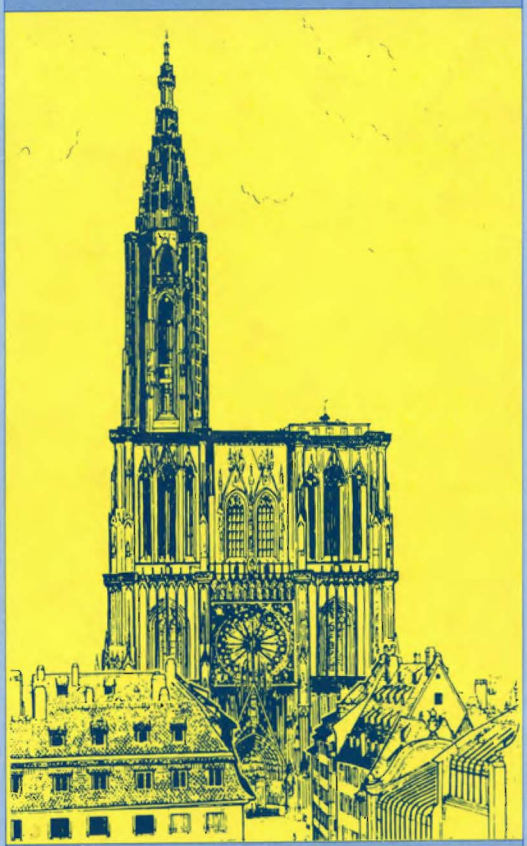
PROCEEDINGS OF THE

Seventh ASTM-EURATOM Symposium on Reactor Dosimetry

STRASBOURG, FRANCE
27-31 AUGUST 1990



Kluwer Academic Publishers

PROCEEDINGS OF THE

Seventh ASTM-EURATOM Symposium on Reactor Dosimetry

STRASBOURG, FRANCE
27-31 AUGUST 1990

edited by

G. TSOTRIDIS
Commission of the European Communities,
Joint Research Centre, Institute for Advanced Materials, Petten, The Netherlands

R. DIERCKX
Commission of the European Communities,
Joint Research Centre, Institute for Safety Technology, Ispra, Italy

P. D'HONDT
SCK/CEN, Mol, Belgium

KLUWER ACADEMIC PUBLISHERS
DORDRECHT / BOSTON / LONDON

Library of Congress Cataloging-in-Publication Data

ASTM-Euratom Symposium on Reactor Dosimetry (7th : 1990 : Strasbourg, France)
Proceedings of the Seventh ASTM-Euratom Symposium on Reactor Dosimetry, Strasbourg, France, 27-31 August 1990 / edited by G. Tsotridis, R. Dierckx, P. d'Hondt.
p. cm.
English and French.
Includes index.
ISBN 0-7923-1792-0 (alk. paper)
1. Nuclear reactors--Materials--Effect of radiation on--Congresses. 2. Radiation dosimetry--Congresses. I. Tsotridis, G. II. Dierckx, R. III. Hondt, P. d'. IV. Title. V. Title: Proceedings of the 7th ASTM-Euratom Symposium on Reactor Dosimetry, Strasbourg, France, 27-31 August 1990.
TK9185.A1A88 1990
621.48'33--dc20 92-15198

ISBN 0-7923-1792-0

Publication arrangements by
Commission of the European Communities
Directorate-General Telecommunications, Information Industries and Innovation,
Dissemination of Scientific and Technical Knowledge Unit, Luxembourg

EUR 14356 EN

Published by Kluwer Academic Publishers,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

Kluwer Academic Publishers incorporates the publishing programmes of
D. Reidel, Martinus Nijhoff, Dr W. Junk and MTP Press.

Sold and distributed in the U.S.A. and Canada
by Kluwer Academic Publishers,
101 Philip Drive, Norwell, MA 02061, U.S.A.

