

Written By: Greg Gogates	Title: Excel 97 Data Security

1. BACKGROUND

Laboratories use Microsoft Excel 97 in various ways including preparing tables and reports, automating routine tasks, executing programs provided by instrument vendors, and even implementing small data management systems. Many of these spreadsheets are now subject to ISO 17025 electronic record requirements.

2. PURPOSE AND SCOPE

This document is not intended to any official position regarding regulatory compliance. It is provided to assist developers in identifying Excel 97 features helpful for compliance related to the following data security and protection clauses in ISO 17025;

4.3.3.4 - "Procedures are established.....documents maintained in computer systems are made and controlled".

4.12.2.3 - "When mistakes occur in records,.....In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data".

5.4.7.2(b) - "Procedures are established for protecting data, such procedures shall include integrity, confidentiality..."

5.5.12 - Test and Cal equipment, including software, shall be safeguarded for adjustments..."

3. OVERVIEW

Excel 97 provides several built in features that help spreadsheet authors provide data security and protection for their users. In addition to the built in features that Excel provides, macros can be written to automatically disable options in Excel, automate common tasks to reduce errors and improve efficiency, and require the user to follow predetermined set of steps as is done in traditional programming environments.

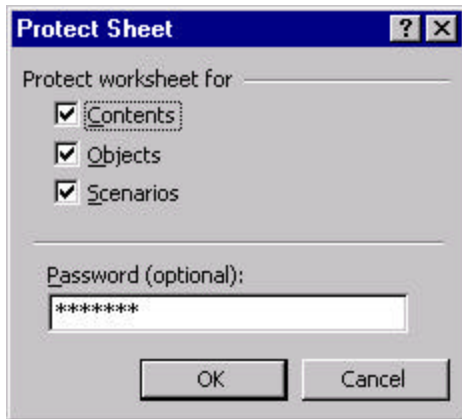
4. Protect a Sheet from Changes

To prevent a user from making changes to a sheet use the following menu option in Microsoft Excel:

Tools

Protection

Protect Sheet



You can select the areas of the sheet that you want to protect. Generally all three of the following options are selected:

- Contents - Prevents changes to cells on worksheets, and prevents changes to items in charts.
- Objects - Prevents others from deleting, moving, editing, or resizing graphic objects on a worksheet or chart sheet.
- Scenarios - Prevents changes to the definitions of scenarios on a worksheet.

Note: a password should be entered, otherwise a user can just select the Unprotect Sheet menu option without entering a password to unprotect a sheet. This same password is required in order to unprotect the sheet.

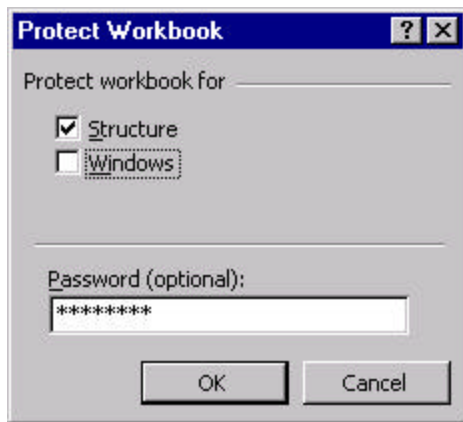
5. Protect a Workbook

To prevent a user from making changes to the structure or windows in a workbook use the following menu option in Microsoft Excel:

Tools

Protection

Protect **W**orkbook



You can select the areas of the workbook that you want to protect. Generally only the Structure option is selected:

- Structure - Protects the structure of a workbook so that sheets can't be deleted, moved, hidden, unhidden, or renamed, and new sheets can't be inserted.
- Windows - Protects a workbook's windows from being moved, resized, hidden, unhidden, or closed.

Note: A password should be entered, otherwise a user can just select the Unprotect Workbook menu option without entering a password to unprotect the workbook. This same password is required in order to unprotect the workbook.

