Clean Air Engineering

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Report Manual
Revision 5.1
April 2001

Changes made in Revision 5.1 to the Report Manual

1. Updated Title Page
2. Removed Appendix B: CAE Helvetica Font Display
3. Inserted Appendix D: Project Overview Samples
4. Inserted Appendix E: Description of Installation Samples
5. Inserted Appendix F: CEM Significant Figures
6. Added a new appendix; Appendix I: Conversion of Report Into Adobe Format
7. Updated Table of Contents

Having... Trouble???

If you are writing a report and have a question (and you can't find or understand the answer in this manual) there are a number of friendly people that can help you out. Please call when you have a question - just think of the headaches you will avoid if you call with a question before you start.

For Overall Expertise and Problem Solving Ability
Eric Campbell (x2085) and Barb Timbers (x2112) have the most experience.

Coming in a close second
Laura Hoffman (x2044), Karen James (x2066) and Paul McGary (x2123)
This list will obviously be growing as more people start to write reports. Eventually, all project managers will be able to write reports.

Specific Problems
CEM Macro: Dave Perkins (x2055) or Barb Timbers
Sample Calculations: Eric Campbell
Canvas Drawings: Dave Nasralla (x2015)
Computer Problems: Dave Perkins (x2055)
4D Database: Dave Nasralla
Kinko's: Karen James (x2066)

Scheduling Concerns are currently being taken care of by Alison Millerick Lane (x2064).

Please direct any questions, complaints, comments or suggestions about this manual to Eric Campbell (x2085).

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General

Before you really start the report you need to examine your material. Check to make sure everything you need to write the report is complete. In addition to this, you need to keep track of questions, problems, hours, mistakes and corrections for QA/QC reasons and for legal reasons. As you write the report, be sure to keep everything (preliminary data, job plan, etc.) together for archival purposes.

Basic Definitions

Report File

Originally, the primary report information (raw data, job plan, calibration data, client data, lab data etc.) will be in a 3-ring binder. Once a report is completed, put all of the information (along with copies of the report, corrections, etc.) in an accordion folder. The 3-ring binder will be reused.

Report Synopsis

The Report Synopsis summarizes the report information. The technical writer is responsible for filling it out and printing it up. The information necessary for filling out the Report Synopsis is found in the Job Plan or the Project Manager's Project Summary. Once completed, the Report Synopsis is printed and attached to the front of the manila Report File. There is a sample copy and instructions on how to fill it out in Appendix A. You can find a copy on **TechComm Server: Standard Files: Forms**.

Report Narrative

The technical writer uses the Report Narrative to record any questions or problems encountered while writing the report. Make an informal, running list of questions for the project manager. There is a sample copy and instructions on how to fill it out in Appendix A. You can find a copy on **TechComm Server: Standard Files: Forms**.

Report Hours

Record the amount of time spent for the different types of work on this log. There is a sample copy and instructions on how to fill it out in Appendix A. You can find a copy on **TechComm Server: Standard Files: Forms**.

Report Body

The main body of the report consists of a Microsoft Word document. It is the front part of the report (Project Overview, Results, Description of Installation, Methodology)

Report Appendix

The appendix of the report consists of all of the supporting data for the Report Body. You will find Sample Calculations, Parameters, Calibration Data, Weight Sheets, Field Data, Field Data Printouts, Lab Data, Chain of Custody, Operating Data, Fuel Analysis, etc...

Starting a Report

Project managers organize all the project information into a three ring binder. The order of the field data indicates the order data is to be presented in the final report. In order to become familiar with the report, the Job Plan, the Job Log and the Project Manager Summary should be read through. These three documents will give the technical writer enough direction to start working on the report.

Job Plan

The Job Plan explains the type of testing performed, the test locations, the dates and other information about the project. This document should be read once before starting the report, but will be referenced throughout the entire report writing procedure. Hand made corrections are made by the test leader during testing and by the project manager when the project data returns from the field. Any information contained in the job plan is assumed to be final and supersedes any other documents.

Job Log

The Job Log consists of daily entries by a person at the test site. This document describes the actual test conditions and any problems encountered.

Project Manager's Summary

The Project Manager's Summary provides deadlined, analytical results, units and other information the report writer needs to be aware of when writing a report.

Project Overview

The Project Overview will be used in the report body. See section 5 of this manual for further information.

Additional Information

Previous Testing

Use the Report Rolodex (**TechComm Server: Active Files: Reports: Public:**) to determine if CAE has previously performed any testing at this location. If so, retrieve any previous reports to compare conditions and results. Any large discrepancies may indicate errors, and should be indicated to the project manager. Also, certain clients require custom report layouts, forms or tables.

Proposal

A copy of the proposal is included in the binder and can help to determine the client's needs. Caution: proposals are frequently appended, and clients sometimes change work orders during testing. Information in the job plan supersedes the proposal.

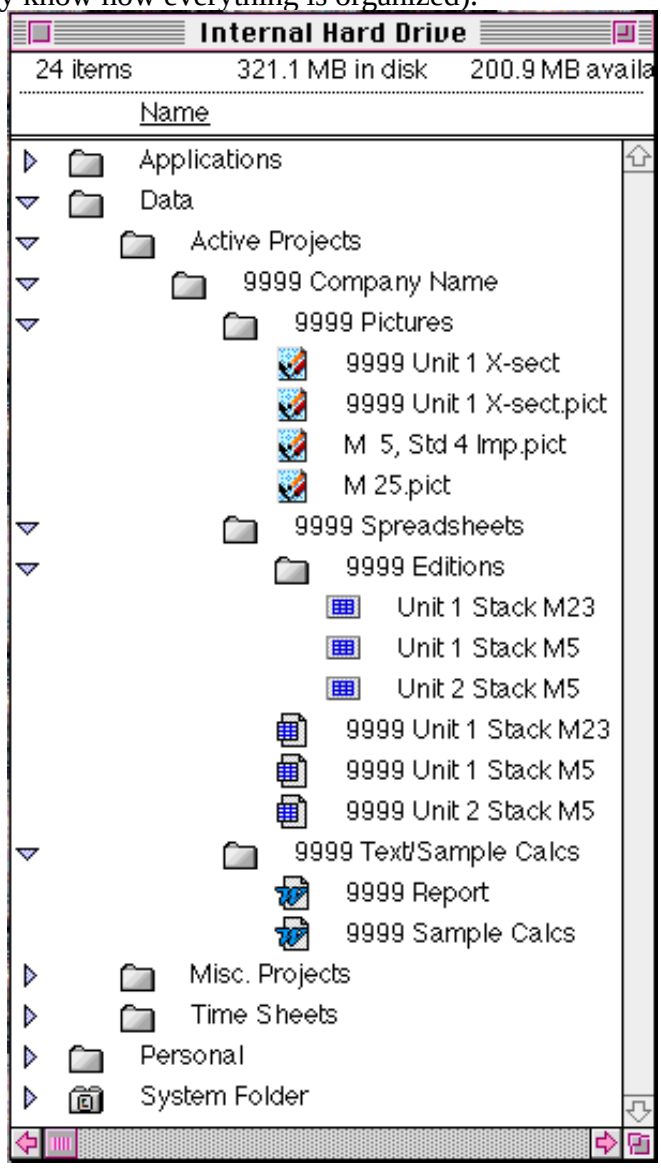
Protocol

If a protocol was created for the project, it can be used as a guide for the clients requirements. The test methods as well as type of results required can be determined from the protocol. Caution: as with proposals, the work request may have changed since the protocol was issued. Information in the job plan supersedes the protocol.

Report Folder (Digital)

Setting up your computer and report folder like the figures below is important for a number of reasons.

1. Include the CAE number with all folders and documents (except the editions where it isn't necessary). This will aid in the recovery of data in case of a hard drive crash (or if you just misplace data).
2. Use the same folder names you see in the figures below when you write a report. If you do this, links will work correctly on your computer and should work correctly if you transfer the folder to another computer. Note: if you divide the spreadsheets up using separate folders, you run the risk of losing any links you have between spreadsheets - the spreadsheets won't be able to "find" each other (ex: putting the Unit 1 data and Unit 2 data in separate folders).
3. Notice that the Editions folder is in the same folder with the spreadsheets (this helps alleviate problems if you transfer the report to another computer).
4. Using these conventions for your folders and documents will make it easier for others to access the information at a later date. These conventions will also help if someone else is helping you write the report (they will already know how everything is organized).



Daily Tasks

In order to figure out how to best improve the process, measurements need to be made throughout the report writing process. Some of these measurements are numerical (hours, pages), and others descriptive (narrative). It is best to record this information on a regular basis in order to obtain accurate numbers. Also, as a precaution, all work in progress should be backed-up regularly.

Time Log

These measurements are to be made on a daily basis and totaled when the report is completed. This total is then submitted (electronically) to be entered into a data-base. More detailed instructions for the submittal can be found in Section 8 of this manual.

Narrative

As the report progresses, problems and questions always seem to arise and need to be noted. The Narrative should also be used to measure any delay incurred due to missing or incomplete information.

Back-ups

The Palatine file servers are backed-up on a daily basis to digital tapes. These tapes are rotated on a three week basis. This means that in case any of the servers should crash, at most, only one days work would be lost. Additionally, it is possible to retrieve data up to three weeks after it was deleted from the file servers. Since none of the individual computers are presently equipped to automatically back-up to tape, it is possible to use the server as a means of backing up any work in progress. By simply copying the entire data folder to the server, one can back-up all the data for any projects. In the eventuality of a crash, only the work since the last back-up would be lost. Any work in progress could easily be recovered from the server when the computer is repaired, or from another computer if necessary. It is not necessary to back-up the applications or the system since they can easily be restored from the original disks (any custom preferences, however, will be lost).

Data Entry and Spreadsheets

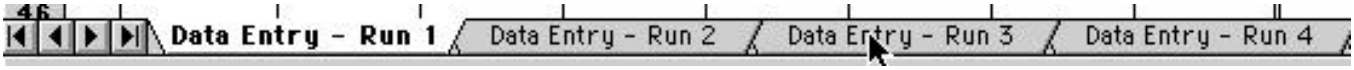
In some respects, data entry is extremely simple, but this simplicity can lead to errors if you aren't aware of some of the "tricks" and mistakes often encountered during data entry. This section will go over the basics of data entry and problems to look out for. The end of this section also deals with CEM data and the CEM macro.

Wet Methods

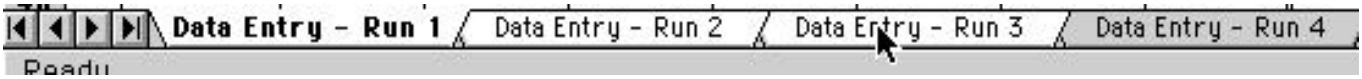
1. Copy Excel workbook (spreadsheet) into your report folder on your harddrive from the server**:** **TechComm Server: Standard Files: Excel Spreadsheets**.
2. Rename the workbook to fit your needs (refer to Section 1 for naming conventions).
3. Enter the data in the appropriate cells.
4. Some data is the same in Run 1, 2, 3 and 4 (examples of this data: Company Name, Location Name, Cross Section Area, etc.). Use the "Group Edit" feature in Excel to speed things up.

How to Group Edit:

1. Click on the **Data Entry Run 1** "tab" at the bottom of your Excel window.



2. Hold the shift key down and click on the **Data Entry Run 3** "tab" (or Run 4 if necessary).
3. The Run 1, 2 and 3 tabs should be selected. Now whatever you change in one of the spreadsheets will change in all of them.



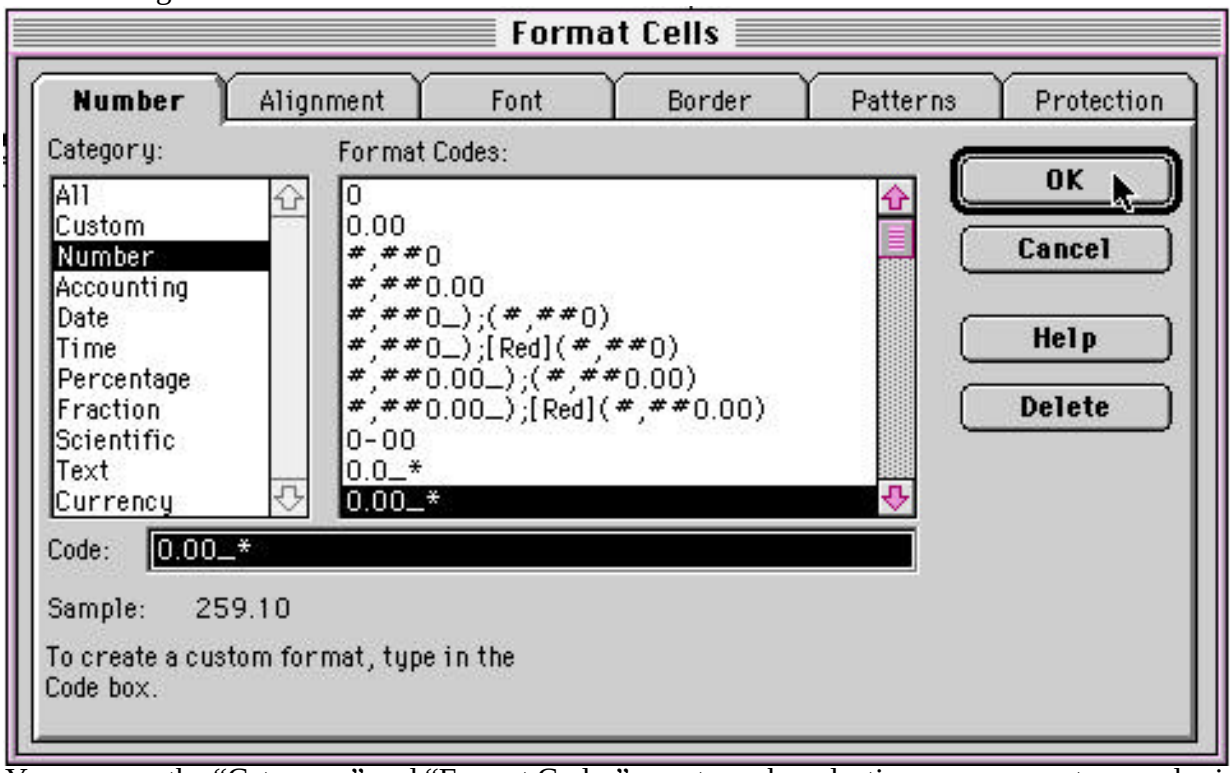
4. If you hold the command (apple) key down and click on the tabs you can select tabs that aren't next to each other (example: click **Data Entry Run 1** "tab", hold the command key down, and click on **Data Entry Run 4** "tab").
5. Click on an unselected "tab" to get out of the group editing mode.
6. Be careful when you are group editing - make sure you really want to make the same change on all of the pages. This has led to some pretty costly mistakes in the past.

Note: a selected "tab" may look different on a black and white computer monitor.

Formatting

Most of the formatting is already taken care of with the existing standard spreadsheets. However, you will occasionally need to change the format of text and numbers (especially in the summary table).

1. In the menu bar go to **Format: Cells**.... A dialog box will appear:
2. Most of the formatting tabs are pretty self explanatory (alignment, font, etc.), but the Number tab can be a bit confusing. Click on the Number tab.



3. You can use the "Category:" and "Format Codes" area to make selections or you can type codes into the "Code:" area.
4. The "_*" part of the code creates a space after the number (it doesn't print). We can use this space to footnote a number as shown below.
5. Useful formats

Code	Sample	Comments
0.00_*	56.60	Standard
0.00	57.60	Example of what not to do (doesn't line up with the 56.60 above)
0.00E+00_*	5.21E+06	Standard
0-00_*	2-03	Used for port-point numbering
m/dd/yy	5/06/95	Date format on field data printouts
mmmm d_*	May 6	Date format on parameters and summary sheets
#,##0_*	67,563	Standard
hh:mm_*	16:52	We always use Military Time
0.00*	0.70*	The backslash character lets you put non-number characters. This is useful for footnotes and asterisks. Note: We have been trying to avoid this format lately and instead footnote the text in the spreadsheets.
\@ 0\"\Hg	@ 12"Hg	Leak rate format on field data printout (only a '12' was entered)
<0.00_*	<56.61	An equation referencing this number treats it as a normal 56.61

Port-Point and Run Time Changes

The standard spreadsheets should be properly configured to take care of most contingencies. However, you will need to change the Port-Point numbering and Run Time:

1. In Figure 1 you can see the standard 2 Port - 6 Point setup. In Figure 2 you can see the hidden equations that make the Port-Point numbering system. Therefore, if you changed 101 to 401 then 1-02 through 1-06 would automatically change to 4-02 through 4-06.
2. To change your spreadsheet to look like Figure 3, you have to first change the run time equations. Highlight the cell with the 5.0 displayed (cell C18) and change the equation from "=C17+5" to "=C17+2.5". **Copy** and **Paste** that cell or "Fill Down" until you get to 40.0.
3. Use similar techniques to fill out and change the Point-Port numbering. A common mistake is to type in "1-01" - don't type in the hyphen - it will show up automatically due to the number format (the previous page explains how to format a number).

Figure 1

Traverse Point	Run Time
	0.0
1-01	5.0
1-02	10.0
1-03	15.0
1-04	20.0
1-05	25.0
1-06	30.0
2-01	35.0
2-02	40.0
2-03	45.0
2-04	50.0
2-05	55.0
2-06	60.0

Figure 2

Traverse Point	Run Time
	0
101	=C17+5
=B18+1	=C18+5
=B19+1	=C19+5
=B20+1	=C20+5
=B21+1	=C21+5
=B22+1	=C22+5
201	=C23+5
=B24+1	=C24+5
=B25+1	=C25+5
=B26+1	=C26+5
=B27+1	=C27+5
=B28+1	=C28+5

Figure 3

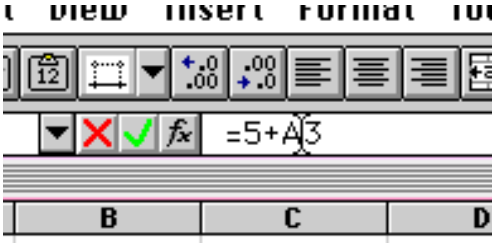
Traverse Point	Run Time
	0.0
1-01	2.5
1-02	5.0
1-03	7.5
1-04	10.0
2-01	12.5
2-02	15.0
2-03	17.5
2-04	20.0
3-01	22.5
3-02	25.0
3-03	27.5
3-04	30.0
4-01	32.5
4-02	35.0
4-03	37.5
4-04	40.0

Absolute and Relative References

1. Putting a dollar sign in front of a column letter or row number in an equation makes the column or row reference absolute.
2. An absolute reference does not change when you copy the equation to a new cell
3. In the examples below you can see what happens when a reference is relative or absolute.

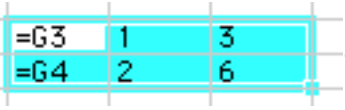
	A	B	C	D	E	F
1						
2		If you copy		...into this		...then this is the result.
3		this equation...		cell...		
4						
5		=5+A3				The row and column are relative.
6				=5+C4		When the equation is copied, the row and column change.
7						
8		=5+$A7				The row is relative. The column is absolute.
9				=5+$A8		When the equation is copied, the row changes.
10						
11		=5+A$10				The column is relative. The row is absolute.
12				=5+C$10		When the equation is copied, the column changes.
13						
14		=5+$A$13				The row and column are absolute.
15				=5+$A$13		When the equation is copied, the row and column stay the sam
16						

4. You can simply type the "$" in or you can place your insertion (example below) point in the equation and onto the reference (A3) for example and press " **T**"



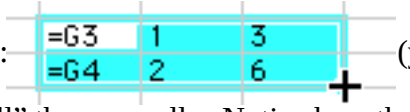
Autofill

1. Look at the cells below for an example:



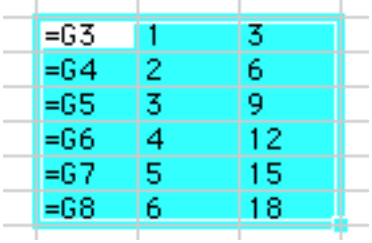
-Notice the little square "handle" on the bottom right of the selection.

2. Click and hold on the handle:



(your cursor turns into a "+")

3. Now drag it down to "autofill" the new cells. Notice how the numbers and equations follow the pattern of the original cells.



Experiment with this feature. There are a number of quirks to it and sometimes you don't get what you want, but it is generally pretty useful. Quirk Example: if you select a single cell with a normal number in it and autofill you will end up with a bunch of cells with the same number (3,3,3,3,etc), but if you do the same thing with a date, the date will advance one day in each cell (Jan 4, Jan 5, Jan 6, etc.).

Entering Leak Checks - (between points or ports)

Refer to the example on the following pages. For leak checks between points or between ports, the following should be entered:

1. Enter the words "Leak Check" in the Traverse Point column.
2. Enter the relative stop/start time (the time on the stop watch) in the Run Time column. Sometimes the time isn't written down on the data sheet so make an educated "guess" - watch the point by point isokinetics number and try and get close to 100. You may need to go back and readjust the time after you have completed your data entry (the iso numbers have a tendency to change as you enter more data and the moisture value changes).
3. Enter the meter volume after the leak check in the Metered column.
4. All other data entry cells should be left blank.
5. A simple way to start is to enter the data as if there were no leak check. Then, highlight and **copy** the block of data entry starting below the leak check and **paste** it one row down. Delete the row "left behind" and use this newly blank row to enter in the words "Leak Check", the time and the metered volume.

Entering Leak Checks - (in the middle of a point)

Refer to the example on the following pages. Leak checks or filter changes in the middle of a point will require an additional line:

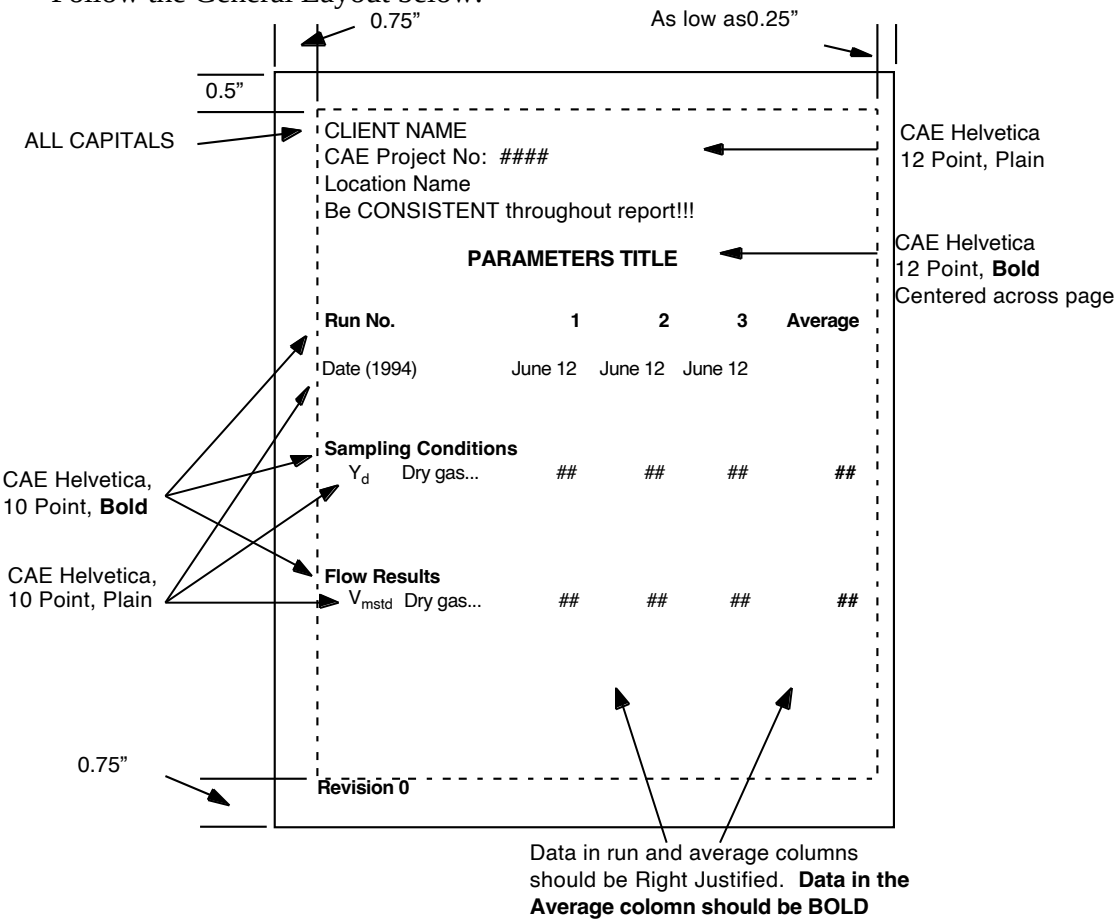
1. The first line should follow standard data entry procedures, except that the relative stop time should be entered in the Run Time column.
2. The second line should follow the "between points" leak check data-entry procedure with the same relative stop time entered in the Run Time column.
3. The third line will consist of the same data as the first line above, except the final relative stop time for the point should be entered in the Run Time column.
4. A simple way to start is to enter the data as if there were no leak check. Then, highlight and **copy** the block of data entry starting below the leak check and **paste** it two rows down. Delete the rows "left behind" and use these newly blank rows to enter leak check data.

Separate Velocity and Moisture Data

- Obviously, you will need to use some common sense when it comes to matching up the velocity runs to the moisture runs. The velocity and moisture runs with the closest times should be matched up to each other.
- Open the spreadsheet "SS EPA 2-4(Separate)". The Moisture run is what you focus on. For example, if you have velocity Run 3 from 9:10 to 9:18 and a moisture Run 1 from 9:20 to 10:05, you will enter 9:20 and 10:05 in your data entry sheet and call it Run 1.
- If you have more velocity runs than moisture runs, then you will enter the moisture runs as usual, but you can enter 2 velocity runs on each data entry page (for example just enter Run 1 velocity ΔP_s and T_s and then below that, enter Run 2 ΔP_s and T_s). Name the page by the moisture run number.
- If you have 3 moisture runs and 4 velocity runs, then you can enter Run 1 velocity and the Run 2 velocity for moisture Run 1 and then enter Run 2 and 3 velocities for moisture Run 2 and so on. Don't worry that you are entering the velocity data twice (using **Copy/Paste** speeds things up).

Things to remember!

- Military time is always used.
- In general, carry significant digits to as many decimal places as the field data sheet is written down as.
- Use the "CAE Helvetica" font in all spreadsheets.
- CAE Helvetica allow subscripts and superscripts. See the Font Layout in the Appendix
- All numbers in the thousands need a comma (ex: 5,300)
- On parameter pages, the header in the upper left hand corner of the page should have the exact company name, the exact location name and the project number
- Follow the General Layout below:



- More examples of how spreadsheets and parameters should be formatted are on the following pages.

Footnotes

When to use:

- Referencing gas conditions from a different method.
- Less than signs
- Noting a fuel factor value
- Noting the destruction/capture efficiency basis.
- Missing runs

Where to put it:

- Put a superscript 1, 2, 3, etc. in the text in a table. Avoid footnoting numbers.
- Type in the footnotes in the cells below the table. Skip 1 line below the bottom bar in the summary table or two lines below the last line of data on the parameter page.

Examples of footnotes.

[1] Gas conditions obtained from concurrent Method ### Testing.
[2] Based on an F_d factor of #### dscf/10^6Btu.
[3] Run 1 was omitted due to data acquisition problems.
[4] Destruction efficiency based on ppmdv.
< Indicates below the detection limit.
(<#) Indicates detection limit is included in averages.

Mistakes to Watch Out For

You can save yourself a lot of work down the line if you pay attention to some possible mistakes....

