Radiation Safety Information Computational Center

Oak Ridge National Laboratory
Post Office Box 2008
Oak Ridge, Tennessee 37831-6003
Managed by
UT-Battelle, LLC
for the U.S. Department of Energy
under contract DE-AC05-00OR22725

phone 865-574-6176 fax 865-241-4046
email PDC@ORNL.GOV
www http://rsicc.ornl.gov/

Timothy E. Valentine, Ph.D. - RSICC Director

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"A strong, positive self-image is the best possible preparation for success."

-- Joyce Brothers

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CHANGES TO THE RSICC CODE AND DATA COLLECTION

There are three updates to the RSICC catalog for those individuals that may be interested.

PSR-351/PREPRO2017

The Nuclear Data Center at the International Atomic Energy Agency, Vienna, Austria, contributed a newly frozen version of the pre-processing code system for data in ENDF/B format, PREPRO2017. PREPRO2017 is a modular set of computer codes, each of which reads and writes evaluated nuclear data in the ENDF format. The codes are named "the pre-processing" codes, because they are designed to pre-process ENDF/B data for use in applications. These codes are designed to operate on virtually any type of computer with the included capability of optimization on any given computer. They can process datasets in any ENDF/B format, ENDF/B-I through ENDF/B-VII. This package release contains updated content.

The package is transmitted on one CD which contains the referenced documents in electronic form and compressed system files containing source files, executables for Linux, MacOS X, and Windows systems, sample input and output, and information files. Fortran and C; Linux, MacOS X, Unix, Windows (P00351MNYCP09).

PSR-550/ALICE2017

A collaboration of Lawrence Livermore National Laboratory, Livermore, California; Institute of Reaktorsicherheit, Karlsruhe, Germany; Los Alamos National Laboratory, Los Alamos, New Mexico, Institute of Applied Physics, Academy of Sciences, Chisinau, Moldova, and the Institute of Physics and Power Engineering, Obninsk, Russia, produced a newly updated version HMS-ALICE2017. The HMS-ALICE2017 codes address the question: What happens when photons, nucleons or clusters/heavy ions of a few 100 kV to several 100 MeV interact with nuclei? The ALICE codes (as they have evolved over 50 years) use several nuclear reaction models to answer this question, predicting the energies and angles of particles emitted (n, p, 2H, 3H, 3He, 4He, 6Li) in the reaction, and the residues, the spallation and fission products.

Models used are principally Monte-Carlo formulations of the Hybrid/Geometry Dependent Hybrid pre-compound Weisskopf-Ewing evaporation, Bohr Wheeler fission, and recently a Fermi statistics break-up model (for light nuclei). Angular distribution calculation rely on the Chadwick-Oblozinsky linear

momentum conservation model. In addition, HMS-Alice2017 contains updated OVER, TLJ and PARAP routines

ALICE2017 runs on PC under Windows or Linux and on Mac computers. A Fortran compiler is required on all systems to compile source. The package is transmitted on one CD in a WinZIP file format which contains documentation, source code, and example problems. Fortran; Linux, MacOS and Windows (P00550PCX8606).

PSR-616/NucWiz

NucWiz was contributed by Visual Editor Consultants, Richland, Washington, USA. NucWiz is a program that can set up and run Monte Carlo N-particle (MCNP®) calculations. The input file is constrained to many simple geometries, source, and detector configurations. The user interface allows a user to specify a simple geometry configuration, select from specific source geometries, and then specify detector types and locations. Once these parameters are specified, a complete MCNP® input file will be generated that can be run from within NucWiz. The output file can also be viewed directly from NucWiz. NucWiz is designed to create simple geometries with simple sources and simple tallies. This allows for 100 shield/source/tally combinations. Only one source and one shield geometry is allowed per input file, however, multiple tallies and tally configurations are allowed

A menu-driven graphical interface that allows a user to dynamically create the input file for MCNP®. As each element is added to the input file, the input file is completely regenerated to include this new element. NucWiz will detect if any of these elements interfere with each other and issue an error message, although care should be taken by the user to avoid this, since, there still may be configurations that are not accurately detected. The resulting input file can then be executed using the MCNP® code installed on the user's computer, either within NucWiz or at the command prompt. Users are required to acquire and install MCNP® as a separate package from RSICC. Since NucWiz only creates the source, geometry and tallies, it can be run in any version of MCNP5, MCNPX or MCNP6.

