

## TABLE OF CONTENTS

### 1. SYSTEM DESIGN I

SESSION CHAIRMAN: J. Griswold/Southern California Edison Company

- 1.1.1 RESULTS FROM STUDY OF POTENTIAL EARLY COMMERCIAL MHD POWER PLANTS, THIRD AND FINAL PHASE: PARAMETRIC VARIATION OF PLANT SIZE; F. Hals, C. Pian and L. Westra, AVCO Everett Research Laboratory, Everett, MA., W. Morgan, Chas. T. Main Inc., Boston, MA., C. Bozzuto and J. Clark, Combustion Engineering Inc., Windsor, CT.
- 1.2.1 MHD POWER GENERATION FOR THE SYNTHETIC FUELS INDUSTRY; M. S. Jones, Jr. Ebasco Services Inc., Newport Beach, CA.
- 1.3.1 UTILITY PERFORMANCE REQUIREMENTS FOR AN MHD ADVANCED TEST SYSTEM; F. E. Walter and L. J. Ike, The Montana Power Company, Butte, MT.

### 2. COMPONENTS

SESSION CHAIRMAN: D. deCoursin/ Fluidyne Engineering Corporation

- 2.1.1 ENGINEERING TEST FACILITY HEAT RECOVERY AND SEED RECOVERY CONCEPTUAL DESIGN; A. D. Bolek and B. K. Blackman, The Babcock & Wilcox Company, Barberton, OH:
- 2.2.1 MHD CERAMIC INTERMEDIATE TEMPERATURE OXIDANT HEATER STUDY; D. P. Saari, Fluidyne Engineering Corp., Minneapolis, MN., and A. W. Carlson, Burns and Roe Inc.
- 2.3.1 TRW ECONOSEED PROCESS FOR REGENERATION OF SPENT MHD SEED; R. A. Meyers and W. D. Hart, TRW Energy Technology Division, Redondo Beach, CA.

### 3. COAL COMBUSTORS

SESSION CHAIRMAN: R. Carabetta/Pittsburgh Energy Technology Center,  
United States Department of Energy

- 3.1.1 SINGLE STAGE TOROIDAL FLOW COAL FIRED MHD COMBUSTOR; J.O.A. Stankevics, C. C. Stewart, R. C. Beals and A.C.J. Mattsson, AVCO Everett Research Laboratory, Everett, MA.
- 3.2.1 AUSTRALIAN COALS AND THEIR USE IN MHD POWER GENERATION; Roy R. Rankin, University of Sydney, Sydney, Australia
- 3.3.1 CONTINUOUS OPERATING 20 MW<sub>t</sub> MHD COAL COMBUSTOR; M. Bauer, R. Hamberg, H. Iwata and G. Roy, TRW Energy Development Group, Redondo Beach, CA.

#### 4. GENERATORS I

SESSION CHAIRMAN: A. Solbes/TRW Electronics and Defense Systems

- 4.1.1 PERFORMANCE CHARACTERISTICS OF SUBSONIC GENERATORS; A. W. McClaine, D. W. Swallow and R. Kessler, AVCO Everett Research Laboratory, Everett, MA.
- 4.2.1 ANALYTICAL AND EXPERIMENTAL INVESTIGATIONS OF MHD GENERATOR LOADING FAULTS; I. Sadovnik, P. Weiss and V. J. Hruby, AVCO Everett Research Laboratory, Everett, MA.
- 4.3.1 1000 HOUR MHD ANODE TEST; V. J. Hruby, R. Kessler, S. W. Petty and P. Weiss, AVCO Everett Research Laboratory, Everett, MA.
- 4.4.1 RESULTS AND COMPARISON OF HALL AND DW DUCT EXPERIMENTS; J. Marlin Smith and J. L. Morgan, NASA-Lewis Research Center, Cleveland, OH.
- 4.5.1 HPDE PERFORMANCE IN THE FARADAY MODE; E. J. Felderman, G. L. Whitehead and L. S. Christensen, Calspan Field Services Inc./AEDC Division, Arnold Air Force Station, TN.
- 4.6.1 COM-FIRED MHD TEST FACILITY AND ITS OPERATING EXPERIENCE; T. Okuo, T. Honda, Y. Kaga and S. Ikeda, Electrotechnical Laboratory, Ibaraki, Japan

