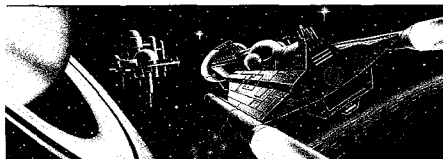


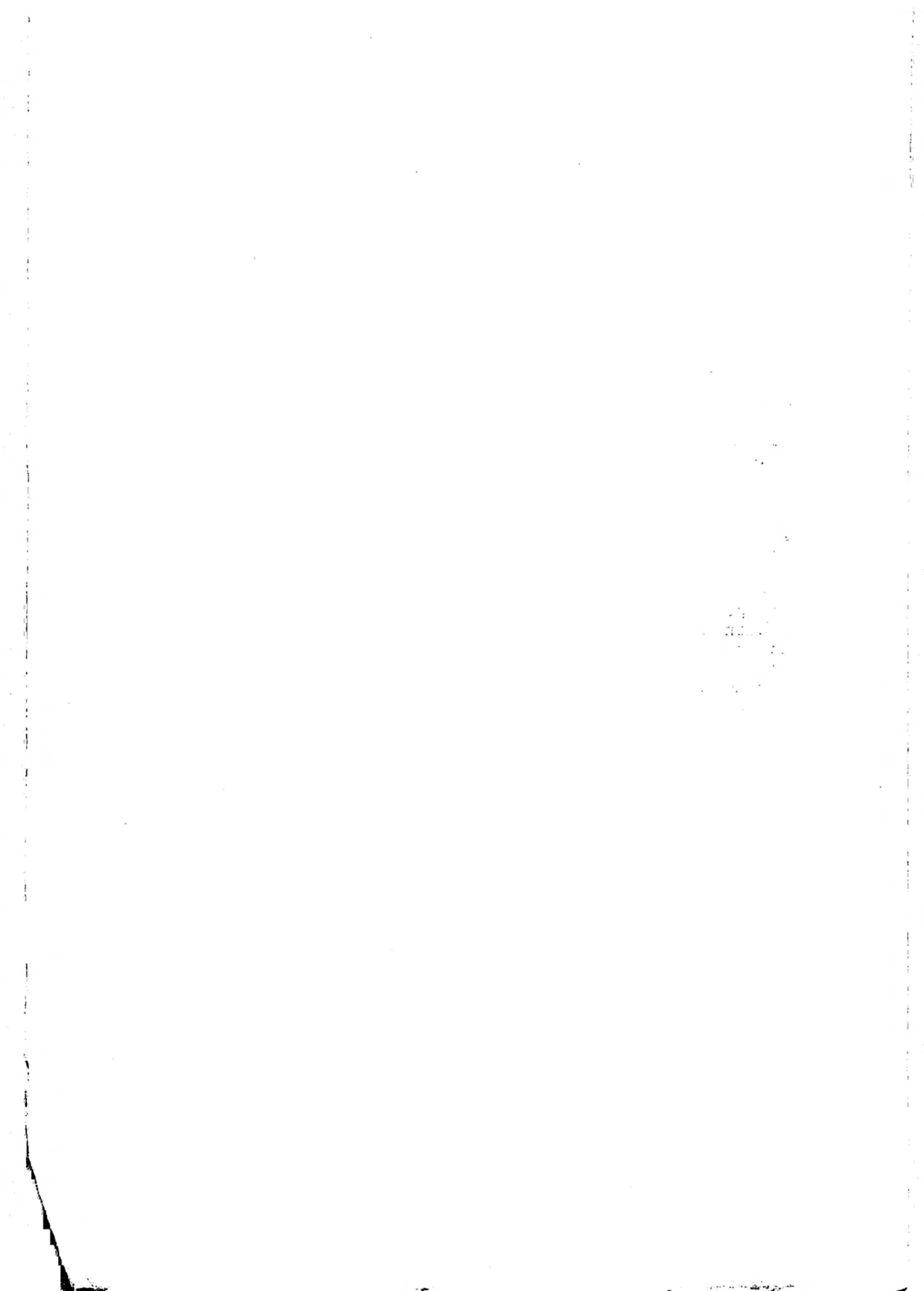
PROCEEDINGS OF THE
1979 SIMULATION SYMPOSIUM ON
REACTOR DYNAMICS AND PLANT CONTROL
HELD AT
ORANGEVILLE, ONTARIO
APRIL 17-18, 1979

Compiled by: R.A. Brown
J.C. Luxat

Nuclear Studies and Safety Department
Ontario Hydro
700 University Avenue
Toronto, Ontario M5G 1X6
April 1979



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FOREWORD

Following the lead started at the 5th Simulation Symposium, more papers were submitted than could be handled in two days. It was, therefore, decided that some parallel sessions be attempted this year since the facilities were available.

