to 1/4 mi.
USE2A-COMMENT	270	41	41	C	Comments about non-irrigated cropland
USE2B-100FT	311	1	1	C	Flag for irrigated cropland within 100 ft.
USE2B-1/4MI	312	1	1	C	Flag for irrigated cropland from 100 ft. to 1/4 mi.
USE2B-COMMENT	313	41	41	C	Comments about irrigated cropland
USE2C-100FT	354	1	1	C	Flag for pasture land within 100 ft.
USE2C-1/4MI	355	1	1	C	Flag for pasture land from 100 ft. to 1/4 mi.
USE2C-COMMENT	356	41	41	C	Comments about pasture land
USE2D-100FT	397	1	1	C	Flag for orchard, grove, vineyard, or nursery within 100 ft.
USE2D-1/4MI	398	1	1	C	Flag for orchard, grove, vineyard, or nursery from 100 ft. to 1/4 mi.
USE2D-COMMENT	399	41	41	C	Comments about orchard, grove, vineyard, or nursery

Table 1.—*Format of records in INFO files FORM.DF, FORMS-UPDATE.DF and DELETED-FORMS.DF*—Continued

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
USE2E-100FT	440	1	1	C	Flag for confined feeding operation within 100 ft.
USE2E-1/4MI	441	1	1	C	Flag for confined feeding operation from 100 ft. to 1/4 mi.
USE2E-COMMENT	442	41	41	C	Comments about confined feeding operation
USE2F-DESCRIP	483	10	10	C	Description of other agricultural land
USE2F-100FT	493	1	1	C	Flag for other agricultural land within 100 ft.
USE2F-1/4MI	494	1	1	C	Flag for other agricultural land from 100 ft. to 1/4 mi.
USE2F-COMMENT	495	41	41	C	Comments about other agricultural land
USE3-100FT	536	1	1	C	Flag for rangeland within 100 ft.
USE3-1/4MI	537	1	1	C	Flag for rangeland from 100 ft. to 1/4 mi.
USE3-COMMENT	538	41	41	C	Comments about rangeland
USE4-100FT	579	1	1	C	Flag for forest land within 100 ft.
USE4-1/4MI	580	1	1	C	Flag for forest land from 100 ft. to 1/4 mi.
USE4-COMMENT	581	41	41	C	Comments about forest land
USE5-100FT	622	1	1	C	Flag for water within 100 ft.
USE5-1/4MI	623	1	1	C	Flag for water from 100 ft. to 1/4 mi.
USE5-COMMENT	624	41	41	C	Comments about water
USE6-100FT	665	1	1	C	Flag for wetland within 100 ft.
USE6-1/4MI	666	1	1	C	Flag for wetland from 100 ft. to 1/4 mi.
USE6-COMMENT	667	41	41	C	Comments about wetland
USE7-100FT	708	1	1	C	Flag for barren land within 100 ft.
USE7-1/4MI	709	1	1	C	Flag for barren land from 100 ft. to 1/4 mi.
USE7-COMMENT	710	41	41	C	Comments about barren land
NOT-IRR	751	1	1	C	Flag for non-irrigated land within 1/4 mi.
SUP-IRR	752	1	1	C	Flag for supplemental irrigation in dry years only within 1/4 mi.
YES-IRR	753	1	1	C	Flag for irrigated land within 1/4 mi.
SPR-IRR	754	1	1	C	Flag for spray irrigation within 1/4 mi.
FLO-IRR	755	1	1	C	Flag for flood irrigation within 1/4 mi.
FUR-IRR	756	1	1	C	Flag for furrow irrigation within 1/4 mi.
DRI-IRR	757	1	1	C	Flag for drip irrigation within 1/4 mi.
CHE-IRR	758	1	1	C	Flag for chemigation irrigation within 1/4 mi.
OTH-IRR	759	1	1	C	Flag for other irrigation within 1/4 mi.
OTH-IRR-TYPE	760	10	10	C	Description of other irrigation method
GW-IRR	770	1	1	C	Flag for ground-water irrigation within 1/4 mi.
SW-IRR	771	1	1	C	Flag for surface-water irrigation within 1/4 mi.
SP-IRR	772	1	1	C	Flag for spring-water irrigation within 1/4 mi.
SE-IRR	773	1	1	C	Flag for sewage-effluent irrigation within 1/4 mi.
S1-IRR	774	1	1	C	Flag for irrigation with primary treatment of sewage effluent
S2-IRR	775	1	1	C	Flag for irrigation with secondary treatment of sewage effluent
S3-IRR	776	1	1	C	Flag for irrigation with tertiary treatment of sewage effluent

Table 1.—*Format of records in INFO files FORM.DF, FORMS-UPDATE.DF, and DELETED-FORMS.DF*—Continued

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
CHEM-COMMENT1	777	74	74	C	Line one of description of pesticide and fertilizer application
CHEM-COMMENT2	851	74	74	C	Line two of description of pesticide and fertilizer application
FARM-COMMENT1	925	74	74	C	Line one of description of crop and animal types
FARM-COMMENT2	999	74	74	C	Line two of description of crop and animal types
FEAT1-100FT	1073	1	1	C	Flag for gas station within 100 ft.
FEAT1-1/4MI	1074	1	1	C	Flag for gas station from 100 ft. to 1/4 mi.
FEAT1-COMMENT	1075	41	41	C	Comments about gas station
FEAT2-100FT	1116	1	1	C	Flag for dry cleaner within 100 ft.
FEAT2-1/4MI	1117	1	1	C	Flag for dry cleaner from 100 ft. to 1/4 mi.
FEAT2-COMMENT	1118	41	41	C	Comments about dry cleaner
FEAT3-100FT	1159	1	1	C	Flag for chemical plant or storage facility within 100 ft.
FEAT3-1/4MI	1160	1	1	C	Flag for chemical plant or storage facility from 100 ft. to 1/4 mi.
FEAT3-COMMENT	1161	41	41	C	Comments about chemical plant or storage facility
FEAT4-100FT	1202	1	1	C	Flag for airport within 100 ft.
FEAT4-1/4MI	1203	1	1	C	Flag for airport from 100 ft. to 1/4 mi.
FEAT4-COMMENT	1204	41	41	C	Comments about airport
FEAT5-100FT	1245	1	1	C	Flag for military base within 100 ft.
FEAT5-1/4MI	1246	1	1	C	Flag for military base from 100 ft. to 1/4 mi.
FEAT5-COMMENT	1247	41	41	C	Comments about military base
FEAT6-100FT	1288	1	1	C	Flag for road within 100 ft.
FEAT6-1/4MI	1289	1	1	C	Flag for road from 100 ft. to 1/4 mi.
FEAT6-COMMENT	1290	41	41	C	Comments about road
FEAT7-100FT	1331	1	1	C	Flag for pipeline or fuel storage facility within 100 ft.
FEAT7-1/4MI	1332	1	1	C	Flag for pipeline or fuel storage facility from 100 ft. to 1/4 mi.
FEAT7-COMMENT	1333	41	41	C	Comments about pipeline or fuel storage facility
FEAT8-100FT	1374	1	1	C	Flag for septic field within 100 ft.
FEAT8-1/4MI	1375	1	1	C	Flag for septic field from 100 ft. to 1/4 mi.
FEAT8-COMMENT	1376	41	41	C	Comments about septic field
FEAT9-100FT	1417	1	1	C	Flag for waste disposal pond within 100 ft.
FEAT9-1/4MI	1418	1	1	C	Flag for waste disposal pond from 100 ft. to 1/4 mi.
FEAT9-COMMENT	1419	41	41	C	Comments about waste disposal pond
FEAT10-100FT	1460	1	1	C	Flag for landfill within 100 ft.
FEAT10-1/4MI	1461	1	1	C	Flag for landfill from 100 ft. to 1/4 mi.
FEAT10-COMMENT	1462	41	41	C	Comments about landfill
FEAT11-100FT	1503	1	1	C	Flag for golf course within 100 ft.
FEAT11-1/4MI	1504	1	1	C	Flag for golf course from 100 ft. to 1/4 mi.
FEAT11-COMMENT	1505	41	41	C	Comments about golf course

Table 1.—Format of records in INFO files FORM.DF, FORMS-UPDATE.DF, and DELETED-FORMS.DF—Continued

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
FEAT12-PERENNIAL	1546	1	1	C	Flag for perennial stream, river, or creek
FEAT12-EPHEMERAL	1547	1	1	C	Flag for ephemeral stream, river, or creek
FEAT12-100FT	1548	1	1	C	Flag for stream, river, or creek within 100 ft.
FEAT12-1/4MI	1549	1	1	C	Flag for stream, river, or creek from 100 ft. to 1/4 mi.
FEAT12-COMMENT	1550	41	41	C	Comments about stream, river, or creek
FEAT13-LINED	1591	1	1	C	Flag for lined irrigation canal
FEAT13-UNLINED	1592	1	1	C	Flag for unlined irrigation canal
FEAT13-100FT	1593	1	1	C	Flag for irrigation canal within 100 ft.
FEAT13-1/4MI	1594	1	1	C	Flag for irrigation canal from 100 ft. to 1/4 mi.
FEAT13-COMMENT	1595	41	41	C	Comments about irrigation canal
FEAT14-LINED	1636	1	1	C	Flag for lined drainage ditch
FEAT14-UNLINED	1637	1	1	C	Flag for unlined drainage ditch
FEAT14-100FT	1638	1	1	C	Flag for drainage ditch within 100 ft.
FEAT14-1/4MI	1639	1	1	C	Flag for drainage ditch from 100 ft. to 1/4 mi.
FEAT14-COMMENT	1640	41	41	C	Comments about drainage ditch
FEAT15-NATURAL	1681	1	1	C	Flag for natural lake
FEAT15-MANMADE	1682	1	1	C	Flag for man-made lake
FEAT15-100FT	1683	1	1	C	Flag for lake within 100 ft.
FEAT15-1/4MI	1684	1	1	C	Flag for lake from 100 ft. to 1/4 mi.
FEAT15-COMMENT	1685	41	41	C	Comments about lake
FEAT16-LINED	1726	1	1	C	Flag for lined reservoir
FEAT16-UNLINED	1727	1	1	C	Flag for unlined reservoir
FEAT16-100FT	1728	1	1	C	Flag for reservoir within 100 ft.
FEAT16-1/4MI	1729	1	1	C	Flag for reservoir from 100 ft. to 1/4 mi.
FEAT16-COMMENT	1730	41	41	C	Comments about reservoir
FEAT17-100FT	1771	1	1	C	Flag for bay or estuary within 100 ft.
FEAT17-1/4MI	1772	1	1	C	Flag for bay or estuary from 100 ft. to 1/4 mi.
FEAT17-COMMENT	1773	41	41	C	Comments about bay or estuary
FEAT18-GEO	1814	1	1	C	Flag for nongeothermal spring
FEAT18-NOTGEO	1815	1	1	C	Flag for geothermal spring
FEAT18-100FT	1816	1	1	C	Flag for spring within 100 ft.
FEAT18-1/4MI	1817	1	1	C	Flag for spring from 100 ft. to 1/4 mi.
FEAT18-COMMENT	1818	41	41	C	Comments about spring
FEAT19-DRY	1859	1	1	C	Flag for dry salt flat or playa
FEAT19-WET	1860	1	1	C	Flag for wet salt flat or playa
FEAT19-100FT	1861	1	1	C	Flag for salt flat or playa within 100 ft.
FEAT19-1/4MI	1862	1	1	C	Flag for salt flat or playa from 100 ft. to 1/4 mi.
FEAT19-COMMENT	1863	41	41	C	Comments about salt flat or playa

Table 1.—*Format of records in INFO files FORM.DF, FORMS-UPDATE.DF, and DELETED-FORMS.DF*—Continued

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
FEAT20-ACTIVE	1904	1	1	C	Flag for active mine, quarry, or gravel pit
FEAT20-ABANDONED	1905	1	1	C	Flag for abandoned mine, quarry, or gravel pit
FEAT20-100FT	1906	1	1	C	Flag for mine, quarry, or gravel pit within 100 ft.
FEAT20-1/4MI	1907	1	1	C	Flag for mine, quarry, or gravel pit from 100 ft. to 1/4 mi.
FEAT20-COMMENT	1908	41	41	C	Comments about mine, quarry, or gravel pit
FEAT21-100FT	1949	1	1	C	Flag for oil well within 100 ft.
FEAT21-1/4MI	1950	1	1	C	Flag for oil well from 100 ft. to 1/4 mi.
FEAT21-COMMENT	1951	41	41	C	Comments about oil well
FEAT22-100FT	1992	1	1	C	Flag for major withdrawal well within 100 ft.
FEAT22-1/4MI	1993	1	1	C	Flag for major withdrawal well from 100 ft. to 1/4 mi.
FEAT22-COMMENT	1994	41	41	C	Comments about major withdrawal well
FEAT23-100FT	2035	1	1	C	Flag for waste injection well within 100 ft.
FEAT23-1/4MI	2036	1	1	C	Flag for waste injection well from 100 ft. to 1/4 mi.
FEAT23-COMMENT	2037	41	41	C	Comments about waste injection well
FEAT24-100FT	2078	1	1	C	Flag for recharge injection well within 100 ft.
FEAT24-1/4MI	2079	1	1	C	Flag for recharge injection well from 100 ft. to 1/4 mi.
FEAT24-COMMENT	2080	41	41	C	Comments about recharge injection well
FEAT25-NAME	2121	15	15	C	Description of other local feature
FEAT25-100FT	2136	1	1	C	Flag for other local feature within 100 ft.
FEAT25-1/4MI	2137	1	1	C	Flag for other local feature from 100 ft. to 1/4 mi.
FEAT25-COMMENT	2138	41	41	C	Comments about other local feature
LUCHANGE-YES	2179	1	1	C	Flag for major land-use changes within 1/4 mi. in last 10-years
LUCHANGE-PYES	2180	1	1	C	Flag for probably major land-use changes within 1/4 mi. in last 10-years
LUCHANGE-PNO	2181	1	1	C	Flag for probably not major land-use changes within 1/4 mi. in last 10-years
LUCHANGE-NO	2182	1	1	C	Flag for no major land-use changes within 1/4 mi. in last 10-years
LUC-COMMENT1	2183	76	76	C	Line 1 for description of major land-use changes
LUC-COMMENT2	2259	76	76	C	Line 2 for description of major land-use changes
LUC-COMMENT3	2335	76	76	C	Line 3 for description of major land-use changes
LUC-COMMENT4	2411	76	76	C	Line 4 for description of major land-use changes
ADD-COMMENT1	2487	76	76	C	Line 1 for additional comments
ADD-COMMENT2	2563	76	76	C	Line 2 for additional comments
ADD-COMMENT3	2639	76	76	C	Line 3 for additional comments
ADD-COMMENT4	2715	76	76	C	Line 4 for additional comments
ADD-COMMENT5	2791	76	76	C	Line 5 for additional comments
ADD-COMMENT6	2867	76	76	C	Line 6 for additional comments
SOURCE-DB	2943	8	8	C	Name of data-base system where field sheet was originally entered

Table 1.—Format of records in INFO files *FORM.DF, FORMS-UPDATE.DF,* and *DELETED-FORMS.DF*—Continued

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description	
PRIMARY-KEY	6	23	23	C	Concatenation of site-identification number and date	(redefined field)
DATE.NUM	21	8	8	I	Date of site visit	(redefined field)
TOWNSHIP	39	2	2	C	Township-number part of public-land survey coordinates	(redefined field)
TOWNSHIP_DIR	41	1	1	C	Township-direction part of public-land survey coordinates	(redefined field)
RANGE	43	2	2	C	Range-number part of public-land survey coordinates	(redefined field)
RANGE_DIR	45	1	1	C	Range-direction part of public-land survey coordinates	(redefined field)
SECTION	47	2	2	C	Section-number part of public-land survey coordinates	(redefined field)
SUBSECTION	50	3	3	C	Quarter-sections part of public-land survey coordinates	(redefined field)
SEQUENCE	54	1	1	C	Sequence-number part of public-land survey coordinates	(redefined field)

data, and receiving data. The file named DELETED-FORMS.DF is used to store the forms that have been modified or deleted from the data base. This file is used for updating a higher-tier data-base system. During the forwarding process, the field sheets in this file are merged into the file of updated data (UPDATED-FORMS.DF) for processing by the higher-tier data-base system, and are removed from the INFO file (DELETED-FORMS.DF).

INFO file HEADER.DF

The INFO file named HEADER.DF (table 2) is used during the processing of new field sheets. While the user is initially entering data for the first screen of the input form, this INFO file is used for data storage. The file stores the information used to determine if the field sheet is already in the data base. If the field sheet is for a site that has been previously visited, or if the field sheet is for a new site, the software moves the data in the file HEADER.DF to the file named UPDATED-FORMS.DF.

INFO file LAT-LON.DF

The INFO file named LAT-LON.DF (table 3) is used for processing of primary-grouping options five and six. In order to determine if sites are located within a range of latitude or longitude, the locations are converted from units of degrees, minutes, and seconds to decimal degrees. The LAT-LON.DEF file is used for storing the locations of sites in decimal degrees.

INFO file SAVED-SET.DF

Primary-grouping option 13 saves the current group for later use, and option 14 retrieves the saved group. These two operations use the INFO file named SAVED-SET.DF. The file contains a single field named RECORD# that is allocated four bytes of storage. The field contains record numbers of field sheets in the INFO file named FORM.DF that are in the current group when the group is saved.

INFO file SELECTED-SET.DF

The INFO file named SELECTED-SET.DF (table 4) is used for a variety of purposes during three different operations. All of the uses of the file are temporary. The contents of the file at any given time depend on which process is occurring.

The first use of the file is for grouping field sheets. The file contains the record numbers of the field sheets in the current group. Record numbers of field sheets are either added to or removed from the file during the grouping process, depending on whether the user is enlarging or reducing the current group.

Table 2.—*Format of records in INFO file HEADER.DF*

[Field-type codes: C = character and D = date]

Field name	Position of first byte (bytes)	Output-display width (char-acters)	Field width (INFO file, bytes)	Field type (code)	Description
SITEID	1	15	15	C	Site-identification number
PROJECT	16	10	10	C	Project number
DATE	26	8	8	D	Date of site visit
PERSON	34	15	15	C	Name of person visiting site
PRIMARY-KEY	1	23	23	C	Concatenation of site-identification number and date (redefined field)

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Table 3.—*Format of records in INFO file LAT-LON.DF*

[Field-type codes: B = integer stored in binary format, I = integer stored in binary format, F = real number stored in character format, F = real number stored in binary format]

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Number of decimal places	Description
RECORD#	1	5	4	B	—	Unique record-identification number computed by the software
LAT-DMS	5	7	7	I	—	Site latitude: degrees, minutes, seconds
LON-DMS	12	8	8	I	—	Site longitude: degrees, minutes, seconds
LAT-DD	20	7	4	F	3	Site latitude: decimal degrees
LON-DD	24	7	4	F	3	Site longitude: decimal degrees
LAT-DEG	5	3	3	I	—	Site latitude: degrees (redefined field)
LAT-MIN	8	2	2	I	—	Site latitude: minutes (redefined field)
LAT-SEC	10	2	2	I	—	Site latitude: seconds (redefined field)
LON-DEG	12	4	4	I	—	Site longitude: degrees (redefined field)
LON-MIN	16	2	2	I	—	Site longitude: minutes (redefined field)
LON-SEC	18	2	2	I	—	Site longitude: seconds (redefined field)

Table 4.—*Format of records in INFO file SELECTED-SET.DF*

[Field-type codes: B = integer stored in binary format and C = character; Description: "flag" indicates a field that is marked by the software by storing the character "X"]

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Field type (code)	Description
RECORD#	1	5	4	B	Unique record-identification number computed by the software
PRIMARY-KEY	5	23	23	C	Concatenation of site-identification number and date
DUPLICATE	28	1	1	C	Flag indicating that an update of the record was stopped by the user

The second use of the file is for updating field sheets with processing-menu option four. The field named DUPLICATE is used during the updating process to indicate that the user has chosen not to update a field sheet. When the field DUPLICATE contains the letter "X", the software does not update the corresponding field sheet in the file named FORM.DEF.

The third use of the file is for receiving updated field-sheet data from a lower-tier data-base system. The file contains site-identification numbers and dates of site visits for field sheets forwarded from a lower-tier data-base system. The combination of these two fields is the "primary key" field that uniquely defines a field sheet in the data base. Field sheets in the higher-tier data base with the same primary key as the field sheets in the update file are deleted from the higher-tier data base before storing the updated field sheets from the update file.

INFO files CODE-FLAG.DF and CODE-LU.DF

Two files named CODE-FLAG.DF and CODE-LU.DF contain data that are used by the software to convert codes into phrases (tables 5 and 6). Both files are used during the preparation of summary reports and of facsimiles of field sheets (processing options one and three). The file named CODE-FLAG.DF contains codes and phrases for the field named UPDATE-FLAG in the INFO file named FORM.DF. The file named CODE-LU.DF contains codes and phrases for land-use and land-cover categories. The fields named DLU-100FT and DLU-1/4MI in the INFO file named FORM.DF contain these codes.

COMPUTER PROGRAMMING

The data-base software is written using three different programming languages. The computer-operating system interface program is written in CPL. Three parts of the data-base software are written in the Fortran programming language. All of the remaining parts of the data-base software are written using the INFO file-management software's programming language.

Command Procedure Language programming

The LULC.CPL program is shown in attachment A of this report. The initial part of the program determines if the user is forwarding, receiving, or interactively processing data and describes the location of the data-base system in the hierarchy. The second part of the program stores information about the user. The third part of the program limits access to the data-base system to one user at a time. All of these parts of the program are performed every time a user runs the program.

Only one of next three parts of the program is performed, depending on whether the user is forwarding, receiving, or interactively processing data. When interactive processing is occurring, which is the default, the program begins running menu-driven software written with the INFO file-management software. The INFO software continues to run until the user selects option 99

Table 5.—*Format of records in INFO file CODE-FLAG.DF*

[Both fields are the character field type]

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Description
UPDATE-FLAG	1	1	1	Code for status of record
STATUS	2	4	4	Description of meaning of the code

Table 6.—*Format of records in INFO file CODE-LU.DF*

[All four fields are the character field type]

Field name	Position of first byte (bytes)	Output-display width (characters)	Field width (INFO file, bytes)	Description
CODE-LU	1	2	2	Code for land-use or land-cover
LAND-USE	3	38	38	Description of meaning of the code
DLU-100FT	1	2	2	Field name in INFO file named FORM.DF containing code for predominant land-use or land-cover within 100 ft. (redefined field)
DLU-1/4MI	1	2	2	Field name in INFO file named FORM.DF containing code for predominant land-use or land-cover from 100 ft. to 1/4 mi. (redefined field)

to exit from the data-base software. Then the final part of the LULC.CPL program is run.

When forwarding data, the LULC.CPL program runs an INFO program named UNLOAD-UPDATE.PG1 to copy all the updated and deleted field sheets to the INFO file named FORMS-UPDATE.DF . Next, the Fortran program IULINF.F77 is run to write these data to an update file in the OUTBOX directory. Then, the INFO program named UNLOAD-UPDATE.PG2 is run to update the local data base so the same updated and deleted field sheets are not transferred the next time that data are forwarded. When this operation is completed, the update file is queued for transfer to the higher-tier data-base system using the File Transfer Service. Last, the final part of the LULC.CPL program is run.

When receiving data, the names of the update files in the INBOX directory are written to a file and sorted by the date and time of creation. The files are processed individually in sorted order. A file is processed by reading the data into the INFO file FORMS-UPDATE.DF using the Fortran program ILDINF.F77. The updated data are merged into the higher-tier data base using the INFO program LOAD-UPDATE.PG. After all the update files have been processed, the final part of the LULC.CPL program is run.

The final part of the LULC.CPL program provides the user with the opportunity to keep a copy of any summary reports, lists of site-identification numbers, and field-sheet facsimiles. It also removes the file named USERLOCK that prevents access to the data-base system by other users while the program is running.

FORTRAN programming

The Fortran subroutine WHOAMI.F77 is shown in attachment B. It is written so it can be called as a function from CPL to provide the user-name of the person running the program. The program will work only with the Primos operating system.

The Fortran programs ILDINF.F77 and IULINF.F77, provided in attachments C and D, are written using calls to subroutines that are part of the ARC/INFO geographic information system. The software uses the IULINF.F77 program to read the INFO file named FORMS-UPDATE.DF and write fixed-format update files during the forwarding process. (Each field of data in a fixed-format file is placed in specific columns.) The software uses the ILDINF.F77 program to read a fixed-format update file and write the INFO file named FORMS-UPDATE.DF during the receiving process.

The ILDINF.F77 and IULINF.F77 programs are general-purpose utility programs and can be used to transfer data between any fixed-format files and INFO files. Because the programs have general-purpose application, a detailed explanation of the use of the programs is provided. The programs can be used with any INFO files, not only those data files that are part of the land-use and land-cover data-base system.

To create an INFO data file using the program ILDINF.F77, it is necessary to construct a fixed-format file that contains a description of the fields to be used in the INFO file (hereafter referred to as the "field-definition file"). Optionally, the program can write data to the INFO file. If this is to be done, another fixed-format file that contains the data (hereafter referred to as the "data file") is needed.

The field-definition file contains one record for each field to be defined in the INFO file. Each record has the following format (also see table 7):

(1) The field name is placed in columns 1-16. This is the name of the field that will be used when referring to the data with INFO commands. INFO places restrictions on the characters that can be used in field names. Field names (referred to in the INFO documentation as "item names") may not begin with a digit ("0" - "9"), a hyphen ("-"), an asterisk ("*"), a slash ("/"), a plus ("+"), a single-quote ("'"), or a parenthesis ("(" or ")"). Furthermore, field names may not contain a blank (" "), an equal sign ("="), or a comma (",") anywhere in the name. The program will display a message and stop if these restrictions are violated.

(2) The width of field in the data file is an integer number placed in columns 17-21. When data are provided in the optional data file, the number in columns 17-21 indicates the number of bytes allocated to the field in the data file. When the value in columns 17-21 is negative, the program uses the absolute value of the number as the position of the first byte in the INFO file for a redefined field. A redefined field may be a subset of an existing field or may overlap two or more existing fields.

(3) The number of bytes to be allocated for storing the field value in the INFO file is placed in columns 22-25. For integer or floating-point (real) numbers stored as binary numbers, the number of bytes must be either four or eight. For character data, the number of bytes may range from 1 to 4096. The INFO file-management software can store numeric data (integer or real) using either a binary translation of the numeric value, or as the character representation of the digits. For integer or real data stored as characters, the number of bytes may range from 1 to 16.

(4) The number of columns to be used when the field value is displayed or printed with INFO commands is placed in columns 26-29.

(5) A code for the field type is placed in column 30. Valid codes are "C" for character data, "I" for integer numbers stored as characters, "N" for real numbers stored as characters, "D" for dates, "B" for integer numbers stored in binary, "F" for real numbers stored in binary, and "X" for fields that are skipped in the input file and not written to the INFO file. When the field-type code "X" is used, the program does not use the information in columns 22-29. However, the program does check for a valid field name, and uses the value in columns 17-21 to determine how many columns in the data file are to be skipped.

(6) When the field-type code is "N" or "F", a positive integer should be placed in column 31 to indicate the number of positions to the right of the

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Table 7.—*Format of records in a field-definition file.*

[There is one record in the field-definition file for every field in the data file.]

Starting column	Ending column	Description
1	16	Name of the field in the INFO file
17	21	Number of columns allocated to the field in the fixed-format data file
22	25	Number of bytes allocated to the field in INFO file
26	29	Number of columns used when displaying the field with INFO commands
30	30	Field-type code:
		C = character data
		I = integer data stored in character format
		N = floating-point data stored in character format
		D = date data
		B = integer data stored in binary format
		F = floating-point data stored in binary format
		X = skipped field in fixed-format file
31	31	Number of digits to the right of the decimal used when displaying a floating-point field with INFO commands (used only when field-type code is "N" or "F")
32	47	Alternate name of the field in the INFO file (optional)

decimal place that should be shown when the field is displayed with an INFO command. For other field-type codes, the information in column 31 is not used.

(7) Columns 32-47 may be used to specify an additional name for the field, to be used when referring to the field with INFO commands. Thus, a field may have more than one name. This additional field name is not the same as a redefined field because the contents of the record cannot be subsetted or concatenated by specifying an additional field name. Use of columns 32-47 is optional.

(8) The contents of the field-definition file after column 47 are not used by the ILDINF.F77 program. These columns may be used for any purpose desired, such as comments about the field.

An example field-definition file named EXAMPLE.DEF is shown below and will be used to create an INFO file named EXAMPLE.DF.

```
COMPLETE-CODE        8    8    8C
SKIP                10    0    0X
DESCRIPTION         40   40   40C
MAJOR-CODE          -1    4    4C
MINOR-CODE          -5    4    4C
```

Five fields are defined, but the last two fields are redefinitions of parts of the first field. The second field of ten columns is skipped and not written to the INFO file. The record length of the INFO file is 48 bytes.

