Instructions for Hawk Software
## Service Physics, Inc
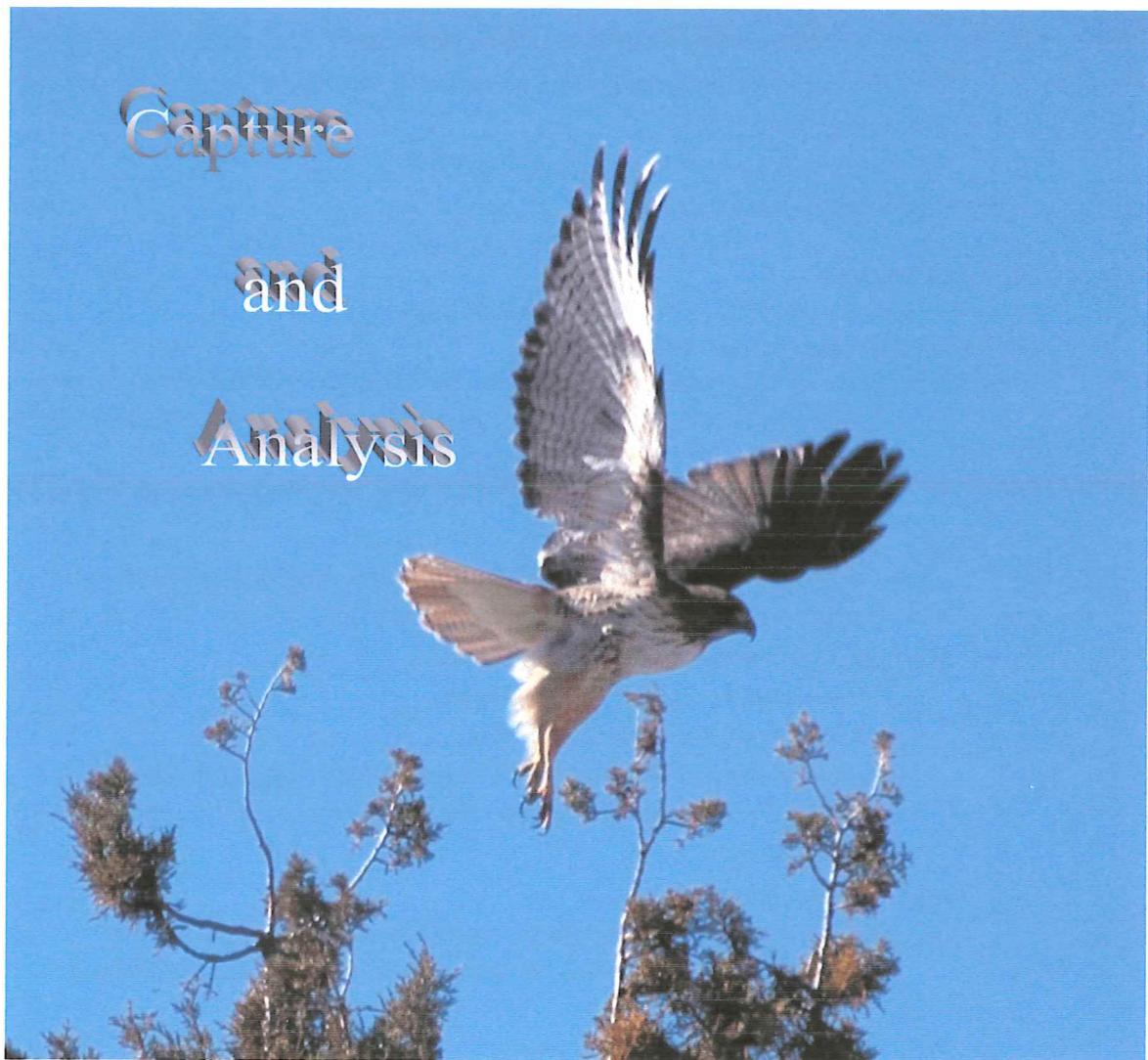
Highlights of Changes form ESCA 200X to ESCA Hawk V1.01

Spectrum Display Window (Graphic Viewer)
The Spectrum Display Window is used in both the capture and analysis programs.
The following additions are included:
- Create stored preferences for appearance of spectra.
- Individual appearance settings for
    - Graphic Viewer
    - Clipboard
    - Printing – only available in Analysis application
- Quick Titles and Figure descriptions can be added to Spectra.
- Icon to save Spectra to file
- Subtract back ground/Restore back ground icons
- Icon for adjusting x,y scales

Capture Application
These features are in addition to the Spectrum Display Window.
The following additions are included:
- Direct transfer of parameters between the MRS table and the ESCA control Panel
    - Test Region button transfers the parameters of the marked region of the MRS table to the ECP and starts the data capture.
    - Update Region transfers the parameters in the ECP to the marked Region in the MRS table
    - A blank Region in the MRS table can be filled. Automatic assignment to appropriate MRS table functions is performed.
- Elapse time estimate provided for MRS table.
    - Scan time is provided for each region
    - Total time for all regions is provided
    - Time to run from marked region to end of MRS table is provided.
    - During Capture the total time for the current region to the end of the MRS Table is provided.
- MRS Table improvements
    - Each region Time/Step may be programmed in 25 millisecond steps.
    - In UnScanned mode, Detector Width and Channel Width are displayed.

- ESCA Control Panel (ECP) Improvements
    - When ECP is closed the state of the parameter set is stored as the "Last Used".
    - At any time you can store the current state of the parameter set as "Default".
    - You can set the ECP to open using the "Default" or "Last Used" parameters.

- o A Count Rate mode is added using an exponential decay with time. This provides monitoring the effects of changes in charge compensation, crystal adjustments and spectrometer adjustments with and adjustable time filter.
  - o "Quick Shift" Binding Energy change. This control behaves like the "brush" mode on IPod displays. The control will move the CBE as much as half a window with in either direction.
- Toolbar icons for quick opening of "Analysis", "ESCA Control Panel", "Big Display" and "Export" of spectra.
- Setup ESCA (Found in the Settings menu)
  - o Configuration table – Added buttons to allow saving and loading the configuration table. Use to back up calibration information.
  - o Added a default peak fit to locate peaks in Detector Width Calibration
- Add additional diagnostics to detect connection problems with detector.
- Improved reliability of Depth Profile setup, running and ion gun control.
- Region Name cell in MRS table is used in Quick Titles for auto assigning names.

Analysis Program

These features work with the new features of the Spectrum Display Window

- Fast Report (FR), a powerful report generation program, has been imbedded for hard copy output of analysis information.
  - o A set of templates are included to provide standard print configurations.
  - o The full Fast Report Designer is imbedded to allow modification and storage of templates.
  - o Fast Report (FR) provides extensive tools for adding spectra and data to predefined reports.
  - o Report Review provides options for a wide range of export of assembled data.
  - o Tables can be automatically added to Fast Report
  - o Column Titles, Placement, Visibility, Format and Font are selectable in Fast Report.
- Editing of Project, Experiment and Region names.
- Delete for Projects, Experiments and Regions.

- Print Tool Bar
  - o Select Template
  - o Add (one) Region to Fast Report (+Regn to FR)
  - o Add all Regions to Report (+ All Regn to FR)
  - o Empty Fast Report (Empty FR)
  - o Review the assembled report (Review Report)
  - o Print out assembled report (Print Now)
  - o Design or modify a template (Design Template)

- Table Functions
  - Export Tables to EXCEL
  - Copy full table Clipboard
  - Copy single row or column to Clipboard
  - Launch Table with cells unprotected

DP Viewer

DP Viewer can be launched directly from the Analysis Application tool bar.

- Tool Bar
  - Add Control of line color
  - Export all cycles of one Region as EMF files. Each EMF file contains one spectrum.
  - Zoom Control
  - Support for Predefined Chart properties after export to EXCEL

SEE - OVERVIEW OF NEW FEATURES after next section for examples of these features.

Recommended system configuration.

1. Pentium IV or higher, 256K Ram, 1Ghz
2. USB 2.0
3. Windows XP operating system with service pack 2
4. Microsoft Office 97 or higher (Word, Excel and Power Point).
5. 19" Flat panel Display.
6. CD R/W
7. Color Printer

Windows 2000 operating system **MUST HAVE SERVICE PACK 4 INSTALLED** to upgrade to ESCA Hawk. The export to Excel requires various security configuration changes in Excel to allow the macro program to operate. If problems occur exporting to Excel see notes at end of install section or contact Service Physics for help.

Preparation of system for upgrade.

1. Backup calibration file. Older ESCA software does not have a calibration export utility. The ESCA Hawk CD has included a program that will create a backup calibration file. The utility is in the Folder, "Hawk Support" > "ESCA Calibration Config" . Copy the file, "XpsRegReadSetup.msi" to the existing ESCA Program folder where the old ESCA program resides. Double click the file to start the utility. Follow the directions to create a backup of the calibration configuration. We suggest you use a name such as ESCA Cal 080521. This provides the date code year 08, month 05, day 21. ESCA 25 and ESCA Hawk have this utility built in. You will be able to load the calibration file after ESCA Hawk is installed. A history of your calibrations can be created from the backup files saved in the Configuration subfolder of you ESCA Hawk program folder. See page **22** in this manual.

2. Uninstall existing ESCA program. Do not uninstall MDAC, National Instruments Software, ACCESSRT, CH Products or Motion Planner. See section below if you are updating your operating system.

3. Updating Operating systems. If updating system from NT the IEEE488 National Instruments card will not work. A new PCI GPIB card needs to be purchased. The IEEE488 version 2.22 (or higher) driver should be used. If updating from Win 2000 to XP it is best to reformat the Hard Drive and install a new copy of windows XP with service pack 2. The PCI GPIB card used on 2000 will work but the Version 2.22 (or higher) driver must be used and not the old driver that may be on the National

Instruments CD. IEEE 488.2 V2.24 is included on the ESCA Hawk CD. Updating requires additional memory and will run much better with at least 1 GHZ processors.

4. ESCA 2000 V1.02.0x releases do not have the backup utility discussed in paragraph 1. It is very important to follow the backup instruction if your are changing operating systems or using a new computer. If you are making no changes to the computer operating system the old configuration should not be lost. It is still advised that you follow step 1 in case of computer problems.

5. There have been problems uninstalling ESCA2000 V1.02.0x. A utility is included on the CD called Uninstall Cleanup. This is found in the Uninstall Utilities folder. This program cleans up a number of problems with the registry and removes some components that are not removed by uninstall. This program should be used to clean up any installation that has had previous problems including ESCA Hawk V1.01. Uninstall Cleanup provides a report about the cleanup. The desired result is that each of the components is not found. If found it uninstalls them and deletes the file from the system 32 folder. Please have the utility make a log file if any cleanup is needed. Please e-mail the log file to us.

Install upgrade.

1. If installing ESCA Hawk on a new computer or on a computer with newly upgraded operating system then do the pre-install in step 2 below. If no change to the operating system then jump to step 3 below.
2. Pre-install support components on new computers and computers with updated operating systems. See table 1 below for components that need to be installed.
3. Install the new ESCA Hawk program. Put the new CD in the disk drive. Find the ESCA Hawk folder and run the Setup program. Accept all default options. Accept keeping newer components that may be on the hard drive.
4. Copy the Calibration Configuration file, saved in step 1 of the **"Preparation of system for upgrade"** section above, to the Calibration folder in the ESCA Hawk directory.
5. If this is a new installation you will need to get a Serial Number form Service Physics by e-mailing either bob@sphysics.com or barb@sphysics.com.
6. Open the Capture program. Select the settings menu. Select Setup ESCA. Open the Configuration Tab and select the Load from File button. Navigate to the Calibration folder and load your backup calibration parameters.

TABLE 1 – SUPPORT COMPONENTS FOR ESCA HAWK.

VERSION	DATA BASE	MOTION	JOY STICK
ESCA HAWK A	ACCESSRT*	NONE	NONE
ESCA HAWK B, BU	ACCESSRT*	NONE	NONE
ESCA HAWK G, GU	ACCESSRT*	NI 488.2 V2.24	NONE
ESCA HAWK E, EU	ACCESSRT*	6K4 MOTION PLANNER	CH PRODUCTS

NOTE: USB VERSIONS WILL AUTOMATICLY INSTALL THE USB DRIVER. LEAVE THE USB CABLE DISCONNECTED DURING THE INSTALLATION OF THE ESCA HAWK PROGRAM. AFTER THE PROGRAM IS INSTALLED THEN CONNECT THE USB CABLE. THE WIZARD WILL ASK IF YOU WISH TO LET WINDOWS FIND THE DRIVER. BE SURE IT IS NOT ASKING TO USE THE INTERNET. IT SHOULD LOOK ON THE CD FOR THE DRIVER. WINDOWS WILL AUTOMATICLY FIND THE DRIVER ON THE CD AND INSTALL. IF THE USB DRIVER IS ALREADY INSTALLED WINDOWS WILL SKIP THIS STEP.

*ACCESSRT IS FOUND IN THE SUPPORT FOLDER ON THE ESCA HAWK CD.

OVERVIEW OF NEW FEATURES

New MRS Table design

			Over Write	Run ⟳	0:02:19	Full Run Time
Update Region	Test Region		One →			
			Append	End	0:00:57	Row to End Tm

1	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time		Clear
	Survey ▼		0	250	800	1	4	1	100	0:00:34		↑
	G Survey 1000 ▼		⫰									
2	Function		CBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time		↓
	ResHi ▼		284	20	300	1	2	0.065	100	0:00:48		▶* A
	G HR R2 ▼		⫰									
3	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time		⋈ X
	HiSen ▼		50	100	800	1	4	.4	100	0:00:38		
	G Sen R4 ▼		⫰									⊤
4	Function		CBE	Det Width	Spot Size	Time	Res#	Ev/Chnl	Tm/Step	Scan Time		
	UnScanned ▼		84	21.500	800	00:15	4	0.168	100	0:00:19		⊥
	G US ▼		⫰									
						END						

- Display Detector Width for UnScanned Function
- Display Channel Width of the Detector for UnScanned Function
- Time/Step (Dwell Time variable) may be input in 25 millisecond steps
- Actual elapsed time for scan. This is longer than the time spent capturing data due to computation overhead. Longer Dwell times reduce percent overhead.
- Elapse time for complete MRS – "Full Run Time"
- Elapse time from current active row to end of MRS – "Row to End Tm"
- "Row to End Tm" tracks the progress of a running MRS table.

Test Region

ESCA Control Panel

Spectrometer Controles

| Flood Gun | Ion Gun | Gray Gun Operate | Aperture: None |

| CBE | Spot Size | Res# | Scan Time |
| 284 | 300 | 2 | 0:00:48 |

☑ Scans | Wnd Width | Ev/Step | Tm/Step
1 | 20 | 0.065 | 100

START * | Abort | Exit

Initial Param
⦿ Last Used
○ Default
Set Current as Default

Scans

Count Rate
636110

274.00, 14385.

Update Region | Test Region | ⦿ Over Write ○ Append | Run 0:02:19 | Full Run Tir
One | End 0:01:45 | Row to Enc

1	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	Survey ▼		0	250	800	1	4	1	100	0:00:34
	G Survey 1000 ▼	⦰								
2	Function		CBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	ResHi ▼		284	20	300	1	2	0.065	100	0:00:48
	G HR R2 ▼	⦰								
3	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	HiSen ▼		50	100	800	1	4	.4	100	0:00:38
	G Sen R4 ▼	⦰								
4	Function		CBE	Det Width	Spot Size	Time	Res#	Ev/Chnl	Tm/Step	Scan Time
	UnScanned ▼		84	21.500	800	00:15	4	0.168	100	0:00:19
	G US ▼	⦰								
					END					

Proj Name: Test
Exp Name: 4 functions
Exp Desc: short scan
Analysis: Raw data

Scan	Visible	Xoffset	
Regn1	⌐	0	0
Regn2	⌐	0	0
Regn3	⌐	0	0
Regn4	⌐	0	0

- Selecting "Test Region", in controls above the MRS table, transfers data from active row of the MRS table (Yellow Highlight button) to the ESCA Control Panel. If panel is not open it will open, down load parameters and start data collection.

Update Region
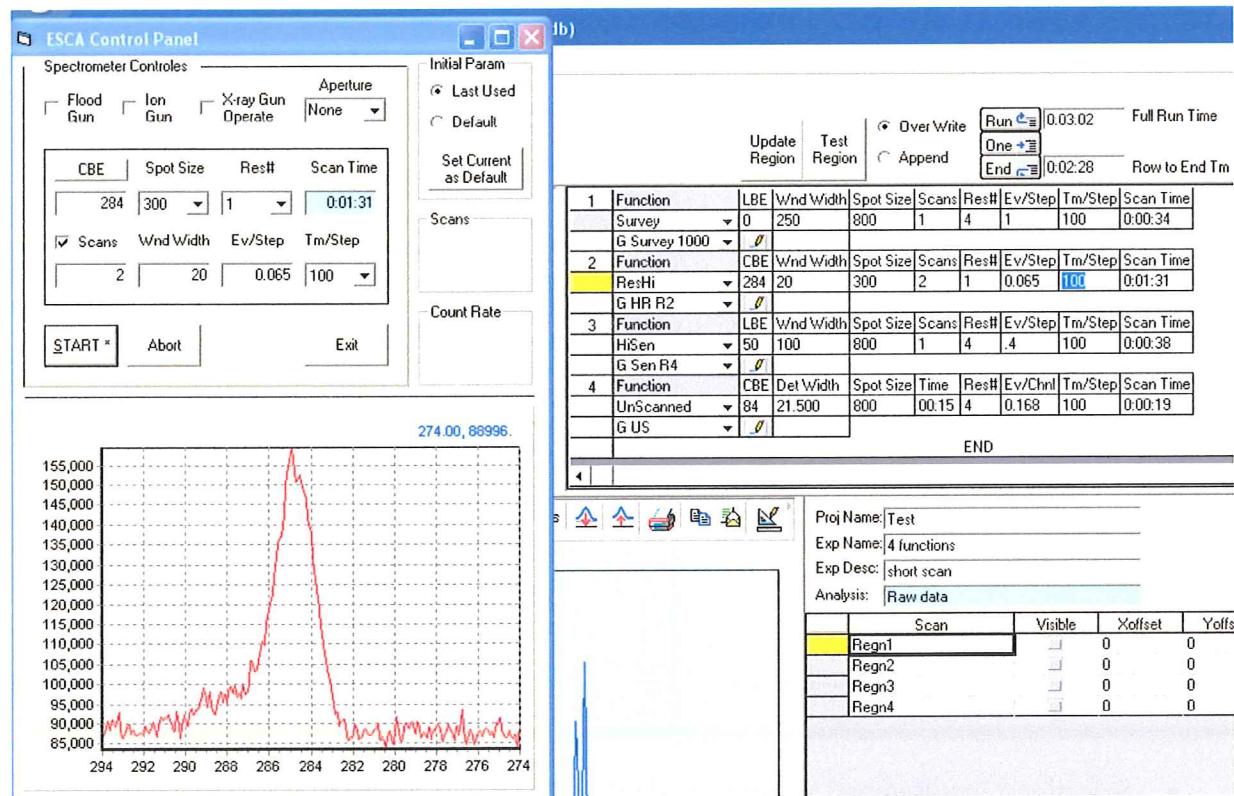
- Changes to ESCA Control Panel are uploaded to MRS table.
- Resolution was changed from 2 to 1, Number of scans from 1 to 2 and the Scan Time was updated.

Update Region used to build MRS table

1	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	Survey	▼	0	250	800	1	4	1	100	0:00:34
	G Survey 1000	▼	⊘							
2	Function		CBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	ResHi	▼	284	20	300	2	1	0.065	100	0:01:31
	G HR R2	▼	⊘							
3	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	HiSen	▼	50	100	800	1	4	.4	100	0:00:38
	G Sen R4	▼	⊘							
4	Function		CBE	Det Width	Spot Size	Time	Res#	Ev/Chnl	Tm/Step	Scan Time
	UnScanned	▼	84	21.500	800	00:15	4	0.168	100	0:00:19
	G US	▼	⊘							
5	Function									
		▼	⊘							
				END						

Add a blank line to MRS table.

1	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	Survey	▼	0	250	800	1	4	1	100	0:00:34
	G Survey 1000	▼	⊘							
2	Function		CBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	ResHi	▼	284	20	300	2	1	0.065	100	0:01:31
	G HR R2	▼	⊘							
3	Function		LBE	Wnd Width	Spot Size	Scans	Res#	Ev/Step	Tm/Step	Scan Time
	HiSen	▼	50	100	800	1	4	.4	100	0:00:38
	G Sen R4	▼	⊘							
4	Function		CBE	Det Width	Spot Size	Time	Res#	Ev/Chnl	Tm/Step	Scan Time
	UnScanned	▼	284	3.641	300	15	1	2.844	100	0:00:19
	G US	▼	⊘							
5	Function		CBE	Det Width	Spot Size	Time	Res#	Ev/Chnl	Tm/Step	Scan Time
	UnScanned	▼	284	3.641	300	15	1	2.844	100	0:00:19
	G US	▼	⊘							
				END						

Selecting Update Region creates the correct function and enters the parameters from the ESCA Control Panel.