#### 5. GENERATORS II

SESSION CHAIRMAN: R. Kessler/AVCO Everett Research Laboratory

- 5.1.1 INVESTIGATIVE DATA ANALYSIS OF THE MARK VI FARADAY GENERATOR EXPERIMENTS; W. Unkel, D. W. Swallow and A. W. McClaine, AVCO Everett Research Laboratory, Everett, MA.
- 5.2.1 ANODE PHENOMENA IN MHD GENERATORS; E. Harmon-Weiss, W. Unkel, A. Y. Chang and J. A. Schwoerer, Massachusetts Institute of Technology, Cambridge, MA.
- 5.3.1 INTERFRAME RESISTANCE AND PERFORMANCE OF SMALL AND LARGE SCALE MHD GENERATORS; E. D. Doss and B. F. Picologlou, Argonne National Laboratory, Argonne, IL.
- 5.4.1 EXPERIMENTAL STUDIES OF A HIGH PERFORMANCE FARADAY TYPE MHD GENERATOR; He Hui-ying, Huang Chang-gang, Ni Qiu-ya, Wang De-zheng, He Xue-qiu, Yang Chang-qi, Wang Zheng, Pei Si-jia, Li Gang, Wang You-lin, Institute of Electrical Engineering, Academia Sinica, Beijing, China.
- 5.5.1 INSTABILITIES IN DISCRETE ELECTRODE MHD CHANNELS; W. W. Simpson, University of Sydney, N.S.W., Australia.

## 6. CLOSED CYCLE/DISK GENERATORS

SESSION CHAIRMAN: J. Sovie/NASA-Lewis Research Center

- 6.1.1 SOLAR LIQUID-METAL MHD PERFORMANCE PREDICTIONS; H. K. Geyer and E. S. Pierson, Argonne National Laboratory, Argonne, IL.
- 6.2.1 RESULTS OF COMBUSTION DRIVEN INFLOW DISK GENERATOR EXPERIMENTS; T. Nakamura, W. E. Lear and Y. Fang, Stanford University, Stanford, CA.
- 6.3.1 CURRENT DISTRIBUTION AND NONUNIFORMITY EXPERIMENTS IN A COMBUSTION DRIVEN MHD DISK GENERATOR; D. Roseman, T. Nakamura and R. Eustis, Stanford University, Stanford, CA.
- 6.4.1 DISK GENERATOR PROJECT AT SYDNEY UNIVERSITY; S. W. Simpson, S. M. Marty, R. R. Rankin and H. K. Messerle, University of Sydney, N.S.W. Australia.
- 6.5.1 THE FUJI-1 FACILITY FOR CLOSED CYCLE MHD POWER GENERATION EXPERIMENT; S. Shioda, H. Yamasaki, S. Kabashima, K. Yoshikawa, H. Harada and T. Abe, Tokyo Institute of Technology, Yokohama, Japan; Y. Hasegawa, Mechanical Engineering Laboratory, Ibaragi, Japan; T. Yokota, M. Ishimura, K. Matsutani, K. Nakamoto, T. Sasaki and K. Nakayama, Toshiba Corporation, Tokyo, Japan.
- 6.6.1 AN INTEGRAL METHOD ANALYSIS OF THE DISK GENERATOR BOUNDARY LAYER; Takashi Nakamura, Stanford University, Stanford, CA.

