RSIC Newsletter

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A rock pile ceases to be a rock pile the moment a man contemplates it, bearing within him the image of a cathedral.— Antoine.de.Saint-Exupéry

RSIC FY 1985 ACTIVITY REPORT

The following is a report of RSIC contributor/user statistics for fiscal year 1985 as compiled from the Automatic Data Entry System (ADES).

USER STATISTICS

Information dissemination activities for the fiscal year were as follows:

A total of 3144 separate letters/telephone calls (about 12.6 each working day) requesting a variety of products and services (8967 total) were processed. These activities, averaged over the total number of workdays in FY 1985, give an indication of a typical RSIC workday.

Activities/Working Day

4.2 Code/data packages shipped to requesters.

3.1 Shielding documents (RSIC reports, handbooks, code and data documents in addition to those included in above packages) mailed.

28.5 Responses to inquiries for information; citing possible solutions to problems; recommendations of calculational methods, computer codes, nuclear data sets, or literature for study; troubleshooting problems when requester had difficulties using RSIC materials; and miscellaneous consultation and advising services.

0.1 Special retrospective bibliographic searches.

35.9 Total separate activities required daily to satisfy the 3144 letters of request.

In addition to the above daily activities, the following special products or services were given during the fiscal year.

The *RSIC Newsletter* was mailed each month to a peak of 2034 people. Maintenance of the RSIC directory resulted in 727 changes.

Sixty-eight people (37 foreign, 31 domestic) came for an orientation visit and/or to use the Center's facilities.

INFORMATION INFLOW

Information collection, analysis, and processing activities continued routinely. Staff members reviewed 1091 reports and other documents, bringing the shielding data base to 13,250 bibliographic citations with abstracts and more than 6100 computer code descriptions. The RSIC data bases on the DOE/RECON system were subsequently updated. New books of special interest were reviewed and added to the reference library.

Technology Contributed

RSIC participants contributed their publications and 65 separate transmissions of technology as follows:

47 New computer programs and data libraries (33 USA; 14 foreign: 6 Japan; 2 Bulgaria; 2 France; and 1 each from Finland, The Netherlands, Austria, and Australia).

8 New hardware versions to extend existing code or data packages (7 USA; 1 France).

2 Updates for error corrections discovered in using existing code/data packages (USA).

8 Updates to replace, improve, and/or extend existing code/data packages (3 USA; 5 foreign: two each from Fed. Rep. of Germany and France and one from Switzerland).

Technology Processed

Announcement of availability was made for 87 transportable, tested packages of new or revised computer code systems and data libraries, including contributions from the previous fiscal year.

41 New code packages [21 USA; 20 foreign: 5 France; 5 Japan; 3 Taiwan (China); 2 Fed. Rep. of Germany; and 1 each from Brazil, Italy, Poland, South Africa, and Spain].

9 Updates to include new hardware versions converted from existing code packages (USA).

11 Replacement of existing code packages with newly frozen versions representing improvements made over that originally packaged (5 USA; 6 foreign: 3 France; 2 United Kingdom; and 1 Finland).

5 Updates to correct, improve, or extend existing data packages (USA).

21 Updates to correct, improve, or extend existing code packages (18 USA; 3 foreign: 1 each from France, Japan, and the United Kingdom).

It should be noted that the same evaluation, computer testing, and packaging must be followed for updates to existing code packages as for new technology.

We continue to give first priority to responding to user requests, and we process new information into transportable, tested code packages as feasible. We appreciate the continuing cooperation and collaboration of our contributors/users in seeking to keep pace with advances in the state of the art and with the international shielding community's efforts to ensure competence in shielding design and radiation protection.

RSIC BIDS ESIS ADDIO

The European Shielding Information Service (ESIS), established in 1972 at the Joint Research Centre (JRC)-Ispra Establishment, Italy, under sponsorship of the Commission of the European Communities (CEC), was discontinued July 1985 as a result of the reorientation of CEC-JRC programs. The service, led by *Rudolpho Nicks* through 1977 and by *Herbert Rief* (1977-85), was staffed by reactor physicists and other shielding experts.