The package is transmitted on one CD which includes executable, documentation and reference material; C++; Windows operating systems. (P616PCX8600).

END USE STATEMENT

Customers are strongly encouraged to provide full and complete information regarding the intended end use of the software being requested. End use statements that specify that the code is for research, training or educational activities are not sufficient. RSICC's regulators need to know explicitly for what purpose you intend to use the codes and detail needs to be provided. Requests that lack sufficient detail will be rejected.

REGISTRATION REQUIREMENTS

RSICC does not permit individuals to "pre-register" or "pre-order" software for use at a temporary or alternate location. The single user license and export control agreements are specific to the individual's end use and the location at which the software will be used. During the registration process, individuals are required to provide the name of the institution at which they will use the software, an institutional mailing address and an institutional e-mail address. As an example, students that work at a location

other than their university are required to update their registration with RSICC and submit a new request for any software that they intend to use after they have begun work at the new location.

SINGLE-USER LICENSE AGREEMENT REVISED

The single-user license agreement has been revised to address concerns regarding changes in end-use and employment changes of individuals that have received packages from RSICC. In some instances, individuals obtain approvals from our Federal regulators for use of software packages for very specific purposes or while employed or associated with specific organizations. To address this concern, the single-user license agreement has been modified to indicate that the license is only valid for the end-use as stated in the Licensee's request and only while associated with the organization under which the request is being made. After February 1, 2015, the individual's single-user license would no longer be valid if they change their end-use or are no longer associated with the organization for which they obtained the original license. In these cases, the individual would need to submit a new request to RSICC for the package for the new end-use or the new affiliation.

SCIENCE EDUCATION PROGRAMS AT OAK RIDGE NATIONAL LABORATORY

Looking for an internship or post-graduate opportunity at Oak Ridge National Laboratory? The Science Education Programs at Oak Ridge National Laboratory provide paid opportunities for undergraduates, grad students, recent graduates, and faculty to participate in high-quality research alongside world-class scientists to solve real-world problems. Opportunities are available for internships and co-ops, research appointments, and sabbaticals.

You can access all available opportunities through the website at http://www.orau.org/ornl. The Talent and Opportunity System allows you to create a profile, and then answer only 5 or 6 questions for each program or job posting for which you apply.

All levels of participants from undergraduates to faculty are encouraged to publish research papers with their mentors. Please browse through the Research Profiles on the different participants and their research experiences at the right-hand side of the bottom of the web site listed above. Also, there is a video of research participants at ORNL sharing their thoughts on how access to world-class research facilities and staff has catapulted their careers in science and technology. You can find it on YouTube at http://ow.ly/2EQLz.

CONFERENCES, TRAINING COURSES, SYMPOSIA

RSICC attempts to keep its customers and contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers via email walkersy@ornl.gov with "**Conferences for RSICC Newsletter**" in the

subject line by the 15th of each month. Please include the announcement in its native format as an attachment to the message. Please provide a website address for the event if one is available.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct; however, if the links become unavailable, please call the point of contact for the event.

CONFERENCES

BEPU 2018

The Best Estimate Plus Uncertainty International Conference will be held **May 13-19, 2018**, in Lucca, Italy. The objective of the Conference is to provide a forum to exchange experience and views among professionals in the nuclear industry in the development and use of Best Estimate Plus Uncertainty (BEPU) methods in safety analyses and design of nuclear installations. Please see the website for more information www.nineeng.com/bepu.