## 7. GENERATORS III

SESSION CHAIRMAN: J. Louis/Massachusetts Institute of Technology

- 7.1.1 EFFECTS OF CORE NONUNIFORMITIES ON THE PERFORMANCE OF MHD GENERATORS; C. Wynn and R. H. Eustis, Stanford University, Stanford, CA.
- 7.2.1 MEASUREMENTS OF PROPAGATING ACOUSTIC AND ENTROPY WAVES IN A COMBUSTION MHD GENERATOR; T. D. Simons, R. H. Eustis and M. Mitchner, Stanford University, Stanford, CA.
- 7.3.1 TIME DEPENDENT ANALYSIS OF FAULT CURRENTS IN MID-CHANNEL POWER TAKEOFF OF A DCW MHD GENERATOR; Motoo Ishikawa, Y. F. Liao, Y.C.L. Wu, and M. H. Scott, University of Tennessee Space Institute, Tullahoma, TN.
- 7.4.1 GASDYNAMIC PERFORMANCE IN RELATION TO THE POWER EXTRACTION OF THE EINDHOVEN MHD BLOW-DOWN FACILITY; P. Masee, W.F.H. Merck, C.C.P. Pian, J. C. Krause and W.J.M. Balemans, J.G.A. Arts, A. A. Bierens, J. P. van Dijke, H. J. Flinsenbergh, A.P.C. Holten, G. Huijgen, J. Kostka, J. W. Peters, M. L. Rutten, M.C.M. Smeets, A.G.C. van Stratum, J. P. Verhagen, L. H. Th. Rietjens, Eindhoven University of Technology, Eindhoven, The Netherlands.
- 7.5.1 ETL MARK VII MHD GENERATOR EXPERIMENTS; Y. Kusaka, K. Takano, T. Honda, K. Kato, T. Okuo, K. Onda, S. Korenaga, Y. Kaga, O. Nomura, S. Ikeda and Y. Aiyama, Electrotechnical Laboratory, Ibaraki, Japan; T. Imatake and Y. Fukaya, Mitsubishi Heavy Industry Co., Tokyo, Japan.

## 8. DIAGNOSTICS

SESSION CHAIRMAN: G. Staats/Mountain States Energy

- 8.1.1 CONDUCTIVITY MEASUREMENTS OF PHOSPHORUS DOPED POTASSIUM SEEDED MHD PLASMAS; W. Unkel and A. Freedman, Aerodyne Research Inc., Billerica, MA.
- 8.2.1 A NEW LINE-REVERSAL METHOD USING THE LIGHT POLARIZATION TECHNIQUE; N. Kayukawa, Y. Aoki, Y. Ozawa, K. Odagiri and K. Sato, Energy Conversion Research Institute, Hokkaido University, Sapporo, Japan.
- 8.3.1 COMBUSTOR PINHOLE CAMERA; A. B. Witte, TRW Space and Technology Group, Redondo Beach, CA.
- 8.4.1 LINESHAPE MEASUREMENTS OF POTASSIUM FOR RADIATION HEAT TRANSFER IN MHD GENERATORS; D. G. Goodwin and M. Mitchner, Stanford University, Stanford, CA.

## 9. COMPONENTS/ENVIRONMENTAL

SESSION CHAIRMAN: M. Jones/Ebasco Services Incorporated

- 9.1.1 FARADAY GENERATOR CONSOLIDATION TEST RESULTS USING D.C. GENERATOR EXCITATION; K. Marcotte, R. Johnson and S. Shink, Montana State University, Bozeman, MT.
- 9.2.1 CONSOLIDATION, CURRENT CONTROL AND SHUFFLE POWER REQUIREMENTS FOR FARADAY AND MULTI-TAP DIAGONAL GENERATORS; R. J. Rosa, Montana State University, Bozeman, MT.
- 9.3.1 DESIGN CHARACTERISTICS OF AN MHD RADIANT BOILER EXPERIMENT; L.S.H. Chow and J. L. Bailey, Argonne National Laboratory, Argonne, IL.
- 9.4.1 CONCEPTUAL DESIGN OF 4T and 6T SUPERCONDUCTING MAGNETS FOR A 200 MW<sub>e</sub> MHD ENGINEERING TEST FACILITY; P. G. Marston, A. M. Hatch, R. J. Thome and A. M. Dawson, Massachusetts Institute of Technology, Cambridge, MA.

## 10. PLASMA EFFECTS

SESSION CHAIRMAN: M. H. Scott/University of Tennessee

- 10.1.1 BOUNDARY LAYER BREAKDOWN ON CATHODES IN A COMBUSTION PRODUCT PLASMA WITH ALCALI SEED; R. Hernberg, Tampere University of Technology, Tampere, Finland; V. V. Kirillov and A. S. Tikhotsky, Institute of High Temperatures, U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.
- 10.2.1 LONG WAVE LENGTH ANALYSIS FOR FLUCTUATIONS IN PLASMA MHD GENERATORS; J. S. Walker, University of Illinois, Urbana, IL.

