
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/>

No. 571

November 2012

Nearly all men can stand adversity, but if you want to test a man's character, give him power. — Abraham Lincoln

CHANGES TO THE RSICC CODE AND DATA COLLECTION	1
SCIENCE EDUCATION PROGRAMS AT OAK RIDGE NATIONAL LABORATORY	3
CONFERENCES, COURSES, SYMPOSIA	3
TRAINING	3
CONFERENCES	9
2013 CALENDAR	10

CHANGES TO THE RSICC CODE AND DATA COLLECTION

[PSR-577/ MC²-3](#)

Argonne National Laboratory, Argonne, Illinois, USA, contributed the latest version of MC²-3. The MC²-3 code is a multi-group cross section generation code for fast reactor analysis, developed by improving the resonance self-shielding and spectrum calculation methods of MC²-2 and integrating the one-dimensional cell calculation capabilities of SDX. The code solves the consistent P1 multi-group transport equation using basic neutron data from ENDF/B data files to determine the fundamental mode spectra for use in generating multi-group neutron cross sections. A homogeneous medium or a heterogeneous slab or cylindrical unit cell problem is solved in ultrafine (~2000) or hyperfine (~400,000) group levels. In the resolved resonance range, pointwise cross sections are reconstructed with Doppler broadening at specified isotopic temperatures. The pointwise cross sections are directly used in the hyperfine group calculation, whereas the ultrafine group calculation, self-shielded cross sections are prepared by numerical integration of the pointwise cross sections based upon the narrow resonance

approximation. For both the hyperfine and ultrafine group calculations, unresolved resonances are self-shielded using the analytic resonance integral method. The ultrafine group calculation can also be performed for two-dimensional whole-core problems to generate region-dependent broad-group cross sections. Multigroup cross sections are written in the ISOTXS format for a user-specified group structure. The code is executable on UNIX, Linux, and PC Windows systems, and its library includes all isotopes of the ENDF/BVII.0 data.

RSICC is authorized to distribute MC²-3 only to DOE labs and U.S. universities with DOE-related projects for the term of that project. All commercial rights are reserved and licensing requests should be directed to the Technology Development and Commercialization Division of technology transfer at Argonne National Laboratory (ANL) - Contact Paul Betten by email at Betten@anl.gov.

The MC²-3 package contains source code, sample problems, documentation, and reference material in tar format and is transmitted on one CD. Fortran 95 (P00577MNYCP00).

[PSR-578/CALENDF-2010](#)

The Culham Centre for Fusion Energy (CCFE), Culham Science Centre, Abingdon, Oxfordshire OX14 3DB United Kingdom, CEA, DEN/DER/SPRC, 13108 Saint Paul lez Durance, Cedex, France, and CEA, DEN/DM2S/SERMA, 91191 Gif Sur Yvette, Cedex, France, through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has contributed CALENDF-2010 - Pointwise, Multi-group Neutron Cross-Sections and Probability Tables from ENDF/B evaluations. The CALENDF Nuclear Data Processing System is used to convert the evaluation defining the cross-section in ENDF format (i.e., the pointwise cross-sections and/or the resonance parameters, both resolved and unresolved) into forms useful for applications. Those forms used to describe neutron cross-section fluctuations correspond to “cross-section probability tables,” based on Gauss quadratures and effective cross-sections. CALENDF also provides capabilities for group collapsing, for merging of several nuclei, and for temperature interpolation; these calculations are based on data probability table description.

Requesters from Nuclear Energy Agency Data Bank member countries are advised to order CALENDF from the NEA Data Bank. Non-commercial users from other OECD member countries (specifically Canada and the United States) may order CALENDF from RSICC. Users from non-OECD member countries and all commercial requesters are advised to contact the NEA Data Bank.

The CALENDF-2010 package includes documentation, source codes, executables, Makefiles, and test cases distributed as a WinZIP file. Fortran 90 and 95; PC Linux and Windows, Sun, MAC (P00578PCX00).

