

TABLE OF CONTENTS

Welcome Address by Ph. Savelli / Discours de Bienvenue par Ph. Savelli	11
Concluding Speech by C. Puyal / Discours de Clôture par C. Puyal	13

Session 1: Nuclear Power Plant Surveillance Feedback Experience
 Session Chairmen: R. BAEYENS (Belgium), D. STEGEMANN (Germany)

Summary of Session 1a	20
1.1 Experience with Vibration Monitoring in German PWRs Obrigheim, Grohnde, Brokdorf and Emsland	23
<i>D. Stegemann, J. Runkel (Germany)</i>	
1.2 Korean Experience in Neutron Noise Monitoring of Nuclear Power Plant	32
<i>T.R. Kim, S.H. Jung, Y.S. Joo, C.M. Sim (Korea)</i>	
1.3 Operational Feedback on Internal Structure Vibration in 54 French PWRs during 300 Fuel Cycles	40
<i>A. Trenty (France)</i>	
1.4 Experience with a PC-based System for Noise and DC Signal Analysis in PWRs	49
<i>H.M. Hashemian (USA)</i>	
1.5 Application of Noise Analysis in two BWR Units of Nuclear Power Plants Gundremmingen	58
<i>J. Runkel, E. Laggiard, D. Stegemann, J. Fiedler, P. Heideman, H.P. Mies, R. Oed, F. P. Weiss, F. Altstadt (Germany)</i>	
Summary of Session 1b	67
1.6 Experiences with a Reactor Noise Diagnostics System for WWER-1000-type Russian Reactors	69
<i>G. Por (Hungary), P. Kantor, I. Sokolov (Russia)</i>	
1.7 Results of Noise Analysis in the WWER-440-type Nuclear Power Plant Dukovany	78
<i>J. Runkel, D. Stegemann, J. Fiedler (Germany), P. Hrosso, S. Fignedy (Slovak Rep), J. Sadilek, J. Hulin (Czech Rep.)</i>	
1.8 Development and Application of Noise Analysis in CANDU Reactors: Ontario Hydro's Experience Gained in the Past Three Years	87
<i>O. Glockler, M. Tulett (Canada)</i>	
1.9 Vibration Measurements in the Argentine CANDU Reactor Embalse by Use of Neutron Noise Analysis	97
<i>J. Fiedler, J. Runkel, D. Stegemann, E. Laggiard (Germany), V. Lescano, M. Guevara, C. Moreno (Argentina)</i>	

1.10	Evolution of FBR Surveillance Using a Noise Analysis and an On-line Signal Processing	106
	<i>J.P. Trapp, R. Berger, A. Lebrun, C. Lhuillier, M. Portier, M. Dicrescenzo, J. L. Perrin, L. Martin (France)</i>	

Session 2: BWR Stability Monitoring
Session Chairman: I. PAZSIT (Sweden)

Summary of Session 2	116
2.1 Coupled Map Lattice Approach to the Stability of Power Reactors	120
<i>R. Kozma, H. Konno, M. Kitamura (Japan)</i>	
2.2 On-line Lyapunov-exponent Estimation of the Decay Ratio in BWR NPP	128
<i>R. Sanchis, G. Verdu, J.L. Munoz-Cobo, M. Bovea, D. Ginestar, I.M. Tkachenko (Spain)</i>	
2.3 Study of BWR Stability at Kashiwazaki BWR Unit 4 Using the On-line Stability Monitor SIMON-64	137
<i>T. Anegawa, M. Ishikawa (Japan), R. Oguma, J. Lorenzen (Sweden)</i>	
2.4 The Use of the Gamma Thermometer as a Multipurpose Sensor.....	146
<i>V. Tosi (Norway), J. Blazquez (Spain)</i>	
2.5 The Noise Analysis and the BWR Operation Map	155
<i>J. Blazquez, J. Ballestrin (Spain)</i>	

Session 3: Signal Processing Advances and Applications
Session Chairmen: H. KONNO (Japan), E. TURKCAN (The Netherlands)

Summary of Session 3a	166
3.1 Separation Between Vibratory Modes in Internal Structure Monitoring Domain	168
<i>L. Cai, G. d'Urso, C. Vincent, A. Trenty (France)</i>	
3.2 Wavelet Analysis of Fast, Short-lived Transients with Noise.....	176
<i>D. Belluzo, M. Marseguerra, S. Tarantola (Italy)</i>	
3.3 Transient Detection by Wavelet Transform in Plant Monitoring	185
<i>O. Ciftcioglu (Turkey), E. Turkcan (The Netherlands)</i>	
3.4 PWR Reactor System Monitoring Using MAR Network Parameters	194
<i>J. Uchiyama, Y. Itami, H. Shirosaki (Japan)</i>	
3.5 Noise Source Analysis of Nuclear Ship Mutsu Plant Using Multivariate Autoregressive Model	203
<i>K. Hayashi, J. Shimazaki, Y. Shinohara (Japan)</i>	
Summary of Session 3b	212
3.6 Numerical Processing of the Core Temperatures for FBR Cores Surveillance	214
<i>A. Lebrun, J.P. Trapp (France)</i>	
3.7 New Statistical Features for Leak Noise Detection in Steam Generator Units of Liquid-metal Fast-breeder Reactors.....	223
<i>G.S. Srinivasan, OP. Singh (India)</i>	

