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**U.S. DEPARTMENT OF ENERGY
PITTSBURGH ENERGY TECHNOLOGY CENTER**

LIQUEFACTION

CONTRACTORS' REVIEW MEETING

PROCEEDINGS

**Edited by: G.J. Stiegel — Pittsburgh Energy Technology Center
R.D. Srivastava — Burns & Roe Services Corporation**

September 3-5, 1991

WESTIN WILLIAM PENN HOTEL

**PITTSBURGH,
PENNSYLVANIA**

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AGENDA

TUESDAY, SEPTEMBER 3, 1991

6:30 - 8:00 p.m. *17th Floor*

REGISTRATION

6:30 p.m. - 8:00 p.m. *Ballroom*

RECEPTION

WEDNESDAY, SEPTEMBER 4, 1991

7:30 a.m. *Sky Room*

COFFEE

7:30 a.m. - 5:00 p.m. *17th Floor*

REGISTRATION

CALL TO ORDER

8:30 - 9:00 a.m. *Ballroom*

WELCOME AND INTRODUCTORY REMARKS

Gilbert McGurl

Pittsburgh Energy Technology Center

KEYNOTE ADDRESS

Ralph Carabetta

Pittsburgh Energy Technology Center

9:00 - 9:10 a.m. *Sky Room*

BREAK

WEDNESDAY, SEPTEMBER 4, 1991

INDIRECT LIQUEFACTION PROGRAM — URBAN ROOM

SESSION CHAIRPERSON: GARY STIEGEL (PETC)

OXYGENATED FUELS / FUEL ADDITIVES

- 9:10 - 9:45 a.m. **Synthesis of Octane Enhancers During Slurry-Phase Fischer-Tropsch**
*George Marcellin
Altamira Instruments, Inc.*
- 9:45 - 10:20 a.m. **High Octane Ether from Synthesis Gas-Derived Alcohols**
*Kamil Klier
Lehigh University*
- 10:20 - 10:55 a.m. **Development and Demonstration of a One-Step Slurry-Phase Process for the Co-Production of Dimethyl-Ether and Methanol**
*D.M. Herron
Air Products & Chemicals, Inc.*
- 10:55 - 11:30 a.m. **Development of Alternative Fuels from Coal Derived Syngas**
*F.J. Waller
Air Products & Chemicals, Inc.*

11:30 - 1:00 p.m. **GROUP LUNCH — Ballroom**

SESSION CHAIRPERSON: GEORGE CINQUEGRANE (PETC)

OXYGENATED FUELS / FUEL ADDITIVES

- 1:00 - 1:35 p.m. **Catalyst and Process Development for Synthesis Gas Conversion to Isobutylene**
*Rayford G. Anthony
Texas A&M University*
- 1:35 - 2:10 p.m. **Catalysts and Conditions for the Highly Efficient and Stable Heterogeneous Oligomerization of Ethylene**
*Chris P. Nicolaides
CSIR, South Africa*
- 2:10 - 2:45 p.m. **Novel Approaches to the Production of Higher Alcohols from Synthesis Gas**
*George W. Roberts
North Carolina State University*
- 2:45 - 3:05 p.m. **BREAK**
- 3:05 - 3:40 p.m. **Development of a Catalyst for Conversion of Synthesis Gas to Isobutylene**
*Gregory J. Gajda
UOP*
- 3:40 - 4:15 p.m. **Design of Slurry Reactor for Indirect Liquefaction Applications**
*Anand Prakash
Viking System International*
- 4:15 - 4:50 p.m. **No Presentation**

WEDNESDAY, SEPTEMBER 4, 1991

AR&TD PROGRAM — MONONGAHELA ROOM

SESSION CHAIRPERSON: WILLIAM MCKINSTRY (PETC)

LIQUEFACTION MECHANISMS AND COAL BANK

**Development of Fully Integrated Coal Liquefaction/
Characterization Techniques** 9:10 - 9:45 a.m.

*Henk L.C. Meuzelaar
University of Utah*

Fundamental Studies of Water Pretreatment of Coal 9:45 - 10:20 a.m.

*Michael A. Serio and Peter R. Solomon
Advanced Fuel Research, Inc.*

Low Temperature Liquefaction Catalysts 10:20 - 10:55 a.m.

*Bradley Bockrath
Pittsburgh Energy Technology Center*

DOE Sample Bank Coals for Liquefaction Research 10:55 - 11:30 a.m.

*Alan Davis
Pennsylvania State University*

GROUP LUNCH — Ballroom 11:30 - 1:00 p.m.

SESSION CHAIRPERSON: MALVINA FARGASIU (PETC)

CATALYSTS AND BIOCONVERSION

**Formation and Characterization of Highly-Dispersed
Metal Colloid Catalysts** 1:00 - 1:35 p.m.

*P. Nigrey
Sandia National Laboratories*

**Catalysts Dispersion and Activity Under Conditions
of Temperature-Staged Liquefaction** 1:35 - 2:10 p.m.

*Harold Schobert
Pennsylvania State University*

**Particle Size Distribution of Catalysts Determined by
X-ray Diffraction and SQUID Magnetometry** 2:10 - 2:45 p.m.

*M.M. Ibrahim
West Virginia University*

BREAK 2:45 - 3:05 p.m.
**Anaerobic Liquefaction/Solubilization of Coal by
Microorganisms and Modified Enzymes** 3:05 - 3:40 p.m.

