RSIC Newsletter

Oak Ridge National Laboratory
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(For RSIC TELEX Communication Only)

No. 294 *May 1989*

It is not enough to be busy. The question is what are we busy with.—Henry David Thoreau

QA Requirements—A Timely Alert

RSIC staff members have drafted a document describing the quality assurance program which has been in effect in RSIC operations over several years. Entitled "Radiation Shielding Information Center Quality Assurance Plan" (QAP-X-89-EPM/RSIC-001, Version 1.0, January 1989), the plan is generic in nature due to RSIC's functional activities and multiagency sponsors. It is a supplement to the Oak Ridge National Laboratory QA plan and that of the technical division in which RSIC is embedded. These plans are designed to meet the requirements of ANSI/ASME NQA-1-1986B, *Quality Assurance Program Requirements for Nuclear Facilities,* DOE ORDER 5700.6B, *Quality Assurance (QA),* 9/23/86, DOE/RW-YYYY (QAR Revision 1, 10/24/88) *QA Requirements for the Civilian Radioactive Waste Management Program,* and NUREG-0856, *Final Technical Position on Documentation of Computer Codes for High Level Waste Management,* June 1983.

RSIC's mission includes the enhancement of quality achievement, a continuing responsibility of its management since its inception. Management controls needed to achieve program objectives were established early and are continuously maintained. In general, these controls conform to the later established NQA-1 requirements, certainly for Q-level III, and in some respects for Q-levels I and II.

As a "middleman" functioning in liaison with developers and users, RSIC activities add value and enhance quality assurance in the related technical information and technology. We do not, however, claim that RSIC-packaged products are fully "quality-assured" for applications which have more specifically structured requirements.

Special Note for DOE/OCRWM Contractors

The following is excerpted from a communication with RSIC sponsor, the DOE Office of Civilian Radioactive Waste Management (OCRWM):

> The OCRWM Repository Program must meet the QA requirements of 10 CFR Part 60, Subpart G, "Disposal of High Level Radioactive Waste in Geologic Repositories."
>
> OCRWM has developed and approved a Quality Assurance Requirements (QAR) document (RW-0214) which defines activities affecting the quality of all program participants. These requirements are applicable to items and activities important to safety and waste isolation.
>
> The QAR document addresses the applicable QA requirements for activities associated with computer software listed in support of a license application. The QA requirements include control of computer software development, testing during development, maintenance, configuration management, verification, validation, and documentation. It is a mandatory requirement that the code developer, considered an OCRWM program participant, develop and implement a QA program to

meet the requirements as specified in the OCRWM QAR. The QA program shall include a QA Program Description (QAPD) document, required QA Administrative Procedures (QAAP), and required technical procedures.

In addition, OCRWM has endorsed the NRC NUREG-1298, *Qualification of Existing Data for High-Level Nuclear Waste Repositories.* This NUREG provides guidance on methods of qualifying data not initially collected under a QA program meeting the requirements of 10 CFR Part 60, Subpart G. This qualification method may be necessary in the event the computer code was not developed under the QA system described in the OCRWM QAR.

The reader, especially when working under contractor subcontract with DOE/OCRWM, is strongly advised to consult with your contract monitor as to your QA requirements. This is especially urgent when you plan to use an RSIC-packaged product in any application related to the OCRWM resposi-tory program.

Betty F. Maskewitz

MCNP-Tutorial Offered at ANS

A four-part tutorial on the MCNP code system (including the SABRINA color graphics code) sponsored by the Mathematics and Computation Division and the Nuclear Criticality Safety Division will be offered during the ANS Meeting in Atlanta, June 4–8, 1989. The sessions will be presented by the Radiation Transport Group and the Nuclear Criticality Group of the Los Alamos National Laboratory. The first two sessions will focus on the basic capabilities of MCNP and SABRINA, and the last two sessions will focus on the criticality safety applications of MCNP.

A general purpose Monte Carlo Neutron-Photon Transport Code, MCNP features three-dimensional generalized geometry. A strength of the code is a large library of continuous energy cross sections, including $S(\alpha,\beta)$ thermal scattering data for several materials. The recently added facility to use multigroup data increases the versatility of the code. Generalized, powerful source and tally capabilities and a rich collection of variance-reduction techniques are additional MCNP features. The code can be used in a fixed-source mode, or to calculate multiplication factor, lifetime, and other parameters for fissioning systems.

SABRINA is an interactive three-dimensional geometry-modeling program for use in generating color graphics of MCNP problems, using either body geometry or surface geometry models. Both SABRINA and MCNP are available from RSIC.