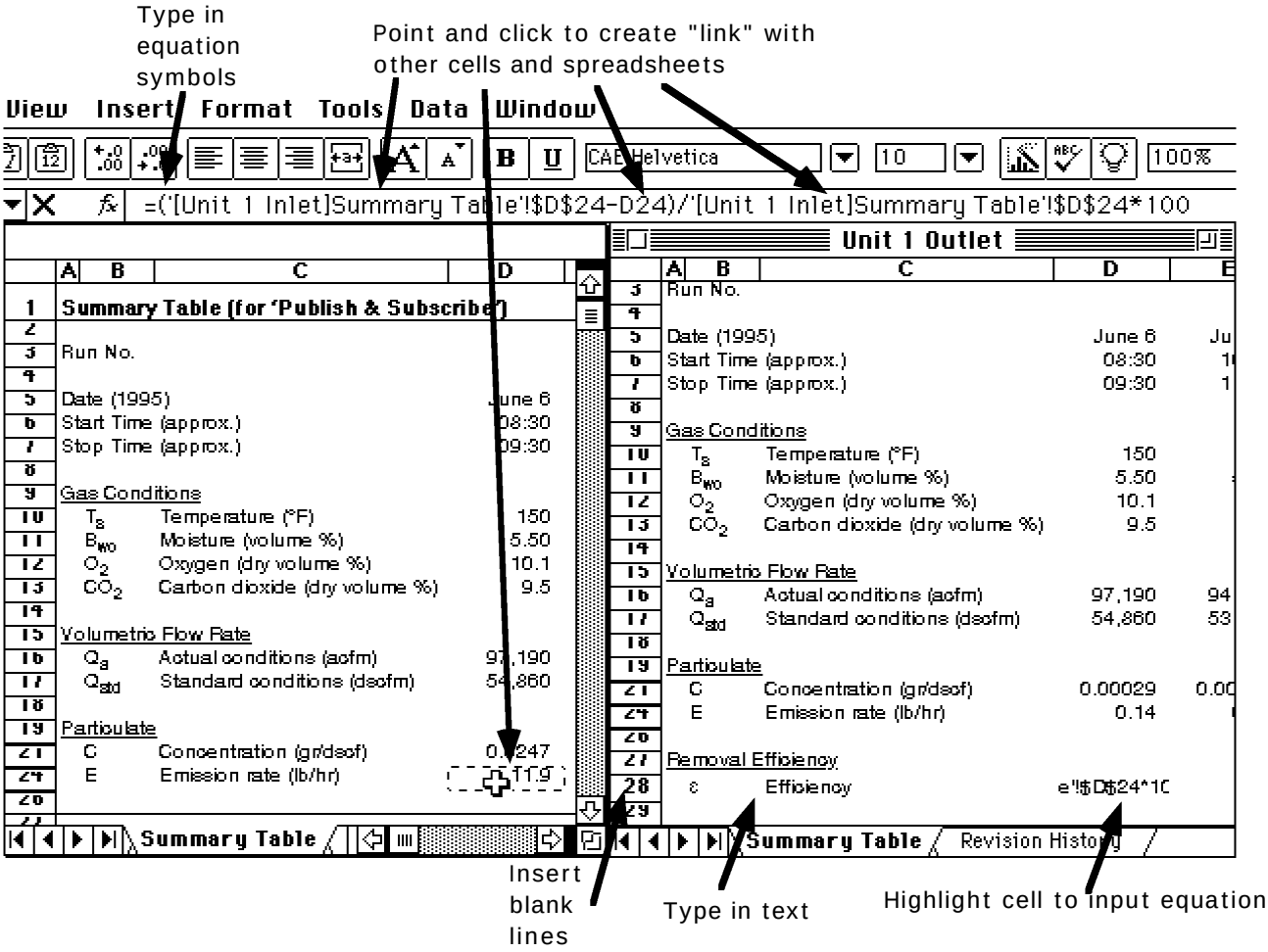
- Never ever use the "Cut" command or the "Drag and Drop" feature. You can easily destroy the workbook if you aren't careful.
- Check the averages written on the field data sheets with the averages on the field data printouts (minor rounding errors are OK).
- Check the other data as well (Meter Yd, Meter ΔH, Static Pressure, Area, Bar. Pressure, Nozzle Diameter, O_2, CO_2, Start/Stop Times, etc.).
- Look at the parameter sheet after you have entered the data - look at the company name, project number, location names - are they correct and consistent.
- Do the flows, moistures and isokinetics make sense?

Spreadsheet Links

Standard spreadsheets contain links between the pages and should not require changing. However, if the report writer needs to create or alter a summary table to include data from another spreadsheet, the following guidelines should be followed.

Example: particulate testing is performed at the inlet and outlet of Unit 1 and the efficiency should be shown on the Unit 1 Outlet summary table.

1. Open both spreadsheets.
2. Insert enough lines in the Unit 1 Outlet summary table to fit the efficiency data.
3. Type in the text required (the left side of the table)
4. Highlight the first cell where you want the efficiency equation to appear
5. If the equation we will use is:
   efficiency = ((inlet emission - outlet emission)/inlet emission)*100
6. then type in the mathematical symbols and click on the cell containing the inlet and outlet emissions when you get to that part of the equation.



Linking mistakes to look out for and how to deal with them:

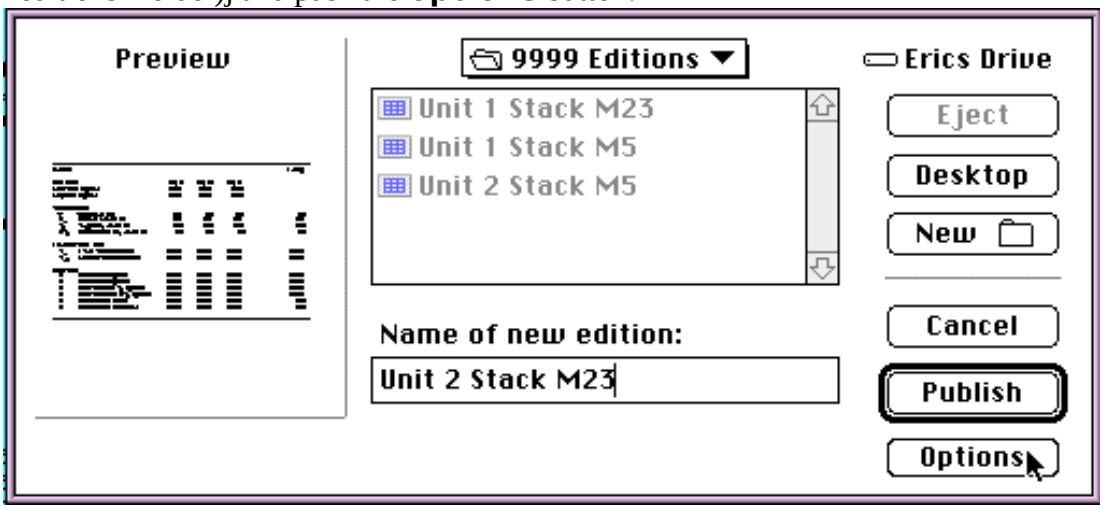
Problem: Spreadsheets with links can't "find" each other.

Probable Cause: you've moved or renamed one or both of the spreadsheets.

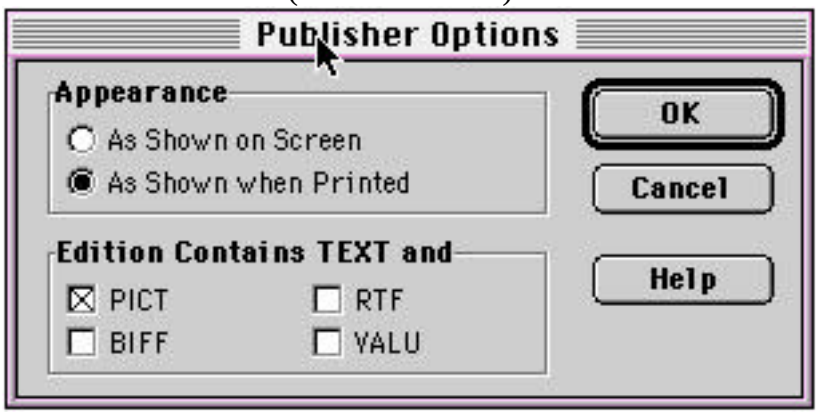
Solution: Open both spreadsheets at the same time and save them both. If this doesn't work, you may have to re-link the spreadsheets.

Creating the Publisher (in Excel)

1. As mentioned in Section 1, you should have a folder called "9999 Editions" for each report.
2. While in Excel, highlight the area you want to publish (usually the summary table).
   Note: You may want to highlight some extra blank rows if you think you might have to add extra units or constituents. This will prevent the bottom of your table from being "pushed" out of the publisher area. If you don't use these extra blank rows you can always "close" them so they don't take up extra space on your table.
3. In the menu, under **Edit**, select **Publishing: Create Publisher**.
4. The dialog box shown below will appear. Name the publisher, select where you want to save it (your "editions" folder)j and push the **Options** button.

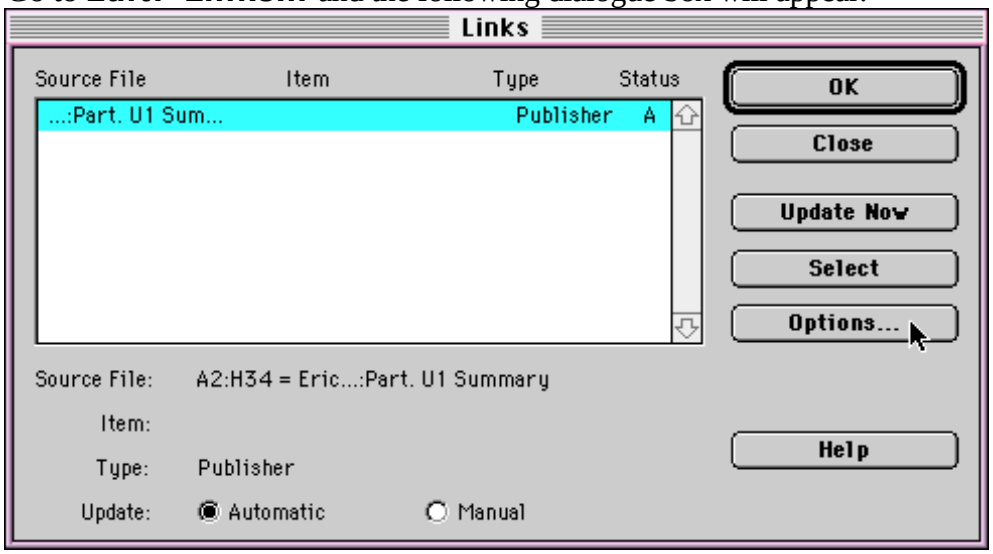


5. Another dialog box will appear. You want to select "As Shown when Printed" and deselect "RTF", "BIFF" and "VALU" (as shown below).

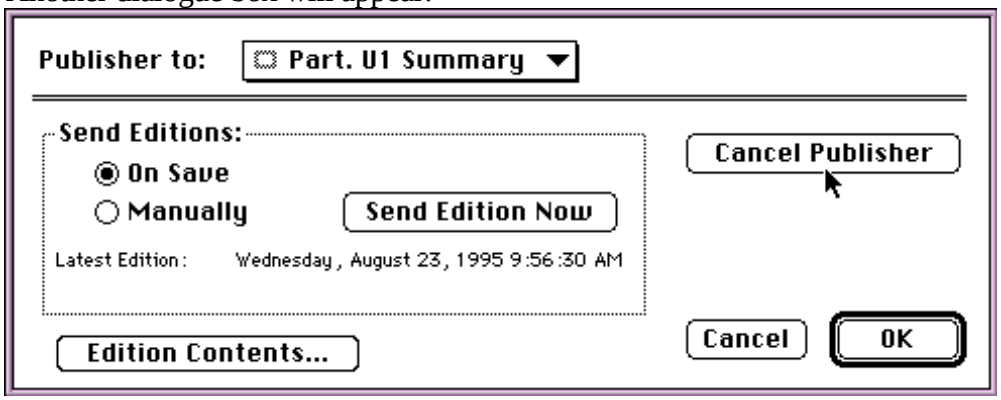


Canceling a Publisher

1. Go to **Edit: Links...** and the following dialogue box will appear.



2. Highlight the publisher you want to cancel and click on the **Options...** button.
3. Another dialogue box will appear:



4. Click on the **Cancel Publisher** button.
5. Save the spreadsheet.

Auto CEM Macro

The macro formats and prints a Labtech/Lotus 'RUN.WK1' file for inclusion in the Field Data Printout section of a report. The accompanying workbooks use the formatted file to generate the Parameters and Summary Tables for a RATA report. The instructions are broken in to three sequential sections.

IF there is not a RUN file/ Checking a suspicious looking RUN file

- Tank values in ROW 3 (Column B through J)
- Run 1 starts (Company Name) in K1, runs are offset by 10 columns; therefore Run 2 starts in U1
- Cal OO starts (Company Name) in A101, CAL 01 starts in K101

Then, check other rows (see below) - there may be an extra line or deleted run

- ROW 1: Client Name (ALL CAPITAL LETTERS)
- ROW 2: CAE Project No: #### !!!!CHECK FORMAT!!!!
- ROW 3: date (don't worry about format)
- ROW 4: time (don't worry about format)
- ROW 5: Col. K thru T: Time, NOx, SO2, THC, O2, CO2, CO, SO2 In, O2 In, CO2 In
- ROW 6: Col. K thru T: Blank, ppm, ppm, ppm, %, %, ppm, ppm, %, %
- ROW 7: Blank
- ROW 8: First line of data

  Data can continue until ROW 79 without interfering with the calibration summary section.

CHECK RUN TIMES

- Find a list of run start and stop times somewhere in folder before running the Macro.
- The Start time is really the first minute of the run minus 1 minute.
- Adjust Runs in RUN.WK1 file OR only copy the data for the times of the runs.

Then, check other rows (see below) - there may be an extra line or deleted run

- ROW 81: Start of calibration section for each run (Cell K81 should say "Run 1")
- ROW 82: IF the cells in Columns K, U, AE, etc. are blank, type the run number in this cell.
- ROW 83: Average
- ROW 84: Blank
- ROW 85: In Zero
- ROW 86: Fn Zero
- ROW 87: In Cal
- ROW 88: Fn Cal
- ROW 89: Tank
- ROW 90: Blank
- ROW 91: Average

If these rows are off, check other rows - there may be an extra line or deleted run

- ROW 98: Fn Zero
- ROW 99: Fn Cal
- ROW 101: Start of Calibrations (CAL OO: A101, CAL 01: K101)

TO SAVE MEMORY:

- Blank out the calibration section for all the runs beyond the ones being used.
- The Lotus Macro in cells A49:I94 can be blanked out.

Auto CEM Macro and RUN file

The 'RUN.WK1' file must be complete (no missing runs) and all 'key' fields properly filled out. Any reference made to cell location are prior to running the macro unless noted otherwise (the macro inserts several rows). Verify the following items before you run the macro:

- The 'SAVE' (B41) cell contains the number of the first run (i.e. to offset all runs)
- The 'Location' (B44) cell contains the proper sampling location name
- The 'Runs' (B45) cell contains the correct total number of runs (NRuns=Runs+1)
- The client name is correct on all runs and bias (K1, U1, AE1 etc. and A101, K101, U101, etc.)
- The calculation section (ex: K81..T92) exists for all runs, particularly with a large number of runs since the standard 'RUN.WK1' file is only setup for 12 runs
- The correct calibration gases were entered in the appropriate 'Tank' cells (B3..J3)

The following are common problem items encountered so far with possible remedies:

- Missing/aborted run: the runs numbers will need to be manually renumbered. The 'Run' cell (K82, U82, AE82, etc.) will also need to be renumbered if the parameters workbook is going to be used.
- Incorrect bias gases are outlined/averaged: check the 'Fn Zero' and 'Fn Cal' cells (rows 98 and 99). These are the ranges that the macro will outline and use for the 'Zero Gas' and 'Cal Gas' averages.
- Gases not tested should be BLANK in these rows.
- Changed calibration gases during the RATA: make sure the individual run calculation section has the correct calibration gas concentration, and the pre/post calibration cells 'In Zero', 'Fn Zero', 'In Cal' and 'Fn Cal' (ex: L85..T88) contain the correct bias values. The parameter workbook links to the calculation section for the calibration gas concentrations and bias averages, and the calculation section is linked to the 'Tank' cells (B3..J3). If a particular run(s) uses a different gas, however, there should be an additional pre/post calibration, and the macro is not setup for such occurrences. This additional calibration should located four (4) rows below the preceding calibration, and will need to be formatted manually. The calculation section of the following run will need to be adjusted accordingly.

Once the 'RUN.WK1' file is properly formatted (if there were no corrections needed, then you do not need to save the document, although the macro does run faster on Excel files than Lotus files):

- Save the 'RUN.WK1' as a 'Microsoft Excel Workbook' Excel file (ex: RUN.XLS) since the macro runs faster on an Excel file
- Close the 'RUN.XLS' file

To run the macro you will need to open the macro file, and then one of the following:

- press the oversized 'Run CEM Macro' button if the macro is the foremost window; or
- using the menus: Macro menu->Run... option and then choose the '!Format_Run' macro; or
- type **-option-A** (as long as this keyboard shortcut has not already been defined for a different macro on your computer).

In order to make the macro as fast as possible it does not update the screen while it is running. It may look as if your Mac has crashed, however, the macro flashes a progress status in the line at the bottom of the Excel screen. Watch this to see if the macro is still running. The macro should take five to ten minutes, and will then prompt you for proper page formatting. It will display the first page (Bias 0) and allow setup modifications. Once the page setup is satisfactory, press the 'Print' button. If you do not wish to print the CEM data, then simply press 'Close'.

The macro does not save the formatted file for you. Use the 'Save As..' option to save the formatted Run file. Since the macro can only be used on the original 'RUN.XLS' or 'RUN.WK1' files you should not over-write this file since you will need it if there were any errors in the original setup and the macro has to be re-applied.

Auto CEM Parameter and Auto CEM RATAs

Because the original workbook got very big (and took forever to re-calculate) it has been broken into two workbooks. These two workbooks are linked to each-other (actually the RATAs are linked to the Parameters) so BE CAREFUL about renaming them:

- open both workbooks and use the 'Save As..' menu option; or
- rename the file and then use the 'Replace' menu option to correct workbook files accordingly.

The first option is by far the best way to go. You could also combine them into a single workbook if you have enough memory in your computer.

If you are using this macro/workbook for regular CEM runs (as opposed to RATA runs), you will not need the RATA workbook at all.

Auto CEM Parameters

The parameters workbook exists of four files (all quite large). The 'CEM Runs' is a blank spreadsheet which is pre-formatted to match the 'RUN.XLS' file generated by the Auto CEM Macro. Transfer the data from the 'RUN.XLS' file to the 'CEM Runs' spreadsheet by:

- Open the formatted 'RUN.XLS' file (or make it the active window)
- Click in the upper-left cell (A1)
- Select all (**-A** or Edit menu->Select All option)
- Copy (**-C** or Edit menu->Copy option)
- Open the 'CEM Runs' spreadsheet part of the CEM Parameter workbook (or make it the active window)
- Click in the upper-left cell (A1)
- Paste (**-V** or Edit menu->paste option). There may be a warning message notifying you that you will not be able to undo, click OK.

The parameters should now all be linked to the proper runs. Verify this by comparing to the Field Data Printouts generated by the macro. The parameters are limited to four gases each per inlet and outlet, and are setup for O_2, CO_2, SO_2 and CO. If you need different gasses, use the 'Replace' option to adjust for your runs:

- Adjust the appropriate cell in the lookup-table index (D8..D11) so that the spreadsheet will use the appropriate molecular weights, etc.
- Adjust the O_2/CO_2 correction factor if applicable
- Determine the present reference column (ex: [Auto CEM Parameters]CEM Runs'!$O$85 uses the $O column)
- Use the column letters suggested in the Source Rows part of the header table (H20..H25) for the gas required (ex: NO_X is $L)
- Highlight the section in question (entire rows, ranging from C under Data Acquisition to C_{ma}) - (8 rows)
- Use the Formula menu->Replace option to adjust (ex: 'Find What: $O' and 'Replace With: $L')
- If you will be using the RATAs workbook, be sure to note any changes made, since the respective RATA table will also need to be changed.

The parameters have been configured to cover every possible contingency (yeah, right), so you will need to 'HIDE' any rows that are not appropriate. The following rules apply:

- Two blank rows between each 'category' (i.e. Gas Conditions/Oxygen/Carbon Dioxide)
- Standard row height is 12 points
- DO NOT DELETE ROWS... especially if you intend to use the RATAs workbook!!!

The following are common problem items encountered so far with possible remedies:

- NONE???

Auto CEM RATAs

This workbook is linked to the Auto CEM Parameters for all of the CAE CEM data. There are 8 tables, each linked to one of the four gasses of the inlet and outlet parameters. The order of the RATA tables matches that of the standard parameters layout (O_2, CO_2, SO_2 and CO). If the gasses required are different, DO NOT change the order of the RATA tables, but rather re-name them accordingly. If you do not need all eight tables (i.e. you are not using all parameters) then you can delete unused RATA tables.

If you needed to adjust one of the parameter gases, you will also need to adjust the RATA table accordingly:

- Type of gas
- Unit of measurement

The default RATA tables are linked to the ppm/% values. If a different measurement unit is required then the RATA cells (E27..E46) will need to be adjusted. Use same steps are Auto CEM Parameters, but replace the appropriate row number.

If two measurement units are required for a single run, additional RATA Tables will be required (or skip the first section if there is an unused table):

Section 1 - Additional table(s):

- Select the appropriate Rata Run in the workbook's table-of-contents.
- Click the 'Remove' button
- Make the Rata Run the active window (using Window menu, or clicking on it if it is visible)
- Save the Rata Run without changing the name, to an easily accessible location on the hard drive (desktop)
- Make the RATA workbook the active window.
- Click on the 'Add' button
- Add the Rata Run back to the RATA workbook by clicking on it in the list, and clicking the 'OK' button
- Rename the Rata Run with the appropriate measurement unit (ex: Outlet O2 Rata - ppm)
+ Make the Finder active (click on the desktop, or select it via the Applications menu - upper right hand icon menu)
+ Find and rename the Rata Run file with the appropriate measurement unit (ex: Outlet O2 Rata - lb/hr)
+ Make Excel active (click in an open spreadsheet, or via the Applications menu)
- Click on the 'Add' button
+ Click on the 'Open' button
+ Find your renamed Rata File on your drive and click open
- if you only needed to add one, then click 'Done'. If you needed more than one additional RATA table then repeat the steps with the '+'.

Section 2 - Adjusting the table(s):

- Type of gas
- Unit of measurement
- The RATA cells (E27..E46) will need to be adjusted. Use same steps are Auto CEM Parameters, but replace the appropriate location (Outlet or Inlet) and row number.

The CEM parameter and RATA workbooks are set up for 20 runs. If not all of the runs were used, you will need to DELETE any unused rows in RATA table for aesthetic reasons. By deleting the rows, rather than 'hiding' them, the number of runs in the attached figure will be automatically adjusted, calculations will not be affected.

Figures and Diagrams

Many figures (especially sample trains) are already inserted in the text so you don't have to insert the picture. However, if you need to insert the picture many already exist and are on the server (**TechComm Server: Standard Files: Common: Std Sample Trains: Rasted Pict Trains**). However, to create a new figure or diagram there are two basic steps you will need to perform.

Creating a Figure From Scratch (ex. Description of Installation)

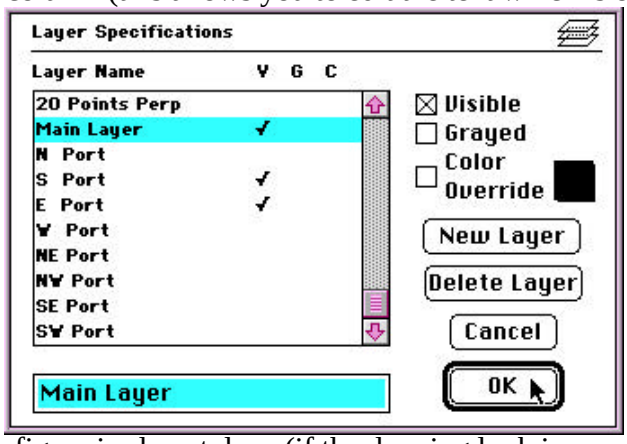
1. If you are making a Description of Installation drawing or a unusual duct drawing you probably need to start from scratch. If you just need a normal duct drawing or sample train drawing, go to the "Using one of the 'Makers'" part of this section.
2. If you are creating a drawing from scratch open Canvas and make a new page.
3. Use the different drawing tools (rectangles, circles, lines, etc.) to make the picture.
   Note: Canvas Hints are included at the back of this section.
4. Put in the text descriptions.
   - Make sure the text is Helvetica.
   - Use 12 point font size (depending on the size of the picture you may need to increase the font size).
   - Avoid abbreviations (Exception: inches is always shown as "in.").
   - Center align text and pay attention to appearance and consistency.
   - The First Letter of Each Main Word is Capitalized (and, is, of, etc. isn't Capitalized).
5. **Save** the drawing as a Canvas file first (in case you need to make changes later). Pay attention to where you save it (Canvas has a bad habit of saving documents in the Canvas Application Folder).
6. Go to the "Making a PICT file" part of this section.

Using One of the "Makers" (Cross Section Maker, Monitor Maker, Train Maker,)

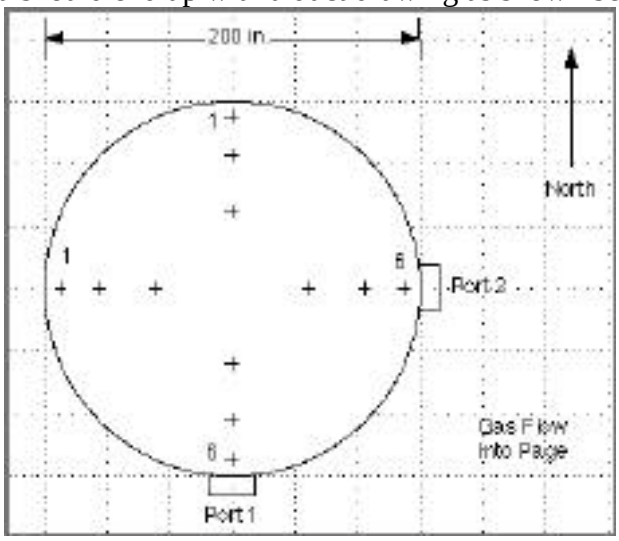
Introduction: the Cross Section Maker, Monitor Maker and Train Maker are drawing files consisting of many layers. Upon start-up, the document should show what is common to all diagrams. This is the "Main" layer. All parts necessary to create a complete figure can be found on their respective layers. To make a part appear, you merely turn the layer on, making it visible.

Example Using the Cross Section Maker

1. **Open** the Cross Section Maker
2. You will see some basic parts of a duct and some basic text.
3. In the menu go to **Layout: Layer Specs**.... A dialog box will appear (shown below).
   - Under the "**V**" column click on the layers you need. In this case the Main Layer and the S Port and E Port are selected (Six Points Perp is also selected but not shown).
   - When you have selected all of the layers you need, click on the Main Layer under the **Layer Name** column (this allows you to edit the text which is on the Main Layer) and click on the **OK** button.



4. The figure is almost done (if the drawing look incorrect you may have made a mistake in the layer specifications dialog box - go back and make the changes).
5. Click and drag the text you need into place. Type in the diameter value, point numbers (first and last) and any additional text. Delete the rest of the text.
6. You should end up with a duct drawing as shown below: (dotted grid lines don't print).



7. **Save** the drawing as a Canvas file first (in case you need to make changes later). Pay attention to where you save it (Canvas has a bad habit of saving documents in the Canvas Application Folder).
8. Go to the "Making a PICT file" part of this section.

Tips For Monitor Maker:

If you know how to use Cross Section Maker, you can use the Monitor Maker also.

1. Make sure you choose either the "Heater Box On" layer or the "Heater Box Off" layer in the **Layout: Layer Specs...** dialog box.
2. If an FID (used for THC/VOC/Propane) is part of the CEM set-up, it must be the first monitor. If an FID is not used, choose either of the other two "Mon 1" layers.
3. Each monitor can have different plumbing for the inlet and outlet of the monitor.

   Inlet Choices

   - **Ind** - Independent monitor that connects directly to the flow panel or sampling line.
   - **Up** - Monitor cascades from the monitor directly above it.