The principal ESIS tasks dealt with studying efficient ways of confining ionizing radiation (from reactors, accelerators, spent fuel, and other sources) to keep population and occupational radiation exposure at safe levels. In this function ESIS contributed to the JRC's work on environmental protection and nuclear safety and to research programs in accident analysis, waste management, and safeguards. Over the years ESIS has dealt with a wide range of radiation protection problems, from basic questions of nuclear data assessment to licensing calculations for power reactor shields.

During the last five years ESIS efforts focused on nuclear data validation work performed as part of an internationally (OECD-NEARCP) coordinated benchmark program in a detailed experimental and theoretical analysis of neutron deep penetration properties in typical power reactor shield components.

ESIS considered technology transfer as a principal function. The support activities ranged from cooperation on acceleration shielding problems to the supervision of radiation streaming studies in a BWR. ESIS participated substantially in the promotion of a Standard European Reference Library on nuclear data used in radiation shielding calculations. The group developed a computer code for sensitivity analysis in complicated shield configurations (based on correlated tracking and differential operator sampling) and a simple but powerful method for minimizing gamma ray penetrations in multilayered shields. Another important part of technology transfer was covered by the quarterly *ESIS Newsletter,* a service initiated

in 1972 by R. Nicks and C. Ponti, who edited the first 20 issues. The following 30 newsletters and 7 special issues were published by H. W. M. Braun. The distribution included a peak of 900 subscribers in more than 60 countries. During its 13 years ESIS organized 6 European working group meetings at Zurich and three one-week shielding courses at Ispra attended by over a hundred scientists. ESIS served as a catalyst for shielding activities in Europe, promoting information transfer across linguistic and national barriers. At the same time it made the JRC-Ispra a focal point in the area of radiation protection research.

The RSIC leadership endorsed the ESIS concept from its beginnings, cooperated in areas of common interest, exchanged technical information, technology, and orientation visits of personnel. With its closing, we lose a technology resource. We hope, however, that we will be able to continue interaction with the experienced individuals, who, whatever tasks they undertake in the future, will never be far removed from participation in international efforts to shield against the harmful effects of ionizing radiation.

CHANGES TO THE COMPUTER CODE COLLECTION

During the month four changes were made to the computer code collection (CCC). Three existing code packages were updated to improve or correct the code system and one code package was extended with an additional hardware version, a contribution of Brazil.

CCC-203/MORSE-CG

The UNIVAC (A) and CDC (B) versions of this general purpose Monte Carlo multigroup neutron and gamma-ray transport code system were updated to remove the BREESE I routine. The IBM version (C) was not affected by this update. BREESE no longer exists in any version of CCC-203/MORSE-CG. If BREESE is needed, users should request PSR-143/BREESE II.

CCC-276/DOT 3.5

A Burroughs 6900 version of this two-dimensional discrete ordinates radiation transport code system was contributed by Seção de Engineering Nuclear, Rio de Janeiro, Brazil. This version has been designated (C) version of the package. FORTRAN IV; IBM (A), CDC (B), and Burroughs 6900 (C).

CCC-371/ORIGEN2

The documentation of the IBM version of this isotope generation and depletion code (matrix exponential method) was updated with information supplied by the Office of Nuclear Waste Isolation, Columbus, Ohio. When applied to the IBM version of the ORIGEN code system these changes allow execution on VAX hardware and upgrade the code to FORTRAN 77. Details of the changes may be requested from RSIC. Reference: ORNL/TM-7175.

PSR-155/DOGS

This collection of routines for the graphical display of calculated data generated by discrete ordinates codes was updated with material supplied by the code contributors, Oak Ridge National Laboratory (ORNL). Several transparent changes were made to the code and an error was corrected. The error should have caused gaps in the plot at boundaries where changes in I-sets occur. In the case of one I-set (fixed mesh), points along the top boundary (in the top two intervals) would be affected. Added features and details of changes made to the code may be requested from RSIC. Reference: ORNL/TM-7188. FORTRAN IV; IBM 360/370.