Time average with exponential decay.
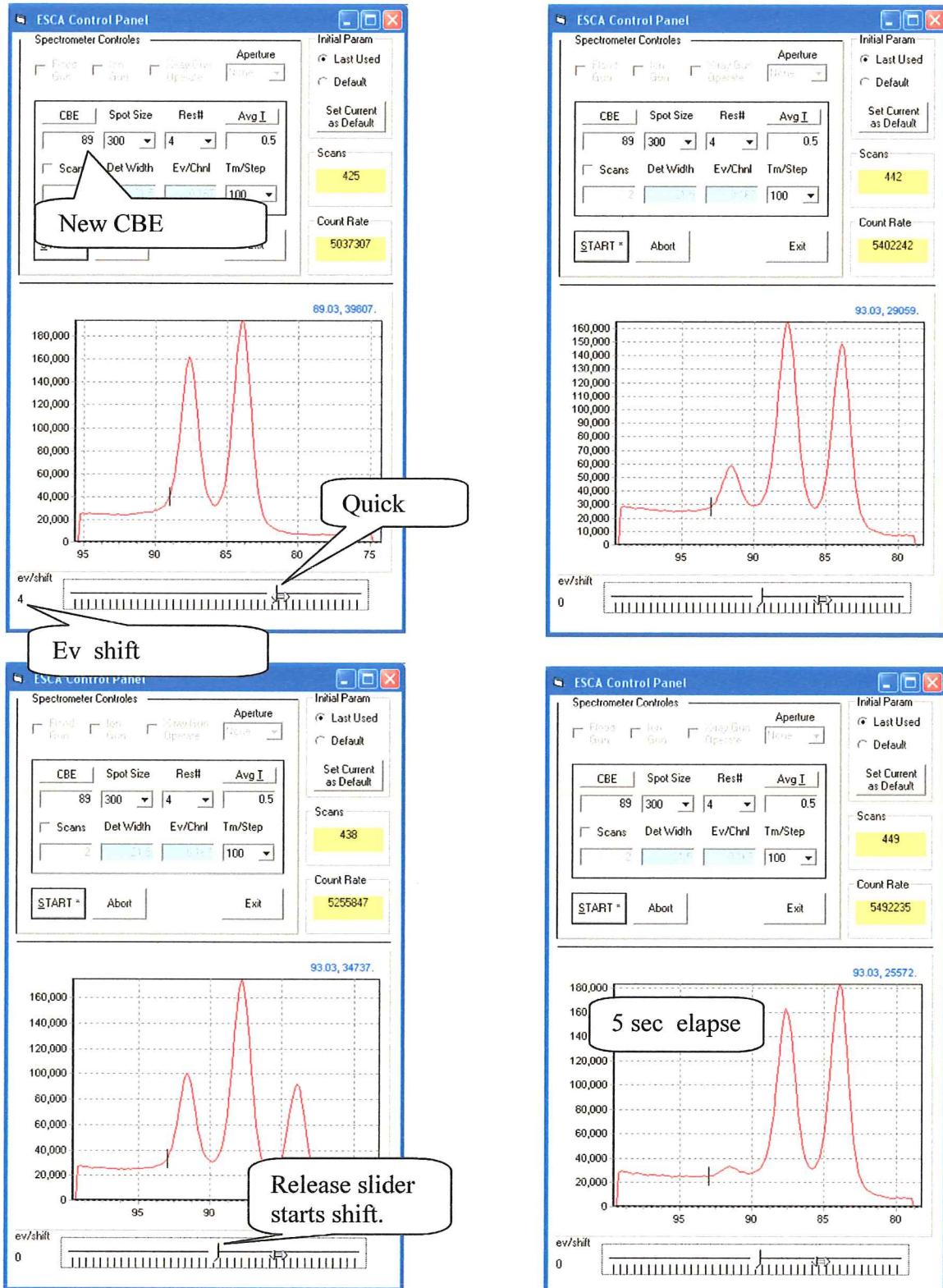
ESCA Control Panel Initialization

ESCA Control Panel

Spectrometer Controles — Aperture

☐ Flood Gun   ☐ Ion Gun   ☐ X-ray Gun Operate   None ▼

CBE	Spot Size	Res#	Avg T
89	300 ▼	4 ▼	0.5

Scans	Det Width	Ev/Chnl	Tm/Step
2	21.5	0.167	100 ▼

START *   Abort   Exit

Initial Param
◉ Last Used
○ Default

Set Current as Default

Scans
562

Count Rate
5521595
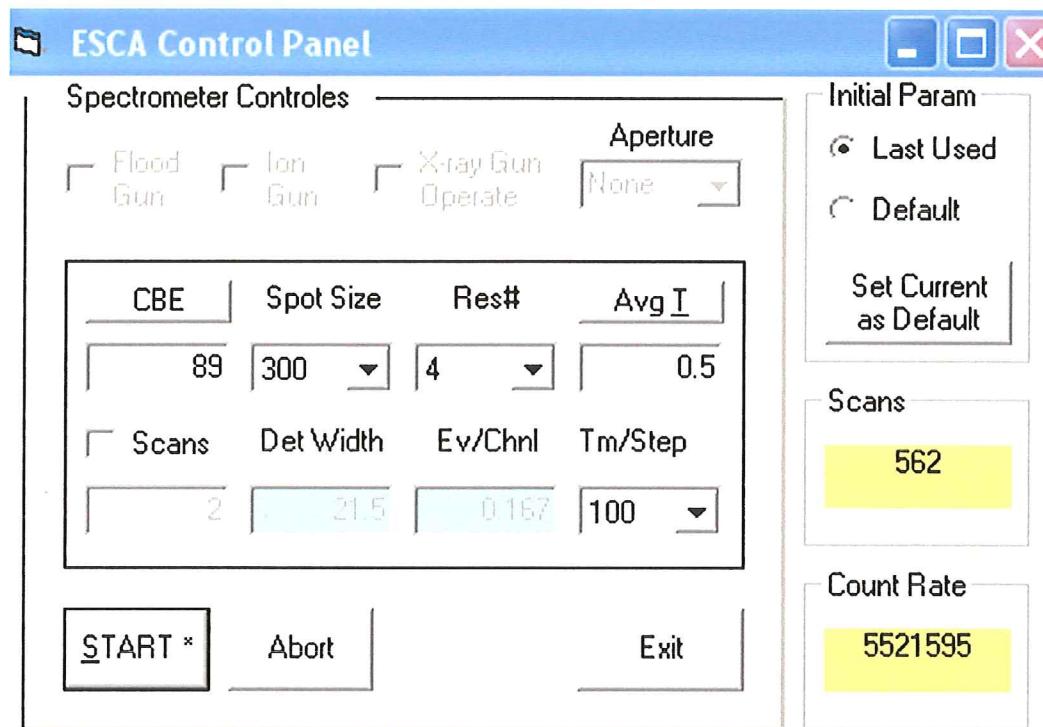
- Set Current As Default – Stores the current parameter set.
- Each time the ECP is closed the current parameter set is saved as "Last Used"
- The selection buttons allow the user to chose which parameter set will be used the next time the ECP is opened.
- The parameter set is the eight parameters in the black box starting with the CBE and ending with the Tm/Step.

CBE/LBE and Avg T/Cap T Buttons

The buttons above the start BE box is fixed to CBE for UnScanned spectra. You can select CBE or LBE for scanned spectra.

The button over the Time box can be switched from Cap T (Capture Time) to Avg T (Averaging Time) in the Unscanned Mode. It displays the elapse time for a scanned spectrum.

Data Analysis

File   Edit   Print   Settings   Start DPV   Help

Open Mdb Editor   t   + Regn to FR   +All Regn to FR   Empty FR

Current Source File C:\Program Files\ESCA Hawk\examples.mdb

Refresh   Load Data   Add Data

+ Project:a
+ Project:A Quickie
+ Project:b
- Project:Test
    - Experiment: 4 functions
        + Raw MRS
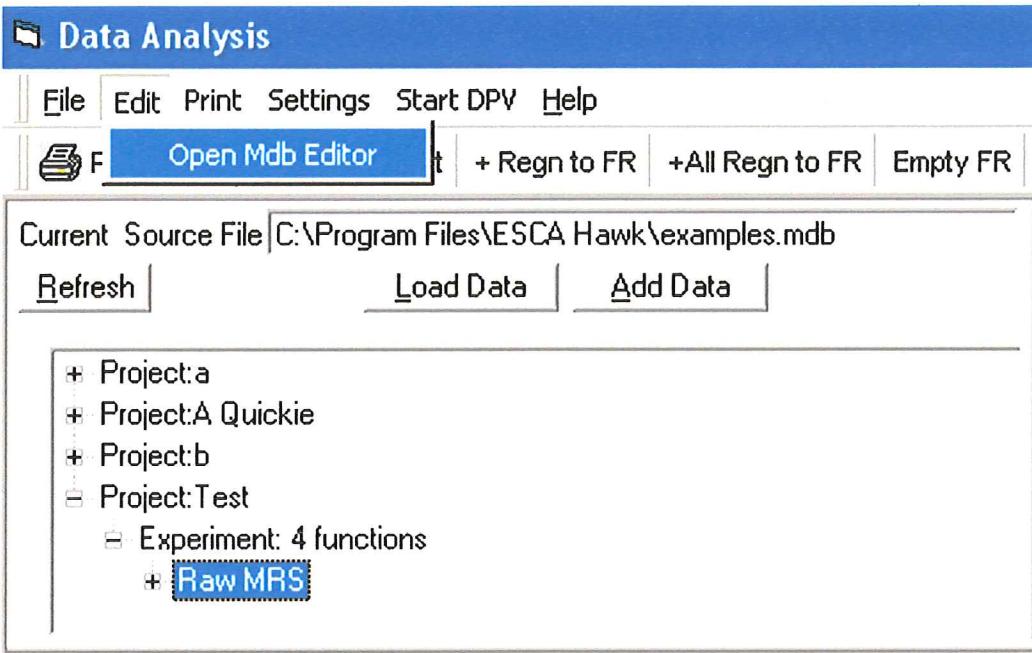
The Project, Experiment and Region information can be edited using the MDB Editor. The Editor can also be used to delete at any level of the project tree. The Data Base structure is very detailed and includes reduced data sets that have been stored. Please keep in mind that deleting an Experiment or Project deletes all information stored for the project or experiment.

Edit Names and Descriptions

+ Project:a
+ Project:A Quickie
+ Project:b
- Project:Test
    - Experiment: 4 functions
        - Raw MRS
            Regn4(73.3-94.8 eV, 128 pts)
            Regn3(50.-150.4 eV, 251 pts)
            Regn2(274.-294.1 eV, 309 pts)
            Regn1(.-251. eV, 251 pts)

Edit Experiment Information

Project:Test
Experiment:4 functions
Has 4 spectra
and 0 data reductions.

Change project of this Experiment (moves to or creates a new project):

Test

Change Experiment Name To:

4 functions

Change Experiment Description To:

short scan

Change Operator Name To:

Bob

Delete Experiment   Update Experiment

Quit

Edit Names and Descriptions

+ Project:a
+ Project:A Quickie
+ Project:b
− Project:Test
    − Experiment: 4 functions
        − Raw MRS
            Regn4(73.3-94.8 eV, 128 pts)
            Regn3(50.-150.4 eV, 251 pts)
            Regn2(274.-294.1 eV, 309 pts)
            Scan on dark spot(.-251. eV, 251 pts)

Edit Region Name

Region: Scan on dark spot
SpectrumName: Scan on dark spot
LBE: 0; WW: 251; Npts: 251
Scans: 1; Cycle: 1
Operator: Bob
Comment: short scan

Change Region Name:

Scan on dark spot

[Delete Region]   [Update Region]

Quit

Edit Names and Descriptions

+ Project:a
+ Project:A Quickie
+ Project:b
− Project:Test
    − Experiment: 4 functions
        − Raw MRS
            Regn4(73.3-94.8 eV, 128 pts)
            Regn3(50.-150.4 eV, 251 pts)
            Regn2(274.-294.1 eV, 309 pts)
            Scan on dark spot(.-251. eV, 251 pts)

Edit Project Name

Summary for Project: Test
Contains 1 experiments,
with 0 data reductions,
and with 4 spectra.

Change Project Name To:

Test

Delete or Update removes or updates the entire Project and all Experiments
and Spectra. They can not be recovered.

Expand Project tree and select Experiment to modify the Experiment Name or
Experiment Description. Seperate Operators names can be input for each
experiment.

Individual Region names can be updated by selecting the Region in the
Raw or Analyzed data sets.

[Delete All]   [Update All]

Quit

Spectrum Display Window (Graphic Viewer)

Create Spectra Appearance Preferences using the Chart Preferences Dialog

Chart Preference Dialog

Chart Preferences Dialog

Edit opens Chart Preferences Editor

Target window types

Default preferences configurations for:
DftWkSp = Spectrum Workspace Display Window
DftPrint = Spectrum sent to print and export.
DftChartCopy = Spectrum put on Clipboard

There are three targets window types; workspace, print and copy to clipboard. You can create a preference configuration using the "Create New…" button. You can edit any configuration using the "Edit Chart Preference Editor" button. One configuration must be checked for each target.

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OPEN Chart Preferences Editor
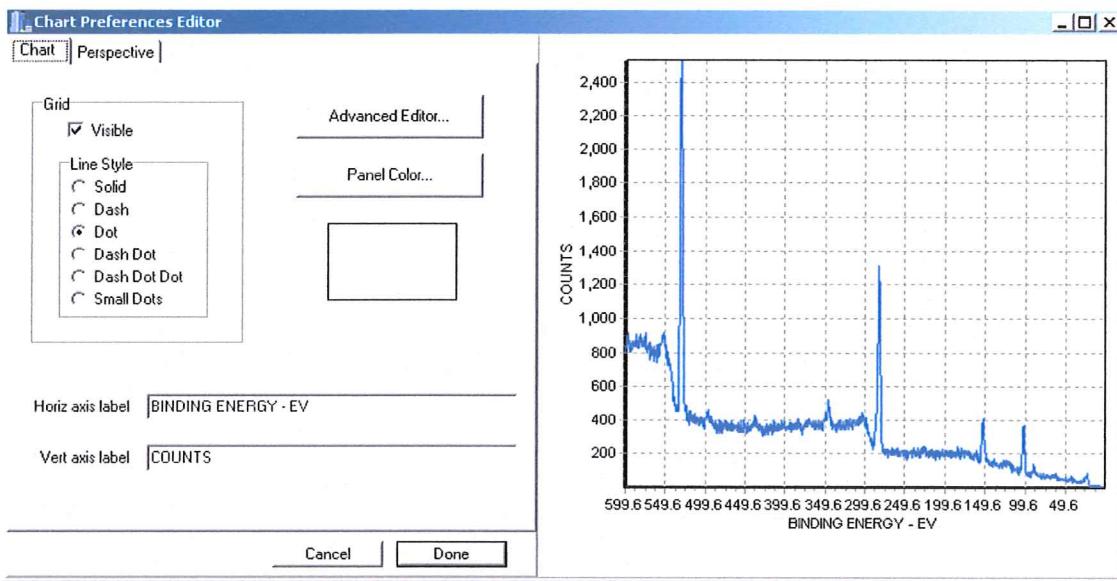
Simple changes of spectrum are selected and reviewed on Chart page.
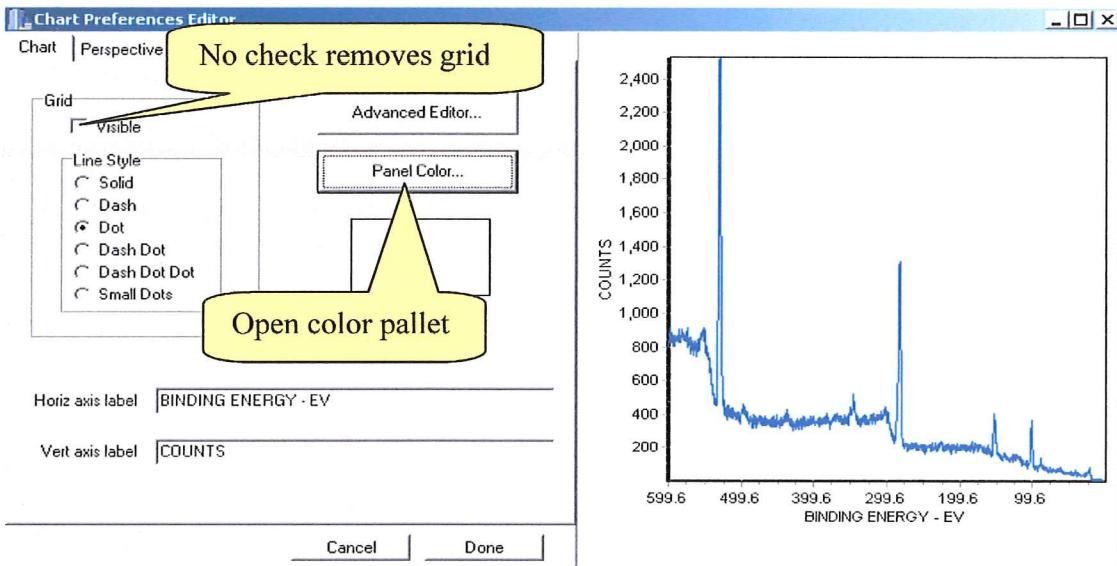
Change grid type and visibility. Change the background color. Change text label for x and y axes.

Note: The line color is changed using the color wheel icon on Graphic Viewer Toolbar. Line colors are unique to the spectrum not the window preference.

NOTE: WE HAVE INCLUDED THE NEXT EXERCISE TO INTRODUCE THE ADVANCED EDITOR.

PLEASE DO THE FOLLOWING EXERCISE TO SET UP YOUR NEW SOFTWARE!

Exercise 1. ADJUSTING THE CLEAR SPACE ABOVE THE HIGHEST PEAK.
Spectrum with highest peak touching top of window.
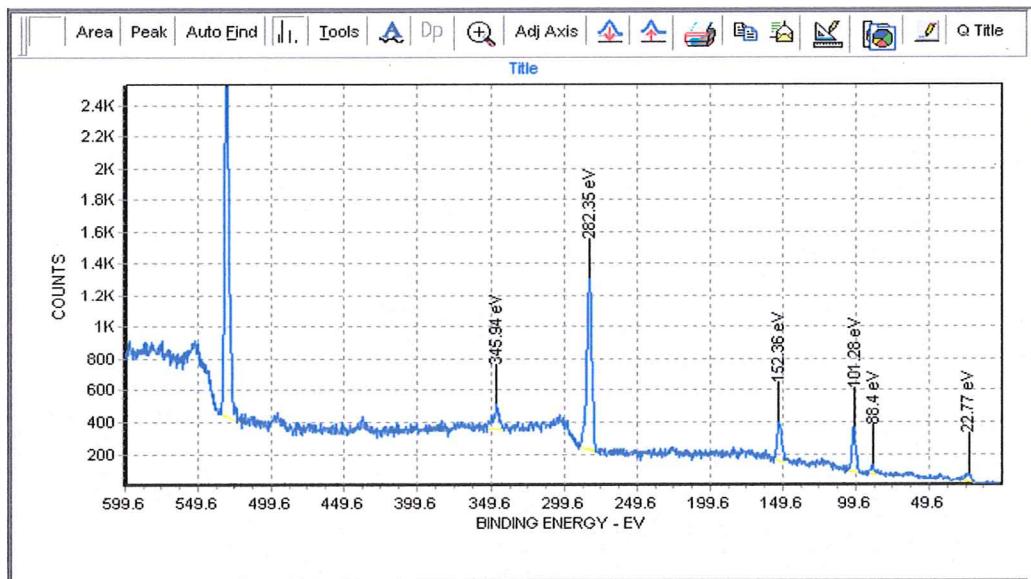
Advanced Editor
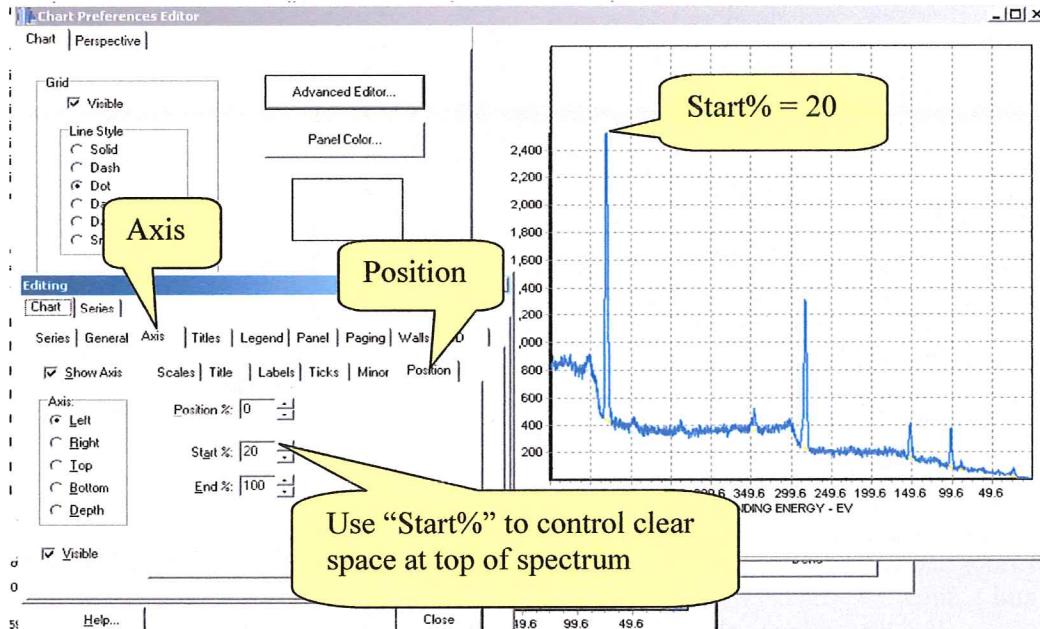
The Axis tab is selected.
To change the clear space at top of spectrum select:
Advanced Editor >Axis >Position. Change the value in the "Start %" entry box.

When the Advanced Editor is used the settings will be saved when "Done" is selected on the Chart
Preferences Dialog. This setting will be used for the target window (Workspace, Print or
Clipboard) selected. IF YOU WANT THE SETTING TO MATCH IN ALL TARGET
WINDOWS YOU WILL NEED TO EDIT EACH CONFIGURATION.

