

**Welcome** to the latest **ANSWERS Newsletter**, which aims to keep you in touch with news and the latest developments from the ANSWERS Software Service, as well as highlighting some useful tools. We hope this newsletter will entice you to visit our [website](#) or simply update you as a current user.



Paul Smith  
ANSWERS Manager

## REACTOR PHYSICS NEWS

### WIMS9A\_RU1 Release

The release of the next version of WIMS9, containing a full set of error corrections since the WIMS9A\_RU0 release, is imminent and will be issued to all current subscribers.

### WIMS10A

This year sees the release of the first version of WIMS10. New features include:

- Enhanced input/output options allowing parameter definitions, equation evaluation, nested looping and graphical edits,
- Full implementation of material dependent fission spectra,
- Resonance shielding treatment of temperature profiles, such as within a fuel pin,
- Fuel pin temperature calculation for iterative solution of pin power distributions with the enhanced temperature shielding treatment,
- Inclusion of the ECCO code as an alternative module for resonance self shielding,
- Three dimensional characteristics method solution in CACTUS using the fractal geometry definitions of MONK and MCBEND,
- Visual Workshop for the visualisation of CACTUS geometries,
- Perturbation theory module,
- Fixed source sub-critical flux solutions,
- WIMS interface comparison capability for additional QA verification against previous results,
- Many others.

WIMS10 will be issued with three nuclear data libraries:

- JEF2.2, back compatible with WIMS9,
- Enhanced JEF2.2 with an extended burnup chain for deep burn scenarios, additional temperatures and corrected, high energy  $^{239}\text{Pu}$  data,
- JEFF3.1.

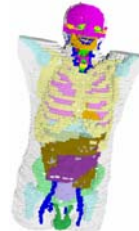
### FISPIN10

A new version of Fispin, FISPIN10, was released in September 2007. This version, in addition to error corrections, includes an increased number of (n,p), (n,d), (n,t), (n, $^3\text{He}$ ), (n, $\alpha$ ) and (n,np) reactions. The TRAIL cross-section database now includes (n,n') reactions, in particular  $^{93}\text{Nb}(n,n')^{93m}\text{Nb}$  which has a ~16 year half life, contributing to structural material activation.

## SHIELDING NEWS

### International Nuclear Codes Workshop/MCNEG – 2008.

ANSWERS participated in this workshop and conference which was hosted at Sellafield Ltd, Risley from 3-6 March 2008. We gave presentations on **MCBEND**, **MONK** and **Visual Workshop** - including a general introduction to our codes and highlights of recent developments, a demonstration of Visual Workshop and a tutorial on Hole Geometries. We also showed how recent developments in MCBEND can be used in a medical application.



Visual Workshop Image of voxelised whole body model in MCBEND

### 11th International Conference on Radiation Shielding (ICRS-11) and the 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008)

ANSWERS will be having a strong presence at this year's International Conference on Radiation Shielding which is being held at Georgia, USA from 13-16 April 2008. We are presenting 4 papers in collaboration with our NCD colleagues from Sellafield Ltd as follows:

- Recent Developments to the Monte Carlo Code MCBEND.
- Visual Workshop as the single model viewer for the ANSWERS Shielding and Criticality Codes.
- Use of Tetrahedral Mesh Geometry to import a converted CAD file for Shielding and Criticality calculations with MONK and MCBEND.
- Importing CAD data for Shielding and Criticality calculations with MONK and MCBEND.

We are also having an **exhibition stand** where we will be demonstrating Visual Workshop and other code developments.

**BINGO in MCBEND** The integration of the combined neutron, gamma and electron BINGO Collision Processor into MCBEND is currently in progress. During 2008 the verification and validation testing of the integrated BINGO collision processor will be carried out, ready for release in the next version of the code.

**MCBEND 10 Validation** A number of MCBEND Validation benchmarks have been updated for MCBEND 10A. The validation inputs have been updated to utilise the latest MCBEND 10A features: Fractal Geometry, Material Specification and Unified Source. The latest Validation documents can be accessed via the Customer Web pages of the ANSWERS Web site. This is an ongoing task.

**MCBEND Applications Guide** The MCBEND Applications Guide for Uncertainty Analysis is currently being updated to take account of the new covariance module and the material covariance data library. These were new features in MCBEND 10A.