6. Restrict the User to Modify Selected Cells

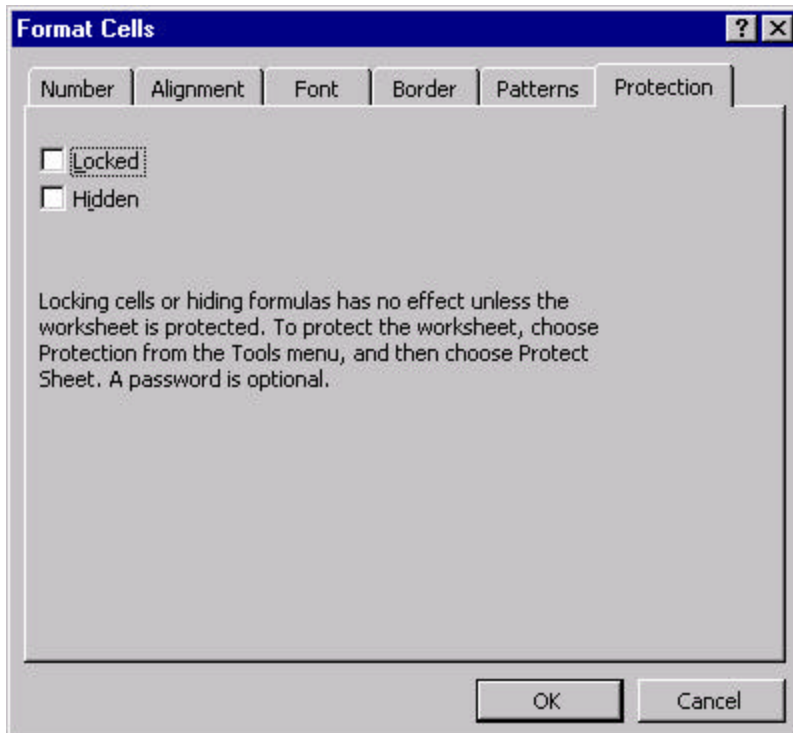
Usually a user needs to enter data into one or more cells on a sheet, but the rest of the sheet can be locked. Perform the following steps to protect all cells except for a select few on a sheet.

This setting works in conjunction with the Protect Sheet option described above. Select the cells that should be *not* be locked and choose the following menu option in Microsoft Excel:

Format

Cells

Protection tab



Deselect the Locked check box to prevent the selected cells from being changed, moved, resized, or deleted. Once this is completed, follow the steps in the *Protect a Sheet from Changes* section above.

7. Hide Cell Formulas

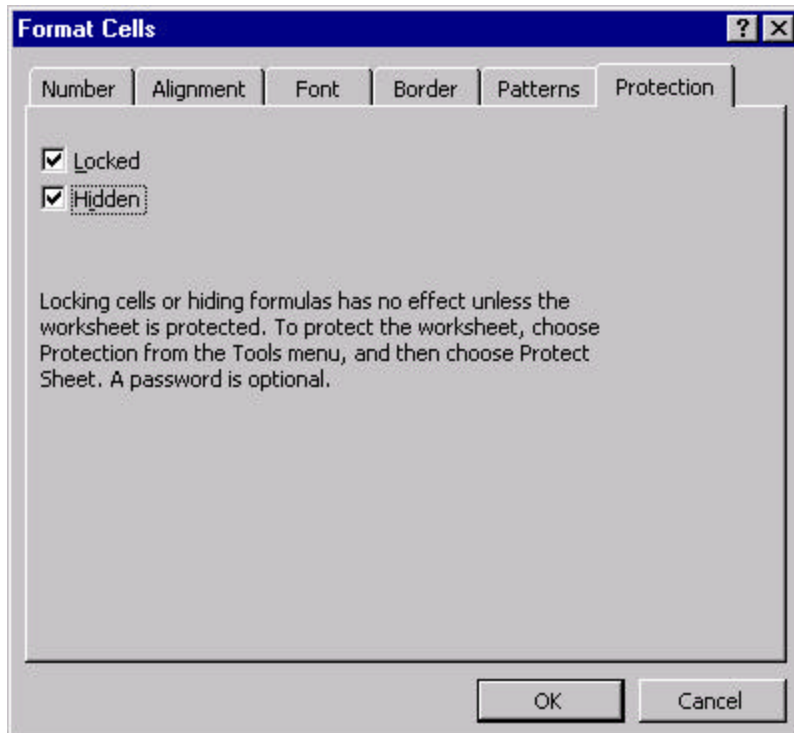
When a user selects a cell the formula is shown in the formula bar above the sheet. This can be prevented if necessary.

This setting works in conjunction with the Protect Sheet option described above. Select the cells containing formulas that should not be viewed and choose the following menu option in Microsoft Excel:

Format

Cells

Protection tab



Select the **H**idden option to hide formulas in cells so that they do not appear in the formula bar when a cell is selected. Once this is completed, follow the steps in the *Protect a Sheet from Changes* section above.

8. Hide Sheets That Should Not Be Viewed

Excel users often create utility sheets that contain data and cell formulas that the user does not need to see nor change. In Microsoft Excel, choose the following menu items to hide the current sheet.

