RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE U . S . DEPARTMENT OF ENERGY

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All things should be done in moderation, including moderation. . . (From New-Tron Newsletter, Vol. XIV, No. I, Reactor Experiments, Inc.)

REPORT ON MONTE CARLO SEMINAR-WORKSHOP

The seminar-workshop on Monte Carlo Theory and Application, held in Oak Ridge on April 21-23. was the first of its kind in which RSIC collaborated on an international basis. The Monte Carlo methods development of the CEA/CEN/Saclay SERMA Shielding Laboratory was featured in the workshop and OECD Nuclear Energy Agency (NEA) Data Bank personnel assisted in advance preparations. The meeting was well attended (1 10 people) and provided a well-rounded review of the state of the art. A total number of 53 institutions were represented from eleven nations as follows: Brazil, Canada, France, West Germany. Hungary, Israel, Italy, Japan, Sweden, United Kingdom, and the USA.

The presentations included surveys of applications at various laboratories, discussions of new techniques, and descriptions of particular code systems. Both shielding and reactor core applications were discussed.

The survey papers summarized applications at Argonne National Laboratory (principally the use of VIM), Hanford Engineering Development Laboratory (KEN0 and MCNP), Los Alamos Scientific Laboratory (MCNP), and Oak Ridge National Laboratory (MORSE, KENO, and TRIPOLI II). Extensive presentations were made on SAM-CE (MAGI) and MCNP (LASL). Additional overviews were given on KENO V (ORNL), TRIMARAN and TRIPOLI II (CEA/CEN/Saclay), KIM (CNEN), and new MORSE modules (ORNL). Reports were given on perturbation theory to obtain sensitivities, on recursive Monte Carlo to develop importance functions, and applications of TRIPOLI II to sodium duct and integral experiment analysis. Other papers were given on analysis of LWR lattices, thermal reactor benchmarks, ex-core' water level detectors, and biological organ dose estimates.

Two contributions of the Japanese Ship Research Institute, not presented orally, will appear in the proceedings.

A summary panel of "three wise men" concluded the seminar with extemporaneous comments and some forecasts for the years ahead. The three panelists were Ely Gelbard (ANL), Mal Kalos (Courant Institute). and Ed Cashwell (LASL).

Gelbard opened the panel session by asking "What more can and should be done?" In addition to the expected improvements in methods and usage, he called for increased Monte Carlo benchmarking of computational methods, especially criticality analysis. He advocated benchmarking the whole computational method through each stage. He felt that there should be more communication between users of deterministic methods and Monte Carlo specialists, and that deterministic methods should be checked more by Monte Carlo. Gelbard called for a review of old criticality experiments which have not been analyzed by the modern powerful methods and for development of methods to study important safety problems such as collapsing sodium voids. He ended by elaborating on the need for a return to a study of basics, especially those related to confidence statements. For example, what do biasing methods do to standard deviations? What is the effect of peculiar estimators? How many histories should be followed per generation (this affects the bias of the eigenvalue)?

Kalos reiterated Gelbard's call to pay attention to basics mentioning the frequent, but wrong, implementation of the exponential transformation which introduces a spurious singularity when the transformed attenuation coefficient is nearly equal to the physical total attenuation coefficient, He also cited

the problem of multiplying the importance function by the a priori flight probability which does not give the marginal distribution to be sampled. He expressed a conviction that the future of recursive Monte Carlo is bright and hoped that attention would be paid in the future to importance sampling in large reactor criticality calculations. In principle, a transformation will yield results with zero variance and bias. Finally, Kalos predicted great improvements in computer architecture, e.g., thousands of processors strongly coupled to each other and sharing memory and data.

Cashwell briefly cited the many recent improvements in applications techniques and codes and predicted much greater use of Monte Carlo methods in fields not related to particle transport.