We will make every effort to run these parallel sessions in an efficient manner in order to judge the feasibility of this approach for future years.

The texts for those papers, which arrived before the printing deadline, are included in these Proceedings. My thanks to the various authors and their respective managements for their cooperation. Information regarding the text of other papers, not included herein, may be obtained by contacting the author.

I wish to thank all those who have helped to organize this meeting and Dr. J. Luxat, Mrs. W. Weatherson and Mr. M. Clements for their invaluable assistance in producing this document.

R.A. Brown
Ontario Hydro
March 30, 1979

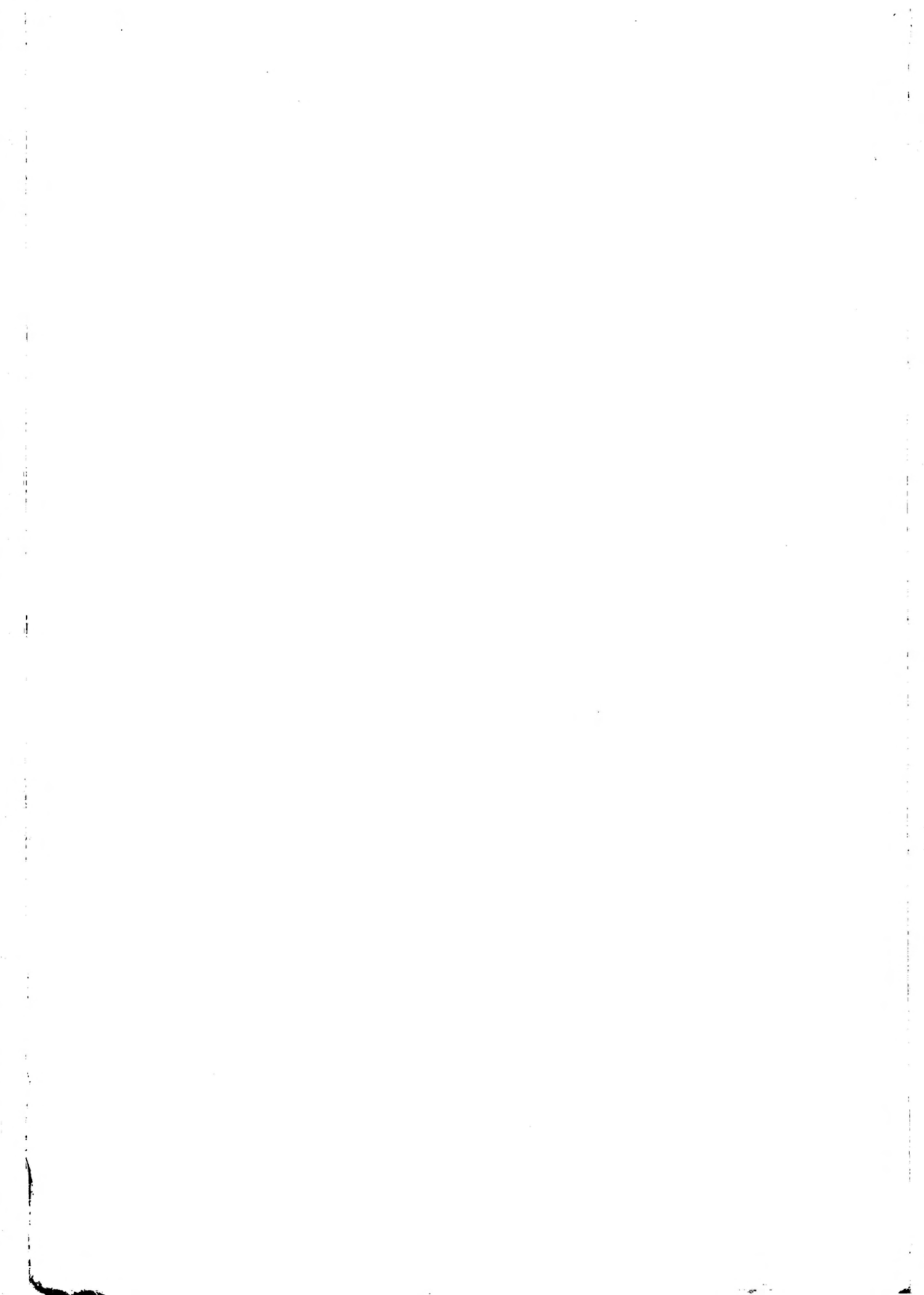


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PROGRAM
1979 SIMULATION SYMPOSIUM ON
REACTOR DYNAMICS AND PLANT CONTROL