The data file contains the data according to the description given in columns 17-21 (width of field) and column 30 (field type) of the field-definition file. The corresponding data file named EXAMPLE.DATA is shown below.

```
11101410        STREAM, BRAIDED
11101411        STREAM, PERENNIAL
```

The user must be running ARC/INFO when the ILDINF.F77 program is started for the program to use the ARC/INFO subroutines. When the ILDINF.F77 program is run, the program displays several questions that the user answers to control the program. A sample run of the program to create an INFO file is shown below. On the right of each line is a number that is not displayed when the program is run, but is used in the following discussion of the program usage.

```
Arc: R ILDINF                                              (1)
Submitting command to Operating System ...                 (2)
Directory of INFO data base is   JSSCOTT>ARC>INFO          (3)
INFO username is  ARC                                      (4)
INFO data filename is EXAMPLE.DF                          (5)
Number of overhead bytes is 16                            (6)
Field-definition file is EXAMPLE.DEF                      (7)
     5 fields defined                                      (8)
     2 items added                                         (9)
```

```
        2 redefined items added                    (10)
     48 bytes / INFO record                         (11)
Data file is EXAMPLE.DATA                           (12)
        2 INFO records written                      (13)
```

The first line shows the command for running the ILDINF.F77 program from within the ARC/INFO software on a Prime computer. The second line shows a message printed by the ARC/INFO software. The third line shows a message prompting the user to enter a directory name for the INFO data base that will contain the INFO file. On the fourth line, a message is displayed prompting the user to enter the INFO "username". An INFO username is a name given to an INFO data base. On the fifth line, a message is displayed prompting the user to enter the name of the INFO file that the program will create.

The sixth line shows a message prompting the user for the number of "overhead bytes". This value specifies a number of reserved bytes that are required by the user's application of the INFO file. The INFO file-management software is limited to a record length less than or equal to 4096 bytes. The program uses the number entered on line six to check if the maximum record length will be exceeded. For example, some INFO files may be concatenated, record-by-record, to an ARC/INFO polygon attribute table. In this case, the number of overhead bytes is the record length of the polygon attribute table, which is 16 bytes. Similarly, an INFO file created with ILDINF.F77 might be concatenated with an ARC/INFO line attribute table which has a record length of 28 bytes.

The message displayed on the seventh line prompts the user to enter the name of the field-definition file. After the user enters a response, the program may display any of the following messages.

If the program is unable to find the field-definition file, the program displays a message and stops. If the name of the INFO file entered on line five is already in the INFO data base specified by the entries on lines three and four, the program displays the message "Delete existing INFO file?". A response is entered by typing either the letter "Y" or "N". If "Y" is entered, the existing INFO file is deleted, and the program proceeds.

If the user elects not to delete the existing INFO by entering "N", the question "Add records to existing INFO file?" is displayed. If records are to be added, the user enters "Y" and the field-definition file is assumed to accurately describe the existing INFO file as well as the data file. The definition of the existing INFO file in the INFO file-management system is not changed, nor are the existing data in the existing INFO file deleted.

If the user elects not to add records by entering "N", the program displays another question, "Exit program (Y), or start over (N)". When "Y" is entered, the program stops. When "N" is entered, the program discards all the information entered up to this time, and begins prompting for information again, starting with line three.

The following conditions cause the program to display an error message and stop without completing the creation of the INFO file.

(1) If the specifications entered on lines three and four do not identify an existing INFO data base, the program displays the message "ERROR creating INFO file" and stops.

(2) If a field name in the field-definition file does not conform to the INFO naming conventions, the program displays a message identifying the field name and stops.

(3) If a field-type code is not C, I, N, D, B, F, or X; the program displays a message identifying the invalid code and stops.

(4) If the sum of the widths of all the fields in the INFO file plus the number of overhead bytes exceeds 4096 bytes, the program displays a message showing how many bytes were required and stops.

(5) If two fields in the field-definition file have the same name, (except skipped fields), the program displays a message and stops.

When the program runs without finding errors in the field-definition file, lines 8-11 are displayed describing the definition of the INFO file. Line eight shows how many records were in the field-definition file. Line nine displays the number of fields that were defined in the INFO file, excluding fields that were skipped in the data file and redefinitions of fields. The number of fields that are redefinitions of existing fields is shown on line ten. The record length of the INFO file is shown on line eleven. The number of fields that are skipped in the data file can be computed by subtracting the numbers shown on lines nine and ten from the number on line eight.

The program displays a message prompting for the name of the data file on line twelve. If the program does not find the data file, a message is displayed and the program stops. If non-numeric data are found in a numeric field, the program displays a message and stops. If no other errors occur, the program finishes by displaying the number of records written to the INFO file on line thirteen. It is not necessary to enter the name of a data file on line twelve. If no name is entered, the program stops without adding data to the INFO file.

The program IULINF.F77 performs the reverse of the operations performed by the program ILDINF.F77. An existing INFO file is used to create a field-definition file and a data file. The IULINF.F77 program will not retrieve and write information about redefined fields or skipped fields. For example, if the INFO file created in the previous example were used with the program IULINF.F77, the user would be presented with the following messages. Again, reference line numbers are printed on the right that would not be present on the screen.

```
Arc: R IULINF                                         (1)
Submitting command to Operating System ...            (2)
Directory of INFO data base is  JSSCOTT>ARC>INFO      (3)
INFO username is  ARC                                 (4)
INFO data filename is EXAMPLE.DF                       (5)
```

```
Field-definition file is  OUT.EXAMPLE.DEF              (6)
     2 items defined                                   (7)
    48 bytes / record                                  (8)
Data file is OUT.EXAMPLE.DATA                          (9)
     2 INFO records written                            (10)
```

The first line shows the command for running the IULINF.F77 program from within the ARC/INFO software on a Prime computer. The second line shows a message displayed by the ARC/INFO software. On the third and fourth lines the directory name and the username of the INFO data base are entered in the same manner as when running the ILDINF.F77 program. The name of the existing INFO file is provided on line five. On line six, a message is displayed that prompts the user to enter the name of a field-definition file. If a file with this name already exists, it is deleted and rewritten by the program.

If the program does not find an INFO file matching the specifications given on lines three, four, and five; a message is displayed and the program stops. For the previous example, the following field-definition file is created. The name of the field-definition file is given on line six.

```
COMPLETE-CODE       8   8   8C
DESCRIPTION        40  40  40C
```

The following data file is created. The name of the file is entered on line nine.

```
11101411 STREAM, BRAIDED
11101411 STREAM, PERENNIAL
```

INFO programming

There are several tools for programming with the INFO file-management system. The land-use and land-use data-base software is written using four INFO programming tools. The first of these tools is called an INFO program. An INFO program consists of programming statements and INFO commands. INFO programs in the data-base software are used to display menus and control the flow of operations during a user's session with the data-base system. The second tool is called an INFO input form. An INFO input form is programmed using a set of specialized commands for data display, entry, and validation. The third tool is called an INFO report. An INFO report is used to produce a table summarizing data in an INFO file. The fourth tool is called an INFO special form. The INFO special form is used to produce displays of data using a specific format. The use of each of these programming tools for the data-base software is described briefly in the following paragraphs.

There are eighteen INFO programs in the software. The names and purposes of these programs are shown in table 8. Also, the name of the calling program(s) is shown in table 8. (A calling program is a program that runs another program.) The INFO programs should not be run individually. Information needed by one program is in many cases provided from a preceding program. The INFO programs are given in attachments E through V.

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Table 8.—*INFO programs in the land-use and land-cover data-base software.*

Name of INFO program	Name of calling program(s)	Purpose of the INFO program
PROFILE	INFO	Print warning message
STARTUP.PG	LULC.CPL	Define variables used throughout the data-base software
MAIN-MENU.PG	STARTUP.PG ENTER-FORM.PG SUBSET.PG	Display main menu and determine desired operation
SUBSET.PG	MAIN-MENU.PG APPLICATIONS-MENU.PG	Display subsetting menus and create current subset
APPLICATIONS-MENU.PG	SUBSET.PG OUTPUT-SITEIDS.PG PRINT-FORM.PG UPDATE-FORM.PG DELETE-FORM.PG	Display applications menu and process data in current subset
ENTER-FORM.PG	MAIN-MENU.PG	Enter new data using INFO input forms
GET-LU-CODE.PG	SUBSET.PG	Display menu of land-use and land-cover codes for user's selections
GET-FEAT-CODE.PG	SUBSET.PG	Display menu of local-feature codes for user's selections
GET-DISTANCE.PG	SUBSET.PG	Display menu of distance codes for user's selections
CVT-DMS-2-DD.PG	SUBSET.PG	Convert latitude and longitude from degrees, minutes, seconds to decimal degrees
OUTPUT-SITEIDS.PG	APPLICATIONS-MENU.PG	Create a file of site-identification numbers
PRINT-FORM.PG	APPLICATIONS-MENU.PG	Create a file containing facsimiles of field sheets
UPDATE-FORM.PG	APPLICATIONS-MENU.PG	Update field sheets in the data base
DELETE-FORM.PG	APPLICATIONS-MENU.PG	Delete field sheets from the data base
UNLOAD-UPDATE.PG1	LULC.CPL	Place updated and deleted field sheets into an INFO file
UNLOAD-UPDATE.PG2	LULC.CPL	Mark field sheets as 'sent' and remove deleted field sheets
LOAD-UPDATE.PG	LULC.CPL	Process field-sheet data sent from lower-tier data base
EXIT-OPTION.PG	—nearly all programs—	Provide access to INFO commands and print a warning message

There are four input-form programs in the software. During entry of new field sheets, the INFO program named ENTER-FORM.PG (attachment J) runs the input form named HEADER.IF (attachment W). This input form prompts the user for the site-identification number, name of person visiting the site, and the date of the site visit. With this information, the program ENTER-FORM.PG determines whether (1) there is no information in the data base for the site, (2) the site has been visited previously, or (3) the field sheet has already been entered. When no data are found in the data base for the site, the program uses the input form named FORM.IF (attachment X). When the site has been visited previously, the program copies the data from the field sheet of the previous site visit and uses the input form named REVISIT.UF (attachment Y). During updating of field sheets that are already stored in the data base, an input form named FORM.UF is used (attachment Z).

There is one INFO report program in the software. The INFO report program is named SUMMARY.RP (attachment AA) and is used to create a summary report. The SUMMARY.RP program is run by the INFO program named APPLICATIONS-MENU.PG (attachment I).

The software includes two INFO special-form programs. The programs are named PRINT-FORM-PAGE1.SF and PRINT-FORM-PAGE2.SF (attachments BB and CC). The special-form programs are used for creating facsimiles of field sheets by the INFO program named PRINT-FORM.PG (attachment P).

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Attachment A.   Command procedure language program LULC.CPL listing

```
/* U.S. Geological Survey Program LULC.CPL for running the land-use and land-
/*   cover data-base system.   Use of this program is described in U.S.
/*   Geological Water-Resources Investigations Report 89-4172, by Jonathon C.
/*   Scott.  This program is written in the Command Procedure Language.  The
/*   program runs the following programs:  the INFO file-management system,
/*   the ARC/INFO geographic information system, as well as various other
/*   programs written in Fortran 77 and the INFO programming language.  This
/*   program was last modified and run on a Prime 9955-II minicomputer running
/*   revision 21 of the PRIMOS operating system on September 18, 1989.
/*
/* Although this computer software has been used by the U.S. Geological Survey,
/*   no warranty, expressed or implied, is made by the USGS as to the accuracy
/*   and functioning of the program and related program material nor shall the
/*   fact of distribution constitute any such warranty, and no responsibility
/*   is assumed by the USGS in connection therewith.
/*
&ARGS UNLOAD_SW: -UN, -UNLOAD;~
         LOAD_SW: -L,  -LOAD
/*
/* -----------------------------------------------------------------------------
/* ----- SET DESCRIPTION OF LOCAL & HIGHER-TIER DATA BASE
/* -----------------------------------------------------------------------------
&S DBHOME  := <UNSAFE>LULC     /* PATHNAME OF LOCAL DATA-BASE SYSTEM
&S UNAME   := LUL              /* INFO 'USERNAME' OF LOCAL DATA BASE
&S NODE    := DOKOKL           /* NETWORK NODE NAME OF LOCAL COMPUTER SYSTEM
&S NATHOME := LULC2            /* PATHNAME OF DATA-BASE SYSTEM IN NEXT TIER
&S NATNODE := DOKOKL           /* NETWORK NODE NAME OF SYSTEM IN NEXT TIER
&S TIER    := 1                /* TIER LEVEL NUMBER OF DATA-BASE SYSTEM
/* ---------------------------------------------------------------------------
/* ----- STORE USER INFORMATION
/* ---------------------------------------------------------------------------
&S HOME     := [DIR [PATHNAME *]]
ATTACH %DBHOME%
&S USERID  := [RESUME WHOAMI.RUN]
&ON QUIT$ &ROUTINE BREAK_OUT
&SEVERITY &ERROR &ROUTINE CLEANUP
MESSAGE -DEFER
/* ---------------------------------------------------------------------------
/* ----- CHECK LOCK ON DATABASE
/* ---------------------------------------------------------------------------
&S UL := [OPEN_FILE USERLOCK -MODE RW IN_USE]
RWLOCK USERLOCK UPDT           /* REMOVE LINE IF USERS DO NOT HAVE 'P' RIGHTS
&IF %IN_USE% ^= 0 &THEN &DO
/*
/* ----- DATA-BASE SYSTEM IS ALREADY IN USE, OR AN ERROR HAS OCCURRED
   &S UL := [OPEN_FILE USERLOCK -MODE R ERR]
   &IF %ERR% ^= 0 &THEN &DO
      TYPE Read/write lock on %DBHOME%>USERLOCK is incorrectly set.
      &STOP 1
   &END
   &S L := [READ_FILE %UL% EOF]
   CLOSE -UNIT %UL%
   TYPE %L%
   TYPE
   TYPE Please try again later.
   &STOP 0
&END
/*
/* ----- SET LOCK ON DATA-BASE SYSTEM TO PREVENT ANOTHER USER FROM ENTERING
&S L   := [QUOTE LULC data base has been in use by %USERID% since ][DATE -VFULL]
&S ERR := [WRITE_FILE %UL% %L%]
```

```
/*-----------------------------------------------------------------------
/* ----- NORMAL INTERACTIVE DATA ENTRY AND RETRIEVAL
/*-----------------------------------------------------------------------
&IF [NULL %UNLOAD_SW%] & [NULL %LOAD_SW%] &THEN &DO
&DATA INFO
=%UNAME%
RUN STARTUP.PG
RUN MAIN-MENU.PG
&TTY
&END                                    /* END OF DATA TO INFO
&END                                    /* END OF INTERACTIVE OPTION
/*-----------------------------------------------------------------------
/* ----- UNLOADING OF RECORDS FOR UPDATING DATA-BASE SYSTEM IN NEXT TIER
/*-----------------------------------------------------------------------
&IF ^ [NULL %UNLOAD_SW%] &THEN &DO
&IF %TIER% = 3 &THEN &DO
    TYPE This data-base system not configured for forwarding data
    &GOTO FINALE
&END
COMO %DBHOME%>OUTBOX>UNLOAD.[DATE -FTAG].COMO
/*
/* -----'RETRIEVE OF UPDATED & DELETED FIELD SHEETS INTO AN INFO-FILE
&DATA INFO
=%UNAME%
RUN UNLOAD-UPDATE.PG1
&END                                    /* END OF DATA TO INFO
/*
/* ----- WRITE UPDATES TO AN UPDATE-FILE
&S OUTFILE := %NODE%.DATA.[DATE -FTAG]
&DATA ARC
R IULINF.RUN
%DBHOME%
%UNAME%
FORMS-UPDATE.DF
*>OUTBOX>CONTENTS
*>OUTBOX>%OUTFILE%
QUIT
&END                                    /* END OF DATA TO ARC
/*
/* ----- MARK UPDATES AS 'SENT', REMOVE 'DELETED' FIELD SHEETS
&DATA INFO
=%UNAME%
RUN UNLOAD-UPDATE.PG2
&END                                    /* END OF DATA TO INFO
/*
/* ----- SEND THE UPDATE-FILE TO THE HIGHER-TIER DATABASE
FTR *>OUTBOX>%OUTFILE% %NATHOME%>INBOX>== -DS %NATNODE% -COPY
DELETE *>OUTBOX>CONTENTS
COMO -END
&END                                    /* END OF UPLOAD OPTION
```

```
/*--------------------------------------------------------------------
/* ----- LOADING OF RECORDS FROM DATABASES IN LOWER TIER
/*--------------------------------------------------------------------
&IF ^ [NULL %LOAD_SW%] &THEN &DO
COMO *>INBOX>LOAD.[DATE -FTAG].COMO
/*
/* ----- SORT THE UPDATE-FILES BY DATE OF CREATION
&S Z := 0
&S N := 0
&IF [EXISTS *>INBOX>UPLOAD.FILES] &THEN DELETE *>INBOX>UPLOAD.FILES
&S U := [OPEN_FILE *>INBOX>UPLOAD.FILES -MODE W OOPS]
&DO FILEIN &ITEMS [WILD *>INBOX>0.DATA.00 -FILE -BRIEF -SINGLE Z]
&S N := %N% + 1
&S E := [WRITE_FILE %U% %FILEIN%]
&END
CLOSE -UNIT %U%
&IF %N% = 0 &THEN &GOTO FINALE
/*
&IF [EXISTS *>INBOX>UPLOAD.ORDER] &THEN DELETE *>INBOX>UPLOAD.ORDER
&DATA SORT -BRIEF
*>INBOX>UPLOAD.FILES *>INBOX>UPLOAD.ORDER
1 32
&END
DELETE *>INBOX>UPLOAD.FILES
/*
/* ----- PROCESS THE UPDATE-FILES IN SORTED ORDER
&S U := [OPEN_FILE *>INBOX>UPLOAD.ORDER -MODE R OOPS]
&DO IFILE := 1 &TO %N%
/*
/* ----- READ UPDATE-FILE INTO AN INFO-FILE
&DATA ARC
&S FILEIN := [READ_FILE %U% EOF]
TYPE Processing file #%IFILE%:  %FILEIN%
R ILDINF
%DBHOME%
%UNAME%
FORMS-UPDATE.DF
0
FORM.DEF
Y
*>INBOX>%FILEIN%
DELETE *>INBOX>%FILEIN%
QUIT
&END                              /* END OF DATA TO ARC
/*
/* ----- MERGE THE UPDATES INTO THE DATABASE
&DATA INFO
=%UNAME%
RUN LOAD-UPDATE.PG
&END                              /* END OF DATA TO INFO
&END                              /* END OF DO-LOOP
CLOSE -UNIT %U%
DELETE *>INBOX>UPLOAD.ORDER
COMO -END
&END                              /* END OF LOAD OPTION
```

```
/* ----------------------------------------------------------------------
/* ----- NORMAL TERMINATION
/* ----------------------------------------------------------------------
&LABEL FINALE
&CALL CLEANUP


/* ----------------------------------------------------------------------
/* ----- 'BREAK' KEY CAUSES THIS ROUTINE TO RUN
/* ----------------------------------------------------------------------
&ROUTINE BREAK_OUT
TYPE BREAK key pressed!
&CALL CLEANUP


/* ----------------------------------------------------------------------
/* ----- DISPOSITION OF TEMPORARY FILES AND RETURN TO OPERATING-SYSTEM SETTINGS
/* ----------------------------------------------------------------------
&ROUTINE CLEANUP
COMOUTPUT -END
CLOSE -UNIT %UL%
DELETE USERLOCK
&IF [EXISTS BINARY-FORMS] &THEN DELETE BINARY-FORMS
&IF [EXISTS SITEIDS] &THEN &DO
   &S FILENM := [RESPONSE 'Enter file name to hold retrieved site ids' SITEIDS]
   COPY SITEIDS %HOME%>%FILENM% -NQ -DELETE
   &END
&DO SOURCE &LIST summary-report printed-forms           .
   &IF [EXISTS %SOURCE%] &THEN &DO
      &IF [ATTRIB %SOURCE% -LENGTH] > 0 &THEN &DO
         &S PROMPT := 'Do you wish to save your '%SOURCE%' in a file'
         &S KEEPIT := [QUERY %PROMPT%]
         &IF %KEEPIT% &THEN &DO
            &LABEL GET_NAME
            &S FILENM := [RESPONSE 'Enter file name to hold '%SOURCE%]
            &IF %SOURCE% = %HOME%>%FILENM% &THEN &DO
               TYPE
               TYPE Please enter a different file name...
               &GOTO GET_NAME
            &END                          /* END OF IF-SOURCE=
            COPY %SOURCE% %HOME%>%FILENM% -NQ
         &END                             /* END OF IF-KEEPIT
         DELETE %SOURCE% -NQ
      &END                                /* END OF IF>0
   &END                                   /* END OF IF-EXISTS
&END                                      /* END OF DO-LIST
MESSAGE -ACCEPT
ATTACH %HOME%
&STOP
```

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Attachment B. Fortran program WHOAMI.F77 listing

```fortran
      SUBROUTINE WHOAMI (ARG,CODE,IGN,IFUNC,RFP)
C
C     FORTRAN PROGRAM STRUCTURED TO OPERATE AS CPL FUNCTION
C     RETURNS USER-IDENTIFICATION ONLY ON A PRIME COMPUTER
C
      INTEGER*2 COMARR(28), IFUNC
      INTEGER*4 RFP(2)
      CHARACTER USERID*32
      EQUIVALENCE (USERID,COMARR(13))
C
      CALL TIMDAT(COMARR,INTS(28))
      DO 10 I=32,1,-1
         IF (USERID(I:I) .NE. ' ') GOTO 20
10    CONTINUE
      I = 1
20    CALL ALS$RA(USERID,I,RFP)
      RETURN
      END
```

Attachment C. Fortran program ILDINF.F77 listing

```fortran
      PROGRAM ILDINF
C
C STARTING WITH A SIMPLE SEQUENTIAL ACCESS FILE DESCRIBING AN DATA STRUCTURE
C CREATE AND, OPTIONALLY LOAD RECORDS, INTO AN INFO FILE
C
C FILE #1 CONTAINS THE INFO ITEMS TO BE DEFINED:  ONE RECORD/ITEM
C  FIELD                          FIELD WIDTH    BEGIN-END     CODE
C
C  INFO FILE ITEM NAME                16            1-16     Cccccccccccccccc
C  INPUT FILE FIELD WIDTH              5           17-21     Iiiii
C  INFO FILE FIELD WIDTH              4           22-25     Wwww
C  INFO FILE OUTPUT WIDTH             4           26-29     Oooo
C  INFO FILE ITEM TYPE (CHAR.CODE)    1              30     T
C  INFO FILE NUMBER OF DECIMALS       1              31     D
C  INFO FILE ALTERNATE NAME          16           32-47     Aaaaaaaaaaaaaaaa
C  Not used by program                             48-
C
CccccccccccccccccIiiiiWwwwOoooTDAaaaaaaaaaaaaaaaa
C
C FILE #2 CONTAINS THE INPUT DATA, DESCRIBED IN FILE #1
C
$INSERT SIZE.INS
      DOUBLE PRECISION INVAL
      CHARACTER FILNAM*128, FILINF*32, LINE80*80, LINE5K*5120
      CHARACTER DIR*128, USER*8, ITMNAM*16, NULSTR*16, CTYPE*1
      CHARACTER INSTR*128, ALTERN*16
      INTEGER ITMARR (MAXCOD,5), ITMDES(4), NEGONE, ENCREC(1024)
      LOGICAL OVRFLW, KILLIT, ADTOIT, ABORT, CYESNO, OKITEM
C
C ARC/INFO SUBROUTINES:
      EXTERNAL LUNINI,  MINIT, INFINT,  AOPEN, INFEXF, INFERS, ACLOSE
      EXTERNAL INFOPN, INFDEF, INFADI, INFENC, INFPUT, INFCLS, INFEND
C
      PARAMETER (IZERO = 0)
      PARAMETER (IONE  = 1)
      PARAMETER (NEGONE=-1)
      PARAMETER (NULSTR='')
```

```
C
C1 -- INITIALIZE ARC LIBRARIES
      CALL LUNINI
      CALL MINIT
      CALL INFINT
C
C2 -- INITIALIZE VARIABLES
      OVRFLW = .FALSE.
      ADTOIT = .FALSE.
      ICOL = 1
      IFLD = 1
      NITM = 0
      NRED = 0
      IREC = 0
C
C3 -- PROMPT USER FOR NEEDED INFORMATION
5     CALL INCRLF ('Directory of INFO data base is ',32)
      READ (*,'(A)') DIR
      CALL INCRLF ('INFO username is ',18)
      READ (*,'(A)') USER
      CALL INCRLF ('INFO data filename is ',22)
      READ (*,'(A)') FILINF
      CALL INCRLF ('Number of overhead bytes is ',28)
      READ (*,'(A)') IOVRHD
      MXINLN = 4096 - IOVRHD
      CALL INCRLF ('Field-definition file is ',25)
      READ (*,'(A)') FILNAM
C
C4 -- OPEN THE FIELD-DEFINITION FILE
      CALL AOPEN (LUN,FILNAM,IER)
      IF (IER .NE. 0) STOP 'ERROR opening field-definition file'
C
C5 -- TEST IF INFO FILE ALREADY EXISTS
      CALL INFEXF (FILINF,DIR,USER,IER)
      IF (IER .NE. 0) THEN
          KILLIT = CYESNO ('Delete existing INFO file?',26)
          IF (KILLIT) THEN
C
C5A --        DELETE OLD INFO FILE, IF USER HAS REQUESTED
              CALL INFERS (FILINF,DIR,USER,IZERO,IER)
              IF (IER .NE. 0) THEN
                  CALL ACLOSE (LUN)
                  STOP 'ERROR deleting existing INFO file'
              ENDIF
          ELSE
C
C5B --        ELSE, GIVE OPTIONS TO ADD DATA TO EXISTING FILE, RESTART, OR EXIT
              IER  = 0
              ADTOIT = CYESNO ('Add records to existing INFO file?',34)
              IF (.NOT. ADTOIT) THEN
                  CALL ACLOSE (LUN)
                  ABORT = CYESNO ('Exit program (Y), or start over (N)',
     &                  35)
                  IF (.NOT. ABORT) GOTO 5
                  STOP 'EXIT requested'
              ENDIF
          ENDIF
      ENDIF
```

```
C
C6 -- WHEN ADDING TO EXISTING FILE: OPEN IT; ELSE: CREATE A NEW INFO FILE
      IF (ADTOIT) THEN
          CALL INFOPN (FILINF,DIR,USER,2,INFNUM,IREC,LENREC,IER)
          IBREC = IREC
      ELSE
          CALL INFDEF (FILINF,DIR,USER,IZERO,INFNUM,IER)
          IBREC = 0
          IF (IER .NE. 0) THEN
             CALL ACLOSE (LUN)
             STOP 'ERROR creating INFO file'
          ENDIF
      ENDIF
C
C ITMARR(*,1) = STARTING BYTE (IN INFO RECORD)
C ITMARR(*,2) = LENGTH IN BYTES (IN INFO RECORD)
C ITMARR(*,3) = ITEM TYPE CODE (1=D, 2=C, 3=I, 4=N, 5=B, 6=F, 0=X (SKIP))
C ITMARR(*,4) = NUMBER OF DECIMAL PLACES (IN INFO DEFINITION)
C ITMARR(*,5) = WHEN > 0 : LENGTH IN BYTES (IN INPUT RECORD)
C              WHEN < 0 : ABS (ITMARR(*,5) INFO STARTING COL OF REDEFINED ITEM
C
C7 -- EXAMINE EACH RECORD IN THE FIELD-DEFINITION FILE
10    CONTINUE
          READ (LUN,11,END=100,ERR=870) ITMNAM,ITMARR(IFLD,5),
     &              ITMARR(IFLD,2),IWDOUT,CTYPE,ITMARR(IFLD,4),ALTERN
11        FORMAT (A16,I5,2I4,A1,I1,A16)
C
C7A --    CHECK THAT FIELD NAME CONFORMS TO INFO NAMING CONVENTIONS
          CALL CKITNM (ITMNAM,OKITEM)
          IF (.NOT. OKITEM) GOTO 875
C
C7B --    RESET NUMBER OF DECIMALS AND ASSIGN INTEGER FIELD TYPE
C         BASED ON FIELD TYPE CODE
          IF     (CTYPE .EQ.  'D') THEN
             ITMARR(IFLD,3) =  1
             ITMARR(IFLD,4) = -1
          ELSEIF (CTYPE .EQ.  'C') THEN
             ITMARR(IFLD,3) =  2
             ITMARR(IFLD,4) = -1
          ELSEIF (CTYPE .EQ.  'I') THEN
             ITMARR(IFLD,3) =  3
             ITMARR(IFLD,4) = -1
          ELSEIF (CTYPE .EQ.  'N') THEN
             ITMARR(IFLD,3) =  4
          ELSEIF (CTYPE .EQ.  'B') THEN
             ITMARR(IFLD,3) =  5
             ITMARR(IFLD,4) = -1
          ELSEIF (CTYPE .EQ.  'F') THEN
             ITMARR(IFLD,3) =  6
          ELSEIF (CTYPE .EQ.  'X') THEN
             ITMARR(IFLD,3) =  0
             GOTO 90
          ELSE
             GOTO 880
          ENDIF
C
C7C --    SET STARTING BYTE POSITION, CHECK FOR RECORD LENGTH OVERFLOW
          ITMARR (IFLD,1) = ICOL
          IF (ITMARR(IFLD,5) .GT. 0) ICOL = ICOL + ITMARR(IFLD,2)
          IF (.NOT. ADTOIT) THEN
          IF (ITMARR(IFLD,5) .GT. 0) THEN
             IF (ICOL .GT. MXINLN) OVRFLW = .TRUE.
```

```
C
C7C1 --     ADD NORMAL FIELD TO THE INFO FILE
            IF (.NOT. OVRFLW)
    &       CALL INFADI (INFNUM,IZERO,ITMNAM,ALTERN,NULSTR,
    &        ITMARR(IFLD,3),ITMARR(IFLD,2),IWDOUT,ITMARR(IFLD,4),
    &        IFOUR,IZERO,NEGONE,NEGONE,NEGONE,NEGONE,IZERO,IER)
            IF (IER .NE. 0) GOTO 890
            NITM = NITM + 1
        ELSE
C
C7C2 --     ADD REDEFINED FIELD TO THE INFO FILE
            ISBYTE = IABS (ITMARR(IFLD,5))
            CALL INFADI (INFNUM,IONE,ITMNAM,ALTERN,NULSTR,
    &        ITMARR(IFLD,3),ITMARR(IFLD,2),IWDOUT,ITMARR(IFLD,4),
    &        IFOUR,IZERO,NEGONE,NEGONE,NEGONE,NEGONE,ISBYTE,IER)
            IF (IER .NE. 0) GOTO 890
            NRED = NRED + 1
        ENDIF
        ENDIF
C
C7D --   RESET POINTERS AND KEEP USER INFORMED
90       IFLD = IFLD + 1
         IF (MOD (IFLD,10) .EQ. 0) THEN
            WRITE (LINE80,'(I5,A)') IFLD, ' fields defined'
            CALL ICRNLF (LINE80,20)
         ENDIF
         GOTO 10
C
C8 -- ALL FIELDS DEFINED, CLEAN HOUSE, AND INFORM USER
100   CONTINUE
      NFLD  = IFLD - 1
      WRITE (*,'(I5,A)') NFLD, ' fields defined'
      WRITE (*,'(I5,A)') NITM, ' items added'
      WRITE (*,'(I5,A)') NRED, ' redefined items added'
      MAXCOL = ICOL - 1
      CALL ACLOSE (LUN)
      IF (OVRFLW) GOTO 900
      IF (.NOT. ADTOIT) WRITE (*,'(I5,A)') MAXCOL,' bytes / INFO record'
C
C9 -- OPTIONALLY, OPEN FILE CONTAINING DATA RECORDS
105   CALL INCRLF ('Data file is ',13)
      READ (*,'(A)') FILNAM
      IF (LENGTH (FILNAM,128) .EQ. 0) GOTO 1000
      CALL AOPEN (LUN,FILNAM,IER)
      IF (IER .NE. 0) GOTO 910
C
C10 -- EXAMINE EACH DATA RECORD
110   CONTINUE
         READ (LUN,'(A)',END=1000) LINE5K
         IREC = IREC + 1
         ISTR = 1
C
C10A -- PROCESS EACH FIELD IN THE RECORD
         DO 190 IFLD = 1,NFLD
C
C10A1 --    SKIP REDEFINED FIELD, NO DATA IS ADDED
            IF (ITMARR(IFLD,5) .LE. 0) GOTO 190
            IEND  = ISTR + ITMARR(IFLD,5) - 1
C
C10A2 --    SKIP OVER UNUSED FIELD
            IF (ITMARR(IFLD,3) .EQ. 0) GOTO 180
            INSTR = NULSTR
            INVAL = 0.D1
```

```
C
C10A3 --    DETERMINE FIELD CONTENTS AND DESCRIPTION
            IF (ITMARR(IFLD,3) .EQ. 2) THEN
                INSTR = LINE5K (ISTR:IEND)
            ELSE
                READ  ( LINE5K (ISTR:IEND),*,ERR=920) INVAL
            ENDIF
            DO 120 I=1,4
                ITMDES(I) = ITMARR(IFLD,I)
120         CONTINUE
C
C10A4 --    PLACE THE DATA ON THE INFO RECORD
            CALL INFENC (ITMDES,INVAL,INSTR,MAXCOL,ENCREC,IER)
            IF (IER .NE. 0) GOTO 930
180         ISTR = IEND + 1
190     CONTINUE
C
C10B --  WRITE THE INFO RECORD
        CALL INFPUT (INFNUM,IREC,ENCREC,IER)
        IF (IER .NE. 0) GOTO 940
C
C10C --  KEEP THE USER INFORMED
        IF (MOD(IREC,10) .EQ. 0) THEN
            WRITE (LINE80,'(I6,A)') IREC,' records written'
            CALL ICRNLF (LINE80,80)
        ENDIF
        GOTO 110
C
C11 -- ERROR EXITS
870   WRITE (*,'(A,I4)') 'ERROR reading field definition #',IFLD
      GOTO 1000
875   WRITE (*,'(2A)') 'ERROR: field name invalid:  ',ITMNAM
      GOTO 1000
880   WRITE (*,'(2A)') 'ERROR: unknown field type:  ',CTYPE
      GOTO 1000
890   WRITE (*,'(2A)') 'ERROR: duplicate field name:  ',ITMNAM
      GOTO 1000
900   WRITE (*,'(2(A,I4))') 'ERROR:  record length (',MAXCOL,
     &                       ') exceeds maximum: ',MXINLN
      GOTO 1001
910   WRITE (*,'(A)') 'ERROR opening data file:  ',FILNAM
      GOTO 1000
920   WRITE (*,925) 'reading',IFLD, IREC
925   FORMAT ('ERROR ',A,' field #',I4,' record #',I4)
      GOTO 999
930   WRITE (*,925) 'coding',IFLD, IREC
      GOTO 999
940   WRITE (*,'(A,I4)') 'ERROR writing record #',IREC
999   IREC = IREC - 1
C
C12 -- HOUSE-CLEANING
1000  CALL INFCLS (INFNUM)
1001  CALL ACLOSE (LUN)
      CALL INFEND
      NREC = IREC - IBREC
      WRITE (*,'(I5,A)') NREC, ' INFO records written'
      STOP
      END
```

```
C
      INTEGER FUNCTION LENGTH (STRING,LEN)
C
C  FUNCTION TO DETERMINE THE LENGTH OF A STRING
C
      CHARACTER*(*) STRING
      DO 10 I=LEN,1,-1
10       IF (STRING(I:I) .NE. ' ') GOTO 20
      I = 0
20    LENGTH = I
      RETURN
      END
C
      SUBROUTINE INCRLF (STRING,LENSTR)
C
C INTERLUDE TO PRIMOS ROUTINE FOR OUTPUTTING A STRING OF CHARACTERS TO THE
C TERMINAL WITHOUT CARRIAGE RETURN/LINE FEED:  TNOUA
C
      CHARACTER*(*) STRING              /* STRING TO BE PRINTED
      INTEGER*2 LEN2                    /* LENGTH OF STRING IN BYTES
      LEN2 = LENSTR
      CALL TNOUA (STRING,LEN2)
      RETURN
      END
C
      SUBROUTINE ICRNLF (STRIN,LENSTR)
C
C PRINT A MESSAGE TO THE SCREEN, PERFORM A CARRIAGE RETURN, BUT NOT A LINE FEED
C
      CHARACTER STRIN*80, STRING*160
      K = 80
      IF (LENSTR .LT. 80) K = LENSTR
      L = LENGTH (STRIN,K)
      STRING = STRIN
      K = 2 * L
      IF (K .GT. 160) K = 160
      DO 10 I = L+1,K
10       STRING(I:I) = CHAR (136)
      CALL INCRLF (STRING(1:K),K)
      RETURN
      END
C
      SUBROUTINE CKITNM (NAME,OKITEM)
C
C CHECK AN INFO ITEM-NAME FOR CONFORMANCE TO INFO NAMING RESTRICTIONS
C
      LOGICAL OKITEM
      CHARACTER NAME*16, CKCHAR*1, RESRVD(3)*1, NFIRST(7)*1
      DATA RESRVD/' ','=',','/
      DATA NFIRST/'-','*','/','+','''','(',')'/
      OKITEM = .TRUE.
C
C1 -- CHECK FOR ILLEGAL INITIAL CHARACTER
      DO 10 I=0,9
         WRITE (CKCHAR,'(I1)') I
         IF (CKCHAR .EQ. NAME(1:1) ) OKITEM = .FALSE.
10    CONTINUE
      DO 20 I=1,7
         IF (NFIRST (I) .EQ. NAME(1:1) ) OKITEM = .FALSE.
20    CONTINUE
```

```
C
C2 -- CHECK FOR RESERVED CHARACTERS ANYWHERE IN ITEM-NAME
      L = LENGTH (NAME,16)
      DO 30 I=1,3
         IF (INDEX (NAME(1:L),RESRVD(I) ) .NE. 0) OKITEM = .FALSE.
30    CONTINUE
      RETURN
      END
C
      LOGICAL FUNCTION CYESNO (PROMPT,LENPMT)
      CHARACTER PROMPT*(*), RESP*1, P*80
C
C GET YES/NO RESPONSE FROM TERMINAL, RETURN:  YES = .TRUE./ NO = .FALSE.
C
      L = LENPMT + 9
      P = PROMPT (1:LENPMT) // ' (Y/N):  '
10    CALL INCRLF (P,L)
      READ (*,'(A)') RESP
      IF     (RESP .EQ. 'Y' .OR. RESP .EQ. 'y') THEN
         CYESNO = .TRUE.
      ELSEIF (RESP .EQ. 'N' .OR. RESP .EQ. 'n') THEN
         CYESNO = .FALSE.
      ELSE
         WRITE (*,'(/A/)') 'PLEASE ANSWER:  YES OR NO'
         GOTO 10
      ENDIF
      RETURN
      END
```

