Radiation Safety Information Computational Center

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Our vast progress in transportation, past and future, is only a symbol of the progress that is possible by constantly striving toward new horizons in every human activity. Who can say what new horizons lie before us if we can but maintain the initiative and develop the imagination to penetrate them – new economic horizons, new horizons in the art of government, new social horizons, new horizons expanding in all directions, to the end that greater degrees of well-being may be enjoyed by everyone, everywhere. — Alfred P. Sloan, Jr.

CHANGES TO THE RSICC CODE AND DATA COLLECTION

CCC-744/Easy-QAD, Version 2

Innovative Technology Center for Radiation Safety (iTRS) and Nuclear Reactor Analysis Laboratory at Hanyang University, Seoul, Korea, contributed EASY-QAD, Version 2.0, which is a stand-alone Windows XP code system that facilitates gamma and neutron shielding calculations with user friendly

graphical interfaces. It is used to analyze radiation shielding problems and includes:
- 8 kinds of geometry types,
- various flexible source options,
- common material library, and
- various detector types.

The updated contents of EASY-QAD Version 2.0 are below:
- Addition of starting option with 'P-code' files,
- Addition of multi-source calculation function,
- Expansion of source geometries,
- Addition of warning message, and
- Modifications of EASY-QAD program errors
    a. Coordination application problem in source division,
    b. Source position error,
    c. Rotation problem of source geometry,
    d. Program running error in using more than six gamma energy distribution, and
    e. EASY-QAD display problem of the right elliptic cylinder, ellipsoid and truncated right cone geometries.

Through intuitive windows and their interactions inside EASY-QAD, the user can specify the dimensions of 3D-shapes, their material compositions, their densities, the type of radioactive sources, the locations of the sources, and the type and positions of detectors. With the ease of using these sequences, shielding problems will become simpler and more clearly understandable to the analyzer. Furthermore, the error checking system can prevent users from making mistakes by automatically debugging the user inputs and giving modal dialog windows. EASY-QAD is based on the AECL implementation of QAD-CGGP-A, which is a point-kernel code for calculating fast-neutron and gamma-ray penetration through various shield configurations defined by combinatorial geometry specifications.

The package is transmitted on one CD, which contains referenced documents in 10.a, executables for EASY-QAD, MATLAB Component Runtime, P-code files and QAD- CGGP-A (Version 95.2), input and output files. MATLAB; PC (C00744PC58601).

CCC-749/SCIP V1.1
The National Radiological Protection Board, Chilton, Didcot, Oxon OX11 0RQ, United Kingdom, contributed SCIP V1.1 through the Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France. The Surface Contamination Investigation Program (SCIP) assesses the doses to both transport workers and members of the public from radioactive contamination on the surface of packages. The program models five package types covering the range commonly transported in both the UK and in other countries. These are a small manually handled package, a small remotely handled package, a large remotely handled package, an EU nuclear fuel flask, and a UK nuclear fuel flask. The exposure pathways assessed are from both internal and external irradiation. Internal irradiation results from the inhalation and inadvertent ingestion of material from the package surface. External irradiation is from material present on the skin and from material on the package or from activity that has been deposited onto the ground surface in the vicinity of the package. The package types and pathways used in this current model have been adapted from those described in an earlier model developed by an IAEA Coordinated Research Project (CRP) on this topic. The program allows users to enter their own scenario-specific parameters, rather than those defined for the CRP. A number of different scenarios can be modeled using SCIP V1.1 by entering parameters such as package type, distance from package, time of exposure, and activity concentration on the package. The flexibility of the program allows for other situations to be modeled with parameter values chosen by the users.

The package is transmitted as a self-extracting installation executable on a CD, which contains documentation, installation and executable files, data files and test cases. There is no source code distributed with the package. Visual Basic; Windows PC (C00749PCX8600).

CCC-751/ELEORBIT

The Department of Thermonuclear Fusion Research, Japan Atomic Energy Research Institute, Naka-machi, Naka-gun, Ibaraki-ken Japan, through the Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, contributed ELEORBIT. Performance characteristics of a magnetic multi-pole plasma sources depend strongly on the structure of the line-cusp magnetic fields and the behavior of the primary electrons. In order to design and improve the plasma source efficiently, a computer code was developed, which can simulate primary electron orbits in the three-dimensional magnetic field generated in the source. ELEORBIT solves the equation of motion for primary electrons in a multi-pole magnetic field from a JT-60 ion source. The magnetic field is determined using 3D analytical solution based on a magnetic charge model.

The package is transmitted on a CD, which contains a readme file, installation files and sample input and output files. Fortran 77, EXCEL; IBM PC (C00751PCX8600).