Quick Titles and Figure descriptions
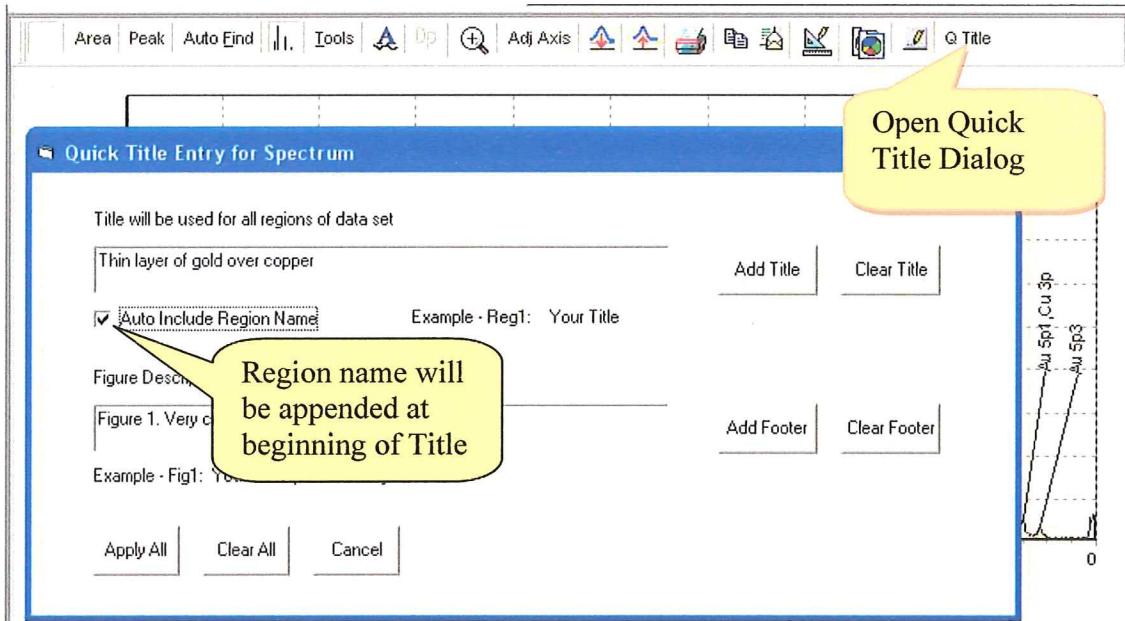
Quick Title Entry for Spectrum dialog
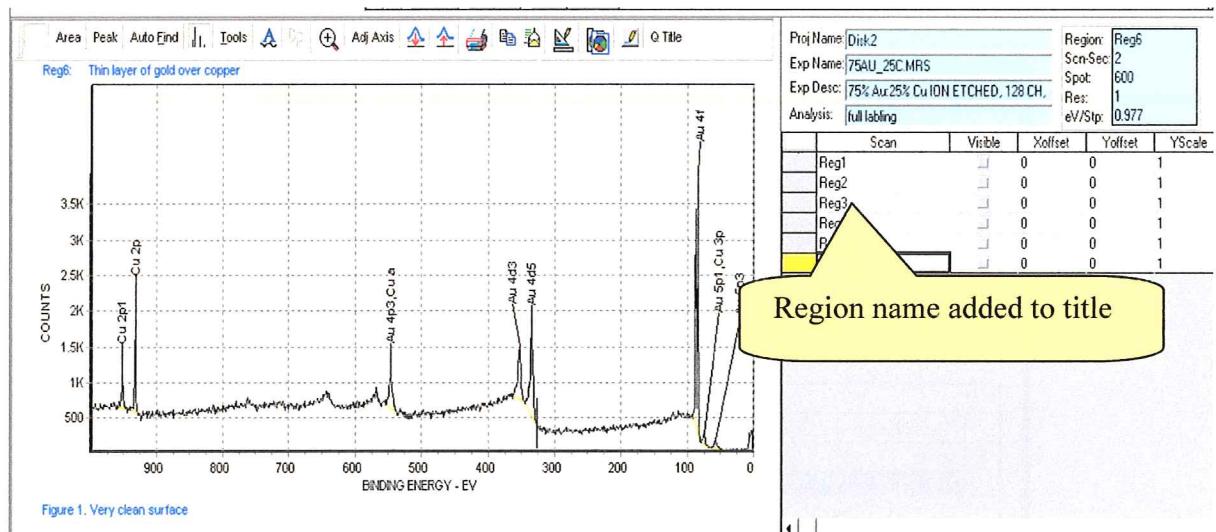
Result of using Apply All Button

Region name is established one of 4 ways.
- By default when spectrum is collected. It is the line number in the MRS table.
- By entering a name in the region cell of the MRS table. See Below.
- From the Region Name entered in the Capture, Depth Profile table.
- By editing the Region Name in the Scan Table.
- The Tools for Smooth, Differentiate, Integrate, Add and Subtract provide entry of Region names for the derived spectra.

Examples of Region Name entry

Region name entered in MRS table in Capture Application is used in Analysis Scan Table

Depth profile Region Name

Edit Region Name in Scan List

Region can be renamed in scan table.
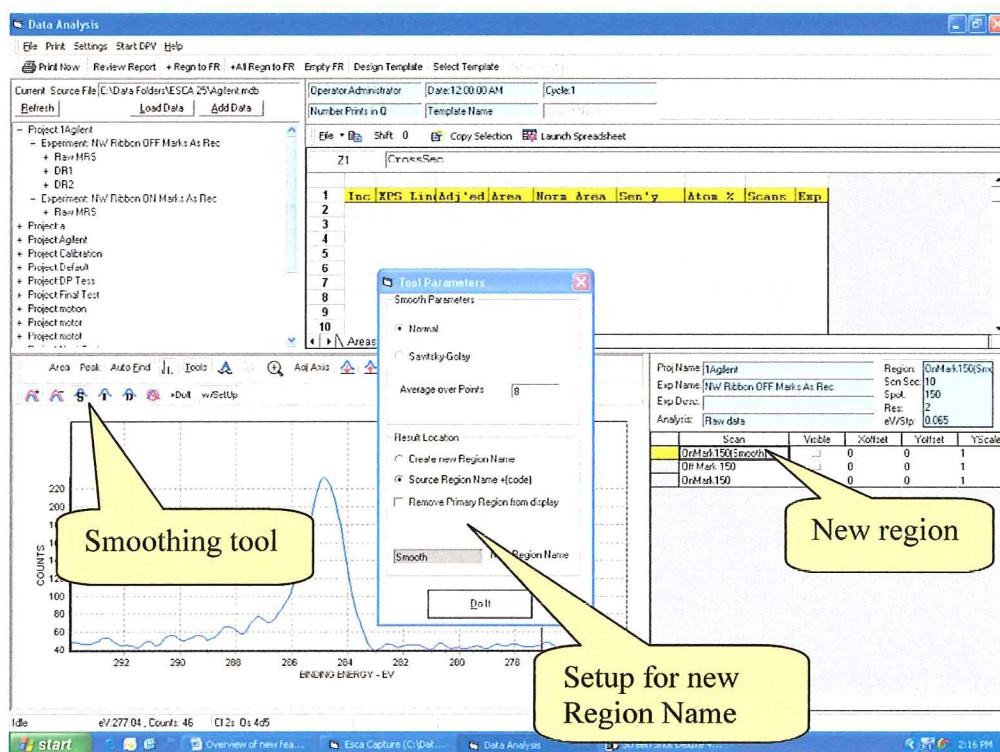


Tools auto create new Region Names.
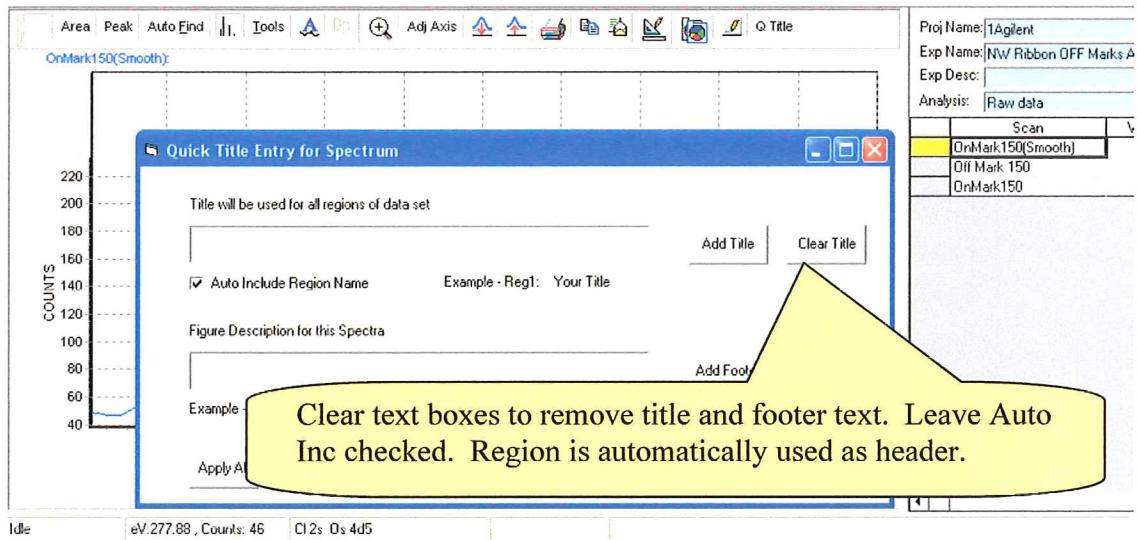
Region as only title.
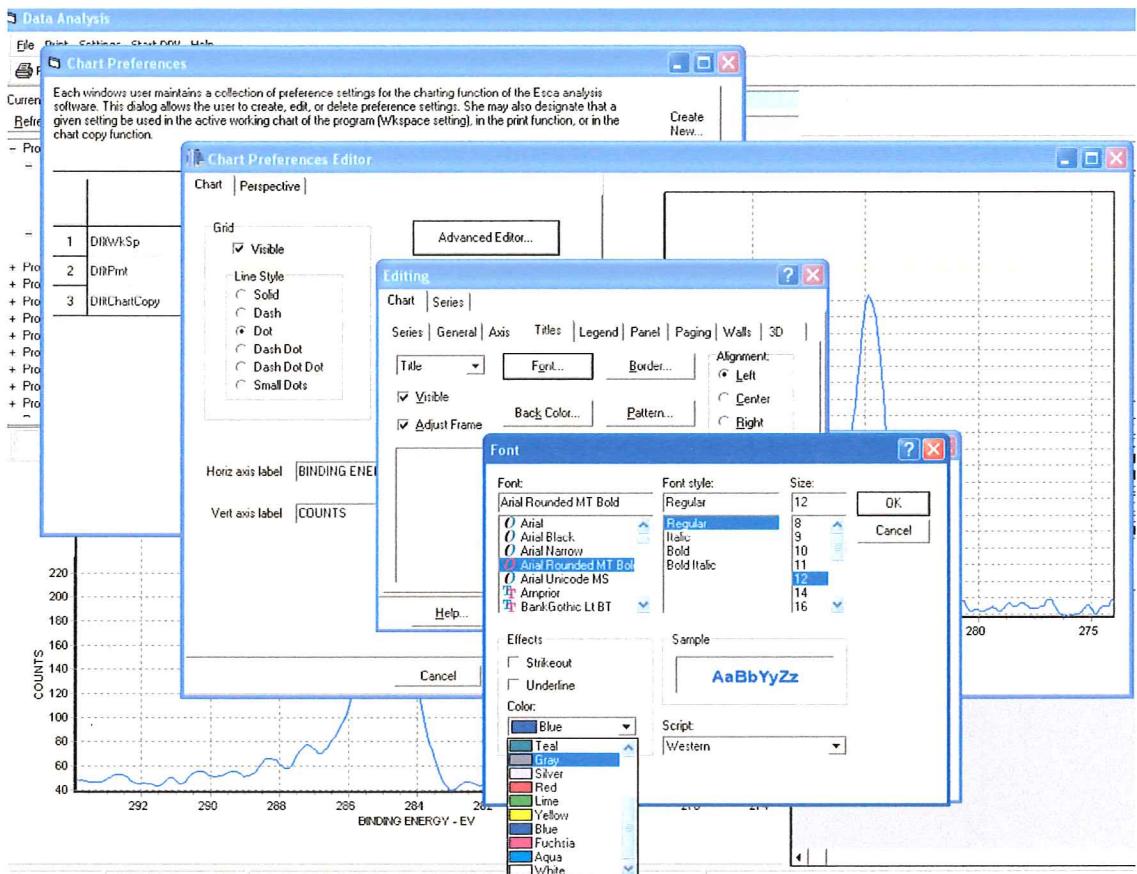

Modify Header and Footer fonts

Select: Chart Preferences > Chart Preference Editor > Titles > Fonts > Size and Color.
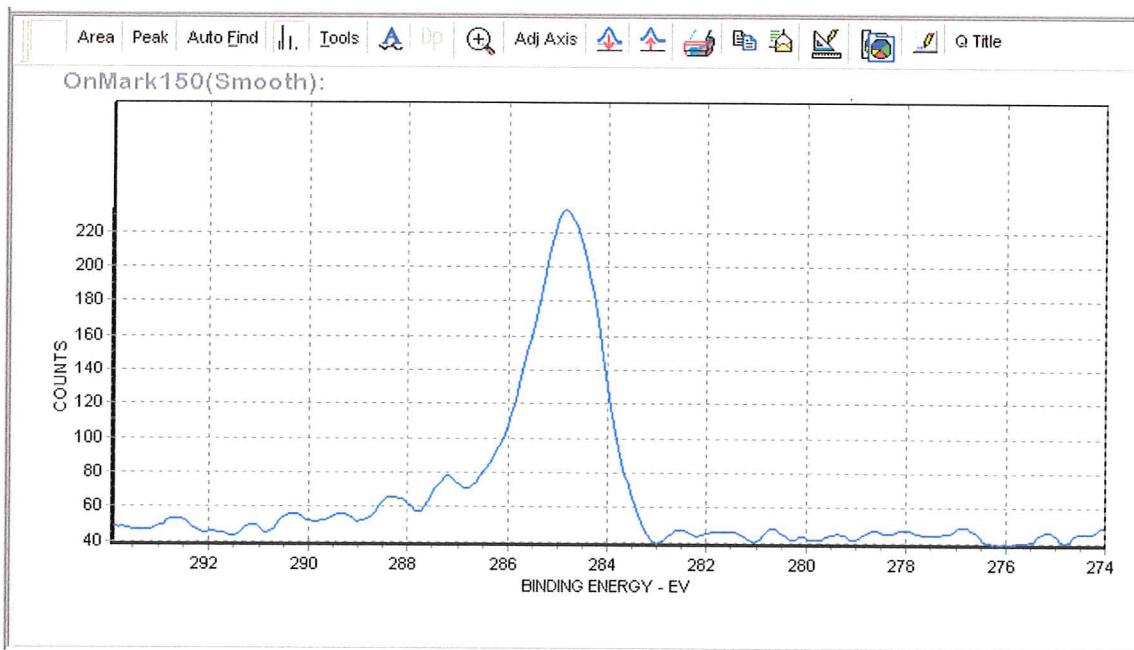
Region header with Font, size and color changed.

See section on Fast Reports (Page 23 - 32) for examples of using the Graphic Display Header and Footer information to enhance the Fast Reports.

Icon to save spectrum to File
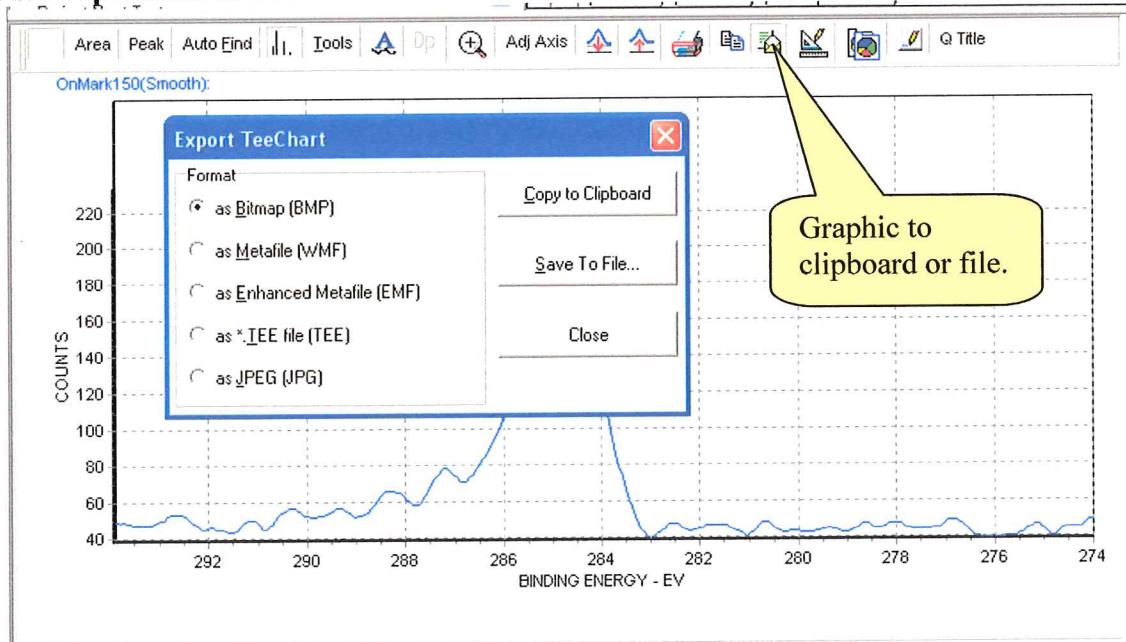
Notice the older font, size and color are in use. The graph background was set to white and the grids are present. To bring them up to date we will use the Chart Preference Dialog to edit the Default Chart Copy preferences. After preferences are set they will remain even if the Application is closed. They are fixed until you change them. If preferences are entered in the Analysis Program they will be installed in the Capture Program the next time it is opened.

Customize Background Color for Power Point Presentations
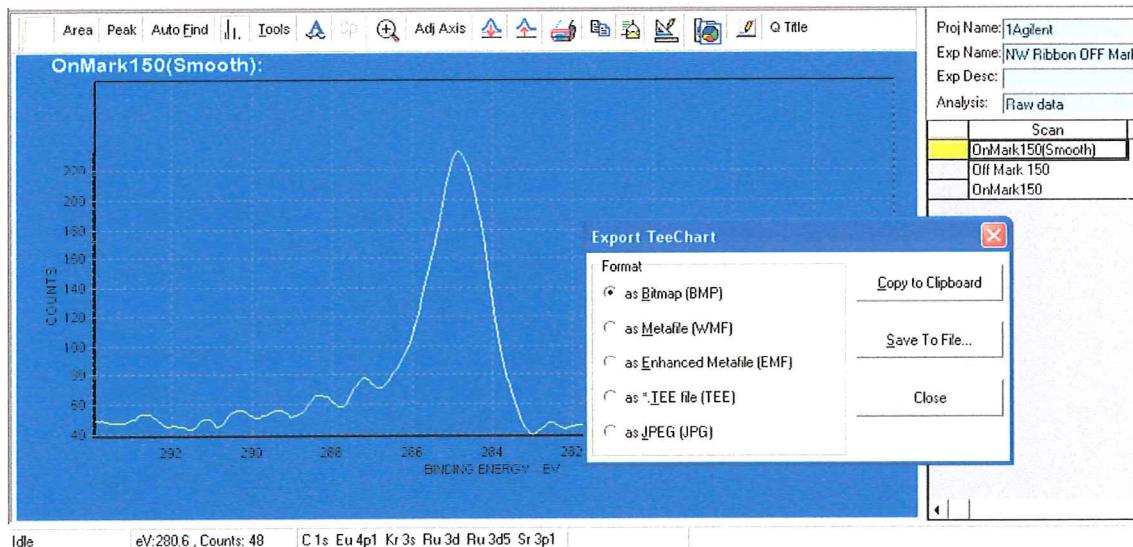
Preferences for clipboard are used for Export. Clipboard preferences set for pasting into Power Point.
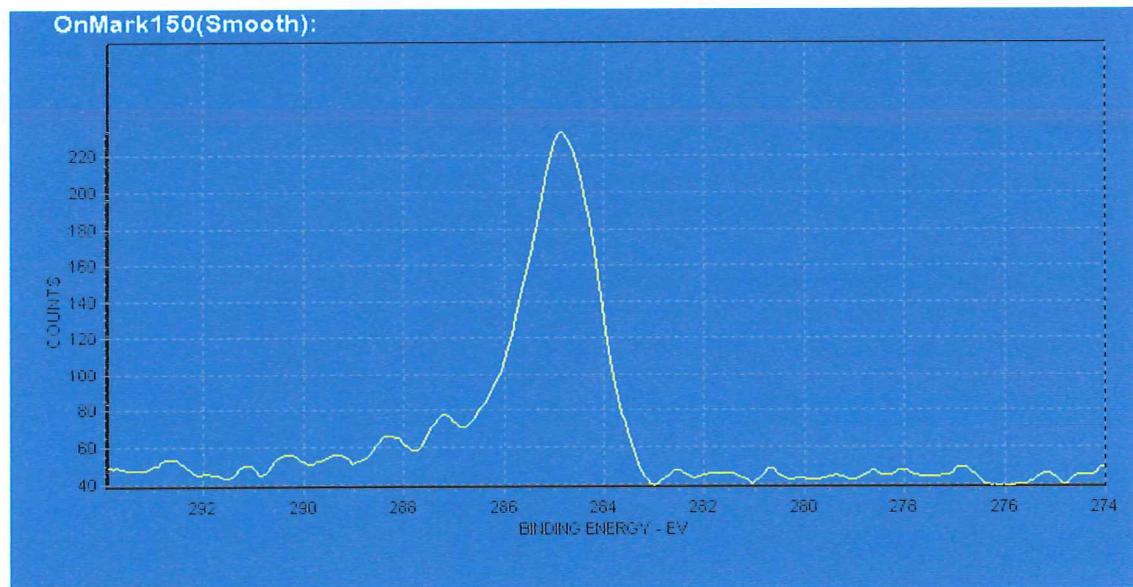
Clipboard was pasted into this instruction document in the above document.   Now each Region selected will have the same format.   Region names will be automatically entered as the title.

Demonstrating line color control and auto assignment of Region name as title.

