
Radiation Safety Information Computational Center



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To put the world right in order, we must first put the nation in order; to put the nation in order, we must first put the family in order; to put the family in order, we must first cultivate our personal life; we must first set our hearts right. — Confucius

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Happy 50th Anniversary RSICC

The Radiation Safety Information Computational Center is celebrating its 50th anniversary on Tuesday, October 9, 2012, at Oak Ridge National Laboratory with a ceremony keynoted by Assistant Secretary for Nuclear Energy Pete Lyons.

RSICC sprang from the recommendation of a presidential advisory committee, chaired by then-ORNL Director Alvin Weinberg, to establish information analysis centers to deal with the growing tide of scientific data. The then-Radiation Shielding Information Center has evolved into the RSICC, a storehouse of nuclear computational tools and data for modeling and simulating the interaction of radiation with matter. The center acquires the state-of-the art codes and data, preserves them and makes them accessible to the research community.

CHANGES TO THE RSICC CODE AND DATA COLLECTION

CCC-763/SOLTRAN

Korea Atomic Energy Research Institute, Daejeon, Republic of Korea, through the OECD Nuclear Energy Agency Data Bank, Issy-Les Moulineaux, France, has contributed a version of SOLTRAN. SOLTRAN is a computer code for solving the multi-dimensional simplified P₂ (SP₂) transport and diffusion problems of a hexagonal geometry by a nodal expansion method for an analysis of fast reactors. The nodal SP₂ equations are formulated with minimum modifications of the nodal diffusion equation by introducing the SP₂ constant and flux. The response matrix equations that are the final forms of the nodal equations involve the spatial flux moments, surface-averaged flux, surface-averaged partial current, and surface averaged sources, where the last terms are used in the SP₂ option only. These equations are solved using a fission source iteration with red-black and coarse-mesh rebalancing acceleration.

Because the SP₂ and diffusion equations can be considered as an asymptotic approximation of a transport equation in optically thick regions, relatively larger errors occur in the regions with long diffusion lengths. But the magnitudes of the errors of the SP₂ nodal are smaller than those of the diffusion nodal.

SOLTRAN is transmitted on a CD in a Windows format file, which includes documentation, source files, precompiled executables, and a sample problem. A Compaq Fortran compiler 6.1 or higher is required if recompilation is desired. FORTRAN 90 and Windows (C00763PCX8600).

CCC-799/HEPROW

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, through the OECD Nuclear Energy Agency Data Bank, Issy-Les Moulineaux, France, has contributed a version of HEPROW. HEPROW unfolds pulse-height spectra for use in spectral neutron or photon fluence determination.

HEPROW consists of the following programs:

UMSPHW transforms a file containing a measured pulse-height to a file in HEPRO format.

RSPGW carries out GAUSSIAN broadening of a response matrix, and re-binning of a matrix.

OPERAW combines HEPRO files and carries out multiplication/division addition/subtraction by numbers.

FALTW folds a fluence file with a response matrix and compares measured and calculated pulse-height spectra.

GRAVELW is a modified SAND-II code (C00112MNYCP03) for unfolding. (Logarithm of pulse-height spectrum is used).

UNFANAW is a maximum entropy code for unfolding.

MIEKEW is a maximum entropy code for unfolding in which uncertainty propagation is performed with a so-called ambiguity term.

PLOFW plots data files or parts of the response function library on the screen. It may be used for a variety of data formats of the files, including the ENDF format.

PLOTAW plots control data curves from a plot file created while one of the other codes is running.

The package is transmitted on a CD, which includes reference material, source files, precompiled Windows executables, sample input and output files, and a sample problem script for Windows and Linux/BSD systems. FORTRAN 90, Windows, Linux, MacOS, ALPHA/AXP, and HP Workstations (C00799MNYCP00).

[DLC-259/PADF-2007](#)

The Institute for Reactor Safety, Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe, Germany, through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has contributed PADF-2007. The intermediate energies Proton Activation Data File (PADF-2007) contains 418,575 excitation functions of nuclear reactions for 2355 target nuclei from Mg to Ra at proton energies up to 150 MeV. The data are given for stable and unstable target nuclei including isomeric targets with half-lives more than one second. The cross-sections were obtained on the basis of model calculations using the TALYS and the ALICE/ASH codes and available experimental data. PADF is available in pointwise and groupwise data format.

The PADF-2007 package is transmitted on CD and includes documentation and 2355 files written in ENDF/B format. PC Windows (D00259PCX8600).

