

PC Algorithm Application

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Goals/features

- Stand-alone PC based dose algorithm
- Calculate doses using standard algorithm
- Allow adjustments to element responses
- Perform “what-if” testing using simulated element responses
- Modular coding to allow efficient update of response matrix or algorithm design
- Formal reporting to printer and export to spreadsheet application.

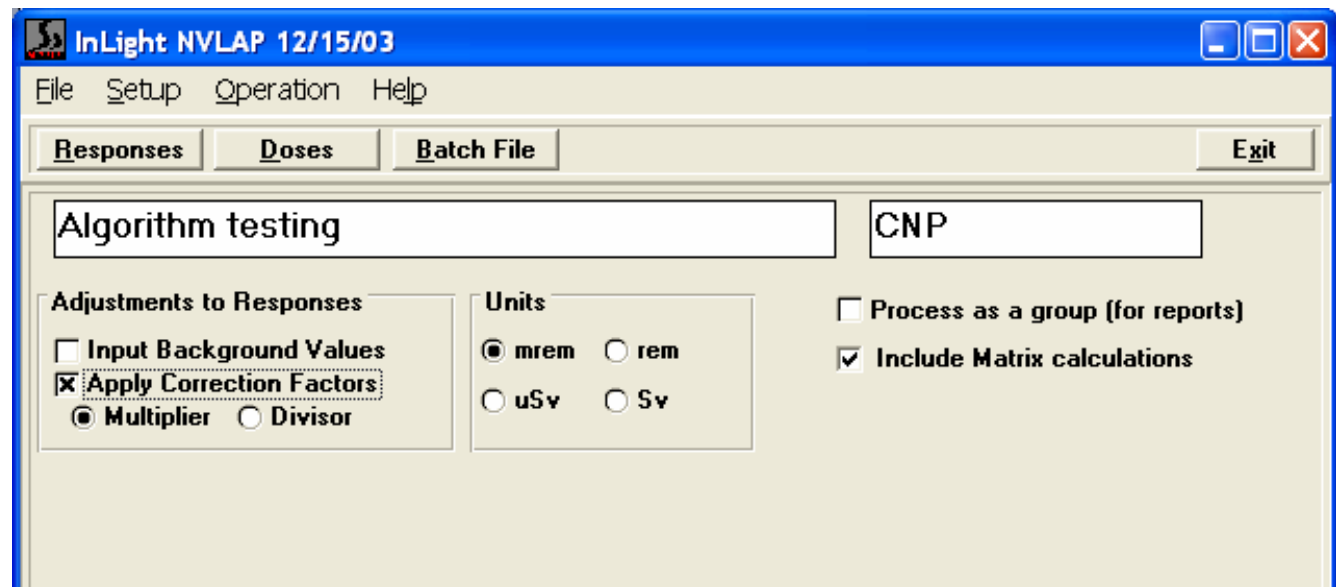


General design

- Two modes of operation
 - Responses – input element responses (keyboard or file)
 - Doses – input doses and responses are estimated
- Matrix calculation
 - Specify fields to use for fit
 - Specify number of iterations
- Three reporting options including export to file
- On-line algorithm documentation

Options

- Background subtraction
- Position-specific correction factors
- Units
- Matrix calculation



Responses mode

- Input element readings, with background and correction factors if desired.
- The dose is calculated using the standard algorithm.

The screenshot shows a software window titled "InLight NVLAP 12/15/03 - [Enter TLD Response Data]". The menu bar includes "File", "Setup", "Operation", and "Help". Below the menu bar are buttons for "New Group...", "Calculate", "Details", "Print", "Report...", and "Exit". The main area contains a text box for a comment, followed by three sections of input fields:

Net Element Responses			
E1	E2	E3	E4
790	380	360	260

Background Values:

0	0	0	0
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Correction Factor:

1	1	1	1
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Radio buttons for "Multiplier" (selected) and "Divisor" are located below the correction factor table.

The screenshot shows the "Algorithm Processing Results" section of the software. It displays a table of calculated doses and a "Show Matrix" button.

<u>Algorithm Processing Results :</u>					
Photon (keV)	82.2	Shallow Dose	Eye Dose	Deep Dose	mrem
Reported Dose		1176	196	203	beta
Matrix dose		1215	231	234	2000 TESTS

A "Show Matrix" button is located at the bottom right of the results table.

Doses mode –

Tests performance of algorithm under ideal conditions without the cost, time and added bias of irradiations.

