

Tenth International Symposium on
REACTOR DOSIMETRY

September 12-17, 1999 Osaka, JAPAN



Final Program
And
Book of Abstracts



TENTH INTERNATIONAL SYMPOSIUM ON REACTOR DOSIMETRY

September 12-17, 1999
Rihga Royal NCB Hotel
Osaka, JAPAN

INTRODUCTION

The symposia in this series are organized to provide a forum for the interchange of techniques, data bases, and standardization of nuclear radiation metrology. The symposium will be of value to those involved in nuclear reactor radiation dosimetry, including researchers, manufacturers, and representatives from industry, utilities, and regulatory agencies.

The theme of the symposium is dosimetry for the assessment of irradiated reactor materials and reactor experiments. Papers will be presented in the following areas:

- Characterization of neutron and gamma-ray environments
- Dosimetry techniques, new developments, and optical methods
- Data evaluation procedures and uncertainty analysis
- Radiation monitoring of irradiation experiments
- Damage correlation and exposure parameters
- Nuclear data, benchmarking, calibrations, and standards
- Neutron and gamma-ray transport calculations
- Reactor surveillance and plant-life management
- Dosimetry for core characterization for reactor physics
- Assessment of dose for decommissioning of reactor components
- Dosimetry for assessment of reactor structural materials
- Fusion and high-energy neutrons
- Advanced neutron sources (reactors and accelerators)
- Irradiation processing and testing of electronics

The symposium program includes oral sessions, poster sessions, workshops, and tutorials. Except for the workshops and tutorials, there are no parallel sessions.

The symposium series is organized jointly by Committee E-10 of the American Society for Testing and Materials (ASTM) and the European Working Group on Reactor Dosimetry (EWGRD). The first symposium in this series, formerly called the ASTM-Euratom Symposia on Reactor Dosimetry, was held in 1975 at the Joint Research Centre in Petten, The Netherlands. Subsequent symposia were held in 1977 in Palo Alto (hosted by the Electric Power Research Institute), in 1979 at the Joint Research Centre in Ispra, Italy, in 1982 at the US National Bureau of Standards (now the National Institute for Standards & Technology) in Washington, DC, in 1984 at the GKKS Research Center in Geesthacht, Germany, in 1987 at Jackson Hole, Wyoming, in 1990 in Strasbourg, France, in 1993 at Vail, Colorado, and in 1996 in Prague, Czech Republic. The 1999 Osaka Symposium represents the first time that this meeting has been held outside of Europe or the United States.

The Osaka Symposium is jointly sponsored by the Atomic Energy Society of Japan, ASTM, and EWGRD. The symposium is held in co-operation with the International Atomic Energy Agency, and co-sponsors include the US Department of Energy, US Nuclear Regulatory Commission, the Electric Power Research Institute, the US National Institute of Standards & Technology, the Institute of Electrical and Electronics Engineers, the American Nuclear Society, the American Physical Society, Studiecetrum voor Kernenergie/Centre d'Etude de l'Energie Nucleaire, the Chinese Nuclear Society, and the Korean Nuclear Society. Local sponsorship is provided by the following Japanese organizations: the Ministry of International Trade and Industry, the Science and Technology Agency, Japan Atomic Energy Research Institute, Japan Nuclear Cycle Development Institute, the Japan Society of

Applied Physics Division of Radiation Science, Thermal and Nuclear Power Engineering Society, Nuclear Power Engineering Corporation, Research Association for Nuclear Facility Decommissioning, the Federation of Electric Power Companies, Central Research Institute of the Electric Power Industry, the Japan Atomic Industry Forum, the Japan Electrical Manufacturers Association, the Japan Electric Association, the Japan Welding Engineering Society and Japan Power Engineering and Inspection Corporation.

The officers of the Organizing Committees for the Tenth International Symposium on Reactor Dosimetry are: Dr. Frank H. Ruddy, Symposium Chairman; Professor John G. Williams, Program Committee Chairman; Dr. David W. Vehar, Symposium Secretary; Dr. David M. Gilliam, Program Committee Vice Chairman; Dr. James M. Adams, Poster Sessions Chair; Ms. Mary Helen Sparks, Workshop Sessions Chair; Professor Itsuro Kimura, Local Organizing Committee Chairman; Professor Katsuhei Kobayashi, Local Organizing Committee Secretary; Dr. Pierre D'hondt, EWGRD Programme Chairman; and Dr. Hamid Ait Abderrahim, EWGRD Programme Secretary. The Chairman of ASTM Committee E-10 is Dr. Patrick J. Griffin. We are grateful to the following committee members for their invaluable assistance in all aspects of the organization of the Osaka symposium:

ASTM Symposium Committee - Dr. Dale E. Alexander, Dr. Richard Cacciapouti, Dr. Jonghwa Chang, Dr. Harry Farrar IV, Mr. Arnold H. Fero, Dr. T. Michael Flanders, Dr. Larry R. Greenwood, Professor Alireza Haghghat, Mr. Michal Herman, Dr. Yujiro Ikeda, Dr. E. Parvin Lippincott, Mr. Arthur L. Lowe, Jr., Professor Masaharu Nakazawa, Dr. Bojan Petrovic, Ms. Felicia Quinzi, Dr. Igor Remec, Mr. Doug Selby, Dr. Roger Stoller, Professor James F. Stubbins, Mr. Soju Suzuki, Professor J. J. Wagschal, Dr. Charles A. Wemple, and Dr. Pan Zi Qiang.

EWGRD Programme Committee - Mr. Alain Alberman, Mr. Bertram Boehmer, Dr. Ferenc Hegedus, Dr. Krassimira Ilieva, Mr. Trevor Lewis, Mr. Henk Nolthenius, Dr. Bohumil Osmera, Mr. Tom Serén, Mr. Willem P. Voorbraak, Dr. Sergei Zaritsky, and Mrs. Eva M. Zsolnay.

Local Organizing Committee - Mr. Kazuo Nakatsuka, Mr. Ichiro Kobayashi, Mr. Yoshikazu Tsuchihashi, Dr. Kiyoto Aizawa, Professor Yoshiaki Fujita, Dr. Toru Hiraoka, Mr. Yoshimitsu Kajii, Mr. Mitsuhiro Yokote, Mr. Morio Makiguchi, Dr. Yoshiaki Makihara, Dr. Hiroyuki Matsuura, Mr. Akiyoshi Minematsu, Professor Chizuo Mori, Mr. Nobuo Nagai, Professor Takashi Nakamura, Professor Masaharu Nakazawa, Mr. Nagao Ogawa, Dr. Sinzo Saito, Mr. Suguru Sakamoto, Mr. Tasuku Shimizu, and Professor Akito Takahashi. The Local Organizing Committee Internet Page was assembled by Dr. Chihiro Ichihara.

We thank all of these members for their contributions to the success of the Tenth International Symposium on Reactor Dosimetry.

