

# AuditNet – Auditor’s Guide for Preparing, Documenting and Referencing Spreadsheets

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Adapted with Permission  
Based on a Technical Guide  
from the U.S. General Accounting Office Information and  
Management and Technology Division

## Purpose of This Guide

Appropriate quality control and documentation are essential throughout an assignment. The purpose of this guide is to provide guidance to users on how to prepare and document electronic spreadsheets. It also provides guidance on how to verify and reference spreadsheets.

Reviewers should be able to use spreadsheets as direct support for checking the accuracy of report data. If spreadsheets are properly prepared and reviewed, reviewers should be able to satisfy themselves as to the accuracy of the written product. On the other hand, since reviewers are responsible for determining the accuracy of the written product, this guide should not restrict them from doing whatever is necessary to fulfill their duties.

This guide was originally prepared by the Information Management and Technology Division of the U.S. General Accounting Office in November 1987. AuditNet obtained permission to update the guide for 2001 and include additional resources for spreadsheet auditing. The original guide used Lotus for the model. AuditNet obtained a copy of the [Lotus Spreadsheet](#) and will incorporate it and make it available for download from the AuditNet site.

Comments and recommendations on how to make this guide apply to Excel and other spreadsheets should be sent to [jmkaplan@ix.netcom.com](mailto:jmkaplan@ix.netcom.com)

## Spreadsheet Development

The following procedures and practices will facilitate the documentation and referencing process. They may be implemented during the initial planning stage, data entry and analysis stage, or during the final accuracy stage of spreadsheet development.

### Initial Planning Stage

The initial planning stage primarily involves planning activities that will result in the effective and accurate spreadsheets.

1. Mapping out the spreadsheet: Before entering any data, draw a map of what the spreadsheet should look like. For example, areas for documentation (Chapter 3), data entries, macros, and spreadsheet formulas should be defined. Further, it is a good idea to update the map as the spreadsheet changes or expands. A record of changes should be maintained for important data.
2. Developing an analysis plan: Develop an analysis plan for the spreadsheet before entering data to ensure that the data required for analysis are included and entered in a format amenable to the analytic techniques planned. The analysis plan should

be documented and included in the work papers. If particularly complex, the plan, with risk assessment and tests of logic should be part of the planning stage of the assignment. If necessary, technical assistance should be obtained. Further, if the analysis involves using the database functions, the requirement for using these features should be built into the spreadsheet plan.

3. Developing a validation plan: A validation plan, which includes using applicable quality controls throughout the job, will help ensure error-free spreadsheets. The most frequent errors in spreadsheets are data entry errors. One method of minimizing errors is to designate a specific area within the spreadsheet for data entry. All data should be entered in that area and verified before the data are used.

Cell references enable users to transfer the data to other areas of the worksheet without reentering the data, thus eliminating possible data entry errors. The extract and combine features of Lotus provide another excellent way of transferring the data to related spreadsheets without additional data entry, thus minimizing errors.

It is also a good idea to denote the parameters of the data entry area in the worksheet. One way of doing this is to mark the area in which data are to be entered with a repeating series of periods.

Also, the validation plan should contain steps to verify the data. Sampling and validation criteria should be established for each individual spreadsheet based primarily on sound auditing principles and professional judgment. Critical data should undergo more vigorous verification. Some guidance on the minimum percentages to use in verifying data follow:

Spreadsheet files with less than 100 data elements – all input items should be verified and all errors corrected.

Spreadsheet files with 101-500 data elements – a 25% sample of input data should be verified. If the error rate is less than 1% of the sample, complete the verification by correcting the errors. If the error rate exceeds 1%, correct the errors and draw another 25% sample and repeat the procedure. If the error rate for the second sample is less than 1%, complete the verification by correcting the errors. If the error rate for the second sample exceeds 1%, correct the errors and complete a 100% verification of the remaining data elements.

Spreadsheet files with over 500 data elements – A 10% sample of the input data should be verified. If the error rate is less than 1% of the sample, complete the verification by correcting the errors. If the error rate exceeds 1%, correct the errors and draw another 10% sample, and repeat the procedure. If the error rate for the second sample is less than 1%, complete the verification by correcting the errors. If the error rate for the second sample exceeds 1%, correct the errors and complete a 100% verification of the remaining data elements.