**RANKERN 15A Release Update 1** Following the release update of MCBEND 10A in July 2007, a release update is planned for RANKERN 15A early in 2008. This will correct outstanding errors in RANKERN 15A and will ensure compatibility between the MCBEND 10A and RANKERN 15A codes.

## CRITICALITY NEWS

This year sees the main emphasis on the continuing development of **BINGO in MONK**. We are completing the validation exercise to demonstrate that JEF2.2 based BINGO nuclear data libraries are fit for purpose with the updated validation database providing the data required to derive an EPD.

We are also implementing the BINGO doppler broadening capability recently developed by Sellafield Ltd in collaboration with ANSWERS. The method being used does not simply interpolate as do most codes, but avoids many of the inherent problems of the method by using sophisticated sampling techniques to directly evaluate Doppler broadening without approximation. Testing of this new method so far shows excellent agreement for temperatures normally found in a reactor, flask or repository. We will also be ensuring most frequently used options function with BINGO.

The sensitivity option in MONK is being revised to provide better estimates of the standard deviation on the sensitivities, and we continue to develop the MAX perturbation method for those systems where a first order sensitivity option is inadequate.

MONK has recently seen a major development in addition of the point-energy burnup capability into the formal development version of MONK. This new version will be undergoing further enhancements as we make use of the latest version of BINGO and testing to ensure it is fit for use.

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## The ANSWERS SEMINAR

13 TO 15 MAY 2008

Wessex Hotel, BOURNEMOUTH, U.K.



This year's programme offers a wide range of presentation topics that I trust attendees will find of interest and the seminar will be broadly split along the lines:

- **Tuesday 13 May – Radiation Shielding**
- **Wednesday 14 May – Reactor Physics**
- **Thursday 15 May – Nuclear Criticality**

In addition to the seminar itself, parallel meetings of the **UK Shielding Forum** and the **UK Working Party on Criticality** will be hosted at the same venue on Wednesday 14 May.

The **UK Nuclear Science Forum** will be hosted at the same venue on Thursday 15 May.

For further details, please visit:

<http://www.sercoassurance.com/answers/seminar.htm>

## GRAPHICS NEWS

Visual Workshop Beta1 was demonstrated and released to customers at last year's Seminar. Developments since then have included:

- Faster 2D and 3D ray trace image generation;
- Improved parameter handling;
- A self test capability;
- Support for WIMS;
- Bug fixes,
- Extensive testing.

The Beta2 version is scheduled for release in the next few weeks.

Visual Workshop is being demonstrated at a number of Workshops and conferences:

**International Nuclear Codes Workshop/MCNEG – 2008**

**11th International Conference on Radiation Shielding (ICRS-11) and the 15th Topical Meeting of the Radiation Protection and Shielding Division (RPSD-2008)**

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## ANSWERS SSQA

Customer support, which is very important to us, is provided by the ANSWERS Software Support and Quality Assurance (SSQA) team. The ANSWERS Hotline, managed by Chris Bazell, received, logged and processed over 500 calls and e-mails during 2007. In excess of 900 code licences were issued during the same period. We are guided by the Hotline Charter that ensures that customer expectations are clearly defined and met.

The ANSWERS hot-line can be contacted by telephone (+44 (0)1305 851240), facsimile (+44 (0)1305 851105) and E-mail ([answers@sercoassurance.com](mailto:answers@sercoassurance.com)).



Chris Bazell  
ANSWERS Hotline Manager

The SSQA team is also responsible for ensuring that the QA management of ANSWERS program developments complies with the ANSWERS Quality Management System which is consistent with the requirements of BN EN ISO 9001. ANSWERS QA Set versions of MONK9A\_RU1, MCBEND10A\_RU1 and FISPIN10A were released in 2007. QA code releases for 2008 will include WIMS9A\_RU1, RANKERN15A\_RU1, WIMS10 and Visual Workshop.

[www.sercoassurance.com/answers](http://www.sercoassurance.com/answers)

The ANSWERS Customer Website provides access to on-line materials to support the use of ANSWERS products. These include information on the latest code releases (user and application guides, memos and reports), software downloads, validation data and reports, and news of forthcoming events including training courses and the ANSWERS Seminar.