A separate room will be used to demonstrate the applications of MCNP and SABRINA, with a Sun workstation for computations. Attendees are encouraged to bring simple problems to run on the workstation to illustrate the capabilities of the codes in relation to individual work sites. Further information on the tutorial may be obtained from Judi Briesmeister at 505-667-7277.

CHANGES TO THE COMPUTER CODE COLLECTION

Five changes were made to the computer code collection during the month. Two existing code packages were replaced with newly frozen versions, two were extended with additional hardware versions, and one was corrected. Four changes resulted from foreign contributions.

CCC-254/ANISN-ORNL

This multigroup, one-dimensional, discrete ordinates transport code package was extended to include a new hardware version for VAX computers contributed by Infintum Sciences Limited,

Ottawa, Ontario, Canada. The code conversion was implemented under VMS 4.6 using the FORTRAN compiler version 4.7 and tested on the VAX 8650. The package is transmitted on one 5.25-in. DS/DD (360K) diskette. References: K-1693 (June 1973), ORNL-TM-3049 (May 1969), NAA-SR-10951 (March 1966) and Informal Notes. FORTRAN IV; IBM (A), CRAY (B), and VAX (C). FORTRAN 77; DEC 10 (G).

CCC-336/ASFIT-VARI

This newly frozen version of ASFIT (Anisotropic Source-Flux Iteration Technique), a radiation transport code system for one-dimensional finite systems, was contributed by the Indira Gandhi Centre for Atomic Research. The new version is variable dimensioned and includes a number of improvements to the previous version which it replaces.

The ASFIT method is applicable to energy-dependent, multiregion radiation transport with an arbitrary degree of anisotropy. Buildup factors and energy-angular distributions at the spatial mesh points are calculated and printed. The source is monoenergetic and either normally or isotropically incident at the surface or isotropic in a region. All secondary sources can be included: annihilation, bremsstrahlung, and fluorescence. Coherent scattering can be treated. The code can be run in a multigroup mode which can treat neutron and coupled neutron-gamma-ray problems. The PC version requires a high density or hard disk and is transmitted on 2 DS/DD 5.25-in. diskettes. The executable file, compiled by a Ryan-McFarland Version 2.42 compiler requires a math coprocessor. Reference: Informal notes (April 1989), *Nucl. Sci. Eng.*, **81**: 172–95 (1982). FORTRAN 77; IBM 3033 and Data General MV/ Family (A); IBM PC (B).

CCC-459B/BOLD VENTURE IV-MICRO

The microcomputer version of this reactor analysis code system has been corrected. The Rocketdyne Division of Rockwell International Corporation, Canoga Park, California, identified errors in Subroutine DCODNC of file INPROSER.FOR which prevent compilation. Users who received the first release may send one DS/DD diskette to retrieve the corrected file. Five DS/HD (1.2MB) diskettes are required for transmittal of the entire package. Reference: Informal documentation, Univ. of Cincinnati (1988). FORTRAN 66; IBM 3033 (A) and FORTRAN 66 and 77; IBM PC (B).

CCC-475/SCALIAS3.1

This package of selected FORTRAN-77 modules from CCC-466/SCALE-3.1 was extended with a new hardware version for VAX/VMS computers contributed by Atomic Energy of Canada, Ltd., Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, Canada. The SCALE system was developed at ORNL for the Nuclear Regulatory Commission to satisfy a need for a standardized method of analysis for the evaluation of nuclear fuel facility and package designs. Several changes were required to convert the IBM version to run on the VAX. The VAX DRIVER relies on the VMS command LIB$SPAWN to run the control and functional modules. Other changes were made to implement quality assurance and traceability. A few changes were made to alter program input/ output. The package is available on one 6250-bpi tape in VMS BACKUP format. Reference: NUREG/CR-0200 (ORNL/NUREG/CSD-2), Vol. 1,2,3. FORTRAN 77; IBM 3033 (A) and VAX (B).

CCC-490/PRIMEDANA-2

This system of codes for neutron physics calculations of fast reactors was replaced with a newly frozen version contributed by the original developers at the Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia, Bulgaria. The addition of a new module, COLAPS, allows the system to collapse multigroup cross sections to a few-group library. PRIMEDANA-2 runs on both the EC 1040 and IBM 3081. Reference: Informal documentation. FORTRAN IV; IBM 3081.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Stan Jones,* Portsmouth Gaseous Diffusion Plant, Ohio; *Yuji Nakamura,* National Institute of Radiological Sciences, Chiba, Japan; *Raymond Durante,* AECL Technologies, Washington; and *Ralph Brittelli, Jr.,* AECL Technologies, Atlanta.

