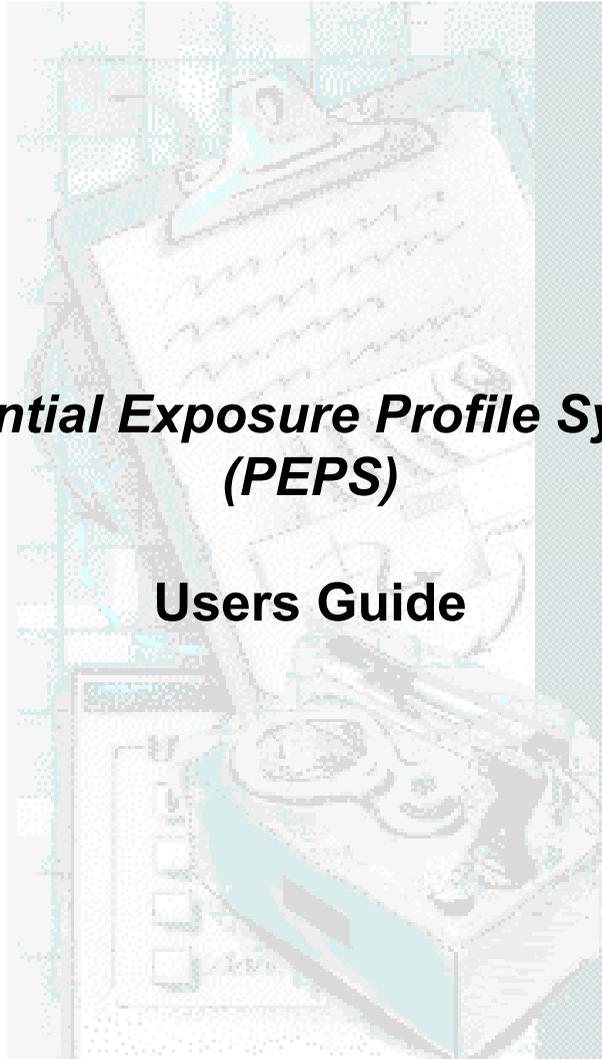


***Potential Exposure Profile System
(PEPS)***

Users Guide



Potential Exposure Profile System (PEPS)

Users Guide

prepared for
The Centers for Disease Control and Prevention
under Grant R01/CCR412029

by
Oak Ridge Associated Universities
Oak Ridge, Tennessee
© 1997

Copyright

This manual and the software to which it pertains are copyrighted by Oak Ridge Associated Universities (ORAU) with all rights reserved. Under the copyright laws, the manual and software may not be reproduced in any form, in whole or part, without the prior written consent of ORAU.

© 1997 Oak Ridge Associated Universities

Disclaimer

Oak Ridge Associated Universities has reviewed this manual thoroughly to provide a thorough yet easily readable guide for using the Potential Exposure Profile System application. All statements, technical information, and recommendations in this manual, or in recommended literature, are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted.

The software media is provided without charge and subject to the disclaimers set forth in this manual. Further, ORAU reserves the right to make changes in the specifications of the products described in this manual at any time without notice and without obligation to notify any person of such changes.

Any questions regarding this software or information in this manual should be directed to:

Oak Ridge Associated Universities
Center for Epidemiologic Research
P. O. Box 117, Oak Ridge, Tennessee 37830 USA
1-423-576-3115 (voice),
1-423-576-9557 (fax)

Trademarks

Any brand and product names referenced in this manual may be trademarks or registered trademarks of their respective companies.

Contents

CHAPTER I: INTRODUCTION	1
The Potential Exposure Profile System (PEPS)	1
The PEPS Data Management Application	1
CHAPTER II: QUICKSTART	3
Purpose of the PEPS System	3
Installation and Using the PEPS Data Management Application ...	3
CHAPTER III: INSTALLATION	5
System Requirements	5
Installing the Software	5
Uninstalling the Software	5
CHAPTER IV: USING THE PEPS APPLICATION	6
Overview	6
Application Setup	6
Online Help	7
Starting the Application	7
User Interface	8
Program Navigation	9
User Input	9
Undo	9
The Database	10
Overview	10
Encode Potential Exposure Profiles	11
Query Potential Exposure Profile Database	11
Edit Potential Exposure Dictionary	11
Data Resources	12
Program Functions	13
Browsing	14
Assigning PEPS Codes	14
Entering Records	15
Loading Data Files	16
Querying	17
Printing	18
Editing	19

Modifying Potential Exposure Dictionary	20
CHAPTER V: SECURITY	22
Security Issues	22
Security Implementation	22
CHAPTER VI: DATABASE MANAGEMENT	24
Good Database Management Practices	24
Backing-Up Data	24
Database Integrity	25
Compacting Database	25
Repairing Database	25
Defragmenting Hard Drive	26
Performance Issues	27
Problems	28
CHAPTER VII: REFERENCE	29
Published Reference Sources	29
Technical Support	29

Chapter I: Introduction

Following is a concise description of a system and associated software for coding of occupations based on potential for occupational exposures. For a full description of the coding system and the details of its development, see the Research Report citation on page 29 of **Chapter VII: Reference** in this manual.