OnMark150(Smooth):

Off Mark 150:

OnMark150:

26
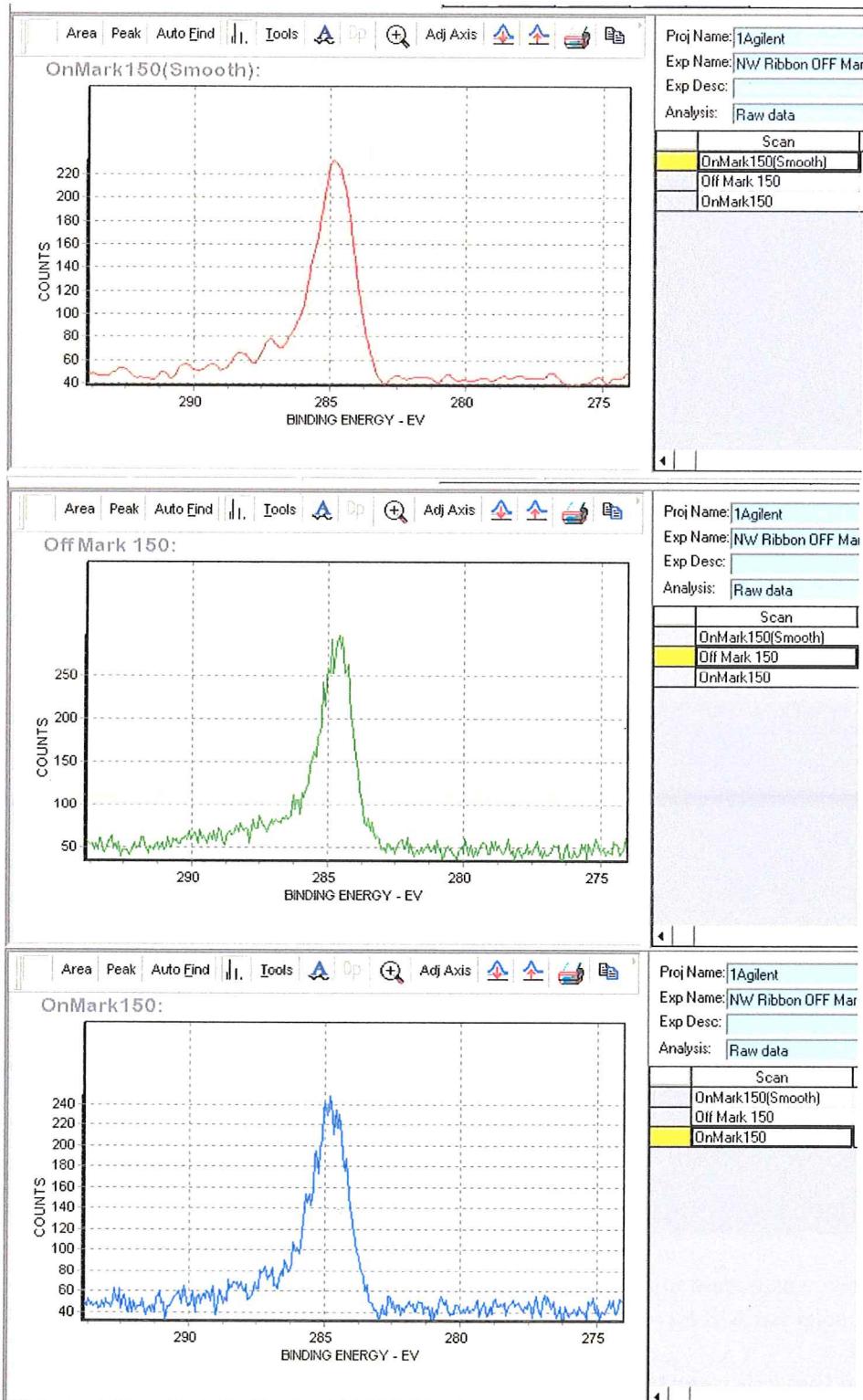
Background removed/Background restored.
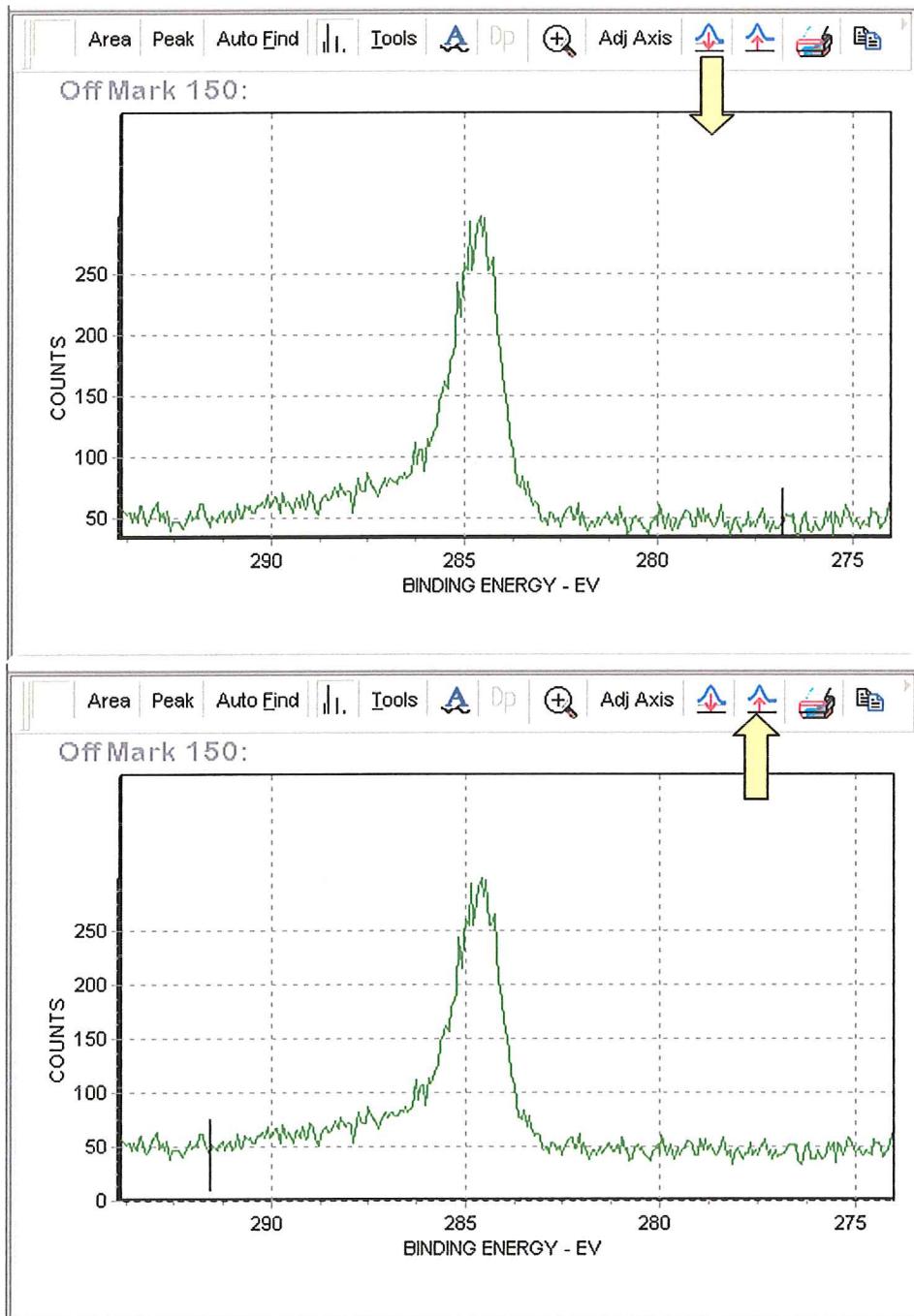
Background remove and restore icons.

Axis Adjusting Tool
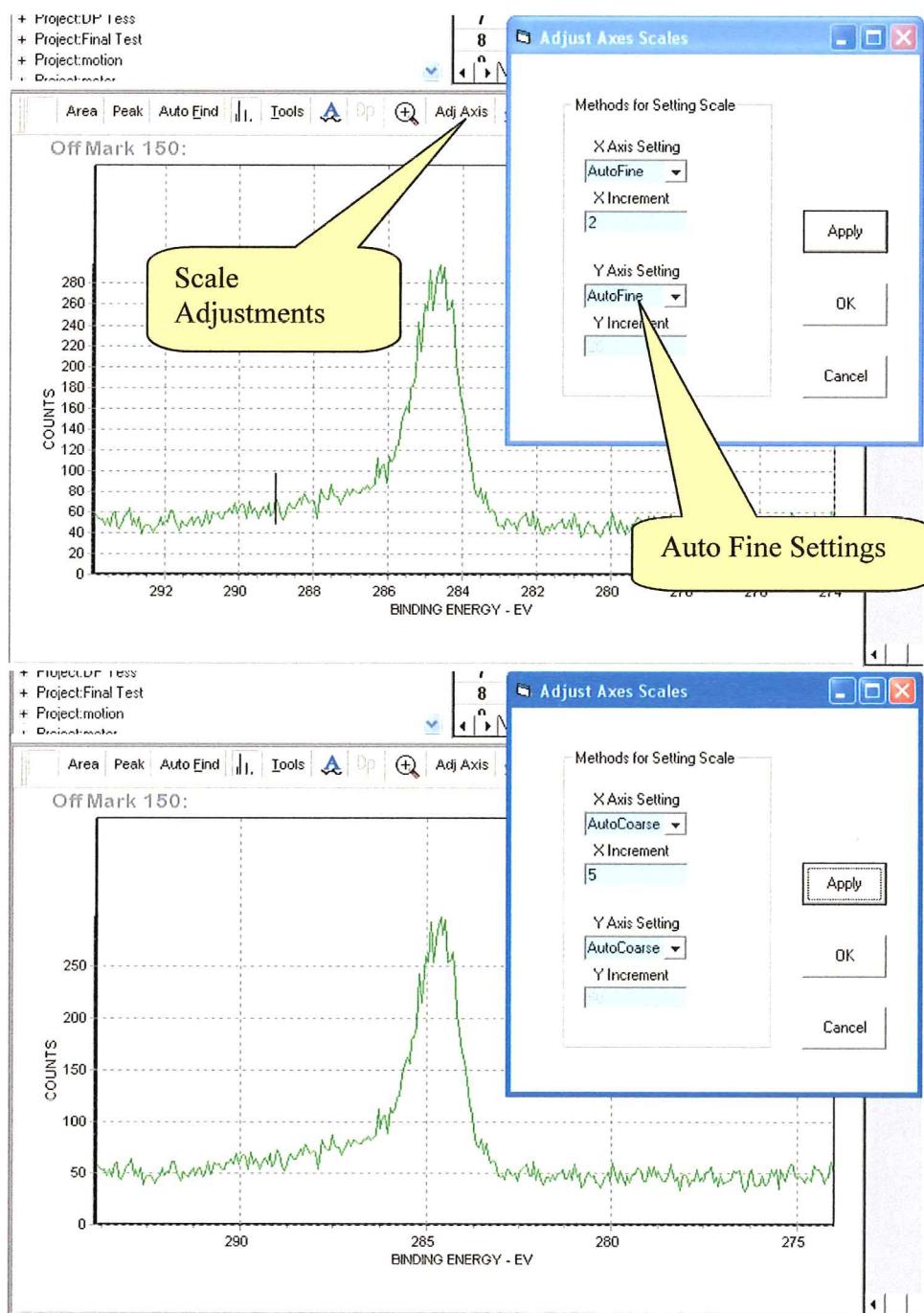
If the Graphic Viewer Window is small there will not be enough room to place the lettering in the auto fine format. Auto Fine and Auto Coarse have different spacing models but in a small window they default back to the Graphic Viewer model. The Fixed Model lets the user set the increment between labels. These fixed values will be used regardless of the Maximum and Minimum of the data. The fixed scale model will produce "bad behavior" during data collection.

Capture Application

Settings Menu
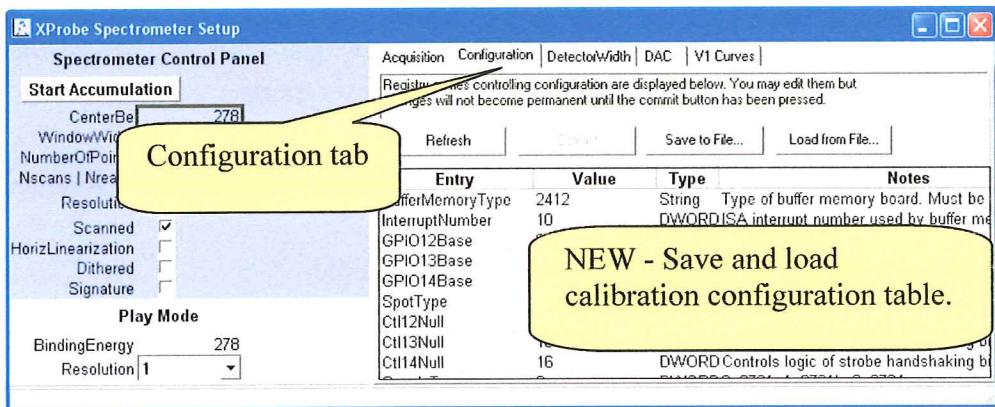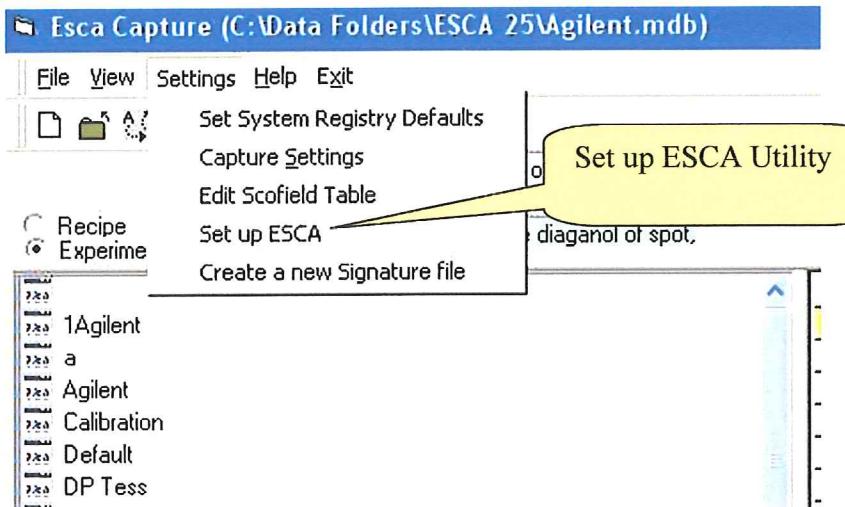
"Save to File" and "Load from File"

The calibration information in the Configuration Tables is extracted to a XML file to provide backup of the instrument calibration. The "Load from File" button loads the backup data into the operating system registry to restore you system calibration. Older software did not have this capability.

The CD provided has a folder labeled System Calibration Utility. This program should be loaded on older installations and run to provide the backup file. After the upgrade the "Load from File" utility can be used if the calibration information becomes lost. This must be done if a new operating system is used in for the upgrade.

The "Save to File" button should be use to save any changes after calibration or service to the instrument. The file should be saved to provide a calibration history.

Hawk Analysis Application

Fast Report

Fast Report is a robust, imbedded program that connects the Graphics Viewer, Data Spread Sheet and Capture Parameter list to a predefined template. The assembled information on the template can then be printed, stored or exported as HTML, EXCEL, RTF or PTF files. The template designer provides a flexible way to customize your output. Predefined text can be incorporated in the template to provide standard reports with the spectra and graphs automatically included.

We have included 7 standard templates to provide convenient printing and exporting. To print out a spectrum you only need to select "Print Now" and the active spectrum will print. To print a spectrum with the composition table choose the appropriate template and select "Print Now". If you have a large number of spectra in the region table you select "+ All Regn to FR" (add all regions to Fast Report) and then select Print Now.

You can always preview the print out before it is printed or exported. It is not possible to edit the information once it is entered into Fast Report. It is important to have the spectrum and tables the way you want them before adding to fast reports.

One spectrum, with or without a table, can be added to Fast Report at a time by selecting "+ Regn to FR".

The report template can be Empted (Cleared) at any time.

The following examples demonstrate the flexibility of this printing system.

Selecting a Template
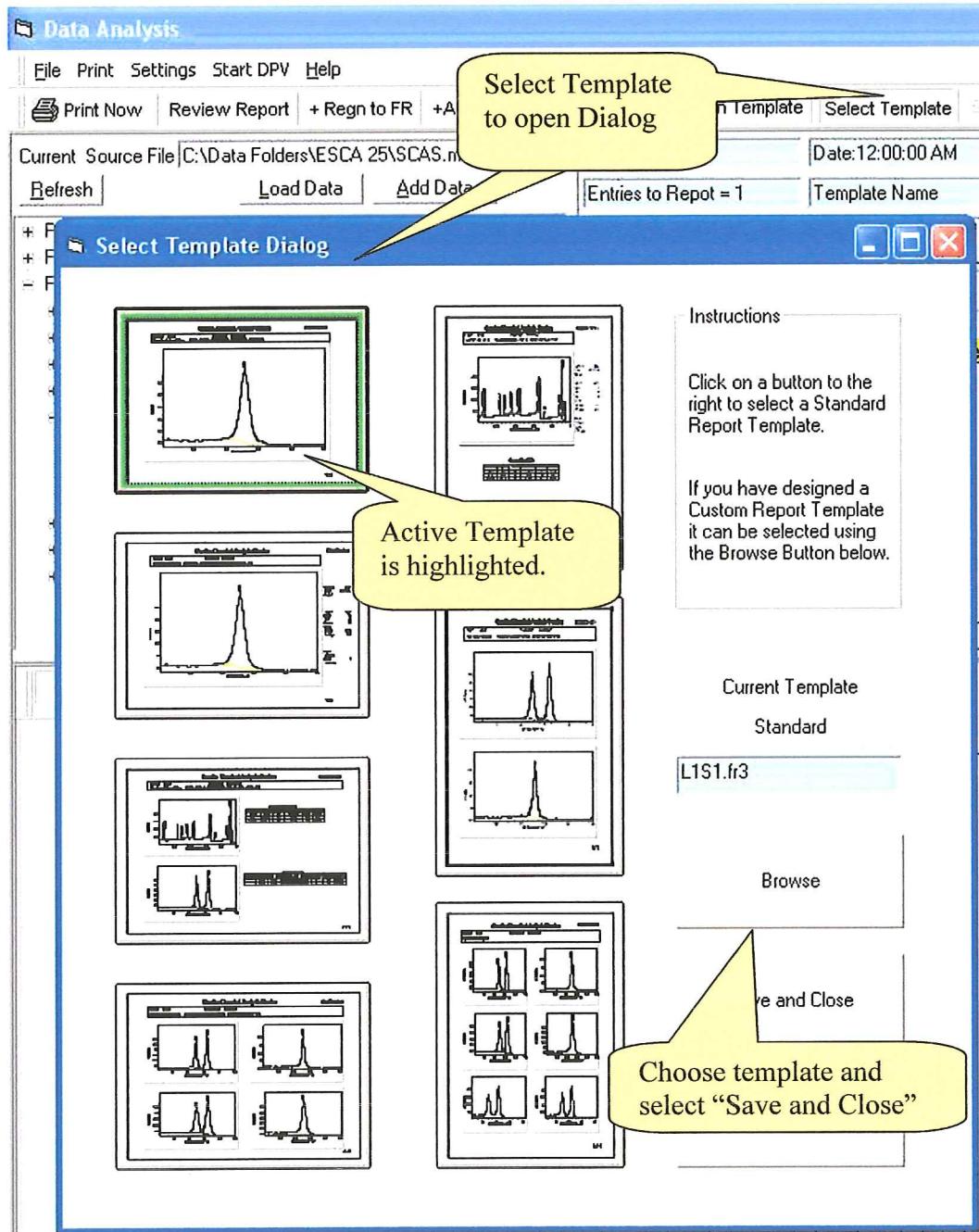
Dialog used to select template. Templates are available that show Spectra with header, collection parameter list, and data tables. The header provides a space for Laboratory name and logo. Custom templates can be created, stored and retrieved using the Browse button.

The following pages display examples or printing with the seven templates.