[DLC-260/FLUKA05-PRE-LIB](#)

The European Organization for Nuclear Research (CERN), Geneva, Switzerland through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has contributed FLUKA05-PRE-LIB. During the preparation of the FLUKA05 Multi-group Nuclear Data Library, several working files were produced; among them a GENDF and a DTF formatted library. These aim at an enlarged group of users for use with other computer codes than FLUKA. The library includes 230 materials (isotopes, elements, and molecules). Neutrons to charged particle scattering matrices are included. No gamma interaction data are given.

The FLUKA05-PRE-LIB is transmitted on CD and includes documentation and data files. 3.54 GB disk space is required for loading the libraries. PC Windows and Linux (D00260PCX8600).

[MIS-017/ROCKWELL-RSDM](#)

Knolls Atomic Power Laboratory; Bettis Plant; AEC; Newport News' Shipbuilding & Dry Dock Company; and General Dynamics Corporation (USA) through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, have contributed the *Reactor Shielding Design Manual* edited by Theodore Rockwell, III. The purpose of the manual is to help an engineer or scientist to design a practical shield by making available to him the techniques and data developed by the Naval Reactors Program and Pressurized Water Reactor Program. The material is organized in the approximate order that the designer would have to accumulate it in developing a shield design of his own.

Theodore Rockwell III, ed., *Reactor Shielding Design Manual*, TID-7004 (March 1956).

The package is transmitted in a PDF file, which contains the report cited above. Many computers (M00017MNYCP00).

[CCC-800/RADTRAD](#)

Sandia National Laboratories, Albuquerque, NM for the U.S. Nuclear Regulatory Commission, Washington, DC, has contributed RADTRAD 3.03. The potential radiological consequences of nuclear power reactor accidents depend in part upon the amount, form, and species of the radioactive material released during the postulated accident. The RADionuclide Transport, Removal, and Dose (RADTRAD) model estimates doses at off-site locations; for example, the exclusion area boundary (EAB) or the low population zone (LPZ), and in the control room. As radioactive material is transported through the

containment, the user can account for sprays and natural deposition that may reduce the quantity of radioactive material. Material can flow between buildings, from buildings to the environment, or into control rooms through high-efficiency particulate air (HEPA) filters, piping, or other connectors. An accounting of the amount of radioactive material retained due to these tortuous pathways is maintained. Decay and in-growth of daughters can be calculated over time as the material is transported. The code contains over 25 model and table options to perform these tasks. It is anticipated that the code will be used to estimate attenuation of source terms as a result of modification for a facility or accident sequence.

The package is transmitted on one CD. The executable-only package includes reference material, precompiled Windows executables and sample input/output files. The source-exe package includes reference material, source files, precompiled Windows executables, and sample input/output files. Note: NRC approval is required for source code distribution. A delay may be experienced in distribution of the source code. Virtual Fortran, Windows 98, 98/SE, NT4.0, 2000 and XP (C00800IBMPC00 – source/exe; C00800IBMPC01 – executable only).

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/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 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. If the meeting is on a website, please include the url.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct and live. However, the very nature of the web creates the possibility that the links may become unavailable. In that case, please call or mail the contact provided.

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.

2012-13 Classes for Visual Editor		
October 15-19	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Paris, France
November 5-9	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Las Vegas, NV
November 12-16	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Anaheim, CA
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

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 2012-13		
October 22-26	MCNP/MCNPX Intermediate Workshop	Paris, France
January 14-18, 2013	MCNP/MCNPX Intermediate Workshop	Las Vegas, NV
February or March of 2013	MCNP/MCNPX Intermediate Workshop	Paris, France
May 13-17, 2013	MCNP/MCNPX Intermediate Workshop	Pleasanton, 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@mcnvised.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
October 29- November 2	Introduction to MCNP6 Registration is open to all. Non-U.S. citizens must register by 8/31/12. 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 3-7	Variance Reduction with MCNP6 Registration is open to all. Non-U.S. citizens must register 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 register 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 register 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>.



Fall 2012 SCALE Training Courses

Date	Title	Location	Registration Fee
October 15-19	SCALE Criticality and Shielding Course <i>Basic criticality calculations with KENO-VI; shielding analysis with automated variance reduction using MAVRIC; criticality accident alarm system analysis</i>	ORNL Oak Ridge, TN, USA	\$2000
October 22-26	SCALE Lattice Physics and Depletion Course <i>2D lattice physics calculations; 1D, 2D, and 3D depletion calculations; resonance self-shielding techniques including</i>	ORNL Oak Ridge, TN, USA	\$2000

	<i>Monte Carlo Dancoff factors for non-uniform lattices; generation of libraries for ORIGEN-ARP</i>		
October 29-31	SCALE/ORIGEN Activation and Decay Calculations Course <i>Isotopic depletion/decay and source term characterization using ORIGEN/ORIGEN-ARP</i>	ORNL Oak Ridge, TN, USA	\$1500
<p>Foreign National Visitors: You must register at least 40 days in advance to obtain security clearance.</p> <p>Payment must be received at least one week prior to training course.</p> <p>For more information and online registration, please visit http://scale.ornl.gov/training.shtml</p>			



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

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.

