# Radiation Safety Information Computational Center


**Oak Ridge National Laboratory**
**POST OFFICE BOX 2008**
**OAK RIDGE, TENNESSEE 37831-6003**

**Managed by**
**UT-Battelle, LLC**
**for the U.S. Department of Energy**
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**phone 865-574-6176 fax 865-241-4046**
**email PDC@ORNL.GOV**
**www http://rsicc.ornl.gov/**

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***The journey of a thousand miles starts with a single step. – Chinese Proverb***



## CHANGES TO THE RSICC CODE AND DATA COLLECTION

**CCC-638/TART2012**

Lawrence Livermore National Laboratory, Livermore, California, contributed a newly frozen version of this coupled neutron-photon Monte Carlo transport code designed to use three-dimensional (3-D) combinatorial geometry. Neutron and/or photon sources as well as neutron induced photon production can be tracked. It is a complete system to assist you with input preparation, running Monte Carlo calculations, and analysis of output results. TART2012 is also incredibly FAST. Use of the entire system can save a great deal of time and energy.

TART2012 extends the general utility of the code to even more areas of application than available in previous releases, by concentrating on improving the physics, particularly with regard to improved treatment of neutron fission, resonance self-shielding, molecular binding, and extending input options used by the code. Several utilities are included for creating input files and displaying TART results and data.

TART2012 is designed to run on any computer. It is presently implemented on Cray, various Unix workstations, IBM-PC (Windows and Linux), and MAC. For use on IBM-PC and MAC, the entire system is distributed in executable form, so that no compiler or loader is required on these systems.

2012 Update:
- Complete rewrite to incorporate all user feedback;
- Made 64 bit compiler compatible;
- Eliminated re-entrant coding;
- Neutrons and photons sources now treated the same;
- sentl 1 = 3 (neutron AND photon sources) is no longer allowed;
- Because of the above, sentl 18 photon/neutron source ratio no longer has any meaning;
- Data files updated based on ENDF/B-VII.1 data.

The TART2012 package is distributed on CD in MAC, Windows and Linux formats. The CD contains the source codes, executables for IBMPC, LINUX (32 and 64 bit), and MAC, data files and test cases for use on a variety of computers. Installation and verification instructions for each type of computer are also included with the package. Fortran and C; CRAY, UNIX workstations (Sun, IBM RS/6000; DEC-Alpha), IBM-PC (Windows or Linux) and MAC (C00638MNYCP07).

## CCC-778/PHITS 2.52

PHITS-2.52 was contributed by the Research Organization for Information Science and Technology, Tokai, Ibaraki, Japan, Japan Atomic Energy Agency, Tokai, Ibaraki, Japan, High Energy Accelerator Research Organization (KEK), Tsukuba, Ibaraki, Japan, RIKEN, Wako, Saitama, Japan, Tokyo Institute of Technology, Tokyo, Japan, and Chalmers University of Technology, Gothenburg, Sweden through the OECD NEA Data Bank, Issy-les-Moulineaux, France.

PHITS can deal with the transport of almost all particles (nucleons, nuclei, mesons, photons, and electrons) over wide energy ranges, using several nuclear reaction models and nuclear data libraries. Geometrical configuration of the simulation can be set with GG (General Geometry) or CG (Combinatorial Geometry). Various quantities such as heat deposition, track length and production yields can be deduced from the simulation, using implemented estimator functions called "tally". The code also has a function to draw 2D and 3D figures of the calculated results as well as the setup geometries, using a code ANGEL.

The PHITS-2.52 package is transmitted on CD and includes the referenced documents, example problems, source code, and precompiled executables for Mac and Windows. Fortran 77; Mac, Windows, Linux, UNIX Workstations (C00778MNYCP01).

