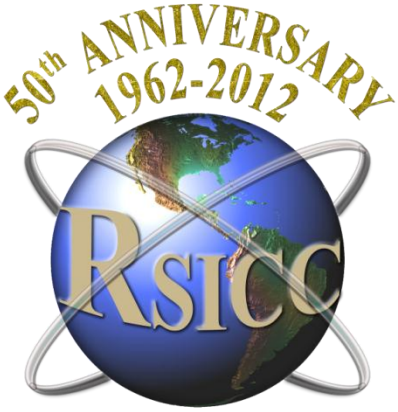
Radiation Safety Information Computational Center



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No. 567 **July 2012**

Knowledge is the eye of desire and can become the pilot of the soul.—Will Durant

CHANGES TO THE RSICC CODE AND DATA COLLECTION

DLC-257/VITJEFF311.BOLIB
The Italian National Agency for New Technologies, Energy and the Environment "E. Clementel" Research Centre, Bologna, Italy and Institute of Physics and Power Engineering, Obninsk, Russian Federation through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France contributed this new library. VITJEFF311.BOLIB is a pseudo-problem-independent library based on the Bondarenko /10/ (f-factor) method for the treatment of neutron resonance self-shielding and temperature effects. The library contains 176 nuclides at 4 temperatures, obtained for the most part with 6 to 8 values for the background cross section.

The Fe-56 processed data file was obtained with an additional value (0.01 barns) for the background cross section with respect to the background cross section values used to generate the corresponding data file for VITAMIN-B6. The thermal scattering cross sections were processed at all the temperatures available in the JEFF-3.1.1 thermal scattering law data file for 6 additional bound nuclides (H-1 in light water (H-

H_2O), H-1 in polyethylene (H-CH_2), H-1 in zirconium hydride (H-ZrH) (not contained in VITAMIN-B6 and VITJEF22.BOLIB /11/), H-2 in heavy water (H2-D_2O), C in graphite (C-Gph) and Be in beryllium metal (Be-Th).

ORIGINAL NUCLEAR DATA FILE: JEFF-3.1.1
DATA PROCESSING SYSTEMS: NJOY-99.259 (with NEA049 patch) and the ENEA-Bologna 2007 Revision of SCAMPI
FORMAT: AMPX
NUMBER OF GROUPS: 199 neutron groups and 42 photon groups
THERMAL NEUTRON GROUPS: 36 groups below 5.043 eV with upscattering cross sections
NEUTRON ENERGY RANGE: 1.0E-5 eV - 19.64 MeV
PHOTON ENERGY RANGE: 1.0 keV - 30.0 MeV
TEMPERATURES [K] (same values as in VITAMIN-B6): 300, 600, 1000 and 2100
BACKGROUND CROSS SECTIONS (SIGMA-ZEROs) [barns] (same values as in VITAMIN-B6):
1, 10, 50, 100, 300, 1.0E+3, 1.0E+4, 1.0E+5, 1.0E+6, 1.0E+10 (infinite dilution)
CROSS SECTION LEGENDRE ORDER:
P7 for materials with Z < /= 29 (copper); P5 for the remainder of the nuclides
NUMBER OF MATERIALS: 182
MATERIALS INCLUDED (one file per material):
H-H2O H-CH2 H-ZrH D-D2O H-3 He-3 He-4 Li-6 Li-7 Be-9 Be-Th B-10 B-11 C-nat C-Gph
N-14 N-15 O-16 O-17 F-19 Na-23 Mg-24 Mg-25 Mg-26 Al-27 Si-28 Si-29 Si-30 P-31 S-32
S-33 S-34 S-36 Cl-35 Cl-37 K-39 K-40 K-41 Ca-40 Ca-42 Ca-43 Ca-44 Ca-46 Ca-48 Ti-46 Ti-47 Ti-48
Ti-49 Ti-50 V-nat Cr-50 Cr-52 Cr-53 Cr-54 Mn-55 Fe-54 Fe-56 Fe-57 Fe-58 Co-59
Ni-58 Ni-60 Ni-61 Ni-62 Ni-64 Cu-63 Cu-65 Ga-nat Y-89 Zr-90 Zr-91 Zr-92
Zr-94 Zr-96 Nb-93 Mo-92 Mo-94 Mo-95 Mo-96 Mo-97 Mo-98 Mo-100 Ag-107 Ag-109
Cd-106 Cd-108 Cd-110 Cd-111 Cd-112 Cd-113 Cd-114 Cd-115m Cd-116 In-113 In-115 Sn-112
Sn-114 Sn-115 Sn-116 Sn-117 Sn-118 Sn-119 Sn-120 Sn-122 Sn-123 Sn-124 Sn-125 Sn-126
Ba-138 Eu-151 Eu-152 Eu-153 Eu-154 Eu-155 Gd-152 Gd-154 Gd-155 Gd-156 Gd-157 Gd-158
Gd-160 Er-162 Er-164 Er-166 Er-167 Er-168 Er-170 Hf-174 Hf-176 Hf-177 Hf-178 Hf-179
Hf-180 Ta-181 Ta-182 W-182 W-183 W-184 W-186 Re-185 Re-187 Au-197 Pb-204 Pb-206
Pb-207 Pb-208 Bi-209 Th-230 Th-232 Pa-231 Pa-233 U-232 U-233 U-234 U-235 U-236
U-237 U-238 Np-237 Np-238 Np-239 Pu-236 Pu-237 Pu-238 Pu-239 Pu-240 Pu-241 Pu-242
Pu-243 Pu-244 Am-241 Am-242 Am-242m Am-243 Cm-241 Cm-242 Cm-243 Cm-244 Cm-245 Cm-246
Cm-247 Cm-248

