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

JOHN E. RUUD

JANUARY 16, 2007

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EXCELSIOR ENERGY, INC.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

PREPARED DIRECT TESTIMONY OF

JOHN E. RUUD

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

A John E. Ruud. I am currently a Director of Process and Environmental Engineering with Fluor Enterprises, Inc., an engineering, procurement, and construction company with offices throughout the world. My business address is 3 Polaris Way, Aliso Viejo, California 92698.

Q Would you please describe your educational and professional background.

A I have a Bachelor of Science in Chemical Engineering from California State Polytechnic University, Pomona and an M.E. in Chemical Engineering from California State Polytechnic University. I have more than 30 years experience in the areas of process engineering, environmental permitting, and project management. My experience includes analysis of facility atmospheric emissions and control equipment, air dispersion modeling, evaluation of wastewater treatment schemes, waste minimization studies, spill prevention plans, storm water pollution prevention, negotiations with environmental permitting authorities, testimony at public hearings and interpretation of environmental regulations related to projects. I have successfully directed/provided environmental engineering and permitting services for numerous power generation projects, petroleum refinery projects, and other chemical/petroleum/energy related facilities. My resume is appended as Exhibit ___ (JER-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").

Scope and Summary

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

A The purpose of my testimony is to provide information regarding the discharges, products and air emissions the Project. I will also identify the portions of the Joint Application, Environmental Supplement, Air Permit Application (attached as Appendix 5 to the Joint Application), and National Pollution Discharge Elimination System ("NPDES") Permit Application (attached as Appendix 6 to the Joint Application) which I am sponsoring and on which I will be able to provide testimony (the "Applications").

Preparation of the Joint Permit Application and Environmental Supplement

Q Are you available to act as sponsor for particular sections of the Applications?

A. Yes. I am sponsoring the following sections:

Joint Application

Section 3.4 (Project Discharges and Products)

Environmental Supplement

Sections 1.8 (Project Discharges and Products)

Section 2.9 (Materials and Waste Management)

Section 3.8 (Materials and Waste Management)

Section 3.15 (Safety and Health)

Air Permit Application (attached as Appendix 5 to the Joint Application)

Section 4.1 (Criteria Pollutants)

Section 4.2 (Lead and Non-Criteria Pollutants)

Section 10 (Air Permit Application Forms)

Appendix A (Criteria Air Pollutant Emission Calculations)

Appendix B (Hazardous Air Pollutant Emission Calculations)

NPDES Permit Application (attached as Appendix 6 to the Joint Application)

Section 3.1 (Water Requirements)

Section 4.1 (Wastewater Generation)

Section 4.2 (Chemical Additives)

Appendix C (Material Safety Data Sheets)

During the preparation of the Applications, I worked closely with Excelsior in preparing and reviewing the Fluor-assigned portions of these sections. I either personally prepared this material or directly supervised and reviewed material prepared by other qualified Fluor engineers and specialists. In addition, I assisted Excelsior in reviewing the portions prepared by other members of the project permitting team, although I was not directly involved in the preparation of some portions of the sponsored sections.

Considerations in Determining Whether to Issue a Site Permit for the Project

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

Criteria Pollutants

A Combustion turbine generator ("CTG") emissions are substantially controlled through the use of syngas fuel that is extensively treated for the removal of sulfur compounds and particulate matter. Emissions of nitrogen oxides ("NOx") from the CTGs are reduced by moisturizing the syngas fuel and diluting it with nitrogen.

Additionally, the tank vent boilers will be designed to safely and efficiently dispose of recovered process vapors from various process tanks and vessels associated with the gasification process. The tank vent boilers prevent the atmospheric emission of trace amounts of reduced sulfur compounds and other gaseous constituents that could cause nuisance odors and other undesirable environmental consequences. Finally, the elevated flares will be designed for high efficiency destruction of carbon monoxide and hydrogen sulfide.

Non-Criteria Pollutants

Emissions of Hazardous Air Pollutants at the IGCC Power Station will be reduced by the inherently low emitting IGCC process and many of the same process features that control criteria pollutant emissions. A large portion of the heavy metals and other undesirable constituents of the feed will be immobilized in the non-hazardous, vitreous slag by-product and prevented from causing adverse environmental effects. Gaseous and particle-bound HAPs that may be contained in the raw syngas exiting the gasifiers will be totally or partially removed in the syngas particulate mater removal system, water scrubber, and AGR systems.

