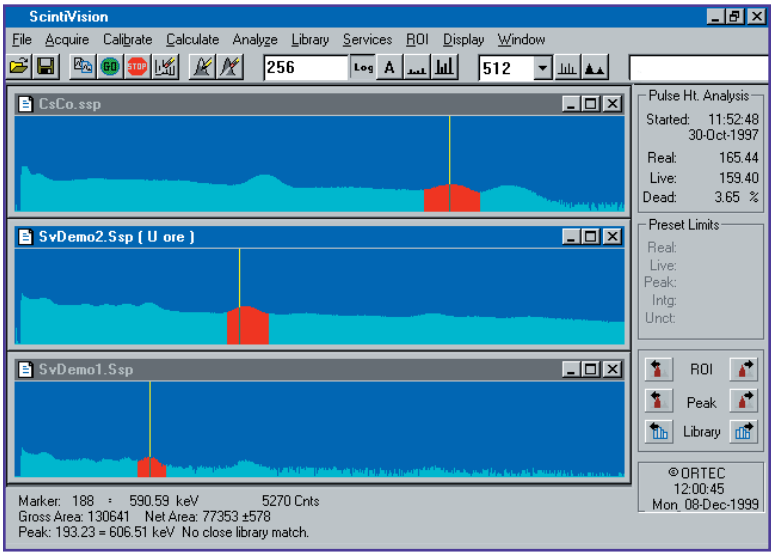
ORTEC®

ScintiVision™-32

A35-B32

A Unique Software Solution for the Quantitative Analysis of Gamma-Ray Spectra from NaI(Tl) Detectors

- Simple to operate — with toolbars for fast action
- Sophisticated quantitative analysis of "known" and "unexpected" isotopes
- Robust nuclide identification technique, resistant to false positives
- Deconvolution of spectral multiplets
- Easy, automatic calibration
- Interactive re-analysis mode
- Multiple, live spectrum displays
- Graphic display of analysis results — see what's been done
- Quality Assurance to ANSI N13.30 ensures regulatory compliance



With the "usual" ORTEC *CONNECTIONS-32* benefits:

- True 32-bit preemptive multitasking operation
- Multi-user, network-wide acquisition control and spectral display
- Connects easily into existing networks
- Uses standard Windows and standard protocols
- User Menu password security, and detector locking
- "Class C2" Security of data with Windows NT operation
- Supports all ORTEC MCA/MCB hardware and non-ORTEC systems via MatchMaker™ Acquisition Interface Module
- Operates side by side with other analysis programs such as GammaVision™
- Easy integration with industry-standard products such as Access®
- Configurable reporting
- Helpful developers' toolkit options
- On-line help

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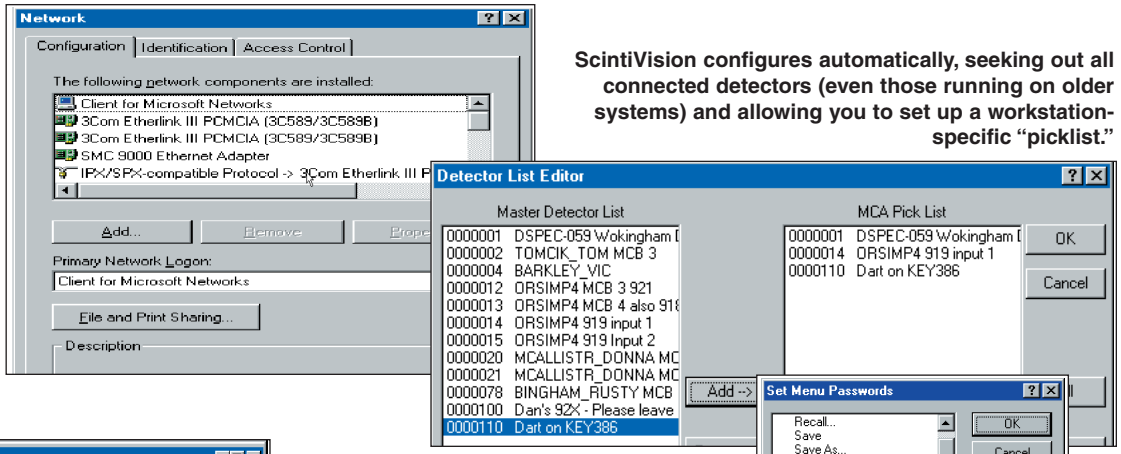
ScintiVision-32, a Completely Integrated Solution for NaI Detector Gamma Spectroscopy

Acquisition Control of all ORTEC Multichannel Buffer and MatchMaker™ Supported Hardware

A **Smart** Multichannel Analyzer with Multiple Spectral Displays
Powerful Automation Features
Advanced Analysis Options
Quality Assurance Support
User-Definable Report Options, Plus Optional Report Writer
Import and Export of Foreign File Formats
On-Line Context Sensitive Help
Interactive Reanalysis with Display of Residuals



ScintiVision configures automatically, seeking out all connected detectors (even those running on older systems) and allowing you to set up a workstation-specific "picklist."