In all other countries, sold and distributed
by Kluwer Academic Publishers Group,
P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

Printed on acid-free paper

Printed in the Netherlands

PREFACE

THE EURATOM WORKING GROUP ON REACTOR DOSIMETRY AND THE ASTM-EURATOM SYMPOSIA

The Euratom Working Group on Reactor Dosimetry (EWGRD) started around 1960 with members having been nominated by the governments, from each European laboratory working in reactor physics and technology. The goal was to exchange directly experience and know-how in reactor dosimetry and related programmes.

A need for normalisation was felt in order to guarantee that: the same nuclear data is used; measurements in different laboratories give the same results (need for intercalibration experiments and standards); results are expressed such that a comparison with results from other laboratories is possible.
In sub-groups, specific arguments were discussed resulting in final recommendations. These final recommendations were then discussed in a plenary meeting and accepted as a recommendation for European usage. Several of these recommendations were published, e.g. radiation damage dosimetry guidebooks, and a nuclear data guidebook. Also a programme, executed by the BCMN GEEL, for the production and selling of Reference Materials for Neutron Dosimetry is sponsored by the EWGRD. Workshops in the field of radiation damage and on the pressure vessel steels programme in Europe were successfully organised.

The group works in close contact with ASTM (American Society for Testing of Materials). Altogether seven symposia were jointly organized, and held, alternatively in Europe and USA. The next symposium, the eighth, will be organized by ASTM in 1993 in the USA.

The first ASTM-Euratom symposium, which took place in 1975 at the Joint Research Centre, Petten, the Netherlands, generally defined the status of neutron dosimetry and damage analysis programs and identified the needs of the emerging nuclear industry. The second symposium, hosted in 1977 by the Electric Power Research Institute, Palo Alto, California, emphasized data and techniques used to characterize neutron and gamma ray environments , including the use of well-characterized benchmark studies. The third meeting, which took place in 1979 at the Joint Research Centre, Ispra, Italy, focussed on the interactions between materials experts and dosimetry metrologists. The thrust of the next two symposia, which were held in 1982 at the National Bureau of Standards, Washington, D.C., and in 1984 at the GKSS Research Centre, Geesthacht, Federal Republic of Germany, was on radiation metrology techniques, data bases, damage correlations analysis, and standardization.

However, a growing number of the papers and discussions were concerned with reactor pressure vessel surveillance techniques and correlations of the resulting data, thus reflecting a progression from test reactor research to applications in a maturing power reactor industry. The sixth symposium, held in 1987 at Jackson Hole USA, was designed to provide and update the complete field of reactor physics and dosimetry. This present and seventh symposium was held in Strasbourg, France. As in the sixth symposium benchmarking to standardize physics dosimetry and materials was a major topic. There was much interest in light water reactor pressure vessel surveillance work and in Plant life extension work. Several papers reported on the results of multi-national joint research projects designed to improve the accuracy of pressure vessel dosimetry and materials property trend curves by performing interrelated experiments in a number of well-characterized neutron fields.

R. Dierckx
Commission of the European Communities
Joint Research Centre
Institute for Safety Technology
Ispra, Italy

G. Tsotridis
Commission of the European Communities
Joint Research Centre
Institute for Advanced Materials
Petten, The Netherlands

ORGANIZATION OF THE
7th ASTM-EURATOM SYMPOSIUM ON REACTOR DOSIMETRY

SPONSORED BY:

Commission of the European Communities
Institute for Advanced Materials

and the

ASTM Committee E-10 on Nuclear Technology and Applications

Co-SPONSORS:

U.S. National Institute of Standars and Technology

U.S. Nuclear Regulatory Commission

U.S. Department of Energy

U.S. Electric Power Research Institute

American Society of Mechanical Engineers

American Nuclear Society

IN COOPERATION WITH:

International Atomic Energy Agency

Council of Europe (European Networks of Scientific Cooperation)

Centre de Recherches Nucleaires de Strasbourg

ACKNOWLEDGEMENTS

This symposium was part of the efforts and support of many individuals and organizations from all parts of the world, and it would be difficult to name everyone who contributed to the Symposium's success.