DLC-232/COV-15GROUP-2006

The IAEA through the NEA Data Bank, Issy-les-Moulineaux, France released COV-15GROUP-2006, a 15-group cross section covariance matrix library presenting a general overview of the presently available data. The library includes the covariances from different sources and cross section evaluations: ENDF/B-V, /B-VI.8, JENDL-3.3, JEFF-3.0, IRDF-2002 and IAEA. The following nuclides are included: H-1, Li-6, Li-7, Be-9, B-10, C-12, N-14, O-16, F-19, Na-23, Al-27, Si-28, Si-nat, Cr-52, Mn-55, Fe-56, Fe-57, Ni-58, Zr-90, Pb-nat, Pb-206, -207, -208, Th-232, U-235, U-238, Np-237, Pu-239, Pu-240, Pu-241, Am-241. In this version the library file, covfils2.lib, was corrected (energy group structure was provided only for one isotope), as well as the corresponding test case outputs. The input files (original BOXER format covariance libraries and ANGELO input instructions) were included, thus allowing one to convert the covariance matrices to a user-defined energy group structure. Examples of output for the 15-group structure are provided. The code LAMBDA is also included for verification of mathematical properties of the matrices (e. g. eigenvalues).

COV-15GROUP-2006 runs under Windows and Linux operating systems. The package contains Fortran source, but does not include executables; a Fortran compiler is required. (D00232MNYCP00).

DLC-233/CLES

Department of Nuclear Engineering, Kyoto University, Yoshida, Sakyo-ku, Kyoto 606-8501, Japan, through the Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has released CLES, a cross section library that consists of 36 sets of multigroup constants (energy-averaged cross sections) for liquid 4He, H2, D2, CH4, H2O and D2O and solid CH4 at many different temperatures. The neutron energy range between 0.1 micro-eV and 10 MeV is discretized into 140 energy groups at equal logarithmic intervals. The angular distribution of scattered neutrons is represented by the expansion in Legendre polynomials up to order 3. The group constants are generated using physical models of a double-differential scattering cross section for the moderator materials, which are newly developed for describing low-energy neutron scattering in terms of the general considerations of molecular dynamics inherent in liquid and solid phases. Most of the calculated cross-section results are compared with many experimental measurements, both double-differential and total, for various material temperatures and neutron energies. Availability of CLES is demonstrated by the multigroup transport analyses of neutron source models for

production of ultra cold ($\gg 0{:}3$micro-eV), cold ($\gg 2$ meV) and thermal ($\gg 25$ meV) neutrons.

The package is transmitted on a CD, which contains the reference, installation and executable files, data files and test cases. FORTRAN 90; Windows or Linux (D00233MNYCP00).

DLC-256/VIP-MAN

Rensselaer Polytechnic Institute, Troy, New York, USA has contributed VIP-Man, a voxel phantom input for MCNP/MCNPX. Risk to the human body due to radiation exposure can be assessed by ICRP conversion factors, which rely on the accuracy or virtual human phantoms to portray the most precise results. VIP-Man phantom allows for the ability to investigate subtle dose variations in relatively small structures from various charged particles. VIP-Man is a voxel phantom (also called tomographic phantom) that represents the entire body of a human. The phantom was developed from segmented cadaver images originally obtained in the Visible Human Project. The phantom was implemented in MCNP/MCNPX codes at a 4mm x 4mm x 4mm voxel size. The input deck allows for the use of MCNP/MCNPX codes to model the transport of photons, electrons, and neutrons through an anatomically realistic adult male for radiation protection, imaging and therapy applications. The phantom geometry can also be extracted from the input file for other purposes such as visualization.

The package includes the input file and documentation. MCNP5/MCNP6/MCNPX executables are required (not distributed with package). Linux, MacOS and Windows (D00256MNYCP00).

PSR-507/COBRA-EN

ENEL SpA, Milano, Italy, through the Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France has contributed COBRA-EN. COBRA-EN is an upgraded version of the COBRA-3C/MIT for thermal-hydraulic transient analysis of reactor cores. Starting from a steady-state condition in a LWR core or fuel element, the code allows the user to simulate the thermal-hydraulic transient response to user-supplied changes of the total power, of the outlet pressure and of the inlet enthalpy and mass flow rate. The thermal-hydraulic homogeneous model of COBRA-EN is based on three partial differential equations that, using what is known as "sub channel approximation", describe the conservation of mass, energy and momentum vector in axial and lateral directions for the water liquid/vapor mixture and the interaction of the two-phase coolant with the system structures. Optionally, a fourth equation can be added which tracks the vapor mass separately and which, along with the correlations for vapor generation and slip ratio, replaces the sub cooled quality and quality/void fraction correlations, needed to extend the capabilities of the essentially homogeneous three-equation model.