   Outlet Choices

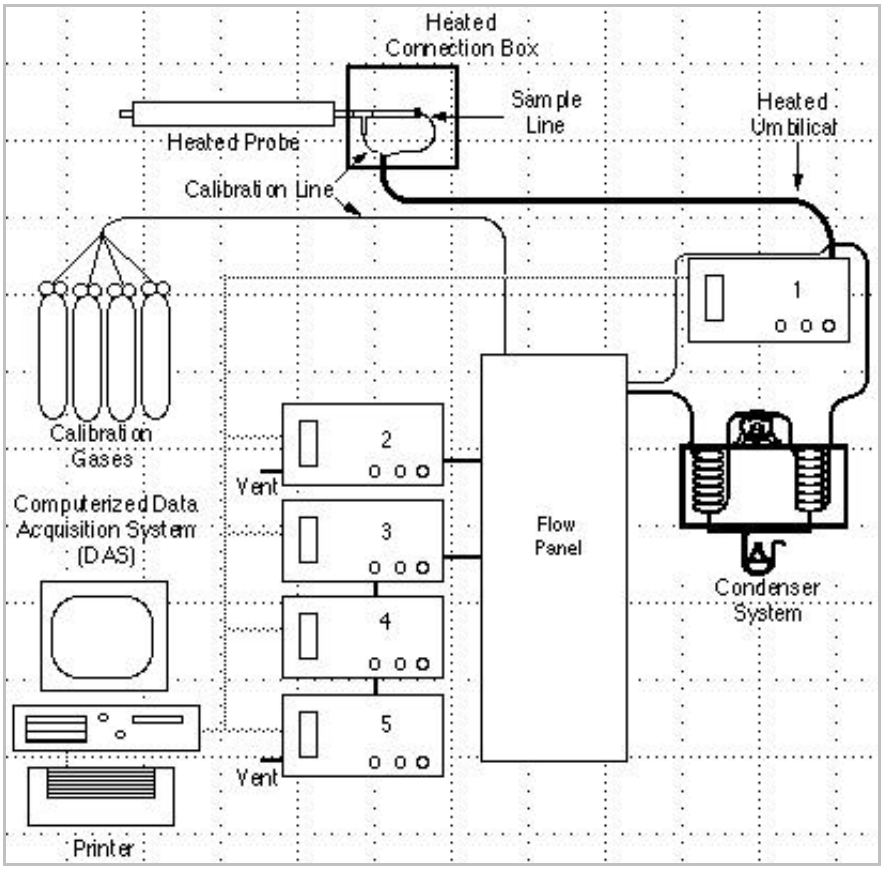
   - **Vent** - When the monitor does not feed to the monitor directly below.
   - **NV** - No Vent. When the monitor feeds the monitor directly below, or when you simply don't want a vent to appear.

4. In the case of six monitors (one of them must be an FID) select the "Mon 1 - FID" as well as another "Mon 1 layer". Then select the "Renumber for 6 Mon".
5. If not using a flow panel, choose the vertical line by the monitor inlets, **Object: Unlock** it and adjust the length.

Here's an example:

The following layers are checked in the Layer Spec...:

Flow Panel
Heated Box - Yes
Heated Umbilical
Stan Heated Probe
Computer
Printer
Mon 1 FID
Mon 2 Ind & Vent
Mon 3 Ind & Vent
Mon 4 Up & NV
Mon 5 Up & Vent
Main

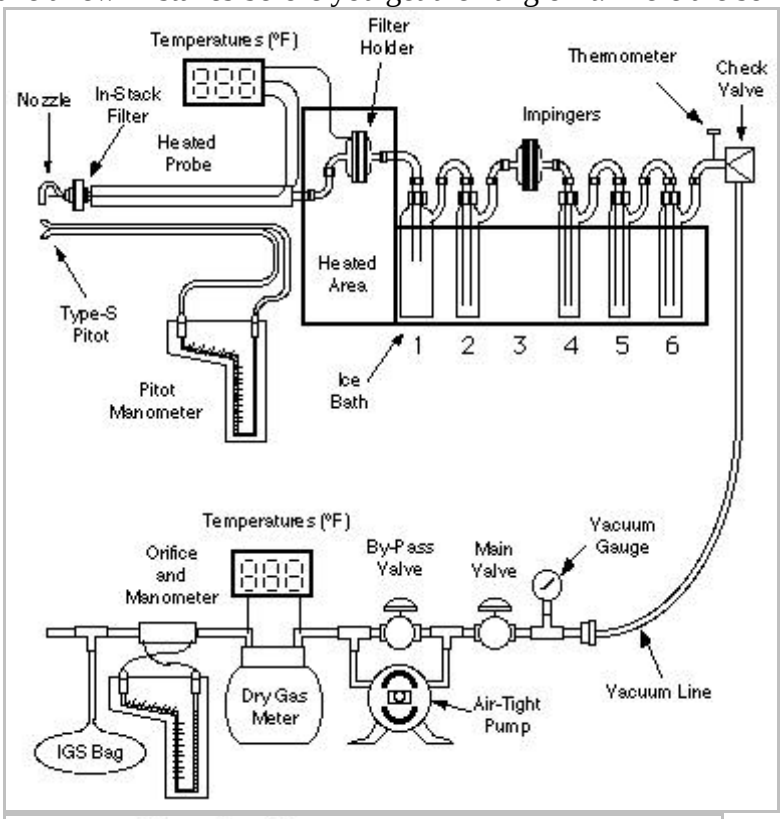


Tips For Train Maker:

If you know how to use Cross Section Maker and Monitor Maker, you can use the Train Maker also. Just go to **Layout: Layer Specs** and select the appropriate layers to use. Train Maker is more complex than the other makers so you may make a few mistakes before you get the hang of it. Here are some examples:

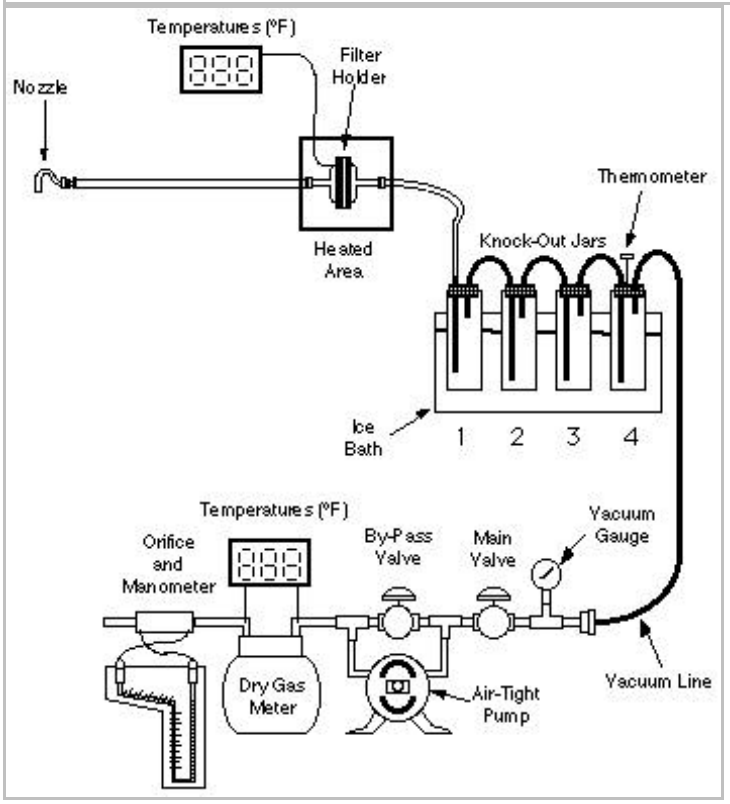
The following layers are checked in the Layer Spec...:

Pump
Std Meter Box
IGS Bag
Std Filter in box
Std Heater Box
Std filter for #3
Std #2 impinger
Std #4 impinger
Std #5 impinger
Std #6 impinger
Std Lrg 1st Imp
Std 6 Box & Line
Std S-type Pitot
In Stack filter
Nozzle
Stack Temperature
Heated Probe
Main



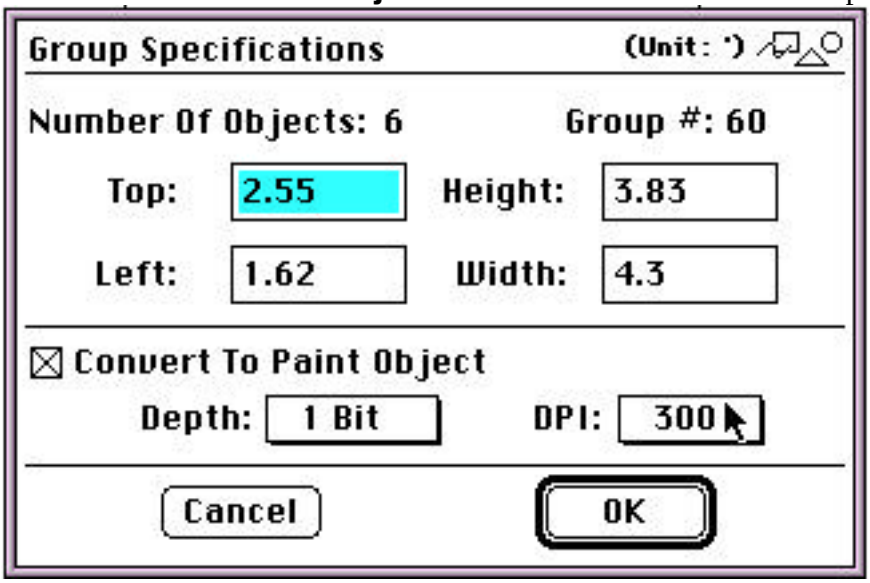
The following layers are checked in the Layer Spec...:

Pump
Std Meter Box
Cat filter in box
Cat heater box
Cat 4 Knockouts
Nozzle
Main



Making a "Rastorized" Pict File

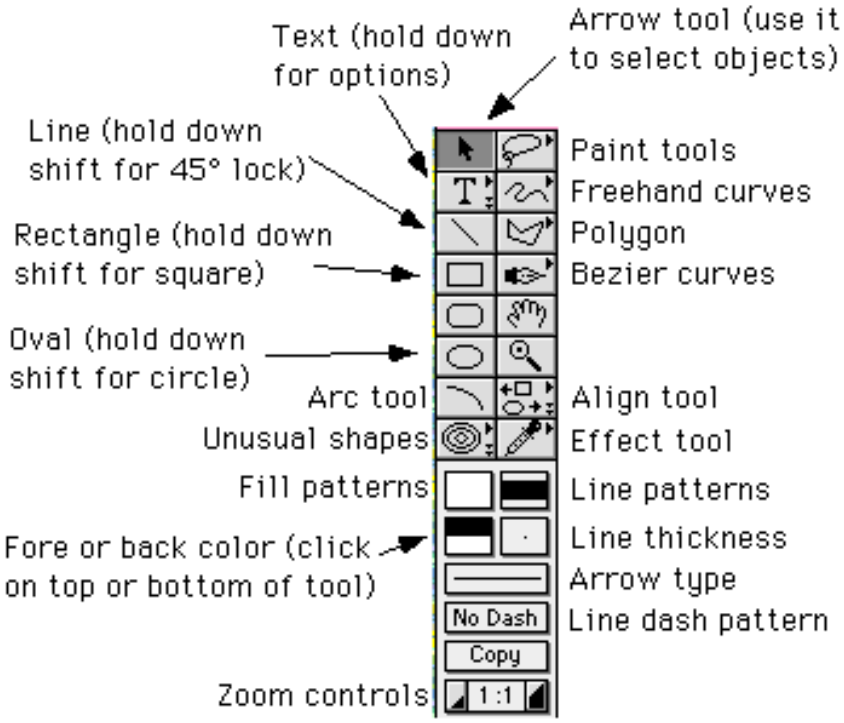
1. For a multi-layer drawing (any of the "Makers") **Edit: Select All (A)** and **Edit: Copy (C)** . Then create a new blank document and **Edit: Paste (V)** the drawing into it (for a single layer drawing, skip to step 2).
2. Deselect everything (click on a blank part of the page).
3. Click on the Text Tool  and then **Edit: Select All Text (A)** . Check to make sure you have selected all of the text - you may have to ungroup some pieces of text from objects that they have been grouped to. Select the objects in question and **Object: Ungroup (U)** .
4. After you have selected all of the text, go under the menu bar and **Object: Group (G)** to group all of the text.
5. **Select All (A)** then deselect the text by holding down the shift key and clicking on a piece of text.
6. Under the menu bar **Object: Group (G)** to group all of the non-text objects.
7. Double click the grouped objects (or pick **Objects: Group Specs**... in the menu bar). The dialogue box shown below will appear.
8. Click **Convert To Paint Object** and select **300** from the **DPI:** pop-up menu. Press OK.



9. Under **File** choose **Save As...**. A dialog box will appear. Choose the name you want to save it as and the file you want to save it in. Choose **PICT** from the **File Format:** pop-up menu and press **Save**. Ignore the warning that appears concerning loss of accuracy (press **OK**).

Canvas Hints

Basic Toolbar - Description:



Useful Menu Commands - Descriptions

File: Save As...: Lets you select what kind of document you want to save it as. Generally you will use either Canvas format or PICT format (Canvas can be edited, PICT files are what we use for putting pictures in MS Word, but can't be edited).

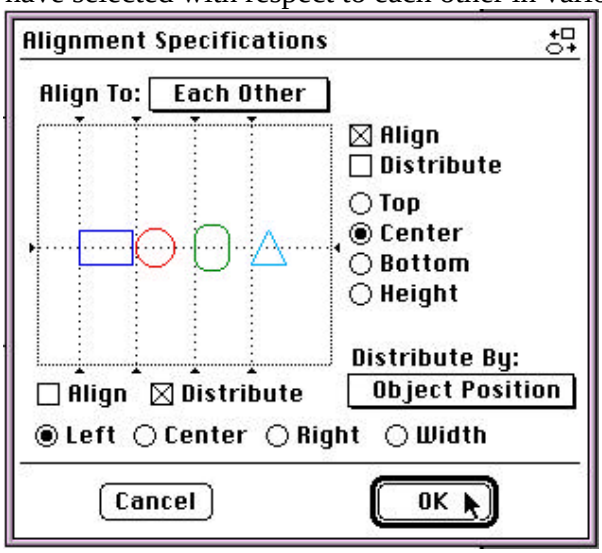
Edit: Select All... (A) : Selects all objects and text on the page.

Edit: Select All Text... (A) : This command is only available when the text tool  is highlighted. Selects all text on the page. If text is grouped with other objects or text it will not be selected (so select the text/object group in question and Ungroup).

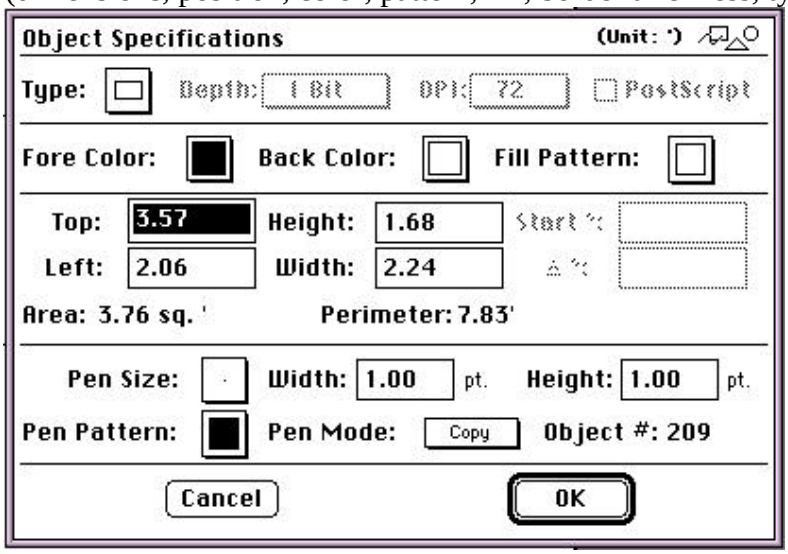
Edit: Duplicate (D) : Duplicates selected object(s).

Object: Arrange: Bring To Front (F)/Send To Back (J) : Puts objects/text all the way in front or back.

Object: Align...: Brings up the dialog box shown below which lets you align or distribute objects you have selected with respect to each other in various ways.



Object: Object Specs... (double click object): Brings up a dialog box shown below which gives you a lot of information about an object you have selected and lets you change this information (dimensions, position, color, pattern, fill, border thickness, type, etc.).



Object: Group (G)/Ungroup (U) : groups and ungroups different objects.

Layout: Show/Hide: Grid/Rulers: Turns the grid and rulers on and off.

Layout: Layer Specs...: If you have (or want to make) layers in your document, this will bring up a dialog box that will let you select different layers to edit them or to make them visible or invisible.

Layout: Grids...: Dialogue box lets you change the size of the grid, display the grid, snap to the grid.

Layout: Rulers...: Lets you change the units on the rulers.

Layout: Snap To Grid: Turns the "snap to" feature on and off.

Effects: Rotate Right/Left: Rotates the selected object.

Effects: Flip Horizontal/Vertical: Flips the selected object.

Sample Calculations

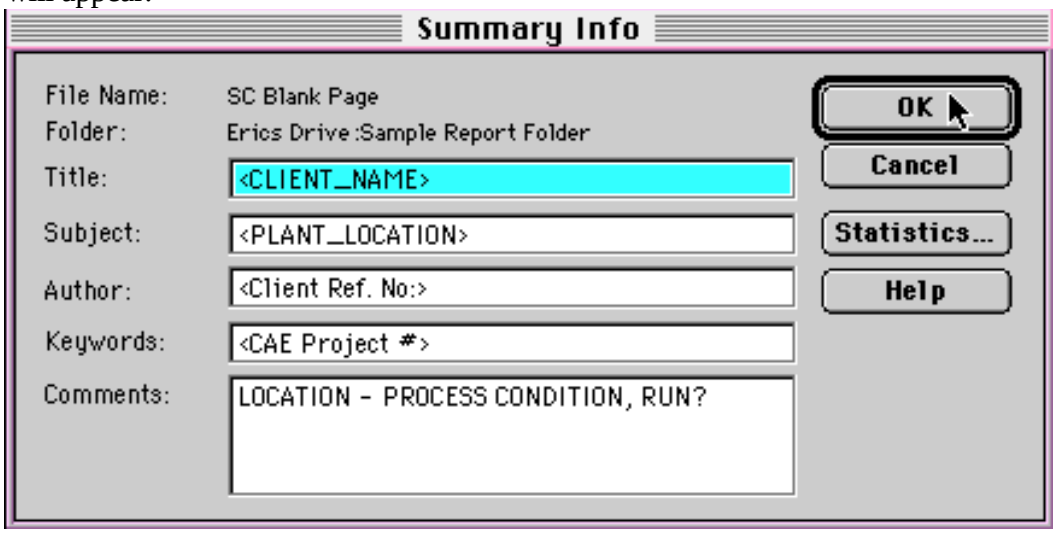
Sample calculations are not difficult and they offer the report writer an opportunity to find errors that might otherwise have been missed. In addition, sample calculations give the client a good explanation of how numbers in the parameters and summary tables were arrived at. Sample calculations display the equations and nomenclature that are used in the parameters and summary tables. One run at one test location is usually chosen as an example. Equations for all calculated numbers are shown.

Preparation

Decide which run and location you will use. If, for example, particulate testing was performed at one test location and CEM testing was performed at a different location, then you will have to note that in the sample calculations. Make sure you have all of the parameters/summary tables you will need. Sample calculations can be very time consuming so it is a very good idea to check the numbers on the parameter pages before you start.

Editing the Header

1. Copy "SC Blank Page" from **TechComm Server: Reports: Std Sample Calcs (Word)** folder into your report folder on your hard drive.
2. Rename the document to fit your needs (refer to Section 1 for naming conventions).
3. Open the sample calculations document
4. From the menu, choose **File**: **Summary Info** to edit the header. The following dialogue box will appear:

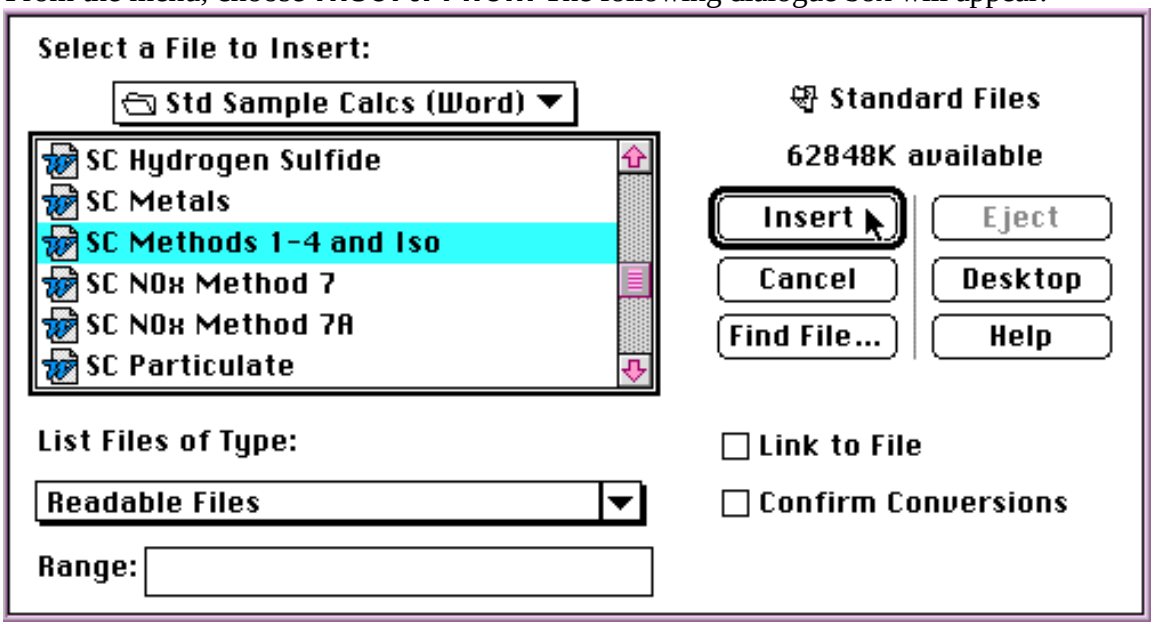


5. Input CLIENT NAME, PLANT LOCATION, Client Ref. No:, CAE Project No: and LOCATION - PROCESS CONDITION, RUN?. These "variables" are linked to fields in the header.
6. If you **View: Normal**, then **Edit: Select All** and press the function key "**F9**" you will be able to update the fields in the header. You can see the header in **View: Page Layout**.
   Note: For some reason, "**F9**" doesn't update the header in the **Page Layout** view.

Inserting the Equations

1. Position your insertion point where you want the equation to appear.

2. From the menu, choose **Insert: File...** The following dialogue box will appear:



3. Use the dialogue box to select the equations you will be using (in this example Methods 1-4 are being selected). Press the **Insert** button. The sample calculations you selected will appear where your cursor was positioned.

4. Repeat this process until you have all of the equations you need in your document. The equation numbering will automatically update when the fields are updated.

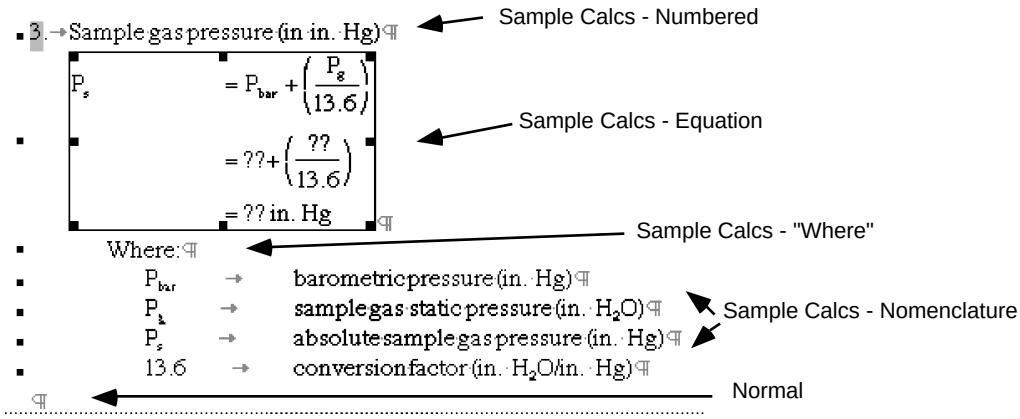
5. To update the equation numbering, **Select All**: **Edit** (A) and press the function key “F9”.

Footnotes

Many equations performed for several pollutants are similar. Instead of showing a separate set of equations for each pollutant, the set of equations can be footnoted stating "Calculations for <<*other applicable pollutants*>> are performed in a similar manner." The respective molecular weights should also be noted in the footnote when applicable. Position your insertion point where you want the footnote to appear, then go to **Insert: Footnote...** in your menu. This inserts a footnote and opens a footnote window. Double click an existing footnote number to edit it. To avoid duplicate footnotes on the same page, use a superscript instead (for the duplicate).

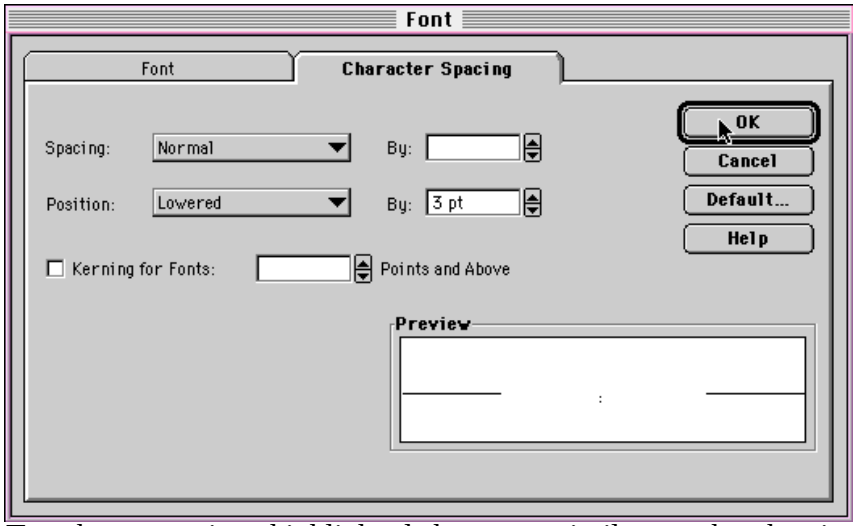
Styles

1. From your style menu, in your MS Word Toolbar, you can define the various paragraph formats - see figure below for proper formatting - if your equations are being "split" between pages, you probably have one of the lines in the equation defined incorrectly (remember the "Normal" formatted blank line between each equation!).



MS Word Hints (use MS Help for more shortcuts)

1. When working with sample calcs, it is often useful to "zoom" or magnify the document to 125% or 150%)
2. To subscript a highlighted character, press: = (or see "Edit Your Toolbar" in Section 5)
3. To superscript a highlighted character, press: **shift** = (or see "Edit Your Toolbar" in Section 5)
4. To sub-subscript a highlighted character, go to **Format: Font...**. Using the "font tab" select "subscript". Then using the "character spacing tab" (shown below) select "position lowered" by 3 pt. Example: $C_{@\ 7\%\ O_2}$ (the "2" is sub-subscripted).



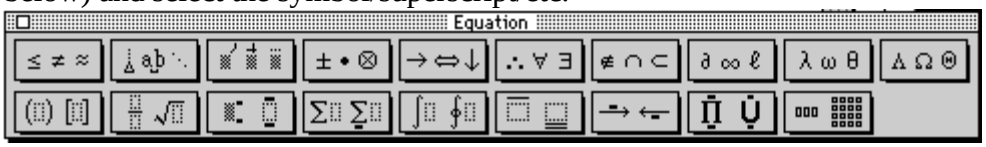
5. To sub-superscript a highlighted character: similar to sub-subscript, but select "raised" instead of "lowered". Example: $E_{10^{6}Btu/hr}$ (the "6" is sub-superscripted).