Special recognition should be given to Mrs. M. Cobut and Mrs. Debeauvais, Centre de Recherche Nucleaire - CRN, Strasbourg, for their support in organizing the Symposium.

CHAIRMEN OF THE 7th ASTM-EURATOM SYMPOSIUM COMMITTEE

EURATOM Co-Chairman:	**R. Dierckx** Commission of the European Communities Joint Research Centre, ISPRA Italy
ASTM Co-Chairman:	**W.N. McElroy** Consultants and Technical Services Richland, WA

EURATOM PROGRAMME COMMITTEE

Chairman:	**R. Dierckx** JRC, Ispra, Italy
Scientific Secretary:	**G. Tsotridis** JRC, Petten, The Netherlands
Members:	**A. Alberman** CEN Saclay, France
	W.G. Alberts PTB, Braunschweig, Federal Republic of Germany
	P. D'hondt CEN/SCK Laboratories, Belgium
	A.J. Fudge AERE, Harwell, UK
	F. Hegedüs PSI, Würenlingen, Switzerland
	M. Petilli ENEA, Casaccia, Italy
	H.J. Nolthenius ECN, Petten, The Netherlands

ASTM SYMPOSIUM COMMITTEE

Executive Chairman:	**W.N. McElroy** Consultants and Technical Services Richland, Washington
General Chairman:	**H. Farrar IV** Rockwell, Los Angeles, California
Vice-Chairman:	**F.H. Ruddy** Westinghouse, Pittsburgh, Pennsylvania
Program Chairman:	**E.P. Lippincott** Westinghouse, Pittsburgh, Pennsylvania
Program Vice-Chairman:	**J.G. Williams** University of Illinois, Urbana, Illinois
Scientific Secretary:	**D.W. Vehar** Sandia, Alburquerque, New Mexico
Members:	**S.L. Anderson** Westinghouse, Pittsburgh, Pennsylvania **L.R. Greenwood** Battelle Northwest Lab., Richland, Washington **F.B.K. Kam** Oak Ridge National Laboratory, Oak Ridge, Tennessee **G.P. Lamaze** NIST, Gaithersburg, Maryland **A.L. Lowe** Babcock & Wilcox, Lynchburg, Virginia **G.C. Martin** General Electric, Pleasanton, California **E.D. McGarry** NIST, Gaithersburg, Maryland **M. Nakazawa** University of Tokyo, Tokyo, Japan **J.W. Rogers** EG & G, Idaho Falls, Idaho **W.L. Server** Tenera (EPRI), Berkeley, California **F.W. Stallmann** Martin Marietta Engineering Systems, Oak Ridge, Tennessee **A. Taboada** NRC, Washington, DC **J.J. Wagschal** Hebrew University, Jerusalem, Israel

LIST OF CONTENTS

PREFACE V

ORGANIZATION OF THE 7th ASTM-EURATOM SYMPOSIUM ON REACTOR DOSIMETRY VII

REACTOR LIFE ASSESSMENT

Surveillance for Life Attainment and License Renewal 3
S.T. BYRNE and W.L.SERVER

Magnox Reactor Pressure Vessel Dosimetry. - A New Assessment 13
P.J.H. HEFFER, L.T. JONES, D.A. THORNTON, A.F. AVERY, N.R. SMITH AND A.K. ZIVER

A Comparison of Fracture Toughness Data on a Pressure Vessel With the ASME KIR Curve 21
M.P. MANAHAN Sr.