The data libraries and documents are transmitted on DVD, which includes data libraries in AMPX format. Uncompressed files are about 442 MB. Unix workstation, PC, or Mac (D00257MNYCP00).

PSR-570/SOFIRE-2

SOFIRE-2 was contributed by Atomics International, Canoga Park, California, USA through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France. SOFIRE2 ONE CELL calculates the consequences of a sodium pool fire in a closed vault. Gas pressure in the vault is calculated from the gas density and temperature. SOFIRE2 TWO CELL calculates the consequences of a sodium pool fire in a vault connected to a containment structure through a restricted opening. Cold gas flows from the containment to the vault due to mass differences while hot gas flows from the vault to the containment to equilibrate pressures. Pressure in the containment is calculated from the gas density and temperature. In both programs the sodium burning rate is governed by the rate of oxygen diffusion to the sodium surface. Both programs use the finite difference method to calculate transient temperatures in a nodal network designed to simulate a physical system (ONE CELL program) or the two cell geometry (TWO CELL program).

The SOFIRE-2 package includes Fortran source, sample problem and the referenced document. No executable is included in the package. FORTRAN; IBM 370; Reference: AI-AEC-13055 (P00570IO37000).

PSR-571/RIPPLE

RIPPLE was contributed by Los Alamos National Laboratory through the Energy Science and Technology Software Center, Oak Ridge, Tennessee. RIPPLE is a two-dimensional, transient, free surface incompressible fluid dynamics program. It allows multiple free surfaces with surface tension and wall adhesion forces and has a partial cell treatment which allows curved boundaries and interior obstacles.

RIPPLE simulates incompressible flows with free surfaces using the volume-of-fluid (VOF) algorithm. This technique is based on the use of donor-acceptor differencing to track the free surface across an Eulerian grid. The complete Navier-Stokes equations in primitive variables for an incompressible fluid are solved by finite differences with surface tension and wall adhesion included. Optionally the pressure equation can be solved by a conjugate residual method rather than the successive overrelaxation (SOR) method.

The RIPPLE package includes FORTRAN source, sample problem and the referenced document. No executable is included in the package. FORTRAN; CRAY XMP; Reference: LA-12007-MS (P00571CYXMP00).