TRAINING COURSES

Safety Analysis Report for Packaging (SARP)
Developed and Conducted by Oak Ridge National Laboratory

SARP Shielding/Criticality Safety Analyst Course

The U.S. Department of Energy (DOE) Packaging Certification Program (PCP), Office of Packaging and Transportation, is offering Safety Analysis Report for Packaging (SARP) shielding and nuclear criticality safety (NCS) course for SARP analysts.

The Analysts Course will provide detailed training on the radioactive material package shielding analyses and NCS evaluation fundamentals needed by analysts/practitioners (i.e., safety analysts and/or technical reviewers) to prepare and/or review technical analyses for the SARP documentation. The Analyst Course also provides an overview of regulations and guidelines in addition to detailed in-class exercises associated with the package shielding and NCS analyses. Regarding the in-class exercises, analysis teams will be faced with "staged" SARP examples in which several important decision processes in the generation of a SARP will be demonstrated and discussed. The SARP Analyst Course will be held at Oak Ridge National Laboratory in Oak Ridge, TN, at the National Transportation Research Center, **September 18-22, 2017**.

Course registration information is available at the following website link:
https://public.ornl.gov/conferences/sarp/index.shtml.

Contact Douglas G. Bowen by email (bowendg@ornl.gov) or phone (865) 576-0315.

LANL MCNP6 Class Schedule

Website: https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml

Nov 28-Dec 1, 2017 Los Alamos, NM	Using NJOY to Create MCNP® ACE Files & Visualize Nuclear Data Non-US citizens must register by 2017-09-25 | Tues 10:00 - Thur 5:00	$1500 or $1200*
Dec 4-8, 2017 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2017-10-02 | Mon 10:30 - Fri 12:00	$1800 or $1500*

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MCNP6 Training

For more information, see the website: http://mcnpvised.com/train_mcnp.html

Current Classes (tuition for all US classes is $2800 with an early payment discount of $300)			
Date (Click Date for Info)	**Class**	**Course Content**	**Location**
October 9-13, 2017	**MCNP6 Intermediate Workshop**	**To see an outline for the course, Click Here.**	**Paris, France**

MCNP6 Visual Editor Training

For more information, see the website: http://mcnpvised.com/train.html

September 11-15, 2017	**Beginning Visual MCNP6**		**Detailed Description**	**Las Vegas, NV**
September 18-22, 2017	**Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.**		**Detailed Description**	**Las Vegas, NV**
October 2-6, 2017	**Beginning Visual MCNP6. The NEA handles registration for this course.**		**Detailed Description**	**Paris, France**

NEA Nuclear Energy Agency

We are pleased to inform you that the NEA Data Bank is co-organising the following workshop / training course:

Date	Class	Course content	Price	Location
2-6 October 2017	Beginning Visual MCNP6	Course description To register, click here	2200 EUR	Paris, France
9-13 October 2017	MCNP6 intermediate	Course description To register, click here	2200 EUR	Paris, France
16-20 October 2017	MCNP6 intermediate, on the RSICC e-Cloud using the NUCWIZ	Course description To register, click here	2200 EUR	Paris, France

Class sizes are limited and workshops may be cancelled if minimum enrollment is not obtained one month prior to the workshop. Workshop fees paid are refundable up to one month before each class.

Please note that all attendees must be registered users. Should you be interested in attending, information is available at:

http://www.oecd-nea.org/dbprog/trainingcourses.htm or contact: programs@oecd-nea.org

SCALE User's Group Workshop

SCALE Training Courses – Fall 2017

Training is delivered by developers and expert users from the SCALE team. Courses provide a review of theory, description of capabilities and limitations of the software, and hands-on experience running problems of varying levels of complexity.

All attendees MUST be licensed SCALE 6.2.1 users. SCALE 6.2.1 is available from ORNL/RSICC in the USA, the OECD/NEA Data Bank in France, and the RIST/NUCIS in Japan. All currently scheduled SCALE Courses are described below.