SYMPOSIUM SCHEDULE

- Sun. Sept. 12 17:30-21:00 Registration & Welcome drink
at Nakanoshima Plaza (room COSMO)
- Mon. Sept. 13 08:00-08:30 Registration at RIHGA ROYAL NCB
08:30-08:50 Opening Session
08:50-10:20 Keynote Session
10:20-10:40 "Coffee Break"
10:40-12:40 Oral Session 1
12:40-14:00 Lunch
14:00-16:10 Poster Session A
15:50-16:10 "Coffee Break"
16:10-18:10 Tutorial Sessions A & B
- Tue. Sept. 14 08:30-10:30 Oral Session 2
10:30-10:50 "Coffee Break"
10:30-12:40 Poster Session B
12:40-14:00 Lunch
14:00-15:40 Oral Session 3
15:40-16:00 "Coffee Break"
16:00-18:00 Workshop Session I
- Wed. Sept. 15 08:30-10:10 Oral Session 4
10:10-10:30 "Coffee Break"
10:30-12:30 Workshop Session II
Afternoon Social Event
- Thu. Sept. 16 08:30-10:30 Oral Session 5
10:30-10:50 "Coffee Break"
10:30-12:40 Poster Session C
12:40-14:00 Lunch
14:00-15:40 Oral Session 6
15:40-16:00 "Coffee Break"
16:00-18:00 Workshop Session III
- Fri. Sept 17. 08:30-10:50 Oral Session 7
10:50-11:10 "Coffee Break"
11:10-12:40 Closing Session

SYMPOSIUM ROOM ASSIGNMENTS:

- 1) Registration on Sunday 12 Sept. Room "COSMO" of Nakanoshima Plaza
- 2) Registration on Monday 13 Sept. Lobby (2nd floor) of RIHGA ROYAL NCB
- 3) Presentations through Mon. to Fri. Room "MATSU" of RIHGA ROYAL NCB
- 4) Banquet on Thursday 16 Sept. "HIKARI Hall" of Nakanoshima Plaza
- 5) Workshops Rooms "MATSU", "HANA" and "TSUKI"
- 6) Tutorials Rooms "HANA" and "TSUKI"

All rooms are in the RIHGA ROYAL NCB
6-2-27, Nakanoshima, Kita-ku, Osaka 530-0005, JAPAN
Telephone: +81-6-6443-2251
Fax : +81-6-6445-2755

SYMPOSIUM SOCIAL/COMPANIONS PROGRAM

Sun.	17:30-21:00	Registration	Nakanoshima Plaza (room COSMO) Welcome drink
Mon.	08:00-08:30 16:10-18:30	Registration Tutorial sessions A and B	RIHGA ROYAL NCB HANA, TSUKI at the RIHGA ROYAL NCB
Tue.	08:30-18:00	Companion program	Ikebana (flower arrangement) Ocha-kai (tea ceremony)
Wed.	12:30-18:30	Symposium tour	Sightseeing in Nara
Thu.	Afternoon 18:30-21:00	Companion program Banquet	Sightseeing/Short Tours Nakanoshima Plaza (Hikari Hall)
Sat.	08:30-18:00	Optional tour	Sightseeing in Kyoto

TECHNICAL SESSION SCHEDULE

		TECHNICAL SESSION SCHEDULE				
		Mon				
		Tue				
		Wed				
		Thu				
		Fri				
8:00am	[8:00] Registration					
8:30am	[8:30] Opening 20 min	[8:30]	[8:30]	[8:30]	[8:30]	
8:50 am	[8:50] Keynote Session 1 hr 30 min 3 papers	Oral Session 2 Test Reactors & Accelerators 2 hours 6 papers	Oral Session 4 Cross Sections & Nuclear Data 1 hr 40 min 5 papers	Oral Session 5 Calculations & Adjustment Methods 2 hours 6 papers	Oral Session 7 Experimental Techniques 2 hrs 20 min 7 papers	
10:10am	[10:20] break 20 min	[10:30] coffee	[10:10] break 20 min	[10:30] coffee		
10:20am	[10:40] Oral Session 1 Power Reactor Surveillance 2 hours 6 papers	Poster Session B 2 hr 10 min	Workshop Session II 2 hours	Poster Session C 2 hr 10 min	[10:50] break 20 min	
10:30am					[11:10] Workshop Summaries 1 hour	
10:40am					[12:10] Closing Session 30 min	
10:50am						
11:10am						
12:30pm	[12:40]	[12:40]	[12:30] Bus Departure	[12:40]	[12:40] End Symposium	
12:40pm	Lunch 1 hr 20 min	Lunch 1 hr 20 min	(Packed Lunch)	Lunch 1 hr 20 min		
2:00pm	[2:00] Poster Session A 2 hr 10 min	[2:00] Oral Session 3 Benchmarks & Intercomparision 1 hr 40 min 5 papers	Afternoon Social Visit to Nara	[2:00] Oral Session 6 Damage Correlation 1 hr 40 min 5 papers		
3:40pm	[3:50] refreshments	[3:40]break 20 mins		[3:40]break 20 mins		
4:00pm	[4:10] Tutorial Session 2 hr	[4:00] Workshop Session I 2 hours		[4:00] Workshop Session III 2 hours		
4:10pm						
6:00pm	[6:10] End tutorial	[6:00] End session		[6:00] End session		
6:10pm						

2:00pm

POSTER SESSION A (room YODO)

Chaired by S. Suzuki

POWER REACTOR SURVEILLANCE
TEST REACTORS AND ACCELERATORS
BENCHMARKS AND INTERCOMPARISONS

POWER REACTOR SURVEILLANCE

- PA1.01 Improved Evaluation of the Atucha-I Ex-vessel Dosimetry
F. Albornoz, H. Blaumann, E. M. Lopasso, A. Blanco, G. Gennuso and O. Serra
- PA1.02 Reactor Dosimetry in the Surveillance Program of Kozloduy NPP Reactor Pressure Vessels
K. Ilieva, T. Apostolov, S. Belousov and M. Monev
- PA1.03 Evaluation of the Reactor Dosimetry Results Obtained During the First 10 Years of the RPV Surveillance Programme at the NPP Paks
E. M. Zsolnay, E. J. Szondi and F. Osvald
- PA1.04 Neutron Dosimetry for VVER Reactor Pressure Vessels and Integrity Assessment in Czech Republic
M. Brumovsky, O. Erben, B. Ošmera and J. Hógel
- PA1.05 Analysis of Pressure Vessel Surveillance Dosimetry Inserted into Korean PWR
C-S. Gil, J-D. Kim and J. Chang
- PA1.06 Integrity Assessment for Aging Reactor Vessel of Japan's First Generation PWR Plants
T. Sato, S. Shiota and A. Kusuki
- PA1.07 Measurement of Neutron Flux Density of TOKAI Power Station
M. Nakazawa, T. Yamamoto and M. Shirakawa
- PA1.08 The Impact of the ENDF/B-VI Cross Sections on the Flux and dpa Attenuation in RPV Walls and on the RPV Fluence Determination
I. Remec
- PA1.09 Factors Affecting Predicted Neutron Dose Rates to Steel Pressure Vessels of Magnox Plant
D. A. Thornton
- PA1.10 The Attenuation of Neutron Dose Rates through the Steel Pressure Vessels of Magnox Power Plants
A. L. Fletcher, J. R. Mossop and C. J. Page
- PA1.11 Assessment of Activation of Concrete Wall for Decommissioning of Nuclear Power Plants
T. Matsumura, T. Hattori and T. Kawabe
- PA1.12 Use of SSRTs and a Multi-Component Shield Assembly to Measure Radiation Penetrating the Reactor Biological Shield in the Presence of Radiation Streaming from Other Sources
A. H. Fero
- TEST REACTORS AND ACCELERATORS**
- PA2.01 The Irradiation Characteristics of the KUR Heavy Water Facility -- Neutron Energy Spectra for Several Irradiation Modes
T. Kobayashi, Y. Sakurai and K. Kobayashi
- PA2.02 Radiation Dosimetry at the BNL High Flux Beam Reactor and Medical Research Reactor
N. E. Holden, J-P. Hu, D. D. Greenberg and R. N. Reciniello
- PA2.03 Measurement of Neutron Spectra at HANARO
U. Hong, H. Kang, C. G. Seo and Y. Kang
- PA2.04 Detailed Neutron Dosimetry and Damage Analysis in Steel Irradiation Test Experiments - The Powerful Tool of Combining Measurements and 3D Neutron Transport Calculations
W. P. Voorbraak, W. E. Freudenreich and D. J. Ketema