Project: Disk2   Experiment: 75AU_25C.MRS

Experiment Description: 75% Au:25% Cu ION ETCHED, 128 CH, 200 mS/CH, 100

Reg6:
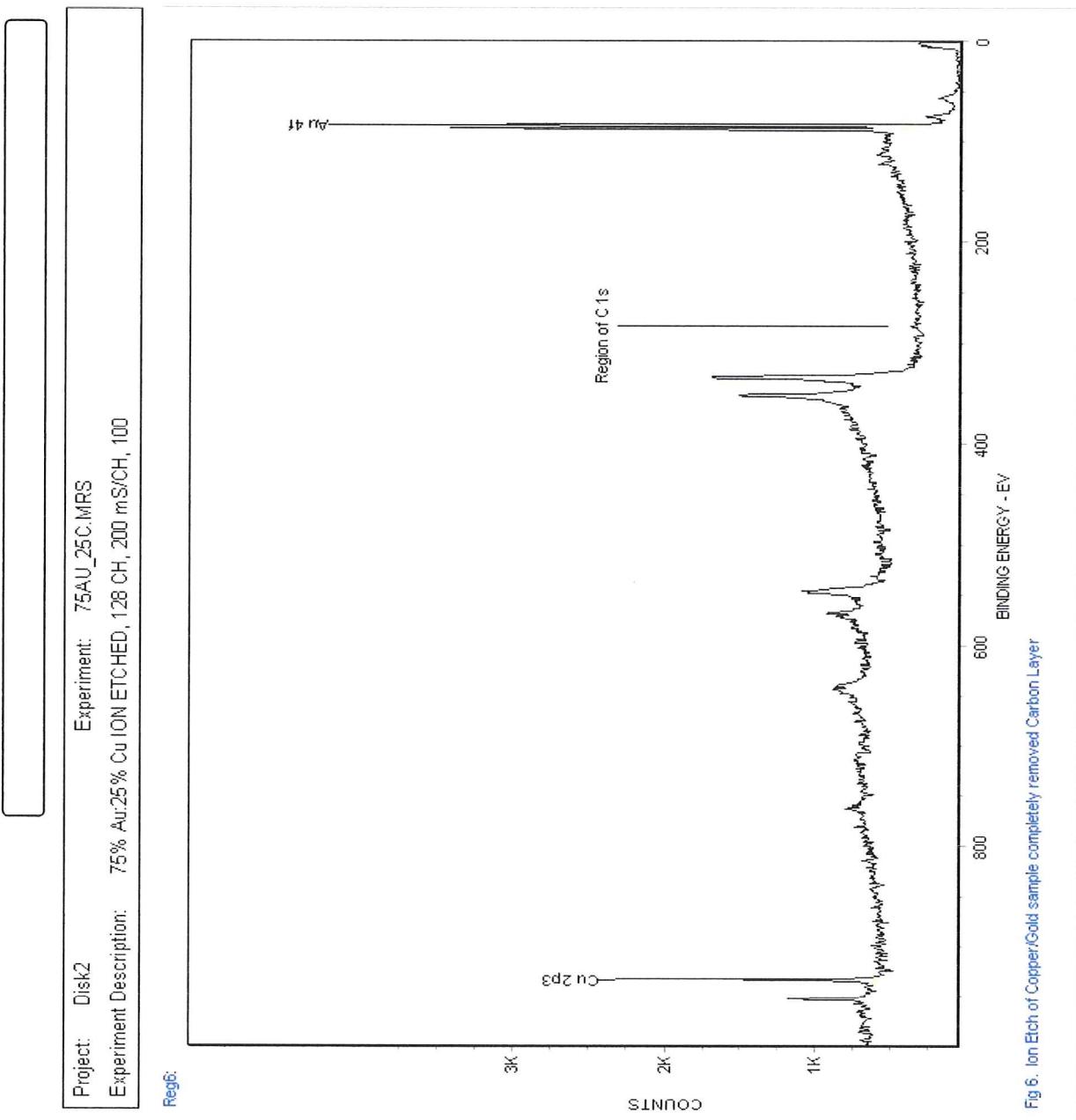
Fig 6. Ion Etch of Copper/Gold sample completely removed Carbon Layer

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Project: Disk2   Experiment: 75AU_25C MRS
Experiment Description: 75% Au:25% Cu ION ETCHED, 128 CH, 200 mS/CH, 100

Reg1:
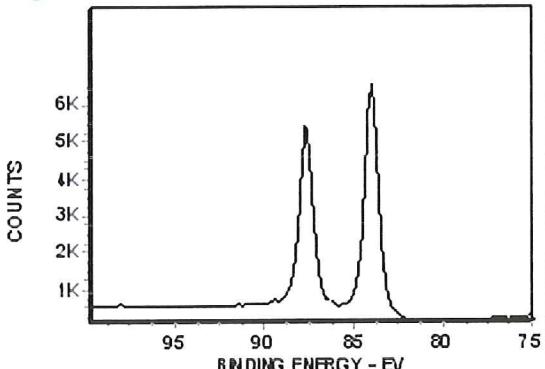
Figure 1. RES 1,600 SPOT

Reg2:
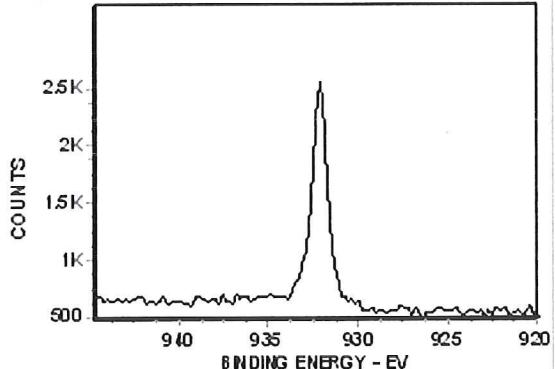
Figure 2. RES 1,600 SPOT

Reg3:
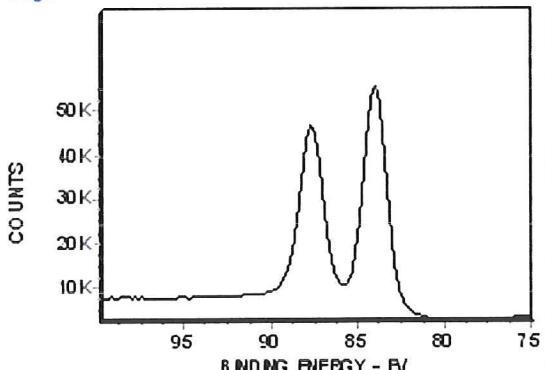
Figure 3. RES 4,600 SPOT

Reg4:
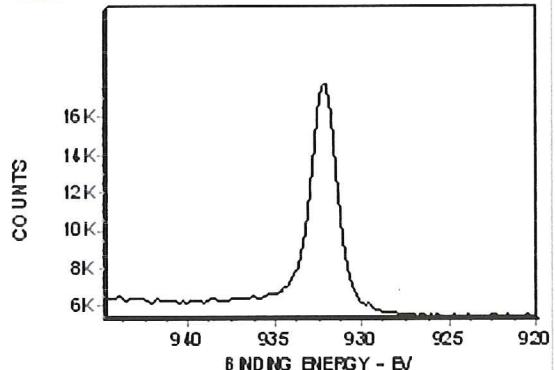
Figure 4. RES 4,600 SPOT

Reg5:
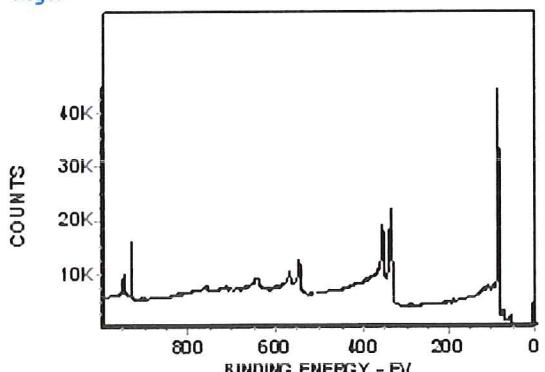
Figure 5. RES 4,600 SPOT

Reg6:

Figure 6. RES 1,600 SPOT

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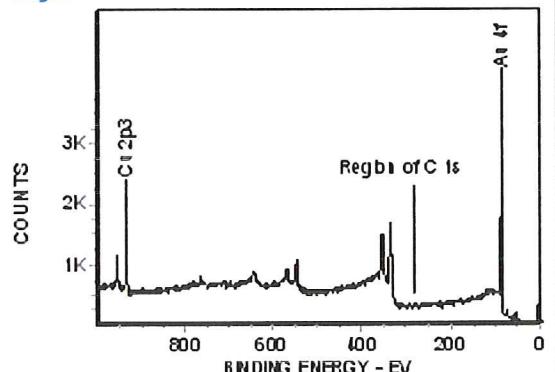
CAUTION: THE COMPOSITION TABLE COMBINES DATA FROM ALL SPECTRA. THIS IS TO ALLOW MIXING OF HIGH SENSITIVITY SCANS TAKEN AT RES 4 WITH SURVEYS TAKEM AT RES 4. IF TWO SURVEYS ARE IN THE SCAN TABLE BE SURE ONLY ONE TABLE HAS "Y" CHARACTERS IN THE INCLUDE COLUMN. YOU MUST ALSO BE SURE YOU MATCH THE SPECTRA ADDED TO FAST REPORT WITH DATA TABLE INCLUDED IN FAST REPORT. THERE IS ONLY ONE COMPOSITION TABLE AND THE "+REGN TO FR" BUTTON WILL ADD IT TO ANY ONE OF THE SURVEY SPECTRA IN THE TABLE.

PEAK FIT TABLES ARE MATCHED WITH THE SPECTRA USED TO COMPUTE THE FITS. The above caution does not apply to the peak fit tables. This can be seen in the example above.

The "Quick Title" tool button allows information to be added to the fixed Templates. See pages 12-16 for details on setting up Quick Titles.

Special print-to-file options are provided in "Review Report" utility. The graphic can be printed, sent to the clipboard, or exported in a number of formats.

Table Functions Tool Bar
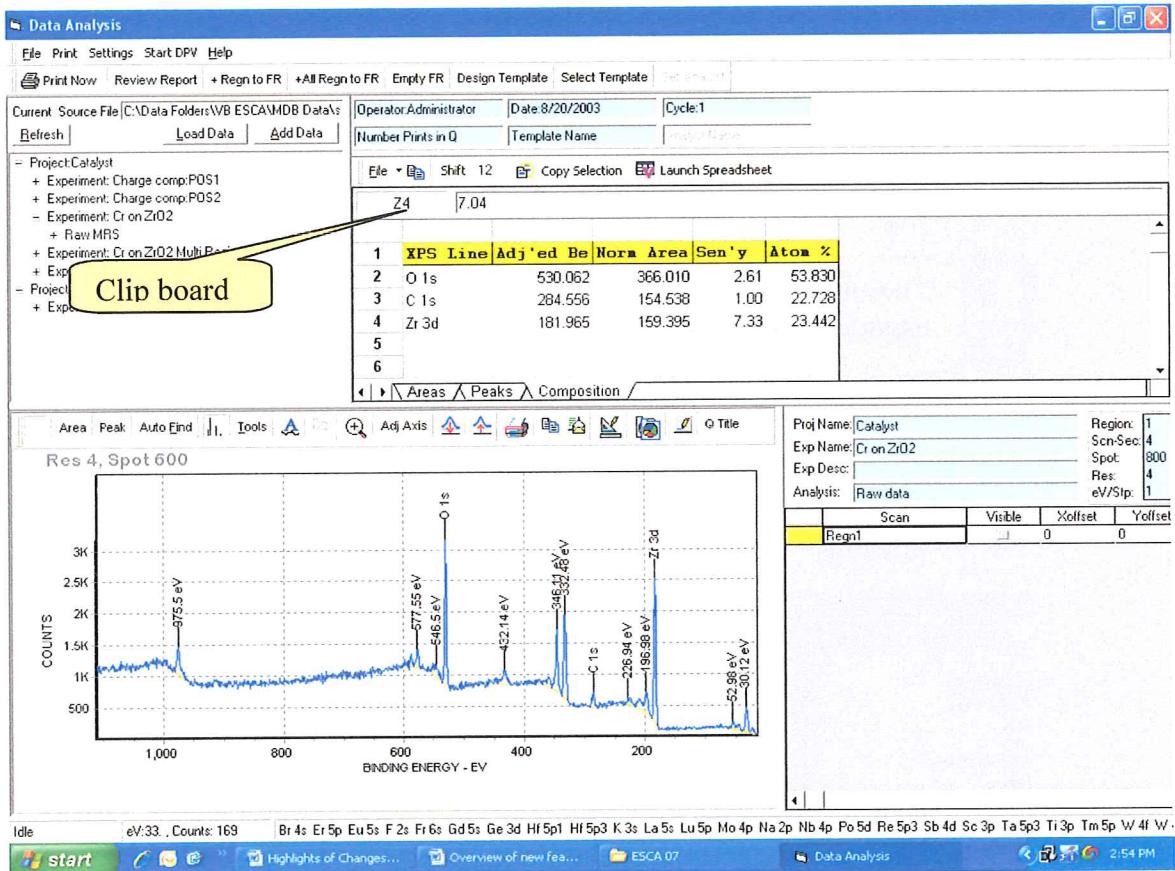
The clip board icon picks up the table. In this example the table was pasted into this word document. The table was then edited in word to eliminate the sensitivity column. Words table editing tools provide column, row and cell formatting and editing.

XPS Line	Adj'ed Be	Norm Area	Atom %
O 1s	530.062	366.010	53.830
C 1s	284.556	154.538	22.728
Zr 3d	181.965	159.395	23.442
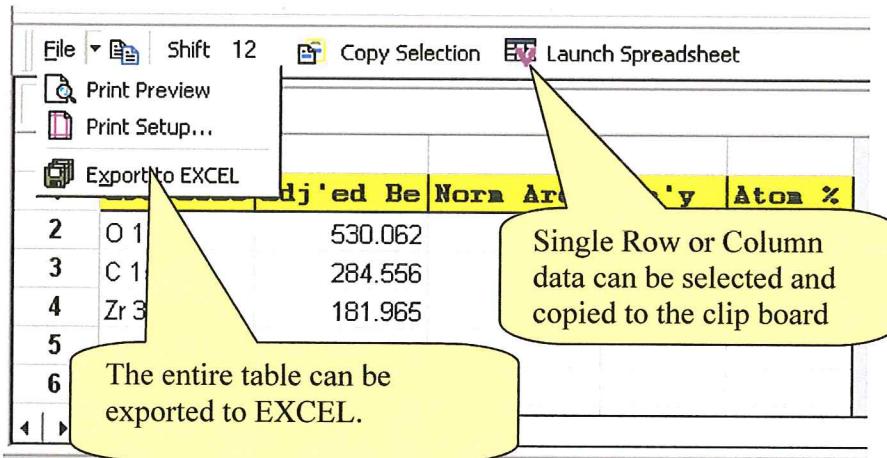
The tables can be exported to EXCEL or the embedded spreadsheet can be used for copy and paste operations. The "copy selection" icon can be used to pick up a single row or column. You can select multiple rows or columns if they are continuous without skipping any rows or columns.

The "Launch Spreadsheet" icon opens the VCI Formula One designer. This provides access to the embedded spreadsheet. A standard set of design tools are available. The redesigned spreadsheet can not be used to change the spreadsheet properties of the ANALYSIS Hawk application. The redesigned spreadsheet can be printed or pasted to other programs.

The following example displays some of the available tools.
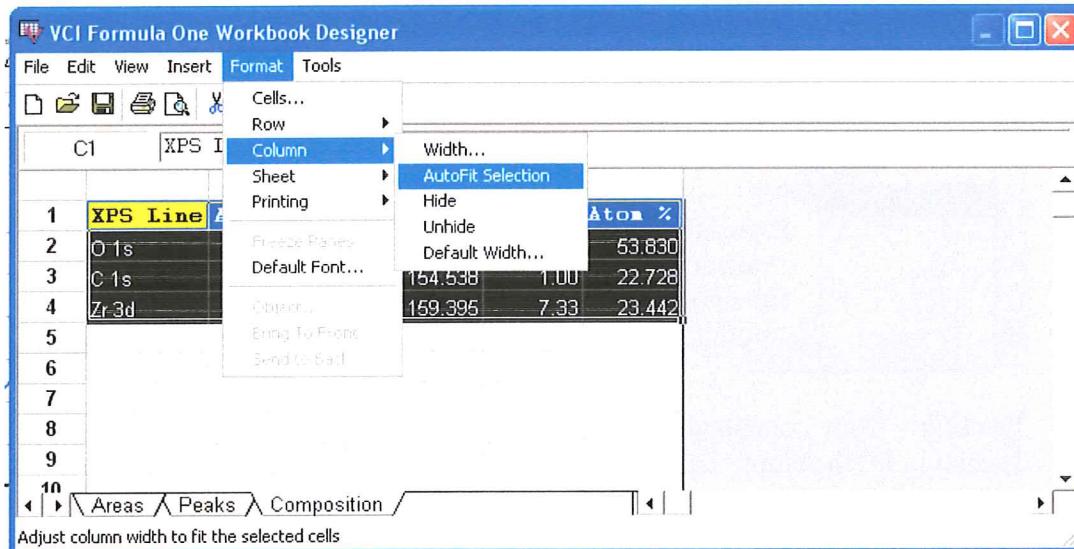
Use the Format > Column > AutoFit Selection to expose all the columns of the spreadsheet.
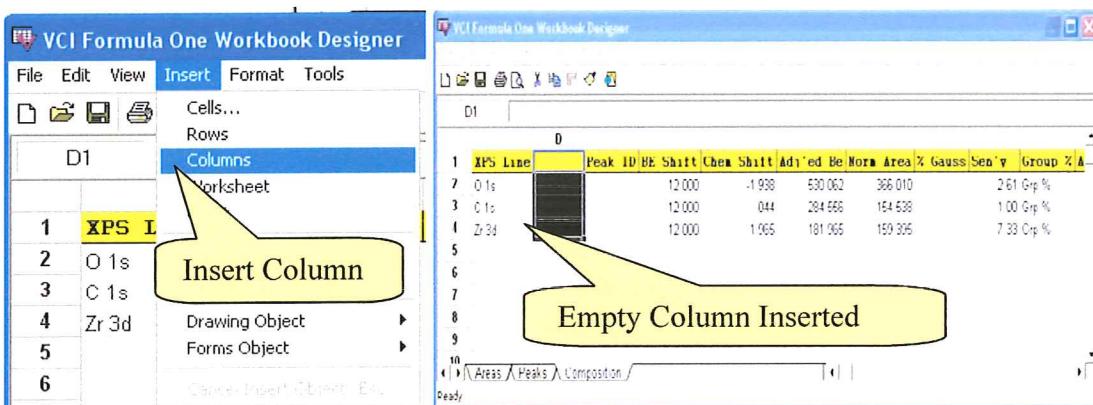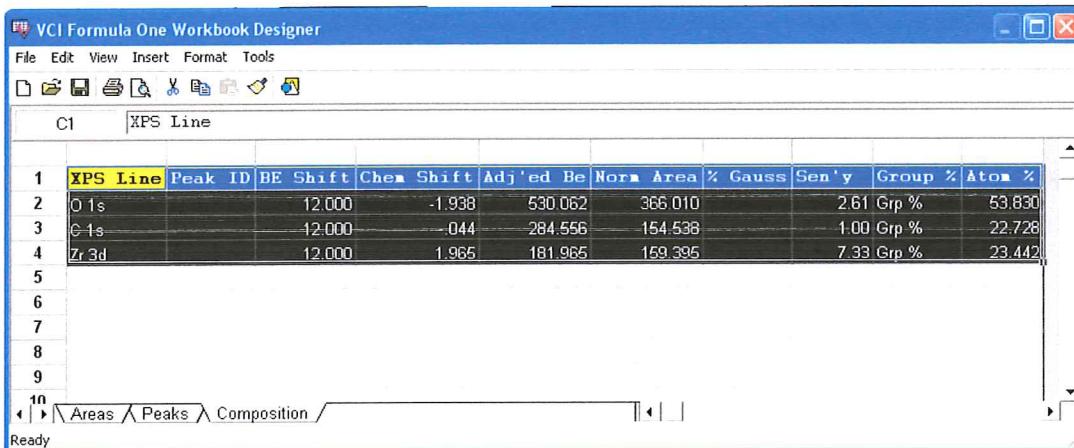
The Insert > Column command can be used to enter an empty column.
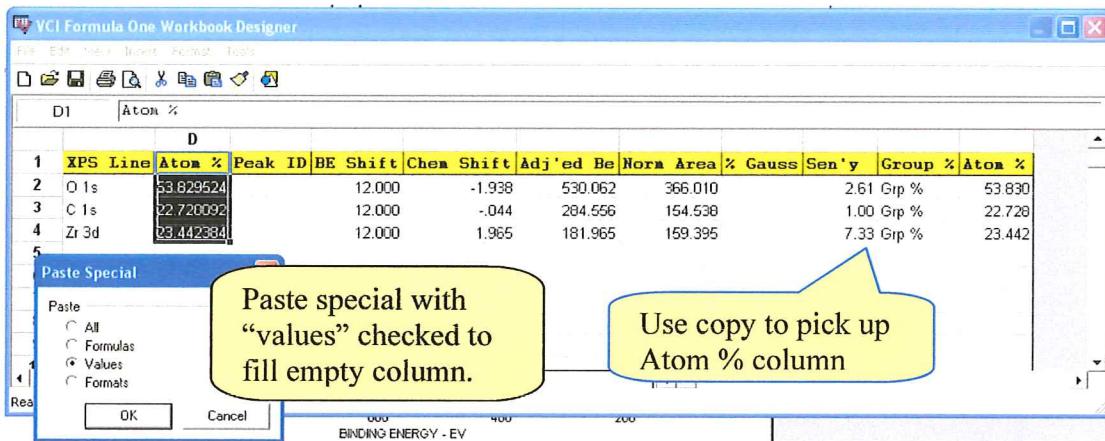
The Edit > Copy command can be used to copy a complete column and then Edit > Paste Special to fill the empty column. Use the Values mode to insure the numbers are copied and not the formulas.

The rearranged table may be printed or copied to the clipboard. The format tool provides hide column or hide row functions.

The VCI Formula One Designer has been opened with cell protection turned off. This allows the editing of both the cell values and formulas.

DP Viewer

DP Viewer provides an alternate depth profile tool. This tool is in development. Any suggestions for improvement are welcome.

In the first window you may browse to an alternate Scofield table. It is recommended that you use the Programdb.mdb that is in the C:\Program Files\Esca 2000 folder. The Scofield table contained in the Programdb.mdb can be loaded by selecting [Load Table] when the path is showing in the path window.