CONFERENCES, COURSES, SYMPOSIA

RSIC attempts to keep its users/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 to RSIC.

ANS Winter Meeting Call for Papers

The call for papers for the 1989 ANS Winter Meeting, to be held November 26–30, in San Francisco, includes several topics of possible interest to RSIC subscribers. Send an original and three copies of a summary not exceeding 900 words on the following topics:

Fuel Cycle and Waste Management — Fuel Cycle and Waste Management — General; Interaction Between Reload Design and Fuel Cycle Economics; International Progress in Fuel Reprocessing and Separation Technology; Current Utility Fuel Cycle Cost Evaluation Practices; Technical & Design Update of the LLW Compact Program; Status of the Yucca Mountain Project; Waste Management at DOE Defense Nuclear Agency Facilities; LLW Disposal Costs for New Facilities; Advances in Spent Fuel Handling and Interim Storage Cask Designs; Waste Management Systems Evaluation and Project Decision Analysis Simulations; Waste Isolation Pilot Plant (WIPP) Operations; Regulatory Status of Naturally Occurring Radioactive Materials and Wastes Below Regulatory Concern; Directions for Monitored Retrievable Storage Planning; Institutional/Public Interaction Dynamics and Techniques; and Utility Operational Experience with Waste Management;

Mathematics and Computation — Mathematical Modeling — General; Reactor Physics Methods; Methods in Thermal Hydraulics and Reactor Safety; Methods in Neutral and Charged Particle Transport; Visualization of Large-Scale Calculations; Chaos and Other Nonlinear Phenomena in Nuclear Energy Production; Bifurcation, Nonlinear Dynamics, Chaos, and Fractals in the Analysis of Nuclear Systems; A Review of Nuclear Computational Methods and Their Applications;

Radiation Protection and Shielding — Operational Radiation Protection; Radiation Transport Methods and Data; Neutronics and Shielding Applications; Source Terms and Accident Analysis; Radiation Measurement Techniques; Physical, Radiobiological, and Legal Aspects of Hot Particles; Radiation Protection Aspects of Radon; Shielding Design for Spent-Fuel Storage and Transportation Casks; Radiation Protection Standards; *De Minimis* and Below Regulatory Concern; Performance Assessment of LLW Disposal Facilities.

The summaries and required forms should be submitted by **June 30, 1989**, to Lloyd W. McClure, Technical Program Chair, ATTN: Transactions Office, American Nuclear Society, 555 North Kensington Ave., La Grange Park, IL 60525.

Supercomputing in Nuclear Applications

The Japan Atomic Energy Research Institute (JAERI) is the sponsor for the *International Conference on Supercomputing in Nuclear Applications,* which will be held in Mito City, Ibaraki, Japan, March 12–16, 1990. A technical program of invited and contributed papers will report research and development in supercomputing technologies with regard to nuclear applications. Scientists and engineers engaging in high-speed computations and advanced information processing, such as artificial intelligence and robotics in nuclear applications, will have a forum in which to report results and experiences, to exchange information, and to suggest future direction.

English abstracts (5 copies) of not more than 1500 words must be submitted to the Secretariat by **October 31, 1989**, on the following topics:

Simulation in the nuclear field (reactor physics, plasma physics, reactor safety, fluid dynamics, material design and environmental safety),

Innovative computer use in the nuclear field (man-machine interface for supercomputing and vector-parallel processing),

Design automation in the nuclear field (computer-aided plant design, operator training, plant control, and plant maintenance),

Artificial intelligence in the nuclear field (expert systems, neural networks, fuzzy systems, sensor fusion, and intelligent database), and

Robotics (robots in hazardous environments and intelligent robots).

Further information about the conference may be obtained from

Kiyoshi Asai
Conference Secretariat
Computing Center, JAERI
Tokai-mura, Naka-gun, Ibaraki 319-11, JAPAN
Phone: 0292(82)5611
Fax: 0292(82)6070
j1666@jpnjaeri.bitnet

EGS4 Course

The National Physical Laboratory of Middlesex, England, is offering a four-day hands-on course in medical applications of the EGS4 code system, September 25–28, 1989. Monte Carlo simulation of coupled electron-photon transport at energies from 10 keV to 50 MeV is applied to a wide range of problems in medical radiation physics and radiation standards. The course introduces fundamental concepts and techniques in Monte Carlo simulations of electron and photon interactions and covers aspects of the EGS4 code system and its application to electron-photon transport problems. A program of interactive sessions will enable participants to gain hands-on experience.

