

## APPENDIX C

### MEMBERS OF THE EXPERT PANEL

In keeping with the changed environment for DOE-sponsored R&D in coal liquefaction, SAIC selected a panel made up of experts who are knowledgeable about the recently developed basic information and oriented towards the basic and applied research in coal liquefaction. However, the panel members' experience does span the scientific, technical, economic, environmental, and application areas of coal liquefaction. The experts on SAIC's panel are all currently active in coal liquefaction R&D and have demonstrated up-to-date technical competency and expertise directly related to coal liquefaction. Dr. Harvey Schindler of SAIC, the Principal Investigator, was also a member of the panel.

The members of the panel and their addresses are listed in Table C-1.

The technical qualifications and the experience of the panel members are summarized below.

Dr. Francis P. Burke is the director of Applied Research at Consolidation Coal Company (Consol). His principal research activities are in oil agglomeration for fine coal recovery, coal liquefaction product deashing, coal liquefaction process development, coal liquefaction process oil characterization, retrograde reactions in coal liquefaction, coal weathering and oxidation, coal mineralogy, retrofit processes for SO<sub>2</sub> abatement, and methanol reforming. He was the principal investigator for a DOE subcontract on retrograde reactions in SRC-I liquefaction and for a DOE contract on coal liquefaction process solvent quality characterization and evaluation, and has served as a panel member for several workshops on coal conversion and liquefaction.

Table C-1. Names and Addresses of COLIRN Panel Members

Dr. Francis Burke  
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Dr. Martin Gorbaty  
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Dr. Kamil Klier  
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Dr. Carl W. Kruse  
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Dr. John Larsen  
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Dr. Robert Lumpkin  
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Dr. Michael E. McIlwain  
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Dr. Harvey Schindler  
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Mr. Norman Stewart  
Electric Power Research Institute  
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Dr. Irving Wender  
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coal liquefaction process development, coal liquefaction process oil characterization, retrograde reactions in coal liquefaction, coal weathering and oxidation, coal mineralogy, retrofit processes for SO<sub>2</sub> abatement, and methanol reforming. He was the principal investigator for a DOE subcontract on retrograde reactions in SRC-I liquefaction and for a DOE contract on coal liquefaction process solvent quality characterization and evaluation, and has served as a panel member for several workshops on coal conversion and liquefaction.

Dr. Kwang-Chu Chao, a professor of chemical engineering at Purdue University, is experienced in the fundamentals of process engineering, especially energy-related processes. His most recent work involves coal liquefaction processes, kinetics, and super-critical fluid extraction. He has also made numerous significant contributions to thermodynamics and fluid phase equilibrium. Dr. Chao is widely published on a variety of chemical engineering topics and has co-written several books on thermodynamics and equations of state.

Dr. Burtron H. Davis is the program director for coal liquefaction at the Kentucky Energy Cabinet Laboratory. His most recent assignment has involved developing a comprehensive direct coal liquefaction program. During the past 10 years, Dr. Davis has developed a comprehensive research program in direct coal liquefaction. This extensive program includes studies of conversion characteristics in small-scale reactors, detailed analyses of products from in-house liquefaction studies and large U.S. pilot plants, studies of catalyst aging in coal liquefaction, studies of corrosion and materials failures in large U.S. direct coal liquefaction pilot plants, and operation of a bench-scale 10-lb coal/hour fully integrated direct coal liquefaction pilot plant.

Dr. Martin Gorbaty is a senior staff advisor for Corporate Research Science Laboratories of Exxon Research and Engineering Company. He has 15 years of research experience in organic chemistry and coal science. He was the director of the Heavy Hydrocarbon Sciences Laboratory at Exxon, where he directed and oversaw various heavy hydrocarbon research

programs, including coal liquefaction processes. In 1984 Dr. Gorbaty served as a DOE AR&TD panel member to assess coal liquefaction research needs. His current research interests include coal physical structures and temperature effects in coal hydrolysis. Dr. Gorbaty has published numerous technical papers on organic chemistry and coal science; he has also edited several technical books on synthetic crudes and coal sciences.

