MPUC Docket No. E-6472/GS-06-668
OAH Docket No. 12-2500-17512-2

BEFORE THE
MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
100 Washington Square, Suite 1700
Minneapolis, Minnesota 55401-2138

FOR THE
MINNESOTA PUBLIC UTILITIES COMMISSION
127 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

In the Matter of a Joint LEPGP Site Permit,
HVTL Route Permit and Pipeline (Partial Exemption)
Route Permit Application for the Mesaba Energy Project

PREPARED DIRECT TESTIMONY AND EXHIBITS OF

EXCELSIOR ENERGY INC., MEP-I LLC, AND MEP-II LLC

THOMAS A. LYNCH

JANUARY 16, 2007

EXCELSIOR ENERGY, INC.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

PREPARED DIRECT TESTIMONY OF

THOMAS A. LYNCH

Q Please state your name, current employment position and business address.

A Thomas A. Lynch. I am a Project Development Director for ConocoPhillips Company, the third largest integrated energy company in the United States. Headquartered in Houston, Texas, ConocoPhillips Company and its subsidiaries operate in more than 40 countries. The company has approximately 38,000 employees worldwide and assets of $160 billion. ConocoPhillips, the parent company, has its stock listed on the New York Stock Exchange under the symbol "COP."

I have been one of the ConocoPhillips Company representatives who has been working with Excelsior Energy Inc. ("Excelsior") and Fluor Corporation over the past 24 months in connection with preliminary engineering and design work for the Mesaba Energy Project. My business address is 444 West Sanford Avenue, West Terre Haute, Indiana 47885.

Q Would you please describe your educational and professional background.

A In addition to being a Project Development Director, I also provide technical support at the 262 MWe (net) Wabash River Coal Gasification Repowering Project ("Wabash River") in Terre Haute, Indiana. The Wabash River facility utilizes ConocoPhillips E-Gas™ technology for gasification of solid feedstocks, the same technology ConocoPhillips has licensed to Excelsior for use in the Mesaba Project.

Professionally, I have been involved with the E-Gas™ technology and the Wabash River Project for 13 years. I was originally assigned to the Wabash River Project in 1993, where I had owner's representative responsibilities for the syngas conditioning processes as well as water treatment and electrical systems at the facility. I managed operations for the Wabash River Facility through start-up, and led the effort to hire, train, and develop the plant operations group.

After the Wabash startup in 1995, I was assigned to manage the plant improvement effort. I then continued to manage plant improvements, but added operations management responsibilities and contract administration until being named to my current position, which involves supporting the development of gasification projects. In particular, I have led the effort for ConocoPhillips with respect to our ongoing support of the Mesaba Project.

I earned a Bachelor of Science degree in Chemical Engineering from Northeastern University (Boston, MA) in 1983. My resume is appended as Exhibit ___ (TAL-1).

Q On whose behalf are you testifying?

A I am testifying on behalf of MEP-I LLC, MEP-II LLC, and Excelsior Energy Inc. (collectively "Excelsior"), the developers of the Mesaba Energy Project (the "Project").

<u>Scope and Summary</u>

Q What is the purpose of your testimony in this proceeding?

A The primary purpose of my testimony is to confirm that I have been directly involved on behalf of ConocoPhillips in connection with all design and engineering

work to date relating to the E-Gas™ technology for the Project, and to note that I am available to answer questions related to the E-Gas™ technology as currently used at Wabash River and to the design improvements incorporated into Mesaba One and Mesaba Two. I will also identify the portions of the Joint Permit Application and Environmental Supplement on which I will be able to provide testimony.

Q On which sections of the Joint Application and Environmental Supplement are you available to act as a sponsor?

A. I am sponsoring the following sections:

Joint Application

Section 3.1.4 (Process Chemistry)

Environmental Supplement

Section 1.6.4 (Process Chemistry)

Air Permit (Appendix 5 to the Environmental Supplement)

Section 2.3 (Process Description)

Section 4.1 (Criteria Pollutants)

Section 4.2 (Lead and Non-Criteria Pollutants)

Section 4.3 (Carbon Dioxide)

In addition, I collaborated with Fluor Enterprises in preparing Appendices A and B of the Air Permit Application.

I acted as a resource during the preparation of the above sections of the applications, provided representative operational data from Wabash River, and reviewed them prior to submission of the applications to the applicable agencies.

Q Please describe the chemistry of the E-Gas™ technology.