The Potential Exposure Profile System (PEPS)

PEPS is a numeric coding system for the purpose of distinguishing occupations based on potential for exposure to 36 occupational hazards reported by certified industrial hygienists and certified health physicists throughout the United States. PEPS also includes a dedicated Windows 95 application for assigning PEPS codes and managing the PEPS database. Although presently the PEPS database is not populated, the database as conceived by the developers would ultimately be populated by commonly recognized jobs with PEPS codes assigned by experts in the occupational exposure assessment field using the set of potential exposures included with the PEPS application as defaults. However, the PEPS application provides a convenient means for customizing the table of potential exposures provided as defaults. In this way, the application can be tailored for the particular needs of each company or industry to code occupations for potential exposures specifically associated with the company or industry. PEPS was developed as part of a pilot project conducted by Oak Ridge Associated Universities, Center for Epidemiologic Research for the U.S. Centers for Disease Control and Prevention under grant R01/CCR412029.

The PEPS Data Management Application

The PEPS Data Management Application provides access to the database of occupations and PEPS codes. The program is a full-featured Windows 95-based application developed in Microsoft Access 95 (version 7.0). Functions are provided for browsing,

querying, and reporting of the database records. Specific data can be selected based on a number of different criteria. For persons with appropriate authorization, functions also are provided for adding new occupations to the database and assigning and modifying PEPS Codes.

The PEPS Data Management Application is event driven, meaning that it reacts or responds to input by the user. All functions are accessible by clicking on an appropriate command button with the left mouse button, or by pressing the **[Alt]** key and a designated “hot key” identified by an underlined character on the command button. Help for most functions is available within the application by pressing the **[Help]** button available on most screens.

Chapter II: Quickstart

This chapter is provided for users who want or need only the very primary instructions for installing and operating the PEPS Data Management Application. To that end, the information provided is extremely brief and with few technical explanations. A more complete description of the PEPS concept and the data management application is found in **Chapter I: Introduction**, and complete instructions for installing and operating the application are found in **Chapter II: Installation** and **Chapter III: Using the PEPS Data Management Application**.

Purpose of the PEPS System

PEPS was developed to provide a methodology and associated software for characterizing occupations based on potential for exposure to chemical or physical hazards likely to be encountered by persons engaged in the occupations included in the system. The data generated by the PEPS system reside in a Microsoft Access 95 database managed by a full-featured data management application.

Installation

Installation of the PEPS Data Management Application is accomplished by simply running the SETUP.EXE file on the first program disk. It is not necessary to have Microsoft Access 95 resident on the computer on which the application is installed. Once the installation is complete, execute the program by clicking on the Windows **[Start]** button, then choosing **[Programs|Potential Exposure Profile System]**.

Using the PEPS Data Management Application

The PEPS Application provides four major services:

- Online help including a broad overview of the PEPS encoding principles, the occupational database, the dedicated data management program, and general instructions for using the program.

- Functions for browsing, querying, adding to, modifying, and reporting occupational records residing in the PEPS database. Records may be selected based on a number of different criteria.
- Functions for assigning or modifying PEPS Codes for occupations in the PEPS database.
- Functions for modifying the 36 materials or physical effects in the **Potential Exposure Dictionary**.

Program functions are available by left-clicking on labeled command buttons. **Hot keys** are also provided for persons preferring, or requiring keyboard access.

WARNING:

Codes in the PEPS database are based on binary characteristics (Yes/No) designated by the user for each of the 36 chemical or physical exposures in the **Potential Exposure Dictionary**. Therefore, extreme care should be exercised when editing the dictionary, since changes in this underlying data can result in illogical or conflicting potential exposure information, very different from that intended.

Note:

Database security for the PEPS database is provided within the Microsoft Access program. Responsibility for issuing or limiting database privileges resides with individuals who install the PEPS Data Management Application and who thereafter are within the ADMINS work group. It is recommended that careful planning be given to the establishment of work groups, with consideration for the degree of security preferred or required.

Chapter III: Installation

System Requirements

The PEPS Data Management Application should run on any IBM PC-compatible computer system using the Windows 95 operating system. Performance can vary considerably, depending on the computer's hardware configuration. Specifically, the system should have the following components:

CPU	80486 or higher (Pentium recommended)
RAM	8 megabytes (16 or more recommended)
Video	SVGA (600 X 800 resolution)
Hard Drive	10 megabytes free (Program only)
Floppy drive	3.5 inch (For installation only)
Mouse	Microsoft compatible (Not required, but strongly recommended)
Printer	Windows compatible (Required only for hard copy reports)

Installing the Software

The software is furnished on 3.5-inch high density disks. The disks are not copy-protected and can be copied freely within the restraints of the license. Back-up copies should be made before beginning installation. The application should be installed through the Windows Control Panel by clicking **[Start]**, then **[Settings|Control Panel|Add/Remove Programs]** and following the instructions. The installation program will offer a choice of where to install the application and will create a program group.

