RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE DEPARTMENT OF ENERGY

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It is not enough for knowledge to exist; it must be communicated to those who can apply it. . . .UNIDO: Industrial Information

ROBERT CARTER NAMED NEW CHAIRMAN OF ANSI CONSENSUS COMMITTEE N17

The American National Standards Institute (ANSI) consensus committee N17, Research Reactors, Reactor Physics, and Radiation Shielding, is now chaired by **Robert S. Carter** of the National Bureau of Standards. He succeeds **W. L. Whittemore**, General Atomic Company, who recently resigned. The committee has its secretariat with the American Nuclear Society (ANS) and reviews standards developed by the following subcommittees of the ANS Standards Committee:

ANS-1, *Safety Guide for the Performance of Critical Experiments*, A. D. Callihan (Union Carbide Corp. Nuclear Division), chairman

ANS-6, *Radiation Protection and Shielding*, D. K. Trubey (Oak Ridge National Laboratory), chairman

ANS-10, *Mathematics and Computation*, L. L. Barinka (Babcock and Wilcox), chairman

ANS-14, *Fast Pulse Reactors*, A. de la Paz (White Sands Missile Range), chairman

ANS-15, *Operation of Research Reactors*, W. J. Richards (Argonne National Laboratory), chairman

ANS-19, *Physics of Reactor Design*, A. Weizberg (NUS Corp.), chairman

The work of these committees and the other groups developing standards within ANS are described in the newly published "Standards Committee Report of Activities," 1980. The report was prepared under the direction of Marilyn D. Weber, Standards Committee administrative secretary.

HAVE YOU RETURNED THE NEWSLETTER QUERY?

Appended to the April 1981 issue of the RSIC Newsletter was our periodic distribution query form designed to give us and our sponsors a better idea of the research areas being investigated by our user community. The query also serves to keep our distribution list current. We remind you that an affirmative response is required in order for you to continue receiving the RSIC Newsletter.

Several hundred responses have been received from our readers to date. We call your attention to the fact that some respondents overlooked the section concerning financial sponsorship. This information, as well as that requested concerning your contribution to the RSIC information collections, helps give us justification to continue to serve your needs without unit charges. Please help us to keep information in the RSIC subject coverage freely exchanged.

The deadline for beginning our review of the newsletter distribution has been extended to July 1. If you have not yet done so, we urge you to return your completed query form immediately. We need the cooperation and collaboration of each of you to continue to provide a useful, viable information exchange.

IF YOU CHANGE YOUR ADDRESS, please notify us (including Building and Room No. where needed). *Third Class Mail* is returned to us at our expense if the addressee has moved. If your mail is returned, your name will be deleted from our distributions until we hear from you.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made during April.

CCC-180/TDA

The time-dependent multigroup one-dimensional discrete ordinates code system, TDA, was updated to correct errors called to RSIC attention by Mohamed E. Sawan of the University of Wisconsin at Madison and Henry A. Sandmeier of Los Alamos National Laboratory, Los Alamos, New Mexico. The errors prevented use of the first collision source option. A statement of the errors is available from RSIC upon request. FORTRAN IV; CDC-6600 and IBM 360.

CCC-254/ANISN-ORNL

The ANISN-ORNL multigroup one-dimensional discrete ordinates transport code package has been updated to reflect coding changes suggested by G. R. Imel of the Princeton Plasma Physics Laboratory in New Jersey and Ward Engle of the Oak Ridge National Laboratory. The changes affect indefinite conditions in Subroutine S833 when a problem was run with no source in a particular energy group (either fixed source or source from scattering). Details of the changes may be requested from RSIC. FORTRAN IV; CDC 6600/7600.

CCC-273/DACRIN-81

The DACRIN airborne radionuclide inhalation organ dose code system has been replaced by a newly frozen version supplied by Battelle Pacific Northwest Laboratory of Richland, Washington. The new version packaged in RSIC as DACRIN-81 uses new data library files and has slight changes in input data formats. References: BNWL-B-389 and BNWL-B-389 Supp. FORTRAN IV; CYBER-74.