- 10.3.1 ELECTRODE PHENOMENA IN SEEDED MHD COMBUSTION PLASMAS; G.V.R. Raju, R. P. Dahiya and Bhmesh Gupta, Indian Institute of Technology, New Delhi, India.
- 10.4.1 TURBULENCE SUPPRESSION IN MAGNETOHYDRODYNAMIC POWER GENERATORS; J. C. Reis, C. H. Kruger, Stanford University, Stanford, CA.
- 10.5.1 EXPERIMENTAL AND THEORETICAL STUDY OF HALL FIELD LIMITATIONS; Wahid Hermina and Charles H. Kruger, Stanford University, Stanford, CA.
- 10.6.1 INVESTIGATIONS ON THE GASDYNAMICAL EFFECTS OF A NON-UNIFORM SUPERSONIC FLOW WITH STREAMERS IN A NOBLE GAS MHD GENERATOR; A.F.C. Sens, V. A. Bityurin, J. M. Wetzer, A. Veefkind and J.F.G. Brauers, Eindhoven University of Technology, Eindhoven, The Netherlands.
- 10.7.1 STREAMER DEVELOPMENT IN NOBLE GAS MHD CHANNELS IN RELATION TO SEED FRACTIONS; T. Hara, J. Umoto and A. Fujiwara, Kyoto University, Kyoto, Japan.

## 11. MATERIALS

SESSION CHAIRMAN: W. Jackson/Energy Consultant, Incorporated

- 11.1.1 THERMAL RESISTANCE OF BUFFER LAYER IN A CERAMIC WALL OF MHD GENERATION CHANNEL; Osami Nomura, Electrotechnical Laboratory, Ibaraki, Japan; Yoshihiro Ebata, Government Industrial Research Institute, Osaka, Japan and Kenichi Hijikata, Mitsubishi Metal Research Institute, Saitama, Japan.
- 11.2.1 MATERIALS SELECTION FOR HEAT RECOVERY AND SEED RECOVERY (HRSR) APPLICATIONS IN OPEN-CYCLE SYSTEMS; K. Natesan, Argonne National Laboratory, Argonne, IL.
- 11.3.1 CHARACTERISTICS OF SEED-SLAG FOULING IN MHD STEAM PLANTS; L.S.H. Chow, P. F. Dunn, T. R. Johnson, C. B. Reed and B. J. Schlenger, Argonne National Laboratory, Argonne, IL.
- 11.4.1 DEVELOPMENT AND TESTING OF HAFNIUM OXIDE-BASED MHD ELECTRODES; D. D. Marchant and J. L. Bates, Pacific Northwest Laboratory, Richland, WA.
- 11.5.1 EVALUATION OF COLD WALL ANODE MATERIALS; B. R. Rossing, I. K. Lloyd and H. D. Smith, Westinghouse Research and Development Center, Pittsburgh, PA.
- 11.6.1 STUDY OF REACTION KINETICS IN PLASMA SPRAYED CALCIA STABILISED ZIRCONIA-SLAG SYSTEM; J. Karthikeyan, N. Venkatramani and V. K. Rohatgi Bhabha Atomic Research Centre, Bombay, India.

## 12. ANALYTICAL STUDIES AND MODELING I

SESSION CHAIRMAN: R. Eustis/Stanford University

- 12.1.1 INSTABILITY ANALYSIS OF THE FIRST POWER RUNS WITH THE EINDHOVEN MHD BLOW-DOWN FACILITY; H. J. Flinsenbergh, J. P. van Dijke, A.P.C. Holten, C.J.J. Driessen and L.H. Th. Rietjens, Eindhoven University of Technology, Eindhoven, The Netherlands.
- 12.2.1 SLAG COMPOSITION CALCULATIONS USING A NON-IDEAL SOLUTION MODEL; C. A. Luongo and C. H. Kruger, Stanford University, Stanford, CA.
- 12.3.1 A GENERALIZED QUASI-ONE DIMENSIONAL ELECTRICAL MODEL FOR MHD GENERATORS; T. D. Simons, M. Mitchner and R. H. Eustis, Stanford University, Stanford, CA.
- 12.4.1 STEP RESPONSE OF A GLOBALLY CONTROLLED FARADAY CONNECTED MHD GENERATOR SYSTEM; R. Johnson, P. Mackin and B. Jordan, Montana State University, Bozeman, Montana.
- 12.5.1 THE TEST RESEARCH OF FLOW FIELD AND THE CALCULATION OF THE TRAJECTORY OF COAL PARTICLES IN JS-2 MHD COMBUSTOR; Zhao Changsui, Zhang Mingyao, Lin Zhongyan, Chen Wiangrong and Tang Huifen, Nanjing Institute of Technology, Nanjing, China.
- 12.6.1 WALL VERSUS IN-FLIGHT BURNING IN MHD COMBUSTORS; A. B. Witte, N. Gat, M. R. Denison, L. M. Cohen, TRW Space and Technology Group, Redondo Beach, CA.