Format

Sheet

Hide

A hidden sheet still exists in the workbook but does not appear in the sheet tabs at the bottom of the window. Other sheets can refer to cells on hidden sheets. An example of a hidden sheet is a table of numbers that remain constant and are used in formulas on other sheets. The sheet containing this table can be hidden so it is invisible to the end user.

This feature works in conjunction with the Protect Workbook option described above. If the workbook structure is protected with a password the user will not be able to unhide a sheet without knowing the password.

9. Maintaining a Change History

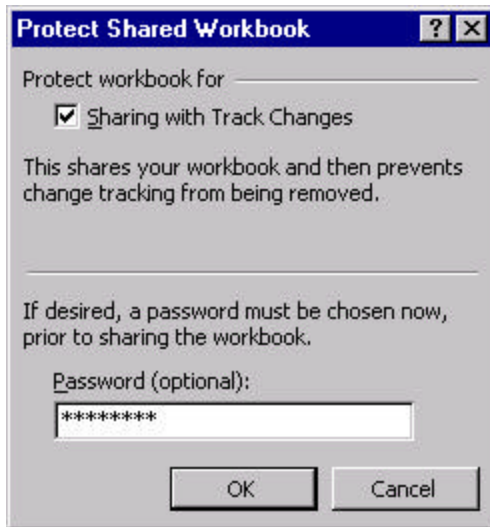
Excel provides the ability to maintain a history of all changes made by one or more users of a spreadsheet. The information includes who made each change, when the change was made, and what data was changed. You can view the information directly on the worksheet or on a separate History worksheet.

To enable this feature choose the following menu option:

Tools

Protection

Protect and Share Workbook



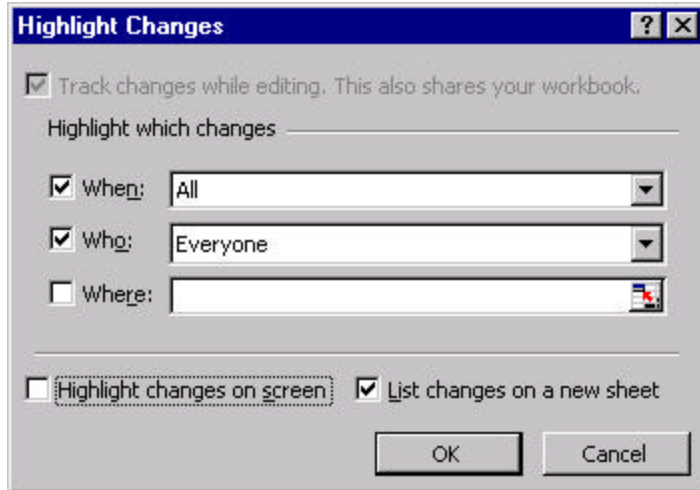
Click the Sharing with Track Changes checkbox to enable the change history tracking in a shared workbook. Enter a password to prevent unauthorized users from removing workbook protection.

After the workbook has been used, a list of the changes that have been made can be created in a history sheet by using the following menu options:

Tools

Track Changes

Highlight Changes



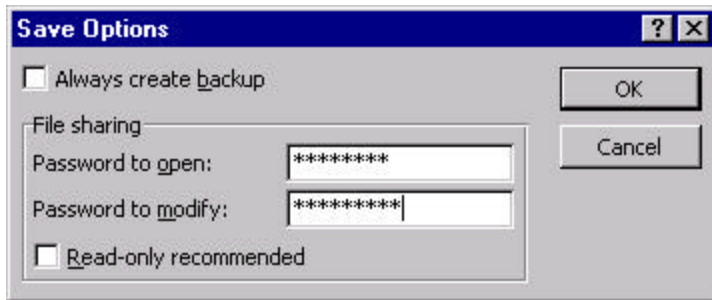
Selecting the "List changes on a new sheet" produces a History sheet listing all changes made to the workbook. The following is an example of a History sheet:

Action Number	Date	Time	Who	Change	Sheet	Range	New Value	Old Value	Action Type	Losing Action
1	5/25/99	3:05 PM	User ID	Cell Change	Sheet1	A1	1	<blank>		
2	5/25/99	3:05 PM	User ID	Row Auto-Insert	Sheet1	2:2				
3	5/25/99	3:05 PM	User ID	Cell Change	Sheet1	A2	2	<blank>		
4	5/25/99	3:05 PM	User ID	Row Auto-Insert	Sheet1	3:3				
5	5/25/99	3:05 PM	User ID	Cell Change	Sheet1	A3	3	<blank>		

The history ends with the changes saved on 5/25/99 at 3:05 PM.

10. Prevent Opening and Mofifying a Spreadsheet

Excel provides the following save options by clicking on the Options... button on the Save As dialog box.