Uninstalling the Software

To uninstall the PEPS Application for any reason, simply click on the **Add/Remove** icon in **Control Panel** and follow the instructions. It is important to use the **Add/Remove** utility provided. Manual deletion of the program files or folder, will not accomplish a complete uninstall and will not update the Windows 95 Registry.

Chapter IV: Using the PEPS Application

Overview

The descriptive occupational data and assigned PEPS Codes reside in the **Job Dictionary** table. Fields included in the table are Job Code, Job Title, Work Group, Job Description, and Job PEPS Code. The 36 materials or physical effects designated as potential exposures are located in the **Potential Exposure Dictionary** table. Descriptive information, details, or further specifications pertaining to the designated potential exposures are also included in the **Potential Exposure Dictionary** table. A number of additional files and forms also are required to manage, retrieve, display, and print information in the PEPS database.

Further information regarding the components of the PEPS system is provided in **Chapter I: Introduction** and **Chapter VII: Reference**. Technical support and training for the PEPS Data Management Application are available from:

Oak Ridge Associated Universities/Center for Epidemiologic Research
Oak Ridge, TN, 37831-0117
423/576-3115 (voice)
423/576-9557 (fax).

Application Setup

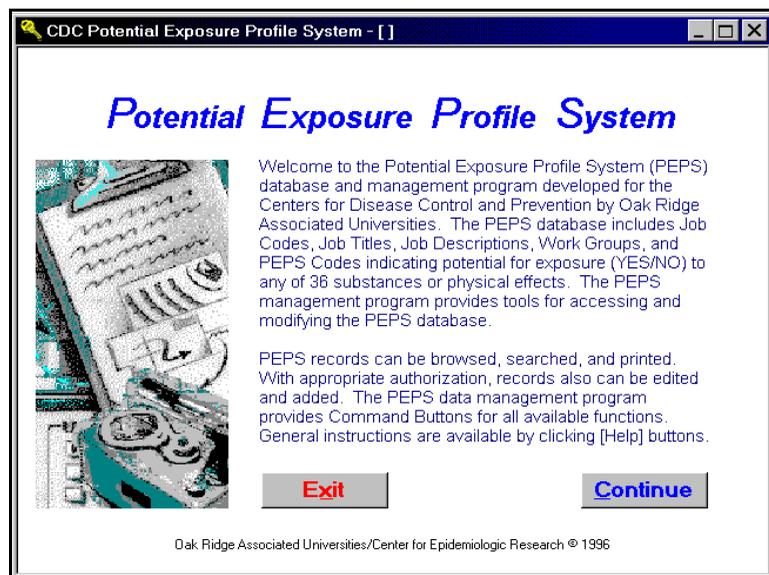
Once the application is installed, no setup is required before operating the program. The user is encouraged to explore and test the program to determine its capability and limits. With adherence to normal Windows operating procedures, there is no reason for concern about damage to the program.

Prior to setting up a permanent occupational database to be managed by the PEPS Application, there are several steps to be taken to insure the integrity of the data. These issues are discussed in detail in **Chapter VI: Database Management**.

Online Help

Information about the PEPS Application and instructions for its use are provided within the application in the form of text help files. This information is readily available, and usually may be accessed without quitting the present activity. Upon initial execution of the program, the user is offered a general overview of the PEPS system and the data management application. Context sensitive help files for most program functions are also available as command choices on many screens. Clicking any **[Help]** button displays the appropriate help file in a superimposed window without disturbing the current operation. In both the overview file and specific help files, **Hypertext Links** to other relevant information are shown in underlined, colored fonts. The help files also may be browsed by using the **[Page Up]** and **[Page Down]** buttons. Clicking the **[Close]** button will return the user to the precise position in the program at which the help was requested.

Starting the Application



Depending on user preferences, the PEPS Data Management Application can be started by selecting the appropriate entry on the Windows 95 **Programs Menu**, double-clicking on a previously created **desktop icon** for the PEPS Application, or selecting an appropriate Windows 95 **Shortcut** previously added to the **Start Menu**. While loading, the welcome screen shown above is displayed. This opening screen provides some general information about the PEPS System and provides a means to immediately exit the program.

The time required for program execution will vary considerably depending on system hardware, configuration, and tuning. As a reference, loading the application on a well-configured 120mhz Pentium system will take approximately 5 seconds.

User Interface

The **user interface** of the PEPS Application is designed to be intuitive and to encourage efficient operation. As in all Windows programs, communication with the program is done through forms. Each PEPS form is displayed within a window and usually has two or more **command buttons** available for moving to a different window or initiating an action. Primary windows are large and positioned centrally by default, while help files, error messages, and results are displayed in **pop-up** windows of varying sizes.

Command buttons are labeled to indicate their function, but due to the limited space available on the faces of the buttons, in some cases the function of a command button may not be apparent. A more detailed description of the function of each command button (with a few exceptions) is provided by a **Control Tip** that displays automatically when the mouse cursor is allowed to rest on the command button for more than two seconds.