In addition, the mercury removal carbon adsorption beds will be designed to control mercury emissions from the IGCC Power Station to less than 10% of the mercury in the as-received feedstock.

Q Please identify the type and quantity of air emissions expected from the Project.

A Phases I and II of the Project are expected to produce maximum emissions of about 2,870 tons/year of NOx, 1,390 tons/year of Sulfur Dioxide ("SO_2"), 2,540 tons/year of Carbon Monoxide ("CO"), 490 tons/year of Particulate Matter ("PM_{10}"), 200 tons/year of Volatile Organic Compounds ("VOC"), trace amounts of lead, total

federal Hazardous Air Pollutants ("HAPs") of 24 tons/year and 54 pounds of Mercury on a twelve month rolling average.

Emission rates and sources are set out in detail in Section 4 of the Air Permit Application.

Q Will any of the emission rates exceed required State or Federal standards?

A The IGCC Power Station will be designed to meet the applicable State and Federal standards for either the West or East Range Sites.

Q How were these estimates calculated?

Emission estimates were calculated using plant performance characteristics, technology and equipment supplier data, the best available control technology 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, judgment, and published and accepted average emission factors such as the U.S. EPA compilation of Air Pollutant Emission Factors.

Q Please explain how the application of design options will work to mitigate adverse environmental effects with respect to water use and discharge.

A The water needs of Mesaba One and Mesaba Two are estimated to range between 8,800–10,300 gpm average annual appropriation. Wastewater generated from the gasification island, containing certain levels of heavy metals and other contaminants from the feedstocks, will be treated in a Zero Liquid Discharge ("ZLD") process that will recover distilled water for reuse in the power plant, (reducing fresh water consumption) and, more importantly, concentrate heavy metals and other contaminants of concern into a solid waste stream. This solid waste will be disposed in an approved solid waste management facility.

Almost all of the wastewater discharged from the IGCC Power Station operations is due to the need to remove a portion of the condenser and non-contact cooling water for control of dissolved solids. Therefore, the constituents in the discharge are essentially the same materials present in the background water supply delivered to the plant, but more concentrated.

Certain chemicals primarily needed to control cooling water corrosion and fouling and to neutralize certain undesirable constituents in the plant discharge will be added to the water stream that will be discharged from the IGCC Power Station. Only residual amounts as allowed by the wastewater discharge permit will be present in the water ultimately discharged.

Q What other design options will be applied to the Project to mitigate adverse environmental effects?

The IGCC Power Station will be designed to minimize process-related discharges to the environment and will represent a significant step toward demonstrating today's environmentally-responsible IGCC technology in the use of coal for power generation on a commercial scale. The Project will stand out as an important example of incorporating pollution prevention concepts into practically every aspect of the IGCC Power Station's design and operational plan, including gasification technology, sour water recycling and removal system, zero liquid discharge unit, COS hydrolysis, mercury removal features, acid gas removal, sulfur recovery unit, and marketing of secondary products that otherwise would be wastes.

<u>Conclusion</u>

Q Does this conclude your testimony?

A Yes.

EXHIBITS

EXHIBIT ___ (JER-1)

FLUOR

PROFESSIONAL SUMMARY

John Ruud
Technical Director, Process and Environmental Engineering

EDUCATION

B.S., Chemical Engineering, California State Polytechnic University, Pomona
M.E., Chemical Engineering, California State Polytechnic University, Pomona

PROFESSIONAL LICENSE/CERTIFICATE

Registered Professional Engineer, Colorado
Registered Chemical Engineer, California

SUMMARY OF EXPERIENCE

Mr. Ruud has more than 30 years experience in the areas of HSE and process engineering, environmental permitting, and project management. He is responsible for ensuring project environmental regulatory compliance and that adequate safety engineering resources are provided during project design, construction, and start-up/operation. His experience includes analysis of facility atmospheric emissions and control equipment, air dispersion modeling, evaluation of wastewater treatment schemes, waste minimization studies, spill prevention plans, storm water pollution prevention, negotiations with environmental permitting authorities, testimony at public hearings and interpretation of environmental regulations related to projects. He has successfully directed/provided environmental engineering and permitting services for numerous petroleum refinery projects, power generation projects, and other chemical/petroleum/energy related facilities.