## DLC-266/TENDL-2012-ACE

NRG - Nuclear Research and Consultancy Group, Petten, The Netherlands, contributed this new library for use with MCNPX. The TENDL-2012 library (TALYS-based Evaluated Nuclear Data Library), developed at NRG, was processed to the ACE format for use with Monte Carlo codes. It consists of a set of 348 neutron data files for isotopes from F-19 to Po-209, stable and long-lived nuclides, completely and consistently evaluated using the TALYS-1.2 nuclear reaction code package (distributed by RSICC as TALYS 1.2/PSR-548). For all isotopes and incident particles, the same methodology is applied to obtain cross sections, angular distributions, double differential data, gamma production data, and isomeric production cross sections covariance information. The result is a nuclear data library with mutually

consistent reaction and covariance information for all isotopes. ACE files are provided for neutrons, protons, deuterons, tritons, helions and alpha particles.

The data libraries and documentation are transmitted on DVDs in WinZip files which include data libraries and xsdir files. ASCII card images; Unix workstation, PC, Mac (D00266MNYCP00).

**DLC-267/ORESUND**

The Risoe National Laboratory, Roskilde, Denmark through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France has released ORESUND, Nordic Mesoscale Dispersion Experiments over Land-Water-Land. The atmospheric dispersion process was investigated by carrying out SF6 tracer experiments and the air trajectories were determined by tetroon flights. Emphasis was placed on the periods when the water surface was colder than surrounding land, which in the experimental period typically occurred during day time. The atmospheric dispersion process and modification in the wind field was conducted across the 20 km wide Oresund strait between Denmark and Sweden.

The ORESUND package is transmitted on CD and includes documentation and 50 data files. Dec VAX (D00267D0VAX00).

**MIS-018/MMRW**

MMRW, Canadian and Early British Energy Reports on Nuclear Reactor Theory (1940-1946), is a collection of reports on the beginning and development of nuclear reactor theory in Canada and in the United Kingdom. In this version, the letter by Alvin Weinberg with comments and historical background (8 September 2000) has been added. The reports were collected by M.M.R. Williams, South Croydon Surrey, CR2 0DX, UK and is distributed through the OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France.

The MMRW package is transmitted on CD and includes 92 PDF files. Many computers (M00018MNYCP00).

# 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 has catapulted their careers in science and technology. You can find it on YouTube at http://ow.ly/2EQLz.

# CONFERENCES, TRAINING 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 arwoodjw@ornl.gov with "conferences" in the subject line by the 20th of each month. Please include the announcement in its native format as an attachment to the message. Please provide a website address for the event if one is available.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct; however, if the links become unavailable, please call the point of contact for the event.

# CONFERENCES

## 2013 IEEE Nuclear and Space Radiation Effects Conference

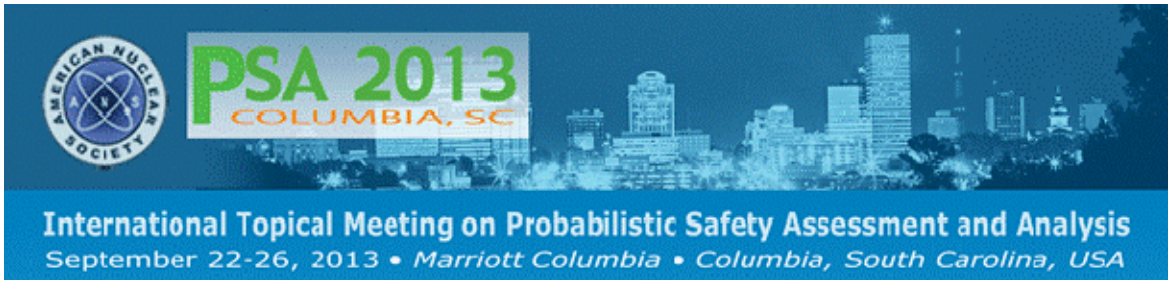
The 2013 IEEE Nuclear and Space Radiation Effects Conference will be held in San Francisco at the Hyatt Regency on July 8-12, 2013. The conference features a technical program consisting of eight to ten technical sessions of contributed papers describing the latest observations in radiation effects, a Short Course on radiation effects offered on July 8, a Radiation Effects Data Workshop, and an Industrial Exhibit. The technical program includes oral and poster sessions. For up-to-date information about this conference, visit their website at http://www.nsrec.com/ .