Program Navigation

Moving about the program, selecting data, and initiating commands are easily accomplished using a mouse or the keyboard. Virtually all program functions may be implemented by clicking once (single-clicking) with the left mouse button, assuming the mouse is configured for right-handed use. Commands may be initiated either by single-clicking on the appropriate command button or by pressing the **[Alt]** key simultaneously with the appropriate “**hot key**” identified by an underlined character on the command button. Similarly, any particular data field may be selected by placing the mouse cursor anywhere within the field and single-clicking with the left mouse button. To further move within the selected data field, use the left or right keyboard cursor control keys.

User Input

For many functions the user is asked to input text data or select from a list (pick list) of available data values. As an example, when selecting occupational records based on **Job Title** or **Work Group**, the program will prompt the user to key in the Job Title or Work Group of interest to identify the records. If the user wishes to select records based on **Potential Exposure**, a pick list of available Potential Exposures will be presented to the user. After responding to the prompt or selecting from the pick list, the records meeting the selection criterion will be displayed or printed.

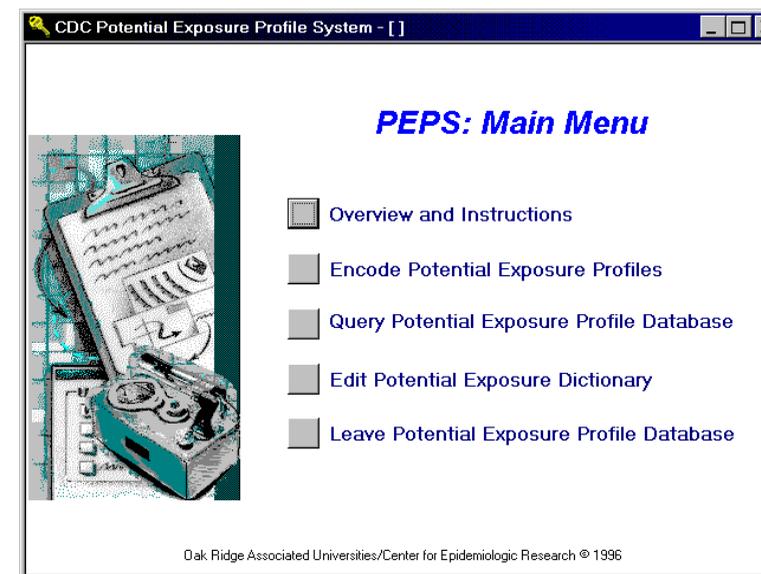
Undo

Microsoft Access always provides a means for reversing any edit change but only if the changes have not been written to the record. Changes are written to a record when the **[Enter]** key is pressed or when the edited field has lost the focus (another field has been selected). To **undo** edits, simply press the **[Escape]** key before selecting a different field.

The Database

If the user chooses to continue from the opening screen, the Main Switchboard screen shown below is presented, from which all data and functions are accessed. The Main Switchboard is available within a few mouse clicks from almost any place in the application.

Five major choices are available on the Main Switchboard.



Overview

A brief description of the PEPS Data Management Application and concise instructions for using the application are available by pressing the **[Overview]** button. Information in this file may be viewed by paging or by jumping to specific subtopics via **Hypertext** links. Users may return to this screen at any time, and additional **Help** files with more details also are available on most screens.

Encode Potential Exposure Profiles

A visual display of the characteristics of each occupation in the PEPS database, and the materials or physical effects identified as potential exposures for each occupation, can be seen by clicking on this command button. Persons with appropriate authorization (database privileges) can assign PEPS codes to newly added occupations or modify PEPS codes for existing occupations.

Query Potential Exposure Profile Database

Pressing this command button provides access to all functions for selecting specific occupational records from the PEPS database for display, printing, or editing. Records can be selected based on a number of selection criteria provided by the user.

Edit Potential Exposure Dictionary

The PEPS Application is shipped with default values (materials or physical effects) populating the Potential Exposure Dictionary. These values were derived from a list of materials and physical effects provided by Certified Industrial Hygienists and Certified Health Physicists as significant potential exposures for the U.S. workforce. Persons with appropriate authorization (database privileges) can modify the default values by choosing this command button.

Exit

Press this command button to exit the PEPS Application. If the user confirms the Exit command, all files are closed and the system is returned to its pre-execution state.

The Main Switchboard well illustrates the appearance and functionality of all subsequent form screens. Most screens will have a descriptive title, one or more labeled command buttons for application functions, a data presentation window, a **[Help]** button, and a command button to return to the previous page or to exit the current form. A single left click is used to initiate all command buttons. **Note:** The right mouse button is not implemented in the

PEPS Application.

Data Resources

All user data in the PEPS database reside in two tables with the following structure:

Table Name	Field Name
Job Dictionary	Job Code
	Job Title
	Work Group
	Job PEPS Code
	Job Description
Potential Exposure Dictionary	Potential Exposure
	Potential Exposure Detail

This information may prove useful when designing queries to segregate particular groups of records, and also may be of general use to persons responsible for maintaining the PEPS database. Functions are available in the data management application for modifying data in both tables.

