
Radiation Safety Information Computational Center



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Never regard study as a duty, but as the enviable opportunity to learn to know the liberating influence of beauty in the realm of the spirit for your own personal joy and to the profit of the community to which your later work belongs.—Albert Einstein

MACCS2 Forum

An online forum for users of MACCS2 (RSICC Code Package CCC-652) is operational at <http://www.maccs2support.chaninconsulting.com/>. This is a weblog (or blog) where support is provided regarding the code's input, models, and output. Many details of the code's internal algorithms are not documented and are difficult to decipher, even with examination of the source code. This forum will create a searchable archive of questions and answers for the benefit of current and future code users.

Changes to the Computer Code and Data Collection

[CCC-704/SlideRule 1.0](#)

The Nuclear Criticality Slide Rule (SlideRule) code system, a rapid PC-based tool for estimating pertinent information needed to guide the actions of response teams and to help characterize some types of nuclear criticality accidents, was developed at Oak Ridge National Laboratory, Oak Ridge, Tennessee. It was released by RSICC in January 2002.

In July 2004, the developers and RSICC sent a notice regarding dose terminology and the “Solve” capability of the electronic version of the “Nuclear Criticality Slide Rule” to all recipients of the package. The notice was also posted in the RSICC document at that time. A new user recently contacted us about this problem. To increase the visibility of the notice, we have added the notice in a separate file on the distribution CD; it is also printed below.

All reported radiation absorbed doses (rads) are “tissue-dose” estimates, not “free-air-dose” estimates.

The “Solve” capability for each of the five types of incidents can provide erroneous results for the determination of specific (i.e., Neutron, Gamma, Neutron Skyshine, Gamma Skyshine, Total Skyshine) “Estimated Prompt Doses Based on Total Fission Yield and Distance from Incident” (i.e., the lower left figure). The “Total Radiation” and Total Skyshine” are calculated correctly. When using the “Solve” feature for the lower left figure to determine the prompt dose of a specific radiation source (i.e., Neutron, Gamma, Neutron Skyshine, Gamma and Skyshine) one must approach the solution in a reverse mode. That is, iteratively solve for a known parameter (e.g., “Total Fissions” or “Distance”) by changing a specific dose value until the desired “Total Fissions” and “Distance” is returned by the “Solver.”

References: NUREG/CR 6504, Vol. 1 & 2 (ORNL/TM 13322/V1 & V2). Visual C++; PC (Pentium or later), Windows 95/NT or later (C00704PC58601).

[CCC-725/ SCALE5](#)

The official SCALE 5 Manual, ORNL/TM-2005/39, was published in April 2005. A CD containing the newly published SCALE 5 manual was sent to all recipients of the initial release of SCALE 5 (C00725/MNYCP/01) by the SCALE development team and RSICC. If you obtained SCALE5 from RSICC and have not yet received the replacement CD, please send email to cdc@ornl.gov and request a copy. Be sure to provide your full name and address.

The initial SCALE 5 release contained a **draft** version of the manual. The new CD contains the official documentation for the package and includes revisions and corrections. It supersedes the draft version of the manual distributed with SCALE 5. **We ask that you begin using this official version of the manual immediately.**

The manual has been updated in the SCALE 5 package now distributed by RSICC. No other changes were made to the package at this time. SCALE 5.1, to be released later this year, will be announced in the SCALE and RSICC websites and newsletters. At that time we recommend that you request the new package. Reference: ORNL/TM-2005/39 (April 2005). FORTRAN 95 and C; DEC, IBM RS/6000, and SUN Unix workstations; Linux, and Windows 2000/XP (C00725/MNYCP/01).

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 riceaf@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. Below is a chronological list of the conferences. More details (if available) are provided following the table.

Fall 2005 SCALE Training Courses at ORNL

Date	Title	Registration Fee*	Description
October 17–21, 2005	SCALE Source Terms and Shielding Course	\$1800	SCALE shielding and depletion/decay sequences (including ORIGEN-ARP)
October 24–28, 2005	KENO V.a Criticality Safety Course	\$1800	CSAS/KENO V.a (including KENO3D and GeeWiz)
October 31– November 3, 2005	TSUNAMI Sensitivity/Uncertainty Tools (Experienced KENO users only)	\$1500	1-D and 3-D sensitivity/uncertainty analysis using XSDRNPM and KENOV.a

*A late fee of \$300 will be applied after September 17, 2005. A discount of \$600 per each additional week will be applied for registration to multiple courses. Course descriptions can be found at <http://www.ornl.gov/sci/scale/training.htm>.