After the Scofield is loaded the DP Viewer will open. No default depth profile is loaded. Go to the Folder Icon to open a database. You may navigate your network, hard drive or removable media to locate the folder that contains the database of interest. When the database is selected the project/experiment tree for the database will be displayed in the right pane. Find the Raw data or previous Analysis for the depth profile of interest. Select open to load the depth profile data into the DP Viewer.
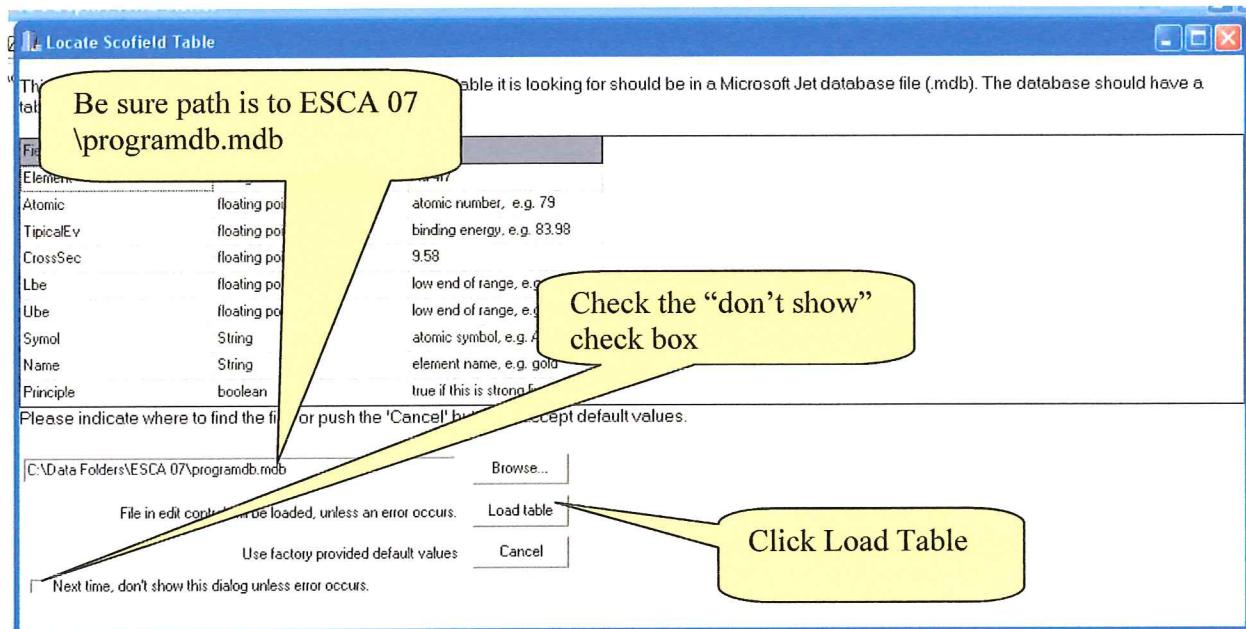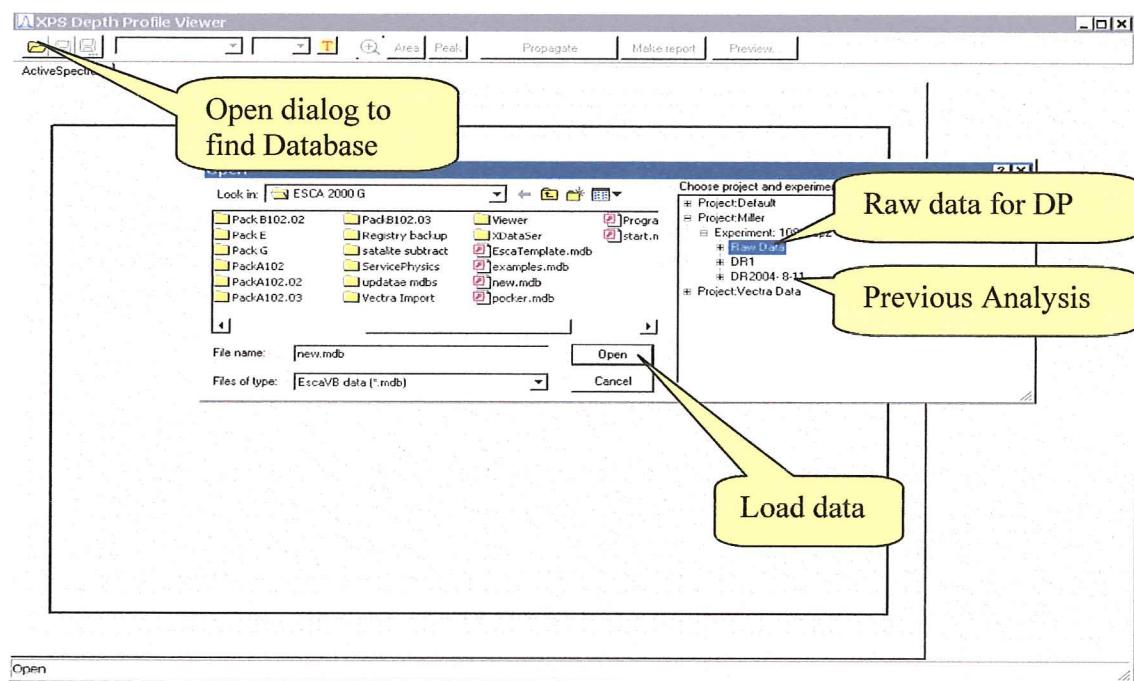
DP Viewer with data loaded. There are no default baselines assigned. Select the spectral region to view. Cycle 1 will be displayed by default.
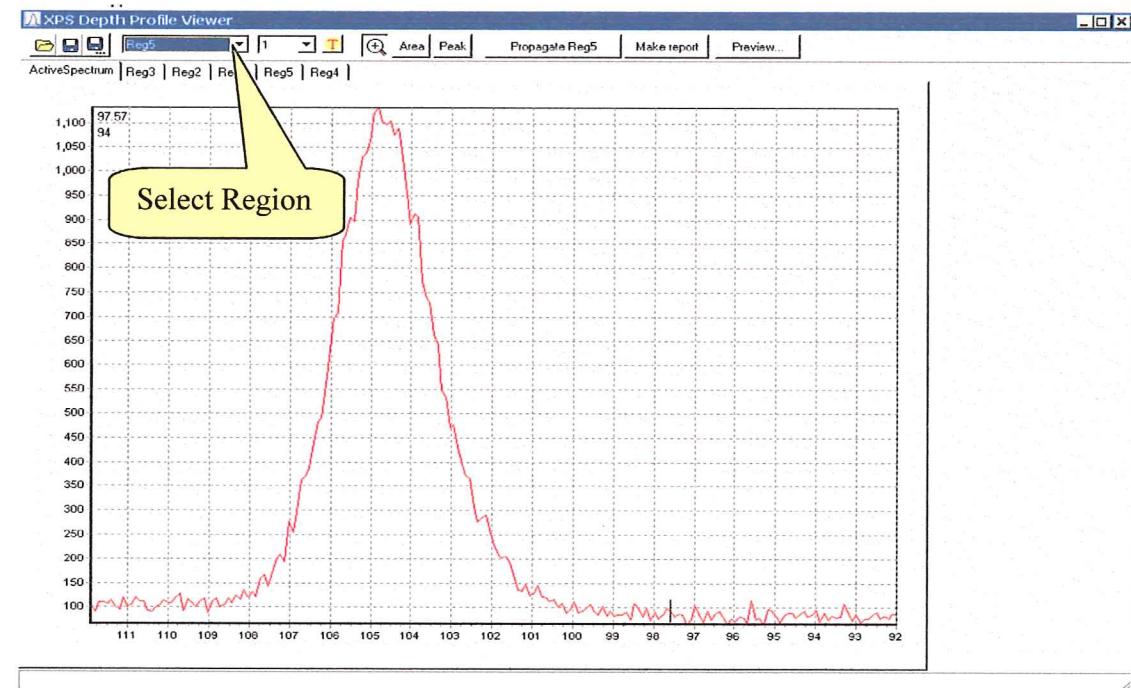
Select a measurement mode. The Zoom tool is turned off when you enter a measurement mode. The Area mode is shown in this example.

Set the end point average.   In the example, 3 points to each side of the selected point will be averaged, for a total of 7 points.

Choose linear or Shirley base line.

To draw a base line click near the spectrum. The end points will jump to the point you click. There is no need to "sneak up" to the current end point, activate it and then drag. When you like the starting point then drag. Now click [Next >] to measure the area.

If this is the first spectrum, for the selected region, then [Is Fit Template] check box will be checked by default. This means the binding energy of the two baseline endpoints can be used to define the base line for the rest of the cycles. Use the [Propagate Reg] button to propagate the area measurement to all cycles of the selected region.

You can move to a different cycle, draw a baseline and select next to make an area measurement. Then check the [Is Fit Template] check box. Now this cycle will become the Template. The original cycle will be automatically unchecked. The new template can be propagated to all cycles.

A cycle can be selected and its endpoints modified. When next is selected the new endpoints will be used to measure the area for this cycle only. Not all cycles need to have the same endpoints.
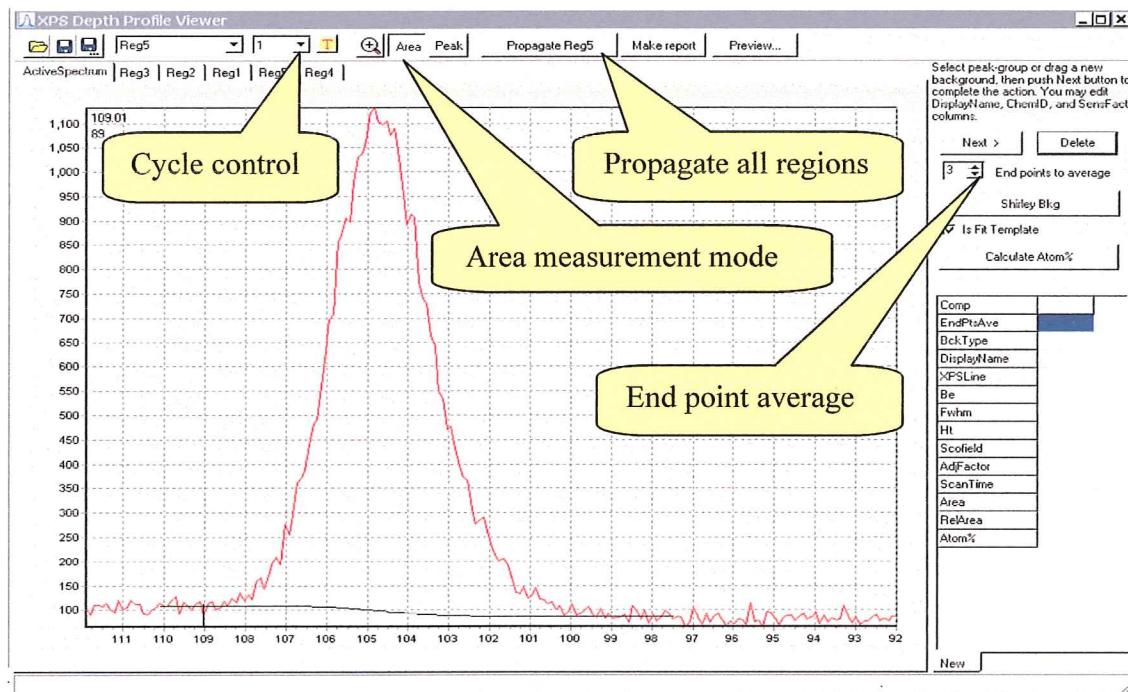
After the [Next >] button is clicked the area is measured and presented in the table.
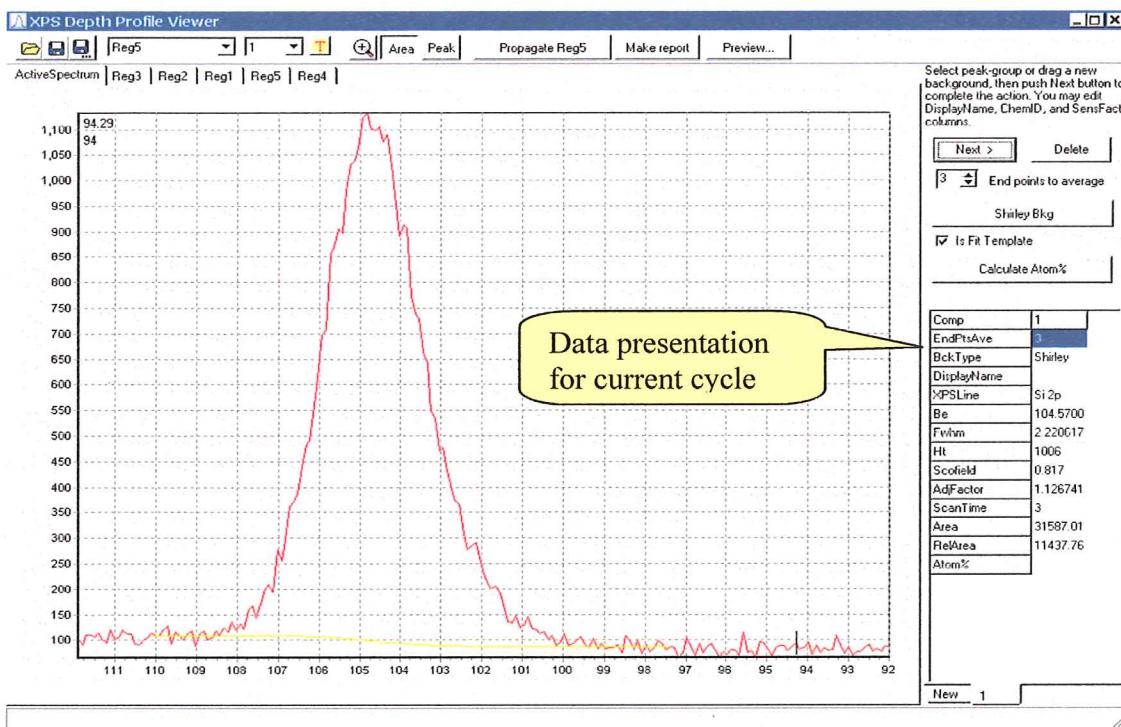
The cycle and be changed using the up/down arrows or the mouse wheel when the cycle control is active.
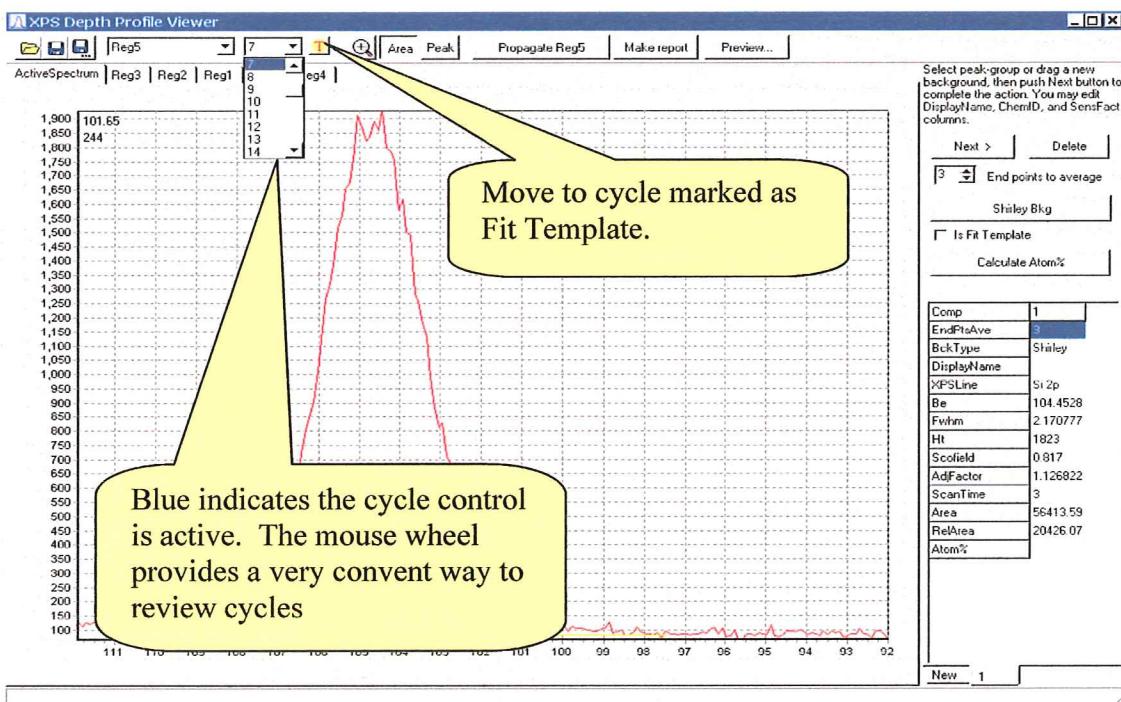
Select a new region using the [Region Control]
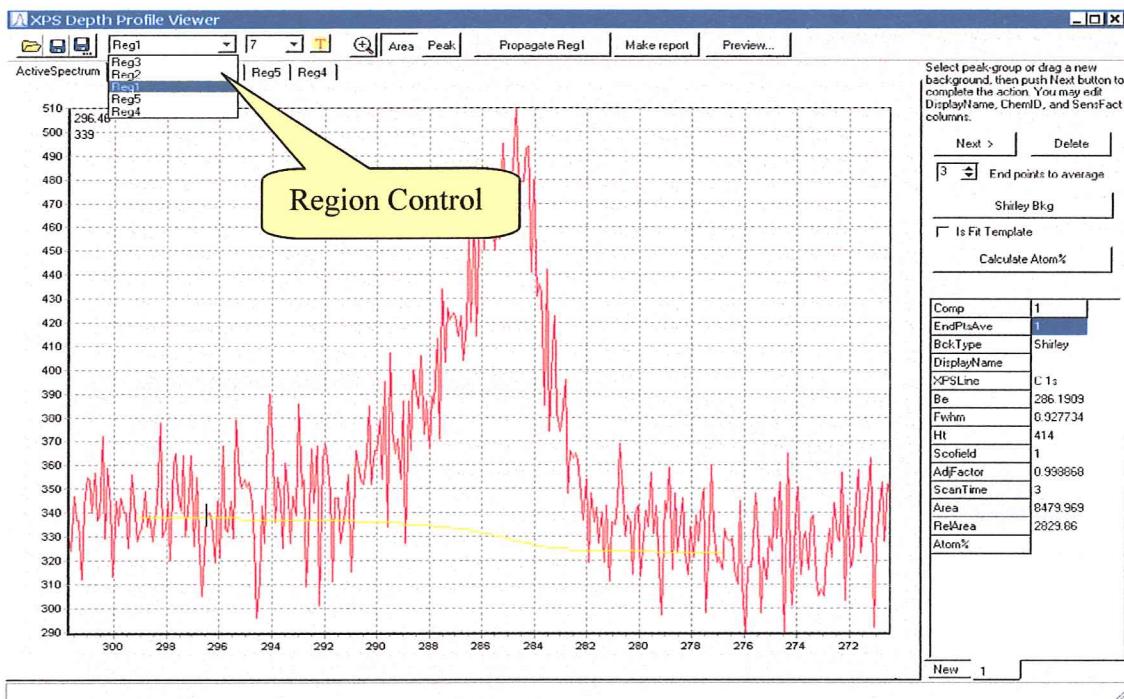
To view all cycles at one time select the [Group Region Tab]
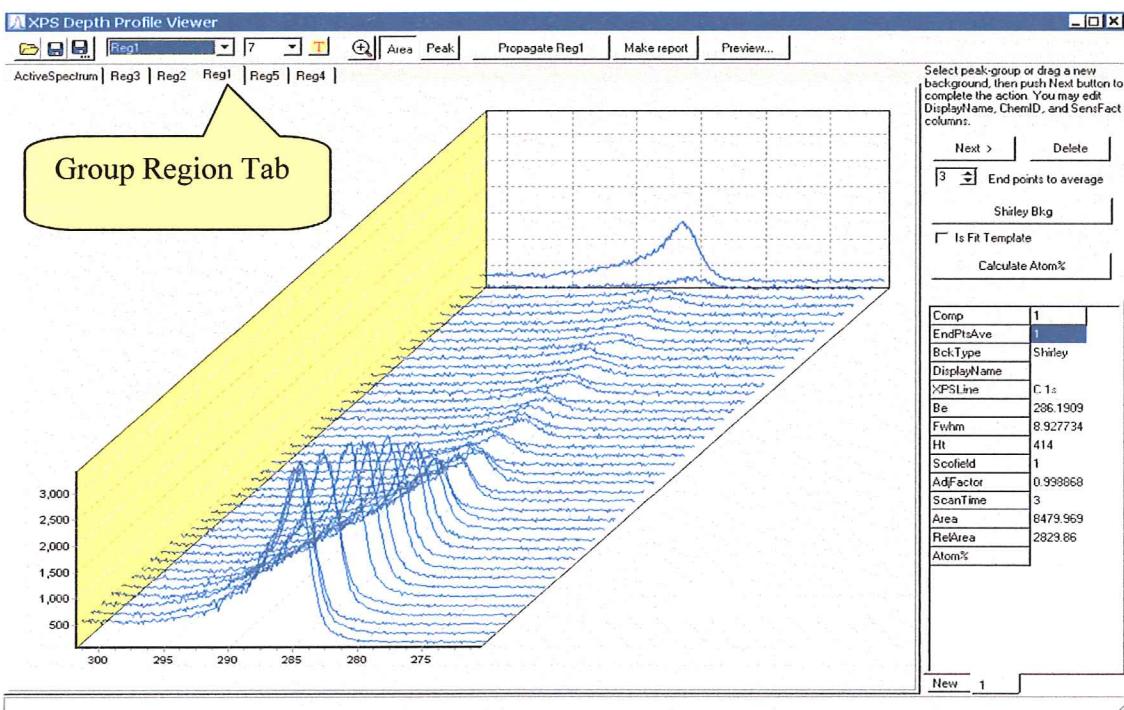
Double click the 3D display to bring up the Display Control. May options are available.
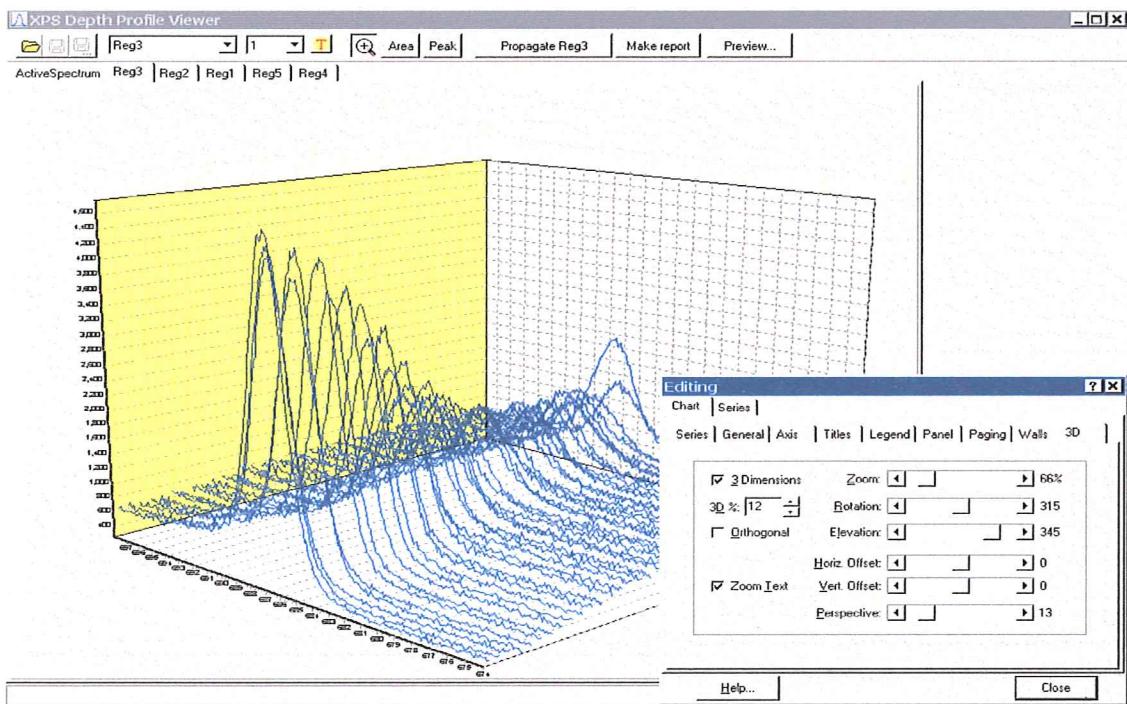
The Atom percent is computed and displayed based on the regions/cycles measured. It is only computed for the cycle displayed.
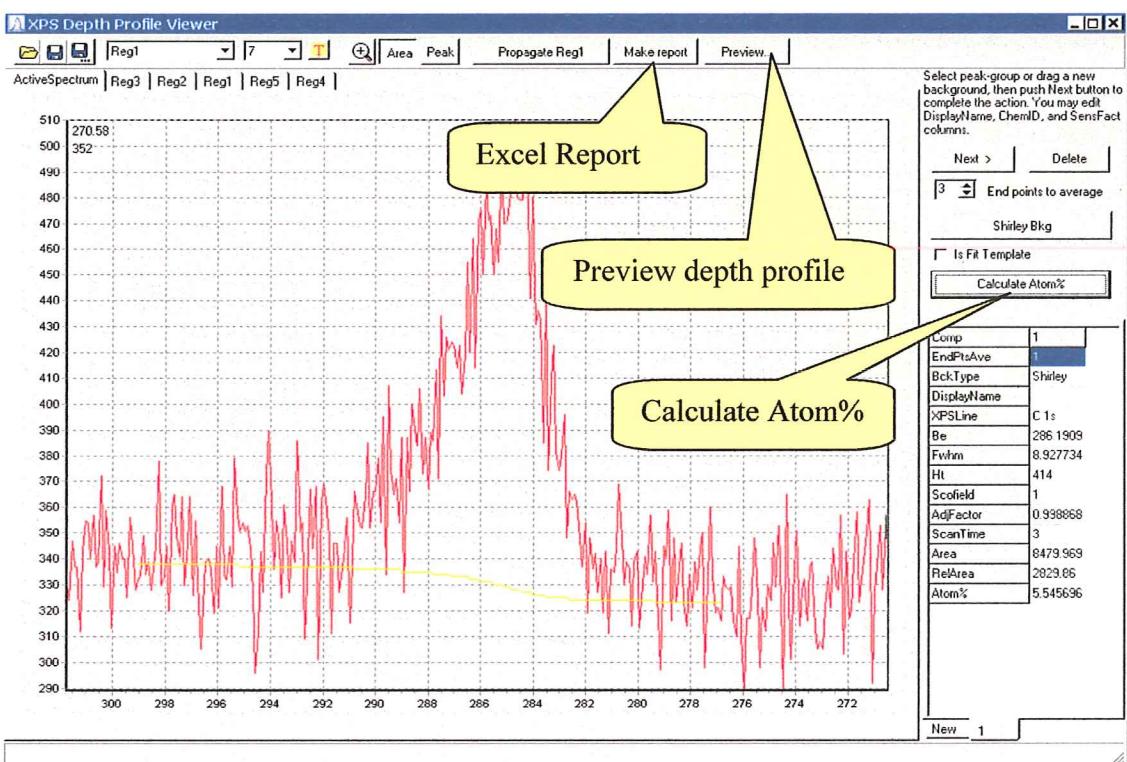
Preview of Depth Profile. This preview can be printed. The chart editor provides font control, background color control and much more.