The package contains source code, 64-bit Windows executable, sample problems and referenced documentation and is transmitted on one CD. Fortran 77; Linux, MacOS and Windows (P00507MNYCP01).

PSR-526/ERROR-J, Version 2.3

The Reactors Physics Research Group, Japan Atomic Energy Agency, 2-4, Shirane, Shirakata, Tokai-mura, Ibaraki, 319-1195, Japan contributed a new version of ERRORJ through the NEA Data Bank, Issy-les-Moulineaux, France. With respect to the previous version of ERRORJ 2.2.1, the treatment of the self-shielding effect was corrected in this version. Note that point-wise cross section data must be used for the calculation with the self-shielding treatment. On the other hand the group-wise data is necessary when the correlation between different nuclides is considered. In other words, it is impossible to consider both the correlation and the self-shielding effect in the current code. The developers suggest that the self-shielding effect should be evaluated without considering the correlations between different nuclides. Additionally,

two bugs were found in the FORTRAN source and corrected in this release.

ERRORJ produces multigroup covariance matrices from ENDF/B-6 format and is based mainly on the methods of the ERRORR module in NJOY94.105. Thus, all the function of ERRORR is available in ERRORJ. ERRORJ produces a COVFIL format file to store multi-group covariance data which is converted to a COVERX format file by the included conversion program NJOYCOVX. A COVERX format is proposed as a standard file of multi-group covariance data in the FORSS system.

The package is distributed on a CD in a GNU compressed Linux tar file which includes documentation, source code, data files for sample cases, test input and output. No executables are included in the package. FORTRAN 77; Windows and Linux (P00526MNYCP03).

PSR-549/CAFDATS

CAFDATS was contributed by Mitsui Engineering and Shipbuilding Co., Ltd. Tokyo, Japan through the Institute of Nuclear Safety, NUPEC, Tokyo, Japan and the NEA Data Bank, Issy-les-Moulineaux, France. CAFDATS is a converter of angular fluxes of the DORT, ANISN and TORT systems. It works similarly to the TORSED or TORSET program in the DOORS code systems, and is designed to calculate the boundary source for the ANISN and DORT codes from the calculated fluxes by the DORT or TORT code. There are some limitations on the dimensions of certain arrays, but these dimensions can be increased to meet user's requirements. There are five sub-programs in the program package:

- TXTODR converts calculated fluxes in the Cartesian geometry (X, Y, Z) of TORT code to the boundary source in the cylindrical geometry (R, Z) of DORT code,
- TRTODR converts calculated fluxes in the cylindrical geometry (R, Theta, Z) of TORT code to the boundary source in the cylindrical geometry (R, Z) of DORT code,
- TRTOAR converts calculated fluxes in the cylindrical geometry (R, Theta, Z) of TORT code to the boundary source in the infinite cylindrical geometry (R) of ANISN code,
- TXTOAX converts calculated fluxes in the Cartesian geometry (X, Y, Z) by TORT code to the boundary source in the infinite plane geometry (X) of ANISN code,
- DRTODR converts calculated fluxes in the cylindrical geometry (R, Z) by DORT code to the boundary source in the cylindrical geometry (R, Z) of DORT code.

The angular fluxes for the boundary source of the secondary calculation are linearly interpolated from the nearest-neighbor angular fluxes in the angular and spatial meshes of the primary calculation.

The package is transmitted on CD and contains documentation, Fortran source code, shell script and an executable for Sun Solaris on a single CD. Fortran; SUN or Linux PC (P00549MNYCP00).

PSR-550/ALICE2012

A collaboration of Lawrence Livermore National Laboratory, Livermore, California; Institut f. 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 frozen version of this statistical model code system to calculate particle spectra from HMS (Hybrid Monte-Carlo Simulation) precompound nucleus decay. This release is designated HMS-ALICE-2012. The code uses the HMS precompound decay model, the Weisskopf-Ewing evaporation model (optional with s-wave approximation) and Bohr-Wheeler fission models, all with multiple particle emission cascades to estimate single- and double-differential emission spectra and product yields of nuclear reactions induced by probes from photons to heavy ions. Initial excitations up to 1 GeV should be tolerated, but a range of 0.2–250 MeV is advised as pion production

channels have not yet been programmed into the physics. Product yields include A, Z of fission products. An option exists to give output of exclusive particle emission spectra of up to multiplicity 3. This version of ALICE gives the option (parm=512) to override the A=12 default mass number as the mass at or below which Fermi decay is implemented. This version also differs from earlier versions in allowing isotopic targets to be used except for incident heavy ions (A>1.)It contains cluster exit channels on demand, precompound and compound (use PARM=128). An ENDF output for 1,2,3 n,p,alpha out reactions is an option. The logic used could be extended to include other clusters and to higher multiplicities if needed. Earlier versions permitted setting of coincident detector 'gates' to predict spectra such as might be measured in an experiment with multiple detectors.