Shielding Standards News

The American National Standards Institute announced accreditation of the N13 Committee (Radiation Protection) effective August 27, 1985. The Health Physics Society is serving as secretariat of this standards committee.

The following newly-published standard may be ordered from ANS, 555 N. Kensington Ave., La Grange Park, IL 60525.

ANSI/ANS-6.4.2-1985 *Specification for Radiation Shielding Materials,* (new standard); $22. This standard sets forth the physical and nuclear properties that shall be reported by the supplier as appropriate for a particular application to form the basis for the selection of radiation shielding materials.

NCRP Publications

The National Council on Radiation Protection and Measurements announced the publication of five new documents. A brief summary of each follows.

NCRP Proc. No. 6, *Some Issues Important in Developing Basic Radiation Protection Recommendations,* is the proceedings of the 20th Annual Meeting of the NCRP held in April 1984. It includes the 8th Lauriston S. Taylor Lecture, "Limitation and Assessment in Radiation Protection" by Harald H. Rossi, as well as presentations on human risk assessment, absolute and relative time-response models in risk estimation, genetic impact of low-level radiation, and non-stochastic effects. Brief presentations on the work of five NCRP committees are also included.

NCRP Report No. 82, *SI Units in Radiation Protection and Measurements,* presents the case for gradual adoption of the international system (SI) of quantities and units over a five-year period. The background and structure of SI units is discussed including base units, supplementary units, derived units, and some special categories of units. The meaning of coherence, an advantage of the SI, and the use of prefixes are explained. Relationships between conventional and SI units for some quantities used in radiation measurements are discussed and examples are given of calculations in both units.

NCRP Report No. 83, *The Experimental Basis for Absorbed-Dose Calculations in Medical Uses of Radionuclides,* reviews the methods used to estimate absorbed dose to humans from internally deposited radionuclides. The results of direct measurements and calculations based on mathematical models used to estimate the parameters in dose calculations are compared. The report gives a brief history of internal radiation dosimetry and discusses the physical parameters of transport calculations used in dosimetry. Techniques used to measure the activity distribution in humans and the factors to be considered in making *in vivo* absorbed-dose measurements are discussed. The report includes comparisons of measured and calculated absorbed-dose values in phantoms, animals, and humans. A formalism that can be used to quantify the radioactivity of irregular geometric shapes using an external measurement technique is included in an appendix.

NCRP Report No. 84, *General Concepts for the Dosimetry of Internally Deposited Radionuclides,* reviews the primary concepts related to protection from internal emitters. An evaluation and recommendation is presented for each concept reviewed which include dose equivalent, effective absorbed energy and specific effective energy, intake patterns, committed dose equivalent, dose equivalent commitment and population dose, the critical organ concept and effective committed dose equivalent, and stochastic and non-stochastic effects. The forms of expression of internal emitter standards are considered and evaluated. Deposition, metabolism, and anatomic models for reference man, respiratory tract, gastrointestinal tract, bone, excretion, and dose from submersion in a radioactive cloud which form the basis for an internal dose calculation system are evaluated.

Lauriston S. Taylor Lecture No. 9, *Truth (and Beauty) in Radiation Measurements* by John H. Harley, is the ninth in a series of lectures which honors Lauriston S. Taylor, former president of the NCRP. Dr. Harley emphasizes the quality assurance aspects of radiation measurement. After stressing the difficulties of validating measurements employed for assessing occupational exposures in early atomic plants, he treats the problems encountered with the accurate measurement of low levels of widely dispersed fallout from weapons tests. He also discusses the validation of measurement of natural radiation and the quality assurance in the assessment of environmental

plutonium and background gamma radiation. The lecture will also be published in the proceedings of the 1985 annual meeting.