SESSION I: NUMERICAL METHODS IN REACTOR ANALYSIS

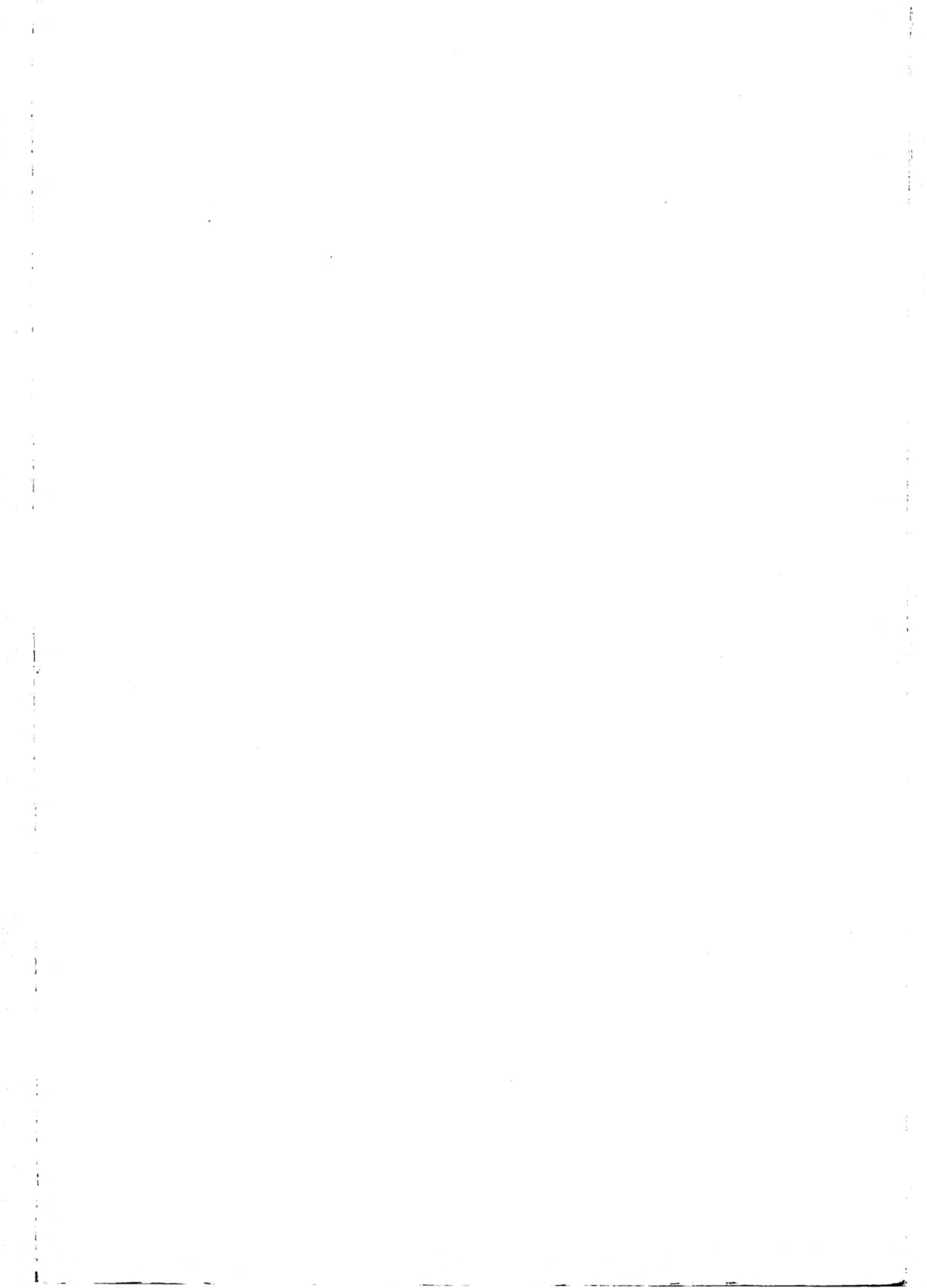
8:30 - 10:00 a.m. Tuesday, April 17
Chairman: D. Rozon (EP)