Exporting Depth Profile to EXCEL

To export the profile to EXCEL select the "Make a Report" button in the DP Viewer toolbar. The "Chart Options Dialog will open. The X axis scale type can be selected as Depth, Etch Time or Cycle. If Depth is selected enter the Etch rate. You may also enter a title for the Depth Chart. Select Continue.

Chart Options Dialog

Etch Rate (nm/min) `34.5`

Chart Title `SiO2 thickness test`

Chart Horiz Axis   (•) Depth   ( ) Etch Time   ( ) Cycle

[Edit Chart Format Code]   [Edit Series Format Code]   [Continue]
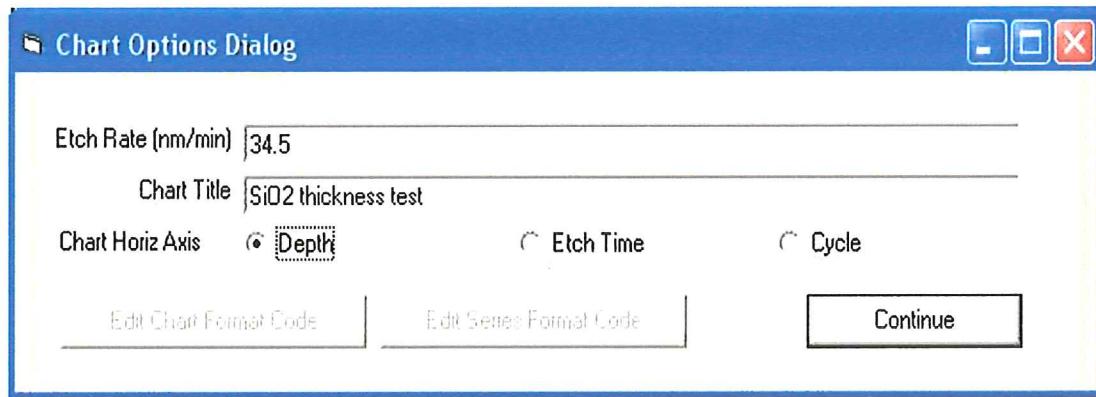
The Scofield Table locator will be presented if the "don't show" check box is unchecked. Select the [Load Table] button.

Locate Scofield Table

This program is attempting to locate a scofield table. The table it is looking for should be in a Microsoft Jet database file (.mdb). The database should have a table named 'Scofield' with the following fields:

Field Name	Type	Use
Element	String	Au 4f7
Atomic	floating point	atomic number, e.g. 79
TipicalEv	floating point	binding energy, e.g. 83.98
CrossSec	floating point	9.58
Lbe	floating point	low end of range, e.g. 82
Ube	floating point	low end of range, e.g. 88
Symol	String	atomic symbol, e.g. Au
Name	String	element name, e.g. gold
Principle	boolean	true if this is strong line

Please indicate where to find the file, or push the 'Cancel' button to accept default values.

`C:\Program Files\Esca 2000\Programdb.mdb`   [Browse...]

File in edit control will be loaded, unless an error occurs.   [Load table]

Use factory provided default values   [Cancel]

☐ Next time, don't show this dialog unless error occurs.

After the export, the EXCEL application may be minimized but the Indicator will be present in the Windows Status bar at the bottom of the display. If you view the DP Viewer window you will find the following Report Log. It may contain the following Error in the 5 line. This is a result of the security setting in EXCEL for using VBA programming. This is not a fatal error. The Export will be complete. Some special programming features that are not currently activated will not be available. The Error can be eliminated by changing the security setting as described in the Software Installation section of this Instruction.

Report Generator Progress Log

```
Excel Launched.
Found Scofield Lookup Component.
Installed worksheet.
About to inject code to format charts.
Error in InjectCode routine: Programmatic access to Visual Basic Project is not trusted raised by Microsoft
Office Excel: 1004
Unable to inject code to format charts
Finished processing composition tables
Added summary sheet.
Added summary tables.
Added binding energy chart
Added area chart
Added atom percent chart
Done generating report
```

Done

Trust Center

- Trusted Publishers
- Trusted Locations
- Add-ins
- ActiveX Settings
- **Macro Settings**
- Message Bar
- External Content
- Privacy Options

Macro Settings

For macros in documents not in a trusted location:
- ○ Disable all macros without notification
- ◉ Disable all macros with notification
- ○ Disable all macros except digitally signed macros
- ○ Enable all macros (not recommended; potentially dangerous code can run)

Developer Macro Settings

- ☑ Trust access to the VBA project object model

OK   Cancel

Security setting for EXCEL 2007 used to avoid programming error.
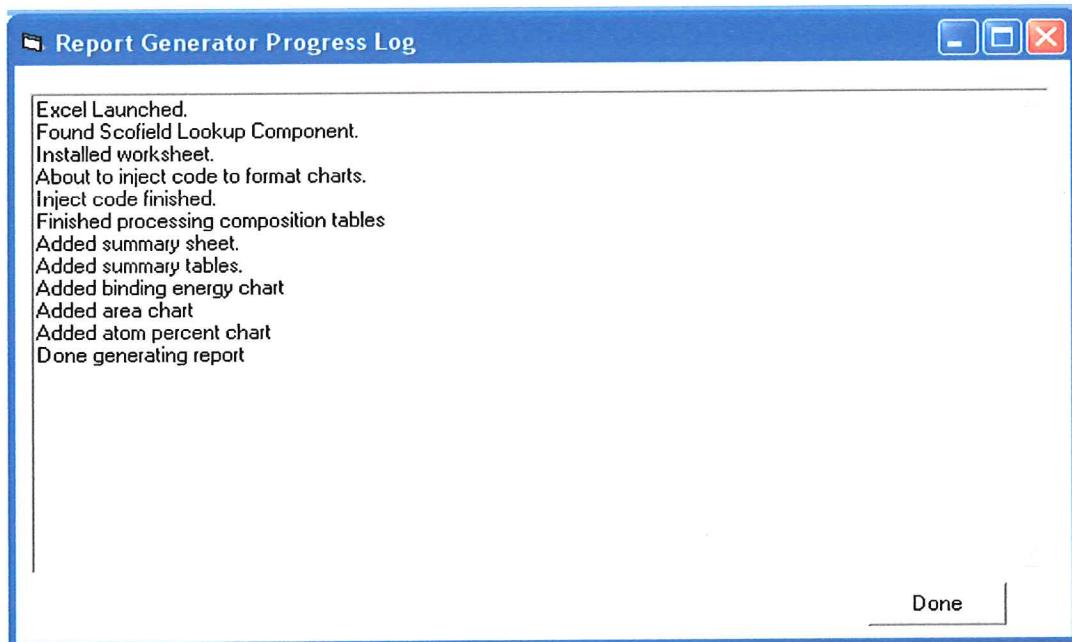
Report with Security setting changed to "Trust" VBA programming.

After the Excel application is loaded with all the depth profile data the Excel Tab will stop blinking in the Windows Application Tray. Select the tab to display the tables.
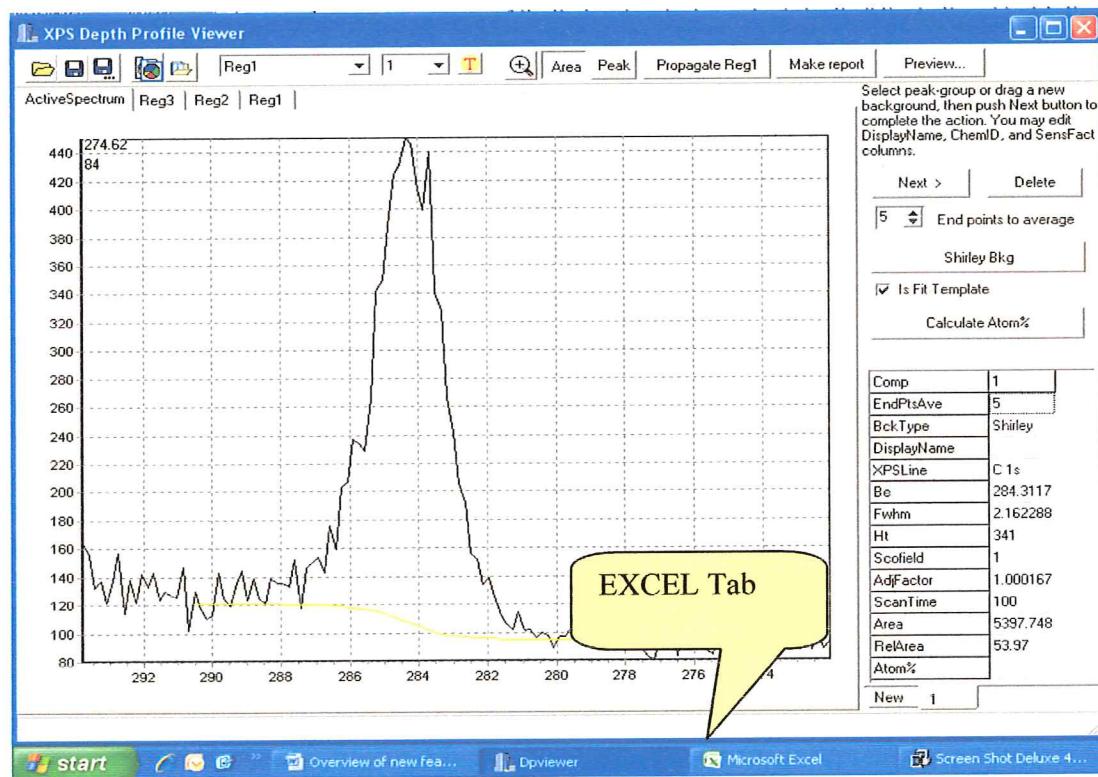
The first tab will display the depth profile.   Atomic percent data tables are summarized in the Summary table. The Composition Table tab displays full data for all cycles.
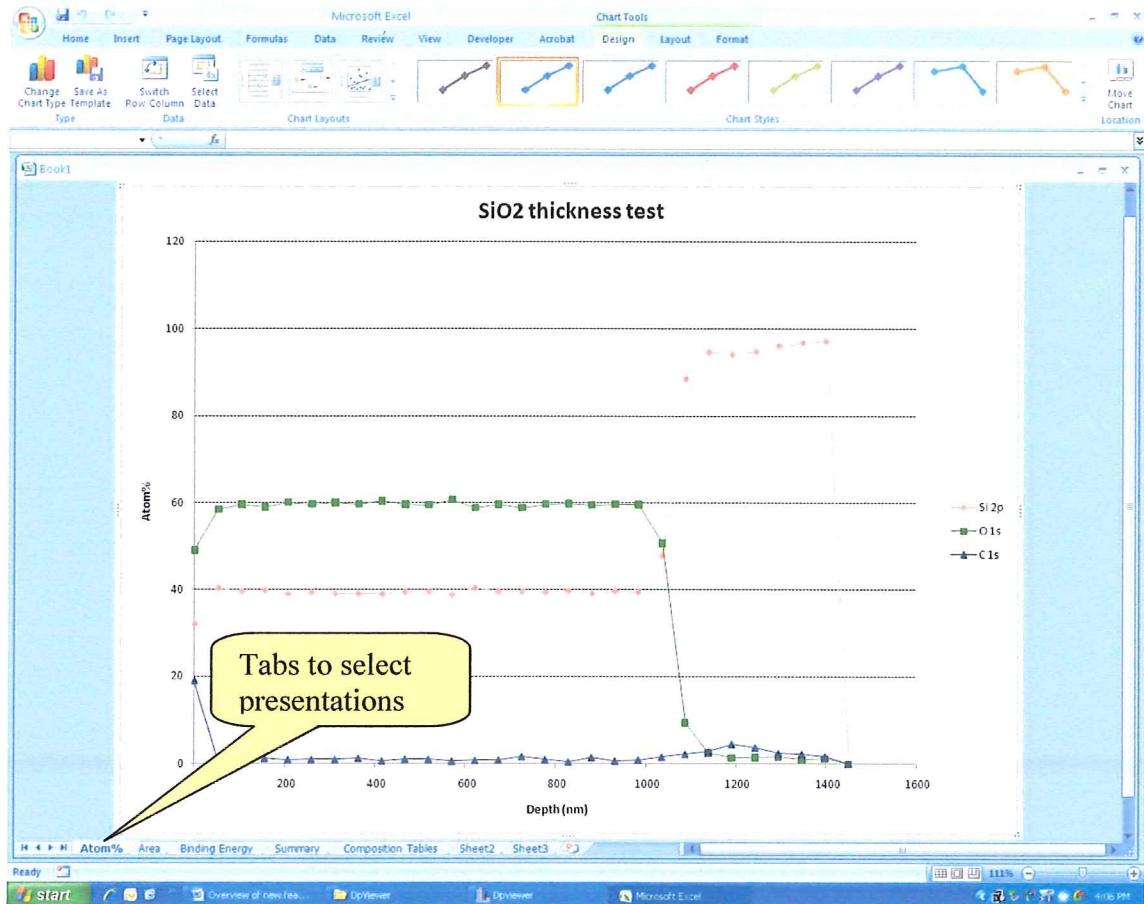
Microsoft Excel

Home | Insert | Page Layout | Formulas | Data | Review | View | Developer | Acrobat

A1 | f_x | Summary Table for BindingEnergy

Book1

|	A	B	C	D	E	F	G	H	I	J	K
1	Summary Table for BindingEnergy										
2		Cycle	EtchTime	Depth	Si 2p	O 1s	C 1s				
3	Cycle_1	1	0	0	102.481	532.3162	284.3117				
4	Cycle_2	2	90	51.75	102.8318	532.3728	284.5275				
5	Cycle_3	3	180	103.5	102.7563	532.4178	285.3359				
6	Cycle_4	4	270	155.25	102.9108	532.4284	284.1075				
7	Cycle_5	5	360	207	102.6595	532.4684	286.0585				
8	Cycle_6	6	450	258.75	102.4377	532.4183	283.6938				
9	Cycle_7	7	540	310.5	102.6671	532.388	284.3129				
10	Cycle_8	8	630	362.25	102.4574	532.4308	284.1707				
11	Cycle_9	9	720	414	102.8823	532.3896	284.25				
12	Cycle_10	10	810	465.75	102.3564	532.3679	284.5404				
13	Cycle_11	11	900	517.5	102.5206	532.1038	285.1686				
14	Cycle_12	12	990	569.25	102.5286	532.0783	282.8661				
15	Cycle_13	13	1080	621	102.7439	532.3097	285.8067				
16	Cycle_14	14	1170	672.75	102.4726	532.3386	284.0458				
17	Cycle_15	15	1260	724.5	102.6425	532.4025	285.5477				
18	Cycle_16	16	1350	776.25	102.6945	532.3604	284.1024				
19	Cycle_17	17	1440	828	102.7373	532.3489	283.9015				
20	Cycle_18	18	1530	879.75	103.0859	532.3201	285.9295				
21	Cycle_19	19	1620	931.5	102.7438	532.0421	285.7705				
22	Cycle_20	20	1710	983.25	102.701	532.1041	285.8831				
23	Cycle_21	21	1800	1035	101.9915	531.9995	284.2719				
24	Cycle_22	22	1890	1086.75	98.35308	530.7889	283.8077				
25	Cycle_23	23	1980	1138.5	98.37248	530.8023	284.771				
26	Cycle_24	24	2070	1190.25	98.36657	531.5303	286.417				
27	Cycle_25	25	2160	1242	98.35715	530.6172	286.2361				
28	Cycle_26	26	2250	1293.75	98.36073	531.0209	284.2061				
29	Cycle_27	27	2340	1345.5	98.34097	531.3896	284.9839				
30	Cycle_28	28	2430	1397.25	98.31579	531.049	283.5266				
31	Cycle_29	29	2520	1449	101.5074	531.5988	284.984				
32											
33	Summary Table for Area										
34		Cycle	EtchTime	Depth	Si 2p	O 1s	C 1s				
35	Cycle_1	1	0	0	12308.37	52124.95	5397.748				
36	Cycle_2	2	90	51.75	16763.95	67053.01	340.0399				

Atom% | Area | Binding Energy | Summary | Composition Tables | Sheet2 | Sheet3

Ready

Summary tables in EXCEL

Microsoft Excel — Book1 — A1 — Composition table for cycle 1

Decrease Indent (Ctrl+Alt+Shift+Tab) — Decrease the margin between the border and the text in the cell.