Attachment D. Fortran program IULINF.F77 listing

```
      PROGRAM IULINF
C
C STARTING WITH AN INFO FILE, WRITE TWO SIMPLE SEQUENTIAL ACCESS FILES
C CONTAINING THE FIELD DESCRIPTIONS AND THE DATA FROM THE INFO FILE.
C
C FILE #1 CONTAINS DEFINITIONS OF THE INFO ITEMS:  ONE RECORD PER ITEM.
C  FIELD                       FIELD WIDTH        BEGIN-END COLUMNS
C
C  INFO FILE ITEM NAME             16                 1-16
C  OUTPUT FILE FIELD WIDTH          5                 17-21
C  INFO FILE FIELD WIDTH            4                 22-25
C  INFO FILE OUTPUT WIDTH           4                 26-29
C  INFO FILE ITEM TYPE              1                   30
C  INFO FILE NUMBER OF DECIMALS     1                   31
C
C FILE #2 CONTAINS THE DATA, DESCRIBED IN FILE #1
C
$INSERT SIZE.INS
      DOUBLE PRECISION INVAL
      CHARACTER FILNAM*128, FILINF*32, LINE80*80, LINE5K*5120
      CHARACTER DIR*128, USER*8, ITMNAM(MAXCOD)*16, NULSTR*16, CTYPE*1
      CHARACTER INSTR*128, FTNFMT*20
      INTEGER ITMARR (MAXCOD,5), ITMDES(5), ENCREC(1024)
C
C ARC/INFO SUBROUTINES:
      EXTERNAL LUNINI,  MINIT, INFINT, ACREAT, INFOPN, ITMALL, INFEX2
      EXTERNAL ACLOSE, INFGET, INFFMT, INFDEC, INFCLS
C
      PARAMETER (MXINLN=5120)
```

```
C
C1 -- INITIALIZE ARC LIBRARIES
      CALL LUNINI
      CALL MINIT
      CALL INFINT
C
C2 -- PROMPT USER FOR NEEDED INFORMATION
      CALL INCRLF ('Directory of INFO data base is ',32)
      READ (*,'(A)') DIR
      CALL INCRLF ('INFO username is ',18)
      READ (*,'(A)') USER
      CALL INCRLF ('INFO data filename is ',22)
      READ (*,'(A)') FILINF
      CALL INCRLF ('Field-definition file is ',26)
      READ (*,'(A)') FILNAM
C
C3 -- OPEN THE FIELD DEFINITION FILE AND THE INFO FILE
      CALL ACREAT (LUN,FILNAM,IER)
      IF (IER .NE. 0) STOP 'ERROR opening field-definition file'
      CALL INFOPN (FILINF,DIR,USER,1,INFNUM,NUMREC,LENREC,IER)
      IF (IER .NE. 0) STOP ' ERROR:  Unable to open INFO file'
C
C4 -- RETRIEVE LIST OF FIELD NAMES
      CALL ITMALL (INFNUM,MAXCOD,ITMNAM,NITEMS)
      IF (NITEMS .GT. MAXCOD) STOP ' ERROR:  Too many items'
C
C5 -- DESCRIBE EACH FIELD
      ICOL = 0
      DO 100 ITEM = 1, NITEMS
C
C5A --    RETRIEVE THE DESCRIPTION OF THE FIELD
          CALL INFEX2 (INFNUM,ITMNAM(ITEM),ITMDES,IEXIST)
          IF (IEXIST .NE. 1) STOP 'ERROR: Expected item not found'
          DO 98 I=1,5
98            ITMARR(ITEM,I) = ITMDES (I)
C
C ITMARR(*,1) = STARTING BYTE (IN INFO RECORD)
C ITMARR(*,2) = LENGTH IN BYTES (IN INFO RECORD)
C ITMARR(*,3) = ITEM TYPE CODE  (1=D, 2=C, 3=I, 4=N, 5=B, 6=F)
C ITMARR(*,4) = NUMBER OF DECIMAL PLACES (IN INFO DEFINITION)
C ITMARR(*,5) = LENGTH IN BYTES (IN OUTPUT RECORD)
C
          IF      (ITMARR(ITEM,3) .EQ. 1) THEN
             CTYPE = 'D'
             IF (ITMARR(ITEM,5) .LT. 8) ITMARR(ITEM,5) = 8
          ELSEIF (ITMARR(ITEM,3) .EQ. 2) THEN
             CTYPE = 'C'
          ELSEIF (ITMARR(ITEM,3) .EQ. 3) THEN
             CTYPE = 'I'
          ELSEIF (ITMARR(ITEM,3) .EQ. 4) THEN
             CTYPE = 'N'
          ELSEIF (ITMARR(ITEM,3) .EQ. 5) THEN
             CTYPE = 'B'
          ELSEIF (ITMARR(ITEM,3) .EQ. 6) THEN
             CTYPE = 'F'
          ELSE
             GOTO 880
          ENDIF
          ICOL = ICOL + ITMARR(ITEM,5)
```

```
C
C5B --    WRITE THE DESCRIPTION TO A FILE
          IF (CTYPE .EQ. 'F' .OR. CTYPE .EQ. 'N') THEN
              WRITE (LUN,11) ITMNAM(ITEM),ITMARR(ITEM,5),
     &                       ITMARR(ITEM,2),ITMARR(ITEM,5),
     &                       CTYPE,ITMARR(ITEM,4)
          ELSE
              WRITE (LUN,11) ITMNAM(ITEM),ITMARR(ITEM,5),
     &                       ITMARR(ITEM,2),ITMARR(ITEM,5),
     &                       CTYPE
          ENDIF
11        FORMAT (A16,I5,2I4,A1,I1)
C
C5C --    LET THE USER KNOW WHAT IS HAPPENING
          IF (MOD (ITEM,10) .EQ. 0) THEN
              WRITE (LINE80,'(I5,A)') ITEM, ' items defined'
              CALL ICRNLF (LINE80,19)
          ENDIF
100   CONTINUE
C
C6 -- PRINT SUMMARY OF ITEMS, AND CLEAN HOUSE
      WRITE (*,'(I5,A)') NITEMS, ' items defined'
      ENDFILE      (LUN)
      CALL ACLOSE (LUN)
      WRITE (*,'(I5,A)') ICOL,' bytes / record'
      IF (ICOL .GT. MXINLN) GOTO 900
C
C7 -- OPEN FILE FOR WRITING CONTENTS OF THE INFO FILE
      CALL INCRLF ('Data file is ',13)
      READ (*,'(A)') FILNAM
      IF (LENGTH (FILNAM,128) .EQ. 0) GOTO 1000
      CALL ACREAT (LUN,FILNAM,IER)
      IF (IER .NE. 0) GOTO 910
C
C8 -- EXAMINE EVERY RECORD IN THE FILE
      DO 200 IREC = 1, NUMREC
C
C8A --    RETRIEVE THE RECORD FROM THE INFO FILE
          CALL INFGET (INFNUM,IREC,ENCREC,IER)
          IF (IER .NE. 0) GOTO 890
          ICOL  = 1
          LINE5K = ''
C
C8B --    EXAMINE EVERY FIELD IN THE RECORD
          DO 150 ITEM = 1, NITEMS
C
C8B1 --       COPY THE FIELD DESCRIPTION AND DETERMINE A FORTRAN FORMAT
              DO 130 I=1,5
130               ITMDES (I) = ITMARR (ITEM,I)
              CALL INFFMT (ITMDES,FTNFMT,IER)
              IF (IER .NE. 0) GOTO 920
C
C8B2 --       EXTRACT THE FIELD CONTENTS FROM THE RECORD
              CALL INFDEC (ENCREC,LENREC,ITMDES,INVAL,INSTR,IER)
              IF (IER .NE. 0) GOTO 930
              IEND = ICOL + ITMDES(5) - 1
```

```
C
C8B3 --     APPEND THE FIELD ONTO A CHARACTER VARIABLE
            IF (ITMARR(ITEM,3) .EQ. 2) THEN
                LINE5K(ICOL:IEND) = INSTR
            ELSE
                IF (ITMARR(ITEM,3) .EQ. 1) FTNFMT = '(I8)'
                WRITE (LINE5K(ICOL:IEND),FTNFMT) INVAL
            ENDIF
            ICOL = IEND + 1
150     CONTINUE
C
C8C --   WRITE THE CHARACTER VERSION OF THE RECORD
         WRITE (LUN,'(A)') LINE5K
C
C8D --   LET THE USER KNOW WHAT IS HAPPENING
         IF (MOD(IREC,10) .EQ. 0) THEN
             WRITE (LINE80,'(I5,A)') IREC,' records written'
             CALL ICRNLF (LINE80,80)
         ENDIF
200     CONTINUE
C
C9 -- NORMAL TERMINATION
      GOTO 1000
C
C10 -- ERROR MESSAGES / EXITS
880    WRITE (*,'(2A)') 'ERROR: unknown item type:  ',CTYPE
       GOTO 1000
890    WRITE (*,'(A)') 'ERROR: unable to decode item'
       GOTO 1000
900    WRITE (*,'(2(A,I4))') 'ERROR:  record length (',MAXCOL,
      &                      ') exceeds maximum: ',MXINLN
       GOTO 1001
910    WRITE (*,'(2A)') 'ERROR opening data file:  ',FILNAM
       GOTO 1000
920    WRITE (*,'(2A)') 'ERROR: Determining format for ',ITMNAM(ITEM)
       GOTO 1000
930    WRITE (*,'(2A)') 'decoding', ITMNAM(ITEM)
       GOTO 1000
C
C11 -- HOUSE-CLEANING
1000   CALL INFCLS (INFNUM)
1001   ENDFILE (LUN)
       CALL ACLOSE (LUN)
       IREC = IREC - 1
       WRITE (*,'(I5,A)') IREC, ' INFO records written'
       STOP
       END
```

Attachment E. INFO program PROFILE listing

```
 PROGRAM SECTION ONE
REM PROFILE
DISP ' '
REM ----- DISPLAY WARNING (ANSI FLASHING CODE EMBEDDED ON NEXT LINE)
DISP 15T,'[5mWARNING:  DO NOT change data from INFO command level[0m'
```

Attachment F. INFO program STARTUP.PG listing

```
 PROGRAM SECTION ONE
REM SET DEFAULTS AND INITIALIZE GLOBAL VARIABLES
FORMAT $CHR1,10,10,C : REM DEFAULT PROJECT
FORMAT $NUM3, 1, 1,I : REM DATA BASE TIER: (1=BOTTOM,2=MIDDLE,3=TOP)
FORMAT $CHR4, 8, 8,C : REM UNIQUE DATA-BASE NAME
FORMAT $NUM5, 2, 2,I : REM MENU OPTION
FORMAT $NUM6, 1, 1,I : REM SUBSETTING 'OR' CONDITION FLAG
FORMAT $NUM7, 4, 6,B : REM NUMBER OF RECORDS IN SET
FORMAT $CHR8, 8, 8,C : REM DELETION PASSWORD
FORMAT $CHR9,16,16,C : REM PRINTER OPTION
FORMAT $NUM11,4, 6,B : REM VARIABLE NUMBER CONTAINING OPTION CODE
MOVE '4640-08200' TO $CHR1
CALC $NUM3          = 1
MOVE 'DOKOKL01' TO $CHR4
MOVE 'ALLEY'     TO $CHR8
MOVE '-AT RASA' TO $CHR9
CALC $ERROR-POSITION = 24
CALC $COMMA-SWITCH   = -1
CALC $NM             = 1
DFMT YMD-
DELIMITER |
```

Attachment G. INFO program MAIN-MENU.PG listing

```
PROGRAM SECTION ONE
REM MAIN-MENU
LABEL DISP-MAIN-MENU
DISP =
DISP AT 1,1,'Land-use and land-cover data base main menu'
DISP AT 3,1,'Code   Option'
DISP AT 4,1,'----   -------------------------------------------------'
DISP AT 5,1,' 1     Enter new field sheets from terminal'
DISP AT 6,1,' 2     Select and process field sheets from data base'
DISP AT 8,1,' 99    Exit from data-base software'
DISP AT 10,1,'Enter code for the option desired:   ',=
ACCEPT $NUM5
CALC $NUM11 = 5
RUN EXIT-OPTION.PG LINK
IF $NUM5 = 1
   RUN ENTER-FORM.PG
ENDIF
IF $NUM5 = 2
   RUN SUBSET.PG LINK
   GOTO DISP-MAIN-MENU
ENDIF
DISP AT 24,1,'Invalid menu-option selected, please re-enter'
SLEEP 1
GOTO DISP-MAIN-MENU
```

```
 PROGRAM SECTION ONE
REM SUBSET THE DATA FOR USE BY AN APPLICATION PROGRAM
FORMAT $NUM7,  4, 5,B  : REM NUMBER OF SELECTED RECORDS
FORMAT $DAT18, 8, 8,D  : REM EARLIER DATE
FORMAT $DAT19, 8, 8,D  : REM LATTER DATE
FORMAT $CHR20,32,32,C  : REM INFO COMMAND
FORMAT $NUM24, 4, 8,F,3 : REM MINIMUM DECIMAL DEGREES
FORMAT $NUM25, 4, 8,F,3 : REM MAXIMUM DECIMAL DEGREES
FORMAT $NUM26, 4, 4,F,0 : REM DEGREES
FORMAT $NUM27, 4, 2,F,0 : REM MINUTES
FORMAT $NUM28, 4, 2,F,0 : REM SECONDS
FORMAT $NUM29, 1, 1,I  : REM MISC. INTEGER
FORMAT $CHR30,15,15,C  : REM MISC. CHARACTER
FORMAT $CHR32, 2, 2,C  : REM AUXILIARY DATA
FORMAT $CHR33, 7, 7,C  : REM DISTANCE RANGE ("-100FT" OR "-1/4MI")
FORMAT $NUM34, 2, 2,I  : REM MISC. INTEGER
FORMAT $NUM35, 1, 1,I  : REM MISC. INTEGER
SELECT FORM.DF
RELATE SELECTED-SET.DF 1 RECORD# INIT
CALC $1RECORD# = RECORD#
CALC $NUM5 = 0
CALC $NUM6 = 0
CALC $NUM7 = $NOSEL
LABEL SUBSET-MENU-1
DISP =
DISP AT  1,1,'Primary Grouping-options menu'
DISP AT  3,1,'Code    Option'
DISP AT  4,1,'----    ----------------------------------------------------------------',
DISP AT  5,1,'  1     Process current group: ',$NUM7,' selected of ',$NOREC,' total field sheets'
DISP AT  6,1,'  2     Group by site-identification number'
DISP AT  7,1,'  3     Group by range of site-visit date'
DISP AT  8,1,'  4     Group by name of person visiting site'
DISP AT  9,1,'  5     Group by range of latitude'
DISP AT 10,1,'  6     Group by range of longitude'
DISP AT 11,1,'  7     Group by project number'
DISP AT 12,1,'  8     Group by predominant land use'
DISP AT 13,1,'  9     Group by occurrence of a land use'
DISP AT 14,1,' 10     Group by occurrence of a local feature'
DISP AT 15,1,' 11     Group by record status'
DISP AT 16,1,' 12     Group by source data-base-system name'
DISP AT 18,1,' 13     Save current group for later use'
DISP AT 17,1,' 14     Retrieve previously saved group'
DISP AT 20,1,' 98  .  Return to main menu'
DISP AT 21,1,' 99     Exit from data-base software'
DISP AT 23,1,'Enter code for the grouping option desired:  ',=
ACCEPT $NUM5
REM ----- EXIT TO INFO COMMAND-LEVEL
CALC $NUM11 = 5
RUN EXIT-OPTION.PG LINK
REM ----- EXIT TO MAIN MENU
IF $NUM5 = 98
   RUN MAIN-MENU.PG
ENDIF
REM ----- PROCESS CURRENT GROUP
IF $NUM5 = 1
   RUN APPLICATIONS-MENU.PG
ENDIF
```

```
REM ----- GROUP BY SITEID
IF $NUM5 = 2
   FORMAT $CHR30,15,15,C    : REM SITEID
   DISP =
   DISP 'Enter site-identification number:   ',=
   ACCEPT $CHR30
   RESELECT SITEID EQ $CHR30
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY DATE RANGE
IF $NUM5 = 3
   DISP =
   DISP AT 1,1,'Grouping by range of site-visit dates'
   DISP AT 3,1,'Enter earliest date:  Yr-Mo-Dy'
   ACCEPT AT 3,23,$DAT18
   DISP AT 5,1,'Enter  latest  date: Yr-Mo-Dy  (<CR> = today)'
   ACCEPT AT 5,23,$DAT19
   IF $DAT19 = 0
      CALC $DAT19 = $TODAY
      DISP AT 5,23,$DAT19
   ENDIF
   RESELECT DATE.NUM GE $NUM18 AND DATE.NUM LE $NUM19
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY FIELD PERSON
IF $NUM5 = 4
   FORMAT $CHR30,15,15,C    : REM NAME OF PERSON
   DISP =
   DISP AT 1,1,'Grouping by name of person visiting site'
   DISP AT 3,1,'Enter name of field person (or part thereof):   ',=
   ACCEPT $CHR30
   CONC $CHR20 FROM 'RES PERSON CN ''',$CHR30,''''
   EXEC $CHR20
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY LATITUDE
IF $NUM5 = 5
   DISP =
   DISP AT 1,1,'Grouping by range of site latitude'
   DISP AT 3,1,'Enter minimum latitude degrees:   ',=
   ACCEPT $NUM26
   DISP AT 4,1,'Enter minimum latitude minutes:   ',=
   ACCEPT $NUM27
   DISP AT 5,1,'Enter minimum latitude seconds:   ',=
   ACCEPT $NUM28
   CALC $NUM24 = $NUM26 + $NUM27 / 60. + $NUM28 / 3600.
   DISP AT 7,1,'Enter maximum latitude degrees:   ',=
   ACCEPT $NUM26
   DISP AT 8,1,'Enter maximum latitude minutes:   ',=
   ACCEPT $NUM27
   DISP AT 9,1,'Enter maximum latitude seconds:   ',=
   ACCEPT $NUM28
   CALC $NUM25 = $NUM26 + $NUM27 / 60. + $NUM28 / 3600.
   RUN CVT-DMS-2-DD.PG LINK
   RESELECT $2LAT-DD GE $NUM24 AND $2LAT-DD LE $NUM25
   RELATE 2
   GOTO SUBSET-MENU-2
ENDIF
```

```
REM ----- GROUP BY LONGITUDE
IF $NUM5 = 6
   DISP =
   DISP AT 1,1,'Grouping by range of site longitude'
   DISP AT 3,1,'Enter minimum longitude degrees:  ',=
   ACCEPT $NUM26
   DISP AT 4,1,'Enter minimum longitude minutes:  ',=
   ACCEPT $NUM27
   DISP AT 5,1,'Enter minimum longitude seconds:  ',=
   ACCEPT $NUM28
   CALC $NUM24 = $NUM26 + $NUM27 / 60. + $NUM28 / 3600.
   DISP AT 7,1,'Enter maximum longitude degrees:  ',=
   ACCEPT $NUM26
   DISP AT 8,1,'Enter maximum longitude minutes:  ',=
   ACCEPT $NUM27
   DISP AT 9,1,'Enter maximum longitude seconds:  ',=
   ACCEPT $NUM28
   CALC $NUM25 = $NUM26 + $NUM27 / 60. + $NUM28 / 3600.
   RUN CVT-DMS-2-DD.PG LINK
   RESELECT $2LON-DD GE $NUM24 AND $2LON-DD LE $NUM25
   RELATE 2
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY PROJECT NUMBER
IF $NUM5 = 7
   FORMAT $CHR30,15,15,C    : REM PROJECT CODE
   DISP =
   DISP AT 1,1,'Grouping by project number'
   DISP AT 3,1,'Enter project number (or part thereof):  ',=
   ACCEPT $CHR30
   CONC $CHR20 FROM 'RES PROJECT CN ''',$CHR30,''''
   EXEC $CHR20
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY PREDOMINANT LAND-USE
IF $NUM5 = 8
   FORMAT $CHR32, 2, 2,C    : REM LAND-USE OR DISTANCE-RANGE CODE
   FORMAT $CHR33, 7, 7,C    : REM DISTANCE RANGE ("-100FT" OR "-1/4MI")
   FORMAT $NUM34, 2, 2,I    : REM 2 DIGIT LAND-USE CODE
   FORMAT $NUM35, 1, 1,I    : REM 1 DIGIT LAND-USE CODE
   CALC $NUM11 = 32
   LABEL PREDOM-LU
   DISP =
   DISP AT 1,1,'Grouping by predominant land use'
   RUN GET-LU-CODE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO SUBSET-MENU-1
   ENDIF
   DISP =
   DISP AT 1,1,'Grouping by predominant land use'
   RUN GET-DISTANCE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO PREDOM-LU
   ENDIF
   IF $NUM29 = 1
      CONC $CHR20 FROM 'RES DLU',$CHR33,' CN ''',$CHR35,''''
   ELSE
      CONC $CHR20 FROM 'RES DLU',$CHR33,' CN ''',$CHR34,''''
   ENDIF
   EXEC $CHR20
   GOTO SUBSET-MENU-2
ENDIF
```

```
REM ----- GROUP BY OCCURRENCE OF LAND-USE
IF $NUM5 = 9
   FORMAT $CHR32, 2, 2,C    : REM LAND-USE OR DISTANCE RANGE CODE
   FORMAT $CHR33, 7, 7,C    : REM DISTANCE RANGE ("-100FT" OR "-1/4MI")
   FORMAT $NUM34, 2, 2,I    : REM 2 DIGIT LAND-USE CODE
   FORMAT $NUM35, 1, 1,I    : REM 1 DIGIT LAND-USE CODE
   CALC $NUM11 = 32
   LABEL LOCAL-LU
   DISP =
   DISP AT 1,1,'Grouping by occurrence of land use/land cover'
   RUN GET-LU-CODE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO SUBSET-MENU-1
   ENDIF
   DISP =
   DISP AT 1,1,'Grouping by occurrence of land use/land cover'
   RUN GET-DISTANCE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO LOCAL-LU
   ENDIF
   IF $NUM29 = 1
      CONC $CHR20 FROM 'RES USE',$CHR35,$CHR33,' NC '' ''''
   ELSE
      CONC $CHR20 FROM 'RES USE',$CHR34,$CHR33,' NC '' ''''
   ENDIF
   EXEC $CHR20
   GOTO SUBSET-MENU-2
ENDIF
REM ----- GROUP BY OCCURRENCE OF LOCAL-FEATURE
IF $NUM5 = 10
   FORMAT $CHR32, 2, 2,C    : REM FEATURE OR DISTANCE-RANGE CODE
   FORMAT $CHR33, 7, 7,C    : REM DISTANCE RANGE ("-100FT" OR "-1/4MI")
   FORMAT $NUM34, 2, 2,I    : REM 2 DIGIT FEATURE-CODE
   FORMAT $NUM35, 1, 1,I    : REM 1 DIGIT FEATURE-CODE
   CALC $NUM11 = 32
   LABEL LOCAL-FEAT
   DISP =
   DISP AT 1,1,'Grouping by occurrence of a local feature'
   RUN GET-FEAT-CODE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO SUBSET-MENU-1
   ENDIF
   DISP =
   DISP AT 1,1,'Grouping by occurrence of a local feature'
   RUN GET-DISTANCE.PG LINK
   RUN EXIT-OPTION.PG LINK
   IF $NUM32 = 98
      GOTO LOCAL-FEAT
   ENDIF
   IF $NUM29 = 1
      CONC $CHR20 FROM 'RES FEAT',$NUM35,$CHR33,' NC '' ''''
   ELSE
      CONC $CHR20 FROM 'RES FEAT',$NUM34,$CHR33,' NC '' ''''
   ENDIF
   EXEC $CHR20
   GOTO SUBSET-MENU-2
ENDIF
```

```
REM ----- GROUP BY RECORD STATUS
IF $NUM5 = 11
    FORMAT $NUM32, 2, 2,I
    CALC $NUM11 = 32
    LABEL STATUS-MENU
    DISP =
    DISP AT  1,1,'Grouping by record status'
    DISP AT  3,1,'Code   Grouping option'
    DISP AT  4,1,'----   ----------------------------------------------------------'
    DISP AT  5,1,'  1    All field sheets not sent to higher-tier data base'
    DISP AT  6,1,'  2    All field sheets previously sent to higher-tier data base'
    DISP AT  8,1,'  98    Exit from menu'
    DISP AT  9,1,'  99    Exit from data-base software'
    DISP AT 11,1,'Enter code for the option desired:   ',=
    ACCEPT $NUM32
    RUN EXIT-OPTION.PG LINK
    IF $NUM32 = 1
        RESELECT UPDATE-FLAG = 'X'
        GOTO SUBSET-MENU-2
    ENDIF
    IF $NUM32 = 2
        RESELECT UPDATE-FLAG = ' '
        GOTO SUBSET-MENU-2
    ENDIF
    IF $NUM32 = 98
        GOTO SUBSET-MENU-1
    ENDIF
    DISP AT 14,1,'Invalid option-code selected, please re-enter'
    GOTO STATUS-MENU
ENDIF
REM ----- GROUP BY SOURCE DATA-BASE-SYSTEM NAME
IF $NUM5 = 12
    FORMAT $CHR30,8,8,C : REM SOURCE DATA-BASE-SYSTEM NAME
    DISP =
    DISP AT 1,1,'Grouping by source data-base-system name'
    DISP AT 3,1,'Enter name of source data-base system:   ',=
    ACCEPT $CHR30
    CONC $CHR20 FROM 'RES SOURCE-DB CN ''',$CHR30,''''
    EXEC $CHR20
    GOTO SUBSET-MENU-2
ENDIF
REM ----- SAVE RECORD NUMBERS
IF $NUM5 = 13
    DISP =
    DISP AT 1,1,'Saving selected record numbers'
    RELATE SAVED-SET.DF 2 BY RECORD# INIT
    CALC $2RECORD# = RECORD#
    DISP AT 3,1,$NOSEL,' records saved in group'
    SLEEP 1
    RELATE 2
    GOTO SUBSET-MENU-2
ENDIF
REM ----- RETRIEVE RECORD NUMBERS
IF $NUM5 = 14
    DISP =
    DISP AT 1,1,'Retrieving saved record numbers'
    RELATE SAVED-SET.DF 2 BY RECORD#
    RESELECT RECORD# = $2RECORD#
    DISP AT 3,1,$NOSEL,' records retrieved in group'
    SLEEP 1
    RELATE 2
    GOTO SUBSET-MENU-2
ENDIF
```

```
REM ----- INVALID GROUP-MENU OPTION
DISP AT 24,1,'Invalid option-code selected:   ',$NUM5,=
SLEEP 1
GOTO SUBSET-MENU-1
REM -------------------------------------------------------------------
REM
LABEL SUBSET-MENU-2
IF $NUM6 = 1
   REM ----- OPTIONAL 'OR' CONDITION
   RELATE SELECTED-SET.DF 1 RECORD# FILL
   CALC $1RECORD# = RECORD#
   RELATE 1
   ASELECT
   RELATE SELECTED-SET.DF 1 RECORD#
   RESELECT RECORD# = $1RECORD#
ELSE
   REM ----- OPTIONAL 'AND' CONDITION
   RELATE SELECTED-SET.DF 1 RECORD# INIT
   CALC $1RECORD# = RECORD#
ENDIF
RELATE 1
LABEL SUBSET-MENU-2-A
DISP =
DISP AT  1,1,'Secondary grouping-options menu'
DISP AT  3,1,'Group created:',$NOSEL,' selected of',$NOREC,' field sheets'
DISP AT  5,1,'Code    Option'
DISP AT  6,1,'----    ----------------------------------------'
DISP AT  7,1,'  1     Process current group'
DISP AT  8,1,'  2     Reduce  current group    (AND condition)'
DISP AT  9,1,'  3     Enlarge current group    (OR condition)'
DISP AT 10,1,'  4     Exclude current group    (NOT condition)'
DISP AT 11,1,'  5     Include complete set '
DISP AT 12,1,'  6     Return to primary grouping-options menu'
DISP AT 14,1,' 98     Return to main menu'
DISP AT 15,1,' 99     Exit from data base'
DISP AT 17,1,'Enter code for the option desired:   ',=
ACCEPT $NUM5
CALC $NUM11 = 5
RUN EXIT-OPTION.PG LINK
REM ----- EXIT TO MAIN MENU
IF $NUM5 = 98
   RUN MAIN-MENU.PG
ENDIF
REM ----- PROCESS CURRENT GROUP
IF $NUM5 = 1
   RUN APPLICATIONS-MENU.PG
ENDIF
REM ----- REDUCE CURRENT GROUP
IF $NUM5 = 2
   CALC $NUM6 = 0
   CALC $NUM7 = $NOSEL
   GOTO SUBSET-MENU-1
ENDIF
REM ----- ENLARGE CURRENT GROUP
IF $NUM5 = 3
   CALC $NUM6 = 1
   CALC $NUM7 = $NOSEL
   ASELECT
   GOTO SUBSET-MENU-1
ENDIF
```

```
REM ----- COMPLEMENTARY GROUP
IF $NUM5 = 4
   CALC $NUM6 = 0
   NSELECT
   CALC $NUM7 = $NOSEL
   RELATE SELECTED-SET.DF 1 RECORD# INIT
   CALC $1RECORD# = RECORD#
   RELATE 1
   GOTO SUBSET-MENU-1
ENDIF
REM ----- RETURN TO COMPLETE SET
IF $NUM5 = 5
   CALC $NUM6 = 0
   CALC $NUM7 = $NOREC
   ASELECT
   RELATE SELECTED-SET.DF 1 RECORD# INIT
   CALC $1RECORD# = RECORD#
   RELATE 1
   GOTO SUBSET-MENU-1
ENDIF
REM ----- RETAIN CURRENT GROUP, RETURN TO PRIMARY GROUPING-OPTIONS MENU
IF $NUM5 = 6
   CALC $NUM6 = 0
   CALC $NUM7 = $NOSEL
   GOTO SUBSET-MENU-1
ENDIF
DISP AT 24,1,'Invalid option-code, please re-enter'
SLEEP 1
GOTO SUBSET-MENU-2-A
```