Security is built into *CONNECTIONS* products such as ScintiVision. Event Logging means no nasty surprises.

Share your data with co-workers without fear of losing it. Any detector on the network can be locked to protect against data loss.

Protect ANY menu function. "Set and forget" analysis options may be password protected: they stay as YOU set them.

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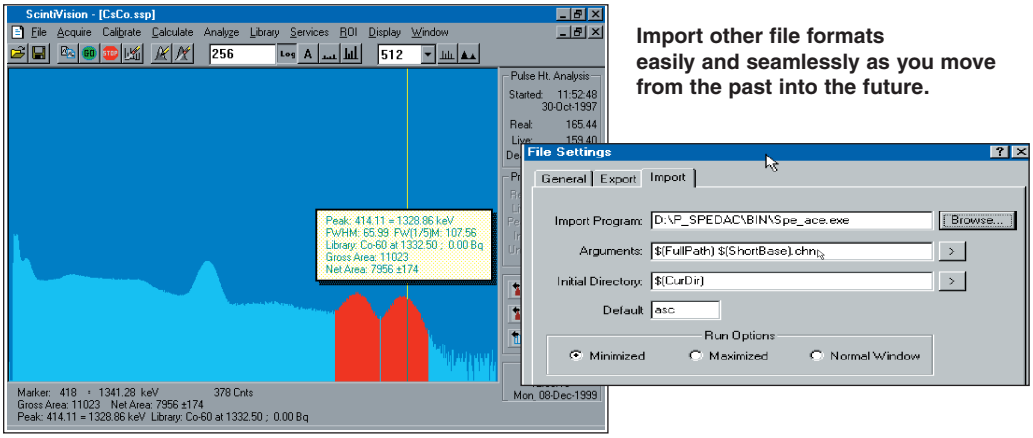
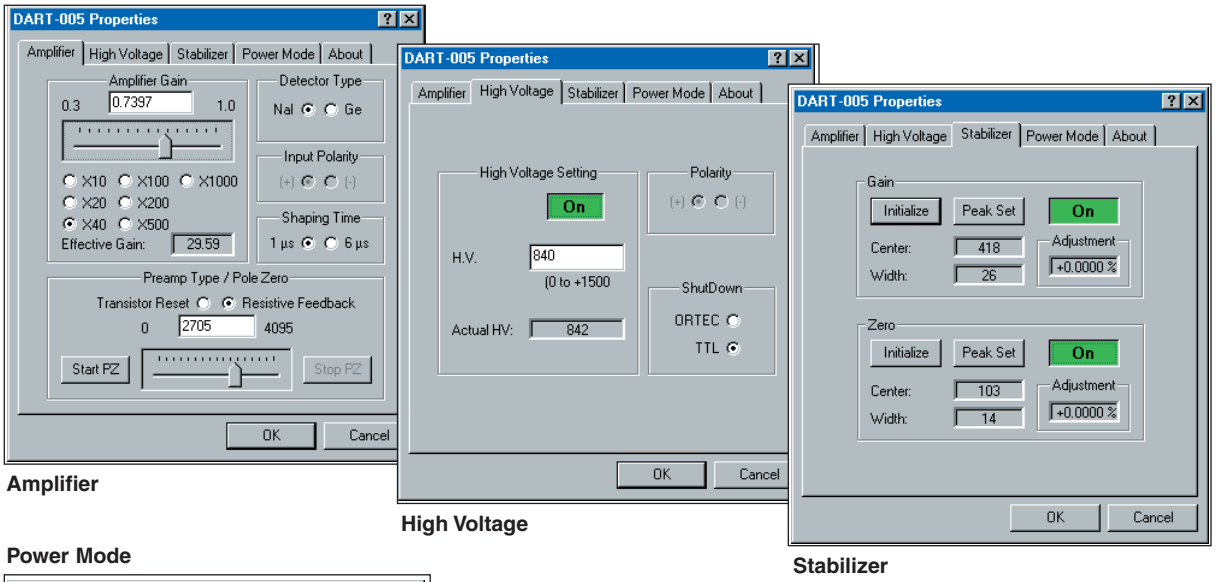
ScintiVision: Seamless Integration at Every Level.