Etude de l'Influence du Spectre Neutronique sur la Fragilisation des Aciers de Cuve de Reacteurs a Eau Pressurisee 31
A. ALBERMAN, D. BERETZ, L. BOURDET, F. HEDIN, C. RIEG AND P. SOULAT

Power Reactor Embrittlement Data Base 41
F.B.K. KAM, F.W. STALLMANN AND J.A. WANG

LIGHT WATER REACTOR SURVEILLANCE

An Analysis of the H.B. Robinson Unit 2 PWR using the Monte-Carlo Code McBEND 53
S.W. POWER

Analysis of Pressure Vessel Cavity and Surveillance Capsule Dosimetry from a Two Loop PWR 63
I. REMEC and M. NAJZER

Mesures Spéciales en REP: Saint-Laurent B1 73
R. LLORET, A. BEVILACQUA, F. HEDIN, AND C. RIEG

Effect of Axial Flux Density Variations on the Determination of Neutron Fluences for LWR-PV Dosimetry 83
H.C. MEHNER

Accuracy Determination in Neutron Flux Density Monitoring 91
B. OSMERA, AND V. STEPANEK

Pressure Vessel Neutron Dosimetry at Arkansas Nuclear One, Past, Present and Future 97
S.C. APPLE, L.M. HODGSON, R.R. CULP, C.O. COGBURN AND J.N. MILLER

ASTM Standards in Support of Codes and Regulations Associated with LWR Power Plant Licensing, Operation and Surveillance 105
W.N. McELROY, P.D. HEDGECOCK, E.P. LIPPINCOTT AND A.L. LOWE Jr.

Contribution of the VENUS-Engineering Mock-up Experiment to the LWR-PV Surveillance 115
P. D'HONDT, A. FABRY, G. MINSART, H. AIT ABDERRAHIM, L. LEENDERS, R. MENIL, S. de LEEUW, G. DE LEEUW-GIERTS, F.B.K. KAM, R.E. MAERKER, E.D. McGARRY AND W.N. McELROY

Benchmark Field Study of Deep Neutron Penetration 125
R. GOLD, J.H. ROBERTS, C.C. PRESTON, J.F. MORGAN AND K. SALE

Analysis of Pressure Vessel Cavity and Surveillance Capsule Dosimetry from a two Loop PWR 135
I. REMEC, M. NAJZER

Surveillance Neutron Dosimetry and Cavity Neutron Flux Monitoring at Czechoslovak VVER-440 Power Reactors 145
B. OSMERA AND M. HOLMAN

Reactor Vessel Fluence Monitoring and Reduction 153
E.P. LIPPINCOTT AND S.L. ANDERSON

Determination des Caracteristiques Neutroniques du Programme de **Surveillance des Tranches Francaises-REP de 900 MWe** 161
J.C. NIMAL, L. BOURDET, T. VERGNAUD, R. LLORET, A. BÉVILACQUA, F. HÉDIN AND J.C. LEFEBVRE

Calculation and Measurement of Neutron Flux Distributions at the WWER-440 Pressure Vessel 171
H.C. MEHNER, H.U. BARZ, B. BÖHMER, U. HAGEMANN AND I. STEPHAN

An Improved Method for Monitoring Neutron Dose on PWR Vessel Steel by Flux Spectrum Measurement with a Few Nonfissionable Foils 179
LI ZHAOHUAN, W. YONGQING AND LI AIN

B&W Reactor Dosimetry Programs 187
L. PETRUSHA AND J.F WALTERS

Determination of the Doses Absorbed by the Chooz a PWR Vessel. Summary and Conclusions of Investigations 197
R. LLORET, A. BÉVILACQUA, J.J. BONNIN, J.C. NIMAL, L. BOURDET, F. HÉDIN AND J.C. GUILLERET

Comparison of Fast Fluences Determined via Fe-, Nb-, and ThO - Detectors with Theoretical Values for Several Irradiation Positions in BWR and PWR 205
E. POLKE

COMPUTER CODES AND METHODS

Experiences from an International Unfolding Intercomparison with Bonner Spheres 215
A.V. ALEVRA, M. MATZKE, AND B.R.L. SIEBERT