PERSONAL ITEMS

In serving a specialized area of scientific endeavor, it seems important that we take note of the movement of people concerned with radiation protection, transport, and shielding in the nuclear industry. We, therefore, continue to carry personal items as they are brought to our attention. During the past month we have been informed of the following changes.

Agnes S. Heller has joined the new Roanoke office of Evaluation Research Corp. (ERC) as a senior analyst after ten years as a statistician with Babcock and Wilcox. Headquartered in Vienna, Virginia, ERC is an engineering services company known for statistical process and quality control, and reliability analysis.

Visitors to RSIC

During October the following persons came to visit/use RSIC facilities: *K. S. Rao,* National Oceanic & Atmospheric Administration, Oak Ridge, Tenn.; *M. Singh,* Indian Institute of Technology, New Delhi; *Jack Courtney,* Louisiana State University, Baton Rouge; *Dermott E. Cullen,* International Atomic Energy Agency, Vienna; and *V. Keshishian,* Rockwell International, Canoga Park, California.

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.

EGS4 Course Planned

The National Research Council of Canada has announced a course on "Radiation Transport Calculations Using EGS4," to be held February 17–20, 1986, in Ottawa. The course will cover the fundamentals of the simulation of coupled electron-photon transport using Monte Carlo techniques and will give an introduction to the use of the EGS4 code system. The code system is a general purpose system for doing transport simulations for energies in the range 10 keV to 20 GeV. Hands-on experience will be gained using a VAX computer. Applications will be discussed with emphasis on radiation dosimetry and medical physics problems. The tuition is $750 (Canadian). Registration is required by January 17, 1986. There will be a maximum of 24 students. For further information contact David W. O. Rogers, Ionizing Radiation Standards, Natl. Res. Council of Canada, Ottawa, Ont. K1A OR6 Canada (phone 613-993-2715).

Calendar

Your attention is directed to the following additional events of interest to the radiation shielding and protection community.

December 1985

Technical Committee on Computer Codes in Fusion Research, Dec. 3–5, 1985, Lausanne, Switzerland, sponsored by the International Atomic Energy Agency. Contact: M. Leiser, Head, Physics Section, Division of Research and Laboratories, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

January 1986

3rd Symposium on Space Nuclear Power Systems, Jan. 13–16, 1986, in Albuquerque, New Mexico, sponsored by the Institute for Space Nuclear Power Studies, Chemical/Nuclear Engineering Department, University of New Mexico. Contact: Institute for Space Nuclear Studies, Chemical/Nuclear Engr. Dept., Univ. of New Mexico, Albuquerque, NM 87131.

February 1986

Health Physics Considerations in Decontamination and Decommissioning, 19th midyear topical symposium, Feb. 2–6, 1986, Knoxville, Tenn., sponsored by the Health Physics Society. Contact: T. W. Oakes, P.O. Box 30503, Knoxville, TN 37930-0503 (phone 615-574-6670).

Workshop on Applications in Nuclear Data and Reactor Physics, Feb. 17–Mar. 21, 1986, Miramare, Trieste, Italy, sponsored by the International Centre for Theoretical Physics. Contact: International Comm. for Theoretical Physics, Workshop on Appl. for Nucl. Data and Reactor Physics, P.O. Box 586, I-34100 Trieste, Italy (phone 040-224281-6).

National Symposium on Atomic Energy, Feb. 24–25, 1986, Tokyo, sponsored by the Atomic Energy Society of Japan. Contact: Minoru Masamoto, Atomic Energy Soc. of Japan, No. 1-13, 1-Chome, Shimbashi, Minato-ku, Tokyo 105, Japan (phone 03-508-1261).

March 1986

Waste Management '86, Mar. 2–6, 1986, Tucson, Arizona, sponsored by the Univ. of Arizona. Contact: Roy Post, Editor-NT, Univ. of Arizona, Nucl. Engr. Dept., Tucson, AZ 85721 (phone 602-621-6158).