Import other file formats easily and seamlessly as you move from the past into the future.

A smarter Multichannel Analyzer for NaI detectors . . .

With Integrated Control of the Latest Hardware . . .

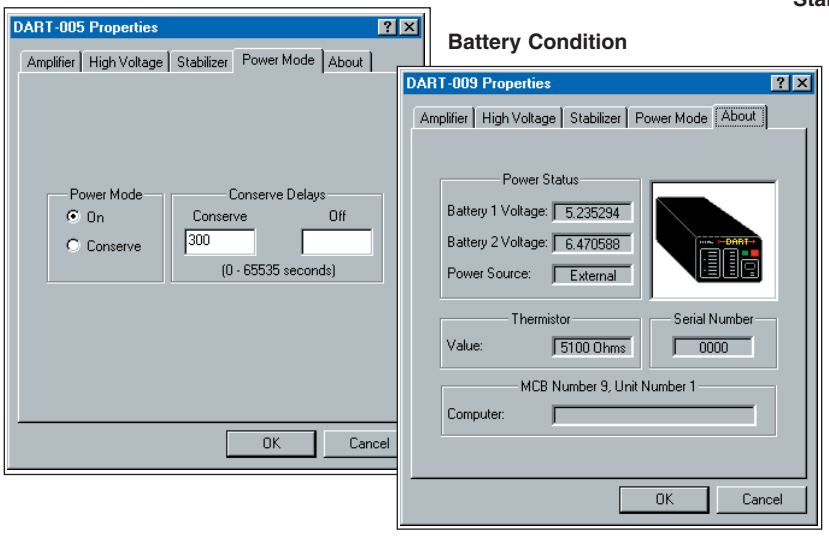


Amplifier

High Voltage

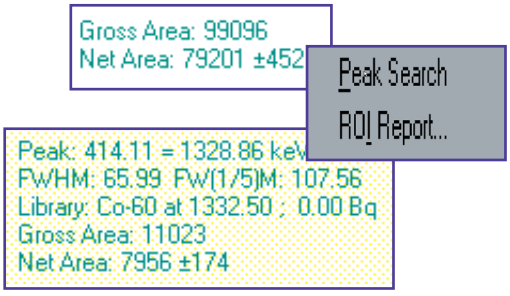
Stabilizer

Power Mode



Battery Condition

. . . and an array of qualitative analysis tools to provide RAPID answers.



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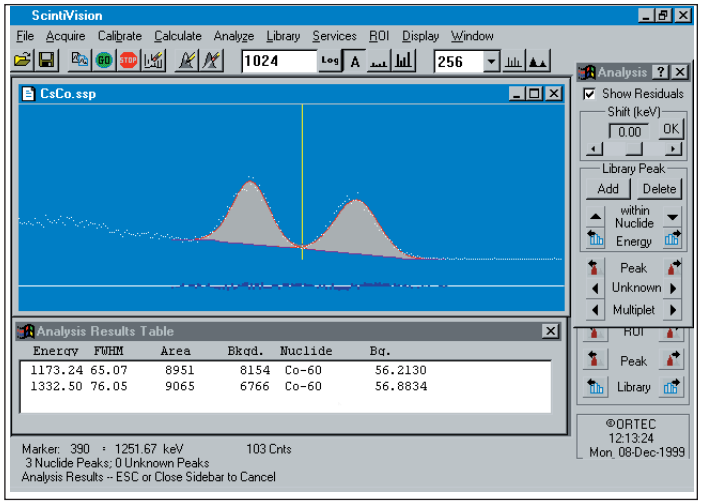
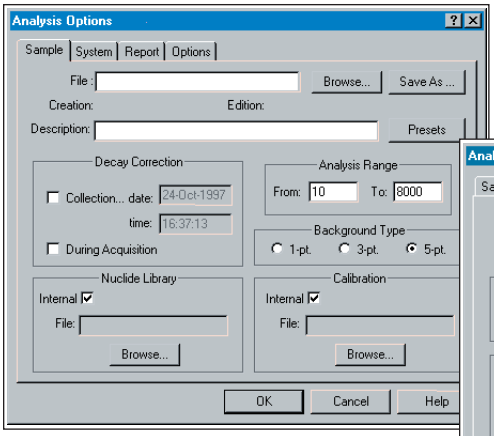
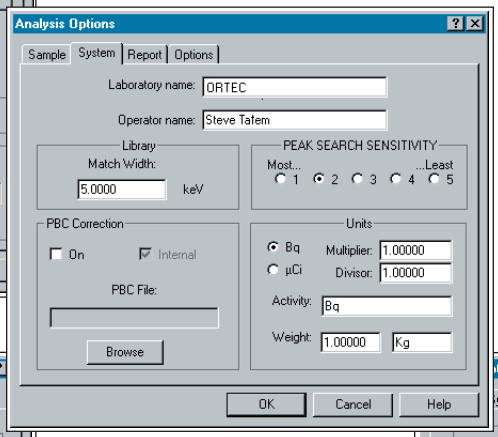
Interactive Reanalysis resolves difficult spectral regions.