CCC-335/GALE

The GALE code package for the calculation of releases of radioactive materials in gaseous and liquid effluents was extended to include a UNIVAC version (B), a contribution of Sargent and Lundy, Chicago, Illinois. The original version (A), developed for IBM hardware, was contributed by the U. S. Nuclear Regulatory Commission, Washington, D.C. FORTRAN IV; IBM 360 (A) and UNIVAC (B).

CCC-363/LADTAP II

The LADTAP II code package for calculating radiation exposure to man from routine release of nuclear reactor liquid effluents was updated to correct an error called to RSIC attention by Sarbeswar Acharya of the Nuclear Regulatory Commission staff and Keith Eckerman of the Oak Ridge National Laboratory. Changes were made in Subroutine RECON and in input for the packaged sample problem. Details of the changes may be requested from RSIC. FORTRAN IV; IBM 360 and CDC.

CHANGES IN THE DATA LIBRARY COLLECTION

DLC-81/DOSDAM77-81

This damage cross section library in 620 neutron group SAND-II/CCC-112 format was contributed by Netherlands Energy Research Foundation, Petten (N. H.), Netherlands. Included in the package is the DOSCROS77 dosimetry cross section library which is based on the ENDF/B-IV dosimetry file, supplemented with some other evaluations. The total number of reaction cross section sets in DOSCROS77 is 49 (+3 cover cross section sets). Also included in the package is DAMSIG77, damage cross sections of the following materials: graphite, stainless steel, aluminum, silicium, chromium, iron, nickel, copper, zirconium, molybdenum, tungsten, vanadium, and niobium. A number of these materials have more than one cross section set, originating from different evaluations. Cross sections for some activation reactions, commonly used to determine thermal and fast neutron fluences have been included, as have some artificial cross sections which can be used to derive values for some physical quantities which may characterize neutron spectra. References: ECN-25, ECN-36, and ECN-37. FORTRAN IV; CDC 6400.

EXPLAINING RADIOLOGICAL PROTECTION: NEW BOOKLET

The U. K. National Radiological Protection Board has published a new version of its booklet, "Living with Radiation," written to stimulate interest in the principles and practice of radiological protection. The objectives of the new booklet are to describe for general readers the nature of ionizing radiation, its sources and effects, and the means of protecting people against it.

The biological effects of radiation have been studied for several decades, and regulations to protect health exist in most countries. Over the years the relationship between radiation dose and the risk of harmful effects has become more firmly established. For the purposes of radiological protection, it is considered prudent to assume a linear relationship between risk and dose, with no threshold below which there is no risk – even at very low doses. This means that any level of radiation, whether in factories, hospitals and colleges, or associated with consumer goods or the generation of electricity by nuclear reactors, is assumed to carry with it a risk borne by individuals and society. It is inevitable, therefore, that radiological protection should be a matter of public debate. Indeed, at the heart of radiological protection is the ethical difficulty of deciding whether radiation risks are worth incurring and how they should be spread throughout the community. In this booklet, information is presented in such a way as to help readers to make their own judgments of the issues.

The complexity of radiological protection, embracing, as it does, aspects of medicine, engineering, statistics, law, public administration and several branches of science hinders public participation in the debate. A number of abstract concepts and quantities have been introduced in recent years which must seem unduly obscure to outsiders. An attempt is, therefore, made early in the booklet to explain essential terms, and a glossary is also provided.

There is more public concern about exposure from artificial radiation than from natural radiation. The irony is that for the average person, exposure from the latter considerably exceeds the former, although this has no bearing on the need to limit artificial exposure. The booklet identifies sources of both types of radiation and summarizes doses to individuals and to the population.

In a survey of radiation effects, risk factors for malignant diseases and hereditary defects are presented, and the strength of the supporting evidence is examined. The use of these risk factors in the overall system of dose limitation is considered next; this may raise questions in the minds of readers: Is the system just and fair? Is the right balance reached between individual and social interests?