## Data Entry and Analysis Stage

Lack of attention to data accuracy and clarity can make it difficult to understand or construct an audit trail on a spreadsheet after it is completed. The following quality assurance measures, implemented during the data entry and analysis stage will help eliminate errors and facilitate supervisory review and referencing.

1. Minimize data entry errors by:
  - a. Using the pointer method to specify a cell or range rather than typing in cell addresses, and
  - b. Copying formulas and then editing. Take the time to verify the formula before copying it.
2. Use range names: Range names are a good way to identify cells. To facilitate the review, prepare a list of all named ranges and their locations in the spreadsheet.
3. Protect formulas and key data: One of the most common errors is writing over a formula or key data. Using the protect command will ensure that this will not happen.
4. Test the model: Test the spreadsheet's features, including its formulas and macros, with a small part of the database to ensure that the spreadsheet works as planned. Using a partial database rather than a complete spreadsheet saves time and makes it easier to identify logic errors.
5. Correct mistakes as soon as they are identified: If an error is not corrected immediately, the task of locating the cell or cells causing the error message becomes more difficult as the spreadsheet becomes larger. This is especially true for circular references.
6. Format cells using two decimals: Spreadsheets automatically round numbers to the next highest whole number. Using at least two decimals generally eliminates those cases where the total would exceed 100%. (Note: This won't completely eliminate the possibility of generating totals exceeding 100%).
7. Write out macros: In the cells adjacent to macros, spell out what each macro command means.

## Final Accuracy Check Stage

Once you have completed data entry and verified its accuracy, there are additional steps, which may be taken to clarify the spreadsheet as well as ensure accuracy prior to printing. They are:

1. Use foots arid cross foots: By adding an extra row and column of formulas that bracket the totals, the accuracy of the preliminary results can be checked.
2. Use hash totals: To verify that all records are included in the spreadsheet, various hash totals (a total arrived at by adding up the data elements to be used in the subsequent analysis) can be used.
3. Use Automatic Recalculation: Each spreadsheet should be set on Automatic Recalculation for a final recalculation before the information is used in the report and the spreadsheet is given to a reviewer to be used as support for a statement of fact.
4. Protect your spreadsheet: After verification, when no further changes are anticipated to the spreadsheet, the entire spreadsheet should be protected using the Global Protect feature.
5. Print out spreadsheet formulas: Printing the formulas facilitates spreadsheet review. The formulas can be printed in two ways under Lotus:

In the Print command (using Options Other), select Cell Formulas. The contents of the cells in the print range will be printed one cell per line. The text of the formulas, not their values will be printed.

Using the Worksheet Global Format command (or the Range Format command), set the numerical format at "Text." Ensure that the column widths are wide enough to accommodate the longest formula. The spreadsheet can then be printed and the formulas will be located as they appear in the spreadsheet (as opposed to the one line per cell printing approach discussed above).

Another way to print out the spreadsheet formulas is to use a program like The Spreadsheet Auditor.

This program has features that identify circular references and print formula reports that help identify logic errors in a spreadsheet. If such programs are available, they should be used by the preparer and supervisor. Supervisors will find The Spreadsheet Auditor particularly helpful when reviewing the spreadsheets and should use The Spreadsheet Auditor prior to referencing.

## Documentation Guidelines

Documenting spreadsheets helps ensure accuracy and provides supervisors and the reviewer with essential audit trail information. This guideline should facilitate quality assurance. It does not preclude the use of any other guidelines. Rather, this guideline suggests some approaches that have worked and that meet the needs of referencing. The use of supervisory checklists, cross-indexed tables of contents, and other processes or procedures needed or desired that help ensure quality, is encouraged.

Documentation requirements should not override the operational requirements of the spreadsheet. Some minimal documentation is required and should be on the disk, but this should not adversely affect the use of the spreadsheet. As much documentation as possible should be done during the development of the spreadsheet. However, some of the more detailed documentation steps can be entered after the spreadsheet layout, formulas, etc. have been finalized, thus minimizing the impact on the operation of the spreadsheet. The location of the documentation on the spreadsheet should be established first, however, even if some of the information is not entered until the end of the assignment.