ALICE2012 runs on a PC under Windows or Linux and on Mac computers. A Fortran 95 compiler is required on all systems. This package has no executables in the package distribution. The package is transmitted on a CD in a WinZIP file which contains documentation, source code, and example problems. Fortran; PC and Mac (P00550PCX8604).

PSR-556/NAUA-MOD5 NAUA-MOD5/M

Laboratorium für Aerosolphysik und Filtertechnik Projekt Nukleare Sicherheit Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Germany, through the OECD NEA Data Bank, Issy-les-Moulineaux, France contributed NAUA-MOD5 NAUA-MOD5/M. NAUA-MOD5 and NAUA-MOD5/M calculates the behavior of a polydisperse aerosol system in a closed container. This container can be subdivided into a number of subcompartments geometrically separated but coupled by gas flows. For NAUA-MOD5/M an arbitrary configuration of subcompartments and flow patterns can be treated. The report for MOD5 and MOD5-M is written in German. However, the report for the previous version (MOD4) is available in English and has been included in this package for additional assistance.

NAUA-MOD5 NAUA-MOD5/M runs on IBM 3090 and DEC VAX 8810 mainframe computers. The code will not run on modern PCs. This package contains reference material, documentation and source code on a single CD-rom. No executables are included with this package. Fortran 77; IBM 3090, DEC Vax (P00556MYCP00).

PSR-575/STABA, STAGT, STEGT, STIG, STIGMA

The Dragon Project, A.E.E., Winfrith, Dorchester, U.K, through the NEADB, Issy-les-Moulineaux, France has contributed STABA, STAGT, STEGT, STIG, STIGMA - Stress Analysis of Dragon HTR Graphite Structure. STABA, stress, temperature and bowing analysis is a quasi 3-D computer code is to apply the principle of rotational plane strain over the full length of a prismatic core component, taking into account spatial variations in fast neutron and thermal flux throughout a period of irradiation, to obtain the stress and bowing effects. A 2-D thermal evaluation option has been included to save the time and work involved in the transfer of nodal point temperatures from other sources. STAGT, which is the oldest in this series of programs, can handle multiply connected regions but is confined to plane strain in x-y geometry. Variations in temperature loading during irradiation are accounted in STAGT (Wigner strain component.). STIG is a version of STAGT where an anisotropic elasticity matrix has been introduced to handle transversely isotropic materials. An additional feature of 'STIG' is the introduction of a boundary restraint condition of practical importance to prismatic gas cooled reactor core construction. This is defined as rotational plane strain in which free distortion of the prism arising from overall gradient of temperature and/or fast neutron damage flux coincident with any single direction may be assumed to occur if variation of thermal expansion coefficient with irradiation is included. STIGMA is intended for evaluation of stress and displacement in composite axi-symmetrical bodies subject to variable loadings in the axial and radial directions. The code has been prepared to take account of transverse isotropy in

material characteristics for up to four separate bonded interface zones within a single composite material problem. Although specifically designed for the analysis of graphite structural components in the fast neutron irradiation environment of a reactor core, it is equally applicable to initial state design of pre-stressed concrete pressure vessels and other problems involving rotational symmetry.

The package is transmitted on one CD and contains source code, documentation, and sample input and output files. FORTRAN IV, FORTRAN 95; IBM PC, Linux, Mac (P00575MNYCP00).

PSR-572/ ENDVER/GUI

The International Atomic Energy Agency, Nuclear Data Section, Vienna, Austria through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France has contributed ENDVER/GUI. Experimental and evaluated nuclear reaction data is compiled world-wide in EXFOR and in ENDF formats, respectively. The ENDVER package can be used to convert EXFOR data into computational C4 format, display them and compare graphically with the contents of a specified evaluated data file. The package also contains utilities to retrieve selected materials from a master library in ENDF format, extract cross sections (including differential and double differential data) and output them in two-column PLOTTAB "curves" format. The ENDVER/GUI package is intended as a utility for evaluators and data compilers to display experimental data from the EXFOR database and compare them to comparable data in evaluated nuclear data files.
> The package has two parts:
> - Data retrieval and manipulation program package, and
> - Graphics User Interface

The package contains source code, executables for Linux and Windows environments, references, and sample problem input and output. The source code was written in FORTRAN, JAVA-2, C, C++. Compliant compilers are required. Users are also required to have Java Runtime Environment (JRE) installed. (P00572PCX8600).