The workshop on TRIPOLI II was led by J. C. Nimal, J. R. Gonnord, and T. Vergnaud of the CEA/CEN/Saclay SERMA Shielding Laboratory. TRIPOLI II is a very complex, but powerful general purpose particle transport code which treats neutrons and gamma rays for both core physics and shielding problems. The geometry treatment is quite general and cross sections, in a very fine multigroup form, can be taken from ENDF, UKNDL, and other sources. The importance sampling is based on a highly-developed system using equal-weight surfaces which, when properly used, minimizes splitting and Russian Roulette.

We are grateful to our French colleagues, Nimal, Gonnord, and Vergnaud, for their very significant and successful efforts on behalf of making the TRIPOLI system available for use in other countries. We are also grateful to the CEA for its support in making the workshop possible. We also wish to express RSIC's appreciation to Enrico Sartori, IAEA representative to the OECD NEA Data Bank, for his assistance in testing and packaging TRIPOLI II and KIM, and to Noel Cramer of ORNL/EPD for special assitance in preparation for the seminar-workshop.

The proceedings will be published as ORNLIRSIC-44. Availability will be announced in the RSIC Newsletter. Those interested may reserve copies by writing to RSIC, ORNL, P. 0. Box X, Oak Ridge, TN 37830. The new Monte Carlo code package is available as CCC-372/TRIPOLI II.

OECD-NEA STEERING COMMITTEE RECOMMENDATION ON COMPUTER PROGRAM EXCHANGE

The NEA Data Bank Management Committee has been seriously worried by the probable long-term effects of a growing resistance to making nuclear energy computer programs freely available for exchange between NEA Member countries. They have observed a small but growing trend to replace free multilateral exchange of these programs through the NEA Data Bank by individual barter arrangements. The problems of obtaining the release of programs vary from country to country, and individual Members of the Data Bank Committee are able to make the necessary contacts in their countries to try to solve the problem.

This question was discussed by the Steering Committee for Nuclear Energy at its 59th Session on October 18, 1979, which adopted the following statement:

> "The Committee notes that an increasing number of restrictions are being imposed within Member countries on the exchange through the NEA Data Bank of computer programs dealing with nuclear reactor technology. A trend can be identified towards the exchange of many such programs on a bilateral basis rather than through the Data Bank.
>
> "The Committee considers that unjustified restrictions on computer program exchange are likely to prove damaging to the development of nuclear power technology. Such restrictions result in increased duplication of effort, as well as hindering the development of common standards and practices, and have correspondingly adverse effects on the public acceptance of nuclear power and on international trade in the nuclear field,
>
> "The Committee therefore urges Member governments to ensure that computer codes used in all areas of nuclear technology are made available through the NEA Data Bank and the associated U.S. software centres with the minimum of restrictions. Such a multilateral exchange procedure is strongly to be preferred to a proliferation of (case-by-case) bilateral arrangements."

SANDOR CLARIFICATION

David Bennett, Sandia Laboratories, called to the attention of RSIC a need for the following clarification.

The February RSIC Newsletter related CCC-364/SANDOR to the CDC-7600. The code will. according to the contributor, run on small as well as large CDC computers, i.e.. it will run on any of the 6000 or 7000 series of CDC computers. The packaged code system has not been tested by RSIC on these computers.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in April,

CCC-323/ DKR

The documentation for this radioactivity afterheat and dose rate calculation code package, DKR, for fusion reactors was updated to include photon energy group structure information. This information was supplied by Kevin Okula, University of Wisconsin, Department of Nuclear Engineering. Madison. FORTRAN IV: UNIVAC 1110.

CCC-363/ LADTAP II

A code package for calculating radiation exposure to man from routine release of nuclear reactor liquid effluents was contributed by the U.S. Nuclear Regulatory Commission Technical Data Management Center at the Oak Ridge National Laboratory. A revision of the original LADTAP program, LADTAP II implements the radiological exposure models of Regulatory Guide 1.109 appropriate for determining the radiation dose to man from the pathways in the aquatic environment-potable water. aquatic foods. shoreline deposits. swimming, boating, and irrigated foods. Doses for both the maximum individual and the general population are calculated as a function of age group and pathway for appropriate body organs. Reference: NUREG/CR-1276 (ORNL/NUREG/TDMC-1). FORTRAN IV; IBM and CDC.