[PSR-579/DYN3D/M2](#)

The Research Center Rossendorf Inc., DO-8051 Dresden, Germany, through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has released DYN3D/M2, a computer code for calculating reactivity induced transients in light-water reactor cores with hexagonal fuel elements, including the initial steady state, in three-dimensional geometry. As results of the program, neutron fluxes and power distributions, thermo-hydraulics parameters of the coolant, fuel and cladding temperatures and some parameters for fuel rod failure estimation are given. Boundary conditions from the primary coolant circuit (pressure, coolant flow rate and temperature) must be given as input.

The DYN3D/M2 package includes documentation, source codes and test cases. Fortran 77; IBM 3090 (P00579I309000).

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.ornl.gov>. 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 have catapulted their careers in science and technology. You can find it on YouTube at <http://ow.ly/2EQLz>.

CONFERENCES, COURSES, SYMPOSIA

RSICC attempts to keep its users 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 to bennas@ornl.gov with “conferences” in the subject line by the 20th 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.

TRAINING

MCNPX and Visual Editor Training

Classes are taught using the most recent (beta) version of the Visual Editor Code. All class attendees must have a valid MCNP/MCNPX RSICC license. Bring proof of receipt (letter or email) to the class.

2013 Classes for Visual Editor		
January 7-11, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Las Vegas, NV
January 21-25, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Livermore, CA

2013 Classes for Visual Editor		
February 4-8, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Honolulu, HI
February 11-15, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Seoul, South Korea
February 18-22, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Sydney, Australia
March 4-8, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor <i>(The NEA handles registration for this class.)</i>	Paris, France
April 8-12, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Washington, DC
April 29-May 3, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Las Vegas, NV
May 6-9, 2013	Introduction to PENELOPE	Las Vegas, NV
June 10-14, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Barcelona, Spain
July 15-19, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Livermore, CA
July 22-26, 2013	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Anaheim, CA

The introductory workshops combine teaching on MCNP basics and how to create MCNP input files using the Visual Editor. The intermediate Visual Editor workshops focus on more advanced topics such as tallies and variance reduction using the Visual Editor.

Exercises will focus on creating input files and visualizing output data with the Visual Editor. Attendees are encouraged to bring their own input files for viewing and modifying in the Visual Editor; this is particularly important for the intermediate workshop.

The course description and registration information can be found at <http://www.mcnpvised.com/index.html>.

MCNPX Classes 2013		
January 14-18, 2013	MCNP/MCNPX Intermediate Workshop	Las Vegas, NV
March 11-15, 2013	MCNP/MCNPX Intermediate Workshop <i>(The NEA handles registration for this class.)</i>	Paris, France
April 15-19, 2013	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction.	Columbus, OH
April 22-26, 2013	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	San Antonio, TX

May 13-17, 2013	MCNP/MCNPX Intermediate Workshop	Pleasanton, CA
June 17-21, 2013	MCNP/MCNPX Intermediate Workshop <i>(The NEA handles registration for this class.)</i>	Barcelona, Spain
June 24-28, 2013	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Barcelona, Spain
July 29-August 2, 2013	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Livermore, CA

The MCNPX team at Los Alamos National Laboratory offers interactive workshops for training users in the capabilities of MCNPX at the intermediate level.

The list of workshops is tentative, as workshops may be added, removed, or modified throughout the year, depending on user interests. Workshops with fewer than 12 registrants on the early registration date are subject to cancellation or rescheduling.

In order to process non-U.S. citizens by the class date, non-U.S. citizens must register at least 6 weeks prior to the start of the training class. All non-U.S. citizens who reside in countries listed in the U.S. Code of Federal Regulations, Title 10, Part 810.8, are required to register at least 8 weeks prior to the start of the training class. These participants must be processed by the DOE and should not make travel arrangements until approval from DOE has been obtained.

Additional information about the courses can be found at the website, <http://mcnpx.lanl.gov/>. To register send an email to Randy Schwarz at randyschwarz@mcnpvised.com, indicating the workshop of interest to you.