Entering the Data

1. Starting with Equation 1, double click the equation box. Equation Editor (a program that MS Word calls upon) opens the equation.
2. Note: If the equation doesn't open, you may need to find the Equation Editor program and open it. The Equation Editor program should be on your hard drive in **Your Applications Folder: Microsoft: Equation Editor**.
3. Note: The first time you open Equation Editor on your computer, you will need to go to **Style: Define**. A dialogue box will open. Uncheck all of the boxes for Italics and Bold and change all of the fonts to Times except the Symbol and Greek styles - change these to Symbol. Close the dialogue box.
4. Highlight the ?? and enter the numbers from your parameter and summary pages.
   Remember: all numbers in the thousands need a comma. Ex. 2,500
5. After entering the data, check the equation on a calculator.
6. The calculator result should be close to the spreadsheet result, although, there will be rounding error (in the case of very low percentages for RATAs, the rounding error can give extremely different results)
7. Although the calculator results may differ, the value from the parameter sheet is the one that should be entered in the sample calcs.
8. If the values differ greatly recheck the equation on the calculator. Then, check the equation for validity and check the actual equation in the MS Excel worksheet.
9. Repeat these steps with all equations, deleting, editing or adding equations for the specific project.

Equation Editor Hints (open Equation Editor and select help for more shortcuts)

- To insert various characters and operators, click and hold various buttons on the Equation bar (shown below) and select the symbol/superscript/etc.



- tab/arrow keys → moves the cursor around the equation
- shift space → space
- shift space → a bigger space
- option tab → tab
- f → create fraction
- (→ create ( ) - these parentheses automatically resize to fit the equation
- arrow keys → nudge highlighted characters in any direction by one pixel
- l → create subscript (lower)
- h → create superscript (higher)

Creating new equations

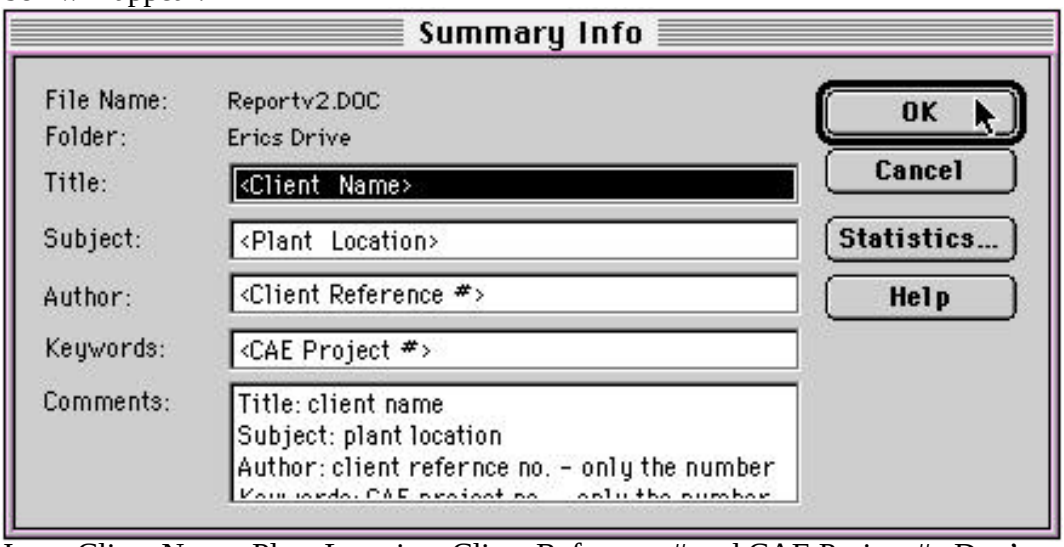
Note: to make a new equation, duplicate an entire existing equation (using **Copy** and **Paste** in MS Word) and modify it.

- Add the equation to the set of equations for specific pollutant
- Follow the format of existing equations
- Copy nomenclature definitions, when possible.
- When creating new nomenclature, follow basic naming conventions.
- All nomenclature of an equation should be defined below it.
- As a final check of the equations, try the new equation to make sure units cancel, leaving only the desired units.
- Remember; all numbers in the thousands need a comma. Ex. 2,500
- If there is an equation that needs to be added to the standard files please notify whoever is in charge of the sample calculations (currently Eric Campbell x 2085).

Getting Started

The main body of the report is the Microsoft Word document found **in Standard Files: Std Word Templates: Reportv2.DOC**. The standard report has most of the text and formatting taken care of. However, you will still have to type in some job specific text (Dates, Overview, etc.), insert some text and pictures and "Subscribe" to your tables. For the most part the report document will "lead" you through what you need to change and add.

1. Copy the Reportv2.DOC document into your report folder on your hard drive and rename it with the project number and client name (ex. 9999 Acme Company).
2. Open the document, go to the menu, choose **File**: **Summary Info...**. The following dialogue box will appear:



3. Input Client Name, Plant Location, Client Reference # and CAE Project #. Don't use 'ALL CAPS' for the name and location.
4. See "Editing and Updating Fields" later in this section.

Stuff you need to know before you rush headlong into trouble....

1. Never, ever delete the section breaks. Never, ever delete the chapter headings (ex: "1. Project Overview 0 0"). If either of these occur, it is easier to start over with a new template.
2. Always work with the **View** in **Normal** mode, and use the **Page Layout** mode only for previewing before printing (Normal mode is much faster).
3. Never place footnotes in table, figure, item or section headings (they will show up in table of contents)
4. The first line of a table heading ends with a colon (for the automatic table of contents)
5. In a sentence with a list, don't use a comma between the second and last item. Use the word "and" only. Example: "The sampling EPA Methods 1, 2, 3 and 4." (no comma after the "3").
6. Phone number format: (708)991-6200 ext. 2085. Don't put a space between "(708)" and "991-6200".
7. "CAE Project No: 7000" is correct. "No." or "#" or "Num." are incorrect.
8. In the report text, "December 25, 1995" is correct. "12/25/95" or "Dec. 25" is incorrect.
9. Always make sure to be consistent with Location Names.
10. Always make sure to type out the full Company Name (and be consistent).
11. Generally, when writing out a method, "Method 5" is incorrect, but "EPA Method 5" is correct.
12. If you need to use a subscript, don't use CAE Helvetica in the report text. Highlight the letter or number and press = for subscript and + for superscript.

The Report Document is Broken Up Into The Following Sections:

Section 1 - Letter (s)
Section 2 - Cover Page
Section 3 - Table of Contents
Section 4 - Project Overview (Chapter 1)
Section 5 - Results (Chapter 2)
Section 6 - Description of Installation (Chapter 3)
Section 7 - Methodology (Chapter 4)
Section 8 - Appendix Table of Contents
Section 9 - Appendix Pages

Section 1 - Letter (s)

The first section of the report is pretty basic.

1. The Client Name and Plant Location will be updated (See "Editing and Updating Fields" later in this section).
2. You will need to change the text in *italics* (date, address, etc.).
3. You may also want to change the text in the letter.
4. Delete the "[TXT1 Blip-files - Project Manager]" and replace the text by **Insert: File...** using the dialogue box that shows up, find **"Standard Files: Reports: Std Text - Report (Word): Section 1: Names-Proj. Manager"** and insert the text.
5. Delete the phone number.
6. Delete "<PM-INITIALS/tech-writer-initials>" and type in the project manager initials in CAPS/report writer initials in lower case (example: DR/ec).

Section 2 - Cover Page

The second section is pretty basic also.

1. The Client Name, Plant Location, Client Ref. No. and CAE Project No. will be automatically updated (See "Editing and Updating Fields" later in this section).
2. You will need to change the text in *italics* (date, address, etc.).
3. Delete the "P*rojectManagerBlipFile*s" and replace the text by **Insert: File...** using the dialogue box that shows up, find **"Standard Files: Reports: Std Text - Report (Word): Section 1: Names-Proj. Manager"** and insert the text.
4. Do the same for "I*ndependantReviewerBlipFile*s" (no phone number for independent reviewers).
5. Make sure a page break doesn't show up before the Project Manager's name. If this occurs, delete a few returns from above the client's address.

Section 3 - Table of Contents

DON'T TOUCH IT! It will update (See "Editing and Updating Fields" later in this section) and if you manually change any of it you will most likely damage it beyond repair.

Section 4 - Project Overview (Chapter 1)

Chapter 1 has some pretty good descriptions of what you need to include in the Project Overview. Some sample project overviews are included in the Appendix Section of this manual.

1. The Overview should be written by the project manager and should include information about dates, locations, a list of pollutants, what happened during the testing, why we tested, problems encountered during testing, unusual results, conclusions from testing, what the client hoped to accomplish.
2. In addition, the names of the field coordinators should be given. Make sure you give complete company and agency names (add more names if required). We always use the first initial and last name (not the full first name). Example:
   J. Weber - Ogden Martin Systems, Inc.
   D. Rhoades - Clean Air Engineering
3. Table 1-1 in the report is a suggested format for the summary table. Obviously you will need to change it in some way. There is a table made up of tabs and another table right below it made with an "embedded" MS Excel spreadsheet. Use one of them and delete the other.
   a. For the table made of tabs, highlight the table and move the tabs around and type in new columns or type in new lines if required. However you change your table, just remember to make it consistent and professional.
   b. For the "embedded" MS Excel spreadsheet - double click the spreadsheet (while in MS Word) to force MS Excel to open it. Edit it just like you would edit a normal Excel spreadsheet. Click, hold and move the sizing handles to change the spreadsheet display size. A few different kinds of tables have been included in the spreadsheet. Click back on another part of the page to get back into MS Word.
   c. Another option for Table 1-1 is to make the table in Excel and publish and subscribe. Refer to the end of this section to see "How To Subscribe to a Excel Publisher".
4. The last sentence requires you to type in the last table and page number in Chapter 2. Remember to change these numbers if you add or delete a table (it's a common mistake).

Section 5 - Results (Chapter 2)

1. **Edit: Copy** and **Edit: Paste** the table title, Picture box (with the big "X") and page break as many times as you think you will need it. For example: if the report will require 5 tables in Chapter 2, you will need to copy and paste 2 new tables since the document starts out with only 3 by default.
2. Type in the Location Name, the Constituent (usually the pollutant), and the Load Condition (if applicable) for each of the tables. Don't change the table number as it will automatically update (See "Editing and Updating Fields" later in this section).
3. If a table title will not fit on a single line, do not use a normal return to break up the title (this will cause problems with the Section 3 Table of Contents). Instead, make a "**soft return**" by holding down Shift and pressing Return.
4. The first line of a table heading ends with a colon (for the automatic table of contents)
5. To put your tables in, click on a picture box to select it and **Edit: Publishing: Subscribe To...**. See "How To Subscribe to a Excel Publisher" later in this section.
6. If you need to delete a publisher, see "How To Subscribe to a Excel Publisher" later in this section.
7. If the table doesn't seem to appear (or if it only seems to show the very bottom of the table) you probably need to change the style of the table box to "-Figure" (any other style like "Normal", "-Table Bottom Bar" or "-Figure Heading" won't show the entire table). Refer to the "Report Text Styles" in the Appendix for more information about styles.

Section 6 - Description of Installation (Chapter 3)

Chapter 3 has some pretty good descriptions of what you need to include in the Description of Installation. Some sample Description of Installations are included in the Appendix Section of this manual.

1. The description should be written by the project manager and should include information about what the plant produces, how the plant controls emissions, where the testing was performed, etc.
2. Click on the picture box and **Insert: Picture...**
3. A dialog box will appear. find the file you want to insert and press the **Insert** button
4. The picture should appear.
5. If the picture doesn't seem to appear (or if it only seems to show the very bottom of the picture) you probably need to change the style of the picture box to "-Figure" (any other style like "normal", "-Table Bottom Bar" or "-Figure Heading" won't show the entire picture). Refer to the "Report Text Styles" in the Appendix for more information about styles.

Section 7 - Methodology (Chapter 4)

This section requires the most work.

1. You will need to change or delete a lot of text in *italics* (date, address, etc.).
2. Remember not to try to change the automatically updating fields (See "Editing and Updating Fields" later in this section).
3. Type in the method numbers in the very first sentence.
4. Table 4-1 in the report is an example of what your final table will look like. Delete the text you don't need and replace the text by **Insert: File...** using the dialogue box that shows up, find **"Standard Files: Reports: Std Text - Report (Word): Section 4: Summary of Methods"** and insert the text you will need.
5. The next page is the Sampling Point Determination page. You will need to enter quite a bit of information in table 4-2. Pay attention to the default table and footnotes.
6. On the following pages you will need to **Insert: Picture...** and enter the port to point distances, the diameters upstream and downstream and the location name.
7. You may need to duplicate the entire Figure 4-1 (by copy and paste) if testing was performed at more than one location.
8. Remember to delete either the word "Traverse" or "Sampling" and the word "Equivalent" if required from Figure 4-1.
9. Delete all of the text on the next page and replace the text by **Insert: File...** using the dialogue box that shows up, find **"Standard Files: Reports: Std Text - Report (Word): Section 4: Methodology"**.
10. After you insert the text for the methodology, you will find that you need to edit the new text. This mostly involves replacing the text in *italics* (sometimes ~~strikethrough~~ or "< >" is used instead of italics) and possibly replacing the pictures (check to make sure that the picture in the standard text was used on the job - if not you will need to make a new picture - see Section 3).

Section 8 - Appendix Table of Contents

DON'T TOUCH IT! It will update (See "Editing and Updating Fields" later in this section) and if you manually change any of it you will most likely damage it beyond repair.

Section 9 - Appendix Pages

It looks a little confusing at first, but each line is separated by a page break (in other words, each line is a separate page and the text will appear as the header for each appendix section. This is easier to see in View: Page Layout mode.

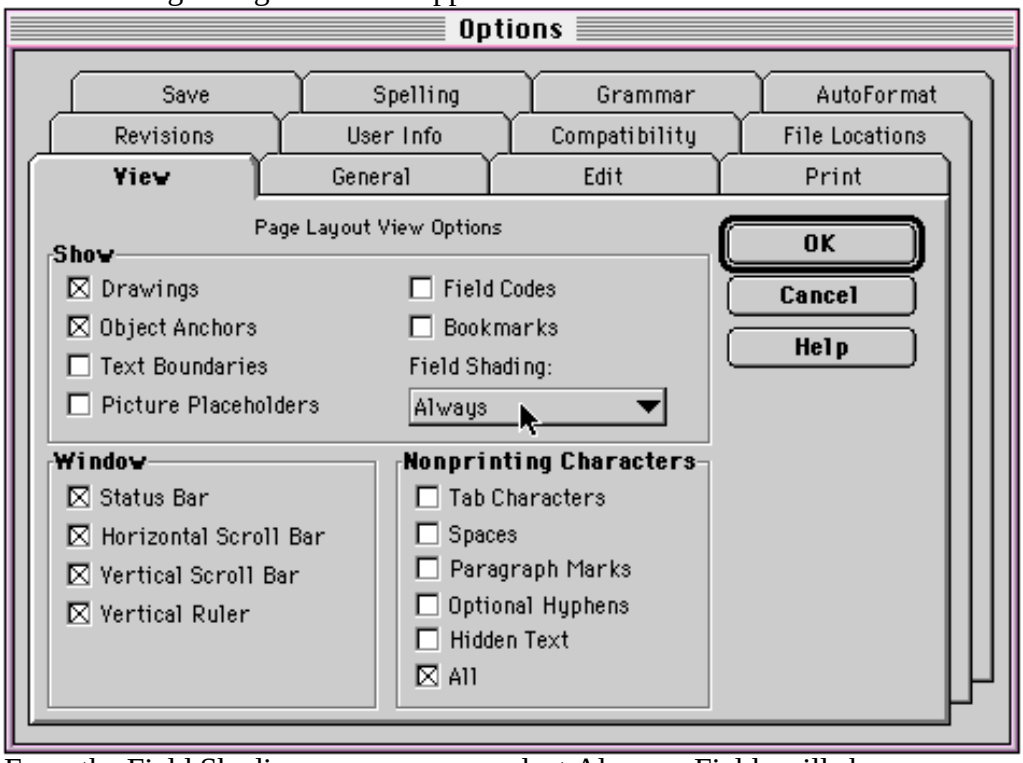
1. Delete the entire line for each appendix page you don't need.
2. If you need to add an appendix page, just put your insertion point at the end of one of the lines of text and press return. Wait a few seconds and you will see an automatic page break show up. Type in whatever text you want to show up on the appendix header.

Spell Check, Spell Check, Spell Check !!!

1. Remember to spell check (**Tools: Spelling...**) the report after you finish editing it (and before it goes to the client).
2. It is a good idea to add technical terms and client names to your custom dictionary (after you make sure you are adding a correctly spelled word).

Editing and Updating Fields

1. To update all of the information throughout the text and header of the document (as well as the Table of Contents, Table and Figure numbers and page numbers) **View: Normal** then **Edit: Select All (A)** and press the **"F9"** function key.
   Note: for some reason, "F9" will not update the header while in **Page Layout** mode.
2. It is very useful to see where the field are. To do this, **Tools: Options...** and select the view tab. The following dialogue box will appear.



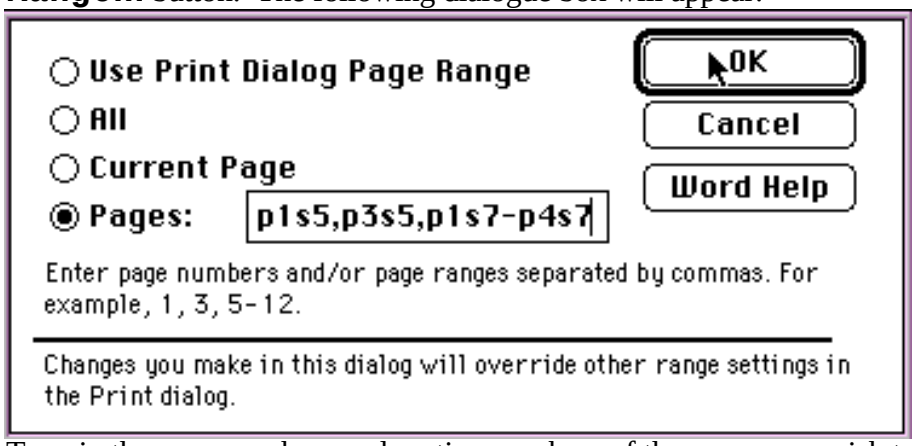
3. From the Field Shading pop-up menu, select Always. Fields will show up as gray highlighted text from now on.
4. You should only have to do this once for your computer.

Sizing Pictures and Tables

1. Click on a table or picture. Notice the eight black "handles" that appear at the corners and sides of the table or picture.
2. To change the size, click and hold (with your pointer) the bottom right handle. Move the handle in or out from the picture or table. Notice the percent scaling display in the bottom status bar.
3. Never use one of the side handles for scaling - it will distort your table and the text will look terrible.
4. If you have blank space at the sides of your picture or table, you can "Crop" the sides of the picture the same way you resized it except you press the shift key as you click and hold on one of the handles. Notice the "Cropping" status in the bottom status bar.

Printing in MS Word

1. Go to **File: Print**. Type in how many copies you need, select the paper tray, then press the **Range...** button. The following dialogue box will appear:

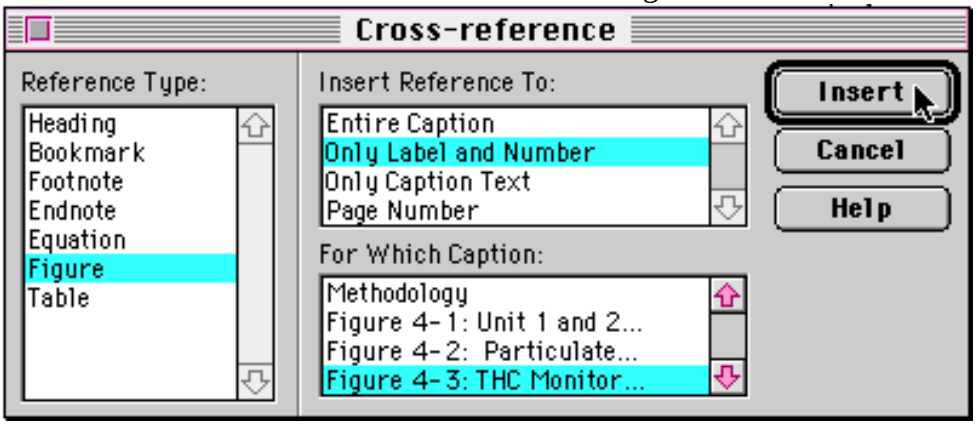


2. Type in the page numbers and section numbers of the pages you wish to print. Commas and Hyphens are recognized by MS Word.
3. The page numbers and section numbers are shown in the bottom status bar.
   Note: the table of contents starts with page 2 of section 3 for some reason.

Cross References

If you want to refer to an automatically updating table number or figure number in your text, you can use a cross reference. This way, your reference in your text will automatically update with the picture or table

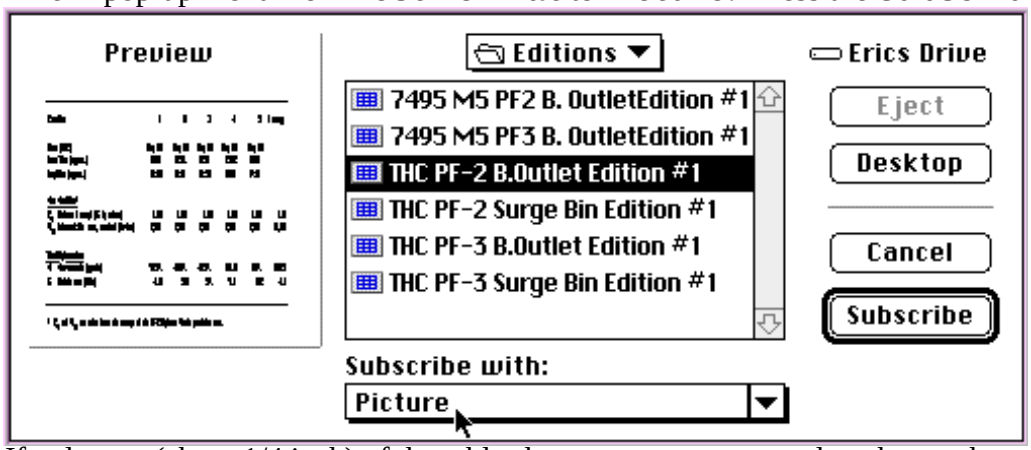
1. Put your insertion point where you want your cross reference to appear.
2. Go to **Insert: Cross-Reference...** a dialogue box shown below will appear.



3. In this example, we are about to **Insert** the a field displaying “Figure 4-3”. Notice that “Only Label and Number” is selected (if “Page Number” were selected then the page number would be displayed in the field).

Subscribing to the Publisher (in Word)

1. Place the cursor (insertion point) where you want to put your table.
2. **Edit: Publishing: Subscribe To...**
3. The dialog box below will appear; find the publisher you want and change the **Subscribe with:** pop-up menu from **Best Format** to **Picture**. Press the **Subscribe** button.



4. If only part (about 1/4 inch) of the table shows up, you may need to change the paragraph Style of the table to "Figure".
5. To delete a publisher, you can click on the table to select it and then **Edit: Publishing: Subscriber Options...** and press the **Cancel Subscriber** button on the dialogue box that appears. **OR** you can highlight the table and delete it. When you highlight the table and delete it make sure it doesn't look like this (in other words don't select it by clicking on it):

Table 2-1:
Unit 1 Stack, Velocity Data

Run No	1	2	3	3-Vertical
Date (1995)	April 6	April 6	April 6	April 6
Start Time (approx.)	08:10	09:50	11:49	11:49
Stop Time (approx.)	09:22	10:53	13:00	13:00
Velocity				
Minimum (ft/s)	15	18	12	21
Maximum (ft/s)	64	68	70	66
Average (ft/s)	46	47	46	47

6. Instead, highlight the entire area as if it were just a really big word or paragraph (shown below) and press delete.

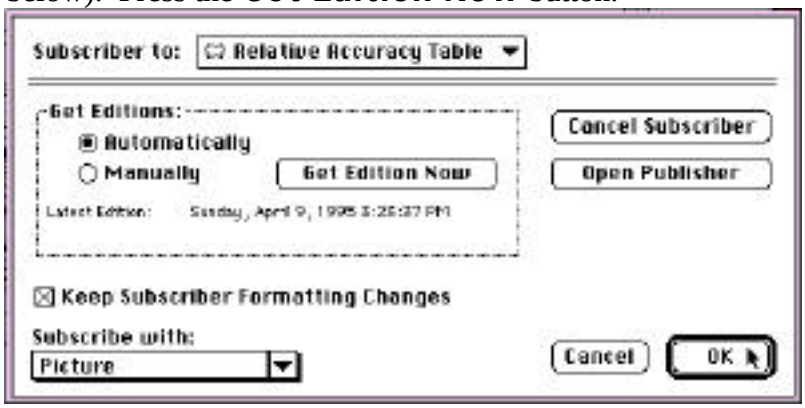
Table 2-1:
Unit 1 Stack, Velocity Data

Run No	1	2	3	3-Vertical
Date (1995)	April 6	April 6	April 6	April 6
Start Time (approx.)	08:10	09:50	11:49	11:49
Stop Time (approx.)	09:22	10:53	13:00	13:00
Velocity				
Minimum (ft/s)	15	18	12	21
Maximum (ft/s)	64	68	70	66
Average (ft/s)	46	47	46	47

Publisher/Subscriber mistakes to look out for and how to deal with them:

Problem 1. You need to make changes in the table.

1. Open the Excel spreadsheet. Make the changes and **Save**. Be careful about inserting rows or columns since you may accidentally "push" part of your table out of the publisher area. You can avoid this complication by leaving extra rows/columns in the publishing area if you think you may need to change the table in the future (and hiding the extra rows/columns if you don't use them). Otherwise you may have to cancel the publisher and create a new one.
2. The table should automatically update in Word (check it). If the table doesn't update, **select Edit: Publishing: Subscriber Options...** from the menu bar. A dialog box will appear (shown below). Press the **Get Edition Now** button.



Problem 2. You forgot to select **Picture** instead of **Best Format** in the **Subscribe with:** pop-up menu when you subscribed to the table in Word (table looks like a mess).

1. Highlight the "messed up" table. Select **Edit: Publishing: Subscriber Options...** from the menu bar. A dialog box (shown above) will appear in which you can change the **Subscribe with:** pop-up menu to **Picture**.

Problem 3. You've moved or renamed a folder or document and the publishers/subscribers, spreadsheets and report document can't "find" each other.

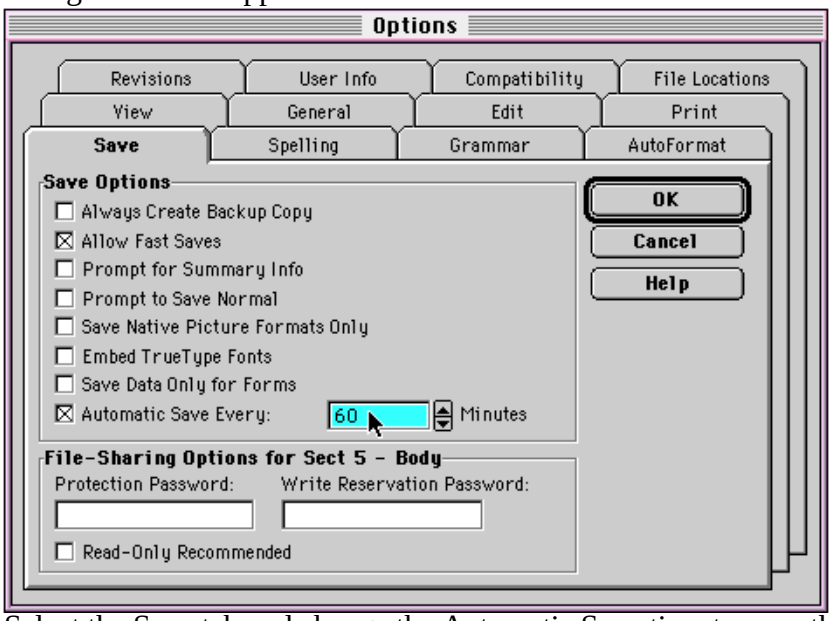
1. Easy Solution: Don't move/rename files around once you start creating publishers.
2. Difficult Solution: In Word, delete the table and re-subscribe. If you can't find the edition, you may need to re-publish the table back in Excel.

