

MEETING MINUTES
LIGNITE RESEARCH COUNCIL
May 21, 2007
Best Western Doublewood Inn, Bismarck, ND

MEMBERS (or their authorized alternates) PRESENT:

Steve Benson – Energy & Environmental Research Center
Ron Breault – U. S. Department of Energy – National Energy Technology Center
Mike Briggs – The Falkirk Mining Company
Charlie Bullinger – Great River Energy
Senator Randel Christmann – ND Senate
Tony Clark – ND Public Service Commission
Tom Durham – Westmoreland Coal Co.
John Dwyer – Chairman, Lignite Research Council
Bob Fagerstrom – Dakota Gasification Company
Joe Friedlander – The Coteau Properties Company
Shane Goettle – ND Department of Commerce
Daniel Hagemeister – ND Coal Conversion Counties Association
Carlyle Hillstrom – ND Farm Bureau
Mike Hummel – BNI Coal, Ltd.
Bruce Imsdahl – Montana-Dakota Utilities Co.
Luther Kvernen – Minnkota Power Cooperative, Inc.
Vernon Laning - Basin Electric Power Cooperative
Dana Mount – ND Department of Health
Ed Murphy – ND Geological Survey
Steven Podwin – SaskPower
Al Rudeck – Minnesota Power
Jan Rudolf – Otter Tail Power Company
Rich Voss – Great Northern Power Development

OTHERS PRESENT:

Dave Allard - Lignite Energy Council
Jeff Burgess - Lignite Research Council
Jim Deutsch – ND Public Service Commission
Justin Dever – ND Department of Commerce
Karlene Fine - ND Industrial Commission
Vicki Gilmore, Lignite Energy Council
John Harju – Energy & Environmental Research Center
Curtis Jabs – Basin Electric Power Cooperative
Melanie Jensen – Energy & Environmental Research Center
Mike Jones – Energy & Environmental Research Center
Jim Lepinski – Headwaters Inc.
John Pavlish – Energy & Environmental Research Center
Dave Schmitz – Basin Electric Power Cooperative
Tom Spaulding – Basin Electric Power Cooperative
Ed Steadman – Energy & Environmental Research Center
Duane Steen – Montana-Dakota Utilities Co.
Vicky Steiner – ND Coal Conversion Counties Association and ND Association of Oil & Gas Producing Counties
David Straley – The North American Coal Corporation
Sandi Tabor, Lignite Energy Council
Scott Tolbert – Energy & Environmental Research Center
Mike Trachtenberg - Carbozyme

Lignite Research Council (LRC) chairman John Dwyer called the LRC meeting to order at 12:10 p.m. (Central Time) May 21, 2007, at the Best Western Doublewood Inn, Bismarck, ND.

Approval of November 21, 2006 LRC Meeting Minutes

Dwyer asked for a motion to approve the minutes of the November 21, 2006 LRC meeting. Vernon Laning so moved; seconded by Al Rudeck. Motion carried.

Program Financial Summary

Jeff Burgess, technical advisor for the North Dakota Industrial Commission (NDIC) and the LRC, summarized the Lignite Research, Development and Marketing Program (Program) financial information. From 1987 to the present, there have been 123 small research projects (\$15.8 million from NDIC for the 123 projects; \$98 million total project costs; \$1 in state funds to \$6 total investment); demonstration projects excluding Lignite Vision 21 (LV21) projects (\$14.7 million from NDIC for the 12 projects; \$206 million total project costs; \$1 in state funds to \$14 total); and seven LV21 projects (\$24.9 million from NDIC; \$952 million total project costs.) He said that the current Technical Advisor activities involve 39 projects (\$34.7 million in project funds). There 22 small research projects (\$3.2 million from NDIC; \$46.9 million total), 10 demonstration projects (\$1.3 million from NDIC for five non-LV21 projects; \$82.8 million total); and two marketing projects (\$4.2 million from NDIC; \$8.4 million total).