3.8	Practical and Theoretical Aspects of the Sequential Probability Ratio Test for Anomaly Detection.....	231
	<i>H. Schoonewelle, T.H.J.J. Van der Hagen, J.E. Hoogenboom (The Netherlands)</i>	
3.9	Boiling Anomaly Detection by Various Signal Characterization Methods.....	240
	<i>M. Sakuma, R. Kozma, M. Kitamura (Japan), H. Schoonewelle, J.E.Hoogenboom (The Netherlands)</i>	
3.10	PWR Moderator Temperature Coefficient Measurement Using Autoregressive Modelling	249
	<i>J.C. Garcia Cuesta, J.B. Blazquez Martinez (Spain)</i>	
3.11	Measurement of Steam Temperature Fluctuations at Outlet of Once-through Steam Generator Tubes	256
	<i>R.K. Vyjayanthi, R. Prabhakar, A. Rajakumar, G. Vaidyanathan (India)</i>	

Session 4: Neural Networks Utilization for Monitoring
Session Chairmen: Ö. CIFTCIOGLU (Turkey), O. GLOCKLER (Canada)

Summary of Session 4a.....	266	
4.1	Neural Network with an Expert System for Real-time Nuclear Power Plant Monitoring	269
	<i>K. Nabeshima, K. Suzuki (Japan), E. Turkcan (The Netherlands)</i>	
4.2	Multiresolution Pattern Analysis for Neural Network Training.....	278
	<i>E. Turkcan (The Netherlands), O. Ciftcioglu (Turkey)</i>	
4.3	Noise Analysis Studies with Neural Networks	286
	<i>S. Seker, O. Ciftcioglu (Turkey)</i>	
4.4	Advances in Spectral Analysis Using Artificial Neural Networks.....	292
	<i>J.M. Martinez, V. Vigneron (France)</i>	
4.5	Pattern Recognition, Neural Networks, Genetic Algorithms and High Performance Computing in Nuclear Reactor Diagnostics – Results and Perspectives	302
	<i>W. Dzwiniel (Poland), Y.N. Pepyolyshev (Russia)</i>	
4.6	Possible Improvements of the Reactor Safety via Neural Networks	311
	<i>M. Marseguerra, E. Pandovani (Italy)</i>	
Summary of Session 4b	321	
4.7	Applying Artificial Neural Networks in Nuclear Power Plant Diagnostics.....	323
	<i>J. Kiss, A. Soumelidis, J. Bokor (Hungary)</i>	
4.8	Adaptive Surveillance Technique for Recognition of Noisy Signals in NPP and its Applications to Acoustic Leakage Detection System in LMFBR.....	332
	<i>A. Gribok, A. Volov (Russia)</i>	
4.9	Nuclear Power Plant Monitoring and Fault Diagnosis Methods Based on the Artificial Intelligence Technique.....	341
	<i>S. Yoshikawa, A. Saiki (Japan), D. Ugolini (Italy), K. Ozawa (Japan)</i>	
4.10	Neural Network Techniques for Control Rod Localization	350
	<i>O. Glöckler (Canada), I. Paszít, N.S. Garis (Sweden)</i>	
4.11	Acoustic Leak Monitoring with Neural Networks at Complicated Structures	359
	<i>G. Hessel, W. Schmitt, F.-P. Weiss (Germany)</i>	

Session 5: Leak Detection in Primary Systems
 Session Chairman: C. MAYO (USA)

Summary of Session 5	368
5.1 Primary Circuit Leak Detection: An Application on PWR Vessel Head Penetrations..... <i>F. Loisy, J.L. Germain, L. Chauvel (France)</i>	372
5.2 Continuous Leak Monitoring and Long-term Experiences at Paks Nuclear Power Plant, Hungary.... <i>A. Peter, I. Jozsa, P. Szabo (Hungary)</i>	380
5.3 Results of the IAEA Coordinated Research Programme on Acoustic Signal Processing for the Detection of Boiling or Sodium/Water Reaction in LMFRs <i>A. Rinejski (IAEA), O.P. Singh et al. (India)</i>	389
5.4 Primary Circuit Boundary Integrity Monitoring Using Continuous Non-invasive Radiation Methods .. <i>G. Champion, J.M. Favennec, J. Veau, P. Moussou (France)</i>	399
5.5 Development and Testing of On-line Detection Systems for Cavitation, Subcooled Boiling and Leaks in NPP Components <i>D. Tirelli (Italy)</i>	404
5.6 Active Acoustic Leak Detection in Steam Generator Units of Fast Reactors <i>L. Oriol, C. Journeau (France)</i>	413