Other things to check if something goes wrong...

1. If part of the table doesn't show up, you probably selected the wrong area in Excel (or you have added rows or columns in Excel and this has "pushed" part of the table out of the publisher area.
2. If the table isn't printing correctly (but looks OK in Excel) check the following...
   a. Make sure you have checked/unchecked the correct boxes in **Publisher Options** when creating the publisher in Excel. You can get to the publisher options dialog box by opening the Excel spreadsheet and going to **Edit: Links...**. A dialog box appears. Select the publisher and press the **Options** button. Another dialog box appears, press the **Edition Contents** button and you will have the **Publisher Options** dialog box. Refer to "Creating a Publisher" in Section 2.
   b. Check to make sure "CAE Helvetica" is on your computer
3. If grid lines (borders for all of the cells) are showing up in your table, go back to Excel and under **File: Page Setup** a dialog box will appear select the **Sheet** tab and turn **Gridlines** off.

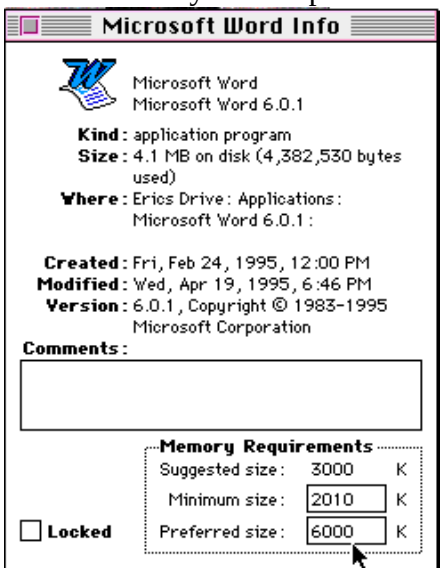
Miscellaneous Tips for MS Word

1. For a page break press Shift Enter and for a soft return press Shift Return.
2. Highlight the letter or number and press = for subscript and + for superscript.
3. To stop MS Word from autosaving every 15 minutes go to **Tools: Options...** the following dialogue box will appear:



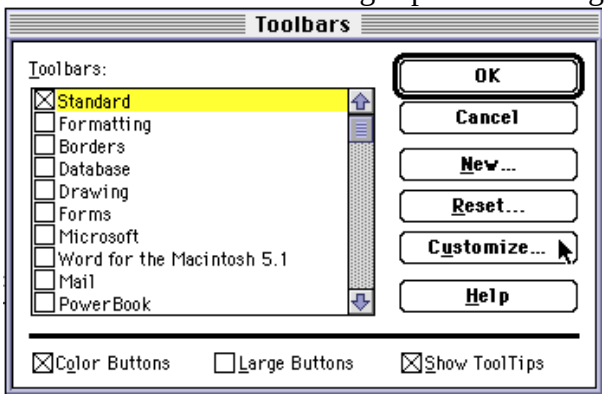
Select the Save tab and change the Automatic Save time to something a bit less irritating.

4. MS Word is slow - but if it suddenly seems close to grinding to a halt after you have been working on a document for a while, try saving and quitting and restarting MS Word.
   The problem seems to be that MS Word remembers your 100 last actions (which can be very useful with the Undo command) and this eventually loads up the memory to the breaking point.
5. Another way to speed up word: Quit our of MS Word. Go to your applications folder, find the actual MS Word application and in your menu bar **File: Get Info**. The dialogue box shown below appears Change the suggested size (make it larger). 3500 to 6000 K of memory will speed things up but make sure your computer can handle the increased memory requirements.

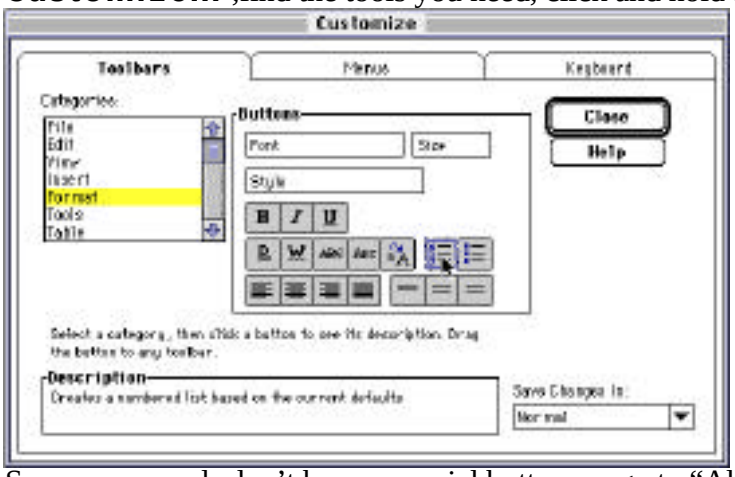


Editing Your Toolbar

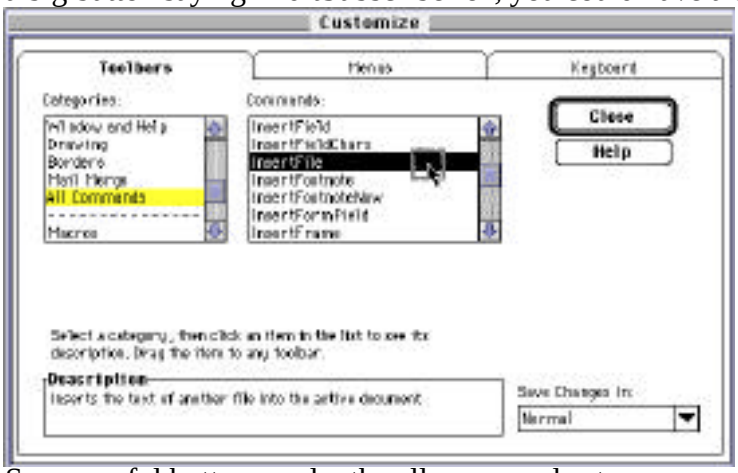
1. **View: Toolbars...** brings up the following dialog box:



2. **Customize...** ,find the tools you need, click and hold and drag the buttons up to your toolbar.



3. Some commands don't have a special button, so go to "All Commands" and find the command you want to make a button for. Click and hold and drag the Command up to your toolbar. Another dialogue box (not shown) will ask you to select a custom button to go with the command. When selecting the custom button, it is probably a good idea to pick the text button so other people using your computer will know what it does (a smiley face isn't very intuitive) and shorten the text shown in the button (instead of having a big button saying "EditSubscribeTo", you could have a button saying "subscribe").



4. Some useful buttons under the all command catagory are: EditSubscribeTo, InsertFile, InsertPicture, Subscript, Superscript.

Review and Revision

Once a report is written, it must be reviewed and often revised. The report must be reviewed by several people to create an accurate and smooth document.

Report Review Responsibilities

1. The Report Writer should review all of his own work. This involves checking the data entry, working through the sample calculations and making sure the format of the report is correct.
2. The Project Manager should review the content of the report (making sure that the correct equations, units, methodology, locations, etc. are being used). Depending on the situation, Project Managers usually review some data entry and calculations to make sure that the numbers are making sense.
3. An approved Independent Reviewer should also look at the report with the client in mind. Will the client understand the project overview, tables, calculations, etc.? Have all of the questions or problems with testing been explained to the client's satisfaction? Depending on the situation, Independent reviewers usually review some calculations to make sure that the numbers are making sense. Any questions the independent reviewer may have should be discussed with the project manager. The project manager should mark any needed adjustments or corrections to the report and return it to the report writer.

Report Review Procedure

1. Report writer writes/reviews the report and gives it to the project manager
2. Project manager reviews the report and gives it back to the report writer.
3. Report writer makes corrections and hands it back to the project manager.
4. Project manager checks that corrections have been made and hands it to the independent reviewer (it is the project managers responsibility to choose the independent reviewer).
5. Independent reviewer reviews the report and discusses any corrections/questions with the project manager.
6. Project manager hands it back to the report writer and explains any corrections the independent reviewer wants.
7. Report writer makes corrections
8. Project manager checks corrections
9. The report is then printed and sent out.

All corrections should be made in pen (preferably red or hi-lighted). Only changes that are uncertain (or opinions) should be in blue pencil. All modified pages should be identified by turning the pages in the report or by "Post-it's" or "Tape Flags".

In order to identify repeating mistakes, all important corrections should be stapled together from the project manager and the independent reviewer and saved with the report folder for archival/legal purposes.

Double Check Checklist

General Layout

- Alignment and size of Client Name & Job Number (including parameters, etc.)
- Consistent margins (left/right as well as top/bottom)
- Page orientation (ex: field data pages bound on top side)

Page numbers

- Table of contents/Appendix
- Reference to figures/graphs/tables

Text

- Spelling and grammar - **SPELLCHECK!!!**
- Correct company name and CAE project number on all sheets (including parameters, etc.) Use a reliable source (i.e. business card, official correspondence)
- Correct contact and company name in cover letter

Tables

- Check super- and sub-scripts
- Consistent units and significant digits
- Consistent formatting (ex: 3,000 not 3000, and all averages in bold, etc.)
- All tables are derived from standard spread-sheets

Numerical Review Checklist

- All manually entered data (from Field Data Sheets to Summary Tables) needs to be checked.
- One run of calculations must be manually checked for each method (same run as the sample-calcs is acceptable).

Revisions

Draft
When you send something to the client draft it doesn't mean "Rough Draft". Instead it means that you have put together a professional finished (with the possible exception of missing lab data or client data) report and the client wants to check out the layout and accuracy of the report before he gets the final copy.

To send a report out draft the entire report will be copied onto CAE draft paper. It will say "Revision 0" in the bottom left hand corner of the main report body, parameter pages and field data printouts. See Section 7 for further instruction on sending the report out.

Revision 0
When you send finished copies of the report to the client, they will say "Revision 0" on main report body, parameter pages and field data printouts. Print the Title page on CAE letterhead and the main body of the report (Table of Contents through Chapter 4) on CAE logo paper (usually refereed to as "2nd Sheet") See Section 9 for further instruction on sending the report out.

Revision 1, 2, 3....
If you have to revise a report you have two main options. Send the client the revised pages or send the client complete new revised reports. Ask the client which one they want. If you send complete reports, change the "Revision 0" to "Revision 1" on changed pages only. This can be kind of pain in MS Word - when you change the footer "Revision 0" to "Revision 1" on page 4-1 in the main body, pages 4-2,4-3, etc. will also change. So print out what doesn't change first (on 2nd Sheet) and then make the "Revision 1" footer change and print out the changed pages. If you only send out revised pages, follow the same procedure (except you wont be printing out the unchanged pages).

When you send out a revised copy or revised pages, you also need to send out a revised title page.
If the revision number and date on the original report title page looks like this:

Revision 0: November 6, 1995

Then the revised title page should look like this:

Revision 0: November 6, 1995
Revision 1: December 17, 1995

Yes, that's right, include the Revision 0 date in addition to the Revision 1 date.

Publishing a Report

The copying and binding of the report is the final process in the report department. When the report has reached this phase it has been reviewed and corrected and is ready to be prepared for the client. The supplies used are to be of the highest quality as this is the 'product' that Clean Air Engineering is supplying to their client. This report is what our reputation is built on. It is essential that no errors are committed in this stage of the process.

A Client Wants 3 Copies of a Report....

For Palatine based reports you will need to make **4 final copies**. Three copies will go to the client and one copy will be kept for our records for legal reasons. Outside office based reports will need **5 final copies**. One copy will be kept at the Palatine office, one copy will be kept at the outside office, and the correct number of copies will go to the client.

Draft Reports

- Print the letter out on CAE Letterhead.
- Print the title page out on CAE Letterhead and copy it onto CAE Draft Paper as many times as you need.
- Copy the rest of the report onto CAE Draft Paper as many times as you need. Refer to "Copying with Kinko's" (later in this section).
- Signatures and Questionnaires are not required at this time.

Final Reports

- Print the letter out on CAE Letterhead.
- Print as many copies as you need of the title page out on CAE Letterhead.
- Print as many copies as you need of the body of the report (Table of Contents through Chapter 4) on 2nd Sheet.
- Print the Appendix on white paper and make as many copies as you need. Refer to Copying with Kinko's.

Report Binder Labels

It is the project manager's choice whether or not a report needs to have label on the binder. Most large reports go out with labels and some clients specifically request them. Here's how to do it:

- Find the Binder Label Form **Standard Files: Misc. Forms: Laser Labels: Report Spine Labels (Word)**. Open up the document. You will see the following (you are only seeing part of the document):

← Read this

- For large reports with 1" or larger binders, you can use the whole label space.
- For reports 3/4" labels, you can only print on the first four lines of each label. After you print it out you will need to trim the label with a scissors.
- For 1/2" or 7/16" reports, you can double up on each label (put 3 lines of information and then put 3 more lines of information on the same label). When you print it out, cut the label in half and presto: two labels.
- Labels are not recommended for smaller reports.
- Finally, when you don't use all of the labels on the sheet, don't throw it away. Save the sheet and use it again.

The information you want to put on the labels is as follows (again, it's really the project manager's decision):

Possible Items	Example
CLIENT NAME - Plant Name	ERM - SOUTHEAST, INC. - American Colloid Company
Testing Location (s)	07-28 Dryer 01-01 and 07-01 Calciner 02-02
Type of testing reported - Data of testing	Compliance RATA Report - March 1994
Client Reference No: or CAE Project No:	

We use Avery Standard address/mailing labels (1"x4"). Currently available from Shervin.

Copying with Kinko's

- Refer to the instructions in the Appendix.

Checklist Before Copies are Made:

- Check cover letter for correct date and correct number of copies to be made.
- Check cover page for correct date.
- Check for pages that are up-side-down, especially horizontal pages (data sheets) which should be bound at the top.
- Check for correct paper punching.
- Check for Post-Its stuck to pages.
- Check for corrections that may have been missed during the review process. Corrections made with the blue pencil are often OK, but make sure that they do not show up on the copies.

Checklist When Binding the Report:

- Make sure the Table of Contents and the actual Appendices match and place the tabs accordingly.
- Make sure the punch is set in the inner position for punching report pages.

Check List When Packing a Report:

- Make sure the cover page is signed (two signatures) and the cover letter is also signed.
- Check the cover letter to see if a questionnaire is to be included, if so:
- Make sure the questionnaire has a department and job number, and the technical writer's initials.
- Fill out Questionnaire Tracking Sheet accordingly.

Reports that are Packed After 6 PM

When Shipping/Receiving is no longer operating you will need a Fed-Ex AirBill. This will need to be filled out and placed in the clear pocket that needs to be stuck to the box. Evening deliveries must be made by 9PM at the Schaumburg Fed-Ex office (see Directions to FED-EX later in this section) or 10PM at O'Hare airport. When filling out an AirBill note the following:

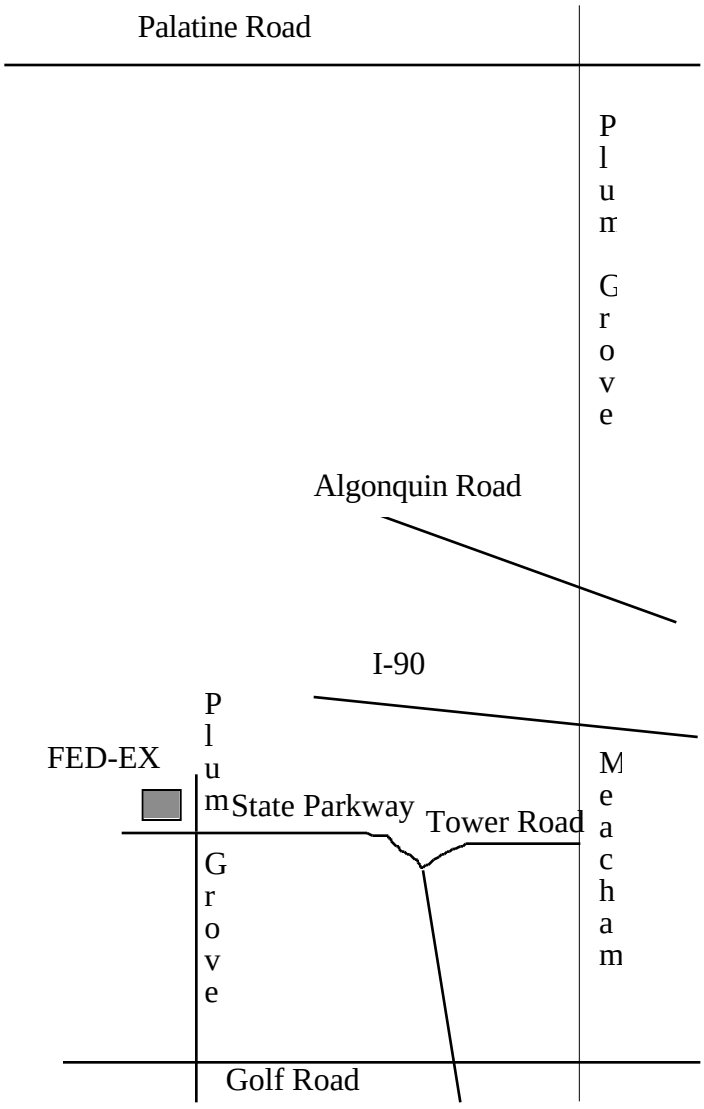
- CAE Fed-Ex number is 0605-1738-0.
- Sender's name and address (1) is the technical communications manager at:
- Clean Air Engineering
- 500 West Wood Street
- Palatine, IL 60067
- Recipient's name and address (2) are the same as those in the letter/address sticker.
  Note: Fed Ex will not ship to a P.O. Box or a "zip-code P.O. Box". When in doubt, ask the client what address to use for Fed Ex.
- Internal billing reference is the same as the '99-9999-RPT' on the address sticker.
- Payment (3) should be 'Bill Sender'.
- Services (4) should be 'other packaging' and can be either Priority Overnight or Standard Overnight depending on the situation. Note that Priority Overnight costs twice as much as Standard Overnight but is guaranteed to get there next morning.
- Tape it up.

After the packing is complete, remember to append the time that has been spent copying, binding and packing to the time log found on the inside cover of the report folder, and return the folder to the technical writer.

Directions to FEDERAL EXPRESS

From CAE Palatine office:

- Go East on Palatine Road until you hit Plum Grove Road.
- Go South on Plum Grove Road - it turns into Meacham Road (don't turn off onto Old Plum Grove).
- You will pass Algonquin Road, a big Motorola complex (west of Meacham).
- Just after you go over an overpass (I-90) there is a stoplight for Tower Road.
- Go West on Tower Road - it curves around but stay to your right (don't turn left)
- Tower Road turns into State Parkway which then intersects with another section of Plum Grove Road.
- Federal Express is visible from this intersection (NW corner of the intersection) (Address 1500 N. Plum Grove)



General:

The individual tasks that must be completed before the report can be filed are as follows:

1. Report Synopsis.
2. Report Narrative.
3. Report Time Sheet.
4. Shipping Information.
5. File Labels.
6. Disk Backup.
7. Network Backup.
8. Database Update.
9. Report File Storage.

Each of these tasks should only take a few minutes and some should be completed well before the report is actually shipped; however, all procedures must be completed in order to close the project, and should be performed within a week after the report is completed.

1. Report Synopsis

Should contain all of the main dates, who worked on the report and the final hours. Directions for use can be found in Appendix A. The report synopsis should be included in the report folder.

2. Report Narrative

A print-out of the report narrative should be included in the report file. Directions for use can be found in Appendix A. The report narrative document should also be included in the report folder.

3. Report Time Sheet

The report time sheet should be filled out daily. The hours should be added with the total clearly marked. The total should also be marked on the Report Synopsis. Directions for use can be found in Appendix A.

4. Shipping Information

The person who shipped the package, the date it was shipped and the shipping method (carrier and delivery time) should be clearly marked in the appropriate spaces on the Report Synopsis.

5. File Labels

If the pre-printed file labels contain the correct information, they should be cut from the bottom of the Report Synopsis and attached (taped) to the tabs on the manila folder and the accordion folder, respectively. The labeled manila folder should be placed the furthest back in the accordion file.

If the pre-printed labels are incorrect in any way, new ones should be printed. The labels should contain the following information: full client name, CAE project number and a plant or site designation (geographical location is acceptable). The font should be in 14 point Helvetica, although a smaller size is acceptable for long company names.

6. Disk Backup

An entire copy of all the report documents needs to be stored on a floppy disk that should be included in the report file. The disk name should contain the job number and the client name (abbreviations are acceptable). The entire report folder should be copied to the disk. The names of all files and folders on the disk should start with the project number (do not include department number). A file compression program should be used to decrease the disk space required. See Appendix.

7. Network Backup

For easy and quick access of any data pertaining to past projects, a complete set of project related documents are stored in **CAE FileServer: Project Folders:** folder on the server. This folder includes **Proposals**, **Protocols**, **Reports** and **General** (the general folder will contain the job log, correspondence and any other computer files not specifically related to the other categories). All documents pertaining to each different phase of the project are stored within their own respective folders. The report folder should be copied to the appropriate project folder. The report folder's name should contain the project number followed by the word 'Report' (ex: **1234 Report**). The MIS department will then compress and back-up the report folders from there.

8. Database Update

Dave Nasralla in MIS is in the process of creating the 4D Database and will be having classes to teach people how to use 4D.. All key information pertaining to the report should to be entered into the database. When closing the report, you will need to enter some data required by 4D and you will also have the opportunity to describe the location names, testing types and other comments. See Appendix.

9. Report File Storage

Once the preceding procedures (I through IX) have been completed, the report file should be placed in the file cabinets. Reports are filed by project number in ascending order. Each file cabinet drawer holds about 20 to 25 completed reports, please keep this in mind to avoid having to move files as the drawers are filled. Twice a year, the oldest report files from half of the cabinets are moved to archive boxes.

When preparing the report file for storage, remove any un-needed materials from the file. The stored file should always contain the following:

- Complete bound draft report as shipped to client (when applicable)
- Complete bound final report as shipped to client.
- Front section on normal white paper and the entire appendix (with original field data etc.).
- All support information (Job Plan, Job Logs, etc.).
- All pertinent review changes (grouped and labeled by reviewer). Type-o, grammatical, or calculation error corrections need not be kept.

APPENDIX A: Report Synopsis, Narrative, Hours

Step-By-Step Instructions:
Synopsis/Time Log/Narrative Forms

Note: These instructions assume the user is using a Mac and knows the basics of networking and folder manipulation.

1) Locate and copy the template to your harddrive. The template can be found on "TechComm Server: Standard Files: Forms". It is an Excel spread sheet and is named 'Synopsis/Time Log/Narrative'.
2) Open the template.
3) Enter the information on the first page into the left-most cells next to the topics:

Cell	Enter	Notes
??	Client Name	Use the complete client name, only abbreviate if necessary.
??	Performed at	Enter plant proprietor name here if different from above; otherwise enter plant identification or city and state.
??	Testing Dept.	Include the hyphen after the two digit number, ex: '66-'
??	Project No.	Include any indicators if more than one report is being written for this project number, ex: 9999-2
??	Responsible	Fill in the names of the technical writer, project manager and independent reviewer. If the data entry or drawings are already completed, fill in the appropriate names or enter 'unknown' if not available. If the data entry or drawings are not yet complete, then leave the areas blank to be filled in by hand when completed.
??	Type of Report	Usually 'Complete', although 'Summary' or 'Letter' are possible options.
??	Number of Draft	Total number of draft reports the client has requested.
??	Number of Final	Total number of final reports the client has requested.
??	Report Data	Check the folder for all testing methods, and fill in the required number of sets. If no lab data is expected, then enter 'N/A', if the data is complete enter the current date, otherwise leave blank and complete by hand when delivered.

4) Verify that the information has correctly been updated on the second and third pages as well as the label in the bottom right of the first page (cells ?? through ??).
5) Check the print areas by viewing the Print Preview. There should be three pages. Print one copy onto plain white paper.
6) Remove the label from the first sheet and affix it to the manila file tab (with tape).
7) Staple all three sheets to the inside back of the manila file.

CAE REPORT SYNOPSIS

Company Name: _____ **CAE Project No:** _____

Performed at: _____

	Name of Responsible	Date Received	Date Completed
Data Entry:			
Drawings:			
Tech. Writer:			
Project Manager Review:			
Independent Review:			

Number of draft copies sent to client: _____

Report Type: _____ **Number of final copies sent to client:** _____

REPORT DATA CHECK-IN

Method:				
Field Data Rec'd:				
Final Lab Data Rec'd:				
Method:				
Field Data Rec'd:				
Final Lab Data Rec'd:				

Comments: _____

Please initial each task upon completion when closing file:

Complete Synopsis: _____

Complete Hours: _____

Complete Narrative: _____ Draft sent on: _____

Complete Hypercard: _____ Draft sent via (Circle One): [P1] [Std] [2nd]

Quickmail QA/QC: _____ Final sent on: _____

Backup to Floppy: _____ Final sent by (Person): _____

Backup to Projects: _____ Final sent via (Circle One): [P1] [Std] [2nd]

Backup to Archives: _____ Final Hours: _____

Remove Files from Pending:

<Expandable Manila>

REPORT TIME LOG

Company Name: *0*

CAE Project No:

Project Manager: *0*

Tech. Writer: _____

Work Type	Hours	Comments	
Data Entry			
Data Formatting			
Sample Calcs			
Drawings			
Report Text			
Assembly/Misc./Personal Review			
Review Changes (CAE)			
Draft Changes (Client)			
Printing (Custom Stock)		F1/2 Number of Pages per Copy:	2-Sided (YES - NO)
Copying/Binding		B1/2 Number of Pages per Copy:	2-Sided (YES - NO)
Closing of Project File			
Total			

ADDITIONAL CHANGES

Date	Hours	Description of Work Performed*

* Please note whether the changes were corrections or revisions, and what type of changes were made.

Ex: Text (descriptions/comments), Formatting (units/number of reports), Incomplete Data (missing information), Incorrect Data/Results (wrong calculations/data entry errors), etc.

REPORT NARRATIVE

Company Name: ***0***

CAE Project No:

Project Manager: ***0***

Tech. Writer: ___________

Date-Time	Log (Problem/Questions)	Response	Date-Time

APPENDIX B: Report Text Styles

CAE Styles

Below are the standard CAE Report Styles. Please add these styles to your Normal Styles on your computer.

Normal: Times, 12pt, English (US), flush left, line spacing exactly 13pt, window/orphan control. Style for following paragraph: Normal
Example:
This is a sample of the above style.
Usage:
This style should be applied to all written text.

-Appendix Header: Helvetica, 12pt, bold, all caps, white, no proofing, flush left, line spacing exactly 12pt, page break before, border: box (single, black, 2 1/4pt line). Style for following paragraph: -Appendix Header
Example (note: page break before removed for sample purposes):

THIS IS A SAMPLE OF THE ABOVE STYLE.

Usage:
This style is used on the Appendix title pages. The standard document is set up for these lines (one per page accomplished with the 'page break before') to appear in the appropriate heading position. Any line that has been tagged with this style WILL appear in the automated Table of Contents.

-Bulleted List: Times, 12pt, English (US), flush left, line spacing exactly 13pt, window/orphan control, indent: left 0.25" hanging 0.25". Style for following paragraph: -Bulleted List
Example:

- This is a sample of the above style.

2) This is a sample of the above style.

Usage:
This style should be applied to any enumerated or bulleted lists.

-Figure: Helvetica, 10pt, no proofing, centered, line spacing single. Style for following paragraph: -Table Bottom Bar
Example:

This is a sample of the above style.

Usage:
This style is intended for all publish and subscribers (tables, figures, graphs), as well as any other pictures or drawings. Note: figures, tables and graphs need to be separated from the body text by horizontal bars (either the styles below, or supplied in the edition).

-Figure Heading: Helvetica, 10pt, bold, no proofing, centered, line spacing exactly 11. Style for following paragraph: -Table Top Bar
Example:

This is a sample of the above style.

Usage:
All figures are to be accompanied by headings below the figure using this style. The figure heading is intended to be on a single line, although the line can be 'broken' into two with the use of a soft-return. Any line that has been tagged with this style WILL appear in the automated Table of Contents.