Attachment I. INFO program APPLICATIONS-MENU.PG listing

```
 PROGRAM SECTION ONE
REM APPLICATIONS MENU
FORMAT $CHR20,80,80,C
FORMAT $CHR30,1,1,C
LABEL APP-MENU
DISP =
DISP AT  1,1,'Processing-options menu'
DISP AT  3,1,'Code   Option'
DISP AT  4,1,'----   ------------------------------------------'
DISP AT  5,1,'  1    Print report summarizing field sheets'
DISP AT  6,1,'  2    Write file of site-identification numbers'
DISP AT  7,1,'  3    Print facsimiles of field sheets'
DISP AT  8,1,'  4    Update field sheets'
DISP AT  9,1,'  5    Delete field sheets'
DISP AT 11,1,' 98    Exit from menu'
DISP AT 12,1,' 99    Exit from data-base software'
DISP AT 14,1,'Enter code for the processing option desired:  ',=
ACCEPT $NUM5
CALC $NUM11 = 5
RUN EXIT-OPTION.PG LINK
REM ----- EXIT MENU
IF $NUM5 = 98
   RUN SUBSET.PG
ENDIF
```

```
REM ----- SUMMARIZE FIELD SHEETS IN A REPORT
IF $NUM5 = 1
   DISP =
   DISP AT 1,1,'Summary Report'
   DISP AT 3,1,'Sorting field sheets...'
   SORT PROJECT,SITEID,DATE,UPDATE-FLAG
   RELATE CODE-LU.DF   1 BY DLU-100FT
   RELATE CODE-FLAG.DF 2 BY UPDATE-FLAG
   OUTPUT SUMMARY-REPORT
   DISP AT 3,1,'Preparing report...'
   REPORT SUMMARY.RP Y 66, SUPPRESS GRAND
   DISP AT 3,1,'Print report ',$CHR9,' (Y/N) ? ',=
   ACCEPT $CHR30
   IF $CHR30 = 'Y' OR $CHR30 = 'y'
      CONC $CHR20 FROM 'SPOOL SUMMARY-REPORT ',$CHR9
      EXEC $CHR20
   ENDIF
   SORT RECORD#
   GOTO APP-MENU
ENDIF
REM ----- WRITE FILE OF SITE-IDENTIFICATION NUMBERS
IF $NUM5 = 2
   RUN OUTPUT-SITEIDS.PG LINK
   GOTO APP-MENU
ENDIF
REM ----- PRINT FIELD SHEETS
IF $NUM5 = 3
   OUTPUT PRINTED-FORMS
   RUN PRINT-FORM.PG LINK
   DISP AT 5,1,'Print field sheets ',$CHR9,' (Y/N) ? ',=
   ACCEPT $CHR30
   IF $CHR30 = 'Y' OR $CHR30 = 'y'
      CONC $CHR20 FROM 'SPOOL PRINTED-FORMS ',$CHR9
      EXEC $CHR20
   ENDIF
   GOTO APP-MENU
ENDIF
REM ----- UPDATE FIELD SHEETS
IF $NUM5 = 4
   RUN UPDATE-FORM.PG
   GOTO APP-MENU
ENDIF
REM ----- DELETE FIELD SHEETS
IF $NUM5 = 5
   RUN DELETE-FORM.PG LINK
   GOTO APP-MENU
ENDIF
DISP AT 24,1,'Invalid processing-option code, please re-enter'
SLEEP 1
GOTO APP-MENU
```

```
 PROGRAM SECTION ONE
REM ENTER-FORM.PG :  INTERACTIVE DATA ENTRY FORM
FORMAT $DAT20,8,8,D            : REM DATE OF VISIT
FORMAT $CHR21,15,15,C          : REM FIELD PERSON
FORMAT $CHR23,23,23,C          : REM PRIMARY-KEY OF PREVIOUS SITE VISIT
FORMAT $CHR30,2,2,I            : REM TOWNSHIP NUMBER
FORMAT $CHR31,1,1,C            : REM TOWNSHIP DIRECTION (N/S)
FORMAT $CHR32,2,2,I            : REM RANGE NUMBER
FORMAT $CHR33,1,1,C            : REM RANGE DIRECTION (E/W)
FORMAT $CHR34,2,2,I            : REM SECTION NUMBER (1-36)
FORMAT $CHR35,3,3,C            : REM SUB-SECTIONS (A,B,C,D)
FORMAT $CHR36,1,1,C            : REM LOCAL SEQUENCE NUMBER
FORMAT $CHR37,1,1,C            : REM DISPOSITION CODE
FORMAT $NUM40,1,1,I            : REM INPUT(1)/UPDATE(2) CODE
REM
LABEL NEW_RECORD
DISP =
SELECT FORMS-UPDATE.DF
PURGE
SELECT HEADER.DF
PURGE
IPF HEADER.IF AL
IF SITEID EQ ''
   RUN MAIN-MENU.PG
ENDIF
RELATE FORM.DF 1 BY PRIMARY-KEY RO
REM ----- CHECK FOR DUPLICATE PRIMARY-KEY
RESELECT PRIMARY-KEY = $1PRIMARY-KEY
IF $NOSEL NE 0
   DISP AT 24,1,'Field sheet already entered.  Enter new station id and date? (Y/N):  ',=
   ACCEPT $CHR37
   IF $CHR37 = 'Y' OR $CHR37 = 'y'
     GOTO NEW_RECORD
   ELSE
     RUN MAIN-MENU.PG
   ENDIF
ENDIF
REM ----- CHECK FOR REVISIT OF EXISTING SITE
ASELECT
RELATE FORM.DF 1 BY SITEID RO
RESELECT SITEID = $1SITEID
IF $NOSEL NE 0
   CALC $NUM40 = 2
   DISP AT 24,1,'Copying data from previous site-visit...please wait',=
   CALC $DAT20 = DATE
   MOVE PERSON TO $CHR21
   MOVE $1PRIMARY-KEY TO $CHR23
   PURGE
   SELECT FORM.DF
   RESELECT PRIMARY-KEY = $CHR23
   COMO -NTTY
   SAVE BINARY-FORMS INIT
   COMO -TTY
   SELECT FORMS-UPDATE.DF
   GET BINARY-FORMS COPY
   MOVE $DAT20 TO DATE
   MOVE $CHR21 TO PERSON
   MOVE TOWNSHIP     TO $CHR30
   MOVE TOWNSHIP_DIR TO $CHR31
   MOVE RANGE        TO $CHR32
   MOVE RANGE_DIR    TO $CHR33
   MOVE SECTION      TO $CHR34
   MOVE SUBSECTION   TO $CHR35
   MOVE SEQUENCE     TO $CHR36
```

```
    DISP AT 24,1,'Previous site-visit data copied',21X,=
    GOTO ENTER_FORM
ENDIF
CALC $NUM40 = 1
DISP AT 24,1,'New site',=
SELECT HEADER.DF
RELATE FORMS-UPDATE.DF 1 BY PRIMARY-KEY FILL
MOVE PERSON  TO $1PERSON
MOVE PROJECT TO $1PROJECT
PURGE
SELECT FORMS-UPDATE.DF
REM
LABEL ENTER_FORM
SLEEP 1
RELATE CODE-LU.DF 1 DLU-100FT RO
RELATE CODE-LU.DF 2 DLU-1/4MI RO
MOVE 'D' TO $CHR37
DISP AT 24,1,80X,=
REM ----- COLLECT THE REST OF THE DATA FOR A NEW SITE
PROGRAM SECTION TWO
IF $NUM40 = 1
  UPF FORM.IF AL NC
ENDIF
PROGRAM SECTION THREE
REM ----- THIS PROGRAM SECTION IS NOT USED
PROGRAM SECTION FOUR
REM ----- UPDATE THE REST OF THE DATA FOR A NEW VISIT TO A PREVIOUS SITE
IF $NUM40 = 2
  UPF REVISIT.UF AL NC
ENDIF
PROGRAM SECTION FIVE
REM ----- IF USER ABORTED ENTRY, DISCARD DATA
IF $CHR37 = 'D'
   PURGE
   DISP AT 24,1,'Data entry aborted...data discarded',=
   SLEEP 1
   RUN MAIN-MENU.PG
ENDIF
REM ----- OTHERWISE, MERGE NEW DATA INTO DATA BASE
MOVE 'X' TO UPDATE-FLAG
CONC LOCALID FROM $CHR30,$CHR31,'-',$CHR32,$CHR33,'-',$CHR34,' ',$CHR35,' ',$CHR36
MOVE $CHR4 TO SOURCE-DB
SAVE BINARY-FORMS INIT
DISPLAY =
SELECT FORM.DF
GET BINARY-FORMS COPY
RESELECT $RECNO = $NOREC
CALC RECORD# = $RECNO
REM ----- CONTINUE DATA ENTRY, OR EXIT, AS PER USER'S SPECIFICATION
IF $CHR37 = 'C'
   RUN ENTER-FORM.PG
ENDIF
SELECT FORMS-UPDATE.DF
PURGE
RUN MAIN-MENU.PG
```

```
 PROGRAM SECTION ONE
REM DISPLAY AND GET FROM USER ACCEPTABLE LAND-USE/LAND-COVER CODES
LABEL ENTER_CODE
DISPLAY AT  3, 1,'Code   Category'
IF $NUM5 = 8
DISPLAY AT  5, 1,' 1      ANY URBAN'
ENDIF
DISPLAY AT  6, 1,' 1A    --Residential'
DISPLAY AT  7, 1,' 1B    --Commercial'
DISPLAY AT  8, 1,' 1C    --Industrial'
DISPLAY AT  9, 1,' 1D    --Other urban land'
DISPLAY AT  3,28,'Code   Category'
IF $NUM5 = 8
DISPLAY AT  5,28,' 2      ANY AGRICULTURAL'
ENDIF
DISPLAY AT  6,28,' 2A    --Non-irrigated cropland'
DISPLAY AT  7,28,' 2B    --Irrigated cropland'
DISPLAY AT  8,28,' 2C    --Pasture'
DISPLAY AT  9,28,' 2D    --Orchard, grove,'
DISPLAY AT 10,28,'          vineyard, or nursery'
DISPLAY AT 11,28,' 2E    --Confined feeding'
DISPLAY AT 12,28,'          operation'
DISPLAY AT 13,28,' 2F    --Other agricultural land'
DISPLAY AT  3,60,'Code   Category'
DISPLAY AT  6,60,' 3     RANGELAND'
DISPLAY AT  7,60,' 4     FOREST LAND'
DISPLAY AT  8,60,' 5     WATER'
DISPLAY AT  9,60,' 6     WETLAND'
DISPLAY AT 10,60,' 7     BARREN LAND'
DISPLAY AT 15, 1,'Enter one of the codes above:  ',=
ACCEPT $CHR32
CALC $NUM29 = 0
IF $NUM5 = 8 AND ( $CHR32 = '1 ' OR $CHR32 = '2 ' )
   CALC $NUM29 = 1
ENDIF
IF $CHR32 = '1A' OR $CHR32 = '1B' OR $CHR32 = '1C' OR $CHR32 = '1D'
   CALC $NUM29 = 1
ENDIF
IF $CHR32 = '2A' OR $CHR32 = '2B' OR $CHR32 = '2C' OR $CHR32 = '2D'
   CALC $NUM29 = 1
ENDIF
IF $CHR32 = '2E' OR $CHR32 = '2F' OR $CHR32 = '3 ' OR $CHR32 = '4 '
   CALC $NUM29 = 1
ENDIF
IF $CHR32 = '5 ' OR $CHR32 = '6 ' OR $CHR32 = '7 '
   CALC $NUM29 = 1
ENDIF
IF $CHR32 EQ 'Q'
   GOTO EXIT
ENDIF
IF $NUM29 = 0
   DISPLAY AT 24, 1,'Invalid code entered, please re-enter, or type Q to exit'
   SLEEP 1
   DISPLAY AT 24, 1,'                                                          '
   GOTO ENTER_CODE
ENDIF
IF $NUM32 > 2 AND $NUM32 < 8
   CALC $NUM35 = $NUM32
   CALC $NUM29 = 1
ELSE
   MOVE $CHR32 TO $CHR34
   CALC $NUM29 = 2
ENDIF
LABEL EXIT
```

```
 PROGRAM SECTION ONE
REM DISPLAY AND GET FROM USER ACCEPTABLE LOCAL FEATURE CODES
LABEL FEAT-MENU
DISPLAY AT  3, 1,'Code Local Feature'
DISPLAY AT  5, 1,'  1  Gas station'
DISPLAY AT  6, 1,'  2  Dry cleaner'
DISPLAY AT  7, 1,'  3  Chemical plant or'
DISPLAY AT  8, 1,'      storage facility'
DISPLAY AT  9, 1,'  4  Airport'
DISPLAY AT 10, 1,'  5  Military base'
DISPLAY AT 11, 1,'  6  Road'
DISPLAY AT 12, 1,'  7  Pipeline or fuel'
DISPLAY AT 13, 1,'      storage facility'
DISPLAY AT 14, 1,'  8  Septic field'
DISPLAY AT 15, 1,'  9  Waste disposal pond'
DISPLAY AT  3,27,'Code Local Feature'
DISPLAY AT  5,28,'10  Landfill'
DISPLAY AT  6,28,'11  Golf course'
DISPLAY AT  7,28,'12  Stream, river, or'
DISPLAY AT  8,28,'     creek'
DISPLAY AT  9,28,'13  Irrigation canal'
DISPLAY AT 10,28,'14  Drainage ditch'
DISPLAY AT 11,28,'15  Lake'
DISPLAY AT 12,28,'16  Reservoir'
DISPLAY AT 13,28,'17  Bay or estuary'
DISPLAY AT 14,28,'18  Spring'
DISPLAY AT 15,28,'19  Salt flat or playa'
DISPLAY AT  3,54,'Code Local Feature'
DISPLAY AT  5,55,'20  Mine, quarry, or'
DISPLAY AT  6,55,'     gravel pit'
DISPLAY AT  7,55,'21  Oil well'
DISPLAY AT  8,55,'22  Major withdrawal '
DISPLAY AT  9,55,'     well'
DISPLAY AT 10,55,'23  Waste injection'
DISPLAY AT 11,55,'     well'
DISPLAY AT 12,55,'24  Recharge injection'
DISPLAY AT 13,55,'     well'
DISPLAY AT 14,55,'25  Other'
DISP AT 17,1,'Enter a local-feature code:  ',=
ACCEPT $NUM32
IF $NUM32 = 98 OR $NUM32 = 99 OR $NUM32 = -1
   GOTO EXIT
ENDIF
IF $NUM32 < 1 OR $NUM32 > 25
   DISP AT 24,1,'Invalid local-feature code, please re-enter'
   SLEEP 1
   GOTO FEAT-MENU
ENDIF
IF $NUM32 < 10
   CALC $NUM29 = 1
   CALC $NUM35 = $NUM32
ELSE
   CALC $NUM29 = 2
   CALC $NUM34 = $NUM32
ENDIF
LABEL EXIT
```

Attachment M. INFO program GET-DISTANCE.PG listing

```
PROGRAM SECTION ONE
REM DISPLAY AND GET ACCEPTABLE DISTANCE RANGE FROM USER
FORMAT $CHR33,7,7,C
LABEL GET-DISTANCE
DISP AT  3,1,'Selecting distance range:'
DISP AT  5,1,'Code   Distance range'
DISP AT  6,1,'----   ---------------'
DISP AT  7,1,'  1    Within 100 feet'
DISP AT  8,1,'  2     From  100 feet to 1/4 mile'
DISP AT 10,1,'Enter distance-range code:  ',=
ACCEPT $NUM5
IF $NUM5 = -1 OR $NUM5 = 98 OR $NUM5 = 99
   GOTO EXIT
ENDIF
IF $NUM5 = 1
   MOVE '-100FT' TO $CHR33
   GOTO EXIT
ENDIF
IF $NUM5 = 2
   MOVE '-1/4MI' TO $CHR33
   GOTO EXIT
ENDIF
   DISP AT 24,1,'Invalid distance-range code, please re-enter'
   SLEEP 1
   GOTO GET-DISTANCE
LABEL EXIT
```

Attachment N. INFO program CVT-DMS-2-DD.PG listing

```
 PROGRAM SECTION ONE
REM CONVERT LAT-LONG (DMS) TO LAT-LONG (DD), BASE-61 IS NOT CHECKED
REM
RELATE LAT-LON.DF 2 RECORD# INIT
CALC $2LAT-DMS = LATITUDE
CALC $2LON-DMS = LONGITUDE
REM
REM ----- FOR EACH SELECTED RECORD, CALCULATE DECIMAL DEGREES
PROGRAM SECTION TWO
CALC $2LAT-DD = $2LAT-DEG + $2LAT-MIN / 60 + $2LAT-SEC / 3600
CALC $2LON-DD = $2LON-DEG + $2LON-MIN / 60 + $2LON-SEC / 3600
 PROGRAM END
```