SIGNIFICANT EXPERIENCE

FLUOR CORPORATION, ALISO VIEJO, CALIFORNIA (1973 – Present)

TECHNICAL DIRECTOR

Mesaba Energy Project (IGCC)
(2005 – Present)

Excelsior Energy Inc.
Taconite, Minnesota

Mr. Ruud is responsible for environmental and project documentation for a world-class (1200 MW) integrated gasification combined cycle (IGCC) project utilizing petroleum coke and sub-bituminous/bituminous coal feeds. Mr. Ruud directed the preparation of information and managed consultants to support power plant licensing applications, environmental air quality and water quality permit applications, a U.S. Department of Energy Environmental Impact Statement, and other project approvals.

Pacific Mountain Energy Center
(2006)

Energy Northwest
Kalama, Washington

Mr. Ruud was responsible for environmental conceptual design for this 600 MW IGCC power plant facility, based on pet coke and sub-bituminous coal, to be located southwestern Washington State. Services provided include

conceptual plot plan arrangement, definition of air pollution control options, estimation of atmospheric emissions, and assistance in responding to agency information requests.

Southern Illinois Clean Energy Center — Steelhead Energy
(2005) — Illinois

Mr. Ruud served as environmental manager during front-end engineering design (FEED) for this nominal 630 MW IGCC plus 110 million scfd substitute natural gas (SNG) project utilizing Illinois coal feedstock. Responsibilities included emission inventories, waste water discharge estimates, pollution control equipment definition, and collaboration with the client's environmental consultants.

ENVIRONMENTAL MANAGER

Amine CO_2 Removal Project — THUMS Long Beach Company
(2005) — Long Beach, California

Mr. Ruud served as the Environmental Manger for an amine-based (MEA) CO_2 removal system to treat produced gas from the Wilmington Oil Field. Responsibilities included the preparation of project descriptions, pollution control equipment information, and emission inventories to support project permit applications to the South Coast Air Quality Management District and the City of Long Beach.

Low Sulfur Gasoline Project — Sunoco Eagle Point Refinery
(2004) — West Deptford, New Jersey

Environmental Manager for a 65,000 BPSD ExxonMobil SCANfiner Unit proposed at the Sunoco Eagle Point Refinery to comply with federal Tier II clean fuels regulations. Mr. Ruud prepared the application and successfully obtained local township planning board approval for the project. He also directed the preparation of environmental information to support other pre-construction approvals, including wastewater and storm water management, plant noise estimates, visual impacts, and FAA notifications.

Alkylation Improvement Project — Valero Energy Corporation
(2003 – 2004) — Wilmington Refinery, California

This refinery revamp project, driven by an agreement with the South Coast Air Quality Management District (SCAQMD), is comprised of HF Alkylation Unit process modifications for volatility suppression and major modifications to several other process units. Mr. Ruud directed a team of Fluor engineers in the development of application information for Permits to Construct and California Environmental Quality Act (CEQA) compliance determination from SCAQMD. Permit applications were submitted on time despite a very compressed project schedule.

Moss Landing Power Plant Project — Duke Energy North America
(1998 – 2002) — Moss Landing, California

Mr. Ruud provided environmental and project engineering for this 1060 MW combined cycle project at an existing power plant on the central coast of California. His responsibilities included direction and preparation of project and facility descriptions for project permit applications (California Energy Commission Application for Certification), evaluation of once through sea water cooling systems and alternative plant cooling technologies, assistance in reviewing/directing client's environmental consultants, and participation in public workshops and hearings. Mr. Ruud also managed the post-startup emission compliance test program and CEMS certification testing in the field.

South Bay Power Plant SCR Retrofit Projects
(2000 – 2001)

Duke Energy North America
Chula Vista, California

Mr. Ruud managed the air quality permit applications for two projects to add selective catalytic reduction (SCR) NOx emission controls to existing Units 2 and 3 (156 MW and 183 MW) at the South Bay Power Plant. His responsibilities included the preparation of emission summaries, management of the air dispersion modeling consultant, assistance in negotiations with the San Diego Air Pollution Control District and preparation of responses to SDAPCD information requests. He also assisted in obtaining startup/testing variances for both SCR units.

CARB3 Clean Fuels Project
(2000 – 2002)

Tesoro Refining & Marketing Company
Martinez, California

As Environmental Manager for this major refinery modification to produce reformulated gasoline, Mr. Ruud effectively directed the development of technical information for air quality and California Environmental Quality Act approval applications to the Bay Area Air Quality Management District and Contra Costa County. He and the Fluor project team worked closely with Tesoro's engineering and environmental staff to maintain the project schedule requirements while revising permit applications several times to reflect significant changes in the project scope.