Two of the subjects that cause most public anxiety are nuclear reactors and radioactive wastes. These are treated separately, but in a similar manner – the nature of reactors and wastes is described, the associated hazards are explained, and the practices and prospects for safety are outlined. Society's requirements are recognized, and the need to rely on scientific skill to meet them is stressed.

Further information is available from the Information Officer, National Radiological Protection Board. Telephone: Abingdon (0235) 831600, Ext. 410.

NCRP BASIC RADIATION PROTECTION CRITERIA AND NEW PROJECTS

The Annual Report of the National Council on Radiation Protection and Measurements (NCRP) released at the 1981 Annual Meeting on April 8–9, 1981, stresses basic radiation protection criteria and new activities initiated during the last year. The program on basic radiation protection criteria is being carried out by six NCRP scientific subgroups: SC-1 Basic Radiation Protection Criteria, SC-40 Radiobiological Aspects of Radiation Protection Criteria, SC-57 Internal Emitter Standards, SC-59 Human Radiation Exposure Experience, SC-64 Radionuclides in the Environment, and a Study Group on Comparative Risk. The work of two of these – SC-1 and SC-40 – is emphasized in the NCRP's Annual Report.

Scientific Committee 40 provides the radiobiological basis for protection criteria and, during 1980, the first in a series of reports was published: NCRP Report No. 64, *Influence of Dose and Its Distribution in Time on Dose-Response Relationships for Low-LET Radiations*. The report makes it clear that the risk per unit dose of low-LET radiation for many effects observed in experimental systems depends upon the magnitude of the dose and its temporal distribution. The report specifies that the effectiveness per unit dose of high versus low dose-rate exposure ranges from a factor of about 2 to about 10. This represents crucial information for the development of basic criteria, especially if the criteria are to utilize risk estimates as a basis for the establishment of permissible levels of exposure. Just such a basis is being explored by Scientific Committee 1.

Committee 1 examining the feasibility and appropriateness of establishing a quantitative risk system for radiation protection. The system would be based on (1) the best available quantitative risk estimates (with specified confidence limits) and (2) independent estimates of reasonably acceptable risk levels. These levels, in turn, are based on comparisons with risks accepted in nonradiation endeavors. This approach is being considered in anticipation of the use of comparative risk for many kinds of hazardous agents and conditions in the future.

New activities received important emphasis in 1980 as part of the council's effort to meet expanding needs. Seven new projects were initiated during the year. These are aimed at the development of NCRP recommendations on the following topics: (1) quality assurance and measurement in diagnostic radiology, (2) disposal of accident-generated waste water, (3) low level waste, (4) radiation exposure and potentially related injury, (5) radiation protection in mammography, (6) exposure from technologically enhanced sources, and (7) comparative carcinogenicity of pollutant chemicals. The new efforts bring to almost 60 the number of active scientific projects underway in the extensive NCRP program.

A new element in the recent program has been the responsiveness of the NCRP to specific, urgent public problems. Work on krypton venting and accident generated waste water at the Three Mile Island installation exemplify this, as does concern with the phosphate-radon problem in Florida. These efforts have been undertaken in the framework of more typical NCRP generic studies.

VISITORS TO EPIC

The following persons came for an orientation visit and/or to use EPIC facilities during the month of April: **Joyce L. Finney** and **Carolyn Srite**, University of Tennessee Energy, Environment, and Resources Center, Knoxville, Tennessee; **Claude A. Philis** and **Michal Collins**, CEA/CEN, Montrouge; France; **John Murdock**, Maxima Corp., Bethesda, Maryland; and **Eietsu Tamura**, IBM Japan Ltd., Tokyo, Japan.

PERSONAL ITEMS

Two well known "shielders" have been elected by the ANS Board of Directors to the grade of Fellow. The new Fellows and their citations are **Russell L. Heath**, of EG&G Idaho, Inc., for "significant technical contributions and continued leadership in the development and application of the techniques of gamma-ray spectrometry in physics research and nuclear technology," *and* **John H. Hubbell**, of the National Bureau of Standards, for "his acknowledged eminence in research on photon interactions and the evaluation and compilation of photon cross sections."