- PA2.05 Characterization of Neutron Field for Stainless Steel Irradiation Experiments in JMTR
S. Shimakawa
- PA2.06 Assessment of the Fission Power Level in Fuel Rods Irradiated in the High Flux Materials Testing Reactor BR2 with the Aid of Fluence Dosimetry. Comparison with Other Methods
Ch. De Raedt, E. Malambu and S. Bodart
- PA2.07 Local Changes of Neutron Spectrum in the Fast Reactor BOR-60 for Expansion of Research Tasks
A. I. Tellin and I. Yakovleva
- PA2.09 Neutron fluxes and Spectra Measurement at TAPIRO Fast Source Reactor Using Unfolding Techniques
M. Angelone, F. Cavallari, A. Festinesi and G. Rosi
- PA2.10 Improvement of Reactor Dosimetry for Irradiation Tests in the Experimental Fast Reactor JOYO
T. Aoyama, A. Yoshida, T. Sekine and S. Suzuki
- PA2.11 Transmutation Process Usage for Thermal and Epithermal Neutron Fluence Estimation in Intensive Neutron Flux
N. V. Markina, D. K. Ryazanov, G. A. Shimansky and H. E. Lebedeva
- PA2.12 Database of Russian Research Reactors Neutron Spectra
N. V. Markina, H. E. Lebedeva, A. R. Yumagulova, D. K. Ryazanov and M. Yu. Tikhonchev
- PA2.13 Estimation of Low Level Neutron Doses Based on Neutron Spectra in the Vicinity of Nuclear Reactor
I. Urabe, H. Sagawa, Y. Ogawa, T. Osawa, K. Kobayashi, T. Yoshimoto and T. Tsujimoto
- PA2.14 Future Plan on Neutron Source in Kyoto University Research Reactor Institute (KURRI)
S. Shiroya, H. Unesaki, Y. Kawase and H. Moriyama
- BENCHMARKS AND INTERCOMPARISONS**
- PA3.01 Dosimetry Benchmark Experiment in LR-0 for WWER-1000/320 Reactor Type
B. Ošmera and S. Zaritsky
- PA3.02 Benchmark Experiments on the KORPUS Facility
N. Markina, V. Tsikanov, S. Zaritsky and H. Aït Abderrahim
- PA3.03 Monte Carlo Calculations of Neutron Fluence Spectra, Activation Measurements, Uncertainty Analysis and Spectrum Adjustment for the KORPUS Dosimetry Benchmark
H. U. Barz, B. Böhmer, J. Konheiser and I. Stephan
- PA3.04 Actual and Potential Measurements of Fission-Rate-Ratios in the NIST Iron Sphere
R. L. Perel, J. J. Wagschal and Y. Yeivin
- PA3.05 Recommendations for PCA and PSF Benchmark Data in Light Water Reactor Pressure Vessel Surveillance
R. Gold
- PA3.06 Adjustment of the ^{235}U Fission Spectrum
P. J. Griffin and J. G. Williams
- PA3.07 PCA and HBR-2 Benchmarks for Qualification of Pressure Vessel Fluence Calculational Methodology
I. Remec
- PA3.08 Analysis of the ORNL PCA and VENUS Benchmarks Using TORT and BUGLE-96
A. H. Fero, S. L. Anderson and G. K. Roberts
- PA3.09 Development of Intermediate Neutron Fluence Standard by Using Several Methods
N. Takeda, K. Kudo, M. Fujishiro, K. Okamoto, K. Kobayashi and S. Yoshimoto

PA3.10 A Study on 14 MeV Neutron Beam Characteristics and its Applications
H. Sakane, Y. Uno, F. Maekawa, Y. Kasugai, C. Konno, J. Kaneko and Y. Ikeda

3:50pm Refreshments

4:10pm-6:10pm **OPTIONAL TUTORIALS**

1. ADJUSTMENT - THE OPTIMAL ANALYSIS OF SURVEILLANCE DOSIMETRY DATA (room HANA)
Presented by Y. Yeivin

2. CROSS SECTIONS AND EVALUATION TECHNIQUES (room TSUKI)
Presented by K. Shibata

Tuesday, September 14

ORAL SESSION 2 DOSIMETRY FOR TEST REACTORS AND ACCELERATOR SOURCES (room Matsui)
Chaired by: H. Ait Abderrahim and K. Kobayashi

8:30am paper 2.01 Spectral Unfolding of Mixed Proton/Neutron Fluences in the LANSCE Irradiation Environment
M. R. James, S. A. Maloy, W. F. Sommer, P. Ferguson, M. M. Fowler, G. E. Mueller and K. Corzine

8:50am paper 2.02 Neutron Beam Characterisation at the Finnish BNCT Facility - Measurements and Calculations
T. Serén, I. Auterinen, P. Kotiluoto and T. Seppälä

9:10am paper 2.03 Establishment of Fe-Filtered Beam Facility and Measurement of the Filtered Neutrons
K. Kobayashi, T. Yoshimoto, Y. Fujita, M. Utsuro and H. Utsumi

9:30am paper 2.04 Design and Characterization of a Facility for Fast Neutron Irradiation of Semiconductors at Penn State
B. Petrovic and A. Haghighat

9:50am paper 2.05 Comprehensive Nuclear Fuel Dosimetry Program in OSIRIS Reactor
A. Alberman, C. Morin, L. Marchand and A. Marcault

10:10am paper 2.06 Dosimetry of a GeV Proton-Driven Spallation Neutron Field by the Activation Method
Y. Kasugai, H. Takada and Y. Ikeda

10:30am Coffee will be served in the Poster Session

10:30am **POSTER SESSION B** (room YODO)

Chaired by A. Takahashi

CROSS SECTIONS AND NUCLEAR DATA

CALCULATIONS AND ADJUSTMENT METHODS

DAMAGE CORRELATIONS AND DAMAGE DOSIMETRY

CROSS SECTIONS AND NUCLEAR DATA

PB4.01 Reference Data Library for Dosimetry Applications
S. A. Badikov

PB4.02 Neutron and Non-neutron Nuclear Data for Radiation Dosimetry
N. E. Holden

PB4.03 Re-evaluation of Al-27(n,p)Mg-27 Reaction Cross Sections for Use as a Standard in Dosimetry and Activation Measurements
A. B. Pashchenko, K. I. Zolotarev and C. J. Csikai