Attachment O. INFO program OUTPUT-SITEIDS.PG listing

```
PROGRAM SECTION ONE
REM OUTPUT-SITEIDS.PG
REM CREATES A ASCII FILE OF SITEIDS FROM THE SELECTED SET OF RECORDS
FORMAT $CHR40,1,1,C
DISP =
DISP AT 1,1,'Creating file of site-identification numbers'
OUTPUT SITEIDS
DISP AT 3,1,'Prefix siteids with USGS agency code?  ',=
ACCEPT $CHR40
IF $CHR30 = 'Y' OR $CHR30 = 'y'
    DISPLAY 1T,'USGS ',6T,SITEID PRINT
ELSE
    DISPLAY 1T,SITEID PRINT
ENDIF
```

```
 PROGRAM SECTION ONE
REM PRINT-FORM.PG
REM PRODUCE A PRINTED FORM SIMILAR TO ORIGINAL PAPER RECORD
FORMAT $CHR30,88,88,C
RELATE CODE-LU.DF 1 BY DLU-100FT RO
RELATE CODE-LU.DF 2 BY DLU-1/4MI RO
DISPLAY =
DISPLAY AT 1,1,'Preparing facsimiles of field sheets'
REM
PROGRAM SECTION TWO
REM
DISPLAY AT 3,1,'Processing record number ',RECORD#
FC CREATE 66, 133
FC INIT 1, 66
FC FORM PRINT-FORM-PAGE1.SF
REM ---------------------- SITE IDENTIFICATION ------------------------
FC PUT 3,19, DATE
FC PUT 3,66, PERSON
FC PUT 4,19, SITEID
FC PUT 4,51, LATITUDE
FC PUT 4,73, LONGITUDE
FC PUT 5,16, LOCALID
FC PUT 5,54, PROJECT
REM --------------- LAND USE AND LAND COVER CLASSIFICATION -------------
FC PUT 13,32, USE1A-100FT
FC PUT 13,39, USE1A-1/4MI
FC PUT 13,45, USE1A-COMMENT
FC PUT 14,32, USE1B-100FT
FC PUT 14,39, USE1B-1/4MI
FC PUT 14,45, USE1B-COMMENT
FC PUT 15,32, USE1C-100FT
FC PUT 15,39, USE1C-1/4MI
FC PUT 15,45, USE1C-COMMENT
FC PUT 16,16, USE1D-DESCRIP
FC PUT 16,32, USE1D-100FT
FC PUT 16,39, USE1D-1/4MI
FC PUT 16,45, USE1D-COMMENT
FC PUT 19,32, USE2A-100FT
FC PUT 19,39, USE2A-1/4MI
FC PUT 19,45, USE2A-COMMENT
FC PUT 20,32, USE2B-100FT
FC PUT 20,39, USE2B-1/4MI
FC PUT 20,45, USE2B-COMMENT
FC PUT 21,32, USE2C-100FT
FC PUT 21,39, USE2C-1/4MI
FC PUT 21,45, USE2C-COMMENT
FC PUT 23,32, USE2D-100FT
FC PUT 23,39, USE2D-1/4MI
FC PUT 23,45, USE2D-COMMENT
FC PUT 24,32, USE2E-100FT
FC PUT 24,39, USE2E-1/4MI
FC PUT 24,45, USE2E-COMMENT
FC PUT 25,16, USE2F-DESCRIP
FC PUT 25,32, USE2F-100FT
FC PUT 25,39, USE2F-1/4MI
FC PUT 25,45, USE2F-COMMENT
FC PUT 26,32, USE3-100FT
FC PUT 26,39, USE3-1/4MI
FC PUT 26,45, USE3-COMMENT
FC PUT 27,32, USE4-100FT
FC PUT 27,39, USE4-1/4MI
FC PUT 27,45, USE4-COMMENT
```

```
FC PUT 28,32, USE5-100FT
FC PUT 28,39, USE5-1/4MI
FC PUT 28,45, USE5-COMMENT
FC PUT 29,32, USE6-100FT
FC PUT 29,39, USE6-1/4MI
FC PUT 29,45, USE6-COMMENT
FC PUT 30,32, USE7-100FT
FC PUT 30,39, USE7-1/4MI
FC PUT 30,45, USE7-COMMENT
REM ---------------------- PREDOMINANT LAND-USE ----------------------
FC PRINT 34,'         WITHIN 100 FT:   ','(',DLU-100FT,') ',$1LAND-USE
FC PRINT 35,'         WITHIN 100 FT TO 1/4 MI:  ','(',DLU-1/4MI,') ',$2LAND-USE
FC PUT 36,38, PREDOM-PCT
REM ---------------------- EXTENT OF IRRIGATION ----------------------
MOVE '' TO $CHR30
IF NOT-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' not irrigated;'
ENDIF
IF SUP-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' supp. irrigation in dry years;'
ENDIF
IF YES-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' irrigated'
ENDIF
FC PUT 42,10, $CHR30
REM ---------------------- METHOD OF IRRIGATION ----------------------
MOVE '' TO $CHR30
IF SPR-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' spray;'
ENDIF
IF FLO-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' flood;'
ENDIF
IF FUR-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' furrow;'
ENDIF
IF DRI-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' drip;'
ENDIF
IF CHE-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' chemigation;'
ENDIF
IF OTH-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' other:   ',OTH-IRR-TYPE
ENDIF
FC PUT 46,10, $CHR30
REM ---------------------- SOURCE OF IRRIGATION WATER -----------------
MOVE '' TO $CHR30
IF GW-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' Ground water;'
ENDIF
IF SW-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' surface water;'
ENDIF
IF SP-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' spring;'
ENDIF
IF SE-IRR NE ' '
   CONC $CHR30 FROM $CHR30,' sewage effluent ('
   IF S1-IRR NE ' '
      CONC $CHR30 FROM $CHR30,'primary/'
   ENDIF
```

```
    IF S2-IRR NE ' '
        CONC $CHR30 FROM $CHR30,'secondary/'
    ENDIF
    IF S3-IRR NE ' '
        CONC $CHR30 FROM $CHR30,'tertiary'
    ENDIF
    CONC $CHR30 FROM $CHR30,' treatment)'
ENDIF
FC PUT 50,10, $CHR30
REM ------------ PESTICIDE AND FERTILIZER APPLICATION ----------------
FC PUT 54,10, CHEM-COMMENT1
FC PUT 55,10, CHEM-COMMENT2
REM ----------------- CROP AND ANIMAL TYPES ----------------------------
FC PUT 59,10, FARM-COMMENT1
FC PUT 60,10, FARM-COMMENT2
IF UPDATE-FLAG = 'X'
    MOVE 'THIS FIELD SHEET HAS NOT BEEN SENT TO THE NEXT DATA BASE' TO $CHR30
ELSE
    MOVE 'THIS FIELD SHEET HAS BEEN SENT TO THE NEXT DATA BASE' TO $CHR30
ENDIF
FC PUT 65,5,$CHR30
FC DUMP 1, 66
REM -------------------- END OF PAGE 1 -------------------------
FC INIT 1, 66
FC FORM PRINT-FORM-PAGE2.SF
FC PUT 2,20,SITEID
FC PUT 2,62,DATE
REM -------------------- LOCAL FEATURES ------------------------
REM                           GAS STATION
FC PUT  8,32, FEAT1-100FT
FC PUT  8,39, FEAT1-1/4MI
FC PUT  8,45, FEAT1-COMMENT
REM                           DRY CLEANER
FC PUT  9,32, FEAT2-100FT
FC PUT  9,39, FEAT2-1/4MI
FC PUT  9,45, FEAT2-COMMENT
REM                           CHEMICAL PLANT
FC PUT 11,32, FEAT3-100FT
FC PUT 11,39, FEAT3-1/4MI
FC PUT 11,45, FEAT3-COMMENT
REM                           AIRPORT
FC PUT 12,32, FEAT4-100FT
FC PUT 12,39, FEAT4-1/4MI
FC PUT 12,45, FEAT4-COMMENT
REM                           MILITARY BASE
FC PUT 13,32, FEAT5-100FT
FC PUT 13,39, FEAT5-1/4MI
FC PUT 13,45, FEAT5-COMMENT
REM                           ROAD
FC PUT 14,32, FEAT6-100FT
FC PUT 14,39, FEAT6-1/4MI
FC PUT 14,45, FEAT6-COMMENT
REM                           PIPELINE
FC PUT 16,32, FEAT7-100FT
FC PUT 16,39, FEAT7-1/4MI
FC PUT 16,45, FEAT7-COMMENT
REM                           SEPTIC FIELD
FC PUT 17,32, FEAT8-100FT
FC PUT 17,39, FEAT8-1/4MI
FC PUT 17,45, FEAT8-COMMENT
```

```
REM                          WASTE DISPOSAL POND
FC PUT 18,32, FEAT9-100FT
FC PUT 18,39, FEAT9-1/4MI
FC PUT 18,45, FEAT9-COMMENT
REM                          LANDFILL
FC PUT 19,32, FEAT10-100FT
FC PUT 19,39, FEAT10-1/4MI
FC PUT 19,45, FEAT10-COMMENT
REM                          GOLF COURSE
FC PUT 20,32, FEAT11-100FT
FC PUT 20,39, FEAT11-1/4MI
FC PUT 20,45, FEAT11-COMMENT
REM                          STREAM, RIVER, OR CREEK
FC PUT 22,16, FEAT12-PERENNIAL
FC PUT 23,16, FEAT12-EPHEMERAL
FC PUT 23,32, FEAT12-100FT
FC PUT 23,39, FEAT12-1/4MI
FC PUT 23,45, FEAT12-COMMENT
REM                          IRRIGATION CANAL
FC PUT 25, 7, FEAT13-LINED
FC PUT 25,16, FEAT13-UNLINED
FC PUT 25,32, FEAT13-100FT
FC PUT 25,39, FEAT13-1/4MI
FC PUT 25,45, FEAT13-COMMENT
REM                          DRAINAGE DITCH
FC PUT 27, 7, FEAT14-LINED
FC PUT 27,16, FEAT14-UNLINED
FC PUT 27,32, FEAT14-100FT
FC PUT 27,39, FEAT14-1/4MI
FC PUT 27,45, FEAT14-COMMENT
REM                          LAKE
FC PUT 28,16, FEAT15-NATURAL
FC PUT 29,16, FEAT15-MANMADE
FC PUT 29,32, FEAT15-100FT
FC PUT 29,39, FEAT15-1/4MI
FC PUT 29,45, FEAT15-COMMENT
REM                          RESERVOIR
FC PUT 30,16, FEAT16-LINED
FC PUT 31,16, FEAT16-UNLINED
FC PUT 31,32, FEAT16-100FT
FC PUT 31,39, FEAT16-1/4MI
FC PUT 31,45, FEAT16-COMMENT
REM                          BAY OR ESTUARY
FC PUT 32,32, FEAT17-100FT
FC PUT 32,39, FEAT17-1/4MI
FC PUT 32,45, FEAT17-COMMENT
REM                          SPRING
FC PUT 34, 7, FEAT18-GEO
FC PUT 35, 7, FEAT18-NOTGEO
FC PUT 35,32, FEAT18-100FT
FC PUT 35,39, FEAT18-1/4MI
FC PUT 35,45, FEAT18-COMMENT
REM                          SALT FLAT OR PLAYA
FC PUT 37, 7, FEAT19-DRY
FC PUT 37,16, FEAT19-WET
FC PUT 37,32, FEAT19-100FT
FC PUT 37,39, FEAT19-1/4MI
FC PUT 37,45, FEAT19-COMMENT
REM                          MINE,QUARRY, OR PIT
FC PUT 39, 7, FEAT20-ACTIVE
FC PUT 39,16, FEAT20-ABANDONED
FC PUT 39,32, FEAT20-100FT
FC PUT 39,39, FEAT20-1/4MI
FC PUT 39,45, FEAT20-COMMENT
```

```
REM                             OIL WELL
FC PUT 40,32, FEAT21-100FT
FC PUT 40,39, FEAT21-1/4MI
FC PUT 40,45, FEAT21-COMMENT
REM                             MAJOR WITHDRAWAL WELL
FC PUT 41,32, FEAT22-100FT
FC PUT 41,39, FEAT22-1/4MI
FC PUT 41,45, FEAT22-COMMENT
REM                             WASTE INJECTION WELL
FC PUT 42,32, FEAT23-100FT
FC PUT 42,39, FEAT23-1/4MI
FC PUT 42,45, FEAT23-COMMENT
REM                             RECHARGE INJECTION WELL
FC PUT 43,32, FEAT24-100FT
FC PUT 43,39, FEAT24-1/4MI
FC PUT 43,45, FEAT24-COMMENT
REM                             OTHER
FC PUT 44,12, FEAT25-NAME
FC PUT 44,32, FEAT25-100FT
FC PUT 44,39, FEAT25-1/4MI
FC PUT 44,45, FEAT25-COMMENT
REM ----------------- LAND-USE CHANGES -----------------------------
IF LUCHANGE-YES NE ' '
   FC PUT 48,44, 'Yes'
ENDIF
IF LUCHANGE-PYES NE ' '
   FC PUT 48,44, 'Probably'
ENDIF
IF LUCHANGE-PNO NE ' '
   FC PUT 48,44, 'Probably not'
ENDIF
IF LUCHANGE-NO NE ' '
   FC PUT 48,44, 'No'
ENDIF
FC PUT 50,9,LUC-COMMENT1
FC PUT 51,9,LUC-COMMENT2
FC PUT 52,9,LUC-COMMENT3
FC PUT 53,9,LUC-COMMENT4
REM ----------------- ADDITIONAL COMMENTS ----------------------
FC PUT 58,9,ADD-COMMENT1
FC PUT 59,9,ADD-COMMENT2
FC PUT 60,9,ADD-COMMENT3
FC PUT 61,9,ADD-COMMENT4
FC PUT 62,9,ADD-COMMENT5
FC PUT 63,9,ADD-COMMENT6
IF UPDATE-FLAG = 'X'
   MOVE 'THIS FIELD SHEET HAS NOT BEEN SENT TO THE NEXT DATA BASE' TO $CHR30
ELSE
   MOVE 'THIS FIELD SHEET HAS BEEN SENT TO THE NEXT DATA BASE' TO $CHR30
ENDIF
FC PUT 65,5,$CHR30
FC DUMP 1, 66
FC CLOSE
PROGRAM SECTION THREE
DISPLAY AT 3,1,'Processing complete,',$NOSEL,' facsimiles prepared'
```

```
 PROGRAM SECTION ONE
REM UPDATE-FORM.PG
REM UPDATE SELECTED FORMS USING AN INFO INPUT FORM
FORMAT $CHR30,2,2,I            : REM TOWNSHIP NUMBER
FORMAT $CHR31,1,1,C            : REM TOWNSHIP DIRECTION (N/S)
FORMAT $CHR32,2,2,I            : REM RANGE NUMBER
FORMAT $CHR33,1,1,C            : REM RANGE DIRECTION (E/W)
FORMAT $CHR34,2,2,I            : REM SECTION NUMBER (1-36)
FORMAT $CHR35,3,3,C            : REM SUB-SECTIONS (A,B,C,D)
FORMAT $CHR36,1,1,C            : REM SEQUENCE NUMBER
FORMAT $CHR37,1,1,C            : REM DISPOSITION CODE
DISP =
DISP AT 1,1,'Updating forms'
DISP AT 3,1,$NOSEL,' field sheet(s) will be updated in this session.'
DISP AT 5,1,'Are you sure that you want to proceed?   (Y/N):  ',=
ACCEPT $CHR37
IF $CHR37 NE 'Y' AND $CHR37 NE 'y'
   RUN APPLICATIONS-MENU.PG
ENDIF
REM ----- SAVE ALL SELECTED RECORDS IN AN OPERATING SYSTEM FILE
SAVE BINARY-FORMS INIT
DISP =
SELECT FORMS-UPDATE.DF
PURGE
GET BINARY-FORMS COPY
REM ----- PERFORM UPDATE PROCESS ON A COPY OF THE SELECTED FORMS
RELATE CODE-LU.DF 1 DLU-100FT RO
RELATE CODE-LU.DF 2 DLU-1/4MI RO
MOVE 'C' TO $CHR37
REM ----- UPDATE EACH FORM IN SELECTED SET
PROGRAM SECTION TWO
IF $CHR37 NE 'C'
   GOTO SKIP_UPDATE
ENDIF
MOVE 'D' TO $CHR37
DISPLAY =
MOVE TOWNSHIP      TO $CHR30
MOVE TOWNSHIP_DIR TO $CHR31
MOVE RANGE         TO $CHR32
MOVE RANGE_DIR     TO $CHR33
MOVE SECTION       TO $CHR34
MOVE SUBSECTION    TO $CHR35
MOVE SEQUENCE      TO $CHR36
UPF FORM.UF AL NC
CONC LOCALID FROM $CHR30,$CHR31,'-',$CHR32,$CHR33,'-',$CHR34,' ',$CHR35,' ',$CHR36
REM ----- WHEN USER HAS ABORTED UPDATE BY SELECTION OR W/ CTL-A OR CTL-B
REM -----  SET FLAG FOR SKIPPING THIS UPDATED FORM
IF $CHR37 = 'C' OR $CHR37 = 'Q'
   GOTO NORMAL_UPDATE
ENDIF
LABEL SKIP_UPDATE
   MOVE 'S' TO UPDATE-FLAG
   DISP =
   DISP AT 12,1,'Update for record #',RECORD#,' aborting'
   SLEEP 1
LABEL NORMAL_UPDATE
REM ----- END OF RECORD UPDATING...
PROGRAM SECTION THREE
DISP =
```

```
REM ----- EXPUNGE RECORDS WHICH WERE SKIPPED DURING UPDATE PROCESS
RESELECT UPDATE-FLAG EQ 'S'
RELATE SELECTED-SET.DF 1 RECORD#
MOVE 'X' TO $1DUPLICATE
PURGE
IF $NOSEL = 0
   DISP 'NO FIELD SHEETS UPDATED...'
   SLEEP 1
   RUN SUBSET.PG
ENDIF
REM ----- SAVE DELETE TRANSACTIONS FOR UPDATING DATA BASE IN NEXT TIER
SELECT DELETED-FORMS.DF
GET BINARY-FORMS COPY
RELATE SELECTED-SET.DF 1 RECORD#
RESELECT $1DUPLICATE EQ 'X'
PURGE
MOVE 'D' TO UPDATE-FLAG
REM ----- SAVE UPDATE TRANSACTIONS FOR LOADING INTO THE DATA BASE
SELECT FORMS-UPDATE.DF
MOVE 'X' TO UPDATE-FLAG
SAVE BINARY-FORMS INIT
REM ----- REMOVE OLD COPIES OF UPDATED FORMS FROM DATA BASE
SELECT FORM.DF
RELATE SELECTED-SET.DF 1 RECORD#
RESELECT RECORD# = $1RECORD# AND $1DUPLICATE NE 'X'
PURGE
REM ----- LOAD UPDATE TRANSACTIONS INTO DATA BASE
GET BINARY-FORMS COPY
RESELECT RECORD# = $1RECORD#
IF $NOSEL = 0
   ASELECT
   RUN SUBSET.PG
ELSE
   RUN APPLICATIONS-MENU.PG
ENDIF
```

Attachment R. INFO program DELETE-FORM.PG listing

```
 PROGRAM SECTION ONE
REM DELETE-FORM.PG
REM MARK FOR DELETION SELECTED FORMS
FORMAT $CHR30,1,1,C
FORMAT $CHR31,8,8,C
DISP =
DISP AT 1,1,'Deleting field sheets'
DISP AT 3,1,'Enter password:  ',=
COMO -NTTY
ACCEPT $CHR31
COMO -TTY
REM ----- CHECK PASSWORD
IF $CHR31 NE $CHR8
   DISP AT 5,1,'INCORRECT PASSWORD'
   SLEEP 1
   RUN APPLICATIONS-MENU.PG
ENDIF
```

```
LABEL PURGE-MENU
DISP AT  5,1,'Password accepted'
DISP AT  7,1,$NOSEL,' field sheets will be deleted'
DISP AT  9,1,'Are you sure you want to do this?  (Y/N):  ',=
ACCEPT $CHR30
IF $CHR30 EQ 'Y' OR $CHR30 = 'y'
   REM ----- SAVE COPY OF DELETED RECORDS IN OPERATING SYSTEM FILE
   IF $NUM3 NE 3
     SAVE BINARY-FORMS INIT
     DISP AT 10,1,'                  '
   ENDIF
   REM ----- REMOVE DELETED RECORDS FROM DATA BASE
   PURGE
   REM ----- SAVE DELETED RECORDS FOR UPDATING DATA BASE IN NEXT TIER
   IF $NUM3 NE 3
     SELECT DELETED-FORMS.DF
     GET BINARY-FORMS COPY
     MOVE 'D' TO UPDATE-FLAG
   ENDIF
   DISP AT 11,1,'DELETION COMPLETED'
   SLEEP 1
   RUN SUBSET.PG
ELSE
   DISP AT 11,1,'DELETION ABORTED'
   SLEEP 1
   RUN APPLICATIONS-MENU.PG
ENDIF
```

Attachment S. INFO program UNLOAD-UPDATE.PG1 listing

```
 PROGRAM SECTION ONE
REM ----- SEND UPDATED FORMS TO NATIONAL DATA BASE
SELECT FORM.DF
REM ----- GET UPDATED RECORDS AND WRITE TO A OPERATING SYSTEM FILE
RESELECT UPDATE-FLAG NE ' '
SAVE BINARY-FORMS INIT
REM ----- GET DELETED RECORDS AND APPEND TO OPERATING SYSTEM FILE
SELECT DELETED-FORMS.DF
SAVE BINARY-FORMS
REM ----- RETRIEVE UPDATED RECORDS INTO A TEMPORARY INFO FILE
SELECT FORMS-UPDATE.DF
PURGE
GET BINARY-FORMS COPY
Q STOP
```

Attachment T. INFO program UNLOAD-UPDATE.PG2 listing

```
 PROGRAM SECTION ONE
REM CLEAN HOUSE AFTER UNLOADING RECORDS FOR NATIONAL DATA BASE
SELECT FORMS-UPDATE.DF
PURGE
SELECT FORM.DF
REM ----- REMOVE UPDATE FLAG FOR NEW RECORDS
RESELECT UPDATE-FLAG EQ 'X'
MOVE ' ' TO UPDATE-FLAG
REM ----- EXPUNGE DELETED RECORDS
SELECT DELETED-FORMS.DF
PURGE
Q STOP
```

Attachment U. INFO program LOAD-UPDATE.PG listing

```
 PROGRAM SECTION ONE
REM LOAD UPDATES FROM AN ASCII DATA FILE
FORMAT $DAT30,8,8,D
FORMAT $NUM30,8,8,I
CALC $NM = 1
DFMT YMD-
SELECT FORMS-UPDATE.DF
REM ----- REFORMAT ZERO-PADDED TO BLANK-PADDED DATES
PROGRAM SECTION TWO
CALC $NUM30 = DATE.NUM
CALC  DATE  = $DAT30
PROGRAM SECTION THREE
REM ----- REMOVE THE RECORDS FLAGGED FOR DELETION AND UPDATED RECORDS
RESELECT UPDATE-FLAG = 'D'
SAVE BINARY-FORMS INIT
ASELECT
RELATE SELECTED-SET.DF 1 BY PRIMARY-KEY INIT
MOVE PRIMARY-KEY TO $1PRIMARY-KEY
RELATE 1
SELECT FORM.DF
SORT PRIMARY-KEY
RELATE SELECTED-SET.DF BY PRIMARY-KEY
RESELECT $1PRIMARY-KEY = PRIMARY-KEY
PURGE
REM ----- PROCESS THE NEW RECORDS
SELECT FORMS-UPDATE.DF
RESELECT UPDATE-FLAG NE 'D'
SORT PRIMARY-KEY
MERGE INTO FORM.DF ON PRIMARY-KEY
ASELECT
PURGE
REM ----- CLEAN HOUSE
IF $NUM3 = 3
   MOVE ' ' TO UPDATE-FLAG
ELSE
   MOVE 'X' TO UPDATE-FLAG
   SELECT DELETED-FORMS.DF
   GET BINARY-FORMS COPY
ENDIF
SELECT FORM.DF
CALC RECORD# = $RECNO
```

Attachment U. INFO program LOAD-UPDATE.PG listing--Continued

```
REM ----- REMOVE ANY STORED SUBSET
SELECT SAVED-SET.DF
IF $NOREC > 0
   DISP 'Removed saved group'
   PURGE
ENDIF
Q STOP
```

Attachment V. INFO program EXIT-OPTION.PG listing

```
 PROGRAM SECTION ONE
REM EXIT-OPTION.PG
REM ----- EXIT TO INFO COMMAND LEVEL
IF ( $NUM5 = -1 AND $NUM11 = 5 ) OR ( $NUM32 = -1 AND $NUM11 = 32 )
REM ----- DISPLAY WARNING (ANSI FLASHING CODE EMBEDDED ON NEXT LINE)
   DISP ' '
   DISP 15T,'[5mWARNING:  DO NOT change data from INFO command level[0m'
   END
ENDIF
REM ----- EXIT DATA BASE
IF ( $NUM5 = 99 AND $NUM11 = 5 ) OR ( $NUM32 = 99 AND $NUM11 = 32 )
   Q STOP
ENDIF
```

Attachment W. INFO input form HEADER.IF listing

```
 0, 0,' '
 1, 1,'        LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 1, Topic 1'
 3, 1,'DATE FIELD CHECK yr-mo-dy    PERSON COND'
 3,41,'UCTING INSPECTION  _____'
 4, 1,'WELL STATION ID  _____'
 4,41,'LATITUDE _____  LONGITUDE _____'
 5, 1,'LOCAL NUMBER __  _  _  __  _ __ __ _'
 5,50,'PROJECT ID _____'
 5,62,PROJECT,S,$CHR1
 5,62,PROJECT,D
 7, 1,'PREDOMINANT LAND USE:'
 8, 1,'   WITHIN 100 FEET OF WELL                     (Enter code): __'
 9, 1,'   WITHIN 100 FEET TO 1/4 MILE OF WELL         (Enter code): __'
 10, 1,'   PERCENTAGE OF AREA WITHIN 1/4 MILE OF WELL (Enter percent): ___'
 12,32,'Codes for land uses'
 14, 3,' 1A = Residental'
 15, 3,' 1B = Commercial'
 16, 3,' 1C = Industrial'
 17, 3,' 1D = Other urban land'
 14,28,' 2A = Non-irrigated cropland'
 15,28,' 2B = Irrigated cropland'
 16,28,' 2C = Pasture'
 17,28,' 2D = Orchard, grove,'
 18,28,'      vineyard, or nursery'
 19,28,' 2E = Confined feeding'
 20,28,' 2F = Other agricultural land'
```

```
14,58,' 3 = RANGELAND'
15,58,' 4 = FOREST LAND'
16,58,' 5 = WATER'
17,58,' 6 = WETLAND'
18,58,' 7 = BARREN LAND'
 3,18,'yr-mo-dy',LABEL ENT-1A
 3,18,DATE,F,FAIL ENT-1A,      MESS 'Date required, format is:  yr-mo-dy'
24, 1,'                                                                '
 3,60,PERSON,F,                MESS 'Name is required'
24, 1,'                                                                '
 4,18,SITEID,F,                MESS 'Site-identification number is required'
24, 1,'                                                                '
```