## 2013 IEEE Nuclear Science Symposium and Medical Imaging Conference

"Beyond Imagination of Future Science" will be held in Seoul, South Korea from October 27 - November 2, 2013 at the COEX Convention Center. In addition to the presentation of original work, the conference will provide extensive educational opportunities via short courses and special emphasis seminars before and during the conference. This meeting has always been a great place to exchange ideas and share knowledge and experience in the nuclear science, medical imaging, and room-temperature semiconductor X-Ray and Gamma-Ray detector fields. For up-to-date information about this conference, visit their website at http://www.nss-mic.org/2013/NSSMain.asp .


## 2013 INMM Packaging and Transportation of Radioactive Materials Conference (PATRAM)

The 2013 INMM Packaging and Transportation of Radioactive Materials (PATRAM) will be held at the Hilton San Francisco Union Square in San Francisco, CA August 18-23, 2013. This conference brings together experts from government, industry and research organizations worldwide to exchange information on all aspects of packaging and transporting radioactive materials around the globe. For up-to-date information about this conference, visit their website http://www.patram.org/ .




## 2013 International Topical Meeting on Probabilistic Safety Assessment and Analysis

PSA 2013, the International Topical Meeting on Probabilistic Safety Assessment and Analysis, the thirteenth meeting in the technical series sponsored by the American Nuclear Society (ANS) and its Nuclear Installations Safety Division (NISD) will take place September 22-27, 2013, in Columbia, South Carolina, USA. This edition of the PSA conference is dedicated in the memory of Professor David Okrent

(1922-2012), a nuclear safety/design pioneer, and major contributor to PRA and probabilistic safety methods and analysis. PSA 2013 will be of interest to traditional applications including nuclear reactor facilities, nonreactor installations, processing, decontamination & decommissioning, and storage, as well as other non-traditional areas where probabilistic safety approaches are applied. The meeting will continue to follow lessons learned and impacts to PRA from the Fukushima Dai-ichi, explore progress on risk-informing regulation and fire PRA, provide status on the development of PRA standards, as well as many other topics during four days of planned paper and panel sessions. More information on PSA 2013 can be found at the conference website, http://psa2013.org

## GLOBAL 2013: International Nuclear Fuel Cycle Conference

The GLOBAL 2013 International Nuclear Fuel Cycle Conference will be held September 29-October 3, 2013 in Salt Lake City, UT. The conference is a forum for the discussion of the scientific, technical, social and regulatory aspects of the nuclear fuel cycle. Relevant topics include global utilization of nuclear energy, current fuel cycle technologies, advanced reactors, advance fuel cycles, nuclear nonproliferation and public acceptance.

For up-to-date information about this conference, visit their website at
http://www.new.ans.org/meetings/m_158 .

## Nuclear Criticality Safety Division 2013 Conference

The Nuclear Criticality Safety Division 2013 Conference will be held September 29-October 3, 2013 in Wilmington, NC. NCSD 2013 will focus on key program/technical improvement areas involving state-of-the-art methods, analysis, procedures, training, risk assessment operating experience and lessons learned, and post-Fukushima impacts on nuclear criticality safety (NCS) programs for existing / planned new facilities.

For up-to-date information about this conference, visit their website at ncsd2013.org.