1. "IQS and FIM Solutions of Space - Time Dynamic Benchmark Problems Simulating Accidents in Two-Phase Flow Cooled One-Dimensional Reactors"
W. Paskievici (Ecole Polytechnique)
G. Parent and N. Seery (Hydro-Quebec)
2. "Preliminary Results of Multidimensional Static Calculations Using the EPKIN Code"
D.H. Chung (Ecole Polytechnique)
3. "Multiple-Error-Mode-Subtraction Extrapolation Technique"
B. Rouben and G. Kugler (AECL-EC)
4. "The Application of Perturbation Theory Based Optimization Methods for Reactor Design"
D. Rozon and D. McNabb (Ecole Polytechnique)
5. "A Probabalistic Approach to Safety System Evaluation: An Example Involving Application of Monté Carlo Techniques"
A.H. Chung and M. Khanna (Ontario Hydro)

SESSION II a: LATTICE AND CORE PHYSICS

10:30 - 12:00 a.m. Tuesday, April 17
Chairman: M.F. Duret (CRNL)

1. "Heterogeneous Lattice Physics: A Unified View"
R.A. Bonalumi (Ontario Hydro)
2. "A Synthesis Method for the Calculation of Booster Rod Parameters"
M. Mamourian, A.R. Dastur (AECL-EC)



3. "The Calculation of Collision Probability Integrals in Annular Geometry"
M. Milgram and K.N. Sly (CRNL)
4. "A Local Effect Correction Model for SMOKIN"
M.C. Crocker and A.R. Dastur (AECL-EC)
5. "Use of the Rectangular Lattice Code CHEBY for Simulating A Hexagonal Lattice"
M.D. Atfield (CRNL)

SESSION II b: REACTOR AND PLANT CONTROL

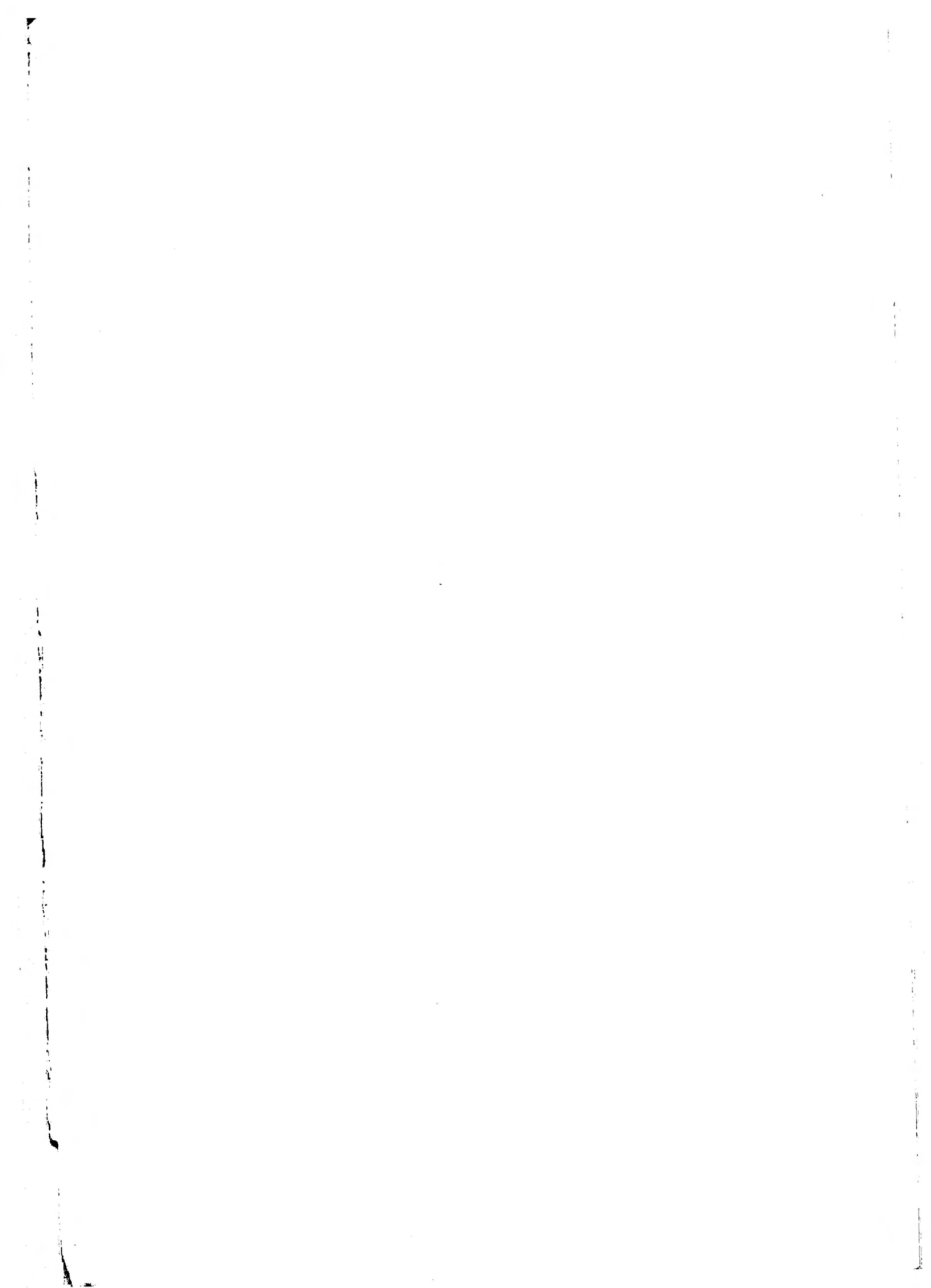
10:30 - 12:00 a.m. Tuesday, April 17
Chairman: E.M. Hinchley