Attachment X. INFO input form FORM.IF listing

```
 4,51,LATITUDE,V,0
 4,71,LONGITUDE,V,0
 5,18,'T'
 5,15,$CHR30,R,'  ','99',     MESS 'Invalid township number'
24, 1,'                                                                '
 5,18,' '
 5,22,'N/S'
 5,20,$CHR31,L,' ', 'N','S', MESS 'Enter:  N  or  S'
24, 1,'                                                                '
 5,22,'   R'
 5,28,$CHR32,R,'  ','99',     MESS 'Invalid range number'
24, 1,'                                                                '
 5,22,'  -  '
 5,31,'E/W'
 5,35,$CHR33,L,' ', 'E','W', MESS 'Enter:  E  or  W'
24, 1,'                                                                '
 5,31,'   '
 5,37,$CHR34,R,'  ','36',     MESS 'Enter section number:  1-36'
24, 1,'                                                                '
 5,40,$CHR35,R,'   ','DDD',   MESS 'Subsection designated by letters A-D'
24, 1,'                                                                '
 5,44,$CHR36
 8,65,DLU-100FT,M1,DLU-100FT,MESS 'Invalid land-use code'
24, 1,'                                                                '
 9,65,DLU-1/4MI,M2,DLU-1/4MI,MESS 'Invalid land-use code'
24, 1,'                                                                '
10,65,PREDOM-PCT,R,1,100,      MESS 'Out of range:  0 < Percentage <= 100'
24, 1,'                                                                '
 0, 0,' '
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 1, Topic 2            '
 3, 1,'Land use and land cover|within|100 ft|  '
 4, 1,'                       |100 ft|1/4 mi|  '
 4,41,'           Comments                     '
 5, 1,' I. URBAN LAND          |    |    |   | '
 6, 1,'   --Residential        | _  | _  | _ |_'
 6,41,'_____'
 7, 1,'   --Commercial         | _  | _  | _ |_'
 7,41,'_____'
 8, 1,'   --Industrial         | _  | _  | _ |_'
 8,41,'_____'
 9, 1,'   --Other _____     | _  | _  | _ |_'
 9,41,'_____'
```

```
10, 1,'II. AGRICULTURAL LAND |         |         |     '
11, 1,'  --Cropland           |         |         |     '
12, 1,'    -nonirrigated       | _ |  _ |  _ '
12,41,'_____
13, 1,'    -irrigated          | _ |  _ |  _ '
13,41,'_____
14, 1,'  --Pasture             | _ |  _ |  _ '
14,41,'_____
15, 1,'  --Orchard, grove,     |         |         |     '
16, 1,'      vineyard, nursery | _ |  _ |  _ '
16,41,'_____
17, 1,'  --Confined feeding    | _ |  _ |  _ '
17,41,'_____
18, 1,'  --Other _____      | _ |  _ |  _ '
18,41,'_____
19, 1,'III.RANGELAND           | _ |  _ |  _ '
19,41,'_____
20, 1,'IV. FOREST LAND         | _ |  _ |  _ '
20,41,'_____
21, 1,' V. WATER               | _ |  _ |  _ '
21,41,'_____
22, 1,'VI. WETLAND             | _ |  _ |  _ '
22,41,'_____
23, 1,'VII.BARREN LAND         | _ |  _ |  _ '
23,41,'_____
 6,27,USE1A-100FT,V,' '
 6,34,USE1A-1/4MI,V,' '
 6,40,USE1A-COMMENT,NL,'Q',PASS USE-1B,MESS
 6,40,USE1A-COMMENT,S,'',  PASS ENT-3
 7,27,USE1B-100FT,V,' ',  LABEL USE-1B
 7,34,USE1B-1/4MI,V,' '
 7,40,USE1B-COMMENT,NL,'Q',PASS USE-1C,MESS
 7,40,USE1B-COMMENT,S,'',  PASS ENT-3
 8,27,USE1C-100FT,V,' ',  LABEL USE-1C
 8,34,USE1C-1/4MI,V,' '
 8,40,USE1C-COMMENT,NL,'Q',PASS USE-1D,MESS
 8,40,USE1C-COMMENT,S,'',  PASS ENT-3
 9,11,USE1D-DESCRIP,      LABEL USE-1D
 9,27,USE1D-100FT,V,' '
 9,34,USE1D-1/4MI,V,' '
 9,40,USE1D-COMMENT,NL,'Q',PASS USE-2A,MESS
 9,40,USE1D-COMMENT,S,'',  PASS ENT-3
12,27,USE2A-100FT,V,' ', LABEL USE-2A
12,34,USE2A-1/4MI,V,' '
12,40,USE2A-COMMENT,NL,'Q',PASS USE-2B,MESS
12,40,USE2A-COMMENT,S,'',  PASS ENT-3
13,27,USE2B-100FT,V,' ',  LABEL USE-2B
13,34,USE2B-1/4MI,V,' '
13,40,USE2B-COMMENT,NL,'Q',PASS USE-2C,MESS
13,40,USE2B-COMMENT,S,'',  PASS ENT-3
14,27,USE2C-100FT,V,' ',  LABEL USE-2C
14,34,USE2C-1/4MI,V,' '
14,40,USE2C-COMMENT,NL,'Q',PASS USE-2D,MESS
14,40,USE2C-COMMENT,S,'',  PASS ENT-3
16,27,USE2D-100FT,V,' ',  LABEL USE-2D
16,34,USE2D-1/4MI,V,' '
16,40,USE2D-COMMENT,NL,'Q',PASS USE-2E,MESS
16,40,USE2D-COMMENT,S,'',  PASS ENT-3
17,27,USE2E-100FT,V,' ',  LABEL USE-2E
17,34,USE2E-1/4MI,V,' '
17,40,USE2E-COMMENT,NL,'Q',PASS USE-2F,MESS
17,40,USE2E-COMMENT,S,'',  PASS ENT-3
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18,11,USE2F-DESCRIP,        LABEL USE-2F
18,27,USE2F-100FT,V,' '
18,34,USE2F-1/4MI,V,' '
18,40,USE2F-COMMENT,NL,'Q',PASS USE-3,MESS
18,40,USE2F-COMMENT,S,'',  PASS ENT-3
19,27,USE3-100FT,V,' ',  LABEL USE-3
19,34,USE3-1/4MI,V,' '
19,40,USE3-COMMENT,NL,'Q',PASS USE-4,MESS
19,40,USE3-COMMENT,S,'',  PASS ENT-3
20,27,USE4-100FT,V,' ',  LABEL USE-4
20,34,USE4-1/4MI,V,' '
20,40,USE4-COMMENT,NL,'Q',PASS USE-5,MESS
20,40,USE4-COMMENT,S,'',  PASS ENT-3
21,27,USE5-100FT,V,' ',  LABEL USE-5
21,34,USE5-1/4MI,V,' '
21,40,USE5-COMMENT,NL,'Q',PASS USE-6,MESS
21,40,USE5-COMMENT,S,'',  PASS ENT-3
22,27,USE6-100FT,V,' ',  LABEL USE-6
22,34,USE6-1/4MI,V,' '
22,40,USE6-COMMENT,NL,'Q',PASS USE-7,MESS
22,40,USE6-COMMENT,S,'',  PASS ENT-3
23,27,USE7-100FT,V,' ',  LABEL USE-7
23,34,USE7-1/4MI,V,' '
23,40,USE7-COMMENT,NL,'Q',PASS ENT-3,MESS
23,40,USE7-COMMENT,S,''
0, 0,' ',LABEL ENT-3
1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
1,41,'- GW NAWQA - Page 1, Topic 3'
3, 1,'3. AGRICULTURAL PRACTICES within 1/4 mil'
3,41,'e of the sampled well.'
5, 1,'   a. EXTENT OF IRRIGATION - mark applic'
5,41,'able statement(s).'
6, 1,'    _ nonirrigated, _ supplemental ir'
6,41,'rigation in dry years only, _ irrigated'
8, 1,'   b. METHOD OF IRRIGATION - mark those '
8,41,'that apply.'
9, 1,'     _ spray, _ flood, _ furrow, _ drip'
9,41,', _ chemigation, _ other _____'
11, 1,'   c. SOURCE OF IRRIGATION WATER - mark '
11,41,'those that apply.'
12, 1,'     _ ground water, _ surface water, _'
12,41,' spring, _ sewage effluent,'
13, 1,'     _ primary treatment, _ secondary t'
13,41,'reatment, _ tertiary treatment'
15, 1,'   d. PESTICIDE AND FERTILIZER APPLICATI'
15,41,'ON - Describe past and present chemicals'
16, 1,'     used, application rates, and appl'
16,41,'ication methods.'
17, 1,'     _____ '
17,41,'_____,'
18, 1,'     _____ '
18,41,'_____,'
19, 1,'   e. CROP AND ANIMAL TYPES - Describe p'
19,41,'ast and present crop and animal types'
20, 1,'     and crop rotation practices.'
21, 1,'     _____ '
21,41,'_____,'
22, 1,'     _____ '
22,41,'_____,'
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6, 7,NOT-IRR,V,' '
6,24,SUP-IRR,V,' '
6,70,YES-IRR,V,' '
9, 7,SPR-IRR,V,' '
9,16,FLO-IRR,V,' '
9,26,FUR-IRR,V,' '
9,35,DRI-IRR,V,' '
9,43,CHE-IRR,V,' '
9,58,OTH-IRR,V,' ',L,' ',PASS ENT-3C,MESS
9,58,'X',D
9,58,OTH-IRR,S,'X'
9,66,OTH-IRR-TYPE
12, 7,GW-IRR,V,' ',          LABEL ENT-3C
12,23,SW-IRR,V,' '
12,40,SP-IRR,V,' '
12,50,SE-IRR,V,' ',L,' ', PASS ENT-3D,MESS
12,50,'X',D
12,50,SE-IRR,S,'X'
13, 7,S1-IRR,V,' '
13,28,S2-IRR,V,' '
13,51,S3-IRR,V,' '
17, 7,'_',               LABEL ENT-3D
17, 7,CHEM-COMMENT1,NL,'',FAIL ENT-3E, MESS
18, 7,CHEM-COMMENT2
21, 7,'_',               LABEL ENT-3E
21, 7,FARM-COMMENT1,NL,'',FAIL ENT-4, MESS
22, 7,FARM-COMMENT2
0, 0,' ',LABEL ENT-4
1, 1,'       LAND-USE / LAND-COVER FIELD SHEET '
1,41,'- GW NAWQA - Page 2, Topic 4'
3, 1,'                         |within|100 ft|   '
4, 1,'Feature                  |100 ft|1/4 mi|   '
4,41,'            Comments                       '
5, 1,'Gas station              |  _  |  _  |  _'
5,41,'_____'
6, 1,'Dry cleaner              |  _  |  _  |  _'
6,41,'_____'
7, 1,'Chemical plant or        |     |     |   '
8, 1,' storage facility        |  _  |  _  |  _'
8,41,'_____'
9, 1,'Airport                  |  _  |  _  |  _'
9,41,'_____'
10, 1,'Military base           |  _  |  _  |  _'
10,41,'_____'
11, 1,'Road                    |  _  |  _  |  _'
11,41,'_____'
12, 1,'Pipeline or fuel        |     |     |   '
13, 1,' storage facility       |  _  |  _  |  _'
13,41,'_____'
14, 1,'Septic field            |  _  |  _  |  _'
14,41,'_____'
15, 1,'Waste disposal pond     |  _  |  _  |  _'
15,41,'_____'
16, 1,'Landfill                |  _  |  _  |  _'
16,41,'_____'
17, 1,'Golf course             |  _  |  _  |  _'
17,41,'_____'
18, 1,'Stream, river, or       |     |     |   '
19, 1,' creek    _ Perennial   |     |     |   '
20, 1,'          _ Ephemeral   |  _  |  _  |  _'
20,41,'_____'
21, 1,'Irrigation canal        |     |     |   '
22, 1,' _ Lined _ Unlined      |  _  |  _  |  _'
22,41,'_____'
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5,27,FEAT1-100FT,V,' '
5,34,FEAT1-1/4MI,V,' '
5,40,FEAT1-COMMENT,NL,'Q',PASS FEA-2,MESS
5,40,FEAT1-COMMENT,S,'',   PASS ENT-4B
6,27,FEAT2-100FT,V,' ',   LABEL FEA-2
6,34,FEAT2-1/4MI,V,' '
6,40,FEAT2-COMMENT,NL,'Q',PASS FEA-3,MESS
6,40,FEAT2-COMMENT,S,'',   PASS ENT-4B
8,27,FEAT3-100FT,V,' ',   LABEL FEA-3
8,34,FEAT3-1/4MI,V,' '
8,40,FEAT3-COMMENT,NL,'Q',PASS FEA-4,MESS
8,40,FEAT3-COMMENT,S,'',   PASS ENT-4B
9,27,FEAT4-100FT,V,' ',   LABEL FEA-4
9,34,FEAT4-1/4MI,V,' '
9,40,FEAT4-COMMENT,NL,'Q',PASS FEA-5,MESS
9,40,FEAT4-COMMENT,S,'',   PASS ENT-4B
10,27,FEAT5-100FT,V,' ',   LABEL FEA-5
10,34,FEAT5-1/4MI,V,' '
10,40,FEAT5-COMMENT,NL,'Q',PASS FEA-6,MESS
10,40,FEAT5-COMMENT,S,'',   PASS ENT-4B
11,27,FEAT6-100FT,V,' ',   LABEL FEA-6
11,34,FEAT6-1/4MI,V,' '
11,40,FEAT6-COMMENT,NL,'Q',PASS FEA-7,MESS
11,40,FEAT6-COMMENT,S,'',   PASS ENT-4B
13,27,FEAT7-100FT,V,' ',   LABEL FEA-7
13,34,FEAT7-1/4MI,V,' '
13,40,FEAT7-COMMENT,NL,'Q',PASS FEA-8,MESS
13,40,FEAT7-COMMENT,S,'',   PASS ENT-4B
14,27,FEAT8-100FT,V,' ',   LABEL FEA-8
14,34,FEAT8-1/4MI,V,' '
14,40,FEAT8-COMMENT,NL,'Q',PASS FEA-9,MESS
14,40,FEAT8-COMMENT,S,'',   PASS ENT-4B
15,27,FEAT9-100FT,V,' ',   LABEL FEA-9
15,34,FEAT9-1/4MI,V,' '
15,40,FEAT9-COMMENT,NL,'Q',PASS FEA-10,MESS
15,40,FEAT9-COMMENT,S,'',   PASS ENT-4B
16,27,FEAT10-100FT,V,' ', LABEL FEA-10
16,34,FEAT10-1/4MI,V,' '
16,40,FEAT10-COMMENT,NL,'Q',PASS FEA-11,MESS
16,40,FEAT10-COMMENT,S,'',   PASS ENT-4B
17,27,FEAT11-100FT,V,' ',   LABEL FEA-11
17,34,FEAT11-1/4MI,V,' '
17,40,FEAT11-COMMENT,NL,'Q',PASS FEA-12,MESS
17,40,FEAT11-COMMENT,S,'',   PASS ENT-4B
19,10,FEAT12-PERENNIAL,    LABEL FEA-12
20,10,FEAT12-EPHEMERAL
20,27,FEAT12-100FT,V,' '
20,34,FEAT12-1/4MI,V,' '
20,40,FEAT12-COMMENT,NL,'Q',PASS FEA-13,MESS
20,40,FEAT12-COMMENT,S,'',   PASS ENT-4B
22, 2,FEAT13-LINED,        LABEL FEA-13
22,10,FEAT13-UNLINED
22,27,FEAT13-100FT,V,' '
22,34,FEAT13-1/4MI,V,' '
22,40,FEAT13-COMMENT,NL,'Q',PASS ENT-4B,MESS
22,40,FEAT13-COMMENT,S,''
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0, 0,' ',LABEL ENT-4B
1, 1,'       LAND-USE / LAND-COVER FIELD SHEET '
1,41,'- GW NAWQA - Page 2, Topic 4 continued'
3, 1,'                       |within|100 ft|  '
4, 1,'Feature                |100 ft|1/4 mi|  '
4,41,'         Comments                        '
5, 1,'Drainage ditch     |     |     |     |  '
6, 1,' _ Lined _ Unlined  |  _  |  _  |  _  '
6,41,'_____'
7, 1,'Lake       _ Natural |     |     |     |  '
8, 1,'           _ Man-made |  _  |  _  |  _  '
8,41,'_____'
9, 1,'Reservoir _ Lined   |     |     |     |  '
10, 1,'          _ Unlined  |  _  |  _  |  _  '
10,41,'_____'
11, 1,'Bay or estuary      |  _  |  _  |  _  '
11,41,'_____'
12, 1,'Spring              |     |     |     |  '
13, 1,' _ Geothermal (> 25 C) |   |     |     |  '
14, 1,' _ Nongeothermal    |  _  |  _  |  _  '
14,41,'_____'
15, 1,'Salt flat or playa  |     |     |     |  '
16, 1,' _ Dry    _ Wet     |  _  |  _  |  _  '
16,41,'_____'
17, 1,'Mine, quarry, or pit |    |     |     |  '
18, 1,' _ Active _ Abandoned |  _  |  _  |  _  '
18,41,'_____'
19, 1,'Oil well            |  _  |  _  |  _  '
19,41,'_____'
20, 1,'Major withdrawal well |  _  |  _  |  _  '
20,41,'_____'
21, 1,'Waste injection well |  _  |  _  |  _  '
21,41,'_____'
22, 1,'Recharge injection well|  _  |  _  |  _  '
22,41,'_____'
23, 1,'Other _____ |  _  |  _  |  _  '
23,41,'_____'
 6, 2,FEAT14-LINED
 6,11,FEAT14-UNLINED
 6,27,FEAT14-100FT,V,' '
 6,34,FEAT14-1/4MI,V,' '
 6,40,FEAT14-COMMENT,NL,'Q',PASS FEA-15,MESS
 6,40,FEAT14-COMMENT,S,'',  PASS ENT-5
 7,11,FEAT15-NATURAL,    LABEL FEA-15
 8,11,FEAT15-MANMADE
 8,27,FEAT15-100FT,V,' '
 8,34,FEAT15-1/4MI,V,' '
 8,40,FEAT15-COMMENT,NL,'Q',PASS FEA-16,MESS
 8,40,FEAT15-COMMENT,S,'',  PASS ENT-5
 9,11,FEAT16-LINED,      LABEL FEA-16
10,11,FEAT16-UNLINED
10,27,FEAT16-100FT,V,' '
10,34,FEAT16-1/4MI,V,' '
10,40,FEAT16-COMMENT,NL,'Q',PASS FEA-17,MESS
10,40,FEAT16-COMMENT,S,'',  PASS ENT-5
11,27,FEAT17-100FT,V,' ',  LABEL FEA-17
11,34,FEAT17-1/4MI,V,' '
11,40,FEAT17-COMMENT,NL,'Q',PASS FEA-18,MESS
11,40,FEAT17-COMMENT,S,'',  PASS ENT-5
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13, 2,FEAT18-GEO,          LABEL FEA-18
14, 2,FEAT18-NOTGEO
14,27,FEAT18-100FT,V,' '
14,34,FEAT18-1/4MI,V,' '
14,40,FEAT18-COMMENT,NL,'Q',PASS FEA-19,MESS
14,40,FEAT18-COMMENT,S,'',  PASS ENT-5
16, 2,FEAT19-DRY,          LABEL FEA-19
16,11,FEAT19-WET
16,27,FEAT19-100FT,V,' '
16,34,FEAT19-1/4MI,V,' '
16,40,FEAT19-COMMENT,NL,'Q',PASS FEA-20,MESS
16,40,FEAT19-COMMENT,S,'',  PASS ENT-5
18, 2,FEAT20-ACTIVE,       LABEL FEA-20
18,11,FEAT20-ABANDONED
18,27,FEAT20-100FT,V,' '
18,34,FEAT20-1/4MI,V,' '
18,40,FEAT20-COMMENT,NL,'Q',PASS FEA-21,MESS
18,40,FEAT20-COMMENT,S,'',  PASS ENT-5
19,27,FEAT21-100FT,V,' ',   LABEL FEA-21
19,34,FEAT21-1/4MI,V,' '
19,40,FEAT21-COMMENT,NL,'Q',PASS FEA-22,MESS
19,40,FEAT21-COMMENT,S,'',  PASS ENT-5
20,27,FEAT22-100FT,V,' ',   LABEL FEA-22
20,34,FEAT22-1/4MI,V,' '
20,40,FEAT22-COMMENT,NL,'Q',PASS FEA-23,MESS
20,40,FEAT22-COMMENT,S,'',  PASS ENT-5
21,27,FEAT23-100FT,V,' ',   LABEL FEA-23
21,34,FEAT23-1/4MI,V,' '
21,40,FEAT23-COMMENT,NL,'Q',PASS FEA-24,MESS
21,40,FEAT23-COMMENT,S,'',  PASS ENT-5
22,27,FEAT24-100FT,V,' ',   LABEL FEA-24
22,34,FEAT24-1/4MI,V,' '
22,40,FEAT24-COMMENT,NL,'Q',PASS FEA-25,MESS
22,40,FEAT24-COMMENT,S,'',  PASS ENT-5
23, 7,FEAT25-NAME,         LABEL FEA-25
23,27,FEAT25-100FT,V,' '
23,34,FEAT25-1/4MI,V,' '
23,40,FEAT25-COMMENT,NL,'Q',PASS ENT-5,MESS
23,40,FEAT25-COMMENT,S,''
 0, 0,' ',LABEL ENT-5
 1, 1,'       LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 2, Topics 5 and 6'
 3, 1,'5. LAND-USE CHANGES - Have there been ma'
 3,41,'jor changes in the last 10 years in land'
 4, 1,'   use within 1/4 mile of the sampled w'
 4,41,'ell?'
 6, 1,'    Yes _        Probably _        Probabl'
 6,41,'y not _        No _'
 8, 1,'    If yes, describe major changes:'
 9, 1,'       _____  '
 9,41,'_____  '
10, 1,'       _____  '
10,41,'_____  '
11, 1,'       _____  '
11,41,'_____  '
12, 1,'       _____  '
12,41,'_____  '
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14, 1,'6. ADDITIONAL COMMENTS - Emphasize facto'
14,41,'rs that might influence local'
15, 1,'     ground-water quality.'
16, 1,'        _____        ,
16,41,'_____       ,
17, 1,'        _____        ,
17,41,'_____       ,
18, 1,'        _____        ,
18,41,'_____       ,
19, 1,'        _____        ,
19,41,'_____       ,
20, 1,'        _____        ,
20,41,'_____       ,
21, 1,'        _____        ,
21,41,'_____       ,
 6, 9,'_', LABEL ENT-5A
 6, 9,LUCHANGE-YES, V,' ',L,' ',FAIL ENT-5BY,   MESS
 6,26,LUCHANGE-PYES,V,' ',L,' ',FAIL ENT-5BPY, MESS
 6,47,LUCHANGE-PNO, V,' ',L,' ',FAIL ENT-5BPN, MESS
 6,58,LUCHANGE-NO,  V,' ',L,' ',PASS ENT-5A,    MESS
 6,58,LUCHANGE-NO,  S,'X',PASS ENT-6
 6, 9,'X', LABEL ENT-5BY
 6, 9,LUCHANGE-YES, S,'X',PASS ENT-5B,  MESS
 6,26,'X', LABEL ENT-5BPY
 6,26,LUCHANGE-PYES,S,'X',PASS ENT-5B,  MESS
 6,47,'X', LABEL ENT-5BPN
 6,47,LUCHANGE-PNO, S,'X',PASS ENT-6,    MESS
 9, 5,'_', LABEL ENT-5B
 9, 5,LUC-COMMENT1, F,              MESS 'Entry required'
24, 1,'                                            ,
10, 5,LUC-COMMENT2,V,' ',NL,' ',FAIL ENT-6, MESS
11, 5,LUC-COMMENT3,V,' ',NL,' ',FAIL ENT-6, MESS
12, 5,LUC-COMMENT4
16, 5,'_', LABEL ENT-6
16, 5,ADD-COMMENT1,V,' ',NL,' ',FAIL ENT-E, MESS
17, 5,ADD-COMMENT2,V,' ',NL,' ',FAIL ENT-E, MESS
18, 5,ADD-COMMENT3,V,' ',NL,' ',FAIL ENT-E, MESS
19, 5,ADD-COMMENT4,V,' ',NL,' ',FAIL ENT-E, MESS
20, 5,ADD-COMMENT5,V,' ',NL,' ',FAIL ENT-E, MESS
21, 5,ADD-COMMENT6
 0, 0,' ',LABEL ENT-E
 3, 1,'Entry complete for station id:  '
 3,33,SITEID,D
 3,62,'visit on:  '
 3,73,DATE,D
 5, 1,'CODE       DATA DISPOSITION'
 7, 1,'  Q    =    Store data, exit data entry'
 8, 1,'  C    =    Store data, continue data entry'
 9, 1,'  D    =    Discard data, exit data entry'
11, 1,'Please select a data-disposition code:  ', LABEL DISP
11,41,$CHR37,F,L,'Q','C','D',MESS 'Invalid data-disposition code'
24, 1,'                                            ,
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 3,18,DATE,D
 3,60,PERSON,D
 4,18,SITEID,D
 4,51,LATITUDE,D
 4,71,LONGITUDE,D
 5,15,$CHR30,D
 5,17,$CHR31,D
 5,18,'-'
 5,19,$CHR32,D
 5,21,$CHR33,D
 5,22,'-'
 5,23,$CHR34,D
 5,26,$CHR35,D
 5,30,$CHR36,D
 5,62,PROJECT,D
 8,65,DLU-100FT,D
 9,65,DLU-1/4MI,D
10,65,PREDOM-PCT,D
 4,51,LATITUDE
 4,71,LONGITUDE
 5,15,'            '
 5,18,'T'
 5,15,$CHR30,D
 5,15,$CHR30,R,'  ','99',    MESS 'Invalid township number'
24, 1,'                                                '
 5,18,'  '
 5,20,$CHR31,D
 5,22,'N/S'
 5,20,$CHR31,L,'  ', 'N','S', MESS 'Enter:  N  or  S'
24, 1,'                                                '
 5,22,'    R'
 5,28,$CHR32,D
 5,28,$CHR32,R,'  ','99',    MESS 'Invalid range number'
24, 1,'                                                '
 5,22,'  -  '
 5,31,'E/W'
 5,35,$CHR33,D
 5,35,$CHR33,L,'  ', 'E','W', MESS 'Enter:  E  or  W'
24, 1,'                                                '
 5,31,'    '
 5,37,$CHR34,D
 5,37,$CHR34,R,'  ','36',    MESS 'Enter section number:  1-36'
24, 1,'                                                '
 5,40,$CHR35,D
 5,40,$CHR35,R,'   ','DDD',  MESS 'Subsection designated by letters A-D'
24, 1,'                                                '
 5,44,$CHR36,D
 5,44,$CHR36
 5,62,PROJECT,V,$CHR1
 8,65,DLU-100FT,M1,DLU-100FT,MESS 'Invalid land-use code'
24, 1,'                                                '
 9,65,DLU-1/4MI,M2,DLU-1/4MI,MESS 'Invalid land-use code'
24, 1,'                                                '
10,65,PREDOM-PCT,R,1,100,    MESS 'Out of range:  0 < Percentage <= 100'
24, 1,'                                                '
 0, 0,'  '
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET  '
 1,41,'- GW NAWQA - Page 1, Topic 2'
 3, 1,'Land use and land cover|within|100 ft|  '
 4, 1,'                       |100 ft|1/4 mi|'
 4,41,'            Comments                    '
 5, 1,' I. URBAN LAND            |    |     |'
 6, 1,'   --Residential         | _  | _   |'
```