**[General Course on Monte Carlo N-Particle \(MCNP\) Transport Code
2012-13– MCNP Class Schedule](#)**

Date	Course name and description	Location	Cost
December 3-7	Variance Reduction with MCNP6 Registration is open to all. Non-U.S. citizens must have completed registration by 10/08/12. Minimum of 8 students-Maximum of 15, Monday 12:30 p.m. - Friday 12:00 p.m.	Los Alamos, NM	\$1,900 or \$1,600*
December 10-14	Criticality Calculations with MCNP6 Registration is open to all. Non-U.S. citizens must have completed registration by 10/15/12. Minimum of 8 students-Maximum of 15, Monday 12:30 p.m. - Friday 12:00 p.m.	Los Alamos, NM	\$1,900 or \$1,600*

January 28- February 1, 2013	Introduction to MCNP6 Registration is open to all. Non-U.S. citizens must have completed registration by 11/26/12. Minimum of 8 students-Maximum of 15, Monday 12:30 p.m. - Friday 12:00 p.m.	Los Alamos, NM	\$1,900 or \$1,600*
---	---	----------------	------------------------

*Early payment discount: A discount of \$300 per student is given when the registration payment is received in full at least 4 weeks prior to the start of class.

Introductory classes are for those who have little or no experience with MCNP. This class surveys the features of MCNP so the beginning user will be introduced to the capabilities of the program, and will have hands-on experience at running the code to solve simple problems. Course topics include Basic Geometry, Source Definitions, Output (Tallies), Advanced Geometry (repeated structures specifications), Variance Reduction Techniques, Statistical Analysis, Criticality, Plotting of Geometry and Tallies, and Neutron / Photon / Electron Physics.

Intermediate workshops cover the entire spectrum of MCNP/MCNPX, but proceeds at a much faster pace and is more in-depth than the introductory classes. These workshops are open to new users; the first day of class is a review of basics. However, the intermediate workshops are targeted toward more experienced users and are more problem solving than lecture classes. Intermediate workshops feature flexible course content, skip topics of least interest to the participants, and provide significantly more depth than introductory classes.

Advanced classes- Variance Reduction and Criticality are for people with MCNP experience who want to extend their knowledge and gain depth of understanding. Most areas of MCNP operation will be discussed in detail, with emphasis on Advanced Geometry, Advanced Variance Reduction Techniques, and other advanced features of the program. Time will be available to discuss approaches to specific problems of interest to participants. Classes on specific topics are offered when there is sufficient interest.

Note: While MCNP supports a number of platforms, LANL class computers are Windows based.

More information about the MCNP courses at LANL is available on their website at <https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml>.



Health Physics and Radiation Safety Training at the Oak Ridge Associated Universities (ORAU) Professional Training Program

Course	Dates
Gamma Spectroscopy	December 3-7, 2012

ORAU provides a comprehensive suite of health physics services in an integrated program that is tailorable to your exact needs. Since 1948, ORAU Professional Training Programs have been providing technical training in the radiological sciences.

If you wish to discuss having a customized course delivered at your site, please contact Paul Frame at 865-576-3388 or Paul.Frame@orau.org.



OECD Nuclear Energy Agency-Data Bank Training Courses

Date	Class	Course Content	Location
January 14-18, 2013	TRIPOLI-4	<ul style="list-style-type: none"> • General overview of TRIPOLI-4 (semantics, nuclear data, V&V, productivity tools) • Theoretical aspects of Monte Carlo and Criticality-Safety, and how to handle them with TRIPOLI-4 (power iteration method, source convergence, cycle correlation, variance estimation) • Hands-on: examples of ICSBEP benchmarks on the most recent version of TRIPOLI-4 and its nuclear data 	Paris, France
March 18-22, 2013	Training course on Analytical Benchmarks: Case Studies in Neutron Transport Theory	The main objective of this course is to provide a basis for understanding the fundamental concepts of analytical neutron transport theory. This will include recent theoretical as well as numerical advances in analytical benchmarking.	Paris, France

Class sizes are limited and courses may be cancelled if minimum enrollment is not obtained one month prior to course. Course fees are refundable up to one month before each class. After one month, course fees will not be refunded. Note that all attendees must be registered users.