CCC-367/ RADTRAN

A code system for analyzing the radiological portion of the environmental impact from the commercial transportation of radioactive materials was contributed by Sandia Laboratories, Albuquerque. New Mexico. Results are presented in terms of annual latent cancer fatalities and annual early fatality probability resulting from exposure, during normal transportation or transport accidents. The code is developed in a generalized format to permit wide application including normal transportation analysis, consideration of alternatives, and detailed consideration of specific sectors of industry. Reference: SAND 76-0243. FORTRAN IV: CDC.

CCC-369/ PREMOR

PREMOR, a point reactor exposure model code package for survey nuclear analysis of power plant performance.was contributed by the Oak Ridge National Laboratory. It was developed to exploit a simple, two-group point nuclear reactor power plant model for survey analysis. Successive feed batches arc accounted for with provision for from one to twenty batches resident. The effect of exposure of each of the batches to the same neutron flux is determined. The code has been used extensively for analysis of the graphite moderated, gas-cooled reactor concept. Reference: ORNL-5580. FORTRAN IV: IBM 360.

PSR-13/SUPERTOG III

The code package for the IBM version of SUPERTOG III, a generator of fine-group constants and P_N scattering matrices from ENDF/B, was extended to include SAD, a routine designed to automate the transformation of ENDF/B format secondary angular distribution data to the desired form and reference system. The CDC version (A) of SUPERTOG was not affected by this update. Contributions to the SUPERTOG III code system have been made by the Oak Ridge National Laboratory, Kaman Sciences Corp. of Colorado Springs, Colorado and Interuniversity Reactor Institute of Delft, The Netherlands

through the OECD NEA Data Bank, Gif-sur-Yvette, France. SAD was contributed by Atomics International of Canoga Park, California and the Oak Ridge National Laboratory.

PSR-92/ FORIST

FORIST, a neutron spectrum unfolding code package, has been extended to include a CYBER 170/730 version. This extension has been designated (B) version and was contributed by McMaster University, Hamilton, Ontario, Canada. The original code system was written for the IBM 360 computer and contributed by the University of Illinois at Urbana. FORTRAN IV; IBM 360 and CYBER 170/730.

PSR-112/MAME

Documentation for MAME, a collection of AMPX modules, was updated to include a description of the MALOCS module.

PSR-I 17/ MARS

The MARS code package, a collection of computer codes for manipulating multigroup cross-section libraries in AMPX or CCCC format, was updated to correct errors in COMET, called to RSIC attention by John Fiscella of Rockwell International, Inc., Canoga Park, California, and N. M. Greene of Oak Ridge National Laboratory. Current users may correct their version of COMET as follows:

IF (MODIFY(I).EQ.0) GO TO 150

(The 6th statement following statement number 130) was changed to read:

IF (MODIFY(J).EQ.0) GO TO 150.

The 8th statement following statement number 130, (I=I+1), was omitted.

Statement number 150, (I=I+1), was changed to read: I=J+1.

IBM 360.

PSR-131/CARP

The original CARP code package, which produces albedo data from DOT angular flux results, was replaced by a new version supplied by the Oak Ridge National Laboratory. The new package, which uses an improved version of the CCCC I/O routines, should replace all versions of CARP now being used. FORTRAN IV; IBM 360.

PSR-135/ SNAKE

The solid angle calculational system was updated to correct an error in Subroutine KMAX, called to RSIC attention by John Knight of the UCND Computer Sciences Division at the Oak Ridge National Laboratory, and Memory H. Turner, III, consultant, Dallas, Texas. The 11th statement in the subroutine was changed to correct the spelling of the name of the first variable in the statement and correctly reads **SAMAX=0.48*FOURPI.** FORTRAN IV; IBM 360.

CHANGES IN THE DATA LIBRARY COLLECTION

The following change was made in April.