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6,27,USE1A-100FT,D
6,34,USE1A-1/4MI,D
6,40,USE1A-COMMENT,D
7, 1,'  --Commercial          |  _  |  _  |'
7,27,USE1B-100FT,D
7,34,USE1B-1/4MI,D
7,40,USE1B-COMMENT,D
8, 1,'  --Industrial          |  _  |  _  |'
8,27,USE1C-100FT,D
8,34,USE1C-1/4MI,D
8,40,USE1C-COMMENT,D
9, 1,'  --Other               |  _  |  _  |'
9,11,USE1D-DESCRIP,D
9,27,USE1D-100FT,D
9,34,USE1D-1/4MI,D
9,40,USE1D-COMMENT,D
10, 1,'II. AGRICULTURAL LAND    |     |     |'
11, 1,'  --Cropland            |     |     |'
12, 1,'   -nonirrigated        |  _  |  _  |'
12,27,USE2A-100FT,D
12,34,USE2A-1/4MI,D
12,40,USE2A-COMMENT,D
13, 1,'   -irrigated           |  _  |  _  |'
13,27,USE2B-100FT,D
13,34,USE2B-1/4MI,D
13,40,USE2B-COMMENT,D
14, 1,'  --Pasture             |  _  |  _  |'
14,27,USE2C-100FT,D
14,34,USE2C-1/4MI,D
14,40,USE2C-COMMENT,D
15, 1,'  --Orchard, grove,     |     |     |'
16, 1,'      vineyard, nursery |  _  |  _  |'
16,27,USE2D-100FT,D
16,34,USE2D-1/4MI,D
16,40,USE2D-COMMENT,D
17, 1,'  --Confined feeding    |  _  |  _  |'
17,27,USE2E-100FT,D
17,34,USE2E-1/4MI,D
17,40,USE2E-COMMENT,D
18, 1,'  --Other               |  _  |  _  |'
18,11,USE2F-DESCRIP,D
18,27,USE2F-100FT,D
18,34,USE2F-1/4MI,D
18,40,USE2F-COMMENT,D
19, 1,'III.RANGELAND           |  _  |  _  |'
19,27,USE3-100FT,D
19,34,USE3-1/4MI,D
19,40,USE3-COMMENT,D
20, 1,'IV. FOREST LAND         |  _  |  _  |'
20,27,USE4-100FT,D
20,34,USE4-1/4MI,D
20,40,USE4-COMMENT,D
21, 1,' V. WATER               |  _  |  _  |'
21,27,USE5-100FT,D
21,34,USE5-1/4MI,D
21,40,USE5-COMMENT,D
22, 1,'VI. WETLAND             |  _  |  _  |'
22,27,USE6-100FT,D
22,34,USE6-1/4MI,D
22,40,USE6-COMMENT,D
23, 1,'VII.BARREN LAND         |  _  |  _  |'
23,27,USE7-100FT,D
23,34,USE7-1/4MI,D
23,40,USE7-COMMENT,D
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6,27,USE1A-100FT,V,' '
6,34,USE1A-1/4MI,V,' '
6,40,USE1A-COMMENT,NL,'Q',PASS USE-1B,MESS
6,40,USE1A-COMMENT,S,'',  PASS ENT-3
7,27,USE1B-100FT,V,' ',  LABEL USE-1B
7,34,USE1B-1/4MI,V,' '
7,40,USE1B-COMMENT,NL,'Q',PASS USE-1C,MESS
7,40,USE1B-COMMENT,S,'',  PASS ENT-3
8,27,USE1C-100FT,V,' ',  LABEL USE-1C
8,34,USE1C-1/4MI,V,' '
8,40,USE1C-COMMENT,NL,'Q',PASS USE-1D,MESS
8,40,USE1C-COMMENT,S,'',  PASS ENT-3
9,11,USE1D-DESCRIP,       LABEL USE-1D
9,27,USE1D-100FT,V,' '
9,34,USE1D-1/4MI,V,' '
9,40,USE1D-COMMENT,NL,'Q',PASS USE-2A,MESS
9,40,USE1D-COMMENT,S,'',  PASS ENT-3
12,27,USE2A-100FT,V,' ',  LABEL USE-2A
12,34,USE2A-1/4MI,V,' '
12,40,USE2A-COMMENT,NL,'Q',PASS USE-2B,MESS
12,40,USE2A-COMMENT,S,'',  PASS ENT-3
13,27,USE2B-100FT,V,' ',  LABEL USE-2B
13,34,USE2B-1/4MI,V,' '
13,40,USE2B-COMMENT,NL,'Q',PASS USE-2C,MESS
13,40,USE2B-COMMENT,S,'',  PASS ENT-3
14,27,USE2C-100FT,V,' ',  LABEL USE-2C
14,34,USE2C-1/4MI,V,' '
14,40,USE2C-COMMENT,NL,'Q',PASS USE-2D,MESS
14,40,USE2C-COMMENT,S,'',  PASS ENT-3
16,27,USE2D-100FT,V,' ',  LABEL USE-2D
16,34,USE2D-1/4MI,V,' '
16,40,USE2D-COMMENT,NL,'Q',PASS USE-2E,MESS
16,40,USE2D-COMMENT,S,'',  PASS ENT-3
17,27,USE2E-100FT,V,' ',  LABEL USE-2E
17,34,USE2E-1/4MI,V,' '
17,40,USE2E-COMMENT,NL,'Q',PASS USE-2F,MESS
17,40,USE2E-COMMENT,S,'',  PASS ENT-3
18,11,USE2F-DESCRIP,       LABEL USE-2F
18,27,USE2F-100FT,V,' '
18,34,USE2F-1/4MI,V,' '
18,40,USE2F-COMMENT,NL,'Q',PASS USE-3,MESS
18,40,USE2F-COMMENT,S,'',  PASS ENT-3
19,27,USE3-100FT,V,' ',  LABEL USE-3
19,34,USE3-1/4MI,V,' '
19,40,USE3-COMMENT,NL,'Q',PASS USE-4,MESS
19,40,USE3-COMMENT,S,'',  PASS ENT-3
20,27,USE4-100FT,V,' ',  LABEL USE-4
20,34,USE4-1/4MI,V,' '
20,40,USE4-COMMENT,NL,'Q',PASS USE-5,MESS
20,40,USE4-COMMENT,S,'',  PASS ENT-3
21,27,USE5-100FT,V,' ',  LABEL USE-5
21,34,USE5-1/4MI,V,' '
21,40,USE5-COMMENT,NL,'Q',PASS USE-6,MESS
21,40,USE5-COMMENT,S,'',  PASS ENT-3
22,27,USE6-100FT,V,' ',  LABEL USE-6
22,34,USE6-1/4MI,V,' '
22,40,USE6-COMMENT,NL,'Q',PASS USE-7,MESS
22,40,USE6-COMMENT,S,'',  PASS ENT-3
23,27,USE7-100FT,V,' ',  LABEL USE-7
23,34,USE7-1/4MI,V,' '
23,40,USE7-COMMENT,NL,'Q',PASS ENT-3,MESS
23,40,USE7-COMMENT,S,''
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0, 0,' ',LABEL ENT-3
1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
1,41,'- GW NAWQA - Page 1, Topic 3'
3, 1,'3. AGRICULTURAL PRACTICES within 1/4 mil'
3,41,'e of the sampled well.'
5, 1,'   a. EXTENT OF IRRIGATION - mark applic'
5,41,'able statement(s).'
6, 1,'      nonirrigated,    supplemental ir'
6,41,'rigation in dry years only,    irrigated'
6, 7,NOT-IRR,D
6,24,SUP-IRR,D
6,70,YES-IRR,D
8, 1,'   b. METHOD OF IRRIGATION - mark those '
8,41,'that apply.'
9, 1,'      spray,   flood,   furrow,   drip'
9,41,',  chemigation,   other '
9, 7,SPR-IRR,D
9,16,FLO-IRR,D
9,25,FUR-IRR,D
9,35,DRI-IRR,D
9,43,CHE-IRR,D
9,58,OTH-IRR,D
9,66,OTH-IRR-TYPE,D
11, 1,'   c. SOURCE OF IRRIGATION WATER - mark '
11,41,'those that apply.'
12, 1,'      ground water,   surface water,  '
12,41,' spring,   sewage effluent,'
12, 7,GW-IRR,D
12,23,SW-IRR,D
12,40,SP-IRR,D
12,50,SE-IRR,D
13, 1,'      primary treatment,   secondary t'
13,41,'reatment,   tertiary treatment'
13, 7,S1-IRR,D
13,28,S2-IRR,D
13,51,S3-IRR,D
15, 1,'   d. PESTICIDE AND FERTILIZER APPLICATI'
15,41,'ON - Describe past and present chemicals'
16, 1,'      used, application rates, and appl'
16,41,'ication methods.'
17, 7,CHEM-COMMENT1,D
18, 7,CHEM-COMMENT2,D
19, 1,'   e. CROP AND ANIMAL TYPES - Describe p'
19,41,'ast and present crop and animal types'
20, 1,'      and crop rotation practices.'
21, 7,FARM-COMMENT1,D
22, 7,FARM-COMMENT2,D
 6, 7,NOT-IRR,V,' '
 6,24,SUP-IRR,V,' '
 6,70,YES-IRR,V,' '
 9, 7,SPR-IRR,V,' '
 9,16,FLO-IRR,V,' '
 9,25,FUR-IRR,V,' '
 9,35,DRI-IRR,V,' '
 9,43,CHE-IRR,V,' '
 9,58,OTH-IRR,V,' '
 9,66,OTH-IRR-TYPE
12, 7,GW-IRR,V,' '
12,23,SW-IRR,V,' '
12,40,SP-IRR,V,' '
12,50,SE-IRR,V,' '
13, 7,S1-IRR,V,' '
13,28,S2-IRR,V,' '
13,51,S3-IRR,V,' '
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17, 7,CHEM-COMMENT1
18, 7,CHEM-COMMENT2
21, 7,FARM-COMMENT1
22, 7,FARM-COMMENT2
 0, 0,' ',LABEL ENT-4
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 2, Topic 4'
 3, 1,'                        |within|100 ft|'
 4, 1,'Feature                 |100 ft|1/4 mi|'
 4,41,'            Comments                    '
 5, 1,'Gas station           |  _  |  _  |'
 5,27,FEAT1-100FT,D
 5,34,FEAT1-1/4MI,D
 5,40,FEAT1-COMMENT,D
 6, 1,'Dry cleaner           |  _  |  _  |'
 6,27,FEAT2-100FT,D
 6,34,FEAT2-1/4MI,D
 6,40,FEAT2-COMMENT,D
 7, 1,'Chemical plant or     |     |     |'
 8, 1,' storage facility     |  _  |  _  |'
 8,27,FEAT3-100FT,D
 8,34,FEAT3-1/4MI,D
 8,40,FEAT3-COMMENT,D
 9, 1,'Airport               |  _  |  _  |'
 9,27,FEAT4-100FT,D
 9,34,FEAT4-1/4MI,D
 9,40,FEAT4-COMMENT,D
10, 1,'Military base         |  _  |  _  |'
10,27,FEAT5-100FT,D
10,34,FEAT5-1/4MI,D
10,40,FEAT5-COMMENT,D
11, 1,'Road                  |  _  |  _  |'
11,27,FEAT6-100FT,D
11,34,FEAT6-1/4MI,D
11,40,FEAT6-COMMENT,D
12, 1,'Pipeline or fuel      |     |     |'
13, 1,' storage facility     |  _  |  _  |'
13,27,FEAT7-100FT,D
13,34,FEAT7-1/4MI,D
13,40,FEAT7-COMMENT,D
14, 1,'Septic field          |  _  |  _  |'
14,27,FEAT8-100FT,D
14,34,FEAT8-1/4MI,D
14,40,FEAT8-COMMENT,D
15, 1,'Waste disposal pond   |  _  |  _  |'
15,27,FEAT9-100FT,D
15,34,FEAT9-1/4MI,D
15,40,FEAT9-COMMENT,D
16, 1,'Landfill              |  _  |  _  |'
16,27,FEAT10-100FT,D
16,34,FEAT10-1/4MI,D
16,40,FEAT10-COMMENT,D
17, 1,'Golf course           |  _  |  _  |'
17,27,FEAT11-100FT,D
17,34,FEAT11-1/4MI,D
17,40,FEAT11-COMMENT,D
18, 1,'Stream, river, or     |     |     |'
19, 1,' creek   _ Perennial  |     |     |'
20, 1,'         _ Ephemeral  |  _  |  _  |'
19,10,FEAT12-PERENNIAL,D
20,10,FEAT12-EPHEMERAL,D
20,27,FEAT12-100FT,D
20,34,FEAT12-1/4MI,D
20,40,FEAT12-COMMENT,D
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21, 1,'Irrigation canal       |      |      |'
22, 1,' _ Lined _ Unlined     |  _   |  _   |'
22, 2,FEAT13-LINED,D
22,10,FEAT13-UNLINED,D
22,27,FEAT13-100FT,D
22,34,FEAT13-1/4MI,D
22,40,FEAT13-COMMENT,D
 5,27,FEAT1-100FT,V,' '
 5,34,FEAT1-1/4MI,V,' '
 5,40,FEAT1-COMMENT,NL,'Q',PASS FEA-2,MESS
 5,40,FEAT1-COMMENT,S,'',  PASS ENT-4B
 6,27,FEAT2-100FT,V,' ',  LABEL FEA-2
 6,34,FEAT2-1/4MI,V,' '
 6,40,FEAT2-COMMENT,NL,'Q',PASS FEA-3,MESS
 6,40,FEAT2-COMMENT,S,'',  PASS ENT-4B
 8,27,FEAT3-100FT,V,' ',  LABEL FEA-3
 8,34,FEAT3-1/4MI,V,' '
 8,40,FEAT3-COMMENT,NL,'Q',PASS FEA-4,MESS
 8,40,FEAT3-COMMENT,S,'',  PASS ENT-4B
 9,27,FEAT4-100FT,V,' ',  LABEL FEA-4
 9,34,FEAT4-1/4MI,V,' '
 9,40,FEAT4-COMMENT,NL,'Q',PASS FEA-5,MESS
 9,40,FEAT4-COMMENT,S,'',  PASS ENT-4B
10,27,FEAT5-100FT,V,' ',  LABEL FEA-5
10,34,FEAT5-1/4MI,V,' '
10,40,FEAT5-COMMENT,NL,'Q',PASS FEA-6,MESS
10,40,FEAT5-COMMENT,S,'',  PASS ENT-4B
11,27,FEAT6-100FT,V,' ',  LABEL FEA-6
11,34,FEAT6-1/4MI,V,' '
11,40,FEAT6-COMMENT,NL,'Q',PASS FEA-7,MESS
11,40,FEAT6-COMMENT,S,'',  PASS ENT-4B
13,27,FEAT7-100FT,V,' ',  LABEL FEA-7
13,34,FEAT7-1/4MI,V,' '
13,40,FEAT7-COMMENT,NL,'Q',PASS FEA-8,MESS
13,40,FEAT7-COMMENT,S,'',  PASS ENT-4B
14,27,FEAT8-100FT,V,' ',  LABEL FEA-8
14,34,FEAT8-1/4MI,V,' '
14,40,FEAT8-COMMENT,NL,'Q',PASS FEA-9,MESS
14,40,FEAT8-COMMENT,S,'',  PASS ENT-4B
15,27,FEAT9-100FT,V,' ',  LABEL FEA-9
15,34,FEAT9-1/4MI,V,' '
15,40,FEAT9-COMMENT,NL,'Q',PASS FEA-10,MESS
15,40,FEAT9-COMMENT,S,'',  PASS ENT-4B
16,27,FEAT10-100FT,V,' ', LABEL FEA-10
16,34,FEAT10-1/4MI,V,' '
16,40,FEAT10-COMMENT,NL,'Q',PASS FEA-11,MESS
16,40,FEAT10-COMMENT,S,'',  PASS ENT-4B
17,27,FEAT11-100FT,V,' ',  LABEL FEA-11
17,34,FEAT11-1/4MI,V,' '
17,40,FEAT11-COMMENT,NL,'Q',PASS FEA-12,MESS
17,40,FEAT11-COMMENT,S,'',  PASS ENT-4B
19,10,FEAT12-PERENNIAL,    LABEL FEA-12
20,10,FEAT12-EPHEMERAL
20,27,FEAT12-100FT,V,' '
20,34,FEAT12-1/4MI,V,' '
20,40,FEAT12-COMMENT,NL,'Q',PASS FEA-13,MESS
20,40,FEAT12-COMMENT,S,'',  PASS ENT-4B
22, 2,FEAT13-LINED,     LABEL FEA-13
22,10,FEAT13-UNLINED
22,27,FEAT13-100FT,V,' '
22,34,FEAT13-1/4MI,V,' '
22,40,FEAT13-COMMENT,NL,'Q',PASS ENT-4B,MESS
22,40,FEAT13-COMMENT,S,''
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0, 0,' ',LABEL ENT-4B
1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
1,41,'- GW NAWQA - Page 2, Topic 4 continued '
3, 1,'                        |within|100 ft|'
4, 1,'Feature                 |100 ft|1/4 mi|'
4,41,'            Comments                     '
5, 1,'Drainage ditch         |      |      |'
6, 1,' _ Lined _ Unlined     | _  | _  |'
6, 2,FEAT14-LINED,D
6,11,FEAT14-UNLINED,D
6,27,FEAT14-100FT,D
6,34,FEAT14-1/4MI,D
6,40,FEAT14-COMMENT,D
7, 1,'Lake      _ Natural    |      |      |'
8, 1,'          _ Man-made   | _  | _  |'
7,11,FEAT15-NATURAL,D
8,11,FEAT15-MANMADE,D
8,27,FEAT15-100FT,D
8,34,FEAT15-1/4MI,D
8,40,FEAT15-COMMENT,D
9, 1,'Reservoir _ Lined      |      |      |'
10, 1,'          _ Unlined    | _  | _  |'
9,11,FEAT16-LINED,D
10,11,FEAT16-UNLINED,D
10,27,FEAT16-100FT,D
10,34,FEAT16-1/4MI,D
10,40,FEAT16-COMMENT,D
11, 1,'Bay or estuary         | _  | _  |'
11,27,FEAT17-100FT,D
11,34,FEAT17-1/4MI,D
11,40,FEAT17-COMMENT,D
12, 1,'Spring                 |      |      |'
13, 1,' _ Geothermal (> 25 C) |      |      |'
14, 1,' _ Nongeothermal       | _  | _  |'
13, 2,FEAT18-GEO,D
14, 2,FEAT18-NOTGEO,D
14,27,FEAT18-100FT,D
14,34,FEAT18-1/4MI,D
14,40,FEAT18-COMMENT,D
15, 1,'Salt flat or playa     |      |      |'
16, 1,' _ Dry     _ Wet       | _  | _  |'
16, 2,FEAT19-DRY,D
16,11,FEAT19-WET,D
16,27,FEAT19-100FT,D
16,34,FEAT19-1/4MI,D
16,40,FEAT19-COMMENT,D
17, 1,'Mine, quarry, or pit   |      |      |'
18, 1,' _ Active _ Abandoned  | _  | _  |'
18, 2,FEAT20-ACTIVE,D
18,11,FEAT20-ABANDONED,D
18,27,FEAT20-100FT,D
18,34,FEAT20-1/4MI,D
18,40,FEAT20-COMMENT,D
19, 1,'Oil well               | _  | _  |'
19,27,FEAT21-100FT,D
19,34,FEAT21-1/4MI,D
19,40,FEAT21-COMMENT,D
20, 1,'Major withdrawal well  | _  | _  |'
20,27,FEAT22-100FT,D
20,34,FEAT22-1/4MI,D
20,40,FEAT22-COMMENT,D
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21, 1,'Waste injection well    |  _   |  _   |'
21,27,FEAT23-100FT,D
21,34,FEAT23-1/4MI,D
21,40,FEAT23-COMMENT,D
22, 1,'Recharge injection well|  _   |  _   |'
22,27,FEAT24-100FT,D
22,34,FEAT24-1/4MI,D
22,40,FEAT24-COMMENT,D
23, 1,'Other _____  |  _   |  _   |'
23, 7,FEAT25-NAME,D
23,27,FEAT25-100FT,D
23,34,FEAT25-1/4MI,D
23,40,FEAT25-COMMENT,D
 6, 2,FEAT14-LINED
 6,11,FEAT14-UNLINED
 6,27,FEAT14-100FT,V,' '
 6,34,FEAT14-1/4MI,V,' '
 6,40,FEAT14-COMMENT,NL,'Q',PASS FEA-15,MESS
 6, 2,FEAT14-COMMENT,S,'',  PASS ENT-5
 7,11,FEAT15-NATURAL,      LABEL FEA-15
 8,11,FEAT15-MANMADE
 8,27,FEAT15-100FT,V,' '
 8,34,FEAT15-1/4MI,V,' '
 8,40,FEAT15-COMMENT,NL,'Q',PASS FEA-16,MESS
 8,40,FEAT15-COMMENT,S,'',  PASS ENT-5
 9,11,FEAT16-LINED,       LABEL FEA-16
10,11,FEAT16-UNLINED
10,27,FEAT16-100FT,V,' '
10,34,FEAT16-1/4MI,V,' '
10,40,FEAT16-COMMENT,NL,'Q',PASS FEA-17,MESS
10,40,FEAT16-COMMENT,S,'',  PASS ENT-5
11,27,FEAT17-100FT,V,' ',  LABEL FEA-17
11,34,FEAT17-1/4MI,V,' '
11,40,FEAT17-COMMENT,NL,'Q',PASS FEA-18,MESS
11,40,FEAT17-COMMENT,S,'',  PASS ENT-5
13, 2,FEAT18-GEO,        LABEL FEA-18
14, 2,FEAT18-NOTGEO
14,27,FEAT18-100FT,V,' '
14,34,FEAT18-1/4MI,V,' '
14,40,FEAT18-COMMENT,NL,'Q',PASS FEA-19,MESS
14,40,FEAT18-COMMENT,S,'',  PASS ENT-5
16, 2,FEAT19-DRY,        LABEL FEA-19
16,11,FEAT19-WET
16,27,FEAT19-100FT,V,' '
16,34,FEAT19-1/4MI,V,' '
16,40,FEAT19-COMMENT,NL,'Q',PASS FEA-20,MESS
16,40,FEAT19-COMMENT,S,'',  PASS ENT-5
18, 2,FEAT20-ACTIVE,     LABEL FEA-20
18,11,FEAT20-ABANDONED
18,27,FEAT20-100FT,V,' '
18,34,FEAT20-1/4MI,V,' '
18,40,FEAT20-COMMENT,NL,'Q',PASS FEA-21,MESS
18,40,FEAT20-COMMENT,S,'',  PASS ENT-5
19,27,FEAT21-100FT,V,' ',  LABEL FEA-21
19,34,FEAT21-1/4MI,V,' '
19,40,FEAT21-COMMENT,NL,'Q',PASS FEA-22,MESS
19,40,FEAT21-COMMENT,S,'',  PASS ENT-5
20,27,FEAT22-100FT,V,' ',  LABEL FEA-22
20,34,FEAT22-1/4MI,V,' '
20,40,FEAT22-COMMENT,NL,'Q',PASS FEA-23,MESS
20,40,FEAT22-COMMENT,S,'',  PASS ENT-5
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21,27,FEAT23-100FT,V,' ',   LABEL FEA-23
21,34,FEAT23-1/4MI,V,' '
21,40,FEAT23-COMMENT,NL,'Q',PASS FEA-24,MESS
21,40,FEAT23-COMMENT,S,'',   PASS ENT-5
22,27,FEAT24-100FT,V,' ',   LABEL FEA-24
22,34,FEAT24-1/4MI,V,' '
22,40,FEAT24-COMMENT,NL,'Q',PASS FEA-25,MESS
22,40,FEAT24-COMMENT,S,'',   PASS ENT-5
23, 7,FEAT25-NAME,          LABEL FEA-25
23,27,FEAT25-100FT,V,' '
23,34,FEAT25-1/4MI,V,' '
23,40,FEAT25-COMMENT,NL,'Q',PASS ENT-5
23,40,FEAT25-COMMENT,S,''
 0, 0,' ',LABEL ENT-5
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 2, Topics 5 and 6'
 3, 1,'5. LAND-USE CHANGES - Have there been ma'
 3,41,'jor changes in the last 10 years in land'
 4, 1,'   use within 1/4 mile of the sampled w'
 4,41,'ell?'
 6, 1,'   Yes         Probably          Probabl'
 6,41,'y not         No  '
 6, 9,LUCHANGE-YES,D
 6,26,LUCHANGE-PYES,D
 6,47,LUCHANGE-PNO,D
 6,58,LUCHANGE-NO,D
 8, 1,'   If yes, describe major changes:'
 9, 5,LUC-COMMENT1,D
10, 5,LUC-COMMENT2,D
11, 5,LUC-COMMENT3,D
12, 5,LUC-COMMENT4,D
14, 1,'6. ADDITIONAL COMMENTS - Emphasize facto'
14,41,'rs that might influence local'
15, 1,'   ground-water quality.'
16, 5,ADD-COMMENT1,D
17, 5,ADD-COMMENT2,D
18, 5,ADD-COMMENT3,D
19, 5,ADD-COMMENT4,D
20, 5,ADD-COMMENT5,D
21, 5,ADD-COMMENT6,D
 6, 9,'', LABEL ENT-5A
 6, 9,LUCHANGE-YES, V,' ',L,' ',FAIL ENT-5BY,  MESS
 6,26,LUCHANGE-PYES,V,' ',L,' ',FAIL ENT-5BPY, MESS
 6,47,LUCHANGE-PNO, V,' ',L,' ',FAIL ENT-5BPN, MESS
 6,58,LUCHANGE-NO,  V,' ',L,' ',PASS ENT-5A,   MESS
 6,58,'X'
 6,58,LUCHANGE-NO,  S,'X'
 6,58,LUCHANGE-YES ,S,' '
 6,58,LUCHANGE-PYES,S,' '
 6,58,LUCHANGE-PNO, S,' ',PASS ENT-5B, MESS
 9, 5,LUC-COMMENT1, S,''
10, 5,LUC-COMMENT2, S,''
11, 5,LUC-COMMENT3, S,''
12, 5,LUC-COMMENT4, S,'', PASS ENT-6,  MESS
 6, 9,'X', LABEL ENT-5BY
 6, 9,LUCHANGE-YES, S,'X'
 6, 9,LUCHANGE-PYES,S,' '
 6, 9,LUCHANGE-PNO, S,' '
 6, 9,LUCHANGE-NO,  S,' ',PASS ENT-5B, MESS
 6,26,'X', LABEL ENT-5BPY
 6,26,LUCHANGE-PYES,S,'X'
 6,26,LUCHANGE-YES, S,' '
 6,26,LUCHANGE-PNO, S,' '
 6,26,LUCHANGE-NO,  S,' ',PASS ENT-5B, MESS
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 6,47,'X', LABEL ENT-5BPN
 6,47,LUCHANGE-PNO, S,'X'
 6,47,LUCHANGE-YES, S,' '
 6,47,LUCHANGE-PYES,S,' '
 6,47,LUCHANGE-NO,  S,' '
 9, 5,LUC-COMMENT1, S,''
10, 5,LUC-COMMENT2, S,''
11, 5,LUC-COMMENT3, S,''
12, 5,LUC-COMMENT4, S,'', PASS ENT-6,MESS
 9, 5,'', LABEL ENT-5B
 9, 5,LUC-COMMENT1, F,              MESS 'Entry required'
24, 1,'                                                  ,'
10, 5,LUC-COMMENT2,V,' ',NL,' ',FAIL ENT-6, MESS
11, 5,LUC-COMMENT3,V,' ',NL,' ',FAIL ENT-6, MESS
12, 5,LUC-COMMENT4
16, 5,'', LABEL ENT-6
16, 5,ADD-COMMENT1,V,' ',NL,' ',FAIL ENT-E, MESS
17, 5,ADD-COMMENT2,V,' ',NL,' ',FAIL ENT-E, MESS
18, 5,ADD-COMMENT3,V,' ',NL,' ',FAIL ENT-E, MESS
19, 5,ADD-COMMENT4,V,' ',NL,' ',FAIL ENT-E, MESS
20, 5,ADD-COMMENT5,V,' ',NL,' ',FAIL ENT-E, MESS
21, 5,ADD-COMMENT6
 0, 0,' ',LABEL ENT-E
 3, 1,'Update complete for station id:  '
 3,34,SITEID,D
 3,62,'visit on:  '
 3,73,DATE,D
 5, 1,'CODE         DATA DISPOSITION'
 7, 1,' Q    =    STORE data for this form,   STOP updating forms'
 8, 1,' C    =    STORE data for this form,   CONTINUE updating forms'
 9, 1,' D    =    DISCARD data for this form, STOP updating forms'
11, 1,'Please select a data-disposition code:  ', LABEL DISP
11,41,$CHR37,F,L,'Q','C','D',MESS 'Invalid data-disposition code'
24, 1,'                                                  ,'
24, 1,'                                          ,'
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 0, 0,' '
 1, 1,'     LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 1, Topic 1'
 3, 1,'DATE FIELD CHECK         PERSON COND'
 3,41,'UCTING INSPECTION'
 3,18,DATE,D
 3,60,PERSON,D
 4, 1,'WELL STATION ID'
 4,18,SITEID,D
 4,41,'LATITUDE          LONGITUDE'
 4,51,LATITUDE,D
 4,71,LONGITUDE,D
 5, 1,'LOCAL NUMBER'
 5,15,$CHR30,D
 5,17,$CHR31,D
 5,18,'-'
 5,19,$CHR32,D
 5,21,$CHR33,D
 5,22,'-'
 5,23,$CHR34,D
 5,26,$CHR35,D
 5,30,$CHR36,D
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5,50,'PROJECT ID'
5,62,PROJECT,D
7, 1,'PREDOMINANT LAND USE:'
8, 1,'   WITHIN 100 FEET OF WELL                        (Enter code):  __'
8,65,DLU-100FT,D
9, 1,'   WITHIN 100 FEET TO 1/4 MILE OF WELL            (Enter code):  __'
9,65,DLU-1/4MI,D
10, 1,'   PERCENTAGE OF AREA WITHIN 1/4 MILE OF WELL (Enter percent):  ___'
10,65,PREDOM-PCT,D
12,32,'Codes for land uses'
14, 3,' 1A = Residental'
15, 3,' 1B = Commercial'
16, 3,' 1C = Industrial'
17, 3,' 1D = Other urban land'
14,28,' 2A = Non-irrigated cropland'
15,28,' 2B = Irrigated cropland'
16,28,' 2C = Pasture'
17,28,' 2D = Orchard ,grove,'
18,28,'      vineyard, or nursery'
19,28,' 2E = Confined feeding'
20,28,' 2F = Other agricultural land'
14,58,' 3 = RANGELAND'
15,58,' 4 = FOREST LAND'
16,58,' 5 = WATER'
17,58,' 6 = WETLAND'
18,58,' 7 = BARREN LAND'
 3,18,DATE,D
 3,18,DATE
 3,60,PERSON
 4,18,SITEID
 4,51,LATITUDE
 4,71,LONGITUDE
 5,15,'              '
 5,18,'T'
 5,15,$CHR30,D
 5,15,$CHR30,R,'  ','99',    MESS 'Invalid township number'
24, 1,'                                                            '
 5,18,' '
 5,20,$CHR31,D
 5,22,'N/S'
 5,20,$CHR31,L,' ', 'N','S', MESS 'Enter:  N  or  S'
24, 1,'                                                            '
 5,22,'    R'
 5,28,$CHR32,D
 5,28,$CHR32,R,'  ','99',    MESS 'Invalid range number'
24, 1,'                                                            '
 5,22,'  -  '
 5,31,'E/W'
 5,35,$CHR33,D
 5,35,$CHR33,L,' ', 'E','W', MESS 'Enter:  E  or  W'
24, 1,'                                                            '
 5,31,'   '
 5,37,$CHR34,D
 5,37,$CHR34,R,'  ','36',    MESS 'Enter section number:  1-36'
24, 1,'                                                            '
 5,40,$CHR35,D
 5,40,$CHR35,R,'   ','DDD',  MESS 'Subsection designated by letters A-D'
24, 1,'                                                            '
 5,44,$CHR36,D
 5,44,$CHR36
 5,62,PROJECT,V,$CHR1
 8,65,DLU-100FT,M1,DLU-100FT,MESS 'Invalid land-use code'
24, 1,'                                                            '
 9,65,DLU-1/4MI,M2,DLU-1/4MI,MESS 'Invalid land-use code'
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24, 1,'                                                        '
10,65,PREDOM-PCT,R,1,100,    MESS 'Out of range:  0 < Percentage <= 100'
24, 1,'                                                        '
 0, 0,' '
 1, 1,'       LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 1, Topic 2'
 3, 1,'Land-use and land-cover|within|100 ft| '
 4, 1,'                       |100 ft|1/4 mi|'
 4,41,'          Comments                  '
 5, 1,' I. URBAN LAND        |      |      |'
 6, 1,'  --Residential       |  _   |  _   |'
 6,27,USE1A-100FT,D
 6,34,USE1A-1/4MI,D
 6,40,USE1A-COMMENT,D
 7, 1,'  --Commercial        |  _   |  _   |'
 7,27,USE1B-100FT,D
 7,34,USE1B-1/4MI,D
 7,40,USE1B-COMMENT,D
 8, 1,'  --Industrial        |  _   |  _   |'
 8,27,USE1C-100FT,D
 8,34,USE1C-1/4MI,D
 8,40,USE1C-COMMENT,D
 9, 1,'  --Other             |  _   |  _   |'
 9,11,USE1D-DESCRIP,D
 9,27,USE1D-100FT,D
 9,34,USE1D-1/4MI,D
 9,40,USE1D-COMMENT,D
10, 1,'II. AGRICULTURAL LAND |      |      |'
11, 1,'  --Cropland          |      |      |'
12, 1,'   -nonirrigated      |  _   |  _   |'
12,27,USE2A-100FT,D
12,34,USE2A-1/4MI,D
12,40,USE2A-COMMENT,D
13, 1,'   -irrigated         |  _   |  _   |'
13,27,USE2B-100FT,D
13,34,USE2B-1/4MI,D
13,40,USE2B-COMMENT,D
14, 1,'  --Pasture           |  _   |  _   |'
14,27,USE2C-100FT,D
14,34,USE2C-1/4MI,D
14,40,USE2C-COMMENT,D
15, 1,'  --Orchard, grove,   |      |      |'
16, 1,'     vineyard, nursery|  _   |  _   |'
16,27,USE2D-100FT,D
16,34,USE2D-1/4MI,D
16,40,USE2D-COMMENT,D
17, 1,'  --Confined feeding  |  _   |  _   |'
17,27,USE2E-100FT,D
17,34,USE2E-1/4MI,D
17,40,USE2E-COMMENT,D
18, 1,'  --Other             |  _   |  _   |'
18,11,USE2F-DESCRIP,D
18,27,USE2F-100FT,D
18,34,USE2F-1/4MI,D
18,40,USE2F-COMMENT,D
19, 1,'III.RANGELAND         |  _   |  _   |'
19,27,USE3-100FT,D
19,34,USE3-1/4MI,D
19,40,USE3-COMMENT,D
20, 1,'IV. FOREST LAND       |  _   |  _   |'
20,27,USE4-100FT,D
20,34,USE4-1/4MI,D
20,40,USE4-COMMENT,D
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21, 1,' V. WATER                   |  _  |  _   |'
21,27,USE5-100FT,D
21,34,USE5-1/4MI,D
21,40,USE5-COMMENT,D
22, 1,'VI. WETLAND                 |  _  |  _   |'
22,27,USE6-100FT,D
22,34,USE6-1/4MI,D
22,40,USE6-COMMENT,D
23, 1,'VII.BARREN LAND             |  _  |  _   |'
23,27,USE7-100FT,D
23,34,USE7-1/4MI,D
23,40,USE7-COMMENT,D
 6,27,USE1A-100FT,V,' '
 6,34,USE1A-1/4MI,V,' ',
 6,40,USE1A-COMMENT,NL,'Q',PASS USE-1B,MESS
 6,27,USE1A-COMMENT,S,'',  PASS ENT-3
 7,27,USE1B-100FT,V,' ',   LABEL USE-1B
 7,34,USE1B-1/4MI,V,' '
 7,40,USE1B-COMMENT,NL,'Q',PASS USE-1C,MESS
 7,40,USE1B-COMMENT,S,'',  PASS ENT-3
 8,27,USE1C-100FT,V,' ',   LABEL USE-1C
 8,34,USE1C-1/4MI,V,' '
 8,40,USE1C-COMMENT,NL,'Q',PASS USE-1D,MESS
 8,40,USE1C-COMMENT,S,'',  PASS ENT-3
 9,11,USE1D-DESCRIP,        LABEL USE-1D
 9,27,USE1D-100FT,V,' '
 9,34,USE1D-1/4MI,V,' '
 9,40,USE1D-COMMENT,NL,'Q',PASS USE-2A,MESS
 9,40,USE1D-COMMENT,S,'',  PASS ENT-3
12,27,USE2A-100FT,V,' ',   LABEL USE-2A
12,34,USE2A-1/4MI,V,' '
12,40,USE2A-COMMENT,NL,'Q',PASS USE-2B,MESS
12,40,USE2A-COMMENT,S,'',  PASS ENT-3
13,27,USE2B-100FT,V,' ',   LABEL USE-2B
13,34,USE2B-1/4MI,V,' '
13,40,USE2B-COMMENT,NL,'Q',PASS USE-2C,MESS
13,40,USE2B-COMMENT,S,'',  PASS ENT-3
14,27,USE2C-100FT,V,' ',   LABEL USE-2C
14,34,USE2C-1/4MI,V,' '
14,40,USE2C-COMMENT,NL,'Q',PASS USE-2D,MESS
14,40,USE2C-COMMENT,S,'',  PASS ENT-3
16,27,USE2D-100FT,V,' ',   LABEL USE-2D
16,34,USE2D-1/4MI,V,' '
16,40,USE2D-COMMENT,NL,'Q',PASS USE-2E,MESS
16,40,USE2D-COMMENT,S,'',  PASS ENT-3
17,27,USE2E-100FT,V,' ',   LABEL USE-2E
17,34,USE2E-1/4MI,V,' '
17,40,USE2E-COMMENT,NL,'Q',PASS USE-2F,MESS
17,40,USE2E-COMMENT,S,'',  PASS ENT-3
18,11,USE2F-DESCRIP,        LABEL USE-2F
18,27,USE2F-100FT,V,' '
18,34,USE2F-1/4MI,V,' '
18,40,USE2F-COMMENT,NL,'Q',PASS USE-3,MESS
18,40,USE2F-COMMENT,S,'',  PASS ENT-3
19,27,USE3-100FT,V,' ',  LABEL USE-3
19,34,USE3-1/4MI,V,' '
19,40,USE3-COMMENT,NL,'Q',PASS USE-4,MESS
19,40,USE3-COMMENT,S,'',  PASS ENT-3
20,27,USE4-100FT,V,' ',  LABEL USE-4
20,34,USE4-1/4MI,V,' '
20,40,USE4-COMMENT,NL,'Q',PASS USE-5,MESS
20,40,USE4-COMMENT,S,'',  PASS ENT-3
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21,27,USE5-100FT,V,' ',   LABEL USE-5
21,34,USE5-1/4MI,V,' '
21,40,USE5-COMMENT,NL,'Q',PASS USE-6,MESS
21,40,USE5-COMMENT,S,'',   PASS ENT-3
22,27,USE6-100FT,V,' ',   LABEL USE-6
22,34,USE6-1/4MI,V,' '
22,40,USE6-COMMENT,NL,'Q',PASS USE-7,MESS
22,40,USE6-COMMENT,S,'',   PASS ENT-3
23,27,USE7-100FT,V,' ',   LABEL USE-7
23,34,USE7-1/4MI,V,' '
23,40,USE7-COMMENT,NL,'Q',PASS ENT-3,MESS
23,40,USE7-COMMENT,S,''
 0, 0,' ',LABEL ENT-3
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 1, Topic 3'
 3, 1,'3. AGRICULTURAL PRACTICES within 1/4 mil'
 3,41,'e of the sampled well.'
 5, 1,'   a. EXTENT OF IRRIGATION - mark applic'
 5,41,'able statement(s).'
 6, 1,'       nonirrigated,    supplemental ir'
 6,41,'rigation in dry years only,    irrigated'
 6, 7,NOT-IRR,D
 6,24,SUP-IRR,D
 6,70,YES-IRR,D
 8, 1,'   b. METHOD OF IRRIGATION - mark those '
 8,41,'that apply.'
 9, 1,'       spray,   flood,   furrow,   drip'
 9,41,',   chemigation,   other '
 9, 7,SPR-IRR,D
 9,16,FLO-IRR,D
 9,25,FUR-IRR,D
 9,35,DRI-IRR,D
 9,43,CHE-IRR,D
 9,58,OTH-IRR,D
 9,66,OTH-IRR-TYPE,D
11, 1,'   c. SOURCE OF IRRIGATION WATER - mark '
11,41,'those that apply.'
12, 1,'       ground water,   surface water,  '
12,41,' spring,   sewage effluent,'
12, 7,GW-IRR,D
12,23,SW-IRR,D
12,40,SP-IRR,D
12,50,SE-IRR,D
13, 1,'       primary treatment,   secondary t'
13,41,'reatment,   tertiary treatment'
13, 7,S1-IRR,D
13,28,S2-IRR,D
13,51,S3-IRR,D
15, 1,'   d. PESTICIDE AND FERTILIZER APPLICATI'
15,41,'ON - Describe past and present chemicals'
16, 1,'       used, application rates, and appl'
16,41,'ication methods.'
17, 7,CHEM-COMMENT1,D
18, 7,CHEM-COMMENT2,D
19, 1,'   e. CROP AND ANIMAL TYPES - Describe p'
19,41,'ast and present crop and animal types'
20, 1,'       and crop rotation practices.'
21, 7,FARM-COMMENT1,D
22, 7,FARM-COMMENT2,D
 6, 7,NOT-IRR,V,' '
 6,24,SUP-IRR,V,' '
 6,70,YES-IRR,V,' '
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 9, 7,SPR-IRR,V,' '
 9,16,FLO-IRR,V,' '
 9,25,FUR-IRR,V,' '
 9,35,DRI-IRR,V,' '
 9,43,CHE-IRR,V,' '
 9,58,OTH-IRR,V,' '
 9,66,OTH-IRR-TYPE
12, 7,GW-IRR,V,' '
12,23,SW-IRR,V,' '
12,40,SP-IRR,V,' '
12,50,SE-IRR,V,' '
13, 7,S1-IRR,V,' '
13,28,S2-IRR,V,' '
13,51,S3-IRR,V,' '
17, 7,CHEM-COMMENT1,NL,'',FAIL ENT-3E,MESS
18, 7,CHEM-COMMENT2
21, 7,'',LABEL ENT-3E
21, 7,FARM-COMMENT1,NL,'',FAIL ENT-4,MESS
22, 7,FARM-COMMENT2
 0, 0,' ',LABEL ENT-4
 1, 1,'        LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 2, Topic 4'
 3, 1,'                      |within|100 ft|'
 4, 1,'Feature               |100 ft|1/4 mi|'
 4,41,'              Comments                 '
 5, 1,'Gas station           |  _  |  _  |'
 5,27,FEAT1-100FT,D
 5,34,FEAT1-1/4MI,D
 5,40,FEAT1-COMMENT,D
 6, 1,'Dry cleaner           |  _  |  _  |'
 6,27,FEAT2-100FT,D
 6,34,FEAT2-1/4MI,D
 6,40,FEAT2-COMMENT,D
 7, 1,'Chemical plant or     |     |     |'
 8, 1,' storage facility     |  _  |  _  |'
 8,27,FEAT3-100FT,D
 8,34,FEAT3-1/4MI,D
 8,40,FEAT3-COMMENT,D
 9, 1,'Airport               |  _  |  _  |'
 9,27,FEAT4-100FT,D
 9,34,FEAT4-1/4MI,D
 9,40,FEAT4-COMMENT,D
10, 1,'Military base         |  _  |  _  |'
10,27,FEAT5-100FT,D
10,34,FEAT5-1/4MI,D
10,40,FEAT5-COMMENT,D
11, 1,'Road                  |  _  |  _  |'
11,27,FEAT6-100FT,D
11,34,FEAT6-1/4MI,D
11,40,FEAT6-COMMENT,D
12, 1,'Pipeline or fuel      |     |     |'
13, 1,' storage facility     |  _  |  _  |'
13,27,FEAT7-100FT,D
13,34,FEAT7-1/4MI,D
13,40,FEAT7-COMMENT,D
14, 1,'Septic field          |  _  |  _  |'
14,27,FEAT8-100FT,D
14,34,FEAT8-1/4MI,D
14,40,FEAT8-COMMENT,D
15, 1,'Waste disposal pond   |  _  |  _  |'
15,27,FEAT9-100FT,D
15,34,FEAT9-1/4MI,D
15,40,FEAT9-COMMENT,D
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16, 1,'Landfill                 |  _  |  _  |'
16,27,FEAT10-100FT,D
16,34,FEAT10-1/4MI,D
16,40,FEAT10-COMMENT,D
17, 1,'Golf course             |  _  |  _  |'
17,27,FEAT11-100FT,D
17,34,FEAT11-1/4MI,D
17,40,FEAT11-COMMENT,D
18, 1,'Stream, river, or       |     |     |'
19, 1,' creek    _ Perennial   |     |     |'
20, 1,'          _ Ephemeral   |  _  |  _  |'
19,10,FEAT12-PERENNIAL,D
20,10,FEAT12-EPHEMERAL,D
20,27,FEAT12-100FT,D
20,34,FEAT12-1/4MI,D
20,40,FEAT12-COMMENT,D
21, 1,'Irrigation canal        |     |     |'
22, 1,' _ Lined _ Unlined      |  _  |  _  |'
22, 2,FEAT13-LINED,D
22,10,FEAT13-UNLINED,D
22,27,FEAT13-100FT,D
22,34,FEAT13-1/4MI,D
22,40,FEAT13-COMMENT,D
 5,27,FEAT1-100FT,V,' '
 5,34,FEAT1-1/4MI,V,' '
 5,40,FEAT1-COMMENT,NL,'Q',PASS FEA-2,MESS
 5,40,FEAT1-COMMENT,S,'',  PASS ENT-4B
 6,27,FEAT2-100FT,V,' ',  LABEL FEA-2
 6,34,FEAT2-1/4MI,V,' '
 6,40,FEAT2-COMMENT,NL,'Q',PASS FEA-3,MESS
 6,40,FEAT2-COMMENT,S,'',  PASS ENT-4B
 8,27,FEAT3-100FT,V,' ',  LABEL FEA-3
 8,34,FEAT3-1/4MI,V,' '
 8,40,FEAT3-COMMENT,NL,'Q',PASS FEA-4,MESS
 8,40,FEAT3-COMMENT,S,'',  PASS ENT-4B
 9,27,FEAT4-100FT,V,' ',  LABEL FEA-4
 9,34,FEAT4-1/4MI,V,' '
 9,40,FEAT4-COMMENT,NL,'Q',PASS FEA-5,MESS
 9,40,FEAT4-COMMENT,S,'',  PASS ENT-4B
10,27,FEAT5-100FT,V,' ',  LABEL FEA-5
10,34,FEAT5-1/4MI,V,' '
10,40,FEAT5-COMMENT,NL,'Q',PASS FEA-6,MESS
10,40,FEAT5-COMMENT,S,'',  PASS ENT-4B
11,27,FEAT6-100FT,V,' ',  LABEL FEA-6
11,34,FEAT6-1/4MI,V,' '
11,40,FEAT6-COMMENT,NL,'Q',PASS FEA-7,MESS
11,40,FEAT6-COMMENT,S,'',  PASS ENT-4B
13,27,FEAT7-100FT,V,' ',  LABEL FEA-7
13,34,FEAT7-1/4MI,V,' '
13,40,FEAT7-COMMENT,NL,'Q',PASS FEA-8,MESS
13,40,FEAT7-COMMENT,S,'',  PASS ENT-4B
14,27,FEAT8-100FT,V,' ',  LABEL FEA-8
14,34,FEAT8-1/4MI,V,' '
14,40,FEAT8-COMMENT,NL,'Q',PASS FEA-9,MESS
14,40,FEAT8-COMMENT,S,'',  PASS ENT-4B
15,27,FEAT9-100FT,V,' ',  LABEL FEA-9
15,34,FEAT9-1/4MI,V,' '
15,40,FEAT9-COMMENT,NL,'Q',PASS FEA-10,MESS
15,40,FEAT9-COMMENT,S,'',  PASS ENT-4B
16,27,FEAT10-100FT,V,' ', LABEL FEA-10
16,34,FEAT10-1/4MI,V,' '
16,40,FEAT10-COMMENT,NL,'Q',PASS FEA-11,MESS
16,40,FEAT10-COMMENT,S,'',  PASS ENT-4B
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17,27,FEAT11-100FT,V,' ',   LABEL FEA-11
17,34,FEAT11-1/4MI,V,' '
17,40,FEAT11-COMMENT,NL,'Q',PASS FEA-12,MESS
17,40,FEAT11-COMMENT,S,'',   PASS ENT-4B
19,10,FEAT12-PERENNIAL,    LABEL FEA-12
20,10,FEAT12-EPHEMERAL
20,27,FEAT12-100FT,V,' '
20,34,FEAT12-1/4MI,V,' '
20,40,FEAT12-COMMENT,NL,'Q',PASS FEA-13,MESS
20,40,FEAT12-COMMENT,S,'',   PASS ENT-4B
22, 2,FEAT13-LINED,         LABEL FEA-13
22,10,FEAT13-UNLINED
22,27,FEAT13-100FT,V,' '
22,34,FEAT13-1/4MI,V,' '
22,40,FEAT13-COMMENT,NL,'Q',PASS ENT-4B,MESS
22,40,FEAT13-COMMENT,S,''
 0, 0,' ',LABEL ENT-4B
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET'
 1,41,'- GW NAWQA - Page 2, Topic 4 continued'
 3, 1,'                      |within|100 ft|'
 4, 1,'Feature               |100 ft|1/4 mi|'
 4,41,'           Comments                  '
 5, 1,'Drainage ditch        |      |      |'
 6, 1,' _ Lined _ Unlined    | _    | _    |'
 6, 2,FEAT14-LINED,D
 6,11,FEAT14-UNLINED,D
 6,27,FEAT14-100FT,D
 6,34,FEAT14-1/4MI,D
 6,40,FEAT14-COMMENT,D
 7, 1,'Lake       _ Natural  |      |      |'
 8, 1,'           _ Man-made | _    | _    |'
 7,11,FEAT15-NATURAL,D
 8,11,FEAT15-MANMADE,D
 8,27,FEAT15-100FT,D
 8,34,FEAT15-1/4MI,D
 8,40,FEAT15-COMMENT,D
 9, 1,'Reservoir _ Lined     |      |      |'
10, 1,'          _ Unlined   | _    | _    |'
 9,11,FEAT16-LINED,D
10,11,FEAT16-UNLINED,D
10,27,FEAT16-100FT,D
10,34,FEAT16-1/4MI,D
10,40,FEAT16-COMMENT,D
11, 1,'Bay or estuary        | _    | _    |'
11,27,FEAT17-100FT,D
11,34,FEAT17-1/4MI,D
11,40,FEAT17-COMMENT,D
12, 1,'Spring                |      |      |'
13, 1,' _ Geothermal (> 25 C)|      |      |'
14, 1,' _ Nongeothermal      | _    | _    |'
13, 2,FEAT18-GEO,D
14, 2,FEAT18-NOTGEO,D
14,27,FEAT18-100FT,D
14,34,FEAT18-1/4MI,D
14,40,FEAT18-COMMENT,D
15, 1,'Salt flat or playa    |      |      |'
16, 1,' _ Dry   _ Wet        | _    | _    |'
16, 2,FEAT19-DRY,D
16,11,FEAT19-WET,D
16,27,FEAT19-100FT,D
16,34,FEAT19-1/4MI,D
16,40,FEAT19-COMMENT,D
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17, 1,'Mine, quarry, or pit   |      |       |'
18, 1,'_ Active _ Abandoned   | _    | _     |'
18, 2,FEAT20-ACTIVE,D
18,11,FEAT20-ABANDONED,D
18,27,FEAT20-100FT,D
18,34,FEAT20-1/4MI,D
18,40,FEAT20-COMMENT,D
19, 1,'Oil well                 | _    | _     |'
19,27,FEAT21-100FT,D
19,34,FEAT21-1/4MI,D
19,40,FEAT21-COMMENT,D
20, 1,'Major withdrawal well   | _    | _     |'
20,27,FEAT22-100FT,D
20,34,FEAT22-1/4MI,D
20,40,FEAT22-COMMENT,D
21, 1,'Waste injection well    | _    | _     |'
21,27,FEAT23-100FT,D
21,34,FEAT23-1/4MI,D
21,40,FEAT23-COMMENT,D
22, 1,'Recharge injection well| _    | _     |'
22,27,FEAT24-100FT,D
22,34,FEAT24-1/4MI,D
22,40,FEAT24-COMMENT,D
23, 1,'Other _____        | _    | _     |'
23, 7,FEAT25-NAME,D
23,27,FEAT25-100FT,D
23,34,FEAT25-1/4MI,D
23,40,FEAT25-COMMENT,D
 6, 2,FEAT14-LINED
 6,11,FEAT14-UNLINED
 6,27,FEAT14-100FT,V,' '
 6,34,FEAT14-1/4MI,V,' '
 6,40,FEAT14-COMMENT,NL,'Q',PASS FEA-15,MESS
 6,40,FEAT14-COMMENT,S,'',  PASS ENT-5
 7,11,FEAT15-NATURAL,     LABEL FEA-15
 8,11,FEAT15-MANMADE
 8,27,FEAT15-100FT,V,' '
 8,34,FEAT15-1/4MI,V,' '
 8,40,FEAT15-COMMENT,NL,'Q',PASS FEA-16,MESS
 8,40,FEAT15-COMMENT,S,'',  PASS ENT-5
 9,11,FEAT16-LINED,        LABEL FEA-16
10,11,FEAT16-UNLINED
10,27,FEAT16-100FT,V,' '
10,34,FEAT16-1/4MI,V,' '
10,40,FEAT16-COMMENT,NL,'Q',PASS FEA-17,MESS
10,40,FEAT16-COMMENT,S,'',  PASS ENT-5
11,27,FEAT17-100FT,V,' ',  LABEL FEA-17
11,34,FEAT17-1/4MI,V,' '
11,40,FEAT17-COMMENT,NL,'Q',PASS FEA-18,MESS
11,40,FEAT17-COMMENT,S,'',  PASS ENT-5
13, 2,FEAT18-GEO,          LABEL FEA-18
14, 2,FEAT18-NOTGEO
14,27,FEAT18-100FT,V,' '
14,34,FEAT18-1/4MI,V,' '
14,40,FEAT18-COMMENT,NL,'Q',PASS FEA-19,MESS
14,40,FEAT18-COMMENT,S,'',  PASS ENT-5
16, 2,FEAT19-DRY,          LABEL FEA-19
16,11,FEAT19-WET
16,27,FEAT19-100FT,V,' '
16,34,FEAT19-1/4MI,V,' '
16,40,FEAT19-COMMENT,NL,'Q',PASS FEA-20,MESS
16,40,FEAT19-COMMENT,S,'',  PASS ENT-5
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18, 2,FEAT20-ACTIVE,        LABEL FEA-20
18,11,FEAT20-ABANDONED
18,27,FEAT20-100FT,V,' '
18,34,FEAT20-1/4MI,V,' '
18,40,FEAT20-COMMENT,NL,'Q',PASS FEA-21,MESS
18,40,FEAT20-COMMENT,S,'',  PASS ENT-5
19,27,FEAT21-100FT,V,' ',   LABEL FEA-21
19,34,FEAT21-1/4MI,V,' '
19,40,FEAT21-COMMENT,NL,'Q',PASS FEA-22,MESS
19,40,FEAT21-COMMENT,S,'',  PASS ENT-5
20,27,FEAT22-100FT,V,' ',   LABEL FEA-22
20,34,FEAT22-1/4MI,V,' '
20,40,FEAT22-COMMENT,NL,'Q',PASS FEA-23,MESS
20,40,FEAT22-COMMENT,S,'',  PASS ENT-5
21,27,FEAT23-100FT,V,' ',   LABEL FEA-23
21,34,FEAT23-1/4MI,V,' '
21,40,FEAT23-COMMENT,NL,'Q',PASS FEA-24,MESS
21,40,FEAT23-COMMENT,S,'',  PASS ENT-5
22,27,FEAT24-100FT,V,' ',   LABEL FEA-24
22,34,FEAT24-1/4MI,V,' '
22,40,FEAT24-COMMENT,NL,'Q',PASS FEA-25,MESS
22,40,FEAT24-COMMENT,S,'',  PASS ENT-5
23, 7,FEAT25-NAME,          LABEL FEA-25
23,27,FEAT25-100FT,V,' '
23,34,FEAT25-1/4MI,V,' '
23,40,FEAT25-COMMENT,NL,'Q',PASS ENT-5,MESS
23,40,FEAT25-COMMENT,S,''
 0, 0,' ',LABEL ENT-5
 1, 1,'      LAND-USE / LAND-COVER FIELD SHEET '
 1,41,'- GW NAWQA - Page 2, Topics 5 and 6'
 3, 1,'5. LAND-USE CHANGES - Have there been ma'
 3,41,'jor changes in the last 10 years in land'
 4, 1,'    use within 1/4 mile of the sampled w'
 4,41,'ell?'
 6, 1,'    Yes         Probably         Probabl'
 6,41,'y not         No  '
 6, 9,LUCHANGE-YES,D
 6,26,LUCHANGE-PYES,D
 6,47,LUCHANGE-PNO,D
 6,58,LUCHANGE-NO,D
 8, 1,'    If yes, describe major changes:'
 9, 5,LUC-COMMENT1,D
10, 5,LUC-COMMENT2,D
11, 5,LUC-COMMENT3,D
12, 5,LUC-COMMENT4,D
14, 1,'6. ADDITIONAL COMMENTS - Emphasize facto'
14,41,'rs that might influence local'
15, 1,'    ground-water quality.'
16, 5,ADD-COMMENT1,D
17, 5,ADD-COMMENT2,D
18, 5,ADD-COMMENT3,D
19, 5,ADD-COMMENT4,D
20, 5,ADD-COMMENT5,D
21, 5,ADD-COMMENT6,D
 6, 9,'', LABEL ENT-5A
 6, 9,LUCHANGE-YES, V,' ',L,' ',FAIL ENT-5BY,  MESS
 6,26,LUCHANGE-PYES,V,' ',L,' ',FAIL ENT-5BPY, MESS
 6,47,LUCHANGE-PNO, V,' ',L,' ',FAIL ENT-5BPN, MESS
 6,58,LUCHANGE-NO,  V,' ',L,' ',PASS ENT-5A,   MESS
 6,58,'X'
 6,58,LUCHANGE-NO,  S,'X'
 6,58,LUCHANGE-YES ,S,' '
 6,58,LUCHANGE-PYES,S,' '
 6,58,LUCHANGE-PNO, S,' ',PASS ENT-5B, MESS
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6, 9,'X', LABEL ENT-6BY
6, 9,LUCHANGE-YES, S,'X'
6, 9,LUCHANGE-PYES,S,' '
6, 9,LUCHANGE-PNO, S,' '
6, 9,LUCHANGE-NO, S,' ',PASS ENT-6B, MESS
6,26,'X', LABEL ENT-6BPY
6,26,LUCHANGE-PYES,S,'X'
6,26,LUCHANGE-YES, S,' '
6,26,LUCHANGE-PNO, S,' '
6,26,LUCHANGE-NO, S,' ',PASS ENT-6B, MESS
6,47,'X', LABEL ENT-6BPN
6,47,LUCHANGE-PNO, S,'X'
6,47,LUCHANGE-YES, S,' '
6,47,LUCHANGE-PYES,S,' '
6,47,LUCHANGE-NO, S,' '
9, 5,'', LABEL ENT-6B
9, 5,LUC-COMMENT1,V,' ',NL,' ',FAIL ENT-6, MESS
10, 5,LUC-COMMENT2,V,' ',NL,' ',FAIL ENT-6, MESS
11, 5,LUC-COMMENT3,V,' ',NL,' ',FAIL ENT-6, MESS
12, 5,LUC-COMMENT4
16, 5,'', LABEL ENT-6
16, 5,ADD-COMMENT1,V,' ',NL,' ',FAIL ENT-E, MESS
17, 5,ADD-COMMENT2,V,' ',NL,' ',FAIL ENT-E, MESS
18, 5,ADD-COMMENT3,V,' ',NL,' ',FAIL ENT-E, MESS
19, 5,ADD-COMMENT4,V,' ',NL,' ',FAIL ENT-E, MESS
20, 5,ADD-COMMENT5,V,' ',NL,' ',FAIL ENT-E, MESS
21, 5,ADD-COMMENT6
 0, 0,' ',LABEL ENT-E
 3, 1,'Update complete for station id:  '
 3,34,SITEID,D
 3,62,'visit on:  '
 3,73,DATE,D
 5, 1,'CODE         DATA DISPOSITION'
 7, 1,'  Q   =   STORE data for this form,  STOP updating forms'
 8, 1,'  C   =   STORE data for this form,  CONTINUE updating forms'
 9, 1,'  D   =   DISCARD data for this form, STOP updating forms'
11, 1,'Please select a data-disposition code:  ', LABEL DISP
11,41,$CHR37,F,L,'Q','C','D',MESS 'Invalid data-disposition code'
24, 1,'                                                          '
```

Attachment AA. INFO report SUMMARY.RP listing