Spring 2013 Training Courses

Date	Title	Location	Registration Fee
April 8–12, 2013	<p style="text-align: center;">SCALE Criticality and Shielding Course</p> <p><i>Basic criticality calculations with KENO-VI; Shielding analysis with automated variance reduction using MAVRIC; Criticality accident alarm system analysis</i></p>	ORNL Oak Ridge, TN, USA	\$2000
April 15–19, 2013	<p style="text-align: center;">SCALE Sensitivity and Uncertainty Calculations Course</p> <p><i>TSUNAMI: 1D, 2D, and 3D k_{eff} sensitivity/uncertainty analysis; 2D generalized sensitivity analysis for lattice physics; reactivity sensitivity analysis; advanced S/U methods for code and data validation using trending analysis and data assimilation (data adjustment) techniques; k_{eff} burnup credit validation</i></p>	ORNL Oak Ridge, TN, USA	\$2000
April 22–26, 2013	<p style="text-align: center;">SCALE Lattice Physics and Depletion Course</p> <p><i>2D lattice physics calculations; 1D, 2D, and 3D depletion calculations; resonance self-shielding techniques including Monte Carlo Dancoff factors for non-uniform lattices; generation of libraries for ORIGEN-ARP</i></p>	ORNL Oak Ridge, TN, USA	\$2000
April 29 – May 1, 2013	<p style="text-align: center;">SCALE/ORIGEN Activation and Decay Calculations Course</p> <p><i>Isotopic depletion/decay and source term characterization using ORIGEN/ORIGEN-ARP</i></p>	ORNL Oak Ridge, TN, USA	\$1500
May 27–31, 2013	<p style="text-align: center;">SCALE/Criticality Safety Calculations Course</p> <p><i>Introductory through advanced criticality calculations using KENO Va and KENO-VI; resonance self-shielding techniques</i></p>	NEA Data Bank, Issy-les- Moulineaux, France	€2000
June 3–7, 2013	<p style="text-align: center;">SCALE/Sensitivity and Uncertainty Calculations Course</p> <p><i>TSUNAMI: 1D, 2D, and 3D k_{eff} sensitivity/uncertainty analysis; 2D generalized sensitivity analysis for lattice physics; reactivity sensitivity analysis; advanced S/U methods for code and data validation using trending analysis and data assimilation (data adjustment) techniques; k_{eff} burnup credit validation</i></p>	NEA Data Bank, Issy-les- Moulineaux, France	€2000

Please register at least 40 days before the start of the desired course.

For more information, including course descriptions, discounts, registration deadlines, and online registration, please visit <http://scale.ornl.gov/training.shtml>

CONFERENCES

CONTE 2013

The 2013 Conference on Nuclear Training and Education (CONTE 2013) will be held in Jacksonville, Florida, February 3-6, 2013, at the Hyatt Regency Jacksonville-Riverfront. The General Chair for this event is Audeen Fentiman, Associate Dean for Graduate Education at Purdue University. For up-to-date information about this conference, visit their website at www.new.ans.org/meetings/c_2.



Waste Management Conference

The annual Waste Management Conference, presented by Waste Management Symposia (WMS), will be held on February 24-28, 2013, at the Phoenix Convention Center in Phoenix, AZ. This conference is widely regarded as the premier international conference for the management of radioactive material and related topics. WMS is a non-profit organization dedicated to education and opportunity in waste management. It was founded to provide a forum for discussing and seeking cost-effective and environmentally responsible solutions to the safe management and disposition of radioactive waste and radioactive materials.

Supporting organizations include the American Nuclear Society, International Atomic Energy Agency, International Framework for Nuclear Energy Cooperation, and the Organisation for Economic Co-operation and Development/Nuclear Energy Agency. The conference is also organized in cooperation with the U.S. Department of Energy, U.S. Nuclear Regulatory Commission, U.S. Environmental Protection Agency, and the U.S. Department of Defense. For up-to-date information about this conference, visit their website at www.wmsym.org/.