- PB4.04 New Measurements of the H(n,n)H Angular Distribution
F. B. Bateman, N. Boukharouba, C. E. Brient, A. D. Carlson, S. M. Grimes, R. C. Haight, T. N. Massey and O. A. Wasson
- PB4.05 Fission Cross Section Measurements of Th-229 and Pa-231 Using LINAC-Driven Lead Slowing-Down Spectrometer
K. Kobayashi, S. Yamamoto, T. Kai, H-J. Cho, H. Yamana, Y. Fujita, T. Mitsugashira and I. Kimura
- PB4.06 Measurement of Differential Neutron-Induced Charged-Particle Emission Cross Sections for 5 - 75 MeV Neutrons
M. Baba, Y. Nauchi, T. Sanami, Y. Hirasawa, N. Nakashima, S. Meigo, S. Tanaka and N. Hirakawa
- PB4.07 Measurements of ⁹Be-d Nuclear Reaction Cross Sections at Low Energy
K. Ochiai, K. Ishii, I. Murata, H. Miyamaru and A. Takahashi
- PB4.08 Fast Neutron Yields Generated from Deuteron Break-up in Low Energy Reactions of Light Nuclei
P. Bém, V. Burjan, F. Cvachovec, M. Götz, V. Kroha, E. Yu. Nikolskii, E. Simečkova and J. Vincour
- PB4.09 Gamma-ray Production Cross Sections for ²⁰⁹Bi in the Incident Neutron Energy of 0.5 - 20 MeV
K. I. Zolotarev and G. Ya. Tertychny
- PB4.10 Measurement of Neutron Capture Cross Sections for Dy and Hf between 0.001 eV and 50 keV Using Total Energy Absorption Detector
H-J. Cho, K. Kobayashi, S. Yamamoto, Y. Fujita, G. Kim, J. Chang and S. K. Ko
- CALCULATIONS AND ADJUSTMENT METHODS**
- PB5.01 Algorithm and Computer Code of Group Neutron Spectra Transformation
G. A. Shimansky, A. I. Tellin and M. Gurevich
- PB5.02 Improved Covariance Analysis and Spectrum Adjustment for VVER-1000 Pressure Vessel Fluences
B. Böhmer, G. I. Borodkin and G. N. Manturov
- PB5.03 Resolving Measurement Spectrum in Reactor With Flexible Tolerance Method
Y. Wang, K. Kobayashi, Z. Li and I. Kimura
- PB5.04 Input Source Generator and Visualisation Tool Software Package for Dort/Tort Application
I. Popova, S. Belousov, K. Ilieva and S. Antonov
- PB5.05 VENUS-3 Modeling with PENTRAN
A. Haghighat, H. Ait Abderrahim and G. E. Sjoden
- PB5.06 Three Dimensional Neutron Analysis in the Baffle-Former Area of PWR Plant
H. Kitagawa and N. Yamagiwa
- PB5.07 Analysis of a 3-D Computational Benchmark for PWR Pressure Vessel Fluence Calculations
B. Petrovic and A. Haghighat
- PB5.08 MCBEND - A Fluence Modeling Tool from AEA Technology
P. Cowan, E. Shuttleworth and G. Wright
- PB5.09 Two Proposals for Enhancing Monte Carlo Transport Codes for Reactor Dosimetry: Increase of Efficiency and Incorporation of Uncertainty Estimations
K. Noack
- PB5.10 TRIPOLI-4 Monte Carlo Transport Code for Research Reactor In-Core Calculations
Y. K. Lee, G. Néron, M. Nobile, Y. Péneliau, J. P. Both and C. Diop

- PB5.11 Benchmarking of the 3-D Neutron-Gamma Calculations for the BWR Core Shroud Using A3-MCNP
A. Haghghat, H. Hikaru and B. Petrovic
- PB5.12 Development of 3D MCNP-Based Fluence Computational Software Package: MF3D
R-T. Chiang and S. Sitaraman
- PB5.13 BWR Neutron and Gamma Fluence and Spectral Computations Using MF3D
S. Sitaraman, R.T. Chiang, R. L. Kruger, A. L. Jenkins, K. Asano and K. Koyabu
- PB5.14 Detailed Source and Nuclear Data Sensitivity Analysis in PHWR Pressure Vessel Dosimetry Calculations
E. M. Lopasso, A. Blanco, A. F. Albornoz, H. Blaumann
- PB5.15 Development of Induced Activity Estimation Method for PWR Containment
M. Nakata and T. Muramatsu
- PB5.16 MCNP-to-TORT Radiation Transport Calculations in Support of Mixed Oxide Fuels Testing for the Fissile Materials Disposition Program
J. V. Pace III
- DAMAGE CORRELATIONS AND DAMAGE DOSIMETRY**
- PB6.01 Primary Recoil Energy Spectra at the RPV of a PHWR
M. Caro and A. Caro
- PB6.02 The PKA Energy Spectrum Analysis of Defect Structures in Neutron Irradiated Metals
T. Yoshiie, Q. Xu and Y. Satoh
- PB6.03 Refinement of Threshold Energy Values and Calculation of Nuclear Displacement for Vanadium Alloys
V. V. Kirsanov, A. N. Balashov, N. V. Markina and M. U. Tikhonchev
- PB6.04 A Comparison of the NRT Displacement Model and Primary Damage Formation Observed in Molecular Dynamics Cascade Simulations
R. E. Stoller
- PB6.05 Fusion Neutron Irradiation Effects on Some Electronic Devices
T. Iida, Y. Tanimura, F. Sato and T. Tanaka
- PB6.06 Dosimetry Using Interaction Between Materials and Radiation Field
T. Shikama, T. Kakuta, M. Narui, S. J. Zinkle and T. Sagawa
- PB6.07 Nondestructive Analysis of Properties Degradation in NPRV Steels Using Magnetic Properties
J. F. Stubbins and W-J. Shong
- PB6.08 Project AMES Dosimetry and MADAM: Results and Future Activities
A. Ballesteros and L. Debarberis
- PB6.09 U.S. NRC Embrittlement Data Base (EDB) - The Merging of the Power Reactor Embrittlement Data Base (PR-EDB), the Test Reactor Embrittlement Data Base (TR-EDB), and the Fracture Toughness Data Base
J-A. Wang

12:40-2:00pm LUNCH

ORAL SESSION 3 BENCHMARKS AND INTERCOMPARISONS (room MATSU)

Chaired by F. Ruddy and S. Zaritsky

- 2:00pm paper 3.01 Results from the NIST Round Robin Test of Fissionable Dosimeters in a Reactor Leakage Spectrum
J. M. Adams

- 2:20pm paper 3.02 New NEA Benchmarks Reveal Decisive Improvements in Calculating Fast Neutron Fluence for Prediction of Neutron Embrittlement in the Reactor Pressure Vessel
G. Hehn and R. P. Rulko
- 2:40pm paper 3.03 Database for WWER-1000 Reactor Pressure Vessel. IAEA Regional Project RER 4/017
B. Ošmera, S. Zaritsky, K. Iljeva, Ju. Kovbasenko, V. Lyssakov and A. Uritani
- 3:00pm paper 3.04 Balakovo-3 Ex-vessel Exercise: Intercomparison of Results
G. Borodkin, O. Kovalevich, H. U. Barz, B. Böhmer, I. Stephan, W. Voorbraak, J. Hógel, A. Borodin, V. Vikhrov, V. Lichadeev, N. Markina, E. Grigoriev and V. Troshin
- 3:20pm paper 3.05 Measurement and Analysis of Pulsed Sphere Experiment of Fusion Related Material with Incident 14 MeV Neutrons
C. Ichihara

3:40 - 4:00pm BREAK

4:00 - 6:00pm **WORKSHOP SESSION I**

- 1. RADIATION DAMAGE CORRELATIONS** (Room MATSU) Chaired by I. Remec and T. Lewis
- 2. DOSIMETRY FOR IRRADIATION FACILITIES AT TEST AND RESEARCH REACTORS** (Room TSUKI)
Chaired by D. Beretz and S. Suzuki
- 3. THERMAL AND LOW-ENERGY NEUTRONS** (Room HANA) Chaired by D. Gilliam and A. Takahashi

Wednesday, September 15

ORAL SESSION 4 CROSS SECTIONS AND NUCLEAR DATA (room MATSU)

Chaired by P. Griffin and E. Zsolnay

- 8:30am paper 4.01 Integral Assessment of the Revised JENDL Dosimetry File
K. Kobayashi, T. Iguchi, S. Iwasaki, T. Aoyama, S. Shimakawa, Y. Ikeda, N. Odano, K. Sakurai, K. Shibata and M. Nakazawa
- 8:50am paper 4.02 High Energy Neutron Activation Cross Sections
T. Nakamura, E. Kim, Y. Uwamino, N. Nakao and S. Tanaka
- 9:10am paper 4.03 SPALLDOS, A New Neutron Metrology Cross Section Library for Use at Spallation Neutron Sources
E. J. Szondi, E. M. Zsolnay and F. Hegedüs
- 9:30am paper 4.04 Integral Testing of Spallation Cross Sections for Neutron Dosimetry at 113 and 256 MeV
L. R. Greenwood
- 9:50am paper 4.05 Production of a Self-Consistent Dosimetry Cross Section Set Up to 50 MeV
F. Maekawa, U. Von Moelendorff, P. Wilson, M. Wada and Y. Ikeda