```
PROJECT,B,C,
 , PROJECT,
SITEID,N,
     WELL,  STATION ID,
LOCALID,TEXT ALL 'FORMS PROCESSED',
    LOCAL,   NUMBER,
DATE,
DATE OF ,VISIT  ,
PERSON,
FIELD,PERSON,
$1LAND-USE,38,
PREDOMINANT LAND-USE,WITHIN 100 FEET
$2STATUS,10,
PROCESSING,  STATUS,
'SUMMARY OF LAND USE AND LAND COVER FIELD SHEETS'
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 1, 1,'1    LAND-USE / LAND-COVER FIELD SHEET - GROUND-WATER NAWQA PILOT STUDIES - Page 1'
 3, 1,' DATE FIELD CHECK __/__/__    PERSON CONDUCTING FIELD INSPECTION: '
 4, 1,' WELL STATION-ID:                       LATITUDE            LONGITUDE '
 5, 1,' LOCAL NUMBER:                        PROJECT ID   '
 6, 1,'  '
 7, 1,' LAND USE AND LAND COVER CLASSIFICATION'
 8, 1,'  '
 9, 1,'                              |within|100 ft|'
10, 1,'       Land use and land cover|100 ft|1/4 mi|            Comments'
11, 1,'       ----------------------+------+------+--------+------------------------------'
12, 1,'       I. URBAN LAND         |      |      |       '
13, 1,'         --Residential       |      |      |       '
14, 1,'         --Commercial        |      |      |       '
15, 1,'         --Industrial        |      |      |       '
16, 1,'         --Other             |      |      |       '
17, 1,'       II. AGRICULTURAL LAND |      |      |       '
18, 1,'         --Cropland          |      |      |       '
19, 1,'          -nonirrigated      |      |      |       '
20, 1,'          -irrigated         |      |      |       '
21, 1,'         --Pasture           |      |      |       '
22, 1,'         --Orchard, grove,   |      |      |       '
23, 1,'            vineyard, nursery |      |      |       '
24, 1,'         --Confined feeding  |      |      |       '
25, 1,'         --Other             |      |      |       '
26, 1,'       III.RANGELAND         |      |      |       '
27, 1,'       IV. FOREST LAND       |      |      |       '
28, 1,'        V. WATER             |      |      |       '
29, 1,'       VI. WETLAND           |      |      |       '
30, 1,'       VII.BARREN LAND       |      |      |       '
31, 1,'       ----------------------+------+------+--------+------------------------------'
32, 1,' '
33, 1,'     PREDOMINANT LAND USE: '
34, 1,' '
35, 1,' '
36, 1,'         Percentage within 1/4 mile:   '
37, 1,' '
38, 1,' AGRICULTURAL PRACTICES'
39, 1,' '
40, 1,'     a.  EXTENT OF IRRIGATION:'
41, 1,' '
42, 1,' '
43, 1,' '
44, 1,'     b.  METHOD OF IRRIGATION:'
45, 1,' '
46, 1,' '
47, 1,' '
48, 1,'     c.  SOURCE OF IRRIGATION WATER:'
49, 1,' '
50, 1,' '
51, 1,' '
52, 1,'     d.  PESTICIDE AND FERTILIZER APPLICATION:'
53, 1,' '
54, 1,' '
55, 1,' '
56, 1,' '
57, 1,'     e.  CROP AND ANIMAL TYPES:'
58, 1,' '
59, 1,' '
60, 1,' '
61, 1,' '
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 1, 1,'1    LAND-USE / LAND-COVER FIELD SHEET - GROUND-WATER NAWQA PILOT STUDIES - Page 2'
 2, 1,' WELL STATION-ID:                        DATE FIELD CHECK:'
 3, 1,' '
 4, 1,' LOCAL FEATURES'
 5, 1,'                              |within|100 ft|   '
 6, 1,'      Feature                |100 ft|1/4 mi|               Comments'
 7, 1,'      -----------------------+------+------+------------------------------------------'
 8, 1,'      Gas station            |      |      | '
 9, 1,'      Dry cleaner            |      |      | '
10, 1,'      Chemical plant or      |      |      | '
11, 1,'        storage facility     |      |      | '
12, 1,'      Airport                |      |      | '
13, 1,'      Military base          |      |      | '
14, 1,'      Road                   |      |      | '
15, 1,'      Pipeline or fuel       |      |      | '
16, 1,'        storage facility     |      |      | '
17, 1,'      Septic field           |      |      | '
18, 1,'      Waste disposal pond    |      |      | '
19, 1,'      Landfill               |      |      | '
20, 1,'      Golf course            |      |      | '
21, 1,'      Stream, river, or      |      |      | '
22, 1,'        creek      Perennial |      |      | '
23, 1,'                   Ephemeral |      |      | '
24, 1,'      Irrigation canal       |      |      | '
25, 1,'          Lined    Unlined   |      |      | '
26, 1,'      Drainage ditch         |      |      | '
27, 1,'          Lined    Unlined   |      |      | '
28, 1,'      Lake       Natural     |      |      | '
29, 1,'                 Man-made    |      |      | '
30, 1,'      Reservoir  Lined       |      |      | '
31, 1,'                 Unlined     |      |      | '
32, 1,'      Bay or estuary         |      |      | '
33, 1,'      Spring                 |      |      | '
34, 1,'         Geothermal (> 25 C) |      |      | '
35, 1,'         Nongeothermal       |      |      | '
36, 1,'      Salt flat or playa     |      |      | '
37, 1,'          Dry       Wet      |      |      | '
38, 1,'      Mine, quarry, or pit   |      |      | '
39, 1,'          Active   Abandoned |      |      | '
40, 1,'      Oil well               |      |      | '
41, 1,'      Major withdrawal well  |      |      | '
42, 1,'      Waste injection well   |      |      | '
43, 1,'      Recharge injection well|      |      | '
44, 1,'      Other                  |      |      | '
45, 1,'      -----------------------+------+------+------------------------------------------'
46, 1,' '
47, 1,' LAND-USE CHANGES - Have there been major changes in the last 10 years in land use'
48, 1,'       within 1/4 mile of the sampled well?'
49, 1,' '
50, 1,' '
51, 1,' '
52, 1,' '
53, 1,' '
54, 1,' '
55, 1,' ADDITIONAL COMMENTS - Emphasize factors that might influence local ground-water'
56, 1,'       quality.'
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