The course lecturers are:

Dr. Alex Bielajew and Dr. David Rogers, National Research Council, Ottawa, who tailored EGS4 to the needs of medical physics researchers, and who have run the two EGS4 courses at NRC on which this course is modeled.

Dr. Ralph Nelson, Stanford Linear Accelerator Center, California, one of the originators of the EGS system and an acknowledged expert in high energy physics;

Dr. Alan Nahum, Royal Marsden Hospital and Institute of Cancer Research, U. K., a specialist in Monte Carlo methods applied to radiation dosimetry; and

Dr. Simon Duane, head of the dosimetry theory group of the Division of Radiation Science and Acoustics, NPL.

The number of places available for the course is limited so early registration is essential. The registration fee is £460 and includes documentation, a copy of the EGS4 system, luncheon, light refreshment, and a welcoming buffet on the evening of September 24. Further information and a registration form may be obtained from Dr. S. Duane, National Physical Laboratory, Teddington, Middlesex TW11 0LW (phone 01-943 6568; Telex 262344 NPLG; Fax 01-943-2155). Completed forms and the registration fee should be sent no later than **July 31, 1989**.

Calendar

Your attention is directed to the following events of interest.

June 1989

29th Annual Conference of the Canadian Nuclear Association and the 10th Annual Conference of the Canadian Nuclear Society, June 4–7, 1989, Toronto, Canada. Contact: Canadian Nuclear Association, 111 Elizabeth Street, Toronto, Ontario M5G 1P7 Canada.

Annual Meeting of the American Nuclear Society, June 4–8, 1989, Atlanta, Georgia. Contact: ANS Meetings Dept., 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

4th International Symposium on Radiation Protection—Theory and Practice, June 4–9, 1989, Malvern, England, sponsored by the Society for Radiological Protection. Contact: Peter Schwemlein, SRP, Central Electricity Generating Board, Courtney House, 18 Warwick Lane, London, England EC4P 4EB (phone 01-634-5080).

Parallel Processing with Personal Computers, June 5–9, 1989, a course sponsored by the Joint Research Centre, Ispra Establishment. Contact: Secretariat "ISPRA-Courses", Centro Comune di Ricerca, I-21020 ISPRA (Varese) Italy (phone 0332-789819/789839/781128).

Packaging and Transportation of Radioactive Materials: PATRAM '89, June 11–16, 1989, Arlington, Virginia, sponsored by US-DOE. Contact: Larry Blalock, Chairman, US Organizing Comm., US Dept. of Energy, P.O. Box 2001, Oak Ridge, TN 37831-8765 (phone 615-576-0945 or FTS 626-0945).

Advanced Seminar on Selected Topics in Radiation Protection, June 12–16, 1989, in Lisbon, Portugal,

a course sponsored by the Joint Research Centre, Ispra Establishment. Contact: Secretariat "ISPRA-Courses", Centro Comune di Ricerca, I-21020 ISPRA (Varese) Italy (phone 0332-789819/789839/781128).

36th Annual Meeting of the Society of Nuclear Medicine, June 13–16, 1989, St. Louis, Missouri. Contact: Meetings Department, SNM, 136 Madison Ave., New York, NY 10016-6760 (phone 212-889-0717).

34th Annual Meeting of the Health Physics Society, June 25–29, 1989, Albuquerque, New Mexico. Contact: HPS, 8000 Westpark Drive, Suite 400, McLean, VA 22102 (phone 703-790-1745).

14th Annual Conference of the Australian Radiation Protection Society, Inc., June 26–29, 1989, Perth, Australia. Contact: ARPS Conference Convenor, Queen Elizabeth II Medical Center, Verdun Street, Nedlands, WA 6009, Australia.

July 1989

Radioactive Material Transportation Workshop, July 17–20, 1989, Idaho Falls, Idaho. Contact: Teresa Yearwood, SAIC, P.O. Box 2501, Oak Ridge, TN 37831 (phone 615-482-9031 ext. 403).

26th IEEE Annual Conference on Nuclear and Space Radiation Effects, July 24–28, 1989, Marco Island, Florida. Contact: Dante M. Tasca, General Electric Co., Room M1211, Bldg. 100, P.O. Box 8555, Philadelphia, PA 19101 (phone 215-354-4132).

Radioactive Material Transportation Workshop, July 31–Aug. 3, 1989, Kennewick, Washington. Contact: Teresa Yearwood, SAIC, P.O. Box 2501, Oak Ridge, TN 37831 (phone 615-482-9031 ext. 403).