Bayesian Unfolding of Pulse-Height Spectra 223
M. TICHY

Multiple Scattering Resonance Self-Shielding Factors in Wires 231
M. DO CARMO LOPES AND J.M. AVILA

PC Programs for the Conversion of Neutron Spectra and Cross Sections Between Different Group and Point Representations 239
T. SERÉN

On the Importance of Neutron Self Shielding in Activation Detectors and the Influence of Covers Around the Detectors 247
C. ERTEK

Measurement of Neutron Spectra at KUR and SPR, by Multi-Foil Activation Methods 255
K. KOBAYASHI, I. KIMURA, LI ZHAOHUAN AND WANG YONGQING

The U Fission Neutron Spectrum Udjusted with Multi-Foil Activation Data 263
K. KOBAYASHI, I. KIMURA, Li ZHAOHUAN, AND WANG YONGQING

Adjusted Spectra for Three GODIVA Type Reactors 271
W.W. SALLÉE

Neutron Flux Calculations on Fast Breeder Reactors with the Programme DLS 281
Kl. MULLER AND U. QUADE

Uses and Abuses of Adjustment. A Critical Review of Common Practice 291
J.J. WAGSCHAL AND Y. YEIVIN

Reference Data File for Neutron Spectrum Adjustment and Related Radiation Damage Calculations 299
E.M. ZSOLNAY, H.J. NOLTHENIUS, L.R. GREENWOOD AND E.J. SZONDI

Uncertainties in Damage Prediction - Comparison of two Methods 307
M. MATZKE AND J. KOBAN

The "MACH-1" Code for Coupled Neutron, Photon and Electron Transport by the MONTE CARLO Method 315
F. CLERI AND G.K. VOYCOV

Parameter and Fluence-Rate Covariances in Lepricon 323
R.E. MAERKER

Experiences with Nb Dosimeters for Neutron Flux Measurements 331
B. BÄRS AND K. UUSHEIMO

NUCLEAR DATA

Nuclear Model Calculation of Dosimetry Reactions on Nb 341
N. ODANO, S. IWASAKI AND K. SUGIYAMA

Improvements in ENDF/B-VI Iron and Possible Impacts on Pressure Vessel Surveillance Dosimetry 349
C.Y. FU, D.M. HETRICK, C.M. PEREY, F.G. PEREY, N.M. LARSON AND D.C. LARSON

International Reactor Dosimetry File (IRDF-90) Status and Testing 357
N.P. KOCHEROV AND H.K. VONACH

Measurement of the Isotopic Abundance of Fe in Natural Iron by Means of Neutron Activation 363
B. BÄRS AND T. SERÉN

Measurement of the Nb(n,2n) Nb Cross Section in a U Fission Spectrum 371
T.G. WILLIAMSON AND G.P. LAMAZE

Transmission of Neutrons of 20 keV to 1 MeV through Iron 377
M. MATZKE, K. KNAUF, E. DIETZ, A. PLEWNIA AND W.G. ALBERTS

Radiometric Measurement of Cumulative Mass Chain Fission Yields for Uranium-235 and Plutonium-239 from Hard Fast Reactor Core Spectrum to Reflector/Blanket Degraded Neutron Spectra 385
M. ANGELONE, P. D'HONDT AND A. FABRY

Accurate Calculations of Neutron Kerma and Damage From ENDF/B-VI Evaluations for Silicon, Chromium, Iron and Nickel, and Comparison with ENDF/B-V Results 393
D.C. LARSON, D.M. HETRICK, C.Y. FU, S.J. EPPERSON AND R.E. MACFARLANE

Isotopic Abundance in Natural Iron 403
P. WILLE AND R. JEDE

FUSION

Nuclear Data Needs for Fusion Programs 413
E.T. CHENG

Measurement of Average Cross Sections for Several Dosimetry Reactions in a Thick Target Li (d,n) Neutron Field 421
J.R. DUMAIS, S. IWASAKI, S. TANAKA, N. ODANO AND K. SUGIYAMA