[International Conference on Nuclear Data for Science and Technology](#)

The International Conference on Nuclear Data for Science and Technology will be held on March 4-8, 2013, at the Sheraton New York Hotel & Towers, New York, NY, USA. The purpose of the conference is to bring together scientists and engineers involved in the production and use of nuclear data for various applications.

Conference sponsors and co-sponsors include Brookhaven National Laboratory, National Nuclear Data Center, U.S. Department of Energy, Office of Science, Nuclear Energy Agency, and Los Alamos National Laboratory. For up-to-date information about this conference, visit their website at www.bnl.gov/nd2013/.



[International Congress on Advances in Nuclear Power Plants](#)

The 2013 International Congress on Advances in Nuclear Power Plants (ICAPP 2013) will be held on April 14-18, 2013, at the Lotte Hotel Jeju in Jeju Island, South Korea. This congress will bring together international experts of the nuclear industry involved in the operation, development, building, regulation, and research related to nuclear power plants. The program will cover the full spectrum of nuclear power plant issues from design, deployment and construction of plants to research and development of future designs and advanced systems.

For up-to-date information about this conference, visit their website at <http://www.icapp2013.org/>.



The 35th European Safeguards Research and Development Association (ESARDA) annual meeting will be a symposium on Safeguards and Nuclear Non-Proliferation, held at the Congrescentrum Oud St. Jan in Bruges, Belgium on May 27-30, 2013. The symposium will be preceded by meetings of the ESARDA Working Groups on May 27, 2013.

The symposium will be an opportunity for research organizations, safeguards authorities, and nuclear operators to exchange information on new aspects of international safeguards and non-proliferation, as

well as recent developments in nuclear safeguards and non-proliferation related research activities and their implications for the safeguards community.

The symposium is anticipated to include a number of contributions from internationally-renowned authorities in the field.

For up-to-date information about this conference, visit their website at http://esarda2.jrc.it/events/esarda_meetings/bruges-2013/index.html.

SNA + MC 2013

[Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo](#)

The Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo will be held on October 27-31, 2013, at the Cité des Sciences et de L'Industrie de la Villette in Paris, France.

The conference aims to highlight renewed strategy and simulation paradigms, and to identify future conceptual and technological breakthroughs. The objective is to increase the predictive capacity of the calculation tools designed and developed by teams of engineers and researchers all over the globe. The idea is to improve the performances accordingly in terms of calculation time, usability and maintainability. All these factors are indeed crucial for the central question of the role of a global nuclear application economy, including safety, optimizations, and costs.

For up-to-date information about this conference, visit their website <https://www.sfen.fr/SNA-and-MC-2013>.

2013 CALENDAR

February

2013 Conference on Nuclear Training and Education (CONTE 2013), February 3-6, 2013, Jacksonville, FL. For up-to-date information about this conference, visit their website at www.new.ans.org/meetings/c_2.

Waste Management Conference, February 24-28, 2013, Phoenix, AZ. For up-to-date information about this conference, visit their website at <http://www.wmsym.org/>.

March

International Conference on Nuclear Data for Science and Technology (ND2013), March 4-8, 2013, New York, NY. For up-to-date information about this conference, visit their website at www.bnl.gov/nd2013/.

April

2013 International Congress on Advances in Nuclear Power Plants (ICAPP 2013), April 14-18, 2013, Jeju Island, South Korea. For up-to-date information about this conference, visit their website at <http://www.icapp2013.org/>.

May

35th European Safeguards Research and Development Association (ESARDA) Annual Meeting, May 27-30, 2013, Bruges, Belgium. For up-to-date information about this conference, visit their website at <http://esarda2.jrc.it/about/index.html>.

October

Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo, October 27-31, 2013, Paris, France. For up-to-date information about this conference, visit their website at <https://www.sfen.fr/SNA-and-MC-2013>.