"Set and forget" options provide all the flexibility you could want while retaining simplicity of operation.

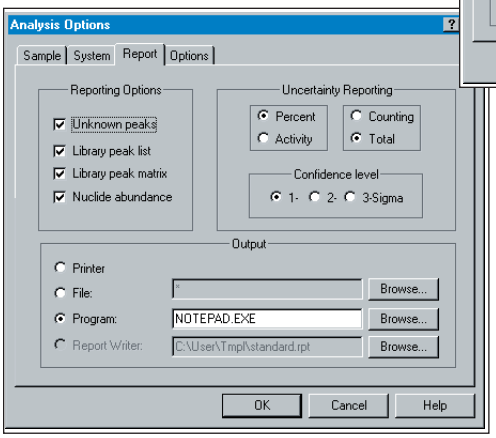


Select options unique for any sample type.

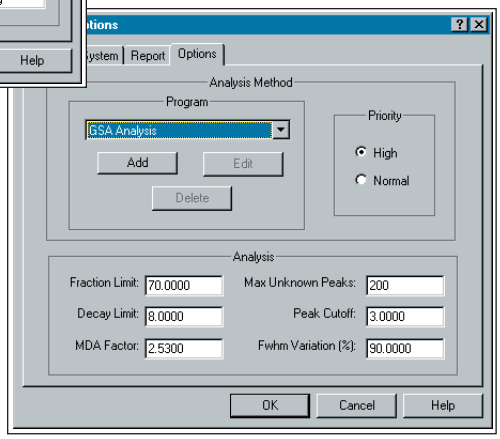


Select system-wide options.

Select advanced features.

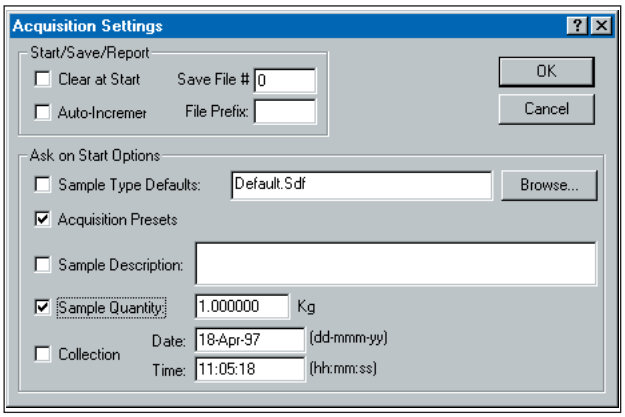


Specify just what you want on the report.



ScintiVision Automatically the Optimum Tool . . .