SCALE Source Terms and Shielding Course

The SCALE Source Terms and Shielding Course covers SAS2 and ORIGEN-ARP (depletion/source-term generation), SAS1/XSDRNPM (1-D neutron/gamma shielding), SAS4/MORSE-SGC (3-D Monte Carlo neutron/gamma shielding), and QADS/QAD-CGGP (3-D point kernel gamma shielding). The course will feature the use of the SCALE Windows GUIs: OrigenArp for Windows, ORIGEN-S plotting utility PlotOPUS, and the ESPN shielding input processor for SAS4.

KENO V.a Criticality Safety Course

The SCALE KENO V.a Criticality Course focuses on KENO V.a and the associated criticality analysis sequences in CSAS. KENO V.a is a widely used 3-D multigroup Monte Carlo criticality safety code that has been in use for 20 years. It is a fast, easy-to-use code that allows users to build complex geometry models using basic geometrical bodies of cuboids, spheres, cylinders, hemispheres, and hemicylinders. Two-dimensional color plots of the geometry model can be generated in KENO V.a or the model may be viewed using the [KENO3D 3-D visualization](#) tool.

TSUNAMI Sensitivity/Uncertainty for Criticality Safety Course

Sensitivity coefficients produced by the TSUNAMI sequences predict the relative changes in a system's calculated k-eff value due to changes in the neutron cross-section data. TSUNAMI produces sensitivity data on a groupwise basis for each region defined in the system model. First-order perturbation theory is used to compute sensitivity coefficients from both cross-section and flux data. TSUNAMI folds the sensitivity data with cross-section covariance data to calculate the uncertainty in the calculated k-eff value due to tabulated uncertainties in the cross-section data. The applicability of benchmark experiments to the criticality validation of a given application can be assessed using S/U-based integral indices that can quantify system similarity. Attendees must have attended a KENO course or be experienced KENO users.

Advanced MCNP Variance Reduction

An Advanced MCNP Variance Reduction class for the MCNP (Monte Carlo N-Particle) transport code will be held in Los Alamos, NM, August 23–25, 2005. This class will be taught by the team that develops and maintains MCNP.

The class will focus specifically on using variance reduction methods in MCNP. Basic experience with MCNP is required. The class will include interactive computer sessions with PC's running Microsoft Windows.

The course will be a mixture of theory and practice. Specific topics include: mean and variance, score distribution vs. mean distribution, central limit theorem, intuitive notions of variance reduction, MCNP variance reduction techniques, how the weight window generator works, deficiencies of biasing by importance function, how not to use dxtran, when to stop attempting more variance reduction, reading an event log, comments on Monte Carlo and equations, “weight” in MCNP and Monte Carlo, and variance reduction for the pulse height tally (f8).

Detailed information and registration is available at <http://laws.lanl.gov/x5/MCNP/aug05var.html>.

MCNPX Workshops

Lead Teachers: Drs. John Hendricks, Gregg McKinney, Laurie Waters

Organizer: HQC Professional Services Contact: bill@mcnpxworkshops.com

More Information: <http://mcnpxworkshops.com> MCNPX homepage: <http://mcnpx.lanl.gov>

Aug. 8–12	Intermediate	Seoul, Korea
Sept. 5–9	Advanced	Bologna, Italy
Sept. 19–23	Intermediate	Washington, D.C.
Nov. 7–11	Introductory	Santa Fe, NM

MCNPX is the LANL all-particle, all-energy (eV-TeV) Monte Carlo transport code based on MCNP4C, LAHET, CEM, etc. MCNPX has been in active development since 1995 and is sponsored by the particle accelerator community. It has now become an accepted tool for a broad range of applications by nuclear engineers, physicists, and scientists. The MCNPX development effort has expanded the use of the Los Alamos tools to applications such as APT, waste transmutation, accelerator shielding and health physics, particle beam cancer therapy, space shielding and cosmic ray analysis, single event effects in semiconductors, radiography, and more detailed analysis of the effects of light and heavy ions in matter. In addition, the entire functionality of MCNP4C is retained. New variance reduction and data analysis techniques, many adapted from high-energy accelerator methodologies, have also been added, such as the extensive “mesh tally” capability which allows up to 3-d plotting of particle tracks, fluence and fluence-derived quantities, energy deposition, next event estimator generation contributions and particle sources.

The workshops include hands-on instruction, generally on PC Windows machines. Subject to participant export approval for the MCNPX beta test team, participants will be able to access the Fortran-90 version of MCNPX 2.4, the LA150 (150 MeV) cross-section data for over 40 isotopes for incident neutrons and protons and 12 for photonuclear interactions, and a notebook of viewgraphs.