Lignite Research, Development and Marketing Program Updates

Burgess briefly summarized the status of the following projects: LV21 Program testing of lignite at Wilsonville, Alabama; the Westmoreland 500 MW LV21 project at Gascoyne; and two LV21 Program studies (EERC: “Feasibility of CO2 Capture Technologies for Existing ND Lignite-Fired Pulverized Coal Boilers” – (Feb. 2007); Unifield Engineering: “Potential for Co-Firing Biomass in North Dakota Power Stations,” (March 30, 2007).

ND Transmission Authority Update

Sandi Tabor presented a brief update about the ND Transmission Authority.

Grant Round LXI (61) Proposals

Proposals to Amend Existing Contracts -

LRC-LXI-H: “Plains Carbon Dioxide Reduction Partnership – Phase II”; Submitted by: Energy & Environmental Research Center (EERC); Request for: \$360,000; Total Project Costs: \$21,500,000; Principal Investigator: Ed Steadman; Project Duration: 2 ½ years. (Small Research Project).

Burgess said that with this proposal, EERC is asking for \$360,000 that they did not receive as part of the original request of the LRC/NDIC for this proposal in Grant Round LV (55). (The LRC recommended and the NDIC approved an investment of \$360,000 of \$720,000 requested by the EERC in November of 2005.) The PCOR Phase II project is a four-year project involving field sequestration tests to validate eventual commercial applications that include geologic and terrestrial storage of carbon dioxide. The project will assess sequestration economics, risk, and monetary co-benefits of carbon sequestration. It will also provide public education carbon sequestration outreach. PCOR Phase II sets the stage for PCOR Phase III, a 10-year large sequestration project in this region in which the U.S. DOE has committed \$67 million.

Burgess said that the three technical peer reviewers of this proposal during Grant Round 55 gave the proposal an average rated score of 210 out of 250. All three technical peer reviewers recommended that the project be funded. Burgess said that proposal LRC-LXI-H for this current Grant Round (61) did not require peer review since it is a proposal to amend an existing contract with NDIC. The project was previously peer reviewed with a request of \$720,000. However, the LRC/NDIC decided to fund the project at \$360,000 because of budget constraints at the time.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that the proposal for additional funding (\$360,000) in Phase II of the contract be funded. (Small research funds from the Lignite Research Fund).

Burgess said that conflict-of-interest parties for proposal LRC-LXI-H are EERC, Great River Energy, Great Northern Power Development, SaskPower, Basin Electric Power Cooperative, Dakota Gasification Company, Minnesota Power, Minnkota Power Cooperative, Montana-Dakota Utilities Co., Otter Tail Power Company, Westmoreland Coal Company, North Dakota Department of Health, North Dakota Department of Commerce and North Dakota Geological Survey.

Ed Steadman of EERC gave a presentation in support of proposal LRC-LXI-H.

LRC-LXI-I: “Lignite Vision 21 Project Coal-to-Liquids Plant, McLean County, North Dakota”; Submitted by: CTL Partners; Request for \$500,000; Total Project Costs: \$50,000,000; Principal Investigator: James Lepinski; Project Duration: 30 months. (Demonstration Project).

Burgess said that this proposal requests an amendment to the existing contract between the Partners and the NDIC to provide for an increase in NDIC funding from \$1.2 million to \$1.7 million (an increase of \$500,000) in Phase I of the contract. The original proposal was submitted for Grant Round LVII (57). (In May of 2006, the LRC recommended, and the NDIC approved, funding for this project.) Headwaters Energy Services, Great River Energy, The North American Coal Corporation, and The Falkirk Mining Company are about one year into pre-FEED (front-end engineering and design) studies. The Partners intend to design, construct and operate a Coal-to-Liquids (CTL) plant in McLean County, North Dakota. The Partners intend to expand the Falkirk Mine to supply lignite to the CTL plant which will utilize a gasification technology to convert lignite to gasoline and electricity. The partners anticipate that it will take \$50 million and up to 30 months to complete the front-end engineering and design (FEED) process to take the project to financial closure and to the point where final design, procurement and construction can begin.