This guideline suggests that the left side of the spreadsheet, columns A through I, be used to document the contents of the spreadsheet. Under this approach, documentation is recorded beginning in cell A2. Data, formulas, and all use of the spreadsheet can then start in column J. To facilitate review and referencing, row 1 and column I should be used for row and column coordinates. (See appendix I.) The Spreadsheet Auditor will print row and column coordinates automatically, thus eliminating the need to enter spreadsheet row and column coordinates. Such a layout generally permits the operation of the spreadsheet without preparation of the documentation adversely affecting the data and formulas or their presentation. For example, column widths or formatting columns for data presentation can be set without altering the documentation.

Caution: Users must be careful when inserting or deleting rows in the spreadsheet. Such actions could adversely alter the documentation.

In small spreadsheets where memory is not a problem, a “step down” approach can be used. For example, the worksheet part of the spreadsheet would start in column j in the row immediately following the documentation. This approach eliminates all problems related to adding or deleting both columns and rows in either the worksheet or the documentation area. In large spreadsheets, where memory is a problem, documentation can be done externally using the word processing program WordPerfect.’ For example, the same areas in columns A through I are set aside for the documentation. After the spreadsheet is complete, the WordPerfect documentation can be merged into the documentation area.

This also provides a hard copy of the documentation as a backup.

In all cases, a final check should be made to validate the integrity of the documentation, including the labels for worksheet row and column coordinates.

In the example spreadsheets used with this guideline, the documentation is recorded in cells A2 to H 138. Also, key items such as job title, code, filename, and source are located in specific cells. If key items are always placed in the same location, it makes it easier for reviewers and reviewers to locate them. Also, macros and templates can be used to create pro forma spreadsheets or operate on the cells containing this documentation information.

Some spreadsheets may require more extensive documentation than is practical to place within the spreadsheet itself. In such instances, external documentation can be used for detailed explanation of the spreadsheet. The internal documentation would still contain the elements listed below, with keys to the external documentation.

Computer-generated spreadsheets must meet all the quality assurance standards required by your office. The procedures followed in describing a Lotus spreadsheet are similar to those followed in describing any work paper. The following discussion highlights critical documentation items. A cell reference, in parentheses, indicating where the information is located on the sample spreadsheets, is provided at the end of each item.

1. Job title and code: The job title and code should be entered just after the spreadsheet layout. (A22..D23)
2. Title of the spreadsheet: The title should be concise and convey the primary focus of the information included in the spreadsheet. (A25)
3. Work-paper index: The work-paper index title, similar to the indexing system used in paper files, will allow the reader to determine the exact location of the data and how it relates to other work papers. The file name should be used as the work-paper index; if a title other than the file name is used, the file name should be included elsewhere in the title screen area. The index should be in cell B2. Also, the name of the person who last updated the spreadsheet and the date this was done should be entered in this area. CA2. .H2)
  - a. Every printed spreadsheet must also have a footer that incorporates the disk title/reference number, file name, page number, and job code. This can be done by selecting Footer under Options and entering the following:
    - b. Disk: XYZ, File Name: ABCDE.WKS Page # Job Code: 123456

4. Purpose: The purpose of the spreadsheet should be described briefly, including whether the spreadsheet represents a specific audit step in the assignment. (A27..B28)
5. Preparer and date: The name of the individual preparing the spreadsheet and the date of preparation/update should be noted in this area. (A129..B132) The date and preparer's name, as well as the job title, must also be included at the top of each printed spreadsheet. This can be done by selecting Header under Printer Options and entering the following:  
  
@: Job Title: ABCDEF REVIEW I Preparer: Joe Preparer
6. Reviewer and date: The name of the reviewer and the date of the most recent review should be entered. Subsequently, the reviewer may confirm that no changes were made to the spreadsheet after the date noted by the reviewer by returning to the Disk Operating System and using the Directory command. The date listed in the directory, signifying when the file was last modified, can be compared to the reviewer's date on the spreadsheet. (E129..F132)
7. Description: The description of the spreadsheet, like a work-paper summary, provides the reviewer with an understanding of the major topics covered in the spreadsheet, how it fits into the overall job, and the logic and assumptions underlying spreadsheet development. (A30..A35)
8. Source: A critical component of spreadsheet documentation is identifying the sources of data entered. If all the data were extracted from a single source, this source should be included In the title area (A37).