-Sub Heading: Helvetica, 12pt, bold, all caps, no proofing, flush left, line spacing exactly 14pt, window/orphan control. Style for following paragraph: Normal
Example:

THIS IS A SAMPLE OF THE ABOVE STYLE.

Usage:
This heading is intended for major subsections within a chapter. Any line that has been tagged with this style WILL appear in the automated Table of Contents.

-Sub Heading (cont.): Helvetica, 12pt, bold, all caps, no proofing, flush left, line spacing exactly 14pt, window/orphan control. Style for following paragraph: Normal
Example:

THIS IS A SAMPLE OF THE ABOVE STYLE.

Usage:
This heading is intended for continuations of major subsections within a chapter. Any line that has been tagged with this style does NOT appear in the automated Table of Contents.

-Table Body: Helvetica, 9pt, no proofing, flush left, line spacing exactly 10. Style for following paragraph: -Table Body
Example:
This is a sample of the above style.
Usage:
All tables should be based on this style. Tab settings are to be individually determined for each table.

-Table Bottom Bar: Helvetica, 9pt, no proofing, flush left, line spacing exactly 10, border: bottom(single), border spacing: 0pt. Style for following paragraph: -Table Body
Example:
This is a sample of the above style.

Usage:
A blank line at the bottom of tables should be formatted with this style. Any footnotes or comments are to be placed below this line using the Table Body Style.

-Table Heading: Helvetica, 10pt, bold, no proofing, centered, line spacing exactly 11. Style for following paragraph: -Table Top Bar

Example:

This is a sample of the above style.

Usage:

All tables are to be accompanied by headings above the table using this style. The table heading is intended to be on two lines. The lines are to be 'broken' into two with the use of a colon followed by a soft-return. Any line that has been tagged with this style WILL appear in the automated Table of Contents.

-Table Heading (cont.): Helvetica, 10pt, bold, no proofing, centered, line spacing exactly 11. Style for following paragraph: -Table Top Bar

Example:

This is a sample of the above style.

Usage:

This heading is intended for continuations of a table across several pages. The lines are to be 'broken' into two with the use of a colon followed by a soft-return. Any line that has been tagged with this style does NOT appear in the automated Table of Contents.

-Table Top Bar: Helvetica, 9pt, no proofing, flush left, line spacing exactly 10, border: top(single), border spacing: 0pt. Style for following paragraph: -Table Body

Example:

This is a sample of the above style.

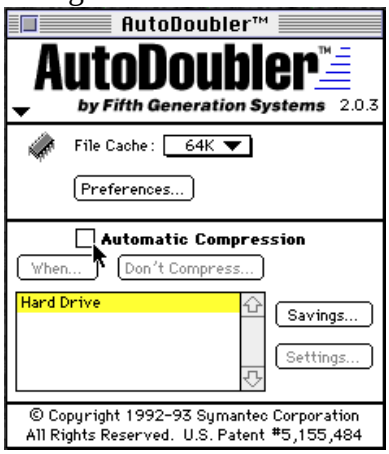
Usage:

A blank line at the top of tables should be formatted with this style.

APPENDIX C: Auto/Disk/Copy Doubler Tips

Using AutoDoubler

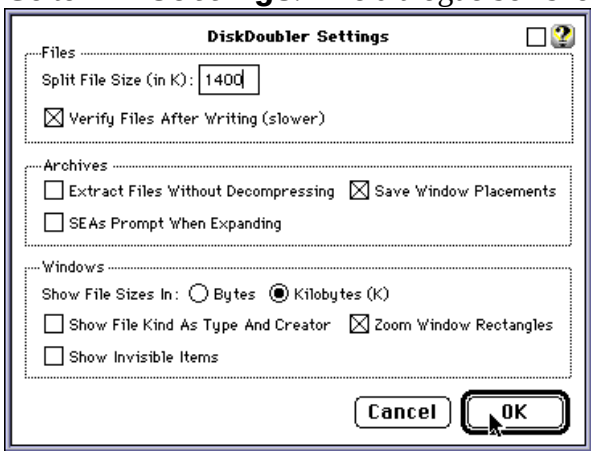
1. In your Apple Menu (top left of your screen), go to **Control Panels: AutoDoubler** and the dialogue box shown below will appear:



2. Make sure you **don't** have **Automatic Compression** selected. It seems useful but it is generally much more trouble than it is worth. This "helpful" little feature has managed to corrupt more data and drives than any computer virus we've encountered.
3. AutoDoubler lets you compress files with DiskDoubler and continue to use them as if they weren't compressed (it automatically expands and opens a document when you double click the document). This works only when you select a document (or documents) in the finder and compress it using **AD1** or **AD2** (**AD2** is better) by going to **DD: Compress Using: AD2**.

Using DiskDoubler

1. Click on a empty part of your desktop. Go to **DD: Compression Default: DD3**
2. Go to **DD: Settings**. The dialogue box shown below will appear. Change "Split File Size" to 1400.



3. Select the file you wish to archive. Go to **DD: Create SEA...**. A dialogue box will ask you what you want to save the archive as. Press **Save**.
4. Remember to always make an SEA (self-extracting-archive) instead of a normal archive since someone that doesn't have DiskDoubler won't be able to use a normal archive (an SEA is able to expand itself without the DiskDoubler program).
5. If you are going to store the SEA on a disk and it is bigger than 1.4 Meg (the most a disk can hold) then select the SEA and **DD: Split File** and store the resulting pieces on separate disks.

Using CopyDoubler (Macintosh Version)

1. Go to your Apple Menu (top left of your screen), go to **Control Panels** - do you see **CopyDoubler**? If you do, go to step 2. If not, go to **Control Panels: Extensions Manager** this will show you the following dialogue box:

Figure 1

Make sure **CopyDoubler** is checked, close the dialogue box, and restart your computer. If you can't find **CopyDoubler**, contact MIS at H-E-L-P (Extension 4375).

2. In your Apple Menu (top left of your screen), go to **Control Panels: CopyDoubler** and the dialogue box shown below will appear:

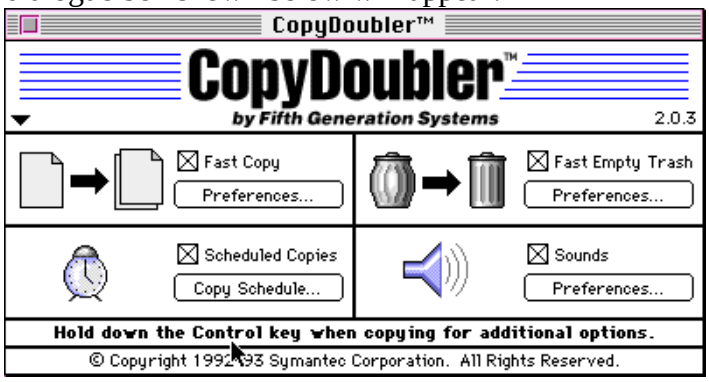


Figure 2

3. Depending on the version (notice the instructions the cursor is pointing at in Figure 2) you will have to hold down the control key or the __ and option keys when you copy.

4. Make sure the **Fast Copy** box shown in the dialogue box in Figure 2 is checked. Push the **Preferences...** button (the one below the words Fast Copy). You will see the following dialogue box:

Figure 3

Make your dialogue box match the one in Figure 3. Press **OK**.

5. In your Apple Menu (top left of your screen), go to your **Chooser**. Open the **CAE FILE SERVER** and open the **User Backups**. Find your personal backup folder.
6. Decide what folder(s) you want to back-up. Only backup things like job files, reports or proposals (or other stuff you think is important) - don't backup your applications or your system folder. Note: if you already have things backed up in your backup folder, check to make sure you haven't backed up applications or your system folder. Also, check to make sure you don't have two copies of the same file in your backup folder - server space is limited.
7. Hold down the control key (or the and option keys) and drag the folder to be backed up from your harddrive to your personal folder in the **User Backups**.
8. Another dialogue box will show up:

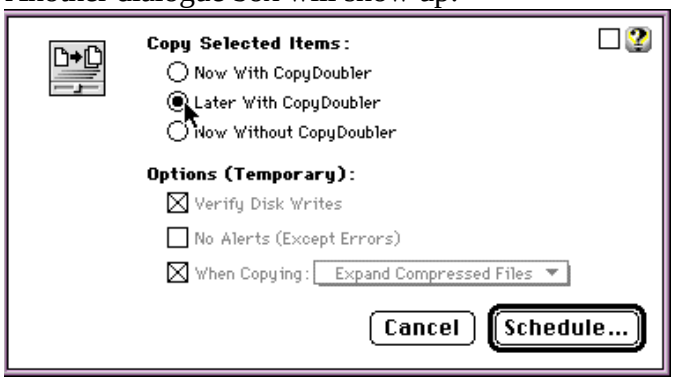


Figure 4

9. Select **Later with CopyDoubler** and press **Schedule...**
10. Another box will appear ("Test Data" is the name of the file I'm backing up in this example):

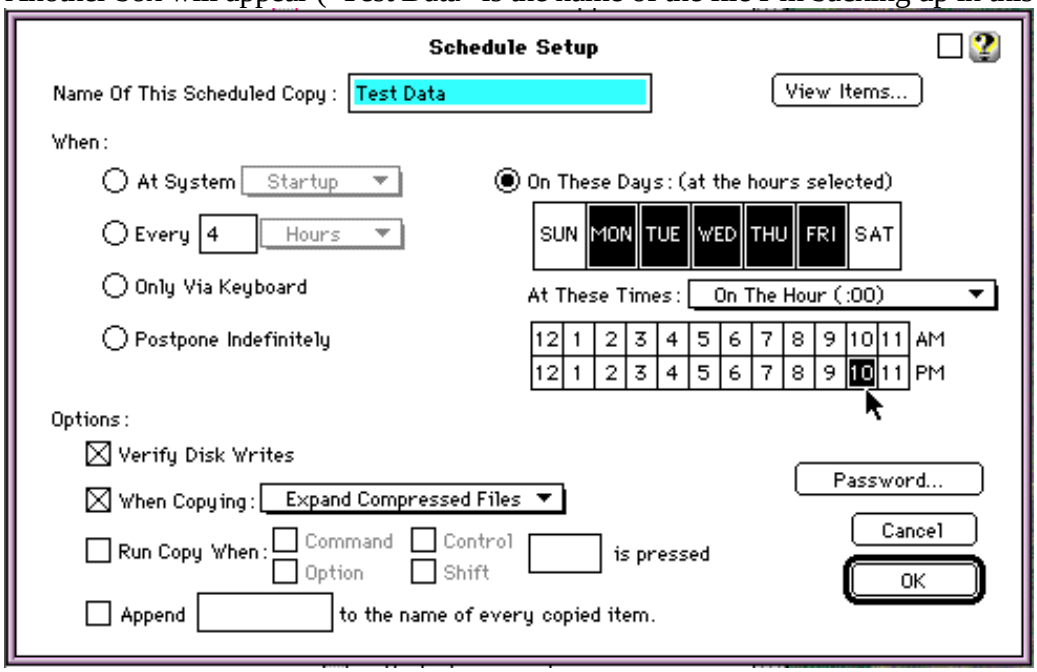


Figure 5

11. Click the "**On These Days...**" button. Click on the days and hours to select a time to back-up. In Figure 5, I've selected 10PM Monday through Friday.
12. Note: I usually leave my computer on at night (making sure to turn off my monitor), but even if my computer is off at 10PM, it will just back-up as soon as I turn it back on. Network traffic/server use is very light between 7PM and 11PM so it is best to back up then (the server backs itself up from 11PM to 6AM).

13. Finally, click on the **Password** button shown on Figure 5. The following dialogue box will show up:

Figure 6

You will need to type in your **CAE FILE SERVER** password so CopyDoubler can automatically log on to the server for you when it backs up. Press **OK**. You will be back to the dialogue box shown in Figure 5 - Press **OK**. You are done!!!

14. In case you make a mistake or want to change your password or want to stop backing up... go your Apple Menu (top left of your screen), go to **Control Panels: CopyDoubler** and the dialogue box shown in Figure 2 will appear. Press the **Copy Schedule...** button shown in Figure 2. The following dialogue box will appear:

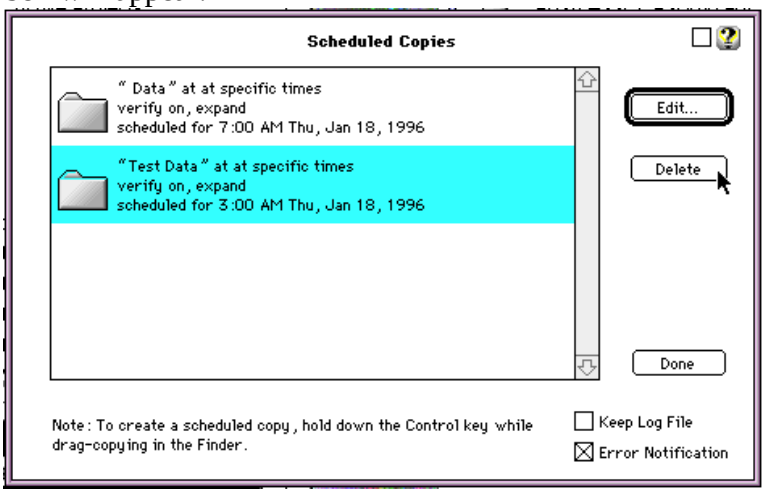


Figure 7

15. Select the "Copy Schedule" you want to change. Clicking on the **Edit** button will bring up the dialogue box in Figure 5 where you can change your backup times and password. Pressing the **Delete** button will get rid of the copy schedule you have selected. Press **Done**.

If you have a comment/complaint/suggestion about the instructions, call or QuickMail Eric Campbell (x2085).
If you are having computer problems call MIS (Dave Perkins, Dave Nasralla, Jim Weisman) at HELP (x4357).

APPENDIX D: Project Overview Samples

PROJECT OVERVIEW

Philip Morris, USA contracted Clean Air Engineering to perform air emissions testing at their Maple Street Facility located in Louisville, Kentucky. The facility processes tobacco which is then used for on-site cigarette manufacturing. The purpose of the testing was to provide data for the Philip Morris, USA environmental emissions database. Additionally, testing was performed to demonstrate a newly installed incinerator performance guarantee of a 95% total hydrocarbon (THC) destruction and removal efficiency (DRE) and an overall system performance of a 90% THC DRE.

The testing was performed at the Scrubber Outlet (AS-29) and Incinerator Outlet (AE-03) on January 6, 1994 to demonstrate the incinerator THC DRE. The testing was also performed at the Scrubber Inlet (AS-03) and Incinerator Outlet (AE-03) on January 7, 1994 to demonstrate the overall system THC DRE.

The test parameters included the following pollutants:

- Oxygen (O_2);
- Nitrogen Oxides (NO_X);
- Total Hydrocarbons (THC).

Coordinating the field testing were:

K. Berkenpas - Philip Morris, USA
D. Blauch - Philip Morris, USA
P. Kaufmann - Clean Air Engineering

Three continuous emissions monitoring (CEM) runs were performed at a single point in each sampling location for O_2, NO_x and THC, concurrently. Two velocity traverses were performed in Port A of the Incinerator Outlet (AE-03) during each day of sampling. The average value of the two measurements represented the average velocity during the test period. Philip Morris, USA personnel collected process data during the entire test program.

PROJECT OVERVIEW

The results of the program are summarized below in Table 1-1. The results presented are the average of three runs. More detailed data and results from the program are presented in Tables 2-1 through 2-4 on pages 2-1 through 2-4. The test parameters, field data and analytical data for the test program are presented in the appendices of this report.

Table 1-1
Summary of Test Results

Source	O_2 %	NOx ppmdv	NOx lb/hr	THC as Carbon ppmwv	THC as Carbon ppmdv	THC as Carbon lb/hr	THC DRE* %
Scrubber Outlet (AS-29)	21.3	0.6	0.1	306.9	328.2	15.3	
Incinerator Outlet (AE-03)	19.7	13.6	2.44	19.5	23.0	1.07	93.7
Scrubber Inlet (AS-03)	21.3	0.3	0.05	796.8	821.5	39.5	
Incinerator Outlet (AE-03)	19.7	13.2	2.44	16.4	18.2	0.88	97.9

* DRE calculation is based on ppmwv.

Ogden Martin Systems, Inc. contracted Clean Air Engineering to perform continuous emissions monitoring at their Ogden Martin Systems of Kent, Inc. facility located in Grand Rapids, Michigan. The testing was performed at Units 1, 2 and 4 of the Kent County District Heating and Cooling Operation (DHCO) for the determination of baseline air emissions. Units 1, 2 and 4 are natural gas fired boilers with the capacity to burn oil.

The testing was conducted at the Stacks of Units 1, 2 and 4 on February 8 and 9, 1994. The test parameters included the following pollutants:

- Oxygen (O2);
- Carbon Dioxide (CO2);
- Sulfur Dioxide (SO2);
- Nitrogen Oxides (NOx);
- Carbon Monoxide (CO);
- Total Hydrocarbons (THC).

Coordinating the field testing were:

J. Weber - Ogden Martin Systems, Inc.
P. Kaufmann - Clean Air Engineering

Sampling was performed at two conditions at each unit. During each condition, three continuous emissions monitoring (CEM) runs were performed at a single point in each sampling location for O2, CO2, SO2, NOx, CO and THC, concurrently. One moisture and velocity traverse was performed during each condition. The test program is summarized in Table 1-1.

Table 1-1
Test Program

Parameter	Method	Location	Unit
Oxygen/Carbon Dioxide	RM 3A	Stack	1, 2, 4
Sulfur Dioxide	RM 6C	Stack	1, 2, 4
Nitrogen Oxides	RM 7E	Stack	1, 2, 4
Carbon Monoxide	RM 10	Stack	1, 2, 4
Total Hydrocarbons	RM 25A	Stack	1, 2, 4

The schedule of activities is summarized in Table 1-2.

Table 1-2
Schedule of Activities

Date/Time	Unit	Location	Sampling Method	Run	Parameter
February 8, 1994					
Condition: Natural Gas, Full Load					
07:55-08:55	2	Stack	RM 3A, 6C, 7E, 10, 25A	1	O2, CO2, SO2, NOx, CO, THC
09:12-10:12	2	Stack	RM 3A, 6C, 7E, 10, 25A	2	O2, CO2, SO2, NOx, CO, THC
11:30-12:30	2	Stack	RM 3A, 6C, 7E, 10, 25A	3	O2, CO2, SO2, NOx, CO, THC
Condition: Natural Gas, Low Load					
13:03-14:03	2	Stack	RM 3A, 6C, 7E, 10, 25A	4	O2, CO2, SO2, NOx, CO, THC

14:19-15:19	2	Stack	RM 3A, 6C, 7E, 10, 25A	5	O2, CO2, SO2, NOx, CO, THC
15:34-16:34	2	Stack	RM 3A, 6C, 7E, 10, 25A	6	O2, CO2, SO2, NOx, CO, THC
Condition: Natural Gas, Low Load					
17:01-18:01	4	Stack	RM 3A, 6C, 7E, 10, 25A	7	O2, CO2, SO2, NOx, CO, THC
18:20-19:20	4	Stack	RM 3A, 6C, 7E, 10, 25A	8	O2, CO2, SO2, NOx, CO, THC
19:37-20:37	4	Stack	RM 3A, 6C, 7E, 10, 25A	9	O2, CO2, SO2, NOx, CO, THC
February 9, 1994					
Condition: Natural Gas, High Load					
07:55-08:55	4	Stack	RM 3A, 6C, 7E, 10, 25A	10	O2, CO2, SO2, NOx, CO, THC
09:10-10:10	4	Stack	RM 3A, 6C, 7E, 10, 25A	11	O2, CO2, SO2, NOx, CO, THC
10:23-11:23	4	Stack	RM 3A, 6C, 7E, 10, 25A	12	O2, CO2, SO2, NOx, CO, THC
Condition: No. 4 Fuel Oil, Low Load					
11:38-12:38	1	Stack	RM 3A, 6C, 7E, 10, 25A	13	O2, CO2, SO2, NOx, CO, THC
12:50-13:50	1	Stack	RM 3A, 6C, 7E, 10, 25A	14	O2, CO2, SO2, NOx, CO, THC
14:06-15:06	1	Stack	RM 3A, 6C, 7E, 10, 25A	15	O2, CO2, SO2, NOx, CO, THC
Condition: No. 4 Fuel Oil, High Load					
15:54-16:54	1	Stack	RM 3A, 6C, 7E, 10, 25A	16	O2, CO2, SO2, NOx, CO, THC
17:09-18:09	1	Stack	RM 3A, 6C, 7E, 10, 25A	17	O2, CO2, SO2, NOx, CO, THC
18:27-19:27	1	Stack	RM 3A, 6C, 7E, 10, 25A	18	O2, CO2, SO2, NOx, CO, THC

The results of the program are summarized in Table 1-3. More detailed data and results from the program are presented in Tables 2-1 through 2-? on pages 2-1 through 2-?.

Table 1-3
Summary of Test Results

Pollutant	Run Number			Average	Permitted Allowable Emission Limit
Concentration, ppmdv					
Unit 1 Stack	13	14	15		
Condition: No. 4 Fuel Oil, Low Load					
Sulfur Dioxide					340.2
Nitrogen Oxides					130.14
Carbon Monoxide					10.8
Total Hydrocarbons					2.16
	16	17	18		
Condition: No. 4 Fuel Oil, High Load					
Sulfur Dioxide					340.2
Nitrogen Oxides					130.14
Carbon Monoxide					10.8
Total Hydrocarbons					2.16
Unit 2 Stack	1	2	3		
Condition: Natural Gas, Full Load					
Sulfur Dioxide					340.2
Nitrogen Oxides					130.14
Carbon Monoxide					10.8
Total Hydrocarbons					2.16
	4	5	6		
Condition: Natural Gas, Low Load					
Sulfur Dioxide					340.2
Nitrogen Oxides					130.14
Carbon Monoxide					10.8
Total Hydrocarbons					2.16

Unit 4 Stack	7	8	9	
Condition: Natural Gas, Low Load				
Sulfur Dioxide				340.2
Nitrogen Oxides				130.14
Carbon Monoxide				10.8
Total Hydrocarbons				2.16
	10	11	12	
Condition: Natural Gas, High Load				
Sulfur Dioxide				340.2
Nitrogen Oxides				130.14
Carbon Monoxide				10.8
Total Hydrocarbons				2.16

PROJECT MANAGER'S OVERVIEW

PROJECT BACKGROUND

Clean Air Engineering (CAE) was contracted by Neville Chemical Company to perform air emissions testing at their Neville Island facility located in Pittsburgh, Pennsylvania. The facility manufactures hydrocarbon resins, and generates co-product petroleum distillate oils in the course of the manufacturing operations. This co-product is used for energy recovery in three on-site boilers designated as Boiler No's. 4, 6 and 7.

The primary objective of the trial burn test program was to demonstrate that each of the three boilers could achieve the relevant destruction and removal efficiency of hazardous organic constituents during the combustion of LX-830 co-product fuel oil. A second objective of the trial burn test program was to demonstrate compliance with the Allegheny County Health Department Bureau of Environmental Quality (BEQ) requirements for combustion of waste derived liquid fuel under section 1002 of Article XX.

The following performance parameters were evaluated for each of the three boilers:

- destruction and removal efficiency (DRE) of benzene and toluene
- combustion efficiency

The test program was performed on November 2 through 4, 1993. Coordinating the field testing were:

J. Habazin - Neville Chemical Company
R. Preksta - Clean Air Engineering

Witnessing the test program were:

J. Ruffing - Allegheny County Health Department BEQ
P. Lawrence - Allegheny County Health Department BEQ

To the best of our knowledge, the data presented in this report are accurate and complete.

Respectfully submitted,

Jim Wright, P.E.
Technical Director, Eastern Region

Reviewed by,

Patrick Clark, P.E.
Manager, VOC Services

PROJECT MANAGER'S OVERVIEW

PROJECT SUMMARY

The test program was conducted in accordance with the procedures and guidelines presented in the document entitled "Trial Burn Test Plan", which was prepared by Clean Air Engineering for the facility and submitted to Allegheny County Health Department BEQ on September 17, 1993. The test program was designed to demonstrate a minimum of 99.99% DRE for selected principal organic hazardous constituents (POHC's) and a minimum of 99.9% for combustion efficiency. Benzene and toluene were selected as the POHC's for the trial burn.

The test program consisted of two major tasks:

- Air emissions testing
- Co-product fuel feed testing

Air emissions testing was performed by Clean Air Engineering at the exhaust stack of each boiler. The following parameters were measured at each stack during the tests:

- gas velocity and volumetric flow rate
- gas moisture content (H_2O)
- carbon monoxide (CO)
- oxygen (O_2)
- carbon dioxide (CO_2)
- volatile organic compounds (VOC's)
  benzene
  toluene

The co-product fuel feed sampling and analysis were designed to determine the amount of POHC's being fed to the boilers during the air emissions tests. The fuel oil sampling was conducted by Environmental Resources Management, Inc. (ERM) of Mars, Pennsylvania. The following parameters were measured for each boiler:

- total fuel oil volumetric feed rate
- fuel specific gravity
- benzene concentration in fuel
- toluene concentration in fuel

In order to determine the DRE of each POHC, the concentrations and mass feed rates of benzene and toluene were measured concurrently in the liquid feed stream (inlet) and gaseous exhaust stream (outlet). Three repetitions of these inlet and outlet measurements were conducted under automated boiler operating conditions (as defined in Section 5.2 of the Trial Burn Test Plan) for each of the three boilers. The results of each set of measurements were used to determine the DRE for each POHC. Compliance with the 99.99% DRE limit was determined from the arithmetic average of the three separate DRE measurements made on each boiler.

PROJECT MANAGER'S OVERVIEW

PROJECT SUMMARY (Continued)

Combustion efficiency was determined by measuring the exhaust gas concentrations of carbon monoxide and carbon dioxide. Three repetitions of these measurements were conducted under automated boiler operating conditions for each of the three boilers. Compliance with the 99.9% combustion efficiency limit was determined from the arithmetic average of the three separate efficiency measurements made on each boiler.

AIR MEASUREMENT TEST STRATEGY

Three test runs were conducted for each boiler during the trial burn. The O_2, CO_2, and H_2O measurements were conducted concurrently using a single sampling train in one of the two test ports of each stack. Three sets of VOC samples were obtained using a volatile organic sampling train in the other test port. A full velocity traverse of each stack was performed before and after each VOC test run of three sample repetitions. The average value of the two measurements represented the average velocity during the VOC test period. The CO measurements were performed using the facility continuous emissions monitoring system (CEMS).

CO-PRODUCT FUEL FEED SAMPLING STRATEGY

Neville Chemical continuously monitored the fuel feed flow rate during the entire test program using stationary flow measurement instrumentation. Grab samples of the fuel were obtained by ERM every 15 minutes during each of the air test runs. These samples were collected from valves in the feed lines supplying each boiler. Collected samples from each separate run were composited by the analytical laboratory immediately prior to analysis. The feed stream samples were analyzed for volatile organics by GC/MS Method SW-846 8240.

PROJECT MANAGER'S OVERVIEW

SUMMARY OF TEST RESULTS

The results of the test program are summarized in Table 1-1 below. More detailed data and results from the program are presented in the Test Results section . The test parameters and field and analytical data for the test program are presented in the appendices of this report.

The results of the test program demonstrated that the three steam boilers achieved the minimum requirement of 99.99% DRE for the hazardous organic constituents present in the co-product fuel oil and the minimum requirement of 99.9% for combustion efficiency under Section 1002 of Article XX. By demonstrating these performance levels, the facility has complied with condition No's. (1) and (4) of the Allegheny County Health Department Bureau of Environmental Quality Notice of Amended Operating Permit Approval dated August 13, 1993 for the utilization of LX-830 co-product fuel oil in boilers No's. 4, 6 and 7.

TABLE 1-1

SUMMARY OF TRIAL BURN RESULTS

	DRE (%)		COMBUSTION
BOILER	BENZENE	TOLUENE	EFFICIENCY(%)
NO. 4	99.9974	99.9961	>99.999
NO. 6	99.9940	99.9965	>99.999
NO. 7	99.9987	99.9948	>99.999

The test conditions and results of analysis are presented in Tables 2-1 through 2-3 on pages 2-1 through 2-3.