A Unlike traditional pulverized coal power plants where fuel is actually combusted, in an IGCC power station, coal and/or petroleum coke slurry is fed to the gasifier along with oxygen, and a number of complex chemical reactions occur to create "syngas." Most of the sulfur in the feedstock is converted to hydrogen sulfide during the gasification process. A small portion of the sulfur is converted into carbonyl sulfide. Most of the nitrogen in the feedstock is converted to ammonia. Most of the energy in the feedstock is ultimately converted into carbon monoxide and hydrogen, steam, and a small amount of methane.

The carbonyl sulfide is "hydrolyzed" in a catalytic reactor before the syngas is sent to the Acid Gas Removal ("AGR") system, which removes hydrogen sulfide and some carbon dioxide from the syngas using a methyl diethanolamine ("MDEA") solution. The hydrogen sulfide is recovered from the MDEA and sent to the sulfur recovery unit ("SRU"). The SRU uses Claus technology to convert hydrogen sulfide to elemental sulfur and water. The Claus unit chemical reactions are exothermic, producing heat. This reaction heat is recovered in the form of low pressure steam. The effluent from the Claus unit, called "tail gas," is recycled to the gasifier and the elemental sulfur is a secondary product of the Project.

<u>Considerations in Determining Whether to Issue a Site Permit for the Project</u>

Q Please explain how the application of design options will work to mitigate adverse environmental effects.

A Air emissions are primarily controlled through use of the inherently lower polluting Integrated Gasification Combined Cycle ("IGCC") technology. The volume

of pre-combustion syngas present at the time of its clean-up in the E-Gas™ process is about one hundred times less than the volume of the post-combustion gas handled in a conventional pulverized coal-fired boiler. An inherent advantage that IGCC technology has over such conventional systems is that gas clean up equipment can be much smaller in size and the residence time for allowing contact between a chemical and an absorbent can be increased, thereby providing for greater pollutant removal efficiency.

Key technology aspects of the Project that allow it to be an inherently lower-polluting process include syngas cleanup and desulfurization systems such as processes for syngas cooling, particulate matter removal, syngas scrubbing, acid gas removal, mercury removal, and potential to retrofit for carbon capture.

Q How were estimates of air emissions from the Project calculated?

Emission estimates were calculated using plant performance characteristics, equipment supplier data, the best available control technology limits as proposed in the Air Permit Application, test results for similar equipment at other IGCC facilities, especially the existing Wabash River plant, engineering calculations, experience, good engineering practice, and published and accepted average emission factors such as the U.S. Environmental Protection Agency compilation of Air Pollutant Emission Factors.

Q Why is it reasonable to use the emissions from the Wabash plant to predict the emissions from the Project?

A As noted, the process that the Project will use to supply fuel to its combined cycle power station is based upon ConocoPhillips E-Gas™ technology for gasification of solid feedstocks. This is a proven technology that has the benefit of a long operational history and experience.

The Project's design is based on the 262 MWe (net) Wabash River Facility. The Wabash River plant was built under the Department of Energy's ("DOE") Clean Coal Technology Program and has been operational since 1995. Following its construction, the technology owners, with some support from the DOE, funded studies of potential performance and technological upgrades, and hundreds of design and operational lessons learned from Wabash River have been identified and implemented. Based in part on the lessons learned from the Wabash River facility, the Project will integrate numerous design improvements that represent a substantial advance in the original Wabash River technology, design, and systems integration.

Q Explain the differences in scale between the Wabash plant and the Project.

A. It is important to distinguish between the gasification trains and the fuel handling and slurry systems. Wabash River operates as a single train facility (*i.e.*, one gasifier and related systems feeding syngas to one combustion turbine unit). The Project is being designed to operate with two gasification trains feeding syngas to two combustions turbine units. Therefore, for everything other than the fuel handling and slurry systems the appropriate comparison is between one gasification train at Wabash River and one gasification train of the Mesaba Project. Wabash River produces 1800 MMBtu/hr of syngas and a single train of the Project will be sized to produce approximately 2100 MMBtu/hr, or approximately 17% more syngas production per train than the current Wabash production. In order to achieve this increased syngas output, the gasifier and related systems for a single train at Mesaba will be on the order of 10-30% larger (depending on the particular component). In my opinion, although there is some scale-up in the gasification train between the Wabash River Facility and

the Project, it should pose minimal concern to design engineers used to dealing with scale ups much greater.

Conclusion

Q Does this conclude your testimony?