CONFERENCES AND COURSES

Nuclear and Space Radiation Effects Conference

The *1981 IEEE Annual Conference on Nuclear and Space Radiation Effects* will be held July 21 through July 24 at the University of Washington, Seattle, Washington. A tutorial *Short Course on Radiation Effects* will be held July 20. This important conference will cover nuclear and space radiation effects, and EMP effects, on electronic devices, materials, circuits and systems; design of, and processing technology for producing radiation-tolerant ("hardened") semiconductor devices, integrated circuits, LSI and VLSI microcircuits; and radiation sources, simulation, energy deposition and dosimetry.

The technical program consists of nine technical sessions, plus several invited speakers and an invited VLSI session as well as a poster session and late news papers.

The conference is cosponsored by the IEEE/NPSS Radiation Effects Committee, Defense Nuclear Agency/DOD, Jet Propulsion Laboratory/NASA, and Sandia National Laboratories/DOE.

Registration fee is $75 for IEEE members, $85 for nonmembers. For complete conference information and registration material, contact either general chairman **Itsu Arimura**, or local arrangements chairman **Harold Stocks** at Boeing Aerospace Company, MS 2R-00, Box 3999, Seattle, Washington 98124, (206) 655-3116; or publicity chairman **Howard H. Sander**, Sandia National Laboratories, Division 2143, Albuquerque, New Mexico 87185, (505) 844-1209.

Calendar of Meetings

We call attention to the following meetings.

May 1981

Fundamentals of Radiation Physics, May 13–15, Hilton Inn, 100 Sandoval Street, Santa Fe, New Mexico. Contact: Engineering Technology, Inc., Post Office Box 9000, Waco, Texas 76710, (817) 772-0082.

10th ASIS Mid-Year Meeting, May 13–16, Ft. Lewis College, Durango, Colorado. Contact: American Society for Information Science, 1010 Sixteenth Street, NW, Washington, D.C. 20036, (202) 659-3644.

Nuclear Safety/Radioactive Waste Management, May 18–22, Hilton Inn, 100 Sandoval Street, Santa Fe, New Mexico. Contact: Engineering Technology, Inc., Post Office Box 9000, Waco, Texas 76710, (817) 772-0082.

June 1981

Fourth Annual Federal Information Institute, Federal Databases: Identification, Evaluation and Access, June 10–11, The American University, Center for Technology and Administration, Washington, D.C. 20016. Contact: Maxine Hattery, Federal Database Institute, (202) 686-2513.

Fifth Symposium on X- and Gamma-Ray Sources and Applications, June 10–12, The University of Michigan, Ann Arbor, Michigan. Contact: Cathy Lehman, Symposium Secretary, Phoenix Memorial Laboratory, The University of Michigan, Ann Arbor, Michigan 48109, (313) 764-6220.

October 1981

9th Symposium on Engineering Problems of Fusion Research, October 26–29, Palmer House, Chicago, Illinois. Contact: Mary Bussert (217) 333-2882 or FTS 957-2882, or George Miley (217) 333-3772 or FTS 957-3772.

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 22151.

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-6478
Annual Limits on Intake, Organ Burdens, and Excretion Rates for Occupational Exposure to Uranium., Johnson, J.R., March 1980, NTIS (U.S. Sales Only), PC A03/MF A01

AEEW-R-1249
Modifications to the Monte Carlo Neutronics Code MONK., Hutton, J.L., September 1979, NTIS (U.S. Sales Only), PC A04/MF A01

ANL/ES-95
Random Numbers Spring from Alpha Decay., Frigerio, N.A.; Sanathanan, L.P.; Morley, M.; Clark, N.A.; Tyler, S.A., May 1980, NTIS, PC A04/MF A01

BNL-NCS-51,245, Vols.I and II; DOE/NDC-21 L
Symposium on Neutron Cross-Sections from 10 to 50 MeV., Bhat, M.R.; Pearlstein, S. (Eds.). Held at Brookhaven National Laboratory, Upton, New York 11973, May 12-14, 1980, July 1980, NTIS, PC $14.00 each; MF $3.00 each