PSR-569/ORTHIS-ORTHAT

Oak Ridge National Laboratory, Oak Ridge, TN, USA through the NEADB, Issy-les-Moulineaux, France has contributed ORTHIS-ORTHAT. ORTHIS and ORTHAT are designed to solve steady-state and transient heat conduction problems, respectively, in two-dimensional geometries. Either Cartesian (x-y) or cylindrical (r-z, r-theta) coordinate systems may be used. Thermal properties, heat generation rates, and boundary conditions may be functions of position, time, or temperature. ORTHIS uses the iterative method of successive overrelaxation to solve the steady-state problem. In addition to overrelaxation it also uses a dominant-error-mode extrapolation procedure to increase the rate of convergence. ORTHAT uses a modified alternating-direction implicit method to solve the transient problem. The input for both programs has been designed in an easily usable free-form style.

The ORTHIS-ORTHAT package contains Fortran-IV source files, sample input and output files, and the referenced document. There are no executable files included in this package. Fortran IV; IBM 360; Reference: ORNL-TM-3324 (P00569I036000).

PSR-543/ADEFTA 4.1

ENEA/FPN-FISNUC (Nuclear Data Centre), Bologna, Italy, through the OECD Nuclear Energy Agency Data Bank, Issy-Les Moulineaux, France, contributed a new version of the Atomic Densities for Transport Analysis script. ADEFTA 4.1 is a script file for any UNIX/Linux platform that uses only Bourne shell commands and the “awk” UNIX (and Linux) utility in order to calculate the atomic densities related to any compositional model for transport analysis. The output produced by ADEFTA 4.1 can be useful for applications with many transport codes. However, ADEFTA 4.1 is particularly addressed to users of both the GIP code, which prepares macroscopic cross-sections for the DORT and TORT deterministic transport codes, and the Monte-Carlo MCNP code. ADEFTA 4.1 output normally consists of two files: the former for “general use” since the atomic density (atom/(barn*cm)) for each isotope

contained in a material mixture of an input compositional model is reported together with the corresponding atomic fraction in the material or mixture, the latter more directly addressed to MCNP and only containing the atomic fractions. A third output file (optional) can be produced by ADEFTA 4.1: this is a partial input file to GIP. It is denoted partial because users must input by themselves the array containing the cross sections for all the nuclides of the complete working library (14** data entries). ADEFTA Version 4.1 differs from version 4.0 in a format detail in the group cross-section library index file oriented to the automatic generation of an input to the GIP code.

ADEFTA 4.1 can be run in the Bourne shell on UNIX or Linux operating systems and can also be run under Cygwin on Windows-based personal computers. The package is transmitted on a CD in a UNIX tar file which includes documentation, the script, data files and test cases. Reference: FPN-P9H6-010 (May 2008). Bourne Shell; Workstation or PC (P00543MNYCP01).

CCC-765/GANDR/SEMOVE

The OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France, has released GANDR/SEMOVE, a Fortran 77 computer program for computing the derivatives of processed multigroup nuclear data with respect to the individual parameters of the Global Assessment of Nuclear Data Requirements (GANDR) library. The basic premise is that a user has chosen a multigroup processing program such as NJOY and developed a script that allows the calculation of all nuclear data of interest in his selected group structure and with his selected weight function. The file "njg" included in this distribution is an example of such a user-supplied script. A distinctive feature of the GANDR project is that the fundamental data uncertainties are assumed to reside, not in the ENDF evaluations, but in the parameters of the GANDR library. To interface the GANDR library with normal sensitivity tools (such as SUSD3D), and thereby to permit the GANDR library to be improved by exploiting the information content of accurate integral data, we need to be able to calculate the changes in the multigroup cross sections that result from changes in the GANDR parameters. The SEMOVE program assumes the existence of reference ENDF and PENDF files, such as are normally supplied to the GROUPR module for multigroup processing. The SEMOVE program performs a lengthy series of discrete alterations. In each alteration, one of the (up to 700) GANDR parameters for the material of interest is either increased or (in the case of odd-numbered Legendre coefficients) decreased by 1%. The SEMOVE code can, with a single execution, populate the reserved data directories with the perturbed ENDF and PENDF files required to calculate all parameter derivatives for a selected nuclide. An illustration of how this works in practice is provided in the documentation included. A Fortran 77 compiler is required running under a Linux OS or Windows/Cygwin environment. NJOY-99.259 is required to run the test cases.

The package is transmitted in a self-extracting executable which contains documentation, source files, C Shell scripts (CSH or TCSH) and sample problems. LINUX or UNIX; Fortran 77 (C00765PCX8600).