Burgess said that the three technical peer reviewers of this proposal during Grant Round LVII (57) gave the proposal an average rated score of 194 out of 250. Two of the three technical peer reviewers recommended that the project be funded; one reviewer recommended that funding may be considered. Burgess said that proposal LRC-LXI-I for this current Grant Round (61) did not require peer review since it is a proposal to amend an existing contract with NDIC. The project was previously peer reviewed and approved for funding up to \$10,000,000. The LRC recommended and the NDIC approved \$1.2 million in Phase I of the contract.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that the proposal for additional funding (\$500,000) in Phase I of the contract be funded (Demonstration funds from the Lignite Research Fund), with the payback condition revised to reflect the new funding amount.

Burgess said that conflict-of-interest parties for proposal LRC-LXI-I are Great River Energy, The Falkirk Mining Company and The North American Coal Corporation.

Jim Lepinski of Headwaters Inc. gave a presentation in support of proposal LRC-LXI-I.

Small Research Projects:

LRC-LXI-A: “Effects of Aging on Treated Activated Carbons”; Submitted by: Energy & Environmental Research Center; Request for: \$40,000; Total Project Costs: \$120,870; Principal Investigator: John Pavlish; Project Duration: 10 months.

Burgess said that with this proposal, EERC proposes to evaluate the effects of storage on activated carbons (ACs). They intend to evaluate the aging effects that might alter the physical or chemical properties of the ACs, which could impact the mercury capture efficiency.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 199 out of 250 points. (The weighted scores were 191 out of 250 points from reviewer 07-1, 199 out of 250 points from reviewer 07-2 and 207 out of 250 points from reviewer 07-3). All three technical peer reviewers recommended that the project be funded.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-A be funded at a level not to exceed \$40,000. (Small research funds from the Lignite Research Fund).

Burgess said that conflict-of-interest parties for proposal LRC-LXI-A are EERC, Otter Tail Power Company and SaskPower.

John Pavlish of EERC gave a presentation in support of proposal LRC-LXI-A. Copies of EERC's written responses to the technical peer reviewers' comments were handed out to the LRC members.

The LRC took a break at 1:15 p.m. and reconvened at 1:20 p.m. to hear about more of the Grant Round LXI (61) proposals.

Demonstration Projects:

LRC-LXI-B: “Phase III – Mercury Control Technologies for Utilities Burning Lignite Coal: Full-Scale Evaluation of Long-Term Balance-of-Plant Effects Resulting from Activated Carbon Injection”; Submitted by: Energy & Environmental Research Center; Request for: \$300,000; Total Project Costs: \$5,000,000; Principal Investigator: John Pavlish; Project Duration: 13 months.

Burgess said that with this proposal, EERC proposes to conduct a yearlong, full-scale test of activated carbon injection upstream of an electrostatic precipitator to determine long-term effectiveness for mercury removal and to further evaluate balance-of-plant impacts. The test will be conducted at SaskPower Poplar River Unit 2.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 214 out of 250 points. (The weighted scores were 228 out of 250 points from reviewer 07-4, 202 out of 250 points from reviewer 07-5 and 212 out of 250 points from reviewer 07-6). All three technical peer reviewers recommended that the project be funded.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-B be funded at a level not to exceed \$300,000. (Demonstration funds from the Lignite Research Fund).

Burgess said that conflict-of-interest parties for proposal LRC-LXI-B are EERC and SaskPower

John Pavlish of EERC gave a presentation in support of proposal LRC-LXI-B. Copies of EERC's written responses to the technical peer reviewers' comments were handed out to the LRC members.

LRC-LXI-C: “Development of Biomimetic Membranes for Near-Zero PC Power Plant Emissions”; Submitted by: Carbozyme, Inc.; Request for: \$260,000; Total Project Costs: \$6,311,118; Principal Investigator: Michael Trachtenberg, Ph.D.; Project Duration: 3 years.