10:10 - 10:30am BREAK

10:30am **WORKSHOP SESSION II**

- 4. LWR SURVEILLANCE AND RETROSPECTIVE DOSIMETRY** (Room MATSU) Chaired by A. Fero and T. Serén
- 5. FUSION AND HIGH ENERGY NEUTRONS** (Room TSUKI) Chaired by F. Hegedüs and Y. Ikeda
- 6. CROSS-SECTION FILES AND UNCERTAINTIES** (Room HANA) Chaired by P. Griffin and E. Zsolnay

12:30pm Depart by Bus for
AFTERNOON SOCIAL EVENT TO NARA (Packed lunch en route)

Thursday, September 16

ORAL SESSION 5 CALCULATIONS AND ADJUSTMENT METHODS (room MATSU)

Chaired by. B. Böhmer and M. Nakazawa

- 8:30am paper 5.01 Modeling of BWR for Neutron and Gamma Fields Using PENTRAN
A. Haghghat, V. Kucukboyaci, G. Sjoden and B. Petrovic
- 8:50am paper 5.02 Activity Determination with High Precision for Components to be Disposed of
E. Polke
- 9:10am paper 5.03 PV-Surveillance Dosimetry and Adjustment: Review of Several Significant "Oral Laws"
R. L. Perel, J. J. Wagschal and Y. Yeivin
- 9:30am paper 5.04 Development of an Associated Data Base for a Unfolding Procedure for RPV VVER Reactor Fluence Estimation
S. Belousov, K. Ilieva, S. Antonov and I. Popova
- 9:50am paper 5.05 Physically Constrained Adjustment of Calculated Neutron Spectra for Dosimetry and Vessel Locations
J. G. Williams and P. J. Griffin
- 10:10am paper 5.06 Analysis of the In- and Ex-Vessel Dosimetry of SLB-1 Using the LEPRICON system
H. Ait Abderrahim, O. Picavet and P. Barbrault

10:30am End of Oral Session
Coffee will be served in the Poster Session

10:30am POSTER SESSION C (room YODO)

Chaired by Y. Ikeda

EXPERIMENTAL TECHNIQUES
LATE NEWS

EXPERIMENTAL TECHNIQUES

- PC7.01 A Method for the Minimization of the HPGe Detector Efficiency Bias in the Measurement of the Spectral Index
A. I. Hawari and L. Tarko
- PC7.02 A Laser Compton-Scattered Photon Source for the Calibration of Gamma-Ray Detectors in the Energy Range from 2 MeV to 22 MeV
K. Kudo, N. Takeda, H. Ohgaki and H. Toyokawa
- PC7.03 Stilbene Neutron Spectrometer with Spreading of a One Parameter Pulse Shape Discrimination (PSD) Dynamic Range
F. Cvachovec and B. Ošmera
- PC7.04 Using of the Reaction $^{93}\text{Nb}(n,n')^{93\text{m}}\text{Nb}$ for Determination of Neutron Spectra at Outer PV Surface of WWER-1000 Reactor
O. O. Gritzay and O. G. Vasiljeva
- PC7.05 $^{93}\text{Nb}(n,n')^{93\text{m}}\text{Nb}$: Intercomparison of Foil Activity Measurements in Application to the VVER-1000 Ex-vessel Experiment
G. Borodkin, H. Ait Abderrahim, J. Hógel, E. Polke, W. Schweighofer, T. Serén, I. Stephan, W. Voorbraak, I. Penev, L. Kinova, E. Grigoriev and V. Troshin
- PC7.06 Experimental Method of Neutron Spectra Determination with Activation Foils
F. Colomb, H. Carcreff and C. Morin
- PC7.07 Qualifying C8/F9 and F8/F9 Spectrum Index Measurements by Using Standard Neutron Fields
K. van der Meer, P. D'hondt and R. Vandebroek

- PC7.08 Metal Discs As Very Low Neutron Flux Monitors In Reactor Environment
M-J. Martinez, M. Hult, M. Köhler, H. Ait Abderrahim and D. Marloye
- PC7.09 Development of Neutron and Gamma-Ray Flux Distribution Measurement System with Scintillator and Optical Fiber Combination
C. Mori, A. Uritani, T. Iguchi, S. Hayashi, Y. Takami, I. Kimura and M. Katagiri
- PC7.10 A Robot-Mounted System for Neutron and Gamma Ray Dosimetry of Fuel Containing Masses at the Chernobyl Unit 4 Shelter
F. H. Ruddy, A. R. Dulloo and J. G. Seidel
- PC7.11 Real-Time Dosimetry Method Using an Imaging Plate
K. Sakasai, M. Katagiri, M. Kishimoto and Y. Fujii
- PC7.12 Dosimetry Techniques Developed for Radiation Monitoring of Irradiation Experiments in the IVV-2M Research Reactor
S. Zlokazov
- PC7.13 Application of Accumulative Type ESR-Sensors for Determination of Intensity, Spectral Characteristics and Volume Distribution of Intense Gamma and Neutron Fields
A. F. Usaty, V. B. Kainov, L. A. Serdiukova and A. Z. Khamidov
- PC7.14 The Light Transmission Method of Automated SSTR Scanning
R. Gold and J. H. Roberts
- PC7.15 Neutron Dosimetry Using Diallyl Phthalate Resin
T. Tsuruta
- PC7.16 Development of In-Core Monitoring System for the Advanced Fission Reactor
T. Kakuta, M. Ishihara, T. Shikama, M. Narui, T. Sagawa, T. Arai and K. Hayashi
- PC7.17 Measurement of Neutron Flux Tilt at Small Core Using Optical Fiber with Scintillator
T. Misawa, C. Mori, H. Unesaki and S. Shiroya
- PC7.18 Development and Modelisation of Neutron Detectors for In-Core Measurement Requirements in Nuclear Reactors
C. Blandin, G. Bignan, J. C. Guyard and A. Lebrun
- PC7.19 On-Line Reactor Dosimetry with Intrinsic Silica Optical Fibre Sensors
P. Borgermans and B. Benoît
- PC7.20 Simultaneous Measurement of Neutron Pulse Series in Time and Space by Using Position Sensitive Proportional Counter
Y. Kitamura, T. Misawa, H. Unesaki, S. Shiroya, K. Ishitani, A. Uritani and Y. Yamane
- PC7.21 A System Design for Measuring Boron Concentration in PWR Cooling Water
K. Oda, T. Kojima, K. Nakagawa, T. Yamauchi and S. Ohashi
- PC7.22 14 MeV Neutron Irradiation Tests on Window Materials for Fusion Reactors
F. Sato, T. Iida, Y. Oyama, F. Maekawa, Y. Ikeda and T. Nishitani
- PC7.23 Mixed-Field Electronic Radiation Dosimeter Development for Reactor Buildings
Y. B. Lee, N. H. Lee, S. H. Kim, and G. U. Youk
- LATE NEWS**
- LN.01 Neutron Flux Characterisation in The Thermal Column of a Fast Research Reactor
S. Agosteo, G. Gambarini, P. Marchesi, E. Nava, P. Palazzi, A. Pecci, G. Rosi and R. Tinti

- LN.02 Application of Monte Carlo Method for Determination of Radiation Fields of Small Regions in Reactor Cores
Yuji Uenohara
- LN.03 Evaluation Method for K-infinite of MOX Lattice with Conversion Ratio Measurement
S. Miyashita, K. Yoshioka, T. Sasaki, I. Mitsunashi, and M. Ueda
- LN.04 Biodosimetry of Fast Neutrons from a Nuclear Reactor
K. Fujikawa, S. Endo, T. Itoh and M. Hoshi
- LN.05 On the Iron Effect on Neutron Transport
A. Jehouani, R. Ichaoui and M. Boulkheir