BNL-NCS-51,245, Vol.I, pp.75-98
Review of Source Characterization for Fusion Materials Irradiations., Greenwood, L.R., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.99-109
Thick Target Neutron Yields and Spectra from the Li(d,xn) Reaction at 35 MeV., Johnson, D.L.; Mann, F.M.; Watson, J.W.; Brady, F.P.; Ullmann, J.L.; Romero, J.L.; Castaneda, C.M.; Zanelli, C.I.; Wyckoff, W.G., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.113-132
Characterization of the Be(d,n) Neutron Field by Passive Dosimetry Techniques., Kneff, D.W.; Farrar, H.,IV; Greenwood, L.R.; Guinan, M.W., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.215-243
Status of High Energy Neutron Cross Sections., Browne, J.C.; Lisowski, P.W., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.245-257
Status of (N, Charged Particle) Measurements at LLL., Haight, R.C.; Grimes, S.M., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.259-275
Neutron Physics Research at Triangle Universities Nuclear Laboratory., Walter, R.L.; Gould, C.R., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.277-288
ORELA Measurements to Meet Fusion Energy Neutron Cross Sections Needs., Larson, D.C., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51,245, Vol.I, pp.343-374
Measurement of the Angle-Integrated Secondary Neutron Spectra from Interaction of 14 MeV Neutrons with Medium and Heavy Nuclei., Vonach, H.; Chalupka, A.; Wenninger, F.; Staffel, G., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.431-458
Nuclear Data Relevant to Shield Design of FMIT Facility., Carter, L.L.; Morford, R.J.; Wilcox, A.D., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.459-493
Fusion Materials High Energy Neutron Studies - A Status Report., Doran, D.G.; Guinan, M.W., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.495-515
Measurements and Evaluations of Nuclear Data to Support Early Design Needs of the FMIT Facility., Johnson, D.L.; Mann, F.M.; Schenter, R.E., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.517-537
Neutron Environment in d+Li Facilities., Mann, F.M.; Schmittroth, F.; Carter, L.L., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.539-552
Integral Cross Section Measurements on (n,x) Reactions Induced by 30 MeV d(Be) Break-Up Neutrons on FRT Wall and Structural Materials., Qaim, S.M.; Khatun, S.; Wolfle, R., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.553-598
Cross Sections Required for FMIT Dosimetry., Gold, R.; McElroy, W.N.; Lippincott, E.P.; Mann, F.M.; Oberg, D.L.; Roberts J.H.; Ruddy, F.H., July 1980, NTIS, PC $14.00; MF $3.00

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Damage Parameters for Non-Metals in a High Energy Neutron Environment., Dell, G.F.; Berry, H.C.; Lazareth, O.W.; Goland, A.N., July 1980, NTIS, PC $14.00; MF $3.00

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Source Imaging for FMIT Using a Neutron Pin-Hole Camera., Johnson, R.G.; Behrens, J.W.; Bowman, C.D., July 1980, NTIS, PC $14.00; MF $3.00

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Recent Developments in Nuclear Reaction Theories and Calculations., Gardner, D.G., July 1980, NTIS, PC $14.00; MF $3.00

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Development and Applications of Multi-Step Hauser-Feshbach/Pre-Equilibrium Model Theory., Fu, C.Y., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.689-710
Phenomenology of Preequilibrium Angular Distributions., Kalbach, C.; Mann, F.M., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.711-729
Comparison of Experimental and Calculated Neutron Emission Spectra and Angular Distributions., Gruppelaar, H.; Akkermans, J.M., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.751-768
Calculation of ^{56}Co Neutron Cross Sections Between 3 and 50 MeV., Arthur, E.D.; Young, P.G.; Matthes, W.K., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51245, Vol.II, pp.799-813
Measured and Evaluated Bismuth Cross Sections for Fusion-Fission Hybrid Reactors., Smith, A.; Guenther, P.T.; Smith, D.L.; Howerton, R.J., July 1980, NTIS, PC $14.00; MF $3.00

BNL-NCS-51354
Compilation of Requests for Nuclear Data., National Nuclear Data Center, March 1981, NTIS, PC A05/MF A01