## 13. SYSTEM DESIGN II

SESSION CHAIRMAN: F. Hals/AVCO Everett Research Laboratory

- 13.1.1 THE PERFORMANCE AND ECONOMIC ADVANTAGES OF MHD RETROFIT; C. Dennis, G. Berry, T. R. Johnson, V. Minkov and M. Petrick, Argonne National Laboratory, Argonne, IL.
- 13.2.1 TURBINE CONFIGURATIONS FOR COMBINED CYCLE MHD STEAM POWER PLANTS: EFFECTS ON DYNAMIC RESPONSE AND INTEGRITY; D. A. Rudgerg, J. C. Shovic and C. A. Heikes, Montana State University, Bozeman, MT.
- 13.3.1 EMISSION CONTROL OF ETL MARK VII MHD FACILITY; Y. Kusaka, K. Takano, S. Korenaga, K. Kato, T. Okuo, K. Onda, T. Honda, Y. Kaga, O. Nomura, S. Ikeda and Y. Aiyama, Electrotechnical Laboratory, Ibaraki, Japan; T. Imatake and Y. Fukaya, Mitsubishi Heavy Industry Company, Tokyo, Japan.
- 13.4.1 CONCEPTUAL DESIGN STUDY OF A 600 MW<sub>e</sub> COAL FIRED OPEN CYCLE MHD PLANT; S. Cervenka and R. A. van der Laken, Netherlands Energy Research Foundation (ECN), Petten, The Netherlands and G. K. Troost and T. W. Verbruggen, FDO, Technical Consultants, Amsterdam, The Netherlands.

## 14. ANALYTICAL STUDIES AND MODELING II

SESSION CHAIRMAN: M. Petrick/Argonne National Laboratory

- 14.1.1 PERFORMANCE STUDIES OF TWO-PHASE LOW TEMPERATURE LIQUID-METAL MHD SYSTEMS; I. K. Smith, The City University, London, England and H. Branover and A. Yakhot, Ben-Gurion University of the Negev, Beer Sheva, Israel.
- 14.2.1 A MODEL FOR THE THERMAL BREAKDOWN OF A SLAG LAYER ON AN ANODE WALL; R. Larsen, D. Westpfahl and R. Pollina, Montana State University, Bozeman, MT.
- 14.3.1 CALCULATION FOR THE COMPOSITION AND PROPERTIES OF SEEDED COAL COMBUSTION PRODUCTS AT A DIFFERENT SLAG REMOVAL RATE; Lu Haosheng, Li Daji, Tang Chuming and Xu Yiqian, Nanjing Institute of Technology, Nanjing, China.
- 14.4.1 QUASI-THREE-DIMENSIONAL MODELLING OF AN MHD COMBUSTION GENERATOR; P. Satyamurthy, N. Venkatramani and V. K. Rohatgi, Bhabha Atomic Research Centre, Bombay, India.
- 14.5.1 ANALYSIS OF TRANSIENT, MHD CHANNEL FLOWS BY A HYBRID LAX-WENDROFF/METHOD OF CHARACTERISTICS COMPUTER CODE; D. R. Wilson and C. S. Stewart, University of Texas at Arlington, Arlington, TX.
- 14.6.1 THE OPTIMIZATION OF MHD GENERATING DUCT; Da Qingli, Cheng Mingxi, Cheng Yongyuan and Xu Nanrong, Nanjing Institute of Technology, Nanjing, China.