*Charles Scott
Oak Ridge National Laboratory*

**Microbial Hydrogenation of Coal and Effect on
Liquefaction** 3:40 - 4:15 p.m.

*M.I.H. Alean,
University of Kentucky*

**A Novel Concept for High Conversion of Coal to
Liquids** 4:15 - 4:50 p.m.

*Wendell H. Wisler
University of Utah*

THURSDAY, SEPTEMBER 5, 1991

INDIRECT LIQUEFACTION PROGRAM — URBAN ROOM

SESSION CHAIRPERSON: V.U.S. RAO (PETC)

FISCHER-TROPSCH TECHNOLOGY

- 8:15 - 8:50 a.m. **Technology Development for Iron Fischer-Tropsch Catalysts**
Hayim Abrevaya
UOP
- 8:50 - 9:25 a.m. **Development of Improved Iron Fischer-Tropsch Catalysts**
Dragomir B. Bukur
Texas AAM University
- 9:25 - 10:00 a.m. **Slurry Phase Fischer-Tropsch Catalysts**
Robert J. Gormley
Pittsburgh Energy Technology Center
- 10:00 - 10:15 a.m. **BREAK**
- 10:15 - 10:50 a.m. **Preparation of Precipitated Iron Fischer-Tropsch Catalysts**
Burt Davis
Applied Energy Research Center, University of Kentucky
Freddie Tungate, United Catalysts, Inc.
- 10:50 - 11:25 a.m. **Characterization of Iron-Based Catalysts for Direct and Indirect Coal Liquefaction**
K.R.P.M. Rao
University of Kentucky
- 11:25 - 12:00 Noon **An Auger Electron Spectroscopy Study of the Activation of Iron Fischer-Tropsch Catalysts**
Allen G. Sault
Sandia National Laboratory
- 12:00 - 1:00 p.m. **GROUP LUNCH — Ballroom**

SESSION CHAIRPERSON: R.D. SRIVASTAVA (BRSC)

FISCHER-TROPSCH TECHNOLOGY

- 1:00 - 1:35 p.m. **Development of A Stable Co-Ru Fischer-Tropsch Catalyst**
Hayim Abrevaya
UOP
- 1:35 - 2:10 p.m. **Quantification of Progress In Indirect Coal Liquefaction**
David Gray
MITRE Corporation
- 2:10 - 2:30 p.m. **BREAK**
- 2:30 - 3:05 p.m. **Program Discussion**

THURSDAY, SEPTEMBER 5, 1991

DIRECT LIQUEFACTION PROGRAM — MONONGAHELA ROOM

SESSION CHAIRPERSON: E. KLUNDER (PETC)

DIRECT LIQUEFACTION

Wilsonville CC-ITSL Process Development	8:15 - 8:50 a.m.
<i>S.V. Gollakota</i> <i>Southern Company Services</i>	
Close Coupled Two-Stage Catalytic Liquefaction- Continuous Bench-Scale and Support Studies	8:50 - 9:25 a.m.
<i>Alfred Comoli</i> <i>Hydrocarbon Research, Inc.</i>	
Baseline Design and System Analysis for Direct Coal Liquefaction	9:25 - 10:00 a.m.
<i>S.K. Poddar, Bechtel Corporation</i> <i>S.J. Kramer, Amoco Oil Company</i>	
BREAK	10:00 - 10:15 a.m.
The Application of Advanced Analytical Techniques to Direct Coal Liquefaction Oils	10:15 - 10:50 a.m.
<i>S.D. Brandes</i> <i>Consolidation Coal Company</i>	
Development of Thin Film Hydrous Metal Oxide- Supported Catalysts for Direct Coal Liquefaction	10:50 - 11:25 a.m.
<i>Howard P. Stephens</i> <i>Sandia National Laboratories</i>	
Recent Progress in the Use of Disposable Catalyst for Coal Liquefaction	11:25 - 12:00 Noon
<i>A. Cugini</i> <i>Pittsburgh Energy Technology Center</i>	
GROUP LUNCH — Ballroom	12:00 - 1:00 p.m.

SESSION CHAIRPERSON: MICHAEL J. BAIRD (PETC)

COPROCESSING

UOP Slurry Catalyzed Co-Processing	1:00 - 1:35 p.m.
<i>Carol Piasecki</i> <i>UOP</i>	
Process and Analytical Studies of Enhanced Low Severity Coprocessing Using Selective Coal Pretreatment	1:35 - 2:10 p.m.
<i>Robert Baldwin</i> <i>Colorado School of Mines</i>	
BREAK	2:10 - 2:30 p.m.
Bench-Scale Development of Coal-Oil Co-Processing Technology: Effect of Coal Concentration on Reactivity	2:30 - 3:05 p.m.
<i>Sudhir V. Panvelker</i> <i>Hydrocarbon Research, Inc.</i>	
Analysis of Coprocessing Products	3:05 - 3:40 p.m.
<i>Raymond P. Anderson</i> <i>National Institute for Petroleum and Energy Research</i>	

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