1. Select a field
2. Specify a dose level
3. Program calculates and sums responses based on inputs and response matrix
4. Doses are calculated as normal, with the percent difference displayed for each dose.

Algorithm Processing Results :

Photon (keV)	82.4	Shallow Dose	Eye Dose	Deep Dose	mrem
Reported Dose		1175	196	204	beta
Delivered Dose		1200	208	210	
% Difference		-2.1%	-5.7%	-2.9%	
Matrix dose		1210	236	236	200 TESTS

Show Matrix

Any mixture can be input, in this case a large beta component with both x-ray and Cs photons added.

Full page detailed report

Detailed report provides all of the interim calculations to allow troubleshooting results.

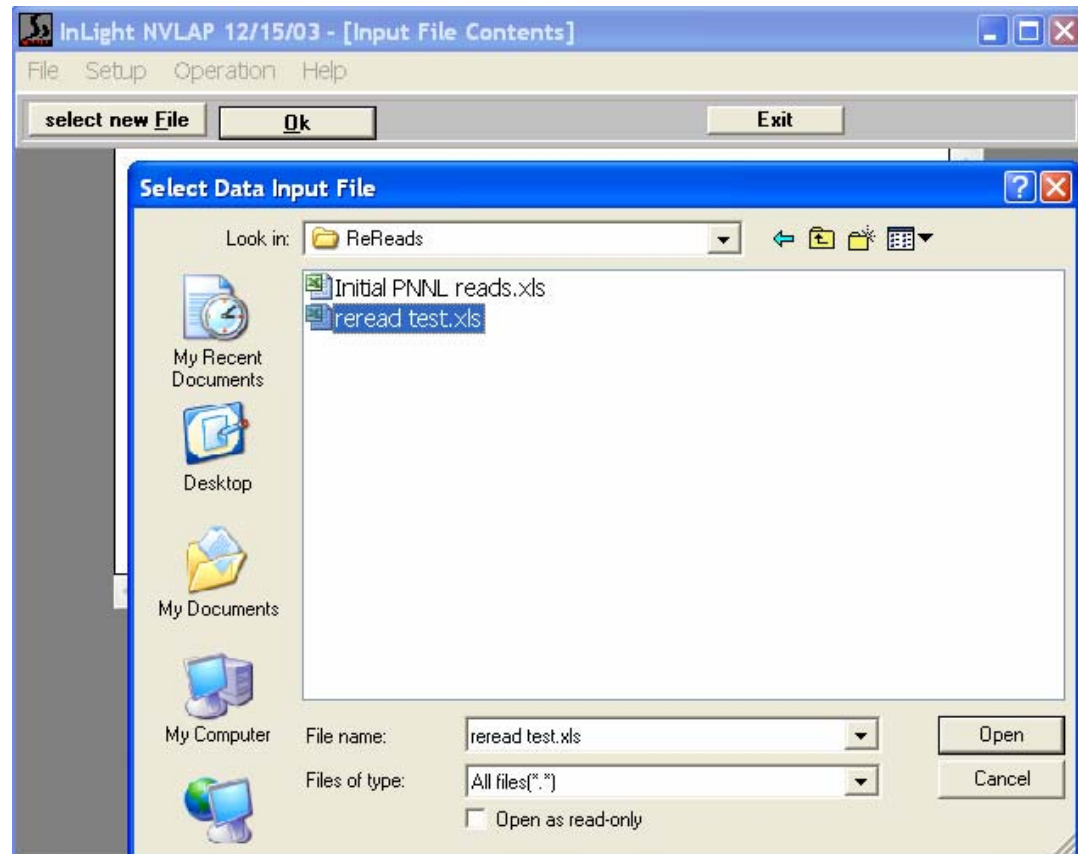
1. Corrected element responses
2. Photon dose estimates
3. Non-photon calculations
4. Final doses