Cherry Point Cogeneration Project
(2001)

BP Cherry Point Refinery
Blaine, Washington

Mr. Ruud was the environmental consultant for preliminary engineering of a nominal 700 MW Cogeneration Plant at a major West Coast refinery. His primary responsibilities included the direction and review of facility emissions and wastewater discharge stream estimates, evaluation of environmental regulations applicable to the project, permitting strategy development with client and client's environmental consultants, and general oversight of technical information development to support environmental permit applications.

Major Capital Projects
Clean Fuels Program
(2000 - 2002)

Shell Oil Products US
Wilmington, California

Mr. Ruud directed the fast-track preparation of project technical information and environmental analyses to support environmental permit applications for the major refinery modifications needed to comply with Phase III reformulated gasoline regulations. The Fluor team worked closely with the client's environmental staff and their consultants to obtain Permits to Construct and California Environmental Quality Act (CEQA) compliance determination from the South Coast Air Quality Management District (SCAQMD).

Mountainview Power Plant Project
(2000 – 2001)

ThemoEcoTek
San Bernardino, California

Mr. Ruud was the Lead Environmental Engineer for the preliminary engineering of this new 1000 MW combined cycle power plant to be constructed at the former Southern California Edison San Bernardino Generating Station. He prepared environmental analyses and other information to support project licensing applications to the California Energy Commission and the SCAQMD. He also evaluated innovative boiler design concepts to comply with the most stringent start-up emissions limits imposed to date in California.

Morro Bay Power Plant Project
(1998 – 2000)

Duke Energy North America
Morro Bay, California

Mr. Ruud performed environmental and project engineering for a nominal 1100 MW combined cycle project at the existing Morro Bay Power Plant on the central coast of California. He directed and prepared project and facility

descriptions for project permit applications (California Energy Commission Application for Certification), evaluated once through sea water cooling systems and alternative plant cooling technologies, assisted in reviewing/directing client's environmental consultants, and participated in public workshops and hearings.

PRINCIPAL ENVIRONMENTAL ENGINEER

Nitrogen Supply Project
(1997 - 1999)

Compania de Nitrogeno de Cantarell
Campeche, Mexico

Mr. Ruud served as the Project Environmental Engineer for the power plant portion (320 MW, gas-turbine based) of this world class nitrogen production plant. He prepared emission and discharge inventories, provided regulatory analysis, performed air dispersion modeling, coordinated owner's environmental consultant, and assisted in negotiations with Mexican environmental agency staff. As result of the air dispersion modeling study, the Mexican environmental agency approved reduced HRSG stack heights that resulted in significant project cost and schedule savings.

Hamaca Crude Upgrading Feed Package
(1997 - 1999)

Petrolera Ameriven
Jose, Venezuela

As Lead Environmental Engineer for this major Upgrading Facility for heavy Orinoco crude oil, Mr. Ruud's responsibilities included air emissions inventory, air pollution control, environmental assessment, regulatory analysis, and pollution prevention studies. He also directed the preparation of facility descriptions and analyses for environmental permitting purposes. These work products were used successfully by PA and their in-country consultants to obtain the project environmental approvals on schedule.

Assets Consolidation Project
Site Closure and Demolition
(1997)

Witco Corporation
Santa Fe Springs, California

Mr. Ruud was the on-site Environmental Compliance Manager for chemical cleanup, demolition, and closure of a multi-site surfactants manufacturing facility. He was responsible for day-to-day environmental compliance reporting and the closure of air quality, wastewater discharge, and storm water discharge permits. He also directed operation of the facility wastewater treatment system and coordinated the hazardous waste management subcontractor. Mr. Ruud negotiated a temporary wastewater discharge variance with the local sanitation district that saved the client about $10,000 in waste disposal fees.

Valdez Marine Terminal
Vapor Control Project
(1990 - 1992, 1994 - 1996)

Alyeska Pipeline Service Company
Valdez, Alaska

As Lead Environmental Engineer for this project to recover hydrocarbon and hazardous air pollutant emissions related to marine tanker loading, Mr. Ruud was responsible for preparation of the PSD (air quality permit) application. He performed or supervised the development of an emission inventory for the entire facility and a best available control technology (BACT) evaluation including cost effectiveness analysis. He also assisted Alyeska in the direction of their air dispersion modeling consultant and in negotiation with the state environmental agency to successfully obtain the PSD approval.

