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**Proceedings of the Second ASTM-EURATOM Symposium
on Reactor Dosimetry**

**DOSIMETRY METHODS FOR FUELS,
CLADDING, AND STRUCTURAL MATERIALS**

October 3 - 7, 1977 at Palo Alto, California



**United States
Nuclear Regulatory Commission**

**Office of
Nuclear Regulatory Research**

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Palo Alto, California
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Sponsors

ASTM, Subcommittee E10.05 on Dosimetry (E10.05)
EURATOM, Working Group on Reactor Dosimetry (WGRD)
Electric Power Research Institute (EPRI)
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PREFACE

These proceedings form the record for the Second ASTM-EURATOM Symposium on Reactor Dosimetry. This series of biennial symposia provide a forum for the exchange of new and critical information concerning methods and applications of neutron dosimetry for materials irradiation studies, and the influence of the neutron energy spectrum upon materials damage response. The goals are to facilitate the exchange of information, to coordinate efforts to improve dosimetry and analysis methods, and to ultimately obtain international standardization of these methods.

The first meeting (Petten, 1975) was primarily aimed at defining the status of dosimetry and damage analysis programs and identifying the needs of the dosimetry community. In addition to improved communication and the more rapid exchange of information, several international cooperative programs have resulted from the Petten meeting.

The present Symposium emphasized the data, methods, and techniques used to characterize the neutron environment, and the utilization of well-characterized neutron fields for irradiation programs on fuels, cladding, and structural materials. It is very evident that much progress has been made toward reaching consensus on standardization of nuclear data, materials, and analytical techniques.

The Symposium was attended by 102 participants from 11 countries. The Proceedings contain the full texts of 86 papers, plus brief reports by the chairmen of the 6 Workshop Sessions. The following papers were presented at the Symposium, but are not included in these proceedings:

- *"Mass Distributions in Monoenergetic-Neutron-Induced Fission of ^{238}U ," S. Nagy, K. F. Flynn, J. E. Gindler, J. W. Meadows, and L. E. Glendenin, Phys. Rev. C, 17, 163 (1978).*
- *"Revue des Techniques de Spectrometre Neutronique in France," M. Debeauvais.*
- *"Integral Experiments on Structural Materials Carried Out In The RB2/TV Fast-Thermal Reactor By Null Reactivity Method," F. Casali.*

In the interest of expedient and economical publishing, the papers were submitted in "camera-ready" form and were printed by photo-offset lithography. Except for minor editing (such as integration of figures and text), which was considered necessary for the reader's assistance or produced a more uniform format, the papers are reproduced exactly as they were submitted.

I wish to express my appreciation to all those whose efforts went into making this Symposium possible. The cooperation of the International Atomic Energy Agency, the assistance of the Electric Power Research Institute in

hosting the meeting, and of the Nuclear Regulatory Commission in publishing these proceedings is gratefully acknowledged.

The assistance and cooperation of the Program Committee and the Session Chairmen are greatly appreciated.

Finally, special thanks are due Frank Rahn, Sharon Gillespie, and Diane Foster for their skillful management of the many details which made the meetings enjoyable, as well as informative.

W. C. Morgan

PROGRAM SUMMARY

The papers are grouped in nine sessions:

Volume I

- Reviews and Overviews
- Dosimetry for Structural Materials Irradiation
- Fuel Element Dosimetry: Pre- and During Irradiation
- Post-Irradiation Analysis of Nuclear Fuels

Volume II

- General
- Determination of Neutron Spectra
- Techniques
- Nuclear Data and Standards for Dosimetry
- Workshop Reviews and Conclusions

Volume III

and six workshops on:

- Dosimetry Materials: Procurement, Fabrication, and Assay
- High-Energy Neutron Dosimetry
- Dosimetry for Light Water Reactor Pressure Vessel Surveillance Programs
- Utilization of Benchmark Neutron Fields
- Standardization of Fission Product Yields
- Computer Codes for Unfolding Neutron Spectra

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