CCC-783/RASCAL 4.2

Athey Consulting, Charles Town, West Virginia, and the U.S.Nuclear Regulatory Commission, Washington, DC contributed a newly frozen version of the Radiological ASsessment for Consequence AnaLysis code system designated RASCAL Version 4.2. RASCAL can estimate reactor source terms, atmospheric transport and doses resulting from radiological emergencies and can be used to assist in making protective action decisions. It was developed for the U.S. Nuclear Regulatory Commission and is designed to be used in the independent assessment of dose projections during response to radiological emergencies.   Updates and fixes include:

- Both the Source Term to Dose and the Field Measurement to Dose models now include an option to allow the use of ICRP-60 dose conversion factors in the calculation of the effective inhalation and thyroid doses. The default setting is to use ICRP-26, the current NRC standard.
- The Field Measurement to Dose model has been updated in several areas. For the intermediate phase calculations, the improved re-suspension model from Maxwell/Anspaugh has been added. Also, a TEDE remainder dose based on a delay before return has been added. The DRL calculations have been expanded to include a delay before return up to 40 years. The early-phase dose calculations have been expanded to cover a 96 hour period with both plume passage and the post-plume components.
- The dose conversion factors used in RASCAL have been updated with values from DCFPAK2 (Eckerman, ORNL). This package provides updates to the DCFs in FGR-11 and FGR-12. In addition, the half-life data used in RASCAL has been updated from DCFPAK2 as well.

- The model user interfaces have been updated to gather and display more information about the scenarios being modeled. Both the STDose and FMDose models have a field for capturing the analyst name. STDose also includes a field where up to 600 characters can be used to describe the scenario.
- The facility database and the facility help file have been updated to include the approved power-uprates for the following nuclear power plants:
  - Calvert Cliffs, Units 1 and 2
  - Harris
  - LaSalle, Units 1 and 2
  - Limerick, Units 1 and 2
  - Nine Mile Point, Unit 2
  - North Anna, Units 1 and 2
  - Point Peach, Units 1 and 2
  - Prairie Island, Units 1 and 2
  - Surry, Units 1 and 2
- The STDose Startup Options menu has been renamed to Settings. Then, the capability to set the default analyst name and ICRP inhalation dose factor option were added to this settings screen.
- The options for the display of the radionuclide mix on the ground surface have been updated. First, there is no longer a cutoff based on activity concentration. Now all the radionuclides can be seen. The option to display "sorted by contribution to groundshine" has been changed to show up to 20 nuclides (up from 10). Finally, the option that previously just showed only the top 10 by activity concentration now sorts by contribution to inhalation CEDE and displays up to 20 radionuclides.

RASCAL runs under Windows operating systems. The software has been tested under Windows 7 64-bit and XP 32-bit systems. Microsoft Basic and Fortran compilers were used to create executables included in the package. No source files are distributed. The package is transmitted on a CD which includes executables, data, help files, documentation and an install procedure. Fortran, Basic; PC running Windows (C00783PCX8601).

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 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

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
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	Los Alamos, NM	$1,900 or $1,600*

	p.m. - Friday 12:00 p.m.		
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.

![scale](scale logo)

Fall 2012 SCALE Training Courses

Date	Title	Location	Registration Fee
October 8-12	**SCALE Criticality Safety Calculations Course** *Introductory through advanced criticality calculations using KENO V.a and KENO-VI; Resonance self-shielding techniques*	ORNL Oak Ridge, TN, USA	$2000
October 15-19	**SCALE Criticality and Shielding Course** *Basic criticality calculations with KENO-VI; shielding analysis with automated variance reduction using MAVRIC; criticality accident alarm system analysis*	ORNL Oak Ridge, TN, USA	$2000
October 22-26	**SCALE Lattice Physics and Depletion Course** *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*	ORNL Oak Ridge, TN, USA	$2000
October 29-31	**SCALE/ORIGEN Activation and Decay Calculations Course** *Isotopic depletion/decay and source term characterization using ORIGEN/ORIGEN-ARP*	ORNL Oak Ridge, TN, USA	$1500

Foreign National Visitors: You **must** register **at least 40 days** in advance to obtain security clearance.

Payment must be received at least one week prior to training course.

For more information and online registration, please visit
http://scale.ornl.gov/training.shtml

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@orau.org.

CONFERENCES

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, 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
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.

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/.

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