Password to open: entering a password prevents others from opening a workbook without the password. For example, authorized users in a laboratory may know this password so they can open and use the workbook, but others would not be able to open it without knowledge of the password.

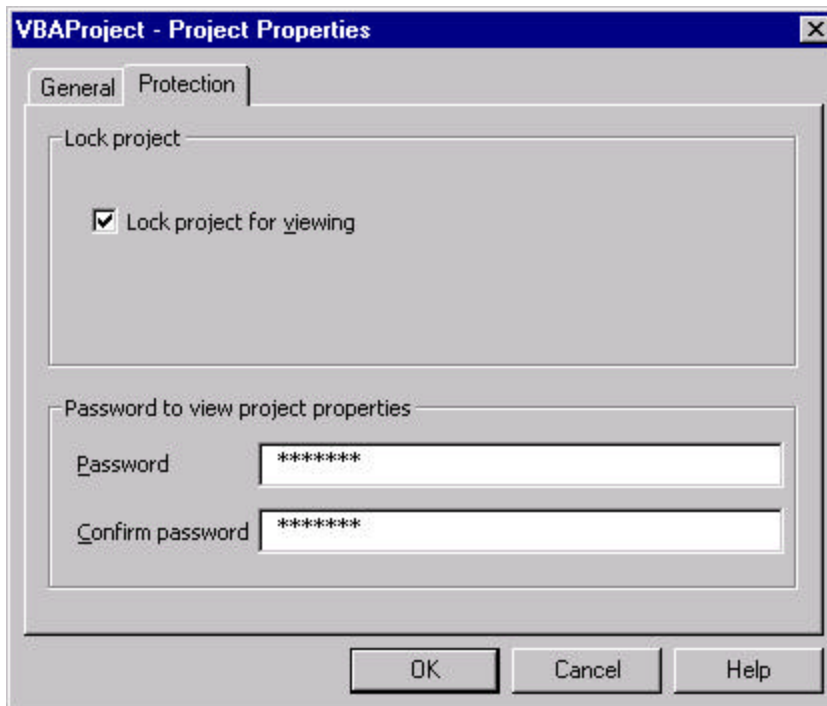
Password to modify: entering a password prevents another user from opening, making changes in, and saving the workbook without a password. If someone opens the workbook as read-only and changes it, it must be saved with a different name. For example, a developer or support person may know this password to maintain the spreadsheet, but general users would not know the password and could not modify the original sheet.

11. Prevent Users from Viewing and Changing Source Code

In the Microsoft Visual Basic editor, choose the following menu items to lock the source code for the current project:

Tools

VBAProject Properties



12. FEATURES AVAILABLE THROUGH VBA PROGRAMMING

While the list of features that can be implemented through VBA to improve data security and protection in Excel 97 is infinite, the following are a few features that are commonly used.

12.1. Auto_Open Procedure

The Auto_Open subroutine is automatically when an Excel workbook is opened. This provides the programmer with an opportunity to set up the environment before the user has a chance to use the spreadsheet.

Example:

```
Public Sub Auto_Open()  
    ' VBA statements that should be executed when the workbook  
    ' is opened should be inserted here.  
  
End Sub
```

12.2. Auto_Close Procedure

The Auto_Close is automatically executed when a workbook is closed.

Example:

```
Public Sub Auto_Close()  
    ' VBA statements that should be executed when the  
workbook  
    ' is closed should be inserted here.  
  
End Sub
```

12.3. Specify the Starting Sheet

A programmer can specify the sheet that the user should start at by using the Application.Goto method in the Auto_Open macro.

Example:

```
Application.Goto  
Reference:=Worksheets("Sheet1").Range("A14"), scroll:=True
```

12.4. Screen Updating

By default, when a subroutine is executed the user can see everything that occurs. For example, if a subroutine copies a column of data from Sheet 1 to Sheet 2 and formats the data, the user can see Excel switch from Sheet 1 to Sheet 2, observe the data being copied and pasted back to Sheet 1 and then formatted. This can be prevented by setting the ScreenUpdating to False at the beginning of the subroutine.

Example:

```
Application.ScreenUpdating = False
```

12.5. Hide Toolbars

The toolbars can be hidden to restrict the actions that a user can perform in the Auto_Open macro.

Example:

```
For Each toolbar In Application.Toolbars  
    toolbar.Visible = False  
Next toolbar
```

12.6. Hide the Formula Bar

If a user should not be able to view or edit any formulas in the spreadsheet, the formula bar can be hidden.

Example:

```
Application.DisplayFormulaBar = False
```