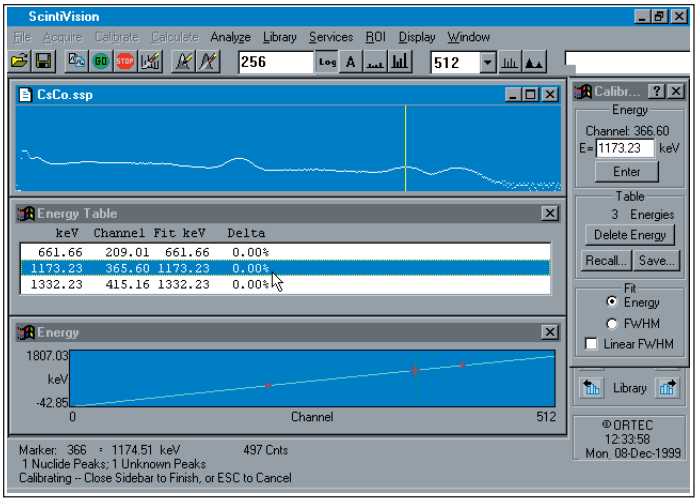
Simple Automation



. . . via Menu Settings options

. . . User-written Job files

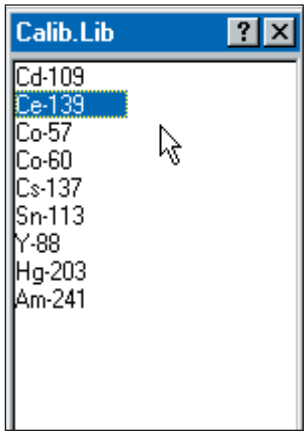
```
Set_Detector 1
Ask_Operator
STOP
Clear
LOAD_LIBRARY "SOIL.LIB"
Set_preset_clear
Recall_Calib "SOIL.LIB"
ASK_PRESET
START
DESCRIBE_SAMPLE "MAKE SURE THAT THIS IS A SOIL SAMPLE FOR DETECTOR 1!!
Ask_description
Ask_collection
Ask_weight
Ask_spectrum
ANALYZE
Wait
Quit
```

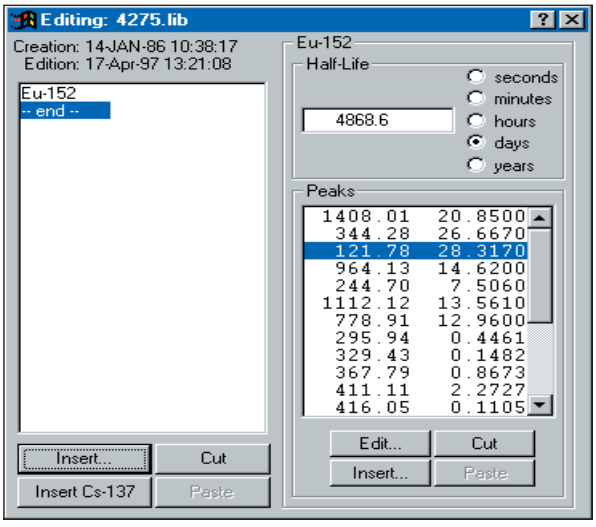


. . . Smart, library-assisted calibration. Do it once, and ScintiVision "learns" how to do it automatically the next time! Interactive graphics show you the fit results. Use single or multiple spectra for the best calibration possible.

Integrated "copy and paste" library editing . . .

no data entry repetition!!





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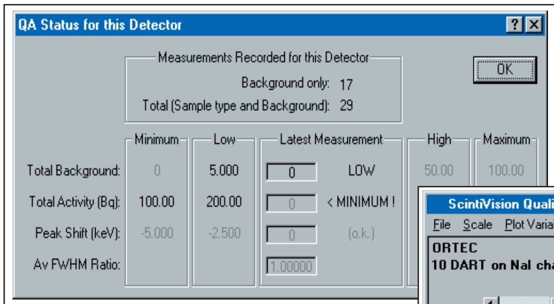
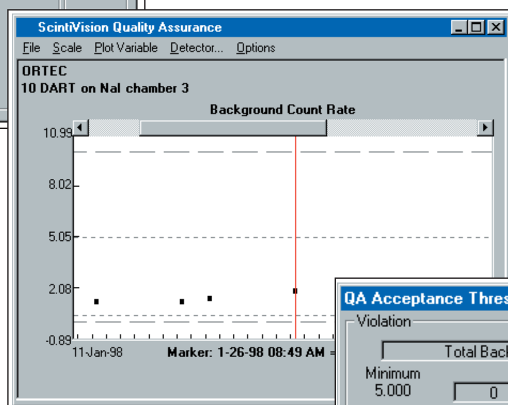
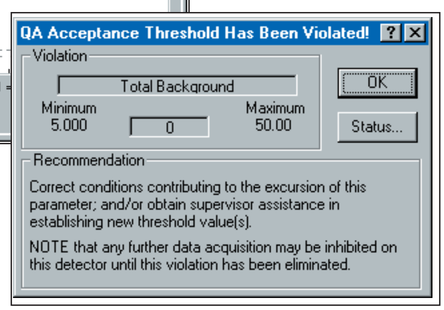
Quality Assured Results . . .