Care should always be exercised when editing or adding data in the PEPS database. Extreme caution is recommended when making changes in the PEPS **Potential Exposure Dictionary**. Ordinarily, changes in this table should not be necessary. Changes in this table would be appropriate when a material or physical effect in the table is known to **not** present a potential exposure for the workforce described in the PEPS database. In this case, it would be reasonable to replace the unassigned material or physical effect with one that does present a potential exposure to the workforce. It should be recognized that the data in the Potential Exposure Dictionary are uniquely related to the Job PEPS Codes, and changes in the values in the Potential

Exposure Dictionary will likely result in illogical PEPS Code assignments for previously assigned occupations. For this reason, only persons with appropriate authorization (database privileges) are able to make changes in the Potential Exposure Dictionary.

Program Functions

The form shown above is the main display and assignment form for the PEPS Data Management Application. This screen graphically displays all of the characteristics of the currently selected occupation. The **Job Code**, **Job Title**, and **Work Group** are shown in text boxes at the top of the form. A more detailed description of the current occupation can be seen by pressing the **[Job Description]** button at the upper right corner of the screen. **Potential Exposures** currently assigned to the selected occupation are indicated by **check marks** in the potential

exposure table, and the resulting **PEPS Code** is displayed immediately below the potential exposure table. This form also provides functions for browsing the PEPS database, for assigning or modifying PEPS Codes, and for adding new occupational records to the database.

Browsing

To browse the PEPS database, navigation buttons are provided for selecting the **First**, **Previous**, **Next**, and **Last** records. All associated information for the newly selected record will be updated. It is also possible to select a particular occupation from a list of available **Job Titles** by clicking on the downward-facing arrow located at the right border of the **Job Title** box.

Assigning PEPS Codes

Persons with appropriate authorization (database privileges) can assign or reassign potential exposures for newly added or previously existing occupations in the PEPS database. Potential exposures are assigned by simply clicking in the appropriate **check box** located to the left of each named potential exposure. Clicking in an already checked box removes the check mark and deselects the associated potential exposure. Additions or changes made in the potential exposure window are not automatically written to the record. To save any changes made, click on the **[Save]** button and respond positively to the verification message offered. Any other action such as moving to another record or closing the potential exposure assignment form will abort any visual changes made since the last **save** command.

In some circumstances it will be useful or helpful to deselect all previously assigned potential exposures and begin the assignment process anew. For this purpose, a **[Clear]** button is provided. As mentioned in the preceding paragraph, this change will not be permanent until the current record is saved.

Entering Records

Occupational records can be added to the PEPS database easily. Pressing the **[New Rec]** button at the bottom of the potential exposure assignment form will present a **record entry form** for adding single records. Pressing the **[Tab]** key moves the cursor to the next field, and multiple changes can be made to the record anytime prior to saving the record. Pressing the **[Save]** button will store the new record in the occupational database.

While the record entry form does provide a field for the PEPS Code, it is highly recommended that the PEPS Code **not** be entered in this way. It is much preferable and safer with respect to errors to have the PEPS Code assigned automatically using the potential exposure assignment form, so the intended changes are represented graphically and can be reviewed before storing the changes. Only in cases where the appropriate PEPS Code is known with certainty should the code be entered in the record entry form. Even in these cases it is recommended that the potential exposures defined by the entered PEPS Code be verified by reviewing the entire occupational record in the potential exposure assignment form.

Loading Data Files

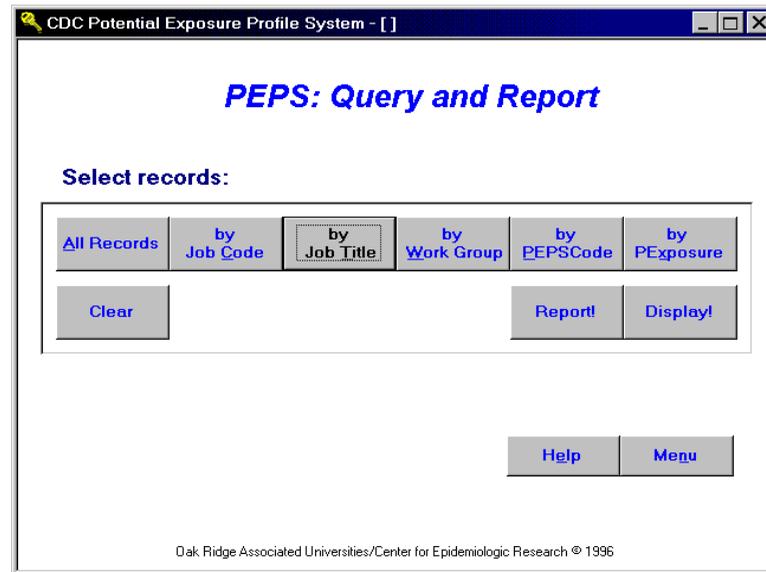
Persons with **Database Administrator** privileges can upload multiple records to the PEPS database using the native Microsoft Access application. Records may be loaded (imported) only into the Job Dictionary table and must comply with a prescribed file layout. If records are in other formats, or data elements (fields) oriented differently, it will be necessary to reformat the input file to match specifications shown.