12:40-2:00pm LUNCH

ORAL SESSION 6 DAMAGE CORRELATIONS AND DAMAGE DOSIMETRY (room MATSU)
Chaired by A. Alberman and T. Yoshiie

- 2:00pm paper 6.01 Comparative Analysis of DPA Processed from Current Evaluated Nuclear Data Libraries
J. Chang, C-S. Gil, Y. Cho and J-D. Kim
- 2:20pm paper 6.02 JENDL PKA/KERMA File for IFMIF Project
T. Fukahori, S. Chiba, K. Shibata, Y. Ikeda, T. Aruga, Y. Watanabe, T. Murata, N. Yamano and M. Kawai
- 2:40pm paper 6.03 A Study of Displacement Cross Section in Medium Energy Region
K. Iga, H. Takada and Y. Ikeda
- 3:00pm paper 6.04 Role of Radiation in BWR Core Shroud Cracking
J. Kwon and A. T. Motta
- 3:20pm paper 6.05 Correlating Radiation Exposure with Embrittlement: Comparative Studies of Electron- and Neutron-Irradiated Pressure Vessel Alloys
D. E. Alexander, L. E. Rehn, G. R. Odette, G. E. Lucas, D. Klingensmith and D. Gragg

3:40 - 4:00pm BREAK

4:00 - 6:00pm **WORKSHOP SESSION III**

- 7. BENCHMARKS AND INTERCOMPARISONS** (Room HANA) Chaired by A. Haghghat and K. Illieva
8. MIXED-FIELD DOSIMETRY (Room TSUKI) Chaired by H. Ait Abderrahim and L. Greenwood
9. ADJUSTMENT METHODS AND UNCERTAINTIES (Room MATSU) Chaired by T. Iguchi and H. Nolthenius

Friday, September 17

ORAL SESSION 7 EXPERIMENTAL TECHNIQUES (room MATSU)
Chaired by F. Hegedüs and D. Vehar

- 8:30am paper 7.01 Measurement of Eigenvalue Separation in Coupled-Core System Using Optical Fiber with Scintillator
H. Unesaki, S. Shiroya, K. Hashimoto, T. Horiguchi, T. Takeda, T. Yamamoto, T. Kitada, O. Aizawa and J. Yamamoto
- 8:50am paper 7.02 Selective and Prompt Self Powered Neutron Detectors for Characterization of Mixed Radiation Fields in Reactors
C. Blandin and S. Breaud

- 9:10am paper 7.03 Neutron and Gamma Ray Dosimetry in Spent-Fuel Radiation Environments Using Silicon Carbide Semiconductor Radiation Detectors
A. R. Dulloo, F. H. Ruddy, J. G. Seidel, T. Flinchbaugh, C. Davison and T. Daubenspeck
- 9:30am paper 7.04 Retrospective Fast Neutron Dosimetry of Nuclear Power Plants by Means of Scraping Samples Using the $^{93}\text{Nb}(n,n')^{93\text{m}}\text{Nb}$ Reaction
J. van Aarle and F. Hegedüs
- 9:50am paper 7.05 A Novel Neutron Spectrometer with Response of Wide Energy Range
A. Uritani, S. Yamaguchi, Y. Makihara, J. Kawarabayashi, T. Iguchi, C. Mori, H. Toyokawa, N. Takeda, K. Kudo, S. Sato and S. Iwai
- 10:10am paper 7.06 Characterization and Representation of the HPGe Detector Efficiency
M. H. Sparks, T. M. Flanders, P. J. Griffin and D. W. Vehar
- 10:30am paper 7.07 Accreditation and Certification in Radioactivity Measurement: Experience of the CEA/Reactor Dosimetry Laboratory
J. C. Royer and D. Beretz
- 10:50 - 11:10am BREAK
- 11:10am **WORKSHOP SUMMARIES SESSION** (room MATSU)
Chaired by M. H. Sparks and W. P. Voorbraak
- 12:10pm **CLOSING SESSION** (room MATSU)
Chaired by P. D'hondt, M. Nakazawa and F. Ruddy

Saturday, September 18

08:30am - 6:00pm **OPTIONAL TOUR** (1-DAY TOUR)

SIGHTSEEING IN KYOTO

WORKSHOPS

Nine workshops will be held during the symposium with the intent of providing an informal exchange of information for a selected variety of topics. The workshops are a very important part of the symposium. They are intended to provide a discussion forum for the workshop topic that was selected by a significant number of attendees. The detailed format of the workshop may vary according to the topic.

TOPICS

1. RADIATION DAMAGE CORRELATIONS

Chaired by I. Remec and T. Lewis

Pressure vessel damage modeling, correlation of material damage data, and quality of data in the embrittlement data base.

2. DOSIMETRY FOR IRRADIATIONS AT TEST AND RESEARCH REACTORS

Chaired by D. Beretz and S. Suzuki

Irradiation conditions, spectral dependence on operating conditions, adjustment codes & calculations in dosimetry.

3. THERMAL AND LOW-ENERGY NEUTRON DOSIMETRY

Chaired by D. Gilliam and A. Takahashi

Measurements of thermal-to-fast neutron ratios and their impact on the relevant metallurgy issues.

4. LWR SURVEILLANCE & RETROSPECTIVE DOSIMETRY

Chaired by A. Fero and T. Serén

Status of accuracy achievable in fluence determinations (capsules, vessels) & a highlight on niobium dosimetry

5. DOSIMETRY FOR FUSION AND HIGH ENERGY APPLICATIONS

Chaired by F. Hegedüs and Y. Ikeda

Includes 14 MeV, spallation and fast/thermal mixed-spectrum reactor irradiations; cross-section needs; dosimetry reactions.

6. CROSS-SECTION FILES AND UNCERTAINTIES

Chaired by P. Griffin and E. Zsolnay

Emphasis on evaluation & uncertainties of dosimetry cross sections, selection of multi-group cross sections for calculations

7. BENCHMARKS AND INTERCOMPARISONS

Chaired by A. Haghghat and K. Illieva

Ongoing benchmarks and intercomparisons to validate calculations.

8. MIXED FIELD DOSIMETRY

Chaired by H. Aït Abderrahim and L. Greenwood

Current state of neutron/gamma mixed-field dosimetry and possible avenues of research and development.

9. ADJUSTMENTS METHODS AND UNCERTAINTIES

Chaired by T. Iguchi and H. Nolthenius

Emphasis on calculational aspects and sensitivity analysis of spectrum adjustment methods; code selection.

TUTORIALS

Two optional tutorials are offered as part of the Symposium Program. They will be held concurrently at the end of the technical program on the first day of the Symposium, Monday, 13 September. A separate registration, with a fee of \$50, is required from Symposium registrants (see registration form). Places will be limited, so advance registration is recommended. Registration for one of the two tutorials is included in the special one-day registration.

The tutorials will be taught classes presented by a leading expert in each of the two fields. Printed lecture notes will be provided. The purpose of these tutorials is to provide attendees with an authoritative introduction to one of the fundamental technical areas of the International Symposium on Reactor Dosimetry. The topics have been selected on the basis of replies received to a questionnaire that was distributed with the Call for Papers.

TUTORIAL A. ADJUSTMENT - THE OPTIMAL ANALYSIS OF SURVEILLANCE DOSIMETRY DATA (room HANA)

Presented by Y. Yeivin

General adjustment prescriptions are derived from elementary principles. Given available parameter and measured-response data (nominal values and uncertainties), and the sensitivities of the responses to each parameter, these prescriptions produce objectively adjusted parameters and their associated uncertainties, and thus enable more reliable predictions. It is shown that the adjustment formalism is the natural procedure to extrapolate surveillance measured information to the RPV, and that it is also the proper way to evaluate the uncertainties in the predicted RPV fluences.