Dr. Kamil Klier is a University Distinguished Professor of chemistry at Lehigh University and the director of the Catalysis laboratory at the Zettlemoyer Center for Surface Studies. He has published extensively in the fields of solid state and physical chemistry of surfaces, and has made major contributions to the understanding of the molecular basis of sorption and catalysis. These contributions were in the areas of molecular structure and dynamics of water at surfaces and interfaces, electronic structure of intrazeolitic transition-metal ion complexes, and comprehensive catalyst and mechanistic studies of oxygenates, mainly alcohol, synthesized from CO/H<sub>2</sub>. Dr. Klier has chaired ACS and MRS symposia, and has been on editorial boards of the Journal of Colloid and Interface Science, the Journal of C<sup>1</sup> Chemistry, and Materials Letters.

Dr. Carl W. Kruse is with the Illinois State Geological Survey. His experience includes 15 years of industrial petrochemicals research and 10 years of coal research. In his 10 years at the Illinois State Geological Survey, he has developed a coal desulfurization program funded through contracts. He has pursued two lines of research -- physical cleaning of very fine coal and production of crude liquid fuel and residual solid fuel by pyrolysis of coal. His current responsibilities include managing a contract with the Electric Power Research Institute to look at pretreating coal to improve its pyrolysis performance by improving either the yield of liquids or their quality.

Dr. John W. Larsen is a professor of chemistry at Lehigh University, a non-regular employee of the Exxon Research and Engineering Company, and the editor of the ACS journal Energy & Fuels. At Lehigh his research

areas are coal chemistry (specifically coal structure and reactivity), new ionic hydrogenation reactions, and organic chemistry in molten salts. At Exxon his research deals with the macromolecular structure of coals, non-covalent interactions in coals, and coal conversion. He has chaired the American Chemical Society's Division of Fuel Chemistry and has served on numerous public and private sector advisory boards and panels.

Dr. Robert E. Lumpkin, director of Coal Utilization Projects in the Synthetic Fuel Development Department of Amoco Corporation, has 20 years of experience in managing, developing, and analyzing chemical engineering technologies. As Amoco's representative on the Wilsonville direct coal liquefaction project, he focused the experimental program on making those improvements most likely to reduce commercial costs, such as using Amocat catalysts, operating at higher space velocities, and recycling heavy liquids to extinction. He organized and directed an evaluation of two-stage direct coal liquefaction commercial economics.

Dr. Michael McIlwain is the fossil energy program manager at the Idaho National Engineering Laboratory. He has more than 12 years of experience in various aspects of fossil energy applications and advanced research. He is responsible for a major program at the Idaho National Engineering Laboratory concerned with studying the use of microorganisms to clean and process coal. Dr. McIlwain currently advises the Office of Fossil Energy on current developments in the area of biotechnology and its energy applications.

Mr. Norman C. Stewart is the project manager of the Coal Liquefaction Program in the Advanced Power Systems Division of the Electric Power Research Institute (EPRI). His work involves H-Coal, EDS, and SRC-I processes, as well as support to the Wilsonville facility. Other projects deal with indirect liquefaction (liquid phase methanol). Before joining EPRI in 1974, Mr. Stewart spent 12 years with Cities' Service Oil Company as a process engineer and as a manager of a product development facility in Lake Charles, Louisiana. Previously, Mr. Stewart worked at Gallery Chemical Company as a process engineer, with Celanese Chemical

Company as a manufacturing engineer, and Monsanto Chemical Company as a plant engineer.

Dr. Irving Wender, a research professor for the Chemical and Petroleum Engineering Department of the University of Pittsburgh, has more than 30 years of research experience in a variety of fields, including fossil energy, coal and petroleum chemistry, and certain aspects of organic chemistry. He has also researched the reactions of synthesis gas catalyzed by transition metals. As director of the Office of Advanced Research and Technology in the Office of Fossil Energy of DOE, Dr. Wender was responsible for all advanced research programs and technology activities in the fossil energy area. He was a research director at the Pittsburgh Energy Research Center from 1972 to 1978, and at PETC from 1978 to 1979. In November 1988 Dr. Wender received DOE's Homer H. Lowry Memorial Award for Meritorious Contributions in Fossil Energy Science and Technology.