OSL Results					
<i>InLight NVLAP 12/15/03</i>					
<i>Full Page Format</i>					
Description	Testing alg performance			Printed	May 13, 2004
Run Time	05-13-2004 15:06:04			Run By	CNP
	Units	mrem			
Background	0.00	0.00	0.00	0.00	Path option: Normal
Correction factors	1.00	1.00	1.00	1.00	
<hr/>					
1					
Corrected element responses					
1	<u>E1 (OW)</u>	<u>E2(PL)</u>	<u>E3(A1)</u>	<u>E4(Cu)</u>	<u>R34 (E3/E4)</u>
	789.50	379.60	360.40	280.70	1.38
Initial calculations					
2	<u>Photon dose calculations</u>	<i>Based on E2</i>	<u>Shallow</u>	<u>Deep</u>	<u>Photon energy (keV)</u>
		<i>Based on E4</i>	186.40	206.52	82.38
			178.72	201.09	
3	<u>Non-photon dose calculations</u>				
	Non photon on E1	408.78	<u>NetE1/NetE2</u>	100.00	
	Non photon on E2	-1.74			
	<u>Calculated neutron</u>		0.00	<u>Calculated shallow beta</u>	988.34
	<u>Neutron correction factor =</u>			<u>Calculated lens of eye beta</u>	0.00
4	Reported Doses				
	<u>mrem</u>	<u>Shallow</u>	<u>Eye</u>	<u>Deep</u>	<i>Flags</i>
	Beta	988.34	0.00		
	Neutron	0.00	0.00	0.00	
	Photon	186.40	196.00	203.81	82.4 keV
	Totals	1,174.75	196.00	203.81	mrem beta



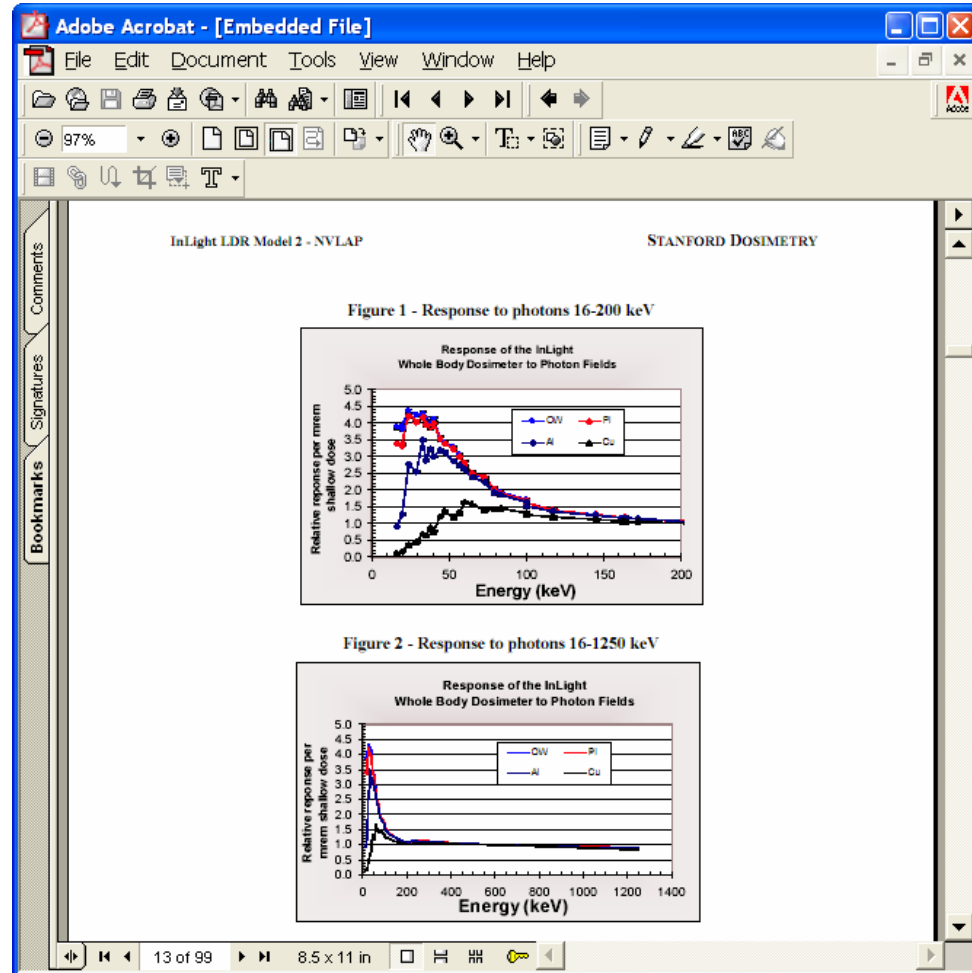
File input/output

- Spreadsheet files can be used for input, and results can be exported back to spreadsheet format.



On-line documentation

Full algorithm documentation with response tables, correction factors and flow charts is available through the help menu.





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