A Yes.

EXHIBITS

EXHIBIT ___ (TAL-1)

Thomas A. Lynch
4309 South Willow Brook CT
Terre Haute, Indiana 47802

CAREER HISTORY:

ConocoPhillips, Downstream Engineering & Licensing Services (07/2003 - Present)
Principal Engineer, Terre Haute, IN

Reports to the Technology Director – Gasification Technology Solutions, responsibilities include: gasification project management, providing technical support and managing Preliminary Design/ Feasibility studies. Managed and completed four Preliminary Design/ Feasibility studies and have been actively involved in others.

Global Energy Inc., Gasification Engineering Corp. (01/2000 – 07/2003)
Manager, GEC Strategic Projects, Terre Haute, IN

Reports to the Vice President Commercial Development, responsibilities included: project management, providing technical support and contract administration, and coordinating the Market-Based operations efforts for the Wabash River plant.

Dynegy Inc., Dynegy Power Corp. (07/1997 - 12/1999)
Manager, Wabash River Plant Improvements and Operations Support, Terre Haute, IN

Responsibilities included: evaluating and overseeing the implementation of plant technology improvements, operation of the Air Separation Unit, laboratory & research support, contract administration, site human resource support, site emergency operations manager, set and track department budgets, and administer various programs associated with site safety and employee development. Coordinated a Petroleum Coke Alternative Fuel test to demonstrate the capabilities of the E-GAS gasification process on petroleum coke.

Destec Energy Inc., 01/1993 - 07/1997

Wabash River Plant (02/1996- 07/1997)
Manager, Plant Improvement, Terre Haute, IN

Responsibilities included: evaluating and overseeing the implementation of plant technology improvements, providing technical and research support to the operations group, acted as site emergency manager, set and tracked department budgets, and administered various programs associated with site safety and employee development.

Wabash River Plant (05/1994 - 02/1996)
Manager, Operations, Terre Haute, IN

Responsibilities included: to hire, develop, and manage the operations group, commission and start-up the facility, ensure safe and efficient plant operations, implement technology improvements, acted as site emergency manager, set and tracked department budgets, administered various programs associated with site safety and employee development. Led the hiring effort and developed the training strategy for 36 operations technicians from a diverse background of industrial experience. Managed the operation of the facility, including the engineering support staff, operating shifts, and training functions through a successful plant commissioning and start-up.

Wabash River Plant (01/1993 - 05/1994)
Manufacturing Representative, Houston, TX

Responsibilities included: Provided technical support for the detailed design of the syngas conditioning process areas, the water treatment process areas, and site electrical systems, oversaw equipment layout and procurement, maintained P&IDs for respective areas, and provided technical support to field construction group, and audited the plant to ensure compliance with environmental, Industrial Hygiene, safety and loss prevention concerns. Provided leadership and direction to the Wabash River project detailed design team.

The Dow Chemical Company, 07/1983 – 12/1992

Michigan Division (1991 - 1992)
Production Supervisor, Magnesium Hydroxide Plant, Ludington, MI

Responsibilities included: direct supervisory responsibility for the operations personnel, production planning and scheduling, interfacing with outside customers, providing technical support to the operations group, participated in developing and implementing new techniques and designs to improve the plant performance, efficiency, and reliability, set and tracked budgets, ensured the plant was safely operated within compliance of all company and government rules and regulations.

Michigan Division (1990 - 1991)
Production Supervisor, Gas Treatment Plant, Ludington, MI
Responsibilities included: same types of responsibilities as stated above. Level of responsibility increased with change in facility.

Michigan Division (1988 - 1990)
Senior Production Engineer, Gas Treatment Plant, Ludington, MI

Responsibilities included: Planned and implemented engineering projects, developed new techniques and designs to improve the performance, efficiency, and reliability of the plant, wrote and/or revised operations and maintenance procedures, participated in equipment trouble-shooting, overhauls, and turnarounds, implemented operating discipline programs, and ensured the plant was safely operated within compliance of all company and government rules and regulations.

Michigan Division (1983 - 1988)
Production/Project Engineer, Gas Treatment Plant, Ludington, MI

Responsibilities included: same types of responsibilities as stated above. Level of responsibility increased through demonstrated proficiency. Provided technical support to Louisiana Gasification Technology Inc., or LGTI during the start-up phase of Dow's first commercial gasification plant.

EDUCATION:

Northeastern University (1983)

Bachelor of Science, Chemical Engineering