File layout for uploading data into Job Dictionary table.

Job Code	Text/Number (No decimals)	
Job Title	Text	28
Work Group	Text	28
PEPS Code	Text	11
Job Description	Text	255

Care should be exercised when importing records into the Job Dictionary table, since these records are the primary data within the PEPS database. It is recommended to first import test data that can be easily recognized (for subsequent deletion) as a trial, before attempting to import actual occupational data.

Querying



The screen shown above is used for selection of records from the PEPS database for querying, printing, and editing. General instructions for selecting records is available by pressing the **[Help]** button. The **[Menu]** button returns to the Main Switchboard screen.

Records in the PEPS database may be selected for viewing, editing, or reporting based on a number of different criteria including Job Code, Job Title, Work Group, PEPS Code, and Potential Exposure (PExposure). If the user wishes to browse the database, the **[All Records]** button may be selected. Note that when selecting records based on Job Title or Work Group, the query engine will accept **text strings** (partial Job Titles or Work Groups) as the values on which to search. However, depending on how closely the criterion value matches the actual Job Title or

Work Group of interest, more than one record matching the input value may be returned. In many cases this will not be a problem. If the user only needs to view the targeted records for immediate use, or to retrieve a particular element of data from an occupational record, navigation buttons will allow the user to scroll through the set of records selected by the imprecise search criterion value until the record(s) of interest is found.

Clicking any of the command buttons on the **Query** screen will prompt for a selection criterion value, or provide a drop-down menu (pick list) of possible values. To perform a query, click on the appropriate command button for the selection criterion to be used. Initially, the text on all command buttons is **blue**. When a command button for selection criterion is pressed, the text on the button changes to **black**. The example screen above shows that the user wishes to display records selected by Job Title. After the selection criterion is chosen, pressing the **[Display]** button executes the query and displays the resulting data set. An example screen showing a record set resulting from such a query is shown in the **Editing** section on page 19.

Printing

A number of predesigned reports are available for printing data from the PEPS database. Reporting formats are traditional with a semi-formal layout. Reports are initially displayed for preview of the output. The user can then elect to print the selected records or cancel the print job. Reports should be possible on any laser or inkjet-type printer with a Windows-compliant driver.

Microsoft Access has the capability to produce publication quality reports on data selected on virtually any criteria. If particular reports are required, other than those predesigned, it will be necessary to interact with the PEPS database at the native DBMS level using the Access application.

Editing

The screenshot shows the 'PEPS Job Dictionary' form. It contains the following fields and values:

Job Code	001010
Job Title	General Cleaner1
Work Group	Facilities Maintenance
Job PEPS Code	15034777618
Job Description	Provides manual assistance for wide variety of non-production tasks

At the bottom of the form are three buttons: 'Edit', 'Save', and 'Close'. Below the buttons is a record navigation bar showing 'Record: 1 of 5 (Filtered)'.

Persons with proper authorization (necessary database privileges) may edit existing occupational records in the PEPS database. Editing is performed after selection of records by querying. When records are first selected they are not editable, because the file is opened in read-only mode. If editing is necessary, clicking on the **[Edit]** button changes the file to edit mode. After editing, changes should be saved by clicking the **[Save]** button.

Care should be exercised when editing any data, but extreme caution is recommended when editing the PEPS Code. The value of the PEPS code is based on binary information determined by the presence or absence of potential exposure to 36 materials or physical effects. Even a small numeric change in the PEPS Code can produce a dramatic change in the potential exposure profile represented by the PEPS code. If change of the PEPS Code is necessary, it is recommended that this be done automatically by the application using the PEPS Code assignment form so the intended changes are represented graphically and can be reviewed before storing the changes. Note that in some cases,

changing the data in the Job Dictionary may produce illogical results or results very different from expected. Note that within the application, records with errors can be edited, but cannot be deleted. It is possible of course to edit and delete records when interacting with the PEPS database at the native Microsoft Access Application level.

Modifying Potential Exposure Dictionary

The screenshot shows the 'PEPS PExposure Dictionary' form. It contains the following fields and values:

ControlNum	0
PExposure	Lead
PExpDetail	Metal, Salts, Oxides

At the bottom of the form are four buttons: 'Edit', 'Save', 'Print', and 'Close'. Below the buttons is a record navigation bar showing 'Record: 1 of 36'.

The PEPS Application is shipped with default values populating the Potential Exposure Dictionary. These default materials and physical effects were selected as those most frequently mentioned by a group of over 40 Certified Industrial Hygienists and Certified Health Physicists who were asked to name significant potential exposures for the U.S. workforce. The PEPS developers originally conceived the system as a universal resource in which all occupations would be coded for exposure to a fixed set of potential hazards. However, during development it was realized that in some cases the system would be more useful if the materials and physical effects in the Potential Exposure Dictionary could be tailored to apply specifically to a particular work environment. Therefore, persons with appropriate authorization can modify the Potential Exposure Dictionary easily.