Study of Neutron Diagnostics for the Compact Tokamak Ignitor 429
J. KÄLLNE, P. BATISTONI, B. COPPI, R. DIERCKX, G. GORINI, M. MARTONE, L. PERASSO AND S. ROLLET

Measurements of Activation Cross Sections for Fusion Reactor Applications 437
L.R. GREENWOOD AND D.L. BOWERS

Microscopic Integral Cross Section Measurements in the Be(d,n) Neutron Spectrum for Applications in Neutron Dosimetry, Radiation Damage and the Production of Long-lived Radionuclides 445
D.L. SMITH, J.W. MEADOWS AND L.R. GREENWOOD

Status of Radiation Damage Evaluation in Fusion Materials Irradiation Experiments 453
A. ALBERMAN, H. NOLTHENIUS AND W. VOORBRAAK

RADIATION FIELDS CHARACTERISTICS

Determination of High Energy Neutron Flux (E > 10 MeV) in Two Light Water Reactors 463
J.J. BONNIN

Present State of Neutron Metrology in the High Flux Reactor 471
A.N. POLLE

High Dose High Temperature Dosimetry Using Radiothermoluminescent Materials 483
C. HICKMAN, J. BARTHE AND G. PORTAL

Thermal Dynamics of Calorimeter Systems 491
J.A. MASON, N. BAINBRIDGE AND P.J.H. HEFFER

Intercomparison of Gamma-Ray Dose Rate Measurement Techniques and Calculation Results for Several Benchmark Radiation Fields 499
H. AIT ABDERRAHIM, R. MENIL AND H. GEENS

Neutron and Gamma Calculations for Future Irradiation Devices in the BR2 Materials Testing Reactor 507
Ch. DE RAEDT

Neutron Spectrum Studies in the ATR 517
JW ROGERS, R.A. ANDERL AND M.H. PUTNAM

Assessment of the Fast Neutron Sensitivity of Thermoluminescent Gamma Dosimeters 529
H. AIT ABDERRAHIM, E.D. McGARRY AND V. SPIEGEL

Photofission Effects in B&W 177-FA Reactor Vessel Surveillance Capsule Dosimeters 537
L. PETRUSHA

Comparison of the Calculated to Measured Values of the Integrated Gamma Dose in the Cavity of a Full-Scale Operating Power Reactor 547
S.Q. KING AND D.M. GILLIAM

Reaction Rates Observed in a Mixed Plutonium-Uranium Solution Critical Assembly 557
R. GOLD, C.C. PRESTON, J.H. ROBERTS, N. FUKUMURA AND T. KOYAMA

Characterization of Gamma and Neutron Radiation Fields at Power Reactors in the U.S. 567
GWR. ENDRES, R.I. SCHERPELZ, L.W. BRACKENBUSH, K.L. SOLDAT, J.E. TANNER AND D.L. HAGGARD

Calculated Neutron Spectra of Fast Pulsed Reactors 575
T.M. FLANDRES AND M.H. SPARKS

Effects of Spectral Perturbation on Calculated Damage Coefficients 583
M.H. SPARKS AND T.M. FLANDERS

Dosimetry in Neutron and Gamma Environment Issued From the Fast Burst "CALIBAN" Reactor 591
J. DORLET, M. FOURGOUX, J.C. JAUREGUY, G. LEDANOIS, J. MORIN, J.C. NIMAL AND P. ZYROMSKI,

The Advanced Neutron Source Reactor: An Overview 599
C.D. WEST

Calculation and Measurement of Neutron and Gamma-Ray Fluxes in and Around Reactors 611
Y. SAKURAI, S. FUJIHARA, I. KIMURA, K. KOBAYASHI, S. SHIROYA AND K. KANDA