Session 6: Thermohydraulics Measurements and Boiling Detection
 Session Chairmen: P. LIEWERS (Germany), T. VAN DER HAGEN (The Netherlands)

Summary of Session 6a.....	424
6.1 Early Boiling Detection Method of Pre or Post Accident Situation on VVER and RBMK <i>K. Proskuriakov (Russia)</i>	426
6.2 Behaviour of Reactor Noises During Simulation of Local Anomalies in Fast Sodium Reactor BOR-60 Reactor Core <i>S.N. Eshchenko, V.N. Yefimov, A.A. Minakov (Russia)</i>	435
6.3 Interpretation of Cross-correlation Transit Time from LPRM Signals in a BWR..... <i>F. Barrio, J.B. Blazquez (Spain)</i>	445
6.4 Development of an Ultrasonic Flow and Temperature Measurement System for Pressurized-water Reactors <i>R.W. James, T. Lubnow, M.C. Baumgart, M.D. Ravetti (USA)</i>	454
6.5 Primary Flow and Temperature Measurements in PWRs Using Non-invasive Techniques..... <i>J.M. Favennec, G. Jossinet, P. Thomas (France)</i>	462
Summary of Session 6b	471
6.6 Experience with the Application of Noise Analysis Based Measurement Techniques to the Dodewaard Natural Circulation Cooled Boiling-water Reactor..... <i>A.J.C. Stekelenburg, T.H.J.J. Van der Hagen (The Netherlands)</i>	474
6.7 On the Fast Estimation of Transit Times – Application to BWR Simulated Data..... <i>M. Antonopoulos-Domis (Greece), M. Marseguerra, E. Pandovani (Italy)</i>	483

6.8	FlowAct, a Neutron Activation Method for the Measurement of Feed-water Flow	492
	<i>I. Pazsit, G. Grosshoeg (Sweden)</i>	
6.9	Diagnostics of Tokamak Fusion Plasma via Correlation Analysis of Soft X-ray Signals.....	501
	<i>I. Pazsit (Sweden), R.D. Gill (UK)</i>	
6.10	New Developments in Nuclear and Acoustic Instrumentation for the Vessel Water Level Monitoring in Accidental Situations.....	510
	<i>G. Bignan, C. Lhuillier, A. Mariani (France)</i>	

Session 7: System Feedback Experience and New System Development

Session Chairmen: R. KRYTER (USA), H. KITAMURA (Japan)

Summary of Session 7a	520	
7.1	Portable System for Reactor Noise Data Acquisition.....	523
	<i>S. Craig, P. Tonner, J. Johnston, E. Nicholson, O. Glockler, D. Williams (Canada)</i>	
7.2	Improving Nuclear Power Plant Reliability through Predictive Maintenance	532
	<i>U. Kunze (Germany)</i>	
7.3	Development of Reactor Internals Vibration Monitoring System (RIVMOS) Using Ex-core Neutron Noise	541
	<i>Y.S. Joo, H.S. Eom, C.M. Sim, S.L. Lee, C.U. Yee, H. K. Jeong, K. S. Jang, C. U. Yi (Korea)</i>	
7.4	Monitoring and Aid to Diagnosis of French PWRs.....	549
	<i>A. Jousseilin, A. Trenty, J.C. Benas, Y. Renault, J.L. Busquet, B. Mouhamed (France)</i>	
Summary of Session 7b	558	
7.5	Technical Diagnostics of V1 and V2 Nuclear Power Plants at Jaslovské Bohunice, Slovak Republic	561
	<i>P. Hrosso, J. Maudry, J. Korec, I. Terneny (Slovakia)</i>	
7.6	A Reactor Equipment Monitoring System for Japanese PWRs.....	572
	<i>J. Uchiyama, K. Skai, (Japan)</i>	
7.7	A Family of Integrated Information and Expert Systems for Plant Noise Analysis	581
	<i>A. Racz, S. Kiss, T. Czibok, J. Laz, S. Lipcsei, O. Glodi, T. Csikos, T.D. Tri, K. Krinisz, G. Pataki and A. Devenyi (Hungary)</i>	
7.8	An Open System Approach to Change Detection and Failure Monitoring of Complex Plants: The NPP Experience.....	590
	<i>J. Kiss, J. Bokor, A. Edelmayr, A. Soumelidis (Hungary)</i>	