Course	Dates
Air Sampling for Radioactive Materials	October 29 - November 2, 2012
Introduction to Radiation Safety	November 5-9, 2012
MARSSIM	November 12-16, 2012
Gamma Spectroscopy	December 3-7, 2012

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

CONFERENCES



The *SYMPOSIUM ON THE FUTURE OF NUCLEAR ENERGY* will be held at Georgia Tech on November 1, 2012, as part of the celebration of the 50th anniversary of the founding of the School of Nuclear Engineering. Nuclear leaders from the Department of Energy, industry, nuclear fission and fusion research, and academia will discuss i) Nuclear Energy in the Near Term, ii) Closing the Nuclear Fuel Cycle and iii) Nuclear Energy in the Future. The *COLLOQUIUM ON HISTORY & CONTRIBUTIONS OF NUCLEAR ENGINEERING AT GEORGIA TECH* will follow on November 2, 2012. Details and registration may be found at <http://www.ne50.gatech.edu>.



[3D Coupled Code Calculations in Nuclear Technology](#)

The seminar and training on Scaling, UNcertainty and 3D Coupled Code Calculations in Nuclear Technology will be held on November 5-23, 2012, Dubrovnik, Croatia.

The seminar will provide a transfer of experience and know-how from recognized experts in the fields of best estimate uncertainty methods, scaling analysis, system thermal-hydraulic calculations including 3D neutron kinetics coupling techniques.

Licensing aspects in connection with best estimate plus uncertainty methods will be widely discussed. The seminar will thus contribute to maintaining and increasing technical competence and to ensuring the sustainable development of nuclear technology.

The participants may choose to attend a one-, two- or three-week course. They will be divided into groups of three or four and each group will be accompanied by an expert during the entire training activity.

For up-to-date information about this seminar and training, visit their website at <http://nrgspg.ing.unipi.it/3dsuncop/>.



International Conference on Radiation Protection in Medicine **“Setting the Scene for the Next Decade”**

The International Conference on Radiation Protection in Medicine, “Setting the Scene for the Next Decade,” which is organized by the International Atomic Energy Agency, will be held on December 3-7, 2012, in Bonn, Germany.

The conference will deal with aspects of radiation protection related to the use of ionizing radiation and radioactive substances in medicine.

The conference will have the following objectives, in particular:

- to indicate gaps in current approaches to radiation protection in medicine;
- to identify tools for improving radiation protection in medicine;
- to review advances, challenges and opportunities in the field of radiation protection in medicine, and to assess the impact of the International Action Plan for the Radiation Protection of Patients, in order to prepare new international recommendations, taking into account newer developments.

For up-to-date information about this conference, visit their website at <http://www-pub.iaea.org/iaeameetings/41578/International-Conference-on-Radiation-Protection-in-Medicine-Setting-the-Scene-for-the-Next-Decade>.

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/>.

2012-13 CALENDAR

November

Symposium on the Future of Nuclear Energy – Georgia Tech, Atlanta, Georgia, November 1, 2012.

For up-to-date information about this event, visit their website at <http://www.ne50.gatech.edu>.

Colloquium on History and Contributions of Nuclear Engineering at Georgia Tech – Georgia Tech, Atlanta, Georgia, November 2, 2012. For up-to-date information about this event, visit their website at <http://www.ne50.gatech.edu>.

3D S.UN.COP Seminar – Seminar and Training on Scaling UNcertainty and 3D Coupled Code Calculations in Nuclear Technology, November 5-23, 2012, Dubrovnik, Croatia. For up-to-date information about this seminar, visit their website at <http://nrgspg.ing.unipi.it/3dsuncop/>.

2012 ANS Winter Meeting and Nuclear Technology Expo, November 11-15, 2012, San Diego, CA, USA

Embedded Topical Meetings:

- Advances in Thermal Hydraulics (ATH'12)
- International Meeting on Severe Accident Assessment and Management: Lessons Learned from Fukushima Dai-ichi

For up-to-date information, visit their website at http://www.new.ans.org/meetings/c_1.

December

International Conference on Radiation Protection in Medicine, “Setting the Scene for the Next Decade,” December 3-7, 2012, Bonn, Germany. For up-to-date information about this conference, visit their website at <http://www-pub.iaea.org/iaeameetings/41578/International-Conference-on-Radiation-Protection-in-Medicine-Setting-the-Scene-for-the-Next-Decade>.

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/>.