Pressing the **[Edit Potential Exposure Dictionary]** button on the Main Switchboard presents the form shown above. When the form is first opened, no changes can be made because the form is in read-only mode. To edit a particular record, use the navigation buttons at the bottom of the form, then press **[Edit]**. After changes are made to the record being edited, pressing the **[Save]** button stores the record. Note that **no more than 36 values** can reside in the dictionary. Also, note that PEPS Codes for all occupational records in the database are based on binary values (yes/no) relevant to the sequential position of potential exposure values residing in the dictionary at the time of encoding. Changes in values in the Potential Exposure Dictionary will almost certainly result in inaccurate, if not meaningless, PEPS Codes for occupations assigned while different values resided in the dictionary. For this reason it is recommended that all changes in the Potential Exposure Dictionary be completed prior to assigning any potential exposures.

Chapter V: Security

Security Issues

Prior to using the PEPS application, thought should be given to the level of security necessary or desirable to maintain the integrity of the database once it is populated. A structured and logical security policy will greatly decrease the possibility of data loss, either accidentally or intentionally. The security policy should provide convenient access to the database for all users to the depth of each user's need while limiting unnecessary access.

Security Implementation

All security functions are implemented within the Microsoft Access application. Access to the data may be enforced at the database or individual database table level. Further, access may be precisely defined according to particular database functions. To illustrate, users may be issued privileges as follows:

1. Access to entire database with all functions,
2. Access to entire database but with restrictions on specific functions such as adding new records,
3. Access to entire database but with read-only privileges, or
4. No access to database.

Decisions on the level of privileges assigned to users should be made carefully with consideration of the users' needs for access and the overall security of the database. Usually, database privileges are issued by the individual(s) with administrative responsibility for the database. Initially, these persons will be in a "work group" designated by Microsoft Access as the Admins work group. Additional work groups can be added with various levels of access.

While privileges can be issued at the individual user level, it is highly recommended that privileges be assigned at the **work group** level. This greatly simplifies security tasks for a number of reasons. First, rather than needing to issue repetitive sets of

privileges to each user, a single set of privileges can be assigned to a work group in which any number of persons can be included. Later, when an individual no longer has need for database access, all privileges are withdrawn by simply removing the individual from a specific work group. Also, when it is necessary to change the level of access for multiple persons, this is much easier accomplished by making the necessary changes to the appropriate work group rather than making changes to each individual's access profile.

Additional information on security issues and implementation of security plans is available in the Microsoft Access help files and in many independent publications on Microsoft Access. Several of these publications are cited in **Chapter VII: Reference** of this guide.

Chapter VI: Database Management

Good Database Management Practices

The most carefully collected data residing in a powerful and elegant database management application will soon be in jeopardy unless good database management policies are implemented. A thorough discussion of this subject is outside of the scope of this manual, however, many excellent volumes are readily available to provide guidance in establishing and maintaining a sound database management system. Within this chapter, the basic topics of database management that should be considered will be presented along with general recommendations.

Backing-Up Data

Why back-up data? All experts in the field of database management will attest that at some time, a situation will occur when data will be lost if a back-up copy does not exist. It is not a matter of "if"; it is a matter of "when". A formal back-up policy should be developed and appropriate procedures integrated into normal data management operations. While no back-up function is included within the PEPS Data Management Application, nor in the native Microsoft Access Application, this presents no problem. All of the files that comprise an Access database are incorporated in a single DOS file with the following naming convention:

Database Name.MDB

It is possible to "split" the database tables from the other elements of the database to segregate the dynamic part (tables) from the static part (forms, reports, macros, VBA code, etc. If the user chooses to split the database, the database will then consist of two MDB files. Any DOS or Windows utility can be used to copy (either compressed or uncompressed) the PEPS MDB files to any storage device and medium available.

Database Integrity

In addition to regularly backing-up the PEPS database, three other procedures should be implemented as formal maintenance procedures to minimize the possibility of data loss. Two of the procedures, **compacting the database** and **repairing the database**, are performed within Microsoft Access while the third recommended procedure (**defragmenting the database**) is performed outside Microsoft Access at the operating system level.

Compacting Database

Any change in the PEPS database (adding, loading, or modifying records) can result in disorder of the electromagnetic data on the mass storage device, usually a hard drive. This situation is **not** a fault of the PEPS or Access applications, nor does it present a problem unless the disordering is excessive as a result of many changes being made to the database. When excessive disordering does occur, performance may suffer.

Microsoft provides a simple and convenient means to reorder the electromagnetic data on the storage device without any special manipulations required of the user within the database application. From the main Access menu, select

Tools|Database Utilities|Compact Database

and follow the instructions provided. Compaction of the database should be performed routinely by the database administrator, after backing-up the database.

Repairing Database

Under certain circumstances it is possible for the PEPS database to become corrupted. There are many events that may result in database corruption such as abnormally exiting the database application, or loss of power while changes are being made in the database. Often, the cause of data corruption can not be determined with certainty. Microsoft provides a utility specifically

for detection of database errors and repair of the database when possible. It should be noted that in some cases a database can not be repaired, and in this situation, the corrupted database should be replaced with a back-up copy.