1. "Design and Dynamic Performance of Bruce NGS B Feedwater Flow and Preheater Outlet Pressure Control System"
Q.B. Chou and K.L. Poon (Ontario Hydro)
2. "Conceptual Design of a Two-Phase Flow Absorber System for Neutron Flux Regulation in a CANDU-PHW-1250 Reactor"
R.M. Lepp, E.O. Moeck and J.S. Glen (CRNL)
3. "Dynamic Simulation of the Two-Phase Absorber Control System"
C.B. Lawrence (CRNL)
4. "Interactive Software and Data Structure for Multivariable Control System Design"
P.D. McMorran (CRNL)

SESSION III a: FUEL MANAGEMENT

1:30 - 3:00 p.m. Tuesday, April 17
Chairman: W.J. Penn (O.H.)

1. "Fuel Recycling in CANDU Reactors"
C. NGO-TRONG (Hydro-Quebec)

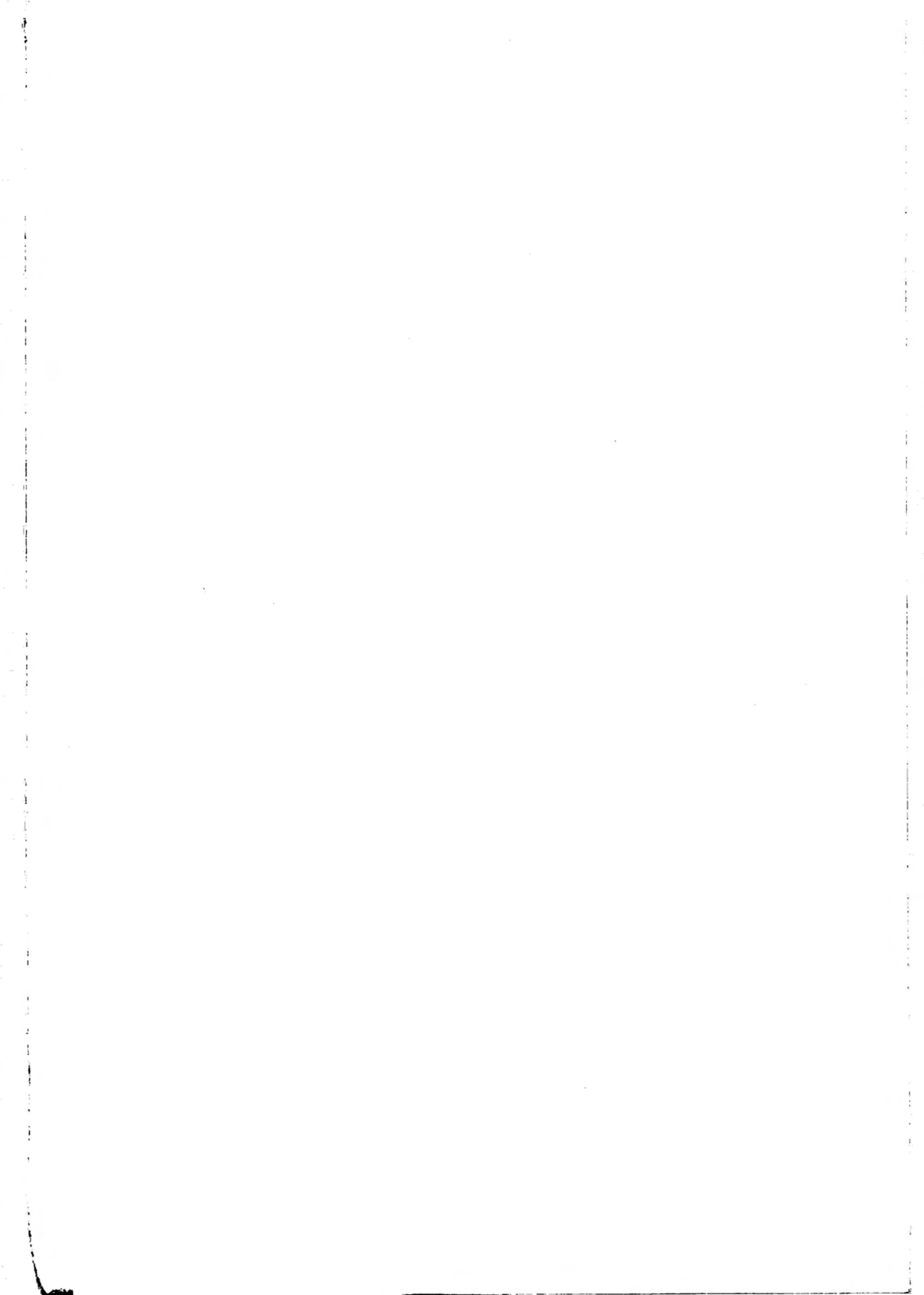


2. "Ontario Hydro Reactor Fuelling Simulation Program (OHRFSP), A Computer Program to Perform Core Design and Fuel Management Calculations for CANDU Reactors"
A.L. Wight (Ontario Hydro)
3. "Simulation of Fuel Management with Single-Ended Fuelling Scheme in 1250 MW(e) CANDU-PHW Reactors"