CEA-N-2143
Perfectig of Shielding Calculation Technique Against the Gamma Rays Arising from a Tokamak with the TFR Experience. Application to the Conceptual Design Tokamak TORE 2 SUPRA., Diop, C.M'B., September 1980, Centre d'Etudes Nucleaires de

Saclay, France, Division d'Etude et de Development des Reacteurs

CINDA 80 Supplement
An Index to the Literature on Microscopic Neutron Data., IAEA, November 1980, IAEA, Vienna

CONF-8010113
Nuclear Data and Benchmarks for Reactor Shielding., NEA,OECD, Proceedings of a Specialists' Meeting, Paris, 27-29 October 1980., 1981, OECD, France; ISBN 92-64-2118-3

CONF-8010113, pp.19-33
Checking and Improvements of the Multigroup Data Library EURLIB-4., Hehn, G.; Mattes, M.; Al Malah, K.; Kicherer, G., 1981, OECD, France; ISBN 92-64-2118-3

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Status of Multigroup Cross-Section Libraries Available from the Radiation Shielding Information Center., Roussin, R.W.; Trubey, D.K.; Maskewitz, B.F., 1981, OECD, France; ISBN 92-64-2118-3

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Examples of Optimized Broad Energy Group Structures Generated by the Automatic Collapsing Scheme AGRUKO., Herrnberger, V.; Padiyath, S., 1981, OECD, France; ISBN 92-64-2118-3

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Preliminary Version of the EURLIB Variance-Covariance Matrices., Hall, M.C.G., 1981, OECD, France; ISBN 92-64-2118-3

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Status of Multigroup Sensitivity Profiles and Covariance Matrices Available from the Radiation Shielding Information Center., Roussin, R.W.; Drischler, J.D.; Marable, J.H., 1981, OECD, France; ISBN 92-64-2118-3

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Uncertainty Analysis in a Fast Breeder Reactor Using ANISN/SWANLAKE., Hall, M.C.G., 1981, OECD, France; ISBN 92-64-2118-3

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The Application of DUCKPOND to the Oak Ridge PCA Calculational Blind Test., Hall, M.C.G.; McCracken, A.K.; Packwood, A., 1981, OECD, France; ISBN 92-64-2118-3

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Application of Cross Section Sensitivity Analysis to "JOYO" Main Shield., Ohtani, N.; Yamauchi, M.; Itoh, J.; Kawai, M., 1981, OECD, France; ISBN 92-64-2118-3

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A Review of the Capabilities of the ORNL FORSS Sensitivity and Uncertainty Analysis System., Roussin, R.W.; Weisbin, C.R.; Lucius, J.L., 1981, OECD, France; ISBN 92-64-2118-3

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Etude de Perturbations Utilisant la Methode de Monte Carlo., Dejonghe, G.; Gonnord, J.; Nimal, J.C., 1981, OECD, France; ISBN 92-64-2118-3

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DUCKPOND - A Perturbation Monte Carlo and Its Applications., Hall, M.C.G., 1981, OECD, France; ISBN 92-64-2118-3

CONF-8010113, pp.221-235 (In French)
SAMPO: Un Systeme de Code pour les Analyses de Sensibilite et de Perturbation a Differents Ordres d'Approximation., Estiot, J.C.; Salvatores, M.; Palmiotti, G., 1981, OECD, France; ISBN 92-64-2118-3

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SENSIT: A Cross-Section and Design Sensitivity and Uncertainty Analysis Code., Gerstl, S.A.W., 1981, OECD, France; ISBN 92-64-2118-3, Previously announced as LA-8498-MS

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The ASPIS Iron Benchmark Experiment - Results and Calculational Model., Carter, M.D.; Chestnutt, M.M.; McCracken, A.K., 1981, OECD, France; ISBN 92-64-2118-3

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Progress Report on Shielding Experiments at YAYOI., Oka, Y.; An, S.; Hashikura, H.; Fukumoto, H.; Akiyama, M.; Miyasaka, S., 1981, OECD, France; ISBN 92-64-2118-3

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