SNA & MC 2013

## Joint International Conference on Supercomputing in Nuclear Applications & Monte Carlo

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

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

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

# TRAINING COURSES

mcnp

## LANL 2013 MCNP CLASS SCHEDULE

| Date | Course Name and Description | Location | Cost |
|---|---|---|---|
| August 5-9, 2013 | **Criticality Calculations with MCNP6** Registration is open to all. Non-U.S. citizens must register by 6/3/13. 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* |
| August 12-16, 2013 | **Variance Reduction with MCNP6** Registration is open to all. Non-U.S. citizens must register by 6/10/13. 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* |
| October 7-11, 2013 | **Introduction to MCNP6** Registration is open to all. Non-U.S. citizens must register by 8/5/13. 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 proceed at a much faster pace and are 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 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.

| **Visual Editor Classes 2013** | | |
|---|---|---|
| July 15-19, 2013 | **Introduction to MCNP/MCNPX** using the MCNPX Visual Editor | Richland, WA |
| July 29-August 2, 2013 | **Introduction to MCNP/MCNPX** using the MCNPX Visual Editor | Anaheim, CA |
| August 5-9, 2013 | **Intermediate MCNPX Visual Editor** with a special emphasis on tallies and variance reduction. | Livermore, CA |
| August 19-23, 2013 | **Introduction to MCNP/MCNPX** using the MCNPX Visual Editor | Las Vegas, NV |
| August 26-30, 2013 | **Intermediate MCNPX Visual Editor** with a special emphasis on tallies and variance reduction. | Albuquerque, NM |

| | | |
|---|---|---|
| September 3-6, 2013 | **Advanced MCNPX Visual Editor** with emphasis on solving user problems. | Myrtle Beach, SC |
| September 9-13, 2013 | **MCNP6 Intermediate Workshop** | Myrtle Beach, SC |
| September 16-20, 2013 | **Introduction to MCNP/MCNPX** using the MCNPX Visual Editor. | Myrtle Beach, SC |
| September 23-27, 2013 | **Intermediate MCNPX Visual Editor** with a special emphasis on tallies and variance reduction. | Myrtle Beach, SC |

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

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

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

| **MCNPX Classes 2013** | | |
|---|---|---|
| September 9-13, 2013 | **MCNP6 Intermediate Workshop** | Myrtle Beach, SC |
| October 7-11, 2013 | **MCNP6 Intermediate Workshop** | Taejon, South Korea |
| November 11-15,2013 | **MCNP6 Intermediate Workshop** | Barcelona, Spain |

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.

MCNPX-PoliMi Workshop

Sara A. Pozzi, Shaun D. Clarke, Marc Ruch
July 24 – 26, 2013 *University of Michigan*
*Department of Nuclear Engineering and Radiological Sciences*
*2355 Bonisteel Blvd. Ann Arbor, MI 48109*

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 three-day workshop will introduce new users to the capabilities of the MCNPX-PoliMi code and acquaint experienced users with new features.

- MCNPX-PoliMi source capabilities
- Detector-response calculations with the MPPost code
- Simulations of time-of-flight and cross-correlation distributions
- Simulations of multiplicity distributions

Seating is limited; therefore, the registrations will be accepted on first-come-first-serve basis. Registration deadline: July 5, 2013. Additional information about the courses can be found at the website, http://www-ners.engin.umich.edu/labs/dnng/polimi_workshop.html .

OECD NEA Nuclear Energy Agency

## OECD Nuclear Energy Agency-Data Bank Training Courses

| | | |
|---|---|---|
| July 2-5, 2013 | **PENELOPE** | University of Barcelona, Spain |
| October 16-18, 2013 | **EASY, the European Activation System** | NEA, Paris, France |
| November 4-8, 2013 | **TRIPOLI 4** | NEA, Paris, France |

These workshops combine teaching by the authors on program physics, along with instructions on how to use the software. The courses include a large number of practical exercises. Note that the number of participants to the courses is limited. Priority is given to nationals from NEA Data Bank member countries. Class sizes are limited and courses may be cancelled if minimum enrollment is not obtained one month prior to course. Course fees are refundable up to one month before each class. After one month, course fees will not be refunded. Note that all attendees must be registered users. Registration information is available at: http://www.oecd-nea.org/dbprog/trainingcourses.htm.