Simulation Fidelity in Reactor Irradiation of Electronics 619
T.F. LUERA, P.J. GRIFFIN, J.G. KELLY AND M.S. LAZO

BENCHMARKS

Analysis of the VENUS-3 Experiments 627
R.E. MAERKER, P. D'HONDT, L. LEENDERS AND A. FABRY

Benchmark Experiments with 14 MeV Neutrons Transmitted Through Pb, Fe, Ni and Al 635
M. TICHY, M. KRALIK, J. PULPAN AND T. NOVOTNY

Interpretation of PWR Vessel Fluence Benchmarks Coupled Neutrons-Gamma transport 643
T. VERGNAUD, J.C. NIMAL AND S. H. ZHENG

Dosimetry Techniques and Methods used to obtain Reactor Cavity Dosimetry Benchmark Data for Vessel Fluence Analysis at Davis-Besse I 651
G.S. CARTER

Calibration and Intercomparison Efforts for Neutron Fluence Monitoring 661
D.W. VEHAR

Effect of ENDF/B-VI Cross Sections on Neutron Dosimetry 669
P.J. GRIFFIN, J.G. KELLY AND T.F. LUERA

Learnings from a Joint Italian-Belgian Neutronic Characterization of the Tapiro Source Reactor 677
A. FABRY, H. AIT ABDERRAHIM, P. D'HONDT, S. DE LEEUW, G. DE LEEUW-GIERTS, G. MINSART, M. CARTA, P. MOIOLI AND M. ANGELONE

DAMAGE CORRELATIONS

Gamma-Ray Induced Displacements in D O Reactors 689
N.P. BAUMANN

DPA Versus Fluence (E > 1 MeV) for Reactor Vessel Wall Attenuation 699
A.L. LOWE, Jr. AND N.L. SNIDOW

Comparison of Measured Silicon Displacement Damage Ratios with ASTM E-722 and NJOY Calculated Damage 711
J.G. KELLY AND P.J. GRIFFIN

Analysis of Instrumented Charpy Data in the PR-EDB 719
F.W. STALLMANN AND D. PACHUR

Neutron Displacement Damage Functions for Iron 729
A.M. OUGOUAG, M.B. DANJAJI, J.G. WILLIAMS AND J.F. STUBBINS

Modified Damage Parameters Applied To a Typical Light Water Reactor's Pressure Vessel Supports 739
C.A. HRABAL

TECHNIQUES

The Application of Niobium for Retrospective Dose Determination in CANDU Reactors 749
M.F. BANHAM, A.J. FUDJE, J.A. TIBBLES, B.E. SHELDON, R. FLECK AND R.A. HOLT

New Reference Materials Prepared at CBNM for Reactor Neutron Dosimetry 757
C. INGELBRECHT, F. PEETERMANS AND J. PAUWELS

Electron Leakage Models for the Evaluation of Self-Powered Detectors Responses 765
D.A. THORNTON

Experiences with the Reaction Nb(n,n') Nb in Neutron Fluence Monitoring 773
W.E. FREUDENREICH

Automated Reader for Solid-State Fission Track Recorders 781
C.A. WEMPLE, F.M. CLIKEMAN AND D.W. VEHAR

The use of Neutron-Sensitive Diodes as Monitors for 1 MeV Equivalent Neutrons 789
C.R. HEIMBACH

Plant Life Extension Related Applications of Solid State Track Recorder Neutron Dosimetry 797
F.H. RUDDY AND J.G. SEIDEL

A Review of the Development of a Luggage Explosive Detection System 807
J. BARTKO, F.H. RUDDY

A Novel On-Line Neutron Dosimeter Based on a Conducting Polymer 817
J. BARTKO, F.H. RUDDY, K.F. SCHOCH, T.V. CONGEDO, E.D. McGARRY AND S.L. ANDERSON