CCC-759/TITAN 1.29

Georgia Institute of Technology, Atlanta, Georgia, contributed an updated version of TITAN, a time-independent deterministic radiation transport simulation code in 3-D Cartesian geometry. The hybrid approach in the TITAN code allows different transport solvers (Sn or ray-tracing) to be applied in different regions. TITAN solves both the k-effective and fixed-source forward/adjoint problems. It has been benchmarked on a number of OECD/NEA benchmark problems. Version 1.29 adds:

1. The Lobatto-Chebyshev quadrature which includes a direction along an axis
2. Improved angular source handling
3. Improved parallel performance.

Titan1.29 is transmitted on CD and includes an installation procedure, executables, source files, sample input and output and documentation. Fortran 90; Windows and Linux (C00759PCX8604).

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 Classes for Visual Editor		
July 23-27	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Anaheim, CA
July 30-August 3	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Anaheim, CA
August 6-10	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Livermore, CA
September 10-14	Introduction to MCNP/MCNPX using the MCNPX Visual Editor	Myrtle Beach, SC
September 17-21	Intermediate MCNPX Visual Editor with a special emphasis on tallies and variance reduction	Myrtle Beach, SC
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	Las Vegas, NV

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		
September 24-28	MCNP/MCNPX Intermediate Workshop	Washington, DC
October 22-26	MCNP/MCNPX Intermediate Workshop	Paris, France
January 14-18	MCNP/MCNPX Intermediate Workshop	Las Vegas, NV

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 – 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.

MCNPX-PoliMi Training Workshop

The Detection for Nuclear Nonproliferation Group at the University of Michigan will present the MCNPX-PoliMi Training Workshop at the University's North Campus on July 25-26, 2012. The MCNPX-PoliMi code is an enhanced version of MCNPX v. 2.7.0 that provides unique capabilities for simulating correlated-particle measurements and detector response. This two-day workshop will introduce new users to the capabilities of the MCNP-PoliMi code and acquaint experienced users with new features.

- MCNPX-PoliMi source capabilities
- Detector-response calculations
- Simulations of time-of-flight and cross-correlations distributions
- Simulations of multiplicity distributions

Workshop attendees should have software licenses for both MCNPX and MCNP-PoliMi. There are two separate licenses that are available by registration and request at the Radiation Safety Information Computational Center (RSICC) at Oak Ridge National Laboratory. Requests for the required software licenses may be made at the RSICC website at www-rsicc.ornl.gov. It is recommended that requests for the software licenses be submitted as soon as possible as the licensing procedure can take upwards of several weeks to complete.

Registration available online at http://www-ners.engin.umich.edu/labs/dnng/polimi_workshop.html. Seating is limited; therefore, the registrations will be accepted on a first-come-first-serve-basis.

Professional Development Short Courses on Radiological Assessment, Nuclear Criticality Safety, and Monte Carlo Analysis

The Department of Nuclear Engineering at the University of Tennessee-Knoxville is offering short courses for radiation transport and criticality safety specialists during Tennessee Industries Week (TIW-47), August 13-17, 2012.

Radiological Assessment—This three-day course is based on selected topics from the University of Tennessee courses on Radiological Assessment, Internal Dosimetry, and Uncertainty Analysis, and is intended for personnel working in areas associated with radiological assessment or internal dosimetry. Individuals professionally established in a particular area would benefit from exposure to a number of important topics, and those who are new to this area of science would benefit from the integration of a variety of important and relevant topics.

Fundamentals of nuclear physics, health physics, and internal dosimetry will be presented for review and to establish a common framework for subsequent presentations. Information presented on radionuclide transport and pathways analysis will include basic theory and solutions to several tutorial examples. Descriptions of several computer programs used for internal dosimetry and for radiological assessment will be presented, and details from several studies will be used as examples.

Information on external dosimetry generally follows material in the cited text. Material presented on internal dosimetry will go beyond the reference text and will involve computational methods as well as practical examples. Methods for analyzing bioassay program data will be carefully reviewed and case studies will be discussed.