Burgess said that with this proposal, Carbozyme, Inc. and EERC propose to evaluate and demonstrate the ability of a contained liquid membrane (CLM) permeator to capture CO₂ from flue gas produced during the combustion of lignite.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 172 out of 250 points. (The weighted scores were 183 out of 250 points from reviewer 07-7, 189 out of 250 points from reviewer 07-8 and 145 out of 250 points from reviewer 07-9). Technical peer reviewer 07-7 recommended that the project be funded; technical peer reviewers 07-8 and 07-9 recommended that funding may be considered.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-C be funded at a level not to exceed \$260,000. (Demonstration funds from the Lignite Research Fund). The commercially available CO₂ capture technologies available to the lignite industry are limited and not cost-effective. While two of the peer reviewers have many questions, Burgess said that he believes they can be addressed by the research team and it is worthwhile for the state of North Dakota to invest in this project. He said that this is a project that has the potential to provide substantial cost-savings over technologies now available and the state's investment provides good value when considering that over \$6 million of other funds are being invested.

Burgess said that conflict-of-interest parties for proposal LRC-LXI-C are EERC, Otter Tail Power Company, Great River Energy and Montana-Dakota Utilities Co.

Michael Trachtenberg of Carbozyme, Inc. gave a presentation in support of proposal LRC-LXI-C. Copies of Carbozyme’s written responses to the technical peer reviewers’ comments were handed out to the LRC members.

LRC-LXI-D: “Activated Carbon Production From North Dakota Lignite – Phase IIA”; Submitted by: Energy & Environmental Research Center; Request for: \$290,348; Total Project Costs: \$858,517; Principal Investigator: Steve Benson, Ph.D.; Project Duration: 9 months.

Burgess said that with this proposal, EERC proposes to test activated carbon’s (ACs) ability to provide effective mercury control at the EERC. This project is designed to: 1) establish the technical feasibility of manufacturing high-quality mercury sorbents from North Dakota lignite using a pilot multiple-hearth furnace for producing ACs and 2) examine the effectiveness of pretreatment of the produced ACs to generate the enhanced carbons for mercury control in a variety of coal-derived flue gas environments.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 184 out of 250 points. (The weighted scores were 188 out of 250 points from reviewer 07-10, 217 out of 250 points from reviewer 07-11 and 148 out of 250 points from reviewer 07-12). Technical peer reviewer 07-11 recommended that the project be funded; technical peer reviewers 07-10 and 07-12 recommended that funding may be considered.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-D be funded at a level not to exceed \$290,348. (Demonstration funds from the Lignite Research Fund). He said that this will be the last R&D project prior to commercialization.

Burgess said that conflict-of-interest parties for proposal LRC-LXI-D are EERC, BNI Coal, Ltd., and Minnesota Power.

Steve Benson, Ph.D. of EERC and Mike Hummel of BNI Coal, Ltd., gave a presentation in support of proposal LRC-LXI-D.

The LRC took a break at 2:25 p.m. and reconvened at 2:35 p.m. to hear about the rest of the Grant Round LXI (61) proposals.

LRC-LXI-E: “Impacts of Lignite Properties on Powerspan’s NOx Oxidation System”; Submitted by: Energy & Environmental Research Center; Request for: \$260,420; Total Project Costs: \$610,985; Principal Investigator: Steve Benson, Ph.D.; Project Duration: 7 months.

Burgess said that this proposal involves the demonstration of lignite in Powerspan’s system. It will demonstrate the ability of the system to reduce NOx and other pollutants from the flue gas of lignite combusted in Minnkota Power Cooperative’s Milton R. Young Unit 1 cyclone-fired boiler.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 199 out of 250 points. (The weighted scores were 225 out of 250 points from reviewer 07-13, 186 out of 250 points from reviewer 07-14 and 185 out of 250 points from reviewer 07-15). Technical peer reviewer 07-15 recommended that the project be funded; technical peer reviewers 07-13 and 07-14 recommended that funding may be considered.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-E be funded at a level not to exceed \$260,420. (Demonstration funds from the Lignite Research Fund). He said that the North Dakota Administrative Code (Section 43-03-03-02) requires that the NDIC funding share not exceed 50% of the total project cost. In other words, a minimum of 50% total project funds must come from other sources other than the Industrial Commission. He said that this project proposal meets the matching fund requirements.