China Energy '86, Mar. 18–22, 1986, Tinajin, People's Republic of China. Contact: Aideen Barrett, Industrial & Trade Fairs International Ltd., Radcliffe House, Blenheim Court, Solihull, West Midlands B91, 2BG, England (phone 011-021-705-6707).

33rd International Electronics, Energy and Space Exposition, Mar. 18–23, 1986, Rome. Contact: RIENA Secretariat, via Crescenzio, 9-00193 Rome, Italy (phone 06-656.93.43).

April 1986

2nd International Conference on Fusion Reactor Materials, (ICFRM-2), Apr. 13–17, 1986, Chicago, Illinois, sponsored by the U.S. Dept. of Energy, American Nuclear Society (ANS), Argonne National Laboratory, and Nuclear Metallurgy Committee of TMS/AIME and ASM. Contact: Dale Smith, Fusion Power Program, Argonne Natl. Lab., Bldg. 205, 9700 S. Cass Ave., Argonne, IL 60439, or A. Rowcliffe, ORNL, Metals and Ceramics Div., P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-5057).

12th Personnel Dosimetry Intercomparison Study, Apr. 14–18, 1986, Oak Ridge, Tenn., sponsored by ORNL. Contact: C. S. Sims, ORNL, Bldg. 7710, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-5851).

May 1986

Conference on the Science and Technology of Fast Reactor Safety, May 12–16, 1986, Channel Islands, U. K. Contact: Inst. of Civil Engineers, Conference Office, 1-7 Great George St., London SWIP 3AA.

June 1986

4th European Nuclear Conference (ENC-86), June 1–6, 1986, sponsored by the European Nuclear Society. Contact: Dr. Peter Bucher, ENC-4 Conference Secretary, ENS, P.O. Box 2613, CH-3001 Berne, Switzerland.

ANS Annual Meeting, June 15–20, 1986, Reno, Nevada. Contact: D. G. Pettengill, ANS, 555 N. Kensington Ave., La Grange Park, IL 60535 (phone 312-352-6611 ext. 257).

July 1986

23rd International Conference on High-Energy Physics, July 16–23, 1986, Berkeley, California. Contact: S. C. Loken, 50-137 Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720.

23rd Annual Conference on Nuclear and Space Radiation Effects, July 20–23, 1986, Providence, Rhode Island, sponsored by the Nuclear and Plasma Sciences Society and the Inst. of Electrical and Electronics Engineers. Contact: Sandra Grawet, Science Applications International Corp., 2615 Pacific Coast Highway, Hermosa Beach, CA 90254 (phone 213-318-2611).

August 1986

Criticality Accident Dosimetry Training Course, Aug. 11-15, 1986, Oak Ridge, Tenn., sponsored by ORNL. Contact: C. S. Sims, ORNL, Bldg. 7710, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-5851).

International Nuclear Physics Conference, August 25–30, 1986. Contact: Inst. of Physics, 47 Belgrave Square, London SWIX 8QX (phone 01-235-6111).

8th International Conference on Solid State Dosimetry Aug. 26–29, 1986, St. Catherine's College, Oxford, organized by the National Radiological Protection Board, U.K. Contact: Miss L. Ashby, National Radiological Protection Board, Chilton, Didcot, Oxfordshire, U.K.

September 1986

International Conference on Nuclear and Radiochemistry, Sept. 1–5, 1986, Beijing, sponsored by the Chinese Nuclear Society and Chinese Chemical Society. Contact: Prof. Liu Yuanfang, Dept. of Technical Physics, Beijing Univ., Beijing, People's Republic of China.

International Conference on Radioactive Waste Management, Sept. 7–12, 1986, Winnipeg, Manitoba, Canada, sponsored by the Canadian Nuclear Society and ANS. Contact: Dr. T. S. Drolet, CFFTP, 2700 Lakeshore Rd. West, Mississauga, Ontario, Canada L5J 1K3 (phone 416-823-6654).