M. Gold and J. Marczak (AECL-EC)
4. "A Method to Estimate the Channel Power Peaking Factors in Low-Enriched Uranium CANDU Reactors"
J.H.K. Lau and R.A. Bonalumi (Ontario Hydro)
5. "The Effect of Reflector Thickness and Mixed Reflectors on Fuel Burnup in CANDU-PHW Reactors"
M.H. Younis and G. Kugler (AECL-EC)

SESSION III b: THERMALHYDRAULICS: ANALYTICAL METHODS

1:30 - 3:00 p.m. Tuesday, April 17
Chairman: B.H. McDonald (WNRE)

1. "PATRIC - A Computer Model for Predicting Containment Response Following LOCA"
R. Leung, J. Skears (Ontario Hydro) and S. Banerjee (SBA)
2. "A Series Explicit - Implicit Fluid Flow Algorithm"
W.M. Collins (AECL-EC)
3. "Psuedo-Characteristic Method of Lines Solution of First-Order Hyperbolic Equation Systems"
M.B. Carver (CRNL)
4. "A Distributed Parameter Model for the Dynamics of Compressible Two-Phase Flow"
S. Mensah and H.W. Hinds (CRNL)



SESSION IV: ROP AND FLUX MAPPING

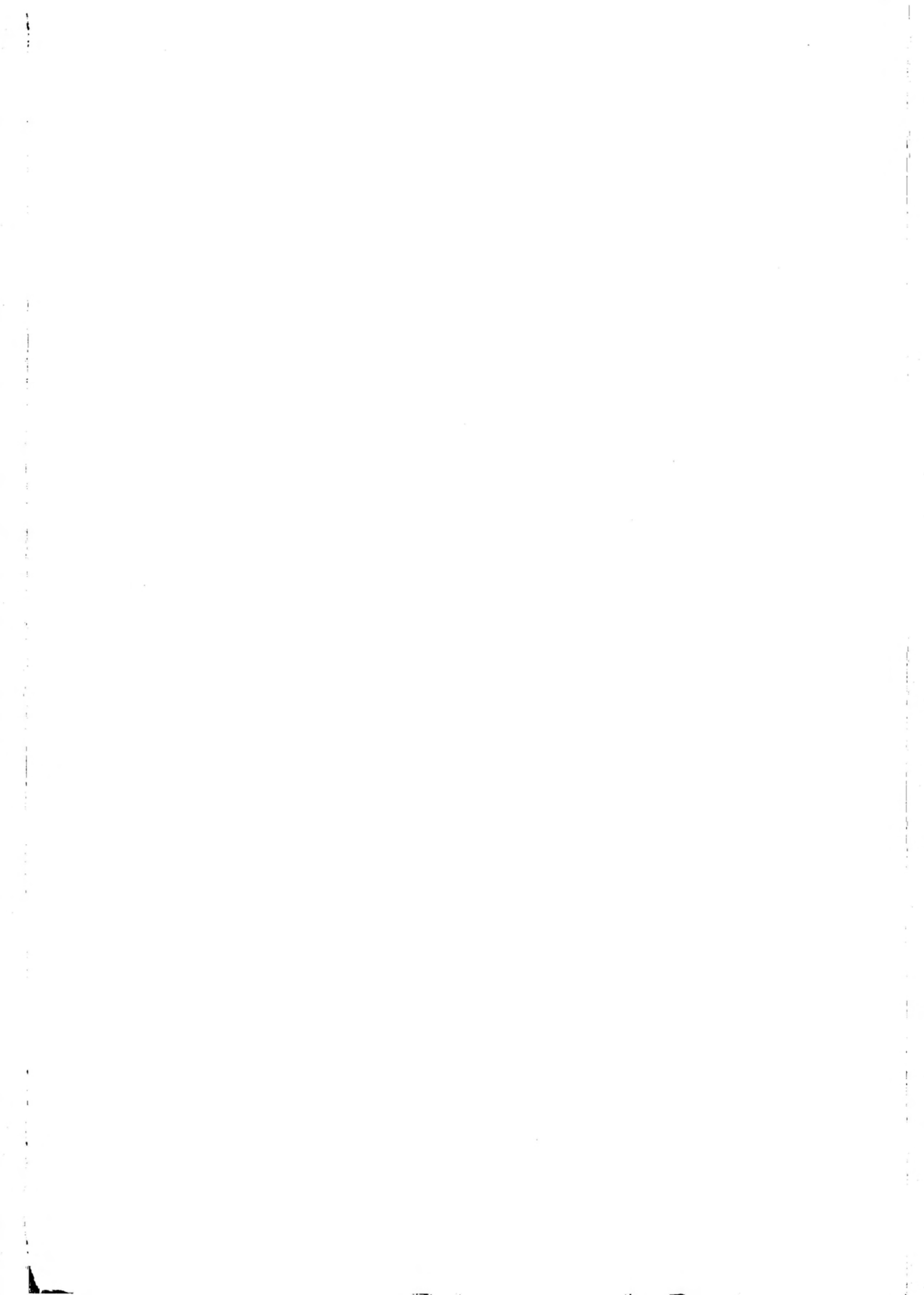
3:30 - 5:15 p.m. Tuesday, April 17
Chairman: A.A. Pasanen (AECL-EC)