It is recommended that the database administrator regularly perform a database repair procedure, after backing-up the database. From the main Access menu, select

Tools|Database Utilities|Repair Database

and follow the instructions provided.

Defragmenting Hard Drive

During any normal computer operations involving writing to the hard drive (installing software, deleting files, moving files, editing data, etc.), file fragmentation occurs. Simply put, fragmentation exists when DOS files are stored in noncontiguous areas on the drive. Fragmentation is not an error condition and is not caused by any flaw in the operating system nor in any application. When fragmentation is not excessive, it presents no problem to the user. However, files can become fragmented to the point where performance suffers. This can be observed in longer times being required to search data sets or collect specific records for display.

When excessive fragmentation occurs, the drive should be defragmented. Microsoft provides a defragmenting utility specifically for this purpose. Other vendors also supply defragmenting utilities, but their compatibility and safety may not be as certain as with the Microsoft utility. It is recommended that the database manager periodically defragment the hard drive where the PEPS database resides, **after** backing-up the data.

Performance Issues

As with all applications, a number of factors will affect performance of the PEPS Database Management Application. A thorough discussion of all of these factors is outside the scope of this manual, but a plethora of literature is available on the subject. Here, a brief discussion of the major factors affecting performance is presented.

The PEPS Application was developed on a 120 MHZ Pentium CPU computer with industry-standard components such as the hard drive, video adapter, etc. Response as measured by display of forms should be almost immediate on any computer of this technology, assuming that no data are being selected for population of the form. When data are being selected for population of a form, the amount of time for display will increase with the size of the database being read or searched. Processing of data for printing of reports often takes somewhat more time because of the need for formatting the data. The actual time for printing reports will chiefly depend on the performance of the printer. Modifying single records usually will be almost instantaneous, while the time required for loading of data files will again increase with the size of the file being loaded.

During development of the application, performance was observed on computers with CPUs ranging from a 486DX-33 to a Pentium 133. Significant differences in performance were noticeable, particularly in machines with less than 16 megabytes of RAM. Overall, performance on any properly tuned 486DX-33 or faster computer should be satisfactory. Performance is a subjective matter, and each user will have to determine if and when performance is unsatisfactory.

Following is a list of items (not in order of significance) generally known to affect computer performance:

- CPU speed
- Amount of RAM memory
- Hard drive access and data transfer speeds
- Size of database
- Degree of file fragmentation
- Indexing of database files
- Network size and configuration

Problems

As of issuance, there were no known bugs or other major problems in the PEPS Database Management Application. Extensive efforts were made to make the application as “bullet-proof” as reasonable. Of course, differences in computer configurations can demonstrate or elicit problems previously undetected. Also, misuse of the operating system or the application, such as improperly exiting from the application or from Windows, can result in corrupted files that may produce a variety of problems when the application is next used.

General instruction and training on operation of the Windows environment and Windows applications are available from hundreds of written, audio, video, and personal resources. A large number of resources focused on database design and management also are available.

Chapter VII: Reference

Published Reference Sources

The following references are provided as sources of information on the PEPS system, the Microsoft Access DBMS, and database principles in general.

1. Access 95 Unleashed. Dwayne Gifford, et al., Sams Publishing, 1996.
2. Microsoft Access Relational Database Management System for Windows 95 / Building Applications, Microsoft Corporation, 1996.
3. Microsoft Access/Visual Basic Step by Step. Evan Callahan, Microsoft Press, 1995.
4. Research Report for Grant R01/CCR412029 prepared for The Centers for Disease Control and Prevention. Oak Ridge Associated Universities, June 30, 1997.
5. Special Edition Using Access 95. Roger Jennings, Que Corporation, 1996.
6. Visual Basic 4 Unleashed, Scott, Shannon, Font, Hatfield, et al, Sams Publishing, 1995

Technical Support

Basic and advanced training for using the PEPS application as well as technical support are available from ORAU. Any questions regarding this software or information in this manual should be directed to:

Oak Ridge Associated Universities
Center for Epidemiologic Research
P. O. Box 117, Oak Ridge, Tennessee 37830 USA
1-423-576-3115 (voice) - Monday-Friday 8:00am-4:30pm EST
1-423-576-9557 (fax)

Notes

Notes

Oak Ridge Associated Universities

Established in 1946, Oak Ridge Associated Universities (ORAU) is a consortium of 88 doctoral-granting colleges and universities. From its headquarters in Oak Ridge, Tennessee, ORAU serves the government, academia, and the private sector in important areas of science and technology. A private, not-for-profit corporation, ORAU manages and operates the Oak Ridge Institute for Science and Education (ORISE) for the U.S. Department of Energy.

ORAU holds the distinction of being the first multi-university consortium created in the United States for the purpose of operating scientific and educational programs under government contract. Fifty years later, ORAU continues to use its unique position in linking the academic community with government agencies and private industry to create beneficial partnerships and discover innovative solutions in the areas of education, training, health, and the environment. Through the cost-effective application of its resources in these areas, ORAU strives to find effective solutions that meet the needs of our nation and our clients.