August 1989

International Nuclear Physics Conference, Aug. 20–26, 1989, São Paulo, Brazil, sponsored by the International Union of Pure and Applied Physics. Contact: Universidade de São Paulo, Departamento de Fisica Nuclear, Caixo Postal 20516, 01498 São Paulo, SP, Brazil.

September 1989

International Meeting on Neutron Activation Cross Section for Fission and Fusion Energy Applications, Sept. 11–15, 1989, Argonne, Illinois, sponsored by IAEA. Contact: Phyllis Michaels, EPD, Argonne National Laboratory, 9700 South Cass Ave., Argonne, IL 60439.

International Workshop on New Developments in Occupational Dose Control and ALARA Implementation at Nuclear Power Plants and Similar Facilities, Sept. 18–21, 1989, Brookhaven National Laboratory, Upton, New York. Contact: Dr. John W. Baum, BNL ALARA Center, Bldg. 703M, Upton, NY 11973 (phone 516-282-4214).

October 1989

First International Conference on Radioactive Nuclear Beams, Oct. 16–18, 1989, Berkeley, California, sponsored by the U.S. Dept. of Energy. Contact: J. M. Nitschke, Nuclear Science Division, Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, CA 94720 (phone 415-486-6471).

November 1989

Selected Topics of Monte Carlo Applications in Science and Technology, Nov. 6–10, 1989, a course sponsored by the Joint Research Centre, Ispra Establishment. Contact: Secretariat "ISPRA-Courses", Centro Comune di Ricerca, I-21020 ISPRA (Varese) Italy (phone 0332-789819/789839/781128).

December 1989

4th International Conference on Fusion Reactor Materials, Dec. 4–8, 1989, Kyoto, Japan. Contact: Prof. S. Ishino, Dept. of Nuclear Engineering, University of Tokyo, Bunkyo-ku, Tokyo 113, Japan.

April 1990

International Conference for High-Level Radioactive Waste Management, April 8–12, 1990, Las Vegas, Nevada. Contact: Dean William Wells, Howard Hughes College of Engineering, UNLV, Las Vegas, NV 89154 (phone 702-739-3699).

June 1990

American Nuclear Society Annual Meeting, June 10–15, 1990, Nashville, Tennessee. Contact: Mary Keenan, Meetings Manager, ANS, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

17th European Conference on Controlled Fusion and Plasma Heating, June 25–29, 1990, Amsterdam, The Netherlands. Contact: F. C. Schuller, FOM-Institut voor Plasmafysica "Rujihuizen," Postbus 1207, NL-3430 BE Nieuwegein.

August 1990

International Topical Meeting on Fast Reactor Safety, Aug. 12–16, 1990, Snowbird, Utah, sponsored by the

ANS. Contact: Wayne K. Letho, Argonne National Laboratory, P.O. Box 2528, Idaho Falls, ID 83403-2528 (phone 208-526-7369).

Operational Radiation Protection, Aug. 20–22, 1990, Idaho Falls, Idaho, sponsored by the ANS. Contact: Jack Liebenthal, EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415-3515 (phone 208-526-1253).

October 1990

Spectrum '90: Radioactive Waste Technologies, Decontamination, Decommissioning and Hazardous Wastes, Oct. 3–5, 1990, Knoxville, Tennessee, sponsored by ANS. Contact: Thomas H. Row, ORNL, P.O. Box 2008, 4500N MS6198, Oak Ridge, TN 37831-6198 (phone 615-574-5974 or FTS 624-5974).

November 1990

American Nuclear Society Winter Meeting, Nov. 11–16, 1990, Washington, D.C. Contact: Mary Keenan, Meetings Manager, ANS, 555 N. Kensington Ave., La Grange Park, IL 60525.

APRIL ACCESSION OF LITERATURE

The following literature cited has been ordered for review, and that selected as suitable will be placed in the RSIC Information Storage and Retrieval Information System (SARIS). This early announcement is made as a service to the shielding community. Copies of the literature are not distributed by RSIC. They may generally be obtained from the author or from a documentation center such as the National Technical Information Service (NTIS), Department of Commerce, Springfield, Virginia 22161.

RSIC maintains a microfiche file of the literature entered into SARIS, and duplicate copies of out-of-print reports may be available on request. Naturally, we cannot fill requests for literature which is copyrighted (such as books or journal articles) or whose distribution is restricted.

This Literature is on order. It is not in our system. Please order from NTIS or other available source as indicated.

RADIATION SHIELDING LITERATURE

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