Richmond Refinery Modernization Project
(1990 - 1991)

Chevron USA, Inc.
Richmond, California

Mr. Ruud was the Permitting Manager for this refinery modernization mega-project ($1 billion-plus), including 50,000 BPD Flexicoker and 142 MW Cogeneration System with SCR, located in the San Francisco Bay Area. He was responsible for the preparation of the California Energy Commission Application for Certification (equivalent to a California EIR), the air quality application to the Bay Area Air Quality Management District, and other environmental permitting documents. Additional work included the preparation of responses to numerous agency requests, participation in public meetings and workshops, and management of specialty consultants. Mr. Ruud managed an overall environmental permitting budget in excess of $2 million. Fluor received a $25,000 recognition bonus from Chevron for the extraordinary effort and excellent performance demonstrated by the environmental engineering team in meeting a key application submittal deadline.

Kalaeloa Cogeneration Project
(1988 - 1990)

Kalaeloa Partners, L.P.
Barbers Point. Hawaii

Mr. Ruud successfully managed the PSD permit application for a 200 MW, heavy oil-fired combined cycle facility (engineered and constructed by others) on the Island of Oahu, including extensive interface with the Hawaii Department of Health and EPA, Region IX. Responsibilities included BACT analysis, air toxics analysis, and technical coordination of dispersion modeling consultant.

Crockett Cogeneration Facility
(1987 - 1989)
(1991 - 1993)

Pacific Thermonetics, Inc.
Crockett, California

Mr. Ruud was the Licensing and Environmental Manager for a highly-controversial, 240 MW combined cycle cogeneration project located in the San Francisco Bay Area. His responsibilities included the extensive revision of licensing and permitting documents for the California Energy Commission and the Bay Area Air Quality Management District to accommodate significant project design modifications. He prepared responses to numerous CEC, BAAQMD and intervenor data requests. He also assisted in the addition of selective catalytic reduction to the project design, performed air quality impact analysis including dispersion modeling, contributed to extensive ammonia safety studies, and participated in numerous public workshops and agency hearings.

Cogeneration Facility
(1985 - 1987)

ARCO Petroleum Products Company,
Carson, California

As the Regulatory and Air Quality Specialist for this 385 MW combined cycle cogeneration project (with SCR), Mr. Ruud was responsible for the preparation of several licensing and permitting documents including the Application for Certification to the California Energy Commission and responses to numerous data requests from the CEC, the South Coast Air Quality Management District and other involved regulatory agencies. He participated in agency workshops and hearings, reviewed emission control technology, prepared emission offset analysis, performed air dispersion modeling, and prepared federal and local air quality permit application documents. Fluor received a $250,000 bonus from ARCO for obtaining the CEC approval in record time.

OTHER ENVIRONMENTAL EXPERIENCE

*Conceptual environmental engineering and analysis for a combined coal/sewage gasification project located in New Jersey (1989)

*Best Management Practices plan for wastewater treating at a major refinery - Ashland Petroleum, Catlettsburg, Kentucky (1987).

*Air quality permitting for bulk cement terminal in the San Francisco Bay area (1985).

*Environmental compliance auditing for 14 divisions of major Southern California aerospace firm (1985).

*Environmental assessments for nuclear waste repository in geologic salt formations (1984).

*Lead environmental engineer and permitting specialist - six major West Coast refinery expansion projects for Getty, Texaco, Pacific Refining, Champlin, and Independent Valley Energy Company. Responsibilities included air quality permitting; compliance with the California Environmental Quality Act; California Coastal Commission compliance; waste water permitting; and spill prevention, containment, and countermeasure (SPCC) plans (1978 - 1983).

*Conceptual engineering for petroleum coke gasification facility (1983).

*PSD air quality permitting for seven compressor stations included in the Alaska Natural Gas Transportation System (1980).

PROCESS ENGINEER

*Detailed process engineering and field checkout for the Trans-Alaska Pipeline System - pump stations and marine terminal (1974 - 1977).

*Detailed process engineering for a 100 M B/D grass-roots refinery in Cilacap, Indonesia (1973 - 1974).

PROFESSIONAL ASSOCIATION:

Air & Waste Management Association

PUBLICATIONS

"Application of Selective Catalytic Reduction (SCR) for NOx Reduction for Combustion Turbines," Presented to the Pacific Coast Electrical Association, 1990.

"SO2 Emission Reduction Alternatives for Catalytic Cracking Units," Presented to the Air Pollution Control Association, 1985.