DLC-16/ COBB

COBB, the 123-group neutron cross-section data set generated from ENDF/B-II data for use in the XSDRN discrete ordinates spectral averaging code package (CCC-123), was updated to correct an error in the JUANITA code, called to RSIC attention by N. M. Greene, UCND Computer Sciences Division at the Oak Ridge National Laboratory, Rogers Farr, Carolina Power and Light Company, and Burt Zolatar, EPRI. Current users may correct their own version as follows: In MAIN, after DO 9 I=1,K remove the following statements: Y(I+1)=Y(2*I+1) and Y(I)=Y(2*I). After statement number 9, replace write (N2,102)(Y(I),I=1,K) with write (N2,102)(Y(2*I),I=1,K). This error affects the binary-to-BCD mode of operation of JUANITA and DLC-16 users might have encountered trouble only in the unlikely event that such a conversion was attempted. Normally a user only runs JUANITA in the BCD-to-binary mode.

VISITORS TO EPIC

The following persons came for an orientation visit and/or to use EPIC facilities during the month of April.

Robert A. Anderl, EG&G Idaho, Inc., Idaho Falls, ID; David J. Blackman, A.W.R.E. Aldermaston, Reading. England; Jack Chalmers, Nuclear Installations Inspectorate, Liverpool, England; Ivon E. Fergus, EXXON Nuclear, Idaho Falls, ID; Jim Finucane, Energy Information Administration, DOE, Washington, D.C.; T. Michael Flanders, University of Arkansas, Fayetteville; Y. Gohar, Argonne National Laboratory, Argonne, IL; Paul Goldman, Siemens Corp., Iselin, NJ; Matthew C. G. Hall. Imperial College of Science & Technology, Dorchester, Dorset, England: Peter J. H. Heffer, Central Electricity Generating Board, Bcrkelcy, England; N. E. Hertel, University of Texas, Austin; M. Kaneko, Control Data Japan, 'Tokyo: Laszlo Koblinger, Central Research Inst. for Physics, Budapest, Hungary; Harold T. Maguire, Jr., Rensselaer Polytechnic Institute, Troy, NY; H. R. Meyer, Health & Safety Research Division. ORNL, Oak Ridge, TN; M. Moghari, Nuclear Associates International, Rockville, MD; Lawrence Rutland, ANEFCO, Inc., White Plains, NY; John M. Ryskamp, EG&G Idaho, Inc., Idaho Falls; U. Salmi, Hebrew University of Jerusalem, Israel; Fritz Schmidt, University of Stuttgart (IKE), Federal Republic of Germany: Shiaw-Der Su, General Atomic Co,, San Diego, CA; Charles Shih, Kaiser Engineers, Inc., Oakland. CA: Rolando Simonini, CNEN, Bologna, Italy; Keith Smith, Nuclear Installations Inspectorate, Liverpool, England: Gian-Maria A. A. Sordi, Inst. de Pesquisas Energeticas e Nucleares, Sao Paulo, Brazil; William L. Thompson, Los Alamos Scientific Laboratory, Los Alamos, NM; Wolf Weber. Gesellschaft fur Reaktorsicherheit Forschungsgelande, Federal Republic of Germany; and Andy Williamson, Siemens Corp.. Atlanta, GA.

PERSONAL ITEMS

Nelson DeGangi, formerly of MAGI, Inc., will be joining the United Engineers in Philadelphia, PA in May.

Dr. P. S. Nagarajan, has recently gone on leave from the Bhabha Atomic Research Centre in Bombay, India to work at the Institut fur Strahlenschutz of the G.S.F. in Munchen, Germany. He is working with SAM-CE for organ dose calculations.

Dr. Siegfried (Sig) A. W. Gerstl has announced that he will be on leave from Los Alamos Scientific Laboratory to spend a year starting in May at the Max-Planck-Institut fur Plasmaphysik. 8046 Garching, Federal Republic of Germany, Sig will participate in ncutronics and shielding analyses for the fusion Ignition device, ZEPHYR. to be built at Garching.

Luisa Hansen, physicist in E-Division of Lawrence Livermore Laboratory, has been named to the American Physical Society's Committee on International Freedom of Scientists (CIFS), a group organized to help scientists whose human rights are violated by oppressive regimes around the world.