Date	Course Name and Description	Location	Cost
October 2-6, 2017	**SCALE/TRITON Lattice Physics and Depletion Course** SCALE supports a wide range of reactor physics analysis capabilities. SCALE reactor physics calculations couple neutron transport calculations with ORIGEN to simulate the time-dependent transmutation of various materials of interest. TRITON is SCALE's modular reactor physics sequence for a wide variety of system types. Attendees of this course will learn how to use TRITON for depletion analysis. The TRITON training material is centered around using the NEWT 2-D transport module	ORNL Oak Ridge, TN USA	$2000*

	for 2-D depletion analysis and briefly touches on 3-D depletion analysis. The course will instruct users on the use of KENO in place of NEWT for 3-D Monte Carlo-based depletion; however, KENO is not covered in depth within this course. Additional applications of TRITON are incorporated into the training, including the creation of ORIGEN libraries for rapid spent fuel characterization calculations, defining appropriate unit cell calculations of various reactor types for cross section processing, performing restart calculations, and performing uncertainty analysis of reactor physics calculations using Sampler.		
October 9-13, 2017	**SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis Course** This is a hands-on class that covers the use of ORIGEN for isotopic depletion, decay, decay heat, and radiation source-terms calculations. The course features the use of the Fulcrum consolidated SCALE graphical interface and Fulcrum plotting capabilities for displaying nuclear data and results. The class includes solving activation, spent fuel, and nuclear safeguards and security analyses. This class provides an introduction to the ORIGAMI tool for convenient characterization of spent nuclear fuel with radially and axially varying burnup. Advanced applications including simulation of chemical processing, continuous feed and removal are also covered.	ORNL Oak Ridge, TN USA	$2000*
October 16-20, 2017	**SCALE Criticality Safety and Radiation Shielding Course** This course provides instruction on the use of the KENO-VI Monte Carlo code for criticality safety calculations and the MAVRIC (Monaco with Automated Variance Reduction using Importance Calculations) shielding sequence with 3-D automated variance reduction for deep-penetration problems. KENO-VI is a 3D eigenvalue Monte Carlo code for criticality safety and Monaco is a 3D fixed-source Monte Carlo code for shielding analysis. Both codes use the SCALE Standard Composition Library and the SCALE Generalized Geometry Package (SGGP), which allows for versatile modeling of complex geometries and provides convenient, efficient methods for modeling repeated and nested geometry configurations such as lattices. The MAVRIC sequence is based on the CADIS (Consistent Adjoint Driven Importance Sampling) methodology. For a given tally in a Monte Carlo calculation that the users wants to optimize, the CADIS method uses the result of an adjoint calculation from the Denovo 3D deterministic code to create both an importance map for weight windows and a biased source distribution. MAVRIC is completely automated in that from a single user input, it creates the cross sections (forward and adjoint), computes the adjoint fluxes, creates the importance map and biased source, and	ORNL Oak Ridge, TN USA	$2000*

	then executes Monaco. An extension to the CADIS method using both forward and adjoint discrete ordinates calculations (FW-CADIS) is included in MAVRIC so that multiple point tallies or mesh tallies over large areas can be optimized (calculated with roughly the same relative uncertainty). Both KENO and Monaco use ENDF/B-VII.0 or ENDF/B-VII.1 cross-section data distributed with SCALE to perform continuous energy (CE) or multigroup (MG) calculations. Both codes can also be used with the Fulcrum consolidated SCALE user interface and KENO3D for interactive model setup, computation, output review, and 3-D visualization. Instruction is also provided on the SCALE material input and resonance self-shielding capabilities and the data visualization capabilities within Fulcrum for visualizing fluxes, reaction rates, and cross-section data as well as mesh tallies. KENO-VI and MAVRIC can be applied together to perform an integrated criticality accident alarm system (CAAS) analysis.		
October 23-27, 2017	**SCALE Sensitivity and Uncertainty Analysis for Criticality Safety Assessment and Validation** Sensitivity and uncertainty analysis methods provide advanced techniques for criticality safety validation including the identification of appropriate experiments, detailed quantification of bias and bias uncertainty, identification of gaps in available experiments, and the design of new experiments. The Sampler sequence within SCALE provides a flexible tool for quantifying uncertainties due to manufacturing tolerances as well as composition and dimensional uncertainties in criticality safety assessments. This 5-day training class provides a foundation on sensitivity and uncertainty analysis and applies these methods to criticality safety validation applications, as well as instruction on the use of Sampler for uncertainty quantification. Topics covered include: • The TSUNAMI sensitivity and uncertainty analysis techniques for determining the sensitivity of the k-eff eigenvalue to cross section uncertainties using both multigroup and continuous-energy physics. • SCALE's comprehensive cross section covariance data library, which is applied to these sensitivity coefficients to estimate the data-induced uncertainty in k-eff. • The TSUNAMI-IP code, which determines the correlation between benchmark and application systems in terms of their shared sources of data-induced uncertainty. • The USLSTATS trending analysis tool, which uses similarity coefficients from TSUNAMI-IP (among other parameters) to estimate the computational bias and bias uncertainty for design and licensing applications. • The TSURFER data adjustment tool, which uses generalized linear least squares to adjust nuclear data	ORNL Oak Ridge, TN USA	$2000*