Nuclear Criticality Safety—Engineers, scientists, and technical managers who wish to increase their knowledge and understanding of nuclear criticality safety will be interested in this intensive one-week short course. The topics covered in the course are based primarily on the experience of the five instructors, which totals over 120 years of nuclear criticality safety related experience. Such a wealth of experience needs to be shared with the criticality safety community including both new professionals in the field as well as experienced professionals.

The course topics include illustrative applications using the SCALE system developed at Oak Ridge National Laboratory with emphasis on the Monte Carlo code KENO, standards, regulations, review of accidents, hand calculation methods, subcritical limits, code validation techniques, accident response planning and management, and transient excursion modeling.

Monte Carlo Analysis—Monte Carlo is often the method of choice to solve complex problems in nuclear criticality safety and radiation shielding. To use Monte Carlo effectively, the analyst must understand the theoretical and computational fundamentals of the method, as well as the computational options available in particular computer tools. Also, it is sometimes advantageous to create new special-purpose Monte Carlo programs to solve particular problems rather than use an existing program. The Monte Carlo course runs for five days and has the following objectives:

1. To familiarize the student with the basic concepts of the Monte Carlo method in a general (non-transport) context to add to the ability of the student to apply the Monte Carlo method to a variety of problems in mathematics, physics, and engineering.
2. To familiarize the student with the particular mathematical techniques and probability distributions that are used in analog Monte Carlo solutions of neutral-particle radiation transport problems. This is reinforced through an in-class exercise that develops an analog Monte Carlo code solution to a simple slab transport problem.

3. To familiarize the student with the mathematical basis for variance reduction techniques: non-analog mathematical methods that increase the efficiency of the calculation without biasing the solution. This is reinforced with a continuation of the in-class exercise to incorporate variance reduction techniques.

4. To apply the lessons learned to the most commonly used Monte Carlo code, MCNP. In a series of hands-on exercises with the PC version of MCNP, the novice user will learn to set up simple problems, and all levels of users will gain experience in using the variance reduction techniques offered by the MCNP code.

Special attention will be given to the understanding of the use of adjoint calculations in transport analyses, both as an alternate means of obtaining system responses and as importance functions for accelerating Monte Carlo forward solutions. Advantages and disadvantages of the adjoint mode versus the forward mode of analysis will be described. In addition, the relationship of Monte Carlo methods to deterministic methods will be described, including strategies involving the hybrid use of both methods to more efficiently solve certain transport problems.

Case Studies in Neutron Transport Theory—The study of the neutron transport equation is a delicate blend of theoretical mathematics, numerical methods and computational strategies describing the interaction of neutrons and nuclei. Not only do we gain physical insight from the solution to the transport equation, but we also create new mathematics and numerical methods for the solution of equations. This short course is offered to those individuals who want to experience the elegance of analytical transport theory and how this theory can impact the development of transport methods for application.

This course will concentrate on transforming theoretical solution representations of the neutron transport equation into numerically useable forms. The course will study reactor physics from neutron slowing down to multidimensional multigroup theory and criticality. Though the backdrop is reactor physics, our emphasis will be on analytical manipulations of the transport equation and the numerical realization of its solutions.

The deadline for registration is **July 23, 2012**. Classes are limited in size and will be filled on a first-come, first-serve basis. For additional information on these and other courses offered during TIW-47, contact Kristin England at the University of Tennessee, phone (865) 974-5048, email kengland@utk.edu, url http://www.engr.utk.edu/nuclear/TIW.html.

Fall 2012 SCALE Training Courses

Date	Title	Location	Registration Fee
Oct 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
Oct 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
Oct 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
Oct 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
Medical Radiation Safety Officer Training	August 20-24, 2012
Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME)	August 27-30, 2012
Applied Health Physics	September 10 - October 12, 2012
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

The International Youth Nuclear Congress 2012

The International Youth Nuclear Congress (IYNC) and the North American Young Generation in Nuclear (NA-YGN) invite you to attend the 7th IYNC in Charlotte, NC, August 5-11, 2012. The primary purpose of the Congress is to transfer knowledge from the current generation of leading scientists and engineers to the next generation. Scientific, political, public and corporate views regarding the development of different nuclear issues will be presented to provide comprehensive discussions on all sides of the subject. More information about this conference is available at http://www.iync.org/.