The following changes of address have been noted: Laurin R. Dodd *from* United Nuclear Ind., Richland, WA *to* Battelle Northwest Laboratories, Richland, WA; James T. Harvey *from* TVA, Muscle Shoals, AL *to* Radiological Hygiene Branch, TVA, Vonore, TN; James Fitzpatrick *from* Electrowatt Engineering Services, London, England *to* Nuclear Energy Board, Dublin, Ireland; Randall C. Foltz *from* ITEL Corp., McLean. VA *to* United Computing Systems, Inc.. Falls Church. VA: and Joe Wallace *from* Science Applications, Inc., La Jolla. CA *to* Science Applications, Inc., Vienna, VA.

NCRP STATEMENT ON DOSE LIMIT FOR NEUTRONS

RSIC received the following statement fr-om W. Roger Ney, Executive Director. National Council on Radiation Protection and Measurements, Washington D.C.

NCRP Statement on Dose Limit for Neutrons

The National Council on Radiation **Protection** and Measurements (NCRP) has followed closely the recent developments in the assessment of the risks of induction of leukemia and other cancers from exposure to neutrons.[1-8] The risk estimates have been derived from only a single source, i.e., the data on the **Japanese atomic bomb** survivors. There seems to be reasonable agreement on the magnitude of the leukemia risk, with less certainty about the risks for other cancers. However, there is considerable diversity of opinion on how to interpret and use this information at the present stage of development.

The NCRP is actively engaged in a detailed examination of the risks associated with exposure to all forms of ionizing radiation, high-LET (Linear Energy Transfer) as well as the more prevalent low-LET radiations. The NCRP committees currently engaged in this work are studying all relevant dosimetric, biological and epidemiological data, together with other important aspects, in order to evaluate the total risk from each kind of radiation and the influence of dose size, dose rate, LET, and other variables on the magnitude of the risks. These assessments are expected to form the basis for NCRP recommendations on maximum permissible dose levels for all types of radiation for radiation workers as well as for members of the general public, This effort may result in substantial changes in the current system of radiation protection and thus be more than a simple updating of previous NCRP recommendations.[9] The maximum permissible dose for neutrons is thus only a part of a much larger issue which is complex and has not been finally resolved.

Although the neutron dose limits that will ultimately be recommended cannot be given at this time, they may well be less than the current ones. The NCRP has, therefore, decided to recommend that, as an interim precautionary measure, steps be taken to reduce the potential exposure of individuals who may receive neutron doses that are a substantial fraction of the current maximum permissible dose. Such steps should be based on the tentative assumption that future changes, if any, in the current values of the maximum permissible neutron doses might reduce the values by a factor of as much as 3, but are unlikely to reduce them by more than a factor of 10.

In line with established principles that apply to all ionizing radiations, further genera1 reductions in neutron exposure should be made whenever practicable.

Note

When the neutron energy is not known, it has been customary to assume a quality factor of about 10. The current occupational maximum permissible dose equivalent is a long-term average of 5 rem per year. Using a quality factor of 10, the current occupational maximum permissible absorbed dose for neutrons is thus a long-term average of 500 mrad per year.

It should be noted that, in many instances, exposures of personnel are assessed in terms of the absorbed dose (or corresponding dose equivalent) at the body surface. In the case of neutrons in the fission energy range, the absorbed dose at the body surface is substantially larger than the absorbed dose in internal organs. For example, the surface dose is larger by a factor of 3 or 4 than the absorbed dose in the bone marrow, the organ at risk for leukemia. The corresponding factor for other cancers of internal organs is also substantial. Hence, if the neutron exposure of personnel is established in terms of the surface dose or a similar quantity, the prudent actions required may be minimal.