Conference on the Treatment and Containment of Radioactive Wastes and Disposal in Arid Environments (Radwaste '86), Sept. 7–13, 1986, sponsored by Atomic Energy Corp. of South Africa, Electricity Supply Commission of South Africa, and Nuclear Development Corp. of South Africa. Contact: Radwaste Conf. Secretariat, NUCOR, Private Bag X256, Pretoria 0001, South Africa (phone 27-12-21-3311 ext. 677).

Advances in Reactor Physics and Safety Meeting, Sept. 17–19, 1986, sponsored by ANS. Contact: Norman C. Francis, Knolls Atomic Power Lab., River Road, Schenectady, NY 12301, or Donald R. Harris, Rensselaer Polytechnic Inst., Troy, NY (phone 518-270-6407).

November 1986

ANS and Atomic Industrial Forum Joint Meeting, Nov. 16–21, 1986, Washington, D. C. Contact: D. G. Pettengill, ANS, 555 N. Kensington Ave., La Grange Park, IL 60535 (phone 312-352-6611 ext. 257).

OCTOBER 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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EPRI-NP-4037, . . *Radionuclide Correlations in Low-Level Radwaste.,* . . Best, W.T.; Miller, A.D., . . June 1985, . . Research Reports Center, Box 50490, Palo Alto, CA 94303

IAEA-TECDOC-335, . . *Nuclear Standard Reference Data.,* . . IAEA, . . June 1985, . . International Atomic Energy Agency, Vienna, . . Proceedings of an Advisory Group Meeting on Nuclear Standard Reference Data, Geel, Belgium, 12-16 November 1984.

JAERI-M-85-101; NEANDC(J)-114/U; INDC(JPN)-100/L, . . *Evaluation of Neutron Nuclear Data of Natural Nickel and Its Isotopes for JENDL-2.,* . . Kikuchi, Y.; Sekine, N., . . July 1985, . . Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan

JAERI-M-85-138; NEANDC(J)-115/U; INDC(JPN)-101/L, . . *Evaluation of Neutron Nuclear Data for 249-Bk and 249-Cf.,* . . Kikuchi, Y.; Nakagawa, T., . . September 1985, . . Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan

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ORNL/TM-9616, . . *Survey of Physical Property Data for Several Alloys.,* . . Pawel, R.E.; Williams, R.K., . . August 1985, . . NTIS, PC A03/MF A01

ORNL/TM-9642, . . *Applications Guide to the RSIC-Distributed Version of the KENO-V Code.,* . . Cramer, S.N., . . September 1985, . . NTIS, PC A03/MF A01

ORNL/TM-9644, . . *Irradiation Capsule for Testing Magnetic Fusion Reactor First-Wall Materials at 60 and 200 Degrees C.,* . . Conlin, J.A., . . August 1985, . . NTIS, PC A03/MF A01

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ORNL/TM-9771, . . *An Automated Procedure for Calculating Time-Dependent Sensitivities in ORIGEN2.,* . . Worley, B.A.; Wright, R.Q., . . October 1985, . . NTIS, PC A03/MF A01

Fusion Technology, 8(1), Pt.2(A), 177-1048 and 2(B), 1049-1919; CONF-850310, Pt.2A, pp.177-1048 and 2(B), pp.1049-1919, . . *Version: Breakeven and Beyond.,* . . Henning, C. (Ch.), . . Proceedings of the Sixth Topical Meeting on the Technology of Fusion Energy (San Francisco, California, March 3-7, 1985)., . . July 1985, . . American Nuclear Society, 555 N. Kensington Ave., La Grange Park, Illinois 60525

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Fusion Technology, 8(1), Pt.2A, 491-500; CONF-850310, Pt.2A, pp.491-500, . . *Status of Fusion Reactor Blanket Evaluation Studies in France.,* . . Carre, F.; Chevereau, G.; Gervaise, F.; Proust, E., . . July 1985, . . American Nuclear Society, 555 N. Kensington Ave., La Grange Park, Illinois 60525

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