However, if there are multiple sources, they should be identified in conjunction with the data. For example, if all the data in that column and row are from the same source, the source could be listed immediately under the related column or row heading. If the sources are cell specific, a column could be inserted, with the corresponding sources next to the cells. (See appendix LII, column K.) In some cases, the source of the spreadsheet could be another spreadsheet. For example, if a data query were done and the results of the query were saved as a separate file, this spreadsheet would have as its source the tile name of the spreadsheet with the source data. Cell PA1 of the sample spreadsheet (appendix IV) shows how this is done.

9. Data verification: This indicates data entry verification and control procedures. For example, if 10 percent of the data items have been verified, describe the process used and the results. (A39..A40)

The extent of data verification can vary depending on the nature of the data and how critical the data is to a finding. If it Is considered very important, 100-percent verification may be necessary.

10. Spreadsheet Layout: Use this space to document the cell addresses for each component of the spreadsheet—data entry, formula explanations, macro explanations and purpose, and range names and their cell addresses, for example. (A11..F20)
11. Printing: Wide carriage printers and compressed print are recommended for printing the spreadsheet(s). Using the Borders Rows Option with a cell in column A as the borders range will print the column coordinates at the top of each page. (See appendixes I, II, III, and IV.)

The topics listed above are not meant to be all-inclusive. Depending on the complexity of your spreadsheet, more sophisticated documentation procedures may be required. We recommend including the documentation in the spreadsheet as soon as possible. If this creates an obstacle for the efficient use of a spreadsheet, the documentation could be temporarily placed in another part of the spreadsheet or completed at the end of the assignment. If this latter approach is used, some detailed external notes on the operation of the spreadsheet should be maintained to facilitate the final documentation process.

The sample spreadsheets used with this guideline contain the documentation information in specific locations in the spreadsheet. We recommend that these locations always be used unless they interfere with the use of the spreadsheet. By reserving the same location on each spreadsheet, users and reviewers will always know where to locate the documentation. This will also facilitate the use of the features of the computer to help us in our work. This approach also allows the development of templates to help the documentation and referencing process.

## Reviewer's Responsibilities and Duties

Referencing is an internal quality control procedure that helps ensure that GAO'S written products are accurate, adequately supported, and logical. Reviewers are responsible for the factual accuracy of the product and, as such, will be responsible for determining the

- Correctness and consistency of figures or statements of facts with the support provided;
- Accuracy of computations within the document;
- Agreement with earlier reports cited;
- Adequacy of supporting sources; and
- Logical soundness of the facts and evidence provided.

The use of microcomputers does not lessen the reviewer's responsibility.

Referencing and report review activities will be the primary mechanism for assuring quality and accuracy.

The reviewer's responsibility remains the same regardless of how the support for a report was acquired or analyzed. Most standard referencing procedures still apply. Consequently, an audit trail must be provided so that report data can be traced back through the various processing steps and intermediate files to the source data. The work papers should also fully document the procedures used to process the data (for example, Lotus macros and data queries).

Although it is not required, it is preferable for a reviewer to understand how to use the spreadsheet package if the job being referenced relies extensively on spreadsheets for analysis. If the spreadsheets are too complex, however, an expert should be asked to reference the section of the report supported by the spreadsheets. The referencing process is not a substitute for proper quality control checks throughout the job, however. These checks include a supervisory review of work papers, management reviews, and a detailed line edit of the product. Others are responsible for these functions.

## Referencing Steps

A reviewer's involvement with Lotus spreadsheets begins when the written product is indexed to an analysis that was done using Lotus. If the analysis is simple enough, adequate support may be limited to a printout of the spreadsheet and the formulas along with the appropriate documentation. In these cases, a reviewer may not have to use a computer for additional analysis. The key factor, however, is that the material provided to the reviewer must adequately support the facts in the written product.

In most cases, however, the referencing process should be done with a computer. The use of a computer is required because printed copies of spreadsheets do not display error messages, such as ERR and CIRC, which inform the reader that errors have occurred. (See page 19, paragraph c.) Furthermore, all electronically-stored data needed in the referencing process must also be provided to the reviewer in the form of hard copy products. The reviewer should also be supplied with a disk containing the Lotus files that produced the hard copy so that he/she can analyze the Lotus material directly or with the Spreadsheet Auditor package. (See chapter 6).