Follow-up consultation for class participants will be provided.

The classes are taught by experienced MCNPX code developers and instructors. More information on code versions and capabilities is available at MCNPX Workshops web site <http://mcnpxworkshops.com>.

230th American Chemical Society National Meeting

Applied Modeling and Computations in Nuclear Science will be held in Washington, DC, August 28–September 1, 2005. The meeting is sponsored by the Division of Nuclear Chemistry and Technology (NUCL) of the American Chemical Society (ACS), and the American Nuclear Society (ANS). The purpose of this symposium is to bring theoretical and computational work in applied nuclear science under one umbrella, so that the nuclear scientists interested in modeling have a broader forum for their research, as well as to enable learning related techniques. Cross-disciplinary computations are also of interest. Tentative topics include:

1. Statistical aspects of radioactivity, such as uncertainties, detection limits, novel statistics.
2. Radiation transport methods (Monte Carlo and deterministic), and nuclear data evaluations.
3. Calculating of the response and theoretical designing of radiation detectors.
4. Spectral deconvolution and fitting: alpha, beta, gamma spectroscopy.
5. Calculations of chemical structure and reactions involving radionuclides.
6. Transport models of radioactive contaminants in the environment.
7. Health physics calculations: dosimetry and risk assessment.
8. Medical radiation physics calculations: radiotherapy and imaging.
9. Nuclear sensing: modeling of well logging and gauges.
10. Computers in nuclear science laboratory, QA/QC, LIMS, etc.
11. Novel and sophisticated methods of nuclear data analysis.
12. Nuclear modeling of interest to counter-terrorism.
13. Novel computational algorithms of interest to applied nuclear science.

Registration and housing reservations will be available on-line in June and the final program appears in C&EN and on the ACS web page in June/July 2005. Full papers are due at the conference August/September 2005 in MS Word format only. Instructions will be distributed to the accepted speakers.

The ACS web page is www.chemistry.org. For further information please contact Thomas Semkow, Wadsworth Center, New York State Department of Health and SUNY, P.O. Box 509, Albany, NY 12201-0509, phone: +518-474-6071, fax: +518-474-8590, email: tms15@health.state.ny.us. The complete announcement as submitted by Thomas M. Semkow can be found at <http://www.cofc.edu/~nuclear/2005WashingtonComputationSymposium.pdf>.

Nuclear Applications of Accelerator Technology “AccApp05”

The forthcoming International Topical Meeting on Nuclear Applications of Accelerator Technology (AccApp'05) is the seventh in a series of international meetings of the Accelerator Applications Division of the ANS. It is scheduled for **August 28–September 1, 2005**, on the Island of San Servolo, Venice, Italy. The purpose of AccApp'05 is to provide an international forum for presenting and discussing the use of particle accelerator technology for a variety of applications. It is intended to focus on a wide area of applications including, spallation neutron sources, isotope production, medical therapy, nuclear waste transmutation, energy production, high power accelerators under construction and future projects, material issues in a particle environment, nuclear data and experiments, codes and models for particle transport, system engineering, thermo hydraulics, contraband detection and radiation protection. For more information see: <http://www.nea.fr/listsmb/satif/pdf00004.pdf>.

International Topical Meeting on Mathematics and Computation, Supercomputing, Reactor Physics and Nuclear and Biological Applications

The International Topical Meeting on Mathematics and Computation, Supercomputing, Reactor Physics and Nuclear and Biological Applications will be held at the 'Palais des Papes,' Avignon, France, **September 12–15, 2005.**

The meeting offers an environment for interdisciplinary exchange among researchers in the nuclear field and comprises 19 general technical sessions and 13 invited technical sessions. Details on the sessions and on the organization of the meeting are given at the web site: <http://mcavignon2005.cea.fr/>.

11th International Topical Meeting on Nuclear Reactor Thermal Hydraulics

NURETH is the foremost international technical meeting on nuclear technology thermal hydraulics. The French Section of the American Nuclear Society is very proud to organize and announce that the Eleventh Nureth Topical Meeting will be held in Avignon, France on October 2-6, 2005, in the historic Palace of the Popes in Avignon, France, **October 2–6, 2005.**

The main topics covered by the Nureth 11 meeting will be devoted to the thermal-hydraulics of existing and future nuclear power plants as foreseen by the Generation IV worldwide initiative. Normal operation and accidental situations are relevant topics of the conference. Topics encompass modeling, experiments, instrumentation and numerical simulations related to flow and heat transfer in nuclear reactors with a special emphasis on the advances of multiphase CFD methods.