Professor Yehuda Yeivin earned advanced degrees from the Hebrew University of Jerusalem, and the Weizmann Institute of Science. He attended the International School of Nuclear Science and Engineering at Argonne National Laboratory and worked at the Centre d'Etudes Nucleaires at Saclay, France and at the Swiss Federal Institute for Reactor Research, E.I.R., at Wuerenlingen. He spent a year with the Israel AEC, before joining the Racah Institute of Physics of the Hebrew University in 1961. He has taught general physics courses at Tel Aviv University, and served as acting head of its physics department, and taught applied mathematics courses at the department of nuclear engineering of Ben Gurion University (Beer Sheva). He has served as president of the Israel Physical Society, vice president of the Israel Nuclear Society and as a member of the council of the European Physical Society. He is a member of the advisory committee for nuclear safety of the Israel AEC. He has been a senior visiting scientist at Goddard Institute for Space Studies, New York, a consultant at ORNL and at the European JRC, Ispra. He also organized and directed the 1986 Ispra school on Data Uncertainties, Sensitivities, Consistency and Adjustment. Professor Yeivin has published over 100 learned articles, including pioneering results on adjustment of cross sections together with I. Reiss and G. Rakavy (1967).

TUTORIAL B. CROSS SECTIONS AND EVALUATION TECHNIQUES (room TSUKI)

Presented by K Shibata

How to evaluate cross sections and uncertainties. Several nuclear reaction models are presented as useful evaluation tools: resonance theory, optical and statistical models, and direct-interaction models. The data in Japanese Evaluated Nuclear Data Library (JENDL) are shown, with emphasis on dosimetry applications. Activities on high-energy neutron-, photon-, and photon-induced reaction data are also presented, together with the results so far obtained.

Dr. Keichi. Shibata is Principal Scientist in the Nuclear Data Center at the Japan Atomic Energy Research Institute (JAERI). He earned his degrees at Rikkyo University, where he majored in nuclear physics. After joining JAERI in 1982, he has been involved in the evaluation of neutron cross-sections for fission and fusion reactors. A medal was awarded him by JAERI for the development of the Japanese Evaluated Nuclear Data Library Version 3 (JENDL-3), issued in 1990. He is now an editor of *J. Nucl. Sci. Technol.* published by the Atomic Energy Society of Japan. His recent publications include articles on gamma-ray production data, evaluation of neutron data for mercury and covariance data for the JENDL files for chromium, iron and nickel.

TOURS

SYMPOSIUM TOUR for Nara (Half-day Tour)

Date:	Afternoon on Sept. 15 (Wed), 1999
Fare:	Attendees : No Fee
	Companions : \$30 (Includes box lunch)
Transportation:	Bus

For a 70-year period or more following the establishment of the Heijokyo capital in Nara in 710, it became Japan's political and cultural hub. Japanese civilization, deeply influenced by Chinese culture, blossomed in Heijokyo. Nara is a place of a long history, whose legacy is still very much alive in the city's many famous buildings and ruins and in its many magnificent works of art.

Todayji Temple:

Founded in the 8th century as the general headquarters of the provincial temples, it houses the world's largest bronze image of Buddha in the main hall, and a lot of sculptures from the 8th century.

Kasuga Shrine:

Established in the 8th century, the most famous and beautiful Shinto shrine in Nara. It features some 3,000 antique stone and bronze lanterns.

Kofukuji Temple:

Founded in the 8th century, it ruled Nara with more than 50,000 warrior priests in the 13th and 14th century. It has the second highest five-storied pagoda in Japan and many Buddhist sculptures.

COMPANION TOURS -- Short Tours

Some companion programs will be scheduled during the Symposium, such as Ikebana (flower arrangement), Ocha-kai (tea ceremony) and short city-tours.

1) Enjoy Ikebana (flower arrangement) and Ocha-kai (tea ceremony)

Date:	Full day on Tuesday, Sept. 14
Fare:	\$30
Transportation:	Bus or Train
Lunch:	Included

IKEBANA (Floral Art)

Japanese floral art (Ikebana) was brought to its peak of refinement in the latter half of the 16th century. Along with the tea ceremony, Ikebana is very popular among young Japanese ladies, and there are schools where they can go to learn it. Ikebana can be divided into two styles, Nageirebana and Moribana, depending on the type of vase used.

OCHA-KAI (Tea Ceremony)

Ocha-kai (Tea ceremony) or Sado (lit. the way of tea) was perfected by Master Senno-Rikyu based on the spirit of "ZEN" in the 16th century.

For Japanese people, tea ceremony is a mental discipline for pursuing "WABI" (a state of mind in which a person is calm and content, with a profound simplicity), and is at the same time a performance in which form and grace are paramount.

2) Short city-tour (visit Osaka castle, etc.)

Date:	Afternoon on Thursday, Sept. 16
Fare:	\$20
Transportation:	City-Bus or Train(Subway)

Osaka Castle was built by Hideyoshi Toyotomi, who succeeded in unifying the entire country in the 16-th century. Destroyed in the past by war and fire, the castle has since been rebuilt, and the present-day castle tower was constructed with the aid of financial contributions from the people of Osaka. The castle grounds now form a large, tree-filled park.

OPTIONAL TOUR

Sightseeing in Kyoto (1- day Tour)

Date:	Sep 18 (Sat), 1999
Fare:	\$50
Transportation:	Bus
Number of Participants:	min.10 to max. 50 people
Lunch:	Included

Kyoto was the capital of Japan for about 1,000 years, from her establishment as Heiankyo in 794 until the transfer of government to Tokyo in 1868 following the Imperial Restoration. Kyoto has provided over the last twelve centuries a natural cradle for the art and culture of Japan, and a noble heritage for her people. For this reason Kyoto is known as the spiritual home of Japanese people.

Nijo Castle:

The Tokugawa shogunate built this castle in 1603. Nijo Castle is noted for the contrast of its solemn appearance and gorgeous interiors.

Golden Pavilion:

Built as a villa in 1397 by Ashikaga Yoshimitsu and later converted into a temple. The Golden Pavilion is covered in gold leaf and stands in the middle of a spacious pond garden.

Kyoto Imperial Palace:

The ancient Imperial Palace clearly shows the Japanese taste for purity, simplicity and calmness.