(February 21, 1980)

References

1. H. H. Rossi, "The Effects of Small Doses of Ionizing Radiation: Fundamental Biophysical Characteristics," *Radiat. Res.* 71(1), 1977.
2. H. H. Rossi and C. W. Mays, "Leukemia Risk From Neutrons," ***Health Phys. 34, 3.53, 1978.***
3. H. H. Rossi, "A Proposal for Revision of the Quality Factor," ***Radiat. Environ. Biophys. 14, 275, 1977.***
4. V. P. Bond, "The Risk From Fast Neutron Exposure," ***Health Phys. 37,*** 391, 1979.
5. P. B. Roberts, Comments on "Leukemia Risk From Neutrons," by H. H. Rossi and C. W. Mays, Letter to the Editor, ***Health Phys. 37, 601,*** 1979.
6. R. G. Mole, "RBE for Carcinogenesis by Fission Neutrons," Letter to the Editor, *Health Phys.* ***36, 463,*** 1979.
7. G. W. Beebe and C. E. Land, Comments on "Leukemia Risk From Neutrons," Letter to the Editor, ***Health Phys. 36, 465, 1979.***
8. S. Jablon, Comments on "Leukemia Risk From Neutrons," by H. H. Rossi and C. W. Mays, Letter to the Editor, ***Health Phys. 36, 205,*** 1979.
9. National Council on Radiation Protection and Measurements, ***Basic Radiation Protection Criteria,*** NCRP Report No. 39 (National Council on Radiation Protection and Measurements, Washington, 1971).

NCRP ANNOUNCES AVAILABILITY OF TWO NEW REPORTS AND PROCEEDINGS

The National Council on Radiation Protection and Measurements (NCRP) announces the publication of two new reports: NCRP **Report** No. *64, Influence of Dose and Its Distribution in Time on Dose-Response Relationships for Low-LET Radiations,* and NCRP **Report** No. 65, *Management of Persons Accidentally Contaminated with Radionuclides.* Report No. 64 represents the result of a comprehensive review of data relating to the influence of the magnitude and temporal distribution of dose on the biological effectiveness of low-LET radiation per unit of absorbed dose. Report No. 65 results from recognition of the fact that the increasing use of radionuclides in research. medical applications, nuclear power and Industrial processes suggests that there is also a concomitant increase in the probability of accidental human exposures to internally deposited radionuclides. The review carried out during the preparation of this new report made evident the fact that the literature on the medical management of such cases is scattered and sparse.

The NCRP also announces the publication of the Proceedings of the Fifteenth Annual Meeting. *Perceptions of Risk.* The new publication is the first of a new series initiated by the Council as part of its effort to disseminate, in the public interest, information about radiation protection and measurement. The Fifteenth Annual Meeting of the NCRP was held on March 14–15, 1979 at the National Academy of Sciences in Washingron. D.C. and included a major scientific session on perception of risk—hence the title of the new publication. That session included. and the new proceedings make available, thought-provoking papers prepared by prominent Individuals from a variety of different backgrounds. Topics include: Federal Regulatory Agency Approaches to the Assessment and Control of Risk from Carcinogens and Mutagens; Risk Assessment Bioethical Considerations; Images of Disaster: Perception and Acceptance of Risks from Nuclear Power; Risk Assessment in Social Perspective; Occupational Risks as Viewed by Labor: Actuarial Views of Risk; and Regulation, A Classic Catastrophe. Panel discussions on the subjects and the third Lauriston S 'Taylor lecture. "Radiation Protection--- Concepts and Trade Offs" by Hymer L. Friedell are also included in the Proceedings.

Persons wishing to receive copies of any of the above three publications may purchase them from: NCRP Publications, P. 0. Box 30175, Washington. D.C. 20014.

