

LMFS-07-39 D
“Lignite Gasification Technologies Summary Report”
Lignite Vision 21 Program Phase V

CONTRACTOR: University of North Dakota Energy & Environmental Research Center

PROJECT ADMINISTRATOR: John W. Dwyer, President & CEO, Lignite Energy Council
701-258-7117
JohnDwyer@lignite.com

PROJECT MANAGER: Michael L. Jones, Ph.D.
Vice President of Research & Development, Lignite Energy Council
701-258-7117
MikeJones@lignite.com

CONTRACT AMOUNT: \$50,000

Project Schedule –	Project Deliverables -
Contract Date – 6/23/08	Draft Final Report - (x)
Start Date – 6/30/08	Final Report - (x)
Completion Date – 3/31/09	
Amended Completion Date – 9/30/10	

OBJECTIVE / STATEMENT OF WORK

Compile various lignite gasification research, development and demonstration project information into a summary report. The unique properties of lignite from the U.S. will be discussed and the impact of those properties on gasification system performance discussed.

Draft Final Report

It was agreed that the contractor would submit chapters of the report as they were completed and the North Dakota Industrial Commission’s technical representative would review each section separately, offer suggestions and return them to the contractor for modification. Once all chapters had been completed then the contractor submitted the completed draft report; it was reviewed by the technical representative and two members of the Lignite Energy Council’s Lignite Technology Development Workgroup. The combined comments were forwarded to the contractor for incorporation into the final report.

Final Report

This report summarizes the past experience and future opportunities for gasification of lignites from North America. Commercial lignite gasification experience includes early production of town gas at a number of locations and the Dakota Gasification Company facility producing synthetic natural gas.

Much of the experience noted has involved smaller-scale research and development activities. These activities indicate lignite coals offer both challenges and opportunities for use as a feedstock for coal gasification. Application of gasification and gas cleanup technologies that utilize these coals must consider the high moisture content, high coal reactivity, non-caking properties, sodium/inorganic materials – ash/slag and trace elements, lower sulfur levels, and high oxygen contents. The opportunities and challenges associated with the use of lignite depend upon the specific application of the gasification process. Gasification of lignite can be used to produce syngas for fuels/chemical production (liquid and gaseous), electric power, and hydrogen. The downstream systems are significantly different. For the production of fuels a quench is used downstream of the gasifier that minimizes the problems associated with syngas coolers and hot/warm gas filters.

Comparisons of the various technology options applicable to lignites indicate that the British Gas Lurgi system offers the highest system efficiency for the production of either gas or liquids. Integration of CO₂ capture analysis indicates that lignite gasification as it exists today offers minimal cost or performance advantage over other technology options available that include CO₂ capture.