	A	B	C	D	E	F	G	H	I	J	K
1	Composition table for cycle 1										
2	Name	Line	Be	Fwhm	Height	Area	CrossSecti	RelArea	Atom%	ScanTime	AdjCs
3	Si 2p	Si 2p	102.481	2.328425	838	12308.37	0.817	90.99108	31.99923	150	0.9018
4	O 1s	O 1s	532.3162	2.152805	3666	52124.95	2.93	139.3945	49.02147	150	2.492922
5	C 1s	C 1s	284.3117	2.162288	341	5397.748	1	53.96842	18.97931	100	1.000168
6											
7											
8	Composition table for cycle 2										
9	Name	Line	Be	Fwhm	Height	Area	CrossSecti	RelArea	Atom%	ScanTime	AdjCs
10	Si 2p	Si 2p	102.8318	2.32059	1078	16763.95	0.817	123.9515	40.41789	150	0.90164
11	O 1s	O 1s	532.3728	2.102947	4901	67053.01	2.93	179.3231	58.47336	150	2.492819
12	C 1s	C 1s	284.5275	8.574507	105	340.0399	1	3.400256	1.108749	100	1.000042
13											
14											
15	Composition table for cycle 3										
16	Name	Line	Be	Fwhm	Height	Area	CrossSecti	RelArea	Atom%	ScanTime	AdjCs
17	Si 2p	Si 2p	102.7563	2.254092	1136	16221.39	0.817	119.9352	39.54109	150	0.901675
18	O 1s	O 1s	532.4178	2.132161	4874	67598.06	2.93	180.7867	59.60303	150	2.492737
19	C 1s	C 1s	285.3359	8.384813	118	259.491	1	2.596023	0.855875	100	0.999571
20											
21											
22	Composition table for cycle 4										
23	Name	Line	Be	Fwhm	Height	Area	CrossSecti	RelArea	Atom%	ScanTime	AdjCs
24	Si 2p	Si 2p	102.9108	2.420061	1049	16411.27	0.817	121.3487	39.85391	150	0.901604
25	O 1s	O 1s	532.4284	2.085839	4935	67096.4	2.93	179.4465	58.93466	150	2.492717
26	C 1s	C 1s	284.1075	9.000133	105	368.9641	1	3.688583	1.211422	100	1.000287
27											
28											
29	Composition table for cycle 5										
30	Name	Line	Be	Fwhm	Height	Area	CrossSecti	RelArea	Atom%	ScanTime	AdjCs
31	Si 2p	Si 2p	102.6595	2.23865	1089	15927.64	0.817	117.7576	39.025	150	0.901719
32	O 1s	O 1s	532.4684	2.083498	4919	67767.8	2.93	181.2474	60.06558	150	2.492644
33	C 1s	C 1s	286.0585	7.046598	98	274.1848	1	2.744179	0.909424	100	0.99915
34											
35											
36	Composition table for cycle 6										

Cycle by Cycle Composition Tables

**SiO2 thickness test**
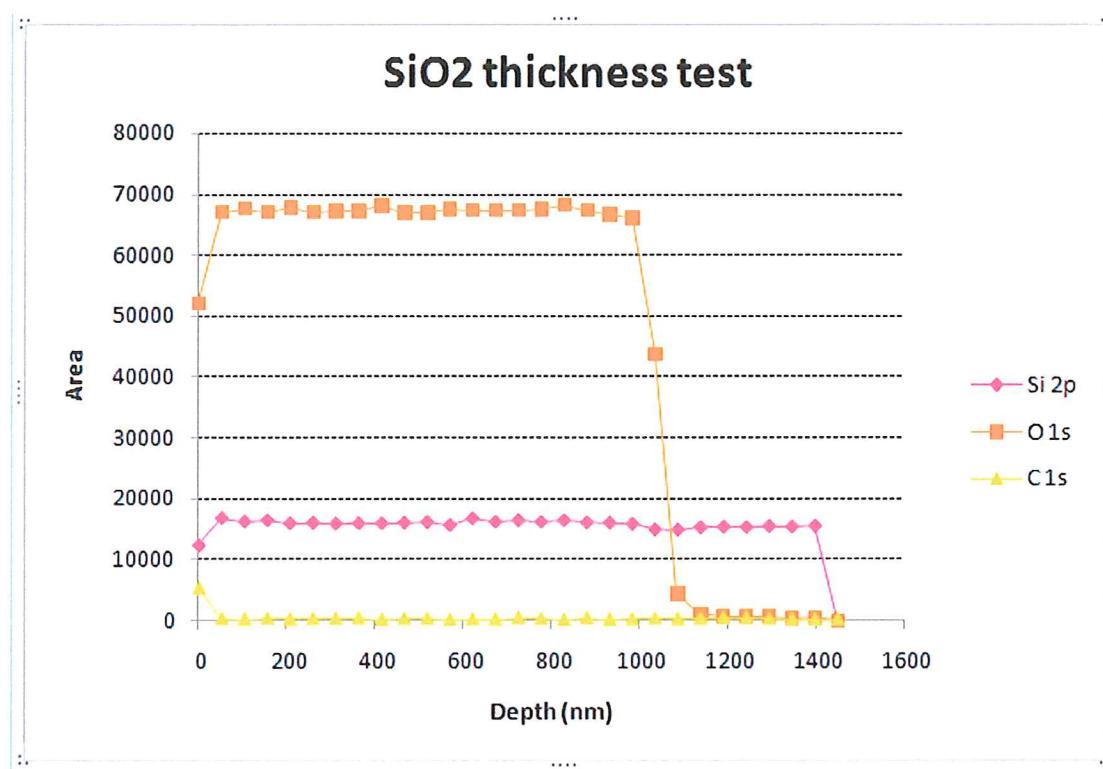
Depth vs Area Chart.

The data exported to EXCEL allows the Analyst flexibility in organizing, formatting and presenting the data.

Other DP Viewer Functions

Auto-lookup of Scofield crossection. If the label given each region uses the standard XPS transition line format, such as Au 4f, then the Auto-lookup feature will find the Scofield crossection and compute the normalized area.
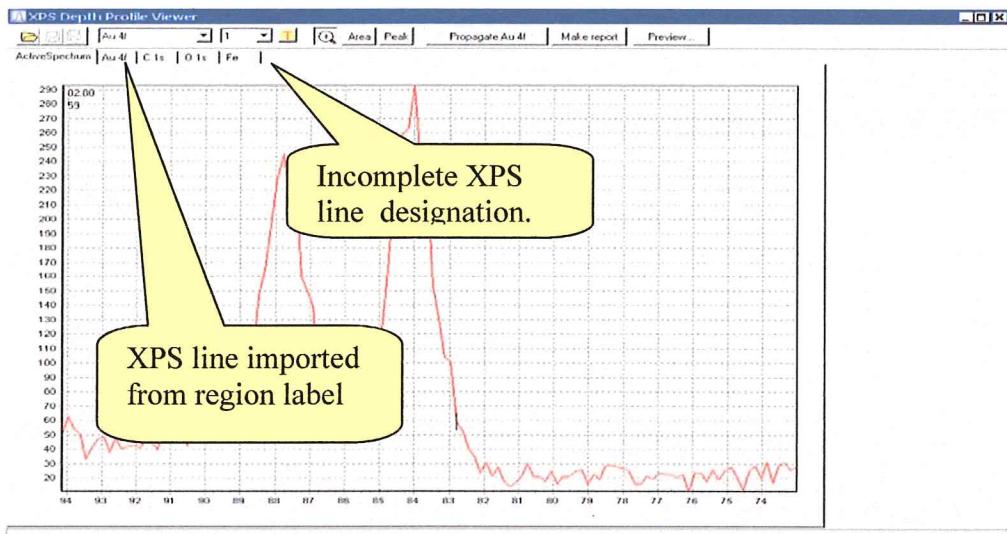
If the label is not found in the Scofield table then a dialog will be displayed. This dialog may result from errors in entering the label.
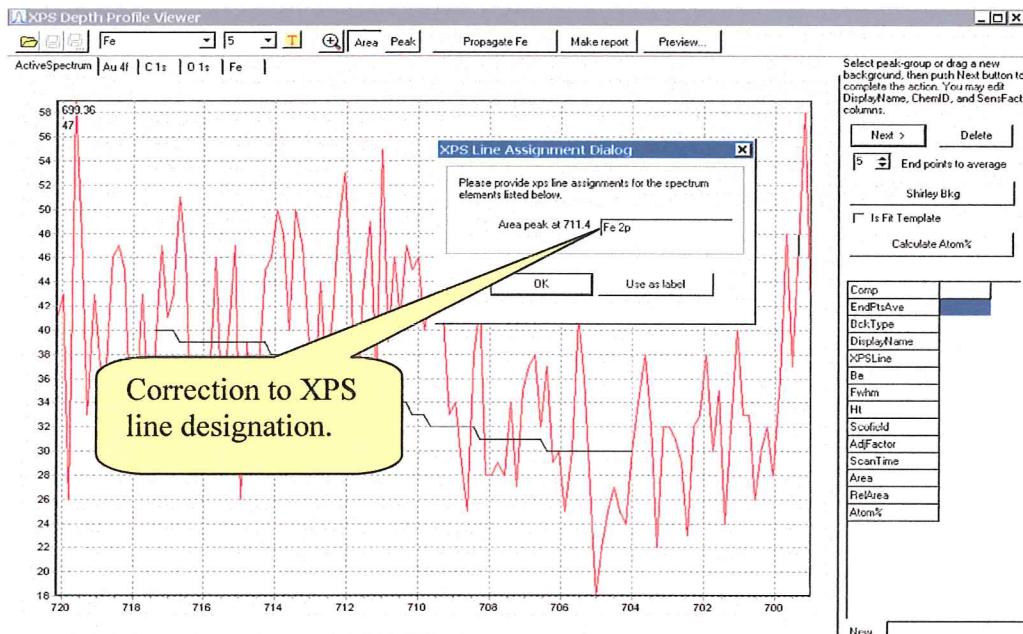
In the Capture Application the XPS Line designations can be used to label the Region Names. This provides the correct information to the Auto-Lookup feature in the DP Viewer Application.

Correct entry of XPS Line designations in Depth Profile Dialog will facilitate the auto assignment of Scofield Crossection information.

1	Function		Spot Size	Etch	Flood Gun	Cycles	Rotate
	Depth Profile ▾		400	00:00:15	off	6	off
	Au on SS ▾		🖉				
				END			

Depth Profile Dialog

Template Name	Create Date	Last Modified
Au on SS	7/21/2000	

Spot Size	Etch	Flood Gun	Cycles
400	00:00:15	off	6

Rotate
off				Set As Default
				Yes

Region Definitions

RegionName	CBE	Scanned?	WW	Scans/Time	Res#	EV/Step
▸ Au 4f	84	☐	0	00:00:15	4	
C 1s		☐	0	00:00:15	4	
O 1s	530		0	00:00:15	4	
Fe	710	☐		00:00:10	4	

Use XPS line designators as Region Names to enable the Auto-Lookup feature in DP Viewer

Comment

New   Cancel   Delete

|◀ ◀ 1 of 1   ▶ ▶|

B   C   D   E

# Line Color Control and Export all Cycles of one Region
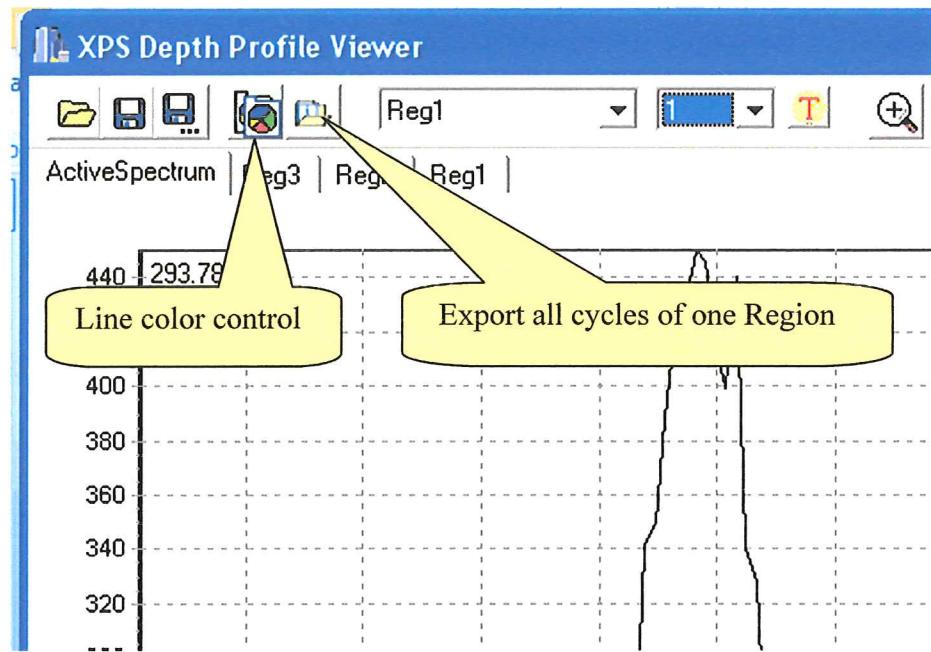
Configuring EXCEL Security

Excel allows macro programs to be used to automate the behavior of the Excel application. DP Viewer uses this feature to automate the setup of charts and tables in Excel. There has been increasing levels of security added to Excel releases. The security help to keep dangerious programs from being embedded on computers tied to the internet. Excel XP 2003 and Excel XP 2007 have this protection built in. The protection can be modified so DP Viewer will still operate. The following describes how to change the protection settings.

EXCEL XP 2002

Open EXCEL and make following settings.
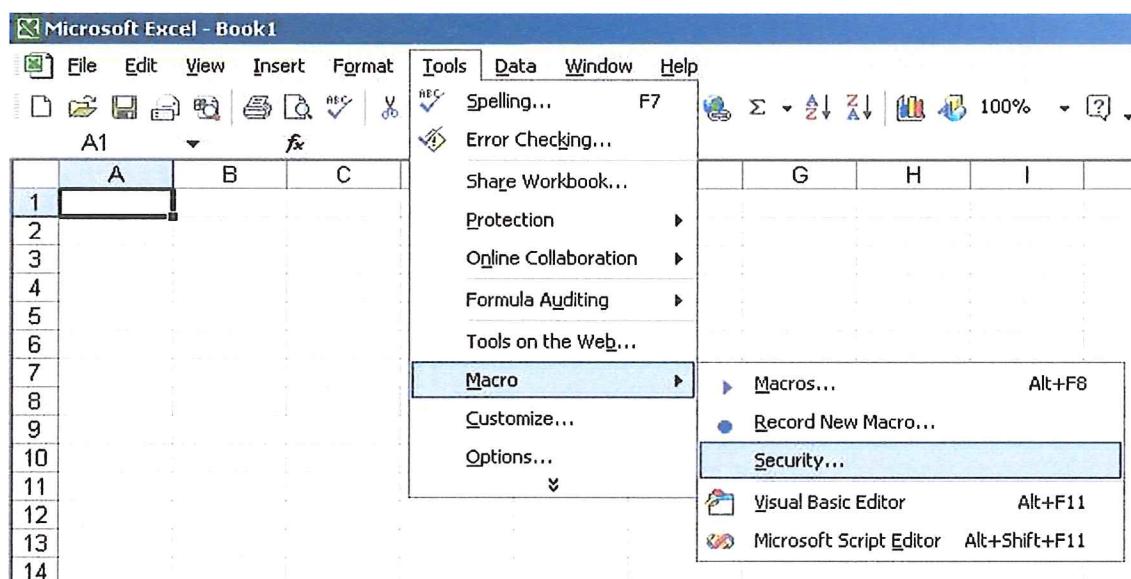
## OPEN THE SECURITY DIALOG
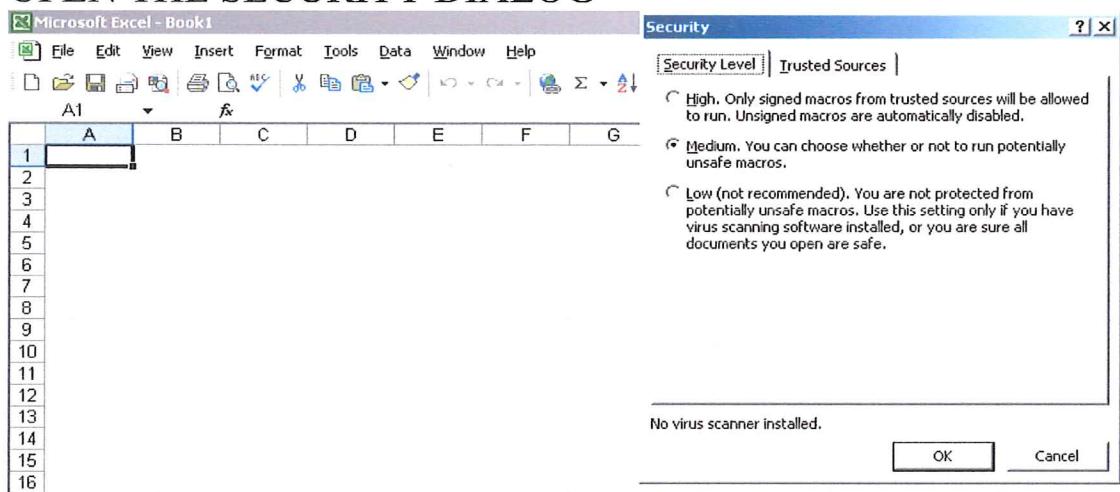
SET SECURITY LEVEL
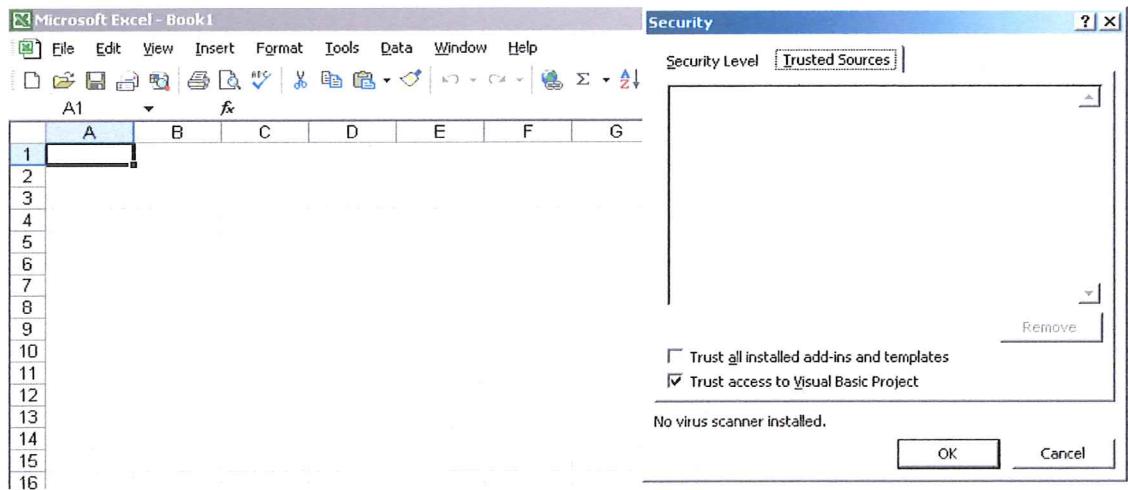
SET TRUST SETTING TO ALLOW ACCESS TO VISUAL BASIC PROJECTS.

EXCEL XP 2007

Excel 2007 must be installed with the developer options. With the Developer options selected select the Macro Security dialog. Make settings as shown.
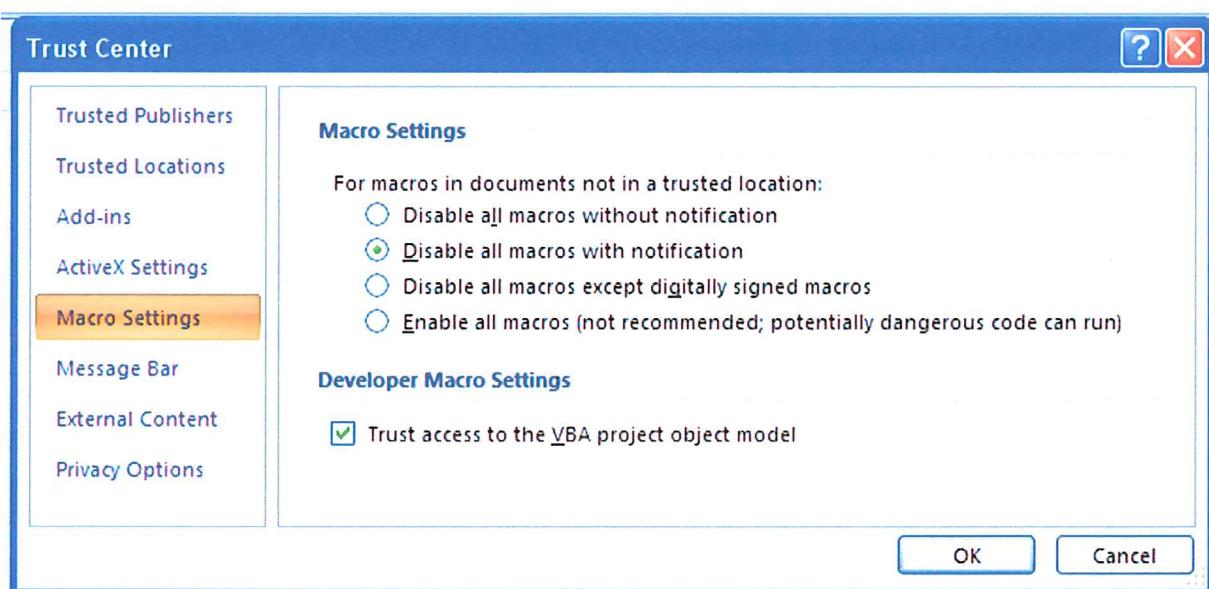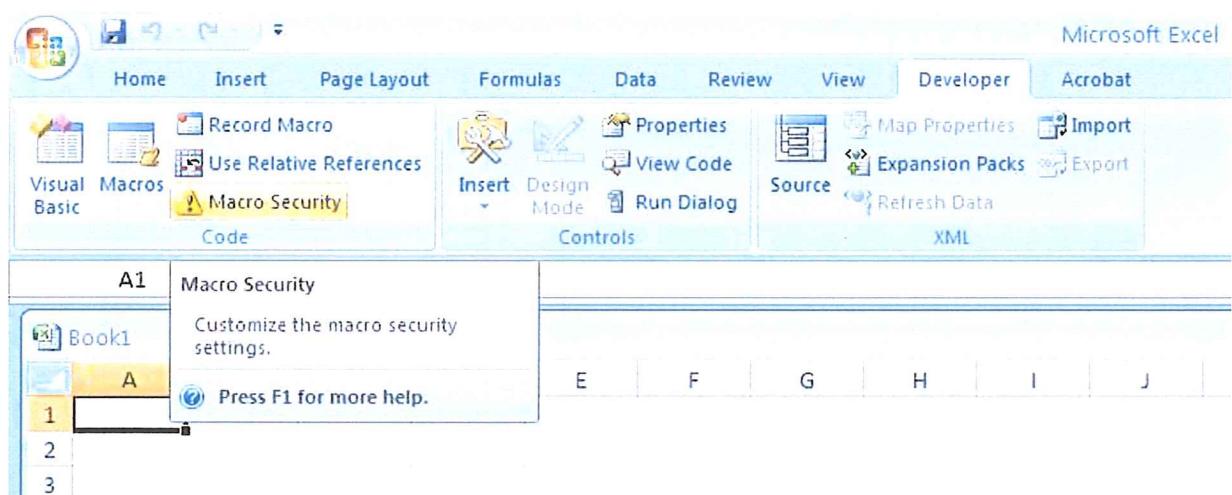
If macros are disabled specify notification is required. Select to trust access to VBA project object model.