Burgess said that conflict-of-interest parties for proposal LRC-LXI-E are EERC and Minnkota Power Cooperative. Al Rudeck said that Minnesota Power, Montana-Dakota Utilities Co. and Basin Electric Power Cooperative are also conflict-of-interest parties for proposal LRC-LXI-E.

Presentations in support of proposal LRC-LXI-E were given by Steve Benson, Ph.D. of EERC and Luther Kvernen of Minnkota Power Cooperative.

LRC-LXI-F: “North Dakota Partnership in the Canadian Clean Power Coalition Phase III”; Submitted by: Basin Electric Power Cooperative; Request for: \$130,000; Total Project Costs: \$260,000; Principal Investigator: Dave Schmitz; Project Duration: 3 years.

Burgess said that this proposal involves North Dakota lignite users, producers and developers participating in the Canadian Clean Power Coalition (CCPC). CCPC Phase III is intended to support the development of advanced coal utilization technologies including gasification, oxy-fuel combustion, and various carbon removal technologies that can be applied to conventional coal power plants. The CCPC Phase III is designed to lead to construction of a supercritical pulverized coal plant using lignite and an Integrated Gasification Combined Cycle (IGCC) plant using subbituminous, both of which will be designed to capture CO₂ emissions.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 212 out of 250 points. (The weighted scores were 211 out of 250 points from reviewer 07-16, 221 out of 250 points from reviewer 07-17 and 187 out of 250 points from reviewer 07-18). All three technical peer reviewers recommended that the project be funded.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-F be funded at a level not to exceed \$130,000. (Demonstration funds from the Lignite Research Fund).

Burgess said that conflict-of-interest parties for proposal LRC-LXI-F are Basin Electric Power Cooperative, Montana-Dakota Utilities Co., Minnesota Power, Great Northern Power Development, Great River Energy, Dakota Gasification Company, Otter Tail Power Company and Westmoreland Coal Company.

Dave Schmitz of Basin Electric Power Cooperative gave a presentation in support of proposal LRC-LXI-F on behalf of BEPC and other CCPC entities.

Tony Clark, representing the ND Public Service Commission as the voter at this LRC meeting, handed in his confidential ballot to Karlene Fine at approximately 3:00 p.m. since he had to leave the meeting prior to its conclusion.

LRC-LXI-G: “Demonstration of WRI’s Pre-Combustion Mercury Removal Process for Lignite-Fired Power Plants”; Submitted by: Western Research Institute (WRI) and Montana-Dakota Utilities Co. (MDU); Request for: \$188,000; Total Project Costs: \$595,000; Principal Investigator: Al Bland, Ph.D.; Project Duration: 2 years.

Burgess said that with this proposal, Western Research Institute (WRI) proposes to develop and demonstrate pre-combustion mercury removal of raw coal by thermal treatment. A mercury removal efficiency improvement of at least 50% in the incoming coal will be achieved at less than \$30,000/lb of mercury removed.

This project includes an economic analysis that will be conducted of the commercial-scale application of the WRI process. A successful demonstration of this project will lead to accelerated deployment of commercial systems.

Burgess said that the three technical peer reviewers gave the proposal an average weighted score of 193 out of 250 points. (The weighted scores were 188 out of 250 points from reviewer 07-19, 213 out of 250 points from reviewer 07-20 and 177 out of 250 points from reviewer 07-21). Technical peer reviewers 07-19 and 07-20 recommended that the project be funded; technical peer reviewer 07-21 recommended that the project not be funded.

As technical advisor to the LRC and NDIC, Burgess said that he recommends that proposal LRC-LXI-G be funded at a level not to exceed \$188,000. (Small research funds from the Lignite Research Fund).

Burgess said that conflict-of-interest parties for proposal LRC-LXI-G are Montana-Dakota Utilities Co., Basin Electric Power Cooperative and SaskPower.

Duane Steen of Montana-Dakota Utilities Co. gave a presentation in support of proposal LRC-LXI-G.