## Verify Supervisory Review

Before staff can expect a reviewer to evaluate the adequacy of spreadsheet evidence, the supervisor must ensure that the supporting spreadsheets are in proper condition for examination. Thus, the first step in the referencing process is to verify that the spreadsheet has received proper supervisory review. These reviews assist reviewers in determining that the logic implied or stated in the report is consistent with the analysis that generated the results. Reviewers must determine that this logic is correct within the Lotus spreadsheets when they are used as the supporting analysis. Although it would be too time consuming for a reviewer to review an entire spreadsheet for correctness of logic, someone on the job should do it, usually the supervisor of the person who prepared the spreadsheet. When dealing with Lotus spreadsheets, the steps needed to verify supervisory review are as follows:

- Check the internal documentation part of the spreadsheet for evidence of supervisory review, such as a supervisor's name and the date of the review entered in the spaces provided. Hard copy backup must include the supervisor's signature. (See appendixes I, 11, 111, and IV.)
- Compare the review date entered in the spreadsheet to the date on the directory of the disk on which the spreadsheet is stored. If they are different, obtain some explanation. A directory date after the date in the spreadsheet may mean that the spreadsheet was changed after supervisory review.

## Check Report Content for Accuracy and Support

The reviewer is responsible for ensuring that proper quality control procedures were used and all points of fact in a written product are accurate. Thus, if the report index for a fact or figure is a Lotus spreadsheet, the reviewer must trace those figures to the supporting spreadsheet. Some of the specific steps a reviewer may follow are listed below.

1. Review the spreadsheet documentation, both internal and external, to become familiar with the purpose of the spreadsheet and the way it was designed. The spreadsheets used as examples with this guideline use columns A to I for documentation. (See chapter 3 for guidance on documenting the spreadsheet.)
2. Verify the formulas used to calculate report items or determine that verification has been performed. Verifying formulas involves checking ranges, the logic of the formulas, spreadsheet messages, and conducting tests—it does not require using a calculator to check the accuracy of the Lotus mathematics. This step is not a substitute for supervisory review of the soundness of the analytical approach and formulas used. However, because a reviewer is responsible for the accuracy of all facts in a report, additional verification steps may be followed when referencing important facts and figures. For example, using a computer or a printout of the formulas used to complete appendix I would disclose that the formula in cell U2 does not agree with the explanation shown in cell A109. Specifically, the reviewer would note that the range of values included in the formula is U5..U78 instead of U5. .U77.
  - a. Check the range of the formula used to calculate the numbers in the report. For example, in appendix I, there is a formula (cell U82) that calculates the number of hours the agency's computer was down. A reviewer must ensure that the range specified in this formula is correct. That is, only the items that should be in the range are included. As noted above, the range specified in cell U82 includes an extra cell that inflates the down time hours. Thus, if the report states that in January 1986 there were 73 instances of down time during business hours for a total of 491 hours, then the statement is wrong. The report should state that there were 69 instances of down tune during business hours with a total down time of 245 hours. There are 69 instances because four instances resulted in no down time during business hours. The total hours of downtime are 245, not 491, because of the error in cell U82. (See appendix VI for the original and revised draft of the report which shows the preparer's indexing notes and the reviewer's referencing points.) This error is noted in the reviewer's review of the spreadsheet, appendix II, cells A1 16..H121, and corrected in the final version, appendix III, cells D121..U82.
  - b. Check the logic of the formula. An @SUM is straightforward, but other formulas, @IF functions for example, may be more difficult to understand.

For example, columns Q and R of the sample spreadsheets (appendixes I, II, III, and IV), contain @IF functions to ensure that events only refer to down time during business hours, and thus would have had an impact on office operations. A reviewer should determine if the formula has the correct logic, that is, that it agrees with statements in the report. If the formula is designed to identify the instances of down time outside normal business hours, but the report states the number of instances within normal business hours, the reviewer should make a point of this fact on GAO Form 92. (See appendix VII.) An examination of the formulas in appendix I, cells ASS through A1 10 in the spreadsheet layout discloses the logic of all formulas and would reveal this error.