ICRS-12 and RPSD-2012

The 12th International Conference on Radiation Shielding (ICRS-12) and the 17th Topical Meeting of the Radiation Protection and Shielding Division of the American Nuclear Society (RPSD-2012) will be held in Nara, Japan, September 2-7, 2012. The first ICRS conference was held in 1958 at Cambridge, United Kingdom. Since then, ICRS has been held in Europe, Japan, and the United States. The ICRS series occurs every four or five years.

This conference, organized by the Atomic Energy Society of Japan, will explore the scientific, technological and engineering issues associated with particle and ionizing radiation shielding in its broadest context, including nuclear energy systems, accelerator facilities, space and other radiation environments. It is one of the premier international radiation shielding events, regularly drawing hundreds of the world's top scientists and engineers.

The conference will open with a special session summarizing the facts and circumstances surrounding the Fukushima accident and consequent environmental assessment and recovery. The special session will complement the conference topics.

Check the website http://www.icrs12.org or contact ICRS-12 & RPSD-2012 Local Organizing Committee secretariat (office@icrs12.org) for further information.

ICFO-SI9

The 9th International Conference on Facility Operations- Safeguards Interface (ICFO-SI9) will be held on September 23-28, 2012, in Savannah, Georgia. The topical conference program committee invites individuals with professional interest in safeguards technology and nuclear material facility operations to participate. The Conference is sponsored by the American Nuclear Society Isotopes and Radiation Division, Oak Ridge/Knoxville Local Section and is cosponsored by the Institute of Nuclear Materials Management, Central Region Chapter, Southeast Chapter.

The purpose of the conference is to foster a better understanding of the relationships of operations in nuclear facilities and the application of safeguards under national and international regimes. This ninth conference in the series will provide an international forum for exchanging ideas and experiences, as well as describing progress in the areas of safeguards implementation. The conference will be timely considering the current activities to strengthen the international safeguards regime. The four and a half day conference will be held in nine half-day sessions at which policy, technical, and scientific aspects of safeguards implementation will be discussed.

Papers are encouraged in the following areas:

- Integrated design of facility safeguards systems,
- Nuclear material accountancy,
- Materials control and accountability activities,
- Measurement and instrument techniques,
- Transparency and confidence-building measures,
- Research and development in general safeguards technology,
- Extension of safeguards in light of the threat of radiological dispersal devices,

- Preparation for and implementation of the IAEA Additional Protocol,
- Safeguards by design,
- The impact of "fully information driven safeguards" on traditional safeguards,
- Advances in process monitoring, unattended measurements/monitoring, remote measurements/monitoring, and
- Application of safeguards earlier in the front end of the fuel cycle, mining and conversion.

Conference information is posted at the website at http://ICFO-9.org.

2012 CALENDAR

July

8th International Topical Meeting on Nuclear Plant Instrumentation, Control and Human Machine Interface Technologies, July 22-26, 2012, San Diego, CA. For up-to-date information, visit their website at http://www.new.ans.org/meetings/m_124

MCNPX-PoliMi Training Workshop, July 25-26, 2012, Ann Arbor, MI, USA. Follow the website for up-to-date information, http://www-ners.engin.umich.edu/labs/dnng/polimi_workshop.html

August

IYNC2012, August 5-11, 2012, Charlotte, NC, USA. For up-to-date information, visit their website at http://www.iync.org/

September

Workshop on Computational Medical Physics, September 2, 2012, Nara Prefectural New Public Hall, Nara, Japan. The meeting agenda is available at http://www.icrs12.org/img/Workshop-CMP-announcement.pdf

ICRS-12 (12th International Conference on Radiation Shielding) and RPSD-2012 (17th Topical Meeting of the Radiation Protection and Shielding Division of the American Nuclear Society), September 2-7, 2012, Nara, Japan. Contact: ICRS-12 & RPSD-2012 Local Organizing Committee secretariat (office@icrs12.org) url http://www.icrs12.org/

9th International Conference on Facility Operations- Safeguards Interface (ICFO-SI9), September 23-28, 2012, Savannah, GA. For up-to-date information, visit their website http://ICFO-9.org.

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.