AMERICAN NUCLEAR SOCIETY SUMMER MEETING IN LAS VEGAS

The 26th Annual Meeting of' the American Nuclear Society will be held June 8–12, 1980 in Las Vegas The theme is "Nuclear Waste Management and Technology." and there will bc some additional emphasis on the results of TMI investigations. Technical sessions of selected ANS Divisions are as follows: CONTROLLED NUCLEAR FUSION—Plasma Engineering, Hybrids and Synfuels, Fusion Reactor Neutronics and Shielding. Fusion Reactor Engineering, ETF/ INTOR, Blanket Design. and Inertial Confinement: MATHEMATICS AND COMPUTATION—Mathematical and Computational Aspects of Two-Phase Fluid Dynamics. Transport Theory, Methods in Heat Transfer and Fluid Flow, Reactor Physics Methods, Computational Methods in Reactor Safety, and Advances in Radiation Transport Methods and Data for Shielding; NUCLEAR FUEL CYCLE-Nuclear Wastes: Can They Benefit Man and the Environment, INFCE Final Evaluations-Part I, Waste Disposal Safety Criteria. INFCE Final Evaluations-Part II, Public Acceptance of Low-Level Waste, LWR and FBR Fuel Managcmcnt. Low-Level Waste Management-I. Front-End Fuel Cycle Supply. Low-Level Waste Management-II. and Fuel Management and Utilization of Extended Burnup Fuel; RADIATION PROTECTION AND SHIELDING- Personnel Neutron Dosimetry. Neutron irradiation Damage – Its Prediction and Interpretation, TMI: Radiation Protection – Lessons Learned, Fusion Reactor Neutronics and Shielding, Advances in Radiation Transport 'Methods and Data for Shielding. Dosimetry and Spectrometry. and Radiation Protection in Nuclear Power Stations: and REACTOR PHYSICS---Measurement and Calculation of Reactor Parameters, Nuclear Data, Physics of Fast and Thermal Reactors. Lessons Learned from TMI in Reactor Instrumentation and Diagnostics, Interaction of Two-Phase Flow in Neutron Fields, Nuclear-Pumped Lasers, and Reactor Theory and Applications.

HEALTH PHYSICS SOCIETY 25TH SILVER ANNIVERSARY MEETING

The 25th Silver Anniversary Meeting of the Health Physics Society will bc held Juty 20-25. 1980. at the Olympic Hotel. Seattle. Washington, The Program Committee is now soliciting titles and suggestions for the

first session, "Current Events," (submission deadline is May 30th). Communications should be directed to: David A. Waite, Office of Nuclear Waste Isolation, Battelle Memorial Institute, 505 King Ave., Columbus, OH 43201; Telephone 614-424-5521. The other sessions planned for the meeting include: Plenary – Risk From Technology, Evolution of Radiation Protection Standards, Internal Dosimetry, Operational Health Physics I, Emergency Planning, Natural Radioactivity I, Operational Health Physics II, Student Papers, Power Reactor **Radiation** Protection, Natural Radioactivity II, Radioactive Waste Management, Radiation Bioeffects, Emergency Monitoring. Environmental Radiation I, Antique Instruments Display, Environmental Radiation II, Radioactivity Measurements, Radionuclide Metabolism, Medical Radiation Protection, External Radiation Dosimetry, Historical Perspective on Reactor Accidents, Environmental Radiation III, and Radiation Instrumentation. Some of the courses to be offered during the meeting include: Beta Dosimetry – Lessons Learned From TMI, Radiation Safety of Radioiodination, and Introduction to Monte Carlo Techniques. (Note: Continuing Education presentations will not conflict with regular Sessions).

ENERGY FOR THE 80s FOUNDATION PLANS CONFERENCE

The Second National Conference on Energy Advocacy will be held at the Palmer House Hotel, Chicago, Illinois. June 26-29, 1980. Sponsored, along with many other organizations, by Energy for the Eighties, Inc.. the conference goals include: to gain understanding of the energy controversy, to learn skills needed for advocacy, to meet with others who share the same convictions, and to become aware of energy legislation and decision making.

Some of the panels and workshops to be offered are: Energy Needs Today and Tomorrow, Available Energy Sources, Coal Perspectives and Issues, Oil Perspectives and Issues, Solar Perspectives and Issues, Natural Gas Perspectives and Issues, Nuclear Perspectives and Issues. Conservation, Energy Economics, Jobs and Energy. The Initiative Process, Health Effects of Energy Production, The Legislative Process. How Government Works. Responses to the 20 'Toughest Questions, Federal Environmental Laws and Citizen Involvement, Working With the Media, Public Views on Energy, Understanding and Learning from the Critics, Organizing Citizen Groups, Fundraising, Creating Alliances, Communicating With Educators, The Engineer in the Political Process, and Roles for Engineers in Advocacy.

