

Simplified Neutron Activation Program

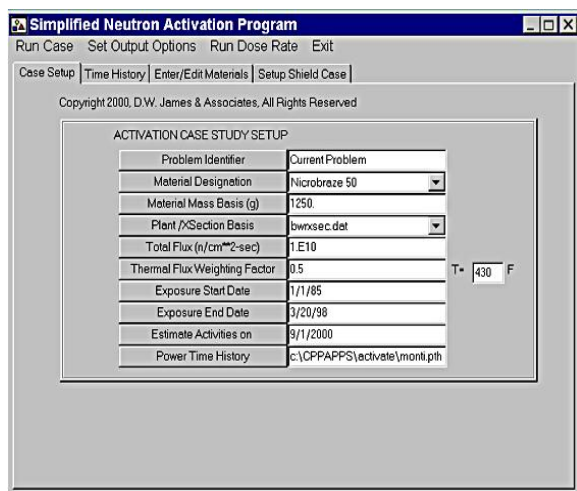
http://www.dwjames.com



Activation analysis made easy . . .

SNAP was written to make it easier to do activation analysis. The program includes a user controlled library of material specifications for commonly activated materials and a facility specific operating time history. Minimum data requirements (for in-core items) are the full power neutron flux, date the item was placed in service, date that it was removed, and date corresponding to the final activity estimate. Program outputs include an exposure histogram, scaling factors, isotopic breakdown by grams, and isotopic breakdown by curies, as well as scaling factors.

SNAP was extensively tested and benchmarked against ORIGEN2.1 (ORIGEN). ORIGEN is the standard for performing activation calculations and used by all organizations performing activation analysis services. SNAP doesn't short change on the analysis. It constructs a complete differential equation matrix corresponding to the problem and the cross sections available.



SNAP Program Main Window

Plant specific time history.

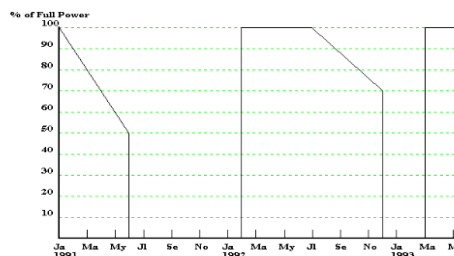
Enter the plant operating history through a convenient grid format dialog. When performing calculation all you have to do is enter the date that the item was put into service and when it was removed, the program takes care of the rest. It calculates the length of each cycle and fills in the gaps with decay steps to account for outage periods. Program output includes a histogram plot of the

specific exposure cycles. Which can be incorporated into your analysis report.

POWER HISTORY DURING EXPOSURE (488 EPPD)

01/01/1991	100	06/01/1991	80
06/01/1991	0	01/30/1992	0
01/30/1992	100	06/30/1992	100
06/30/1992	100	12/01/1992	70
12/01/1992	0	03/01/1993	0
03/01/1993	100	06/01/1993	100
06/01/1993	0	06/01/1996	0

number of tracks = 11
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Automatic thermal flux weighting

Traditional analysis of items outside of the core general involves multiple ORIGEN calculations. One calculation is performed using ORIGEN in-core cross-sections corresponding to the particular reactor type. A second calculation is performed using just thermal cross sections. Results of this calculation have to be externally corrected for temperature. A weighting factor is determined to balance the exposure to account for the difference in the thermal to fast flux at the in-core and out of core region. The weighting factor is determined from neutron transport analysis.

Once having completed the two ORIGEN calculations and determined the weighting factor, the weighting factor is applied through a spreadsheet calculation. If you want to adjust the results for dose rate you would have to use still another program to perform the shielding calculation.

SNAP automatically adjusts the thermal cross sections for temperature and combines the two cross section sets given the weighting factor. If you have the transport analysis results, SNAP can estimate the weighting factor for you. If you don't have the results, D.W. James & Associates can perform the analysis as an added service.

Because SNAP is an interactive program, you can immediately run another case with a different flux, different weighting factor, different time span, without exiting from the program.

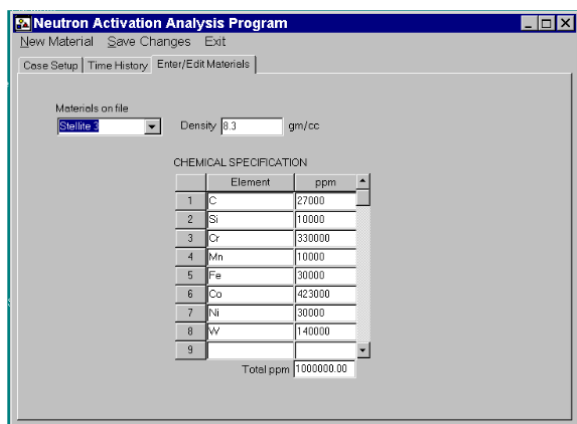
Material library

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With SNAP you can maintain a library of materials that must be analyzed. Materials are stored with their elemental breakdown. Materials may be recalled or edited and materials may be permanently added. A full elemental breakdown is entered in ppm by weight



Built-in dose to activity

Bundled in SNAP is the DWJ point kernel shielding library (Winshld.dll). You can automatically adjust the SNAP activity estimate to account for a dose measurement on the item. In many cases the actual flux on an item is not well known, nor is the content of contaminant elements (such as cobalt). The activation calculation may significantly overestimate the curie content particularly if a conservative estimate of contaminant concentration was used. Given the item weight, geometry and a dose measurement, SNAP can estimate the activity based on the dose rate. You can then decide if the dose based activity is actually more representative. SNAP includes 5 basic shield geometries including (point, line, cylinder, end-cylinder, and sphere). Calculations can account for 2 intermediate shields (of air, water, steel, lead, or concrete). SNAP automatically selects a material basis for source attenuation and build-up based on the effective atomic weight of the source material.

SNAP program features

- Windows Program written in C++
- Selection of time history files to track multiple units or plants.
- Editable material library.
- Built in point kernel shielding program for dose to activity comparisons
- Activity and scaling factor output
- Automatic adjustment between thermal and in-core cross-sections given thermal weighting

- SNAP runs in 1 minute or less for most calculations.

Program requirements

- Windows XP, Vista
- ORIGEN2.1*

*(SNAP uses re-interpreted ORIGEN cross section libraries. While most organizations already have ORIGEN, it can be obtained for a nominal cost from Oak Ridge, Radiation Safety Information Computational Center.)

Why you should be using SNAP

Relatively routine analysis of activated components can cost thousands of dollars. Up to this point in time you had to use ORIGEN which is a DOS based program. The ORIGEN program is run from a scripted input file which has to be modified using a text editor. Instructions for setting up the ORIGEN input file are almost 100 pages long. Much effort can be spent just getting up to speed with its' use. SNAP is much more focused and no particular computer skills are required to use it. An furthermore it produces the same results with a lot less hassle and a lot less chance for input error. Even if you already have experience using ORIGEN, you can save time and money by being able to do all of the work in one place.

Program availability

SNAP is available on the basis of a special introductory offer. Contact D.W. James & Associates for pricing and details.

For More information Contact:

D.W. James Consulting, LLC
855 Village Center Drive #330
North Oaks, MN 55127
Phone: 651-482-7556
E-mail: djames@dwjames.com