1. "OPTROP: A Computer Code for Optimized Design of ROP Detector Systems"
C.M. Bailey (AECL-EC)
2. "Development and Application of a Methodology for the Design of Regional Overpower Protection Systems"
E.A. Attia, G.M. Frescura and J.C. Luxat (Ontario Hydro)
3. "PMCR - A Power Mapping and Calibration Routine for 600 MWe CANDU-PHW Reactors"
G. Kugler (AECL-EC) and S.K. Oh (Korea Electric Co.)
4. "A Rationalized Mapping (RAM) System for Fuel Management and Power Monitoring"
R.A. Bonalumi (Ontario Hydro)
5. "Algebraic Aspects of Detector Layout Optimization for Flux Mapping"
J. Pauksens and A.K.T. Ho (AECL-EC)

SESSION V: CODE VERIFICATION - 1

8:30 - 10:00 a.m. Wednesday, April 18
Chairman: W. Harrison (WNRE)

1. "Verification of the SMOKIN Code with Test Data from Bruce NGS A"
J.C. Luxat, B.C. Choy and A.M. Lopez (Ontario Hydro)
2. "SORGHUM Simulation of Bruce NGS A Boosters"
S. Schafer and G. McCormack (Ontario Hydro)



3. "RD-12 Blowdown and Injection Tests-Comparison of Calculation with Experiment"
F.W. Barclay, T.E. MacDonald, D. Richards, H. Funasaka and H. Hasinoff (WNRE)
4. "SOPHT-B Verification: Bruce NGS A Turbine Load Rejection Test from 83% FP"
Y.F. Chang and J. Sherin (Ontario Hydro)