For further information, write to Second National Conference on Energy Advocacy, Suite 200, 1015 15th Street, N.W., Washington, D.C. 20005.

HEALTH PHYSICS SOCIETY PLANS SUMMER SCHOOL

The Health Physics Society will conduct a summer school on ***Assessment of Environmental Releases of Radioactivity,*** July 14–18, 1980 at the University of Washington, Seattle, Washington. This course features a series of lectures on the theoretical and practical aspects of assessing the Health Physics consequence of radioactive releases, Health physicists, environmental scientists, and other safety professionals will find this state of the art course beneficial.

Topics to be covered include: Source Terms for Nuclear Facilities and Medical and Industrial Sites, Atmospheric Dispersal, Aquatic Dispersal, Environmental Transport and Bioaccumulation, Reference Man, Internal Dosimetry. External Dosimetry, Health Effects From Population Doses, Regulations for Environmental Releases, Computer Models for Environmental Assessments, Uncertainties in Dose Estimates, Measurements and Calculations of Low Level Radioactivity Dose, and Calculation of a Dose After a Nuclear Accident.

For further information, contact: Conference Registration (Conf. No. MC4380NS), University of Washington DW-23, Seattle, Washington 98195.

ORAU, FDA, AND DOE TO SPONSOR RADIOPHARMACEUTICAL DOSIMETRY SYMPOSIUM

The Third International Radiopharmaceutical Dosimetry Symposium will be held in Oak Ridge, Tennessee, October 7-10, 1980. This symposium will concentrate on the presentation of radiopharmaceutical biodistribution and retention data for internal radiation dose estimation. Invited and submitted papers will focus on various facets of problems related to the acquisition of significant distribution and kinetic data from animals, patients, and human volunteers.

Papers are solicited in areas related to internal dosimetry of radiopharmaceuticals. Of primary interest are papers presenting biologic and kinetic data, data extrapolation methods, computer codes and calculation techniques for analysis of biologic data, and methods for data collection. Submitted abstracts including title of the paper, names of authors, and their affiliations should be contained within a 14 X 20 cm block. Abstracts should be single-spaced, elite type. Authors whose contributions are accepted will be notified and will receive instructions for submission of the complete paper for

publication in the symposium proceedings. Send abstracts by June 28, 1980 to: Roger J. Cloutier, Radiopharmaceutical Dosimetry Symposium Planning Committee, Oak Ridge Associated Universities. P. O. Box 117, Oak Ridge. Tennessee 37830. The registration fee of $50 includes social hour. banquet, and one copy of the proceedings of the symposium. Roger Cloutier is also the contact for registration.

CALL FOR PAPERS FOR THE THIRD ANNUAL LOUISIANA COMPUTER EXPOSITION

The Third Annual L'Exposition de l'Informatique en Louisiane (Louisiana Computer Exposition) is to be held at the University of Southwestern Louisiana, Lafayette, on February 26-27, 1981. The Exposition is co-sponsored by the student chapter of the Association for Computing Machinery, the Computer Science Department, and the Computer Center of the University of Southwestern Louisiana. Papers are being solicited in the area of distributed computer systems and related topics and can be written on, but are not restricted to, the following topics: distributed systems programming languages, operating systems considerations for the use of distributed systems. evaluation of distributed systems. dara base management systems support. design criteria for distributed systems, performance measurement and evaluation, fault tolerant design of such systems. and parallelism in systems. Authors must submit three copies of an extended abstract by August 15, 1980. and will be advised of the acceptance of their papers by October 3. 1980 The accepted papers must be typed and received by November 28, 1980.

For further information and details. please contact William R. Edwards. Program Chairman. Computer Science Department, University of Southwestern Louisiana. P. 0. Box 44330, Lafayette, LA 70504: Telephone 318-264-6284

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 22 15 1.

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.

REACTOR AND WEAPONS RADIATION SHIELDING LITERATURE

AECL-6363
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