## 48th Tennessee Industries Week

TIW-48 will be held on the University of Tennessee Main Campus August 12-16, 2013. Tennessee Industries Week (TIW) began over forty years ago as a small short course program with instructors from the College of Engineering at The University of Tennessee, and attendees primarily from industry in Tennessee. Through the years, it has grown in scope and importance. The instructional staff is still composed mostly of UT professors but now also involves industry and government experts from throughout the U.S. and the world. Attendees also come from around the world. The emphasis is on putting knowledge to work and the atmosphere is organized but casual. Instructors present carefully planned lectures and demonstrations, and dialogues between instructors and attendees are encouraged in order to maximize benefits.

TIW-48 will include courses on Nuclear Criticality Safety, Radiological Assessment, and several other topics of interest (see http://www.engr.utk.edu/nuclear/TIW.html for more detailed information).

## RESRAD Training Courses

Argonne National Laboratory will conduct a series of training courses on the use of RESRAD (onsite) And RESRAD-OFFSITE risk assessment codes from September 23-27, 2013. A total of 37 CECs has been approved by the AAHP for these training courses. The latest version of RESRAD codes will be used. For additional information and registration, please go online at http://web.ead.anl.gov/resrad/training/. Any questions please send email to: RESRAD@anl.gov.

# SYMPOSIA

## The 15th International Symposium on Reactor Dosimetry (ISRD-15)

The 15th International Symposium on Reactor Dosimetry (ISRD-15) will take place from May 18-23, 2014 at the Hotel Aquabella in Aix-en-Provence, France. The aim of the symposium is to bring together the communities involved in research, development and applications related to reactor dosimetry. The symposium is jointly organized by the European Working Group on Reactor Dosimetry (EWGRD) and the Committee E10 on Nuclear Technology and Applications of the American Society for Testing and Materials (ASTM).

The Announcement and Call for Papers can be viewed at http://reactordosimetry.org/Announcements/ISRD15_1st-announcement-A4.pdf. For up-to-date information about this conference, visit their website at http://reactordosimetry.org/index.html.

# 2013 CALENDAR

***July***

**Institute of Nuclear Materials Management (INMM) 54th Annual Meeting,** July 14-18, 2013, Palm Desert, CA. For up-to-date information about this conference, visit their website at http://www.inmm.org/Meeting_Home.htm.

***August***

**Utility Working Conference and Vendor Technology Expo**, August 11-14, 2013, Hollywood, FL**.** For up-to-date information about this conference, visit their website at http://www.new.ans.org/meetings/m_142.

**48th Tennessee Industries Week**, August 12-16, 2013, The University of Tennessee Main Campus, Knoxville, TN**.** For up-to-date information about this conference, visit their website at http://www.engr.utk.edu/nuclear/TIW.html .

***September***

**2013 LWR Fuel Performance Meeting/Top Fuel,** September 15-19, 2013, Charlotte, NC. For up-to-date information about this conference, visit their website at http://www.new.ans.org/meetings/m_142.

**International Topical Meeting on Probabilistic Safety Assessment and Analysis (PSA 2013)**, September 22-26, 2013, Columbia, SC. For up-to-date information about this conference, visit their website at http://psa2013.org/.

**Global 2013: International Nuclear Fuel Cycle Conference**, September 29-October 3, 2013, Salt Lake City, UT. For up-to-date information about this conference, visit their website at http://www.new.ans.org/meetings/m_158 .

**The Nuclear Criticality Safety Division 2013 Conference,** September 29-October 3, 2013, Wilmington, NC. For up-to-date information about this conference, visit their website at http://ncsd2013.org/ .

***October***

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

***November***

**ANS Winter Meeting, November 10-14, 2013, Washington, D.C.** For up-to-date information about this conference, visit their website at http://www.ans.org/meetings/m_81.

# 2014 CALENDAR

***May***

**International Symposium on Reactor Dosimetry (ISRD-15), May** 18-23, 2014, Aix-en-Provence, France. For up-to-date information about this conference, visit their website at http://reactordosimetry.org/index.html.