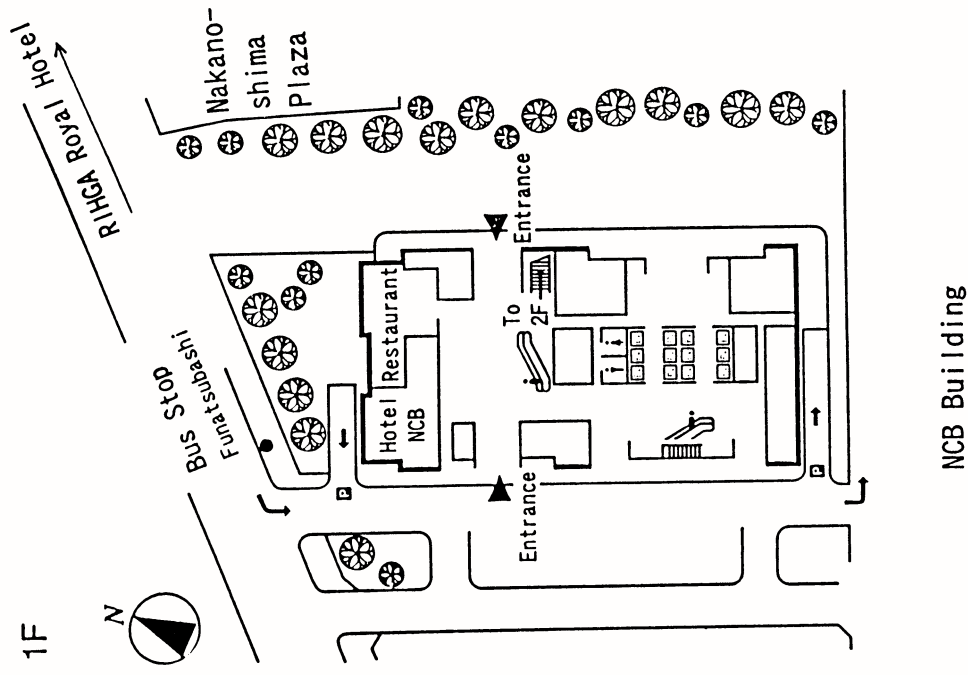
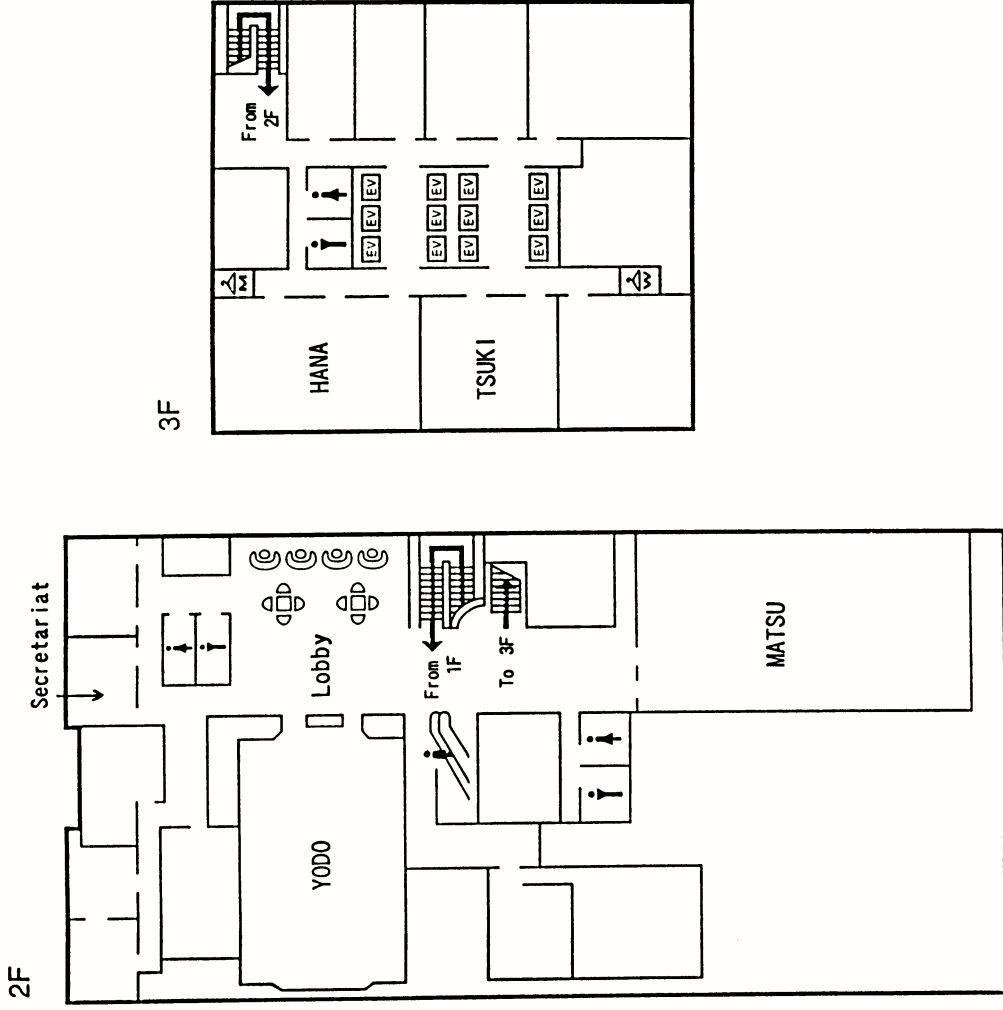
Kiyomizu Temple:

Kiyomizu Temple was founded in 780 and has attracted the faith of ordinary people ever since. Many of the present structures were built in the 15th-17th centuries. The temple is especially famous for the wooden balcony extending from the Main Hall.

Heian Shrine:

Graceful medieval court life is reflected in this brightly colored shrine with its vermilion pillars and green roof and enchanting inner gardens and ponds.

Symposium Site (RIHGA Royal NCB)



Coffee Service	PA3.06 - Griffin	PA3.05 - Gold	PA3.02 Markina
	PA1.10 - Fletcher	PA3.09 - Taketa	PA2.12 Markina
	PA1.09 - Thornton	PA3.10 - Sakane	PA2.09 Angelone
	PA1.07 - Nakazawa	PA2.01 - Kobayashi	PA2.10 - Aoyama
	PA1.06 - Sato	PA2.02 - Holden	PA2.13 - Urabe
	PA1.05 - Gil	PA1.08 - Remec	PA2.14 - Shiroya
	PA1.04 - Brunovsky	PA3.08 - Fero	PA2.07 - Tulin
	PA1.03 - Zsolnay	PA1.12 - Fero	PA2.11 - Markina
	PA1.02 - Ilieva	PA1.11 - Matsumura	PA2.05 - Shinakawa
		PA2.03 - Hong	PA2.06 - De Raedt
		PA2.04 - Voorbraak	
		PA2.05 - Shirakawa	
		PA2.06 - De Raedt	
		PA2.07 - Tulin	
	PA2.11 - Markina		
Entrance			

POSTER SESSION A

Coffee Service	PB4.04 Bateman	PB4.02 - Holden	PB6.05 Iida
	PB4.05 - Kobayashi	PB4.06 - Baba	PB6.06 Shikama
	PB4.07 - Ochiai	PB4.08 - Bern	PB6.07 - Stubbins
	PB4.09 - Zolotarev	PB4.10 - Cho	PB6.08 - Ballesteros
	PB4.03 - Pashchenko	PB5.14 - Lopasso	PB6.09 - J.-A. Wang
	PB5.08 - Cowan	PB5.07 - Petronic	
	PB5.13 - Sitarantan	PB5.11 - Haghghat	
	PB5.06 - Kitagawa	PB5.05 - Haghghat	
	PB5.04 - Popova	PB6.04 - Stoller	
	PB5.03 - Y. Wang	PB6.01 - Caro	
	PB5.02 - Bohmer	PB6.02 - Yoshiue	
	PB5.01 - Shimaansky	PB6.03 - Kirsanov	
Entrance			

POSTER SESSION B

Coffee Service	PC7.14 - Gold	PC7.13 - Usatyi	PCLN.01 - Agosteo
	PC7.15 - Tsuruta	PC7.12 - Zlokazov	PCLN.02 - Uenohara
	PC7.16 - Kakuta	PC7.09 - Mori	PCLN.03 - Miyashita
	PC7.17 - Misawa	PC7.08 - Martinez	PCLN.04 - Fujikawa
	PC7.18 - Blandin	PC7.07 - van der Meer	PCLN.05 - Jehouani
	PC7.19 - Bongeremans	PC7.06 - Colomb	
	PC7.20 - Kitamura	PC7.11 - Sakasai	
		PC7.10 - Ruddy	
		PC7.05 - Borodkin	
		PC7.04 - Grtzyay	
		PC7.03 - Cvachovec	
		PC7.02 - Kudo	
		PC7.01 - Hawari	
Entrance			

POSTER SESSION C

Kansai Area Map