	parameters to minimize discrepancies between computed predictions and the results of integral experiments; these adjustments can then be used to estimate bias and bias uncertainty in design and licensing applications. • The SAMPLER code for uncertainty assessment, which randomly samples nuclear data and/or system compositions and dimensions to quantify the uncertainty in system k-eff. This course will cover the theoretical basis for these analysis techniques and will also conduct exercises for attendees to familiarize themselves with these tools. It is recommended that attendees are familiar with the KENO Monte Carlo code or are experienced SCALE users, although these are not necessary prerequisites.		

***Full-time university students can register at a reduced rate. Both professional and student registration fees are discounted $200 for each course over one.*

FOREIGN NATIONAL VISITORS TO ORNL - *Payment MUST be received at least one week prior to attending the training course. All foreign national visitors must register 40 days before the start date of the training course they plan to attend.*

For more information regarding these courses, visit the website at http://scale.ornl.gov/.

SYMPOSIA

2017 CALENDAR

September

2017 Nuclear Criticality Safety Division Topical, September 10-15, 2017, Carlsbad, New Mexico. Website: http://carlsbadans.com/index.php/carlsbad-conference

Nuclear Power for the People, September 11-14, 2017, Varna, Bulgaria. Website: http://www.bgns.bg/

October

Fourth International Conference on Nuclear Power Plant Life Management, October 23-27, 2017, Lyon, France. Website: http://www-pub.iaea.org/iaeameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management

2017 American Nuclear Society (ANS) Winter Meeting and Nuclear Technology Expo, October 29-November 2, 2017, Washington, DC. Website: http://www.ans.org/meetings/c_1

November

International Conference on Physical Protection of Nuclear Material and Nuclear Facilities, November 13-17, 2017, Vienna, Austria. Website: http://www-pub.iaea.org/iaeameetings/50819/International-Conference-on-Physical-Protection-of-Nuclear-Material-and-Nuclear-Facilities

2018 CALENDAR

June

2018 American Nuclear Society (ANS) Annual Meeting, June 17-21, 2018, Philadelphia, Pennsylvania. Website: http://www.ans.org/meetings/c_1

July

HPS 63rd Annual Meeting, July 15-19, 2018, Cleveland. Ohio. Website: http://hps.org/meetings/meeting46.html

August

20th Topical Meeting of the Radiation Protection & Shielding Division of ANS (RPSD-2018), August 26-31, 2018, Santa Fe, New Mexico. Website: http://rpsd2018.ans.org.

November

2018 American Nuclear Society (ANS) Winter Meeting, November 11-15, 2018, Orlando, Florida. Website: http://www.ans.org/meetings/c_1

2019 CALENDAR

June

2019 American Nuclear Society (ANS) Annual Meeting, June 9-13, 2019, Minneapolis, Minnesota. Website: http://www.ans.org/meetings/c_1