PROJECT OVERVIEW

Background

Richmond Power Enterprises contracted Clean Air Engineering to conduct a relative accuracy test audit (RATA) at their Richmond, Virginia facility. The purpose of this test program was to certify the continuous emissions monitoring systems (CEMS) which services the gas turbine (Stacks No. 1 and No. 2) and the auxiliary boiler (Stack No. 3) at the facility. The nitrogen oxides (NO_X) and carbon monoxide (CO) CEMS were certified for the No. 1 and No. 2 gas turbine stacks and the No. 3 auxiliary boiler stack.

Coordinating the field portion of the testing were:

J. Hall - Richmond Power Enterprises
D. Stone - Department of Environmental Quality
N. Merico - Clean Air Engineering

The certifications were performed in accordance with the requirements of the State of Virginia Department of Environmental Quality (DEQ) and the U.S. EPA. The test program is detailed in CAE Protocol No. 26107-258, dated August 30, 1993. This Protocol, which covered the certification of both gas turbines as well as the auxiliary boiler system, is included in Appendix Section I.

Summary

The test program was conducted during two time periods. The first part of the program was performed on October 5 through October 7, 1993. During this phase, the No. 1 NO_X, No. 1 CO, and No. 2 CO CEMS did not pass the certification acceptance criteria. Additional testing was conducted on November 17 and November 18, 1993 to certify these CEMS. This re-test was scheduled to coincide with a previously scheduled demand test. During this program, the remaining CEMS were found in compliance with State and Federal guidelines. The test results for the entire test program are summarized in Table 1-1 on page 1-2.

PROJECT OVERVIEW

Table 1-1
Summary of RATA Results

Location	Gas Parameter	Reporting Units	Date Certified	Relative Accuracy (%)	Limit (%
Stack No. 1	NO_X	ppm @ 15% O_2	November 18, 1993	12.3	20.0
Stack No. 1	CO	ppm	November 18, 1993	4.5	5.0
Stack No. 2	NO_X	ppm @ 15% O_2	October 7, 1993	7.3	20.0
Stack No. 2	CO	ppm	November 17, 1993	3.5	5.0
Stack No. 3	NO_X	lb/MBtu	October 5, 1993	6.8	20.0
Stack No. 3	CO	lb/hr	October 5, 1993	0.4	5.0

More detailed test results are presented in Tables 2-1 through 2-6 on pages 2-1 through 2-6.

In general, the program consisted of a minimum of nine valid Reference Method tests on each CEMS to determine relative accuracy. Because of a problem with the Reference Method sample delivery system on November 18, three of the No. 1 CEMS runs were invalidated. Additional runs were conducted in place of the three invalidated runs. The results of the invalidated runs are documented in this report but are not used in the calculations for determining relative accuracy.

SUMMARY

PROJECT MANAGER'S OVERVIEW

Background

Clean Air Engineering was contracted by Joy Environmental Technologies and Tennessee Eastman Company to conduct performance/guarantee testing on the Boiler 30 Spray Dryer Absorber (SDA) system located at the Tennessee Eastman Company facility in Kingsport, Tennessee. This report which is being distributed to both Joy Environmental Technologies and Tennessee Eastman Company contains the data from three test series.

Joy Environmental Technologies installed the Spray Dryer Absorber (SDA) at the exit of the Boiler 30 air heaters and before the existing electrostatic precipitator (ESP). They must demonstrate overall performance of the system including an exit emission requirement for sulfur dioxide of 0.36 lb/10^6Btu or a 91% sulfur dioxide removal efficiency.

The test program was divided into three separate test series in order to encompass multiple SDA operational modes and coal sulfur content. The first series of tests was conducted with the SDA in the normal operational mode and "run of the mine coal" was being introduced into the boiler. This coal has an average sulfur content of approximately 1%. During this series of tests, measurements were taken at the Boiler 30 Inlet and Outlet in addition to the Boiler 30 Stack.

The second series of tests was conducted while the SDA was in emergency spray nozzle operation. This test series was conducted to simulate plant operations during change out of an atomization unit. During this series of tests, measurements were taken at the Boiler 30 SDA Inlet and Outlet. The boiler was still fueled with "run of the mine coal."

The third series of tests was conducted with the SDA in normal operation and "high sulfur" coal introduced into the boiler. This series of tests was conducted to establish emissions over the specified coal sulfur content range. During this series of tests measurements were conducted at the Boiler 30 SDA Inlet and Outlet.

The following table summarizes the above information:

Test Series No.	SDA Mode	Coal % Sulfur	SDA Inlet SO_2	SDA Outlet SO_2	Outlet Particulate	Stack Particulate	Stack HCl	Stack Fluoride	Pressure Drop
1	Normal	1.07%	X	X	X	X	X	X	X
2	Emergency Nozzles	1.07%	X	X					X
3	Normal	1.95%	X	X					X

PROJECT MANAGER'S OVERVIEW (Continued)

Program Summary

The first test series began on October 28, 1993. The plant pulled bottom ash prior to the start of sampling which began at 12:15. Run 1 sampling was non-isokinetic because of incorrect moisture parameters. Therefore, a fourth run was conducted at this condition. Run 1 appears in the tables but was not utilized in determining the average conditions or emissions. The first test series was conducted over a two day period to allow hopper and bottom ash to be pulled at the conclusion of the Run 2. The first test series was concluded on October 29, 1993, at 14:01.

The second test series began following the completion of the first test series on October 29, 1933, at 18:50. Prior to starting the second test series, the SDA was placed into Emergency Nozzle Operation. Due to the lime consumption and possible shortage until next scheduled delivery, it was decided to trim back lime injection and allow the sulfur dioxide levels to rise. The second test series was concluded at 20:54.

The third test series began on November 1, 1993. The weekend was utilized to introduce "high sulfur" coal into the boiler and allow conditions to stabilize. Run 8 at the normal SDA operating condition began at 09:10. The third test series was concluded at 14:40.

Coordinating the field testing were:

P. Jurma - Joy Environmental Technologies
G. Kuzma - Joy Environmental Technologies
T. Pifer - Tennessee Eastman Company
N. Merico - Clean Air Engineering

SUMMARY

PROJECT MANAGER'S OVERVIEW (Continued)

Comments

The particulate concentration at the Boiler 30 Stack during Run 4 on October 29, 1993, is above the average. The gr/dscf reported on Run 4 is 0.0210 while the average for Runs 2 and 3 was 0.0026 gr/dscf. This increase is associated with the soot blowing that occurred during the particulate test. The emissions shown in the average column of the table are based on a straight arithmetic average of all three runs. The duration of soot blowing per day was not weighted into the results.

The sulfur dioxide level measured for Run 10 at the Boiler 30 SDA Inlet during the high sulfur coal series on November 1, 1993, appears to be below levels expected for the coal fired into the unit. A review of the field and laboratory data sheets does not show any explanation for this event. Conditions of the flue gas and boiler operation do not suggest a reduction in the sulfur dioxide concentration. Lime feed problems caused a slight increase in the Boiler 30 SDA Outlet emissions, but overall they remained constant. It is my opinion that this value should be considered suspect and has been left out of the average.

To the best of our knowledge, the data presented in this report are accurate and complete.

Respectfully submitted,

Robert Preksta
Project Manager
(412)695-2950

Reviewed by,

Frank S. Kilvinger
Executive Vice President

PROJECT OVERVIEW

Clean Air Engineering was contracted by Georgia-Pacific Corporation to perform air emissions testing at their facility located in Big Island, Virginia. The facility manufactures cardboard materials from raw wood. The purpose of the diagnostic testing was to provide emissions data to assist in completion of their Clean Air Act Amendments Title V operating permit. The testing was performed at nine different process vents located throughout the facility. The vents serviced the following manufacturing areas:

- Pulp Mill
- Recovery Building
- Beater Room
- No. 1 PM Room

The test parameters included in the following pollutants:

- methanol
- acetaldehyde
- acetone
- methyl ethyl ketone (MEK)

The test program was performed on November 10 and 11, 1993. Coordinating the field testing were:

J. Johnson - Georgia-Pacific Corporation
J. Wright - Clean Air Engineering

To the best of our knowledge, the data presented in this report are accurate and complete.

PROGRAM SUMMARY

The test program incorporated sampling and analytical procedures developed by the National Council of the Paper Industry for Air and Stream Improvement (NCASI). Pollutant concentration, gas flow rate and gas moisture content were measured at eight of the sources. Pollutant concentration only was determined at the ninth source. All measurements were performed in triplicate at each source.

The "NCASI Impinger/Sorbent Methanol, Acetone, MEK, Acetaldehyde Method" was used to determine the pollutant concentrations in each of the nine sources. Due to the nature of some of the sources, stack gas moisture and/or velocity could not be determined using standard EPA reference methods.

PROJECT OVERVIEW

PROGRAM SUMMARY (Continued)

In these cases, moisture content was determined using wet bulb/dry bulb temperature measurements and velocity was determined using a vane anemometer. The scope of the test program with respect to the specific sources tested and the means of velocity and moisture measurements used on each source is summarized in Table 1-1.

Table 1-1
Test Program Scope

Vent ID	Mill Location	Vent Source	Velocity Method	Moisture Method
P6	Pulp Mill	WBL tank	Vane Anemometer	EPA 4
P11	Pulp Mill	WBL Screen Vent	EPA 2	EPA 4
P12	Pulp Mill	A-line washer hood vent (UR)	Vane Anemometer	Wet Bulb Dry Bulb
P20	Pulp Mill	Vent for Sutherland Chest	Vane Anemometer	Wet Bulb Dry Bulb
P36	Pulp Mill	Atmospheric steam relief from blow tank	Concentration Only	
M3	Beater Room	Hydrapulper Exhaust	EPA 2	EPA 4
M8	No.1 PM Room	No. 1 PM Wet End Exhaust	Vane Anemometer	Wet Bulb Dry Bulb
M12	Beater Room Tile Tanks	TS Beater Room Tile Tank	Vane Anemometer	Wet Bulb Dry Bulb
R12	Recovery	NCG hot well vent	EPA 2	EPA 4

APPENDIX E: Description of Installation Samples

DESCRIPTION OF INSTALLATION

The Lone Star Industries, Inc. facility located in Cape Girardeau, Missouri manufactures Portland Cement. The facility produces cement in one 14'6" diameter by 235' long cement kiln with a four stage preheater with a precalciner. Raw mix which is made up from limestone, tripoli (silica), diaspore, fly ash, and millscale is ground to a fine powder using a 3000 horsepower vertical roller mill. Other non-toxic, non-hazardous materials (with MNDNR approval) is used as raw materials (such as catalyst cracker fines, BOF stabilized dust, used brick, etc.) to substitute or replace existing raw materials.

The blended raw material mix enters the preheater between the first and second stages of the preheater tower. The raw mix picks up heat rapidly as it travels downward through the four stages of the preheater. The preheater section also has a coal fired swirl calciner which further increases material temperatures to roughly 1650°F before the product enters the rotary kiln.

The kiln itself rotates at approximately 180 revolutions per hour. The kiln is completely lined with refractory material. The kiln is fired with coal, tires and hazardous waste fuels to provide the source of hear. In order for the proper chemical reaction to occur that converts the raw mix into clinker, the mix must be heated to approximately 2700°F.

The clinker exiting the kiln drops into a grate type cooler. Some of the hot gases generated from this cooling process is drawn up into the kiln where it is used for combustion air. Some of this preheated air is used as combustion air in the precalciner. Air is drawn upward through the rotary kiln and preheater sections using a 4000 horsepower induced draft fan. Dust is removed from this gas stream using a fabric filter (baghouse). The burning process from raw material to clinker also has a by-pass duct to remove unwanted chloride and sulfur salts of sodium and potassium. This step is called the alkali by-pass. The gases which are removed by the by-pass system are cooled, de-dusted via a fiber filter dust collection, and exhausted through the main stack upstream of the sampling location. The clinker production process at this facility has only one discharge stack.

A schematic of the process indicating sampling locations is shown on the following page in Figure 3-1.

DESCRIPTION OF INSTALLATION

PECO Cromby Generating Station Unit 1 is a Babcock and Wilcox (B&W) front-wall fired, dry bottom boiler firing bituminous coal. The rated heat input of the boiler is 1261 10^6Btu/hr. This corresponds to a maximum generator output of 159 GMW. The unit has recently been retrofitted with a set of 16 B&W designed low-NOx burners of PC-XCL type or equivalent and an associated advanced overfire air (AOFA) system consisting of six AOFA ports, four located on the front wall of the furnace and two on the opposing side walls.

Boiler emissions are passed through a pair of mechanical collectors for coarse particulate removal. The gas then passes through an air heater and then enters a dual chamber Research-Cottrell Electrostatic Precipitator for fine particulate removal. The cleaned flue gas then enters a pair of ID fans after which the gas path enters a common duct. This common duct leads to a wet scrubbing flue gas desulfurization (FGD) system. The FGD is a three moduled control device operating with two modules on line at all times and a third in standby in the result of a failure of one of the other two chambers. The flue gas enters the FGD modules where sulfur compounds are scrubbed by limestone slurry, the gas then passes through a reheat burner to elevate the gas temperature and prevent condensation of sulfates in the ductwork, and is vented via ID fans to a common duct venting to atmosphere through a 300' steel lined concrete stack.

Cromby Station Unit 2 is a dual fuel capable boiler (natural gas and #2 fuel oil) rated at approximately 215 GMW electrical load with a corresponding steam load of approximately 1550 Klbs/hr. The flue gas is vented through an ESP and to atmosphere via a 300' steel lined concrete stack. During the test program the boiler was fired on natural gas and the ESP was not in operation. All sampling conducted on both units was performed at the stack platform approximately 200' above grade.

A schematic of each unit may be found on pages 3-2 and 3-3.

DESCRIPTION OF INSTALLATION

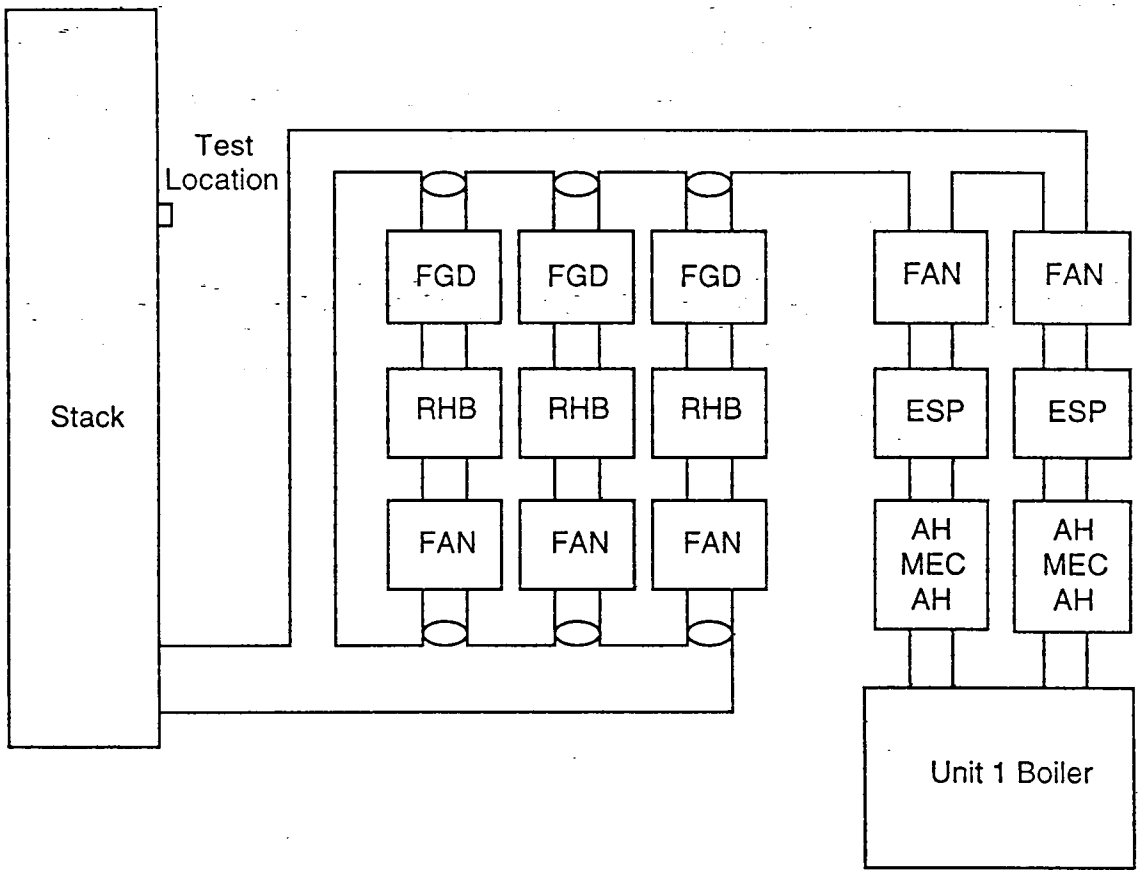


Figure 3-1: Unit 1 Process Schematic

DESCRIPTION OF INSTALLATION

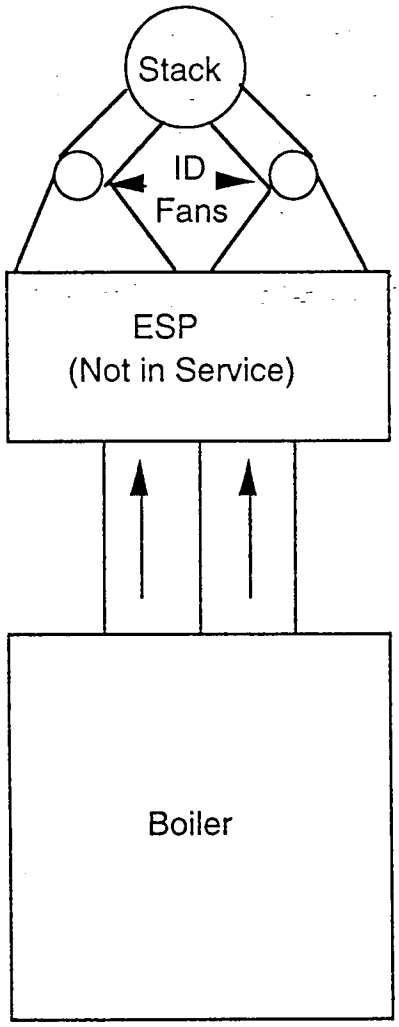


Figure 3-2: Unit 2 Process Schematic

DESCRIPTION OF INSTALLATION

The South Broward Resource Recovery Facility located in Fort Lauderdale, Florida operates three 750 tons per day municipal refuse fired, water wall boiler trains. The trains are manufactured by Babcock and Wilcox to produce electricity for sale to a local utility company. Each boiler is equipped with a Spray Dryer Absorber (SDA) for acid gas removal. The SDA is followed by a Fabric Filter (FF) Baghouse for the control of particulate emissions. The control equipment is manufactured by Wheelabrator Air Pollution Control, Inc. Each Baghouse is followed by an induced draft (I.D.) fan which directs the flue gas to a dedicated flue in a common stack.

The testing reported in this document was performed at the Units 2 and 3 FF Outlets.

A schematic of the process is shown in Figure 3-1.

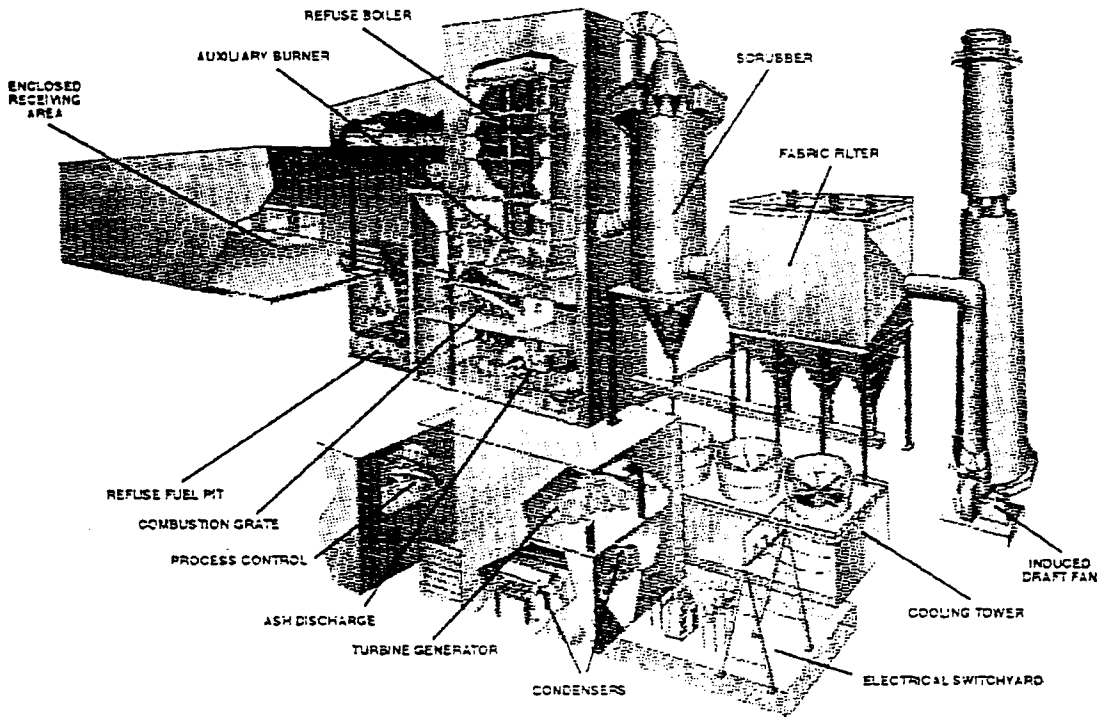


Figure 3-1: Process Schematic

APPENDIX F: CEM Significant Figures

AFFECTED SOP's: **H-GDM-5/1/95: CAE Standard Operating Procedure For Management Of General Emissions Test Data**

H-CDM-5/1/95: CAE Standard Operating Procedure For Management Of CEM Concentration Test

CLARIFICATION TOPIC: **Relative Accuracy Test Audit (RATA) Tables**

1.0 BACKGROUND

1.1 Scope
This document clarifies and expands upon the procedures for the management of data presented in relative accuracy test audit (RATA) reports.

1.2 Applicability
The clarifications in this document apply to any RATA report. The Reference Method data used in the report may be derived from either CEM or manual sampling methods.

1.3 Basis
This document is based on interpretation of SOP's H-GDM-5/1/95 and H-CDM-5/1/95.

1.4 Limitations
The clarifications listed in this document are for guidance purposes only. The Project Manager has ultimate authority to use their discretion concerning the specific application of these guidelines.

1.5 Definitions
The following clarifications and additions to the original SOP definitions are made specifically in reference to RATA reports:

Applicable Emissions Standard: The applicable standard is normally a federal- or state-enforceable limit with which the facility or source must show compliance.
RATA Standard: The RATA standard is the federal- or state-enforceable limit on the relative accuracy of the CEMS.
Facility CEMS Results: Results obtained from the facility's continuous emissions monitoring system (CEMS) in units of the applicable emissions standard.
Reference Method Results: The results obtained from the Reference Method testing in units of the applicable emissions standard.
Final Result: The final result for a RATA is the relative accuracy itself.
Intermediate Result: In terms of RATA reports, all CEMS and Reference Method results are considered intermediate results. This also includes the differences, standard deviations, and confidence intervals calculated between the CEMS and Reference Method results.

2.0 CLARIFICATIONS

2.1 Presentation of Intermediate Results

The following guidelines apply to the procedure for presenting intermediate data in RATA reports:

Result	Presentation in Appendices	Presentation Format in RATA Tables
Facility CEMS Results	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results * Note: If the data is supplied in hard-copy or a non-formattable electronic form, then include the data as given.	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results * Note: If the original data does not have enough accuracy to the right of the decimal to satisfy the above criteria, then present the data as given.
Reference Method Results	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results
Difference between CEMS results and RM results	N/A	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results
Average of Reference Method runs	N/A	• x.x for ppm results • x.xx for % results • x.xxx for lb/10^6Btu results • x.x for lb/hr results • x.x for %removal results
Standard deviation of differences	N/A	x.xxxx
Confidence intervals	N/A	x.xxxx

2.1 Presentation of Final Results

The final relative accuracy results in RATA reports should be presented to the same number of significant figures as contained by the Relative Accuracy Standard. For facilities which are regulated under 40 CFR 60, this implies that the relative accuracy results should be presented with two significant figures. For facilities regulated under 40 CFR 75, the results should be presented using three significant figures.

These guidelines result in the following decimal formats for presentation of relative accuracies:

Magnitude of Relative Accuracy	40 CFR 60 Facilities	40 CFR 75 Facilities
< 1%	0.xx	0.xxx
1%-9.99%	x.x	x.xx
≥ 10%	xx (no decimals)	xx.x

For facilities which do not fall under either Part 60 or Part 75, the specific Relative Accuracy Standard as stated in the source permit should be used to determine the presentation format of the relative accuracy results.

For sources at which the relative accuracy is based on an absolute emissions value instead of a percentage, the level of accuracy stated for the limit in the regulation should be used to determine the presentation format of the relative accuracy results.

APPENDIX G: Kinko's Procedures

The Kinko's Procedure

Table of Contents

The Kinko's Procedure

To obtain higher quality copies and to reduce the maintenance costs on CAE's photocopiers, Clean Air Engineering has made special arrangements with Kinko's of Buffalo Grove, Illinois for copying services.

These special arrangements and specific procedures for using Kinko's services are discussed in detail below.

Copying at CAE

Copying at CAE is de-centralized. Each individual working on a project that requires the use of outside copying service is responsible for obtaining those services.

Kinko's is CAE's preferred vendor for copying services.

In some cases, departmental administrative assistants may be trained to help with these procedures.

There is no one individual at CAE responsible for *coordinating* CAE's copying.

CAE's Kinko's Contact (CKC)

However, CAE has assigned an employee to be CAE's Kinko's *Contact* (CKC).

CAE's Kinko's Contact is responsible for:

* maintaining a working relationship with Kinko's through their corporate account representative,
* tracking daily copying and billing errors,
* arranging for errors to be corrected,
* obtaining the best prices possible,
* checking the monthly invoice from Kinko's,
* obtaining a P.O. number for each monthly invoice,
* helping arrange for special services with Kinko's,
* training CAE employees in these Kinko's procedures,
* helping the outer offices obtain copying services with Kinko's stores in their areas.

Current Contact Information

If you have a problem with an order received from Kinko's or questions about Kinko's services, first contact CAE's Kinko's Contact.

As of September, 1995
CAE's Kinko's Contact is
Karen James, x2066

If CAE's Kinko's Contact is not available and your problem or question requires immediate attention, call the manager of the Kinko's store.

As of September, 1995
the day-shift Manager of Kinko's
Buffalo Grove, Illinois is
Lori McDermott
(708) 459-8008

If your problem or question is not of immediate concern, and neither CAE's Kinko's Contact nor the store manager is available, feel free to call the Kinko's Corporate Account Representative. Leave a message for him/her on Kinko's voicemail system. (S)he will get back to you within a day or two.

As of September 1995
Kinko's Corporate Account Representative is
Carolyn Przyborski
Voicemail: (312) 321-5540, x408

Corporate Account Number

Kinko's franchises are semi-independent. They are each free to make special deals with corporate customers, and are not required to honor other locations' agreements. However, all Kinko's franchises use the same corporate billing service.

CAE has a corporate account number in Kinko's billing system. If copying services are obtained from any Kinko's, at any location, world-wide, please use this number in order to ensure proper billing.

CAE's Account Number with Kinko's:
1200702446

Kinko's Pricing

CAE has a special pricing agreement with the Buffalo Grove, Illinois, Kinko's. This discount pricing is based on the volume of each type of work done for CAE at this particular location, and therefore cannot be guaranteed at any other location.

CAE's discount rate, based on overall Buffalo Grove location volume:

Price per image (side):	$0.042
Price per single sided sheet (1 image)	$0.042
Price per double sided sheet (2 images)	$0.084
Price per GBC punched sheet (single or double sided)	$0.005

Standard Kinko's rates for other commonly used services:

Transparencies (B & W, letter size), each:	$0.75
Transparencies (color, letter size), each:	$2.49
Color copies (letter size), each:	$0.99
Binding (GBC w/cardstock cover), per copy:	$1.95
Stapling, by machine, per copy	$0.02
3 hole drilling, per 100 sheets	$0.75, $1.00 minimum

A copy of Kinko's complete service list, with standard pricing, can be obtained from CAE's Kinko's Contact.