Benchmark Referencing of Solid State Track Recorder Neutron Dosimeters in Standard Neutron Fields 825
F.H. RUDDY AND E.D. McGARRY

A Position-Sensitive Detector for Thermal Neutron and Gamma Field Mapping 835
E. CALLIGARICH, A. CESANA, G. SANDRELLI M. TERRANI AND A. TESTI

Induced X-Ray Emission in Niobium Foil Dosimeters 843
T.G. WILLIAMSON AND A.C. CHUBB

The Radfet System for Real-Time Dosimetry in Nuclear Facilities 851
A. HOLMES-SIEDLE, L. ADAMS, J.S. LEFFLER, S.R. LINDGREN

Fast Neutron Dosimetry of the Reactor Pressure Vessel by Means of the Scraping Sampling Method. Measurement of the Niobium Mass by TXRF Spectrometry 861
F. HEGEDUS

Radiation Dosimetry with Fiber-Optic Sensors 867
H. BUEKER AND W.F. HAESING

Niobium as an Ex-Vessel Neutron Dosimetry for PWRS 875
L.M. HODGSON, S.C. APPLE, R.R. CULP, C.O. COGBURN, J.N. MILLER

GENERAL INTEREST

A study of a Proton Accelerator System as a Source of Epithermal and Thermal Neutrons at Fluence Rates Characteristic of Nuclear Reactor Beams 885
T.E. BLUE, T.X. Bruce QU, C.K.C. WANG AND J.W. BLUE

Evaluation of Two Threshold Foil Neutron Spectrometry Methods for In Phantom Measurements 891
V.V. VERBINSKI

Experience Sphere Pulsee Appliquee au Transport des Neutrons dans l'Azote Liquide 899
J.B. POIRE, C. FONTAINE AND M. FOURGOUX

Progress in neutron beam development at the HFR-Petten (feasibility study for a BNCT-facility) 907
G. CONSTANTINE, P.R.D. WATKINS, C.A. PERKS, H.J. DELAFIELD, D. ROSS, W.P. VOORBRAAK, A. PAARDEKOOPER, W.E. FREUDENREICH, F. STECHER-RASMUSSEN AND R.L. MOSS

Radioiodine Monitoring of Nuclear Power Plant Airbone Emissions Under Accident Conditions 915
W.A. JESTER, T.T. TSENG AND B.S. LEE

SUMMARIES OF WORKSHOP MEETINGS

Adjustment Methods, Cross-Section Files, Uncertainties and REAL88 925

Gamma-ray dosimetry 926

Neutron dosimetry with Niobium 928

LWR surveillance dosimetry 929

Dosimetry for irradiation facilities at test and research reactors 930

Radiation Damage Correlations 931

Reactor life assessment 933

Problems with activation detectors 934

Dosimetry for fusion applications 935

Participants of Seventh ASTM-Euratom Symposium 939

Author Index 949

Proceedings of the Seventh ASTM-EURATOM Symposium on Reactor Dosimetry

Strasbourg, France, 27–31 August 1990

The Euratom Working Group on Reactor Dosimetry (EWGRD) started around 1960 with members nominated by the governments selected from each European laboratory working in reactor physics and technology. The goal was to exchange experience and knowhow in reactor dosimetry and related programmes.
The EWGRD works in close contact with the American Society for Testing of Materials (ASTM) and seven symposia have been jointly organized and held alternatively in Europe and the U.S.A.
This volume presents the lectures given at the seventh symposium held in Strasbourg, France. Standardizing physics dosimetry and materials was a major topic. There was much interest in light water reactor pressure vessel surveillance work and in Plant life extension work. Several papers report on the results of multinational joint research projects designed to improve the accuracy of pressure vessel dosimetry and materials property trend curves by performing interrelated experiments in a number of well-characterized neutron fields.

KLUWER ACADEMIC PUBLISHERS ISBN 0-7923-1792-0