To facilitate the review of formula logic, the reviewer should be provided with a printout of the spreadsheet formulas. The ideal way of presenting formulas is in the same grid structure as the spreadsheet. This can be done with software such as The Spreadsheet Auditor. (See chapter 6.) Otherwise, the spreadsheet and its formulas can be printed by invoking the Range Format Text Option. This option displays the actual content of each cell. Thus, formulas are displayed as formulas, not as results. The Lotus option of printing cell formulas in a list format can also be used. This may be a better option if the formulas are too long to be displayed in a grid format. Whatever method is used, it should be adequate to permit a reviewer to follow the logic of the formulas used. Complex formula logic should be written out. (See appendix I, cells A53..A1 10.)

- c. Check for Lotus messages. Lotus displays messages at the bottom of a spreadsheet that do not show on printed copies of the spreadsheet. For example, if Manual Recalculation is on and the spreadsheet has not been recalculated since the last data change, the message CALC will be displayed on the monitor. The CALC message could be an indication that a problem exists with the results presented. If the CALC message is displayed, the reviewer should inform the staff so that they can recalculate the spreadsheet before reporting any information from it.

Lotus also gives ERR and CIRC messages when there are problems with formulas. If either of these appear in the spreadsheet provided for support, the reviewer should not accept the output as support without a documented explanation. The reviewer should make a point of this on GAO Form 92 (see appendix VII) and inform the preparer so that he/she can correct the problem.

- d. Test selected critical items. A reviewer should test and verify selected critical items of information from lead schedules to the indicated sources. This should be done to insure that supervisory reviews are effective and that cross-indexing is accurate. The reviewer can also request source

documentation when he/she finds errors in lead and back-up schedules. Some specific tests are outlined in chapter II.

Tested items should be marked to indicate that they have been verified. When using paper documents, such as a printed copy of the spreadsheet, use a red T (for traced). If done on the computer, a T in a particular column reserved for the reviewer can be used. This kind of a system was used in the sample of the reviewer's review of the spreadsheet included with this paper. (See appendix II, column V.) When a reviewer verifies items, he/she should describe the testing done and the marking system used. The reviewer should enter his/her name and the date on the spreadsheet as an indication that the reviewer entered these marks.

If no additional changes are requested by the reviewer, no further updating of this file should be done. If additional changes are needed, the reviewer should review the changes. This review is probably necessary since changes to the report have to be re-referenced.

3. If Lotus database features are used, additional documentation should be provided to the reviewer.
  - a. A reviewer should verify a sample of the ranges used in data base functions. Any data base function requires that a criterion range and an input range be specified in order to tell Lotus what to look for. In addition, if the selected items are to be copied to another section of the spreadsheet using the Extract or Unique options, an output range must be specified. All of these ranges must be noted in the documentation part of the spreadsheet. The reviewer must review these ranges to determine if the items selected agree with those presented in the report. An example of the documentation required when using Lotus 1-2-3 data base functions is contained in appendix IV.
  - b. Each data query must be documented. If multiple data queries are made there may be multiple output and criterion ranges. If so, each range must be documented in such a way that reviewers can follow the logic used to select the items that appear in the report. If the number of queries becomes sufficiently large, the staff should consider extracting the items selected and creating separate spreadsheets. The extracted spreadsheets must have the same level of documentation as the source. It may also help the reviewer if some record counts and identification numbers are included in the extracted and source spreadsheet to verify record accuracy. (See discussion on File Combines and Extracts, number 6 below.)
4. If macros are used to perform any functions on the data that will have an impact on critical information presented in a report, the reviewer should check the accuracy of the macro. At the very least, he/she should determine that the macro

has received proper supervisory review. The macro should be described in English, either internally in the spreadsheet or externally in some other form of documentation.

5. If Lotus graphics are used in any product requiring referencing, the same attention to detail will be needed to ensure that the graphics in the written product properly depict the data in the spreadsheet. The reviewer should ensure that the following verification has been done. They can then choose to do additional verification.
  - a. The data ranges. The range should include the data that the written product says it represents.
  - b. The axes. They should agree with the written product presentation.
  - c. The legends. The data the legend represents in the written product must parallel the data in the spreadsheet.

The reviewer can compare source or summary data to the graphs to determine if they properly reflect the data. Reviewers should verify that the rates of change depicted in the graphs reflect actual changes in the data. Interpretation can be a problem when bar or line graphs do not display zero origins. In such instances, the reviewer should ensure that the graphs are not misleading.