For more information please go to <http://nureth11.com/>.

CALENDAR

August 2005

MCNPX Workshop, Aug. 8–12, 2005, Seoul, Korea. Contact: Bill Hamilton (phone 806-928-6021, email bill@mcnpxworkshops.com, url <http://mcnpxworkshops.com> for details).

12th International Conference on Emerging Nuclear Energy Systems (ICENES 2005), Aug. 21–26, 2005, Brussels, Belgium. For more information: http://www.sckcen.be/sckcen_en/activities/conf/conferences/icenes2005/date_place.shtml.

MCNP Advanced Variance Reduction class, Aug. 23–25, 2005, at Los Alamos National Laboratory. Contact: Cheryl Royer (croyer@lanl.gov, phone: 505-665-2154, <http://laws.lanl.gov/x5/MCNP/aug05var.html>.)

Seventh Topical Conference on Nuclear Applications of Accelerator Technology "AccApp05", Aug. 28–Sept. 1, 2005, Venice, Italy. For more information: <http://www.nea.fr/listsmb/satif/pdf00004.pdf>.

Applied Modeling and Computations in Nuclear Science, Aug. 28–Sept. 1, 2005, Washington, DC. Contact Thomas Semkow (phone +518-474-6071, fax +518-474-8590, email tms15@health.state.ny.us).

September 2005

XIX Nuclear Physics Divisional Conference (NPDC19) of the European Physical Society, Sept. 5–9, 2005, Pavia, Italy. Contact: Saverio Altieri (email saverio.altieri@pv.infn.it, url <http://www.pv.infn.it/~npdc19>).

MCNPX Advanced Workshop, Sept. 5–9, 2005, Bologna, Italy. Contact: Bill Hamilton (phone 806-928-6021, email bill@mcnpxworkshops.com, url <http://mcnpxworkshops.com> for details).

International Topical Meeting on Mathematics and Computation, Supercomputing, Reactor Physics and Nuclear Biological Applications (M&C 2005), Sept. 12–15, 2005, Avignon, France. Contact: Dr. Richard Sanchez (email avignon2005@drnsac.cea.fr; url <http://mcavignon2005.cea.fr>).

MCNPX Intermediate Workshop, Sept. 19–23, 2005, Boston, MA, or Washington, D.C. Contact: Bill Hamilton (phone 806-928-6021, email bill@mcnpxworkshops.com, url <http://mcnpxworkshops.com>).

2005 NCSD Topical Meeting, Sept. 19–22, 2005, Knoxville, TN. For more information: <http://meetingsandconferences.com/ncsd2005/>.

October 2005

11th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, Oct. 2–6, 2005, Avignon, France. For more information: <http://nureth11.com>, nureth11@cea.fr.

10th Workshop on Monte Carlo Simulation of Radiotherapy Treatment Sources using the BEAM Code System, Oct. 3–6, 2005, Ottawa, Canada. Contact: Dave Rogers, Physics Department, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, Canada, K1S 5B6 (tel 613-520-2600x4374, fax 613-520-4061, e-mail drogers@physics.carleton.ca, url www.physics.carleton.ca/~drogers/BEAM/course/brochure.html.)

SCALE Source Terms and Shielding Course, Oct. 17–21, 2005, Oak Ridge National Laboratory, Oak Ridge, TN. Contact: <http://www.ornl.gov/sci/scale/training.htm>.

KENO V.a Criticality Safety Course, Oct. 24–28, 2005, Oak Ridge National Laboratory, Oak Ridge, TN. Contact: <http://www.ornl.gov/sci/scale/training.htm>.

TSUNAMI Sensitivity/Uncertainty Tools, Oct. 31–Nov. 3, 2005, Oak Ridge National Laboratory, Oak Ridge, TN. Contact: <http://www.ornl.gov/sci/scale/training.htm>.

November 2005

MCNPX Introductory Workshop, Nov. 7–11, 2005, Santa Fe, NM. Contact: Bill Hamilton (phone 806-928-6021, email bill@mcnpxworkshops.com, url <http://mcnpxworkshops.com> for details).

ANS Winter Meeting and Nuclear Technology Expo, “Talk About Nuclear Differently: A Good Story Untold,” November 13–17, 2005, Washington, D.C. Contact: <http://www.ans.org/meetings/>.

March 2006

HEART Conference, March 6–10, 2006, Sunnyvale, CA. Contact: Technical Program Chair, Dennis Breuner (phone 858-720-7072, email dbreuner@titan.com).