Carlyle Hillstrom, representing the ND Farm Bureau as the voter at this LRC meeting, handed in his confidential ballot to Karlene Fine at 3:25 p.m. since he had to leave the meeting prior to its conclusion.

Dwyer said that the EERC mercury-related publication titled “Controlling Mercury Emissions for Utilities Firing Lignites from North America – Summary Report” will be mailed to the LRC members and alternates by the Lignite Energy Council (LEC) after the EERC has copies of the book available. He asked that proposers with mercury-related projects edit their projects’ final reports so they are tailored to the style of the reports in the EERC publication.

2007 Legislative Update: North Dakota and Minnesota Legislative Sessions:

Sandi Tabor gave a brief presentation highlighting key 2007 ND Legislative Assembly legislative bills favorable to lignite. John Dwyer’s update about the 2007 Minnesota Legislative Assembly included a summary of proposed greenhouse gas emission targets. Details about Minnesota legislative bill SF145 (re: climate change legislation and greenhouse gas emissions) are available on the Minnesota Legislature’s web site.

Next Grant Application Deadline; Next LRC Meeting

Dwyer said that October 1, 2007 is the next grant round application deadline. The next LRC meeting is scheduled for November 19, 2007.

Tom Durham, representing Westmoreland Coal Company as the voter at this LRC meeting, handed in his confidential ballot to Karlene Fine at approximately 3:45 p.m. since he had to leave the meeting prior to its conclusion.

Ballot Results re: Grant Round LXI (61) Proposals

Dwyer announced the LRC voters’ confidential ballot results concerning recommendations for NDIC funding of the nine Grant Round LXI (61) proposals.

Voting results re: Proposals to Amend Existing Contracts -

LRC-LXI-H: “Plains Carbon Dioxide Reduction Partnership – Phase II” -

Recommend Funding: 21 votes.

Do Not Fund: 1 vote.

Abstained from voting: 1.

LRC-LXI-I: “Lignite Vision 21 Project Coal-to-Liquids Plant, McLean County, North Dakota” -

Recommend Funding: 18 votes.

Do Not Fund: 5 votes.

Voting results re: Small Research Projects -

LRC-LXI-A: “Effects of Aging on Treated Activated Carbons” -

Recommend Funding: 19 votes.

Do Not Fund: 4 votes.

Voting results re: Demonstration Projects -

LRC-LXI-B: “Phase III – Mercury Control Technologies for Utilities Burning Lignite Coal: Full-Scale Evaluation of Long-Term Balance-of-Plant Effects Resulting from Activated Carbon Injection” -

Recommend Funding: 18 votes.

Do Not Fund: 5 votes.

LRC-LXI-C: “Development of Biomimetic Membranes for Near-Zero PC Power Plant Emissions” -

Recommend Funding: 17 votes.

Do Not Fund: 6 votes.

LRC-LXI-D: “Activated Carbon Production from North Dakota Lignite – Phase IIA” -

Recommend Funding: 19 votes.

Do Not Fund: 4 votes.

LRC-LXI-E: “Impacts of Lignite Properties on Powerspan’s NOx Oxidation System” -

Recommend Funding: 20 votes.

Do Not Fund: 3 votes.

LRC-LXI-F: “North Dakota Partnership in the Canadian Clean Power Coalition Phase III” -

Recommend Funding: 21 votes.

Do Not Fund: 0 votes.

Abstained from voting: 2.

LRC-LXI-G: “Demonstration of WRI’s Pre-Combustion Mercury Removal Process for Lignite-Fired Power Plants” -

Recommend Funding: 19 votes.

Do Not Fund: 3 votes.

Abstained from voting: 1.

The LRC’s recommendations concerning funding of the proposals will be reviewed and acted upon by the North Dakota Industrial Commission (NDIC) at the NDIC’s 1:30 p.m. May 29, 2007 meeting.

Adjournment

There being no further business, Dwyer requested a motion to adjourn the LRC meeting. Luther Kvernen so moved; seconded By Mike Hummel. Motion carried.

Vicki Gilmore, Recording Secretary