If an outer office starts to use its local Kinko's frequently enough to justify arranging special volume-based pricing, call CAE's Kinko's Contact. (S)he will contact the Kinko's Corporate Account Representative, who can have a local Kinko's Corporate Account Representative get in touch with the outer office directly to make these arrangements.

Turnaround Time

Completed orders sent out from the Palatine office on a weekday, morning or afternoon pickup, will be delivered the next business day morning between 9 and 10 a.m. See Pickup/Delivery section, page 8 for more information.

To arrange for same day service (morning pickup, afternoon delivery) call CAE's Kinko's Contact.

To arrange for any other turnaround time, call CAE's Kinko's Contact.

Preparing an Original

The best way to minimize the likelihood that Kinko's will make mistakes with your order is to prepare the original properly. "Properly" means as clearly, and obviously as possible.

Insert a colored piece of paper between individual sections of the original document to separate them. Colored pieces of paper can be found in collection trays in the copying/binding area -- see Recycling of Colored Paper, Cardboard section, page 10 for more information.

> For example: If the original is the back half of a report, put a colored piece of paper between each appendix section.
>
> Kinko's will insert colored pieces of paper between the sections of the completed copies as well. They will separate individual copies from each other with pieces of paper of a different color.

In order to avoid errors with the double-siding of copies, force each section to have an even number of pages.

> For reports, place a piece of blank, white paper after each appendix section cover page. This ensures that the first page of the appendix will begin on the first right hand page following the cover page.
>
> If the page count for a section is odd, add a blank piece of paper at the end of the section. This way, the copies will come out properly whether Kinko's copiers feed the originals through from back-to-front or front-to-back.
>
> If the page count for a section is even, do nothing.

Put each original document and its request form in a separate container to create a complete copying request package. The container is usually a reused box (see Recycling of Boxes section, page 11 for more information), but can be a bag or an envelope, depending on the size of the original.

Kinko's Request Form

A form for requesting Kinko's services is available on the TechComm Server, in Standard Files, in the Forms folder. The form is set up as an Excel workbook. If you can not access the form, call the MIS department.

The best way to minimize the likelihood that Kinko's will make mistakes with your order is to fill out the request form properly. "Properly" means as clearly, obviously, and completely as possible.

The following are the sections of the request form that need to be completed:

Reference Information:	00-0000, where 00 = department number, and and 0000 = job number If a copying order is not billable to a job, the general accounting category code for outside services, "570," may be used instead.
Delivery Date:	Standard delivery is the next business morning. If this turnaround time frame is not satisfactory, call the CKC to make other arrangements. Once arrangements have been made, enter the information here. *
Copying Requested By:	All deliveries are addressed to the CKC, care of CAE. Put your name here so that once the order gets to the CKC, (s)he can notify you to pick it up.
Copies:	Enter the number of copies you want here.
Size:	Once the Copies space is filled in, '100%' is automatically displayed here. If you need a different scale percentage, type over the '100.' *
Paper Type:	Once the Copies space is filled in, 'white' is automatically displayed. 'White' indicates plain, white paper. If you need a different type of paper, type over 'white.' * Common paper types used by CAE are '100% recycled' and "60 lb. letter." "3-hole" is used for 3-hole punched plain white paper. For a complete list of other paper types available from Kinko's, see the CKC.

* If you have changed a standard option, be sure to highlight the changed or additional information when you print out the request form.

Kinko's Request Form, Continued

Copy Type: Black and white copies are automatically selected. If you want a different option, delete the current X, and then add a new X in the appropriate box. *

The other options available are as follows:

Accent Color:	one additional ink color
Color:	full color
Oversize:	up to 36" -- not legal or ledger size

Duplexing: Duplexing indicates the number of printed sides per page in the original document and in the copies, in that order. Single side (original) to double side (copies) is automatically selected. If you want a different option, delete the current X and then add a new X in the appropriate box. *

Paper Stock: This indicates the size of the paper. Letter sized (8.5 x 11") stock is automatically selected. If you want a different option, add or delete Xs as appropriate. *

Other sizes are legal size (8.5 x 14") and ledger size (11 x 17"). Call the CKC if you need to select any other size.

Special Instructions: GBC punching, collate by section, and copy blank pages are automatically selected. If you want a different combination of options, add or delete Xs as appropriate. *

An additional option is 3-hole punching. Use this only if you need a special paper stock ("draft" paper, for example) 3-hole punched. If you just need white paper 3-hole punched, indicate your choice under Paper Type.

Other/ Additional: This space always shows the home phone number of the CKC in case the Kinko's staff has questions about CAE's orders after business hours. If you have additional special instructions you need to add, type them in, beginning on the next line after the emergency information. *

* If you have changed a standard option, be sure to highlight the changed or additional information when you print out the request form.

Kinko's Request Form, Continued

2nd Order From Same Original:	If you would like an additional set of copies, with different instructions, made from the same set of originals as the first half of the request form, use this section.
NO 2nd Order From Same Original:	If you do not want an additional set of copies made from the same original, hide these rows. This can be done quickly and easily using the expand/collapse button in the Excel spreadsheet. To the left of the row numbers in the Excel window, you will see a small square with a minus sign in it. Click on this button, and the rows for the bottom half of the request form will be hidden.

* If you have changed a standard option, be sure to highlight the changed or additional information when you print out the request form.

A similar set of instructions can be found on the form itself in Excel by scrolling to the right of the window.

Always feel free to write out instructions by hand. Remember, the more clear, obvious, and complete the instructions are, the less chance there is that Kinko's personnel will misunderstand you.

Each original document must have a separate request form.

Special Cases

If you have an unusual copying or document production request, and these procedures do not answer your questions about how to obtain the results you want, please call CAE's Kinko's Contact. If (s)he can not answer your question, (s)he will find the answer for you.

Pickup/Delivery

Bring copying request packages (completed request form with properly prepared originals) to the reception desk and place them in the tray on the northeast corner of the desk (to the receptionist's left).

The Buffalo Grove Kinko's has arranged for a courier service to come to CAE's Palatine office's reception desk twice a day during the work week, once in the morning, and once in the afternoon.

These are the times scheduled for the courier's semi-daily visits:

After	9:00 a.m.	but before	10:00 a.m.
After	4:00 p.m.	but before	5:00 p.m.

Both pickups and deliveries can be made at either pre-arranged courier visit.

The courier will pick up any new orders that have been left in the tray at the reception desk, and will leave completed orders in the same tray.

To arrange for a special pick up or delivery time, call the CKC. (S)he will make arrangements with the Buffalo Grove Kinko's, and will alert the receptionist.

The receptionist(s) is(are) NOT involved in this procedure, except for the following FIVE situations:

Situation	Action
If the courier arrives before 9:00 a.m.	the receptionist should ask him/her to wait while (s)he calls CAE's Kinko's Contact
If the courier arrives after 10:00 a.m.	the receptionist should call the CKC
If the courier arrives before 4:00 p.m.	the receptionist should ask her/him to wait while (s)he calls CAE's Kinko's Contact
If the courier arrives after 5:00 p.m.	the receptionist should leave a voicemail message for CAE's Kinko's Contact
If the courier drops off completed orders	the receptionist should call the CKC to let him/her know that (s)he should pick them up

If an outer office starts to use its local Kinko's frequently enough to justify arranging for pick up and delivery service, call the CKC. (S)he will contact the Kinko's Corporate Account Representative, who can have a local Kinko's Corporate Account Representative get in touch with the outer office directly to make these arrangements.

Checking the Copying

Check your completed order as soon as you receive it.

Check the completed order against the request form:

Did Kinko's deliver your copies by the date and time you requested?
Did Kinko's make the number of copies you asked for?
Did Kinko's use the paper type you requested?
Did you get the correct duplexing?
Was the punching done as you requested?
Was the collating done as you requested?
If you requested special services, were they done properly?

Check the copying:

Appendix coversheets OK -- separate with blank backs?
Are all the appendix sections there? (none missing?)
Are all the sections different? (no sections repeated?)
Are the pages right side up?
Are the pages punched on the correct side?

If there are mistakes that will affect CAE's ability to use the copies as intended, call CAE's Kinko's Contact. (S)he will arrange to have them corrected right away.

If there are mistakes that are minor and do not affect CAE's ability to use the copies, note them on the pink receipt. When CAE's Kinko's Contact receives the receipt (with your original request form attached), (s)he will discuss the mistakes with the Kinko's store manager.

Checking the Receipt

A set of pink receipts will be included with each delivery of completed orders. Find the pink receipt for your order. Staple it to the Kinko's request form you filled out for your order.

Check the number of pages in the original document against the page count on the pink receipt.

This is one of the most important parts of this procedure!
Kinko's charges CAE *by the page*, so getting a correct page count is the only way to assure that CAE is billed correctly.

Note any discrepancies between the actual page count and Kinko's page count on the pink receipt.

Return the request form/receipt to CAE's Kinko's Contact. Use inter-office mail, or any other system as designated by CAE's Kinko's Contact. As of September, 95, there is a special tray on Karen's desk for Kinko's receipts.

The CKC will check the receipts to be sure CAE is being charged the correct rates.

Recycling of Colored Paper, Cardboard

CAE is "dedicated to a clean environment" and seeks "clients who consistently demonstrate global environmental responsibility." In this spirit, CAE participates in a desktop paper recycling program. However, CAE's desktop recycling contractor does not accept colored paper, such as the kind used by Kinko's to separate individual sections and complete copies.

Kinko's recycling contractor does accept colored paper.

Trays for collecting the colored paper and the cardboard inserts that come with completed Kinko's orders are located in the copying/binding room at the north end of the resource center, on the table.

As you bind and distribute your copies and accumulate colored paper and cardboard inserts, deposit them in these trays.

Periodically, CAE's Kinko's Contact will thin out the bins and send the excess colored paper and cardboard back to Kinko's for recycling.

A supply of colored paper will be maintained for use in preparing originals to send to Kinko's for copying. See Preparing an Original section, page 4 for more information.

Recycling of Boxes

Completed copy orders from Kinko's are usually delivered in cardboard boxes. These boxes are not thrown away if they are in good shape. They are folded flat, and saved to be reused for sending originals out to Kinko's for copying.

Folded boxes for reuse are kept in the large box under the table in the copying/binding room.

Please try to keep a matched set of a box top and a box bottom together.

Invoicing

Once a month, Kinko's corporate offices in California will send an invoice summarizing the previous month's transactions to CAE's corporate headquarters in Palatine. This invoice will include all services charged to CAE's corporate account number at all Kinko's locations.

CAE's accounting department will forward the invoice to CAE's Kinko's Contact. (S)he will check the invoice, following procedures documented elsewhere. Briefly, CAE's Kinko's Contact will check the monthly invoice from Kinko's against the pink receipts. (S)he will investigate any missing receipts, discrepancies, or errors, and will straighten them out with the Buffalo Grove store manager, or Kinko's Corporate Account Representative, as appropriate. Finally, (s)he will prepare the necessary paperwork to obtain a CAE P.O. to get the invoice paid.

Filing the Receipts

After CAE's Kinko's Contact has checked the Kinko's invoice, (s)he will return the copying request forms/pink receipts to the appropriate department.

Please file these receipts according to your department's procedures.

Other Kinko's Services

Kinko's can provide many other document production and office services. For a complete list, see CAE's Kinko's Contact.

KinkoNet (Electronic Transfer of Files for Remote Production)

One of the many document production, reproduction, and office services that Kinko's can provide for its customers is the ability to receive electronic files to be transmitted for remote production of documents. As of September of 1995, CAE does not subscribe to this service. If you are interested in using KinkoNet, please call CAE's Kinko's Contact.

If there are any questions about these procedures, please call CAE's Kinko's Contact.

The Kinko's Procedure

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APPENDIX H: Where Does Everything Go In The Report Appendix?

Where To Put Things In The Appendix

Most of this is very self explanatory (for example: field data goes in the field data section). However, some pieces of information are a bit confusing. The list below should hopefully clarify some most of these questions. If this doesn't answer your question, ask the project manager - it is his/her report and they ultimately have the final say in the matter. If you are the project manager, ask someone in reports although sometimes it will generally boil down to your best judgment.

SAMPLE CALCULATIONS

Any sample calculations should be placed here.

PARAMETERS

Any parameters should be placed here.

CALIBRATION DATA

The calibration data sheets should be included here. They should be organized in the following order in the field data binder and the report:

- The nozzle calibration sheets
- The pitot calibration sheets
- By meter box number
    - The meter box full test calibration sheet
    - The meter box post test calibration sheet
    - The meter box critical orifice sheet
    - The meter box pyrometer calibration sheet
- The CAE RM CEM description sheet
- The CAE Client CEM description sheet
- CEM Drift Calibration
- The calibration gas certification sheets organized by method first then by gas value
- Any other miscellaneous calibration sheets including asset numbers (i.e. scale, lab equipment, etc.)
- Cyclonic flow check

WEIGHT SHEETS

Comment: The weight sheet section may soon be a thing of the past. In this case weight sheets will go in the Lab Data section.

Any weight sheets (raw and printouts) should be placed here.

FIELD DATA

The raw data sheets created in the field should be included here. They should be organized in the following order in the field data binder and the report:

- All Orsat sheets should be included first. These should be in order of the locations being tested (i.e. Unit 1,2,3)
- All field data sheets should be included next. These should be in order of the method (i.e. Method 4, 5, 23, 26, 29, BIF 0010, CARB 5). Note that these are in order of EPA Part 60 then any of the odd methods.
- The impinger weight sheet for the three runs it includes should be located directly after the third run's data sheet.
- If there is more than one unit or location that is being tested, organize the data by unit first, then by location, then by the above format.

FIELD DATA PRINTOUTS

Printouts of all isokinetic sampling runs (non-iso runs can be included but usually aren't).
Printed (by Laserprinter - not the original stuff printed in the field) copies of CAE's CEM data should be included here. It should be organized in the following order:

- Calibration error
- Calibration 00
- Run 1
- Calibration 01

This order should continue through the end of the testing. Any additional calibrations should be inserted chronologically where it happened. When testing multiple units, the data should be organized as stated above and then by the unit tested.

LAB DATA

Any lab data should be placed here.

CHAINS OF CUSTODY

The chains of custody should be included here. They should be organized around the lab to which they were sent. All CAE labs should be listed first and then followed alphabetically by outside labs.

OPERATING DATA

Any operating data should be included here. It should be organized by the unit tested (i.e. Unit 1, Unit 2, etc.)

FUEL ANALYSIS

Any fuel analysis should be placed here.

MONITOR DATA

The client's CEM RATA data should follow the same organization as CAE's data. Calibrations and other information may not be applicable here.

PROTOCOL

Any protocol should be placed here.

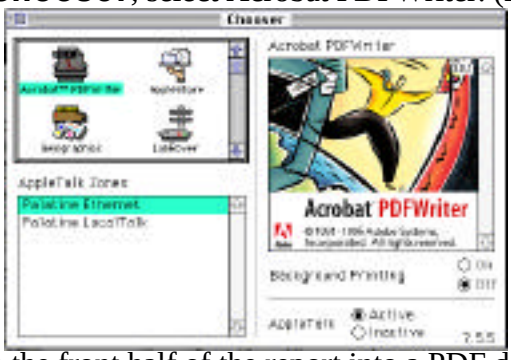
PERTINENT CERTIFICATIONS

Any applicable certificates for a project should be placed here (i.e. VE certificates, 40 hr Haz waste certificates, respirator, etc.).

APPENDIX I: Conversion Of Report Into Adobe Format

Let's Get Started!

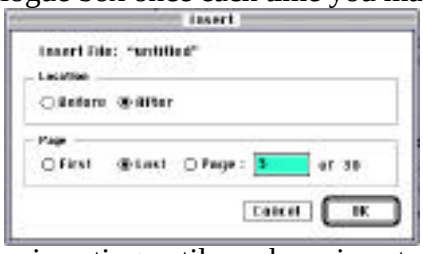
1. Make sure there is no CAE Helvetica in the front tables of the report.
2. Go to **Chooser**, select Acrobat PDFWriter. (Ignore this step in Windows).



3. To turn the front half of the report into a PDF document...
   - **Open** the MS Word Report document.
   - **Print** out the "Title Page" through "Appendix Table of Contents" (the rest of the report will be scanned in). (In Windows, you will be able to select the Adobe Acrobat Printer in your print dialog box).
   - Ignore the "Acrobat Document Info" dialogue box that shows up (you can say OK).
   - **Save** the PDF document to the desktop (only the first section will be named correctly, the rest of the report will show up on the desktop as "untitled", "untitled 1", etc.).

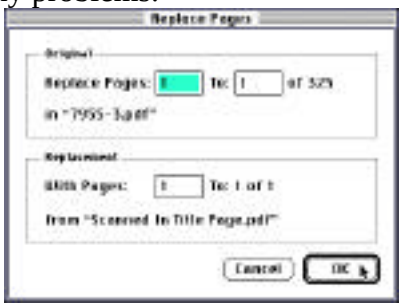
   NOTE: "**Error 1010 Warning: Fonts ... not installed ... Helvetica ... substituted**" probably means some of the tables in the report have CAE Helvetica but you don't have CAE Helv. installed on your computer (you need to remove all CAE Helv. from the tables and replace it with normal Helvetica). You may still have CAE Helv. trouble if you don't get this error (see instruction 10a - bottom of this page).
4. Go to "Project Work Folders: Standard Files: Reports: Std CD-ROM Documents" and copy the "CD-ROM Report Folder" onto your hard drive.
5. Move the first PDF document from your desktop into the "CD-ROM Report Folder". **Open** the first PDF document in Adobe Exchange.
6. In the menu, go to **Document: Insert Pages** (**shift I**) and insert the next section ("untitled").

   Change the dialogue box that pops up to say "**Location: After**", "**Page: Last**". You will need to adjust this dialogue box once each time you make a new report.



7. Continue inserting until you have inserted all of the sections including the scanned Appendix.

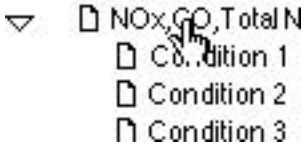
8. Replace (**Document: Replace Pages...**) the "Printed" Title page with the scanned in Title page (with the signatures). Note: The dialogue box that comes up is a bit odd but if you read it closely you shouldn't have any problems.



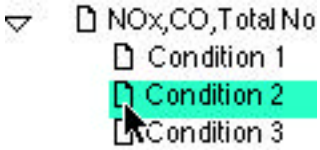
9. In the menu, go to **Document: Create All Thumbnails**.... Save Often!
10. Go through and check the document:
    a. CAE Helvetica isn't in the front tables (it will be pretty obvious - really blotchy dark black characters).
    b. Make sure the tables in the front don't have any "hieroglyphics" left over from turning CAE Helv. into Helvetica (this "hieroglyphic" problem also shows up if you got the "**Error 1010**" mentioned in the beginning of this page). Example: "Q_{std}" and "B_{wo}" look like "QÍˆÎ" and "B„Ø"
    c. Make sure you don't see any blue text in the tables.
    d. Make sure all pages are rotated correctly in the appendix section (**Document: Rotate Pages** will let you fix the problem).

The Ins and Outs of Bookmarking

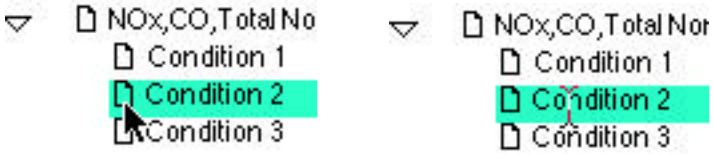
1. To make the bookmarks, go to the first page (the Title Page) of the report.
2. In the menu, go to **Document: New Bookmark** (**B**). Type "Title Page" for the Bookmark.
3. Go to the next page by clicking the  button (also **3**).
   TIP: You can go through an entire document very quickly without using the mouse by remembering **B** , **3** , type the bookmark name, **B** , **3** , type the bookmark name, **B** , **3** , type the bookmark name, etc...
4. Continue by bookmarking the rest of the document (refer to the attached example for bookmark naming conventions)....Save Often!
5. Arrange the bookmark layout so it looks more like the Table of Contents (refer to the attached example).
   - When you have the  tool highlighted and click on a bookmark as shown below, the page will be changed to the bookmarked page.



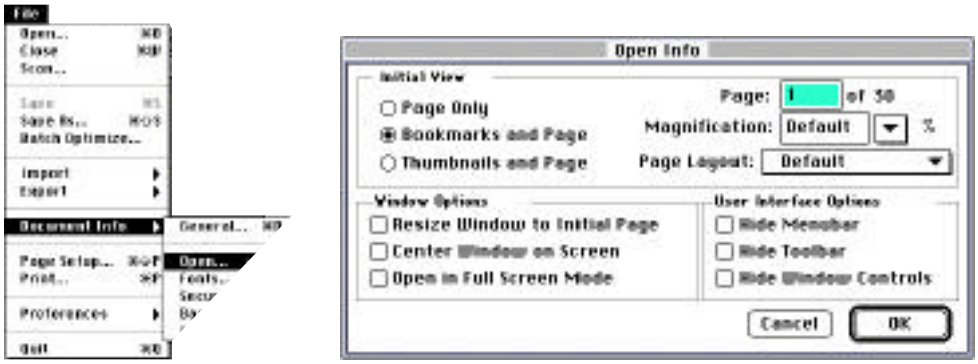
   - When you click and hold on the bookmark icon as shown below, you will be able to move or indent the bookmark in reference to the other bookmarks. You can also delete the bookmark with the Delete key on your keyboard. "Shift-Clicking" will allow you to select more than one bookmark at a time.



   - If you click on the bookmark icon (below left) and then click on the bookmark text (below right), you will be able to edit the bookmark text.



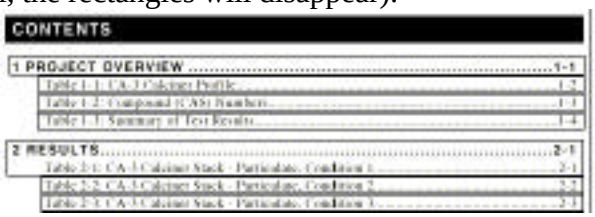
6. In the menu, go to **File: Document Info: Open** and select **Bookmarks and Page**. This makes the client's copy of the report automatically open with the bookmarks showing (instead of just the scanned pages).



Linking the Table of Contents

1. Go to the Table of Contents.
2. In the menu, go to **View: Bookmarks and Page** ( ).
3. In the menu, go to **Tools: Link** ( ).
4. Draw a rectangle around the Table of Contents item that you want to link to (the first one will be "Project Overview"). A dialogue box appears; change **Visible Rectangle** to **Invisible Rectangle**. You will need to adjust this dialogue box once each time you make a new report. **Note:** you will be in a **very bad mood** if you forget to change the **Appearance, Type** to **Invisible Rectangle**.

5. Go to the page you want (using the bookmarks or button) to link to and click **Set Link** (or hit return).
6. Your table of contents will end up looking like this while you have the tool selected (when you select the tool, the rectangles will disappear):



Final Checks! (Once the CD-ROM is burned you can't go back & change things)

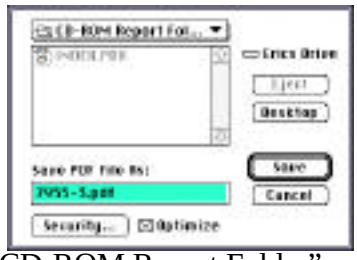
1. Check appearance (no blue text, no CAE Helvetica, nothing missing).
2. Are the links (the rectangles) on the Table of Contents INVISIBLE?
3. Check bookmark spelling, capitalization and naming conventions (will the client understand the bookmarks?).
4. Check that all bookmarks and Table of Contents links go to the right places (especially if you replace or insert pages after you make the bookmarks and links).
5. Make sure title page has signatures.
6. If you have replaced or inserted any pages after your initial work (page 1 of these instructions), you may need to **Document: Create All Thumbnails**... again (don't worry it will be very fast this time). ...In fact, it's probably a good idea to do this for every report as the last step just in case.
7. Finally, close the document and open it again... Do the bookmarks appear automatically? Are they arranged correctly? If not, make the proper changes and close and open it again.
8. Once again, make sure everything is perfect (yes perfect). DON'T RUSH THROUGH CHECKLIST!!!

All Right, Let's Wrap it Up (DON'T SKIP THIS SECTION)

1. If it isn't already open, open up the report PDF document (the document you've been working on this whole time).
2. Go to **File: Document Info: General** and fill in the blanks (two examples shown below).

3. Go to **File: Document Info: Index** and select **Choose Index:** and press the **Browse...** button. Find the "CD-ROM Report Folder" on your hard drive (not on the server) select INDEX.PDX and press **Open** (Then press **OK**). Save often...

4. Go to **File: Save As...** find the "CD-ROM Report Folder" on your hard drive, check the **Optimize** box, name the report 9999.PDF (or 9999-9.PDF) (CAPITALIZE THE "PDF") and press the **Save** button. Go get some lunch since this will take a while. If your hard drive is really full you may get an error message - contact MIS in this case.



5. Your "CD-ROM Report Folder" on your hard drive should look like this (don't rename the folder or INDEX):

6. Drop the whole folder into Dave Perkins' drop folder and notify him via QuickMail. Hold onto your own copy of this folder (and obviously the enclosed report document) until the CD-ROM is burned.

Bookmark Examples

Shown below is how the bookmarks should look the last time you save the PDF file before it is burned to the CD-ROM (and consequently this is how it will look when the client opens it off the CD-ROM). Notice that the bookmarks for the Results Section of the report are all showing (triangles are turned to be "open") while the bookmarks in the Methodology and Appendix Sections are "closed". Note: only some parts of the bookmarks are shown here.

Shown below is how the bookmarks should look if all of the arrows are turned. The hidden bookmarks for the Field Data and Field Data Printouts would look similar to the Parameter Bookmarks (no need to bookmark every run). Obviously, if other sections (such as the Calibration Data or Process Data) were complex or big enough, you might want to bookmark subsections of these as well. Again, only some parts of the bookmarks are shown here.

If you have any questions or comments concerning these instructions please contact Eric Campbell (ext. 2085).

Getting the Appendix and Cover Page WITH Signatures scanned

1. Call Tom Johnson at Root Technologies.
2. Give him **your name**, the **project number**, and an approx. page count (or how many inches high the stack is).
3. Tell him when to expect it (Fed-Ex Overnight vs. 2nd Day etc...).
4. Root Tech. will scan in the document and transfer the files to Dave Perkins (via FTP on the internet or CD-ROM for very big jobs) in one week (plus Fed-Ex shipping).
5. Root Technologies will bill CAE monthly with the CAE job number attached to each job.
6. When the job is done Tom will contact Dave Perkins to inform him that the PDF file is ready and later he will Fed-Ex back the paper copy of the report.
7. Dave Perkins will retrieve the PDF file from our FTP site, put it in the project folder and notify you.

Send the **Cover Page WITH SIGNATURES** and the Appendix section to:

Root Technology
Tom Johnson
14 Wall Street
Princeton, NJ 08540
908-359-9200 Phone (908-359-9250 Fax)

Pricing:

- Scanning: $0.15/page plus $0.56/document
- File Transfer: $25 for first 50Meg PLUS $0.25 additional Meg
- CD-ROM production $35 (only applicable if file size is over 100Meg)
- Express Service: Add 15%. NOTE: Express service subject to availability.
- So a 500 Page document costs $0.15x500+$0.56+$25=$100.56

Note:

- We are getting good rates from this company because we have agreed to send them good quality paper that a high speed scanner and auto feeder can zip right through. Wrinkled or torn paper isn't acceptable... neither are staples.
- I would recommend sending a photocopy of all non reproducible data (hand written field data sheets) instead of the originals.
- Root seems to be a very small company but they give us a quality product at a ridiculously low price (shop around if you don't believe me ... the big companies would have charged us a few thousand for the 500 page document from the example). Bottom line: treat them well.