SESSION VI a: CODE VERIFICATION - 2

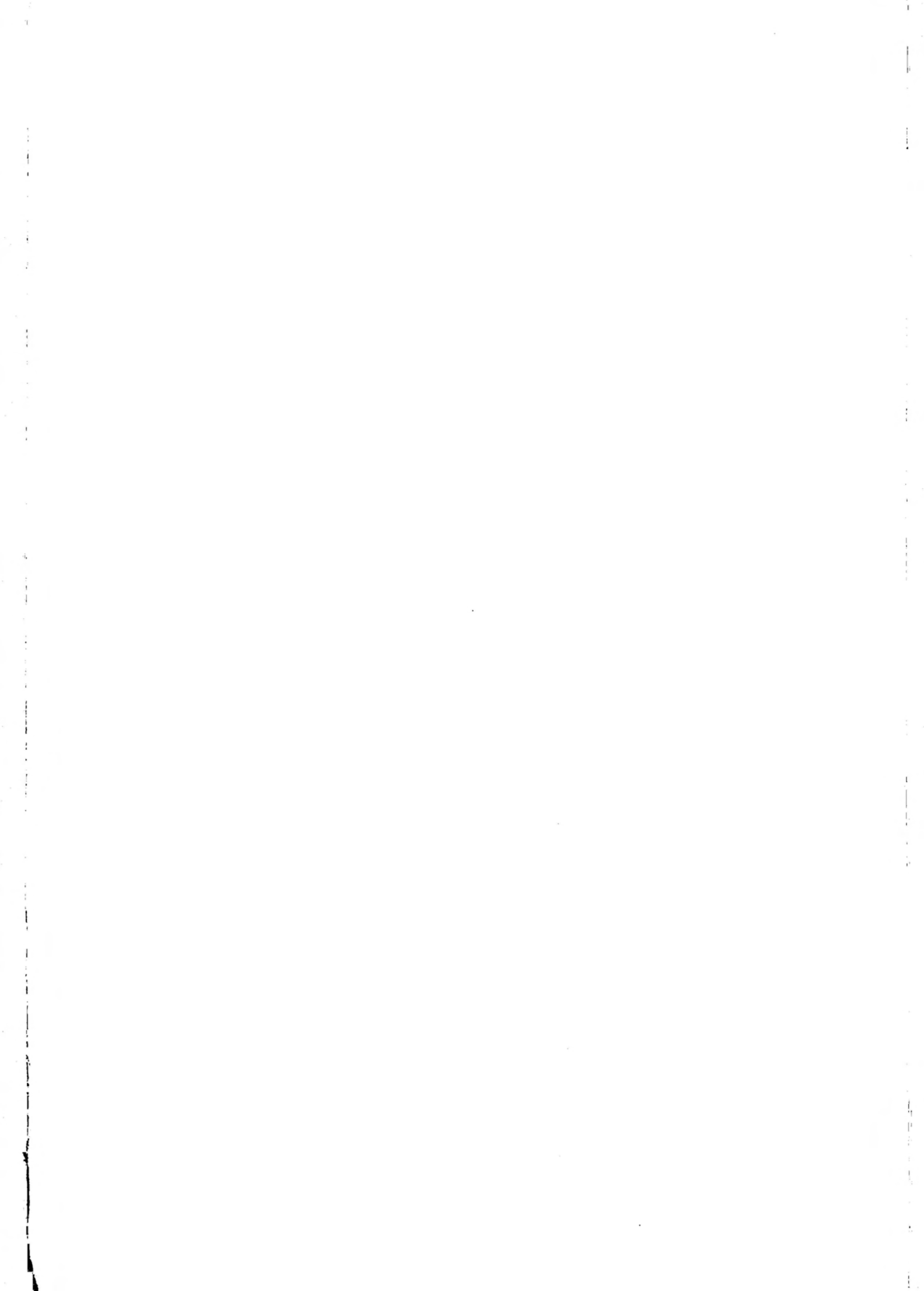
10:30 - 12:30 p.m. Wednesday, April 18
Chairman: D.A. Meneley (O.H.)

1. "Comparison of FIREBIRD Code Predictions with Westinghouse Canada Limited Cold Water Injection Experiments"
A.C.D. Wright and D.F. Rennick (AECL-EC)
2. "Comparison of Network FIREBIRD Predictions with an RD-12 5% Inlet Header Break Blowdown Experiment"
M.A. Couturier and D.F. Rennick (AECL-EC)
3. "Pressure Transient Following Fluid Discharge into a Liquid-Filled Vessel"
D.R. Pendergast (AECL-EC)
4. "A PRESCON Simulation of Transients in a Model Containment"
J.E. Dick (AECL-EC)

SESSION VI b: REACTOR DYNAMICS

10:30 - 12:30 p.m. Wednesday, April 18
Chairman: R.A. Bonalumi (O.H.)

1. "Simulation of Loss of Coolant Accidents at the Ontario Hydro Pickering NGS Simulator"
W.R. Bassermann and G.S. Hall (Ontario Hydro)



2. "Hybrid Computer Simulation of Space-Time Effects Using a Modal Approach"
B.M. Monaghan, F.N. McDonnell and H.W. Hinds (AECL-EC)
3. "Xenon Override and Load Following in a Thorium Fuelled CANDU-PHW"
N. Keller and C.B. Lawrence (CRNL)
4. "The Effect of Single-Ended Fuelling on Spatial Control"
P.S.W. Chan (AECL-EC)
5. "A Thermohydraulic Reactivity Feedback Option for the SORGHUM Code"
C.M. Bailey (AECL-EC)