Check on the QA status of a detector at any time

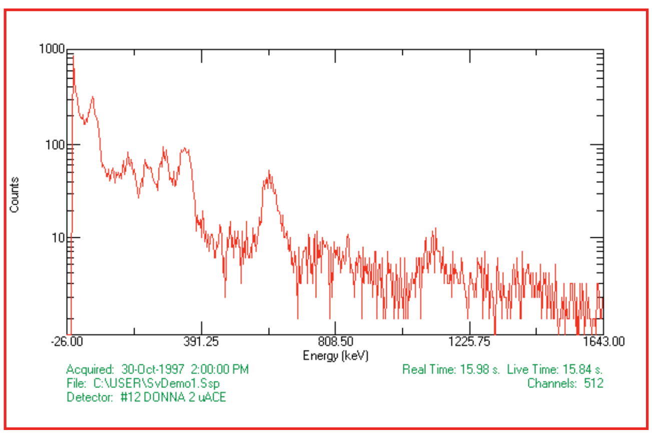


Automatic charting of QA results



Automatic lock-out feature upon QA failure

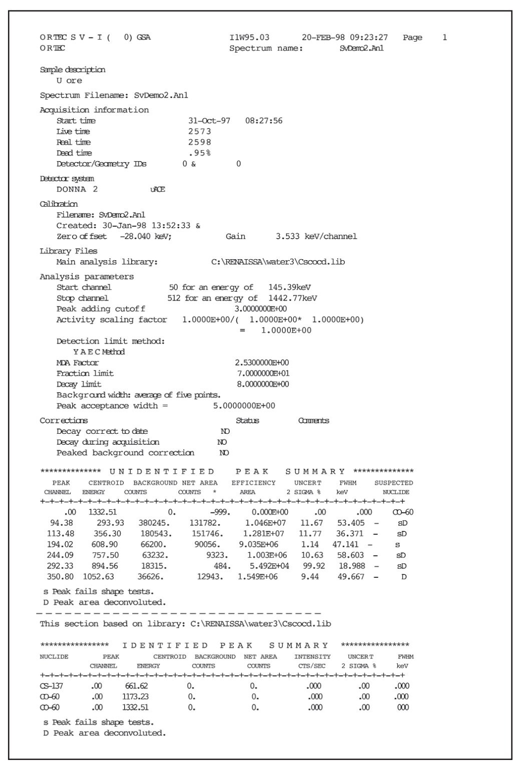
Integral hard-copy plotting of spectrum



ScintiVision Output Report . . .

Clear, Concise, and Flexible

Optional Report Writer (A46-B32) allows TOTAL flexibility in reporting!



ORTEC S V - I (0) GSA I1W95.03 20-FEB-98 09:23:27 Page 1
ORTEC Spectrum name: SvDemo2.An1

Sample description
U ore

Spectrum Filename: SvDemo2.An1

Acquisition information
Start time 31-Oct-97 08:27:56
Live time 2573
Real time 2598
Dead time .95%
Detector/Geometry IDs 0 & 0

Detector system
DONNA 2 uACE

Calibration
Filename: SvDemo2.An1
Created: 30-Jan-98 13:52:33 &
Zero offset -28.040 keV; Gain 3.533 keV/channel

Library Files
Main analysis library: C:\RENAISSA\water3\Cscocd.lib

Analysis parameters
Start channel 50 for an energy of 145.39keV
Stop channel 512 for an energy of 1442.77keV
Peak adding cutoff 3.0000000E+00
Activity scaling factor 1.0000E+00/(1.0000E+00* 1.0000E+00)
= 1.0000E+00

Detection limit method:
Y A E C Method
MDA Factor 2.5300000E+00
Fraction limit 7.0000000E+01
Decay limit 8.0000000E+00
Background width: average of five points.
Peak acceptance width = 5.0000000E+00

Corrections	Status	Comments
Decay correct to date	NO	
Decay during acquisition	NO	
Peaked background correction	NO	

************** U N I D E N T I F I E D   P E A K   S U M M A R Y **************

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	*	EFFICIENCY AREA	UNCERT 2 SIGMA %	FWHM keV		SUSPECTED NUCLIDE
.00	1332.51	0.	-999.		0.000E+00	.00	.000		CO-60
94.38	293.93	380245.	131782.		1.046E+07	11.67	53.405	-	sD
113.48	356.30	180543.	151746.		1.281E+07	11.77	36.371	-	sD
194.02	608.90	66200.	90056.		9.035E+06	1.14	47.141	-	s
244.09	757.50	63232.	9323.		1.003E+06	10.63	58.603	-	sD
292.33	894.56	18315.	484.		5.492E+04	99.92	18.988	-	sD
350.80	1052.63	36626.	12943.		1.549E+06	9.44	49.667	-	D

s Peak fails shape tests.
D Peak area deconvoluted.

