Canadian Society for Chemical Engineering
Société Canadienne du Génie Chimique

33rd Canadian Chemical Engineering Conference 1983

Toronto, Ontario, Canada

October 2 - 5, 1983

PROCEEDINGS — VOLUME I

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Session 7 (Monday, October 3) **NEW FUELS***

Chairman: Toros Topaloglu, Project Leader
Automotive Energy Section
Ontario Ministry of Transportation
and Communication, Canada

*See also Session 40

Session 8 (Monday, October 3) **BIOMASS I (GENERAL)**

Chairman: D.G.B. Boocock, Associate Professor
Department of Chemical Engineering
and Applied Chemistry
University of Toronto
Toronto, Canada

Session 9 (Tuesday, October 4) **BIOMASS II (THERMAL LIQUEFACTION)**

Chairman: Ralph P. Overend, Task Coordinator, Renewable Energy, National Research Council, Ottawa.

Session 10 (Tuesday, October 4) **BIOMASS III (THERMAL LIQUEFACTION)**

Chairman: D.G.B. Boocock, Associate Professor Department of Chemical Engineering and Applied Chemistry University of Toronto, Toronto, Canada

Session 11 (Wednesday, October 5) **HEAVY OIL I**

Chairman: Dick Waugh, Vice-President,
Business Development,
Partec Lavalin,
Toronto, Canada

Session 12 (Wednesday, October 5) **HEAVY OIL II**

Chairman: Dick Waugh, Vice-President,
Business Development,
Partec Lavalin,
Toronto, Canada

Session 13 (Monday, October 3) **HAZARD ANALYSIS I**

Chairman: Douglas H. Napier, Professor
of Industrial Hazard Control,
Department of Chemical Engineering
and Applied Chemistry,
University of Toronto

Session 16 (Tuesday, October 4) **HAZARDOUS CHEMICALS MANAGEMENT II**

Chairman: Ronald S. Gurak, Senior Research Engineer, Imperial Oil Ltd., Sarnia, Canada.

Session 17 (Wednesday, October 5) **CORROSION AND PROTECTION I**

Chairman: Donald W. Kirk, Assistant Professor, Department of Chemical Engineering, and Applied Chemistry, University of Toronto, Toronto, Canada.

Session 18 (Wednesday, October 5) **CORROSION AND PROTECTION II**

Chairman: Donald W. Kirk, Assistant Professor, Department of Chemical Engineering and Applied Chemistry University of Toronto, Toronto, Canada.

Session 19 (Monday, October 3) **FLUID-PARTICLE SYSTEMS***

Chairman: E. Rhodes, Professor and Chairman,
Department of Chemical Enginerring
University of Waterloo

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Session 20 (Monday, October 3) **FLUID MECHANICS AND MULTIPHASE SYSTEMS**

Chairman: Philip E. Wood, Assistant Professor
Department of Chemical Engineering
McMaster University,
Hamilton, Ontario

Session 21 (Tuesday, October 4) **FLUID MECHANICS**

Chairman: Richard L. Hummel, Professor
Department of Chemical Engineering
and Applied Chemistry
University of Toronto

Session 22 (Tuesday, October 4) **THERMODYNAMICS AND KINETICS**

Chairman: Alan E. Mather, Professor
Department of Chemical Engineering,
University of Alberta,
Edmonton, Canada

Session 23 (Wednesday, October 5) **HEAT AND MASS TRANSFER***

Chairman: Jacob H. Masliyah, Professor
Department of Chemical Engineering,
University of Alberta,
Edmonton, Canada

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Session 25 (Monday, October 3) **COAL I**

Chairman: Norm E. Anderson
Director of Technology Development,
Refinery and Chemicals Division,
Kilborn Ltd., Toronto

Co-Chairman: Safaa Fouda,
Research Scientist,
CANMET, Ottawa.

Session 26 (Monday, October 3) **COAL II**

Chairman: Safaa Fouda,
Research Scientist,
CANMET, Canada

Co-Chairman: Norm E. Anderson
Director of Technology Development,
Refinery and Chemicals Division
Kilborn Ltd., Toronto

Session 27 (Tuesday, October 4) **BIOTECHNOLOGY I**
FUNDAMENTALS/STATE-OF-THE-ART

Chairman: Michael V. Sefton, Associate Professor,
Department of Chemical Engineering,
and Applied Chemistry, University of Toronto,
Toronto, Canada

Co-Chairman: William H. Rastetter, Director,
Chemical Sciences,
Genetech Inc.,
San Fransicso, U.S.A.

Session 28 (Tuesday, October 4) **BIOTECHNOLOGY II**
FERMENTOR DESIGN AND CONTROL

Chairman: C.W. Robinson, Professor
Department of Chemical Engineering
University of Waterloo,
Waterloo, Canada

Session 29 (Wednesday, October 5) **BIOTECHNOLOGY III**
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Chairman: M. Tsezos, Assistant Professor
Department of Chemical Engineering,
McMaster University,
Hamilton, Canada.

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Chairman: A. Margaritis, Associate Professor,
Department of Engineering Science,
University of Western Ontario,
London, Canada

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Chairman: Brad Donaldson, Fourth Year,
Department of Chemical Engineering
and Applied Chemistry,
University of Toronto

Co-Chairman: Clara DeAmicis, Fourth Year,
Department of Chemical Engineering
and Applied Chemistry
University of Toronto

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Chairman: Clara DeAmicis, Fourth Year,
Department of Chemical Engineering
and Applied Chemistry
University of Toronto

Co-Chairman: Brad Donaldson, Fourth Year,
Department of Chemical Engineering
and Applied Chemistry
University of Toronto

Session 33 (Tuesday, October 4) **COAL III**

Chairman: Norm E. Anderson
Director of Technology Development,
Refinery and Chemicals Division,
Kilborn Ltd., Toronto

Co-Chairman: Safaa Fouda,
Research Scientist,
CANMET, Ottawa

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Co-Chairmen: Agostino Gianetto,
Politecnico di Torino,
Torino, Italia
and
Hugo I. de Lasa,
Department of Engineering Science,
University of Western Ontario,
London, Canada

Session 35 (Wednesday, October 5) **FLUIDIZED BED REACTORS**

Co-Chairmen: J.R. Grace,
Department of Chemical Engineering,
University of British Columbia,
Vancouver, Canada.

and

Hugo I. de Lasa,
Department of Engineering Science,
University of Western Ontario,
London, Canada.

Session 36 (Wednesday, October 5) **REACTOR TECHNOLOGY III**

Co-Chairmen: R.R. Hugins,
Department of Chemical Engineering,
University of Waterloo,
Waterloo, Canada.

and

Hugo I. de Lasa,
Department of Engineering Science,
University of Western Ontario,
London, Canada.