6. Use of features such as File Combine and File Extract will have a further impact on the referencing and documentation process.
  - a. If a spreadsheet is too large to fit on one floppy disk and is not on a hard disk, it has to be combined. If so, both internal and external documentation must specify that the spreadsheet is on two disks and the disks themselves must be labeled as such. The reviewer must be assured that the complete file is available to him/her when the report is referenced.
  - b. Evidence of supervisory review must also be present on all files that are combined into one spreadsheet or noted in external documentation to assure that nothing was overlooked in the review process.
  - c. If sections of a spreadsheet were extracted and considered separate spreadsheets, these individual spreadsheets must meet all the documentation requirements described in chapter 3. The reviewer must determine that these spreadsheets have received proper review. The reviewer must also be able to trace the data contained in them to the sources. Thus, the extracted spreadsheets should be indexed to the original spreadsheet. For example, cell A41 of appendix IV refers the reviewer to appendix I as the source spreadsheet.

These guidelines should facilitate referencing. However, regardless of how well the spreadsheet is documented, the reviewer has the final say (except when

overridden by the Associate Director or his/her designee) as to what will be acceptable support for a written product or testimony. Thus, the reviewer should take any steps necessary and look at whatever level of detail is needed to satisfy themselves as to the accuracy of the document being referenced. If a reviewer believes more information is needed, he/she should ask for additional support.

## Spreadsheet Auditing (Resources)

The Spreadsheet Auditor is a software package designed to serve as an aid in creating error-free spreadsheets. This package is used throughout in conjunction with the Lotus spreadsheets to identify potential errors. The current version enables the user to simply view problems without having to print out the entire spreadsheet, and it can identify potential flaws in ranges and formulas. The Spreadsheet Auditor prints out a description of ranges, a map indicating which cells contain formulas, labels, numbers or macros, and a formula report.

An interactive tutorial and two other utilities are also included in The Spreadsheet Auditor. One of the utilities prints the spreadsheet sideways for extra-wide spreadsheets that will not fit across the printer page. The other utility attaches notes to cells in a spreadsheet to help document the assumptions that went into the spreadsheet, for the reviewer or others who will review the work.

The Spreadsheet Auditor is a useful tool for Lotus users, reviewers, and supervisors. Users can use it to create well-documented and error-free spreadsheets. Supervisors reviewing spreadsheets and reviewers can use it to understand spreadsheet design and methodology or find errors.

Following are the audit instructions provided with Microsoft Excel:

Microsoft Excel provides tools that help you track down problems on your worksheets. For example, the value you see in a cell may be the result of a formula, or it may be used by a formula that produces an incorrect result. The auditing commands graphically display, or trace, the relationships between cells and formulas with tracer arrows.

When you audit a worksheet, you can trace the precedents (the cells that provide data to a specific cell) or you can trace the dependents (the cells that depend on the value in a specific cell).

One blue tracer arrow shows that cells D9 through D11 are precedents of cell B5, which contains the formula =SUM(D9:D11). The other blue tracer arrows show that cells C9, C10, and C11 are precedents of B6, which contains the formula =C9+C10+C11. Notice that D9:D11, because it's a range in the formula, is traced as a group.

There are other spreadsheet audit tools available via the Internet. Spreadsheet resources useful for auditors will be added to this guide. Some of the tools are offered by third party vendor for sale while others are free for download. AuditNet is not recommending the following products but merely offering them

as options. The decision on which tool to use rests solely with the end user and must comply with internal quality assurance requirements.

Check out the mega-resource site for spreadsheets at: [spreadsheetstyle.com/](http://spreadsheetstyle.com/)

[Methodology for the Audit of Spreadsheet Models](#) – Guide developed by H.M. Customs and Excise Computer Audit Service (an excellent guide for auditors on reviewing spreadsheets).

[The New Guidelines for Writing Spreadsheets](#)

[Spreadsheet Modelling Best Practice](#) 100-page document (PDF) on spreadsheet style.

[Spreadsheet Modelling](#) Institute of Chartered Accountants in Ireland Fact sheet Series on IT

[Getting the OOPS! Out of Spreadsheets](#) How to use built-in audit tools to minimize mistakes.

[Make Your Mark in Spreadsheets](#) AICPA article detailing how to document files with comments and tick marks.

[Excel Design and Audit Tips](#) from Duke University