This section based on library: C:\RENAISSA\water3\Cscocd.lib

**************** I D E N T I F I E D   P E A K   S U M M A R Y ****************

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CS-137	.00	661.62	0.	0.	.000	.00	.000
CO-60	.00	1173.23	0.	0.	.000	.00	.000
CO-60	.00	1332.51	0.	0.	.000	.00	000

s Peak fails shape tests.
D Peak area deconvoluted.

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Overview

Seamlessly Simple
ScintiVision provides a new array of analytical tools to simplify analysis of NaI detector spectral data — all in a "seamless" design requiring minimum operator interaction. Operation is easy with the toolbar buttons for common functions.

Remote Control Made Easy
All ORTEC spectroscopy hardware is supported within the *CONNECTIONS* architecture — with the entire sample analysis process controlled from a single screen, and remote PC workstations able to control, analyze, and display data being gathered in the counting room. ScintiVision, a true 32-bit implementation, operates securely, either standalone or networked.

Compatibility
All ORTEC "multichannel buffer" hardware (circa 1983 on) is supported by *CONNECTIONS*-32 products. ScintiVision is no exception. The exciting MatchMaker hardware brings ScintiVision and *CONNECTIONS*-32 benefits to **non-ORTEC ADC hardware!** Both new 32-bit and older 16-bit workstations can work together on the same network. Other MCAs, such as the LANL M^{3}CA, are also supported.

Security is Standard
System event logging means that interventions such as file deletions may be traced to the originator; System security meets the "Class C2" Security standards of the U.S. Department of Defense.

Password Protection and Automation
All ScintiVision menus are easily password protected. A detector may be also locked with a password. Built-in job file capability allows minimal intervention procedures to be set up quickly.

Reports the Way You Need Them
Scintivsion includes a flexible report format and an optional report generator (A46-B32 for customized results output.

Analysis Methods Specifically for NaI Detector Gamma Spectroscopy
ScintiVision has been designed specifically for the unique characteristics of NaI detector spectra which are quite different than those from germanium detectors. Sodium iodide's broader peaks lead to more interferences and poorer signal-to-noise ratios. ScintiVision's special analysis techniques are not available elsewhere!

Here's how it's done: ScintiVision's Gaussian cross correlation peak search is adapted to the resolution and peak shape of the particular NaI detector being used. Multiplets located by the peak search process are deconvolted by a method which allows the number of peaks, the peak positions, and their width and area to vary until the minimum value of Chi-squared is obtained. The user may vary the fitting parameters from the defaults. (These settings are then password protected.)

Nuclide identity candidates are tested statistically. Before a nuclide is reported as present, it must, in addition, pass a "Fraction Limit" test which checks to see that a sufficient number of peaks of the nuclide have been individually identified; this ensures that positive identification is statistically reasonable. **These tests all but entirely eliminate "false alarm" misreporting of nuclides not present in a sample.**

Reported nuclide activities are calculated for each peak and then used to calculate a weighted average activity in the final output report.

Peaks found but not identified by the library can be reported.

A detection limit may be calculated according to NUREG 4.16 for nuclides in the library but not found in the spectrum.

Peaked Background Correction
ScintiVision can correctly analyze for a nuclide in the sample which is also present in the environmental background. The treatment is statistically rigorous, and the feature is useful in many application situations in which non-ideal shielding conditions exist.

Automated Calibration
Conveniently, ScintiVision may be calibrated from a single standard with multiple lines, or from multiple standards. More crucially, ScintiVision can LEARN the calibration sequence, making recalibration a totally "hands off" and automatic procedure.

QA and Flexible Reporting Ensure Regulatory Compliance
The QA capability, combined with flexible reporting options ensures regulatory compliance. The optional A46-B32 ScintiVision Configurable Report Writer may be used to generate totally custom output from an Access-compatible results database. To ensure traceability, all hardware parameters are saved along with the spectral data.

Developer's Support
The optional A11-B32 UMCBI Toolkit provides easy hardware access and acquisition control, even across networks! The A46-B32 Report Writer option allows easy customizing of output reports via the use of well-known Crystal Reports.

Specifications

General
Integration of acquisition and control, "Smart" MCA, and quantitative analysis functions for use in conjunction with PC-based gamma spectroscopy workstations. On-line help; Operator Menu password protection. Can display multiple spectra.

Operating System
32-bit application for Windows 2000/XP network capabilities; support for preemptive multitasking; and ORTEC *CONNECTIONS*-32 compliant.

Spectroscopy Hardware Support
All ORTEC MCBs (past and present) and all other devices supported by ORTEC *CONNECTIONS*-32 (see *CONNECTIONS* literature). **Non-ORTEC ADCs from Canberra, Nuclear Data, and Silena are supported via the MatchMaker EtherNIM acquisition interface.** Built-in support for advanced operations (where supported by hardware amplifier gain/shaping control, Auto-PZ[1], DSPEC™ "optimize" and InSight™ mode, DART™ field mode, graphical setting of MCB spectrum stabilizer and statistical uncertainty presets. Integrated support is included for non-ORTEC MCAs such as the LANL M^{3}CA.

Detector Locking password protection.

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File Formats Supported
ORTEC SPC and CHN are supported as standard in the file save, recall, and compare functions. **Most non-ORTEC file formats are supported** by loadable modules, in a "set and forget" fashion for save and recall. Check for availability of specific modules.

Semi-Quantitative "Smart" MCA Functions
"Instant" Mariscotti[2] peak search, with ROI marking and "nearest match" suspected nuclide identification.

Net/Gross peak areas with uncertainty calculation, peak centroid, and shape

Spectrum Strip

Spectrum Smooth

Spectrum Compare

Analysis Methods
Isotope Identification Mode: Multi-line gamma fraction method

Peak Search: Optimized Gaussian Cross-Correlation

Background Methods: Least squares for singlets with stepped background fit for multiplets

Correction for Peaked Background (e.g., from other sources in the laboratory)

Decay correction both to sampling date and for decay during acquisition of short half-life nuclides.

Automatic deconvolution of multiplet peaks

Nuclide Activity Averaging: based on peak uncertainty and peak strength

Limit of Detection Calculation: Minimum Detectable Activity (MDA) may be calculated for library peaks NOT found in the spectrum according to the method of NUREG 4.16:

$$MDA = \frac{2.71 + 4.66 \cdot \sigma_b}{LT}$$

Reporting
Choose any ORTEC standard report option (output to file, printer, or to any Windows application, e.g., NOTEPAD):

- Unknown peaks
- Library peak list by energy
- Library peak matrix by isotope
- Activity summary

Uncertainty reporting options:

- Percent or activity
- Counting or Total
- 1, 2, or 3 sigma

Totally custom reporting: from Access-compatible results database via optional A46-B32 Report Writer.

Interactive Re-Analysis Mode
Iterative fitting of multiplets, addition or deletion of peak centroids, and adjustment of energy calibration with graphical display of residuals.

Calibration
Energy calibration: Multipoint, quadratic for energy and FWHM, from single or multiple spectra. (Linear FWHM model also selectable.)

Efficiency Calibration fit options:

- Linear
- Quadratic
- Interpolative
- Polynomial[3]

Analysis Library Manager
Integrated with ScintiVision, "Cut and Paste" library editor. Optional "Nuclide Navigator™ II" database manager, includes Erdtmann and Soyka[4] and PCNUDAT[5] sources. LARA (CEA/DAMRI) optional.

Quality Assurance
Complies with the demands of ANSI N13.30. For each detector, QA tracks:

Total detector background

- Total (decay corrected) activity for all calibration nuclides
- Average FWHM ratio (spectrum to calibration standard)
- Average peak shift from library energy values
- Actual peak centroid energies
- Automatic lock-out feature upon QA failure

Control Charts
Selectable plotting variable
- Selectable time window
- Auto-scaling with the alarm limits shown
- Display or hard copy

Automation Features
Extensive built-in Job Streaming (Macro language), allowing "one-click" analysis from a user-built icon.

Ordering Information

Model	Description
A35-B32	Single-User Copy of ScintiVision
A35-U32	Update of existing A35-B32
A35-N32	Network Copy of A35-B32 (Prerequisite: First licensed copy of A35-B32)
A35-K32	Upgrade from A70-BI or A25-BI to A35-B32

[1]U.S.A. Patent Number 4,866,400.

[2]"A Method for Automatic Identification of Peaks in the Presence of Background and Its Application to Spectrum Analysis," **Nucl. Instrum. Methods 50** pp 309-320 (1967).

[3]"Définition de Criteres de Qualité Pour l'Essai des Logiciels Utilisés en Spectrométrie Gamma," Rapport CAE-R-5347, 1986.

[4]G. Erdtmann and W. Soyka, "The Gamma-Rays of the Radionuclides," Verlag Chemie, ISBN 3-527-25816-7, Weinheim, FRG, ISBN 0-89573-022-7, New York, 1979.

[5]PCNUDAT Nuclear Data file used by permission of NNDC at Brookhaven National Laboratory

Specifications subject to change
031611

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