

## FY08-LXII (62)-159

### “Demonstration of Coal Combustion Products for Green Roadbuilding in Medora, North Dakota”

Submitted by: Energy & Environmental Research Center (EERC)

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### PARTICIPANTS

<u>Sponsor</u>	<u>Cost Share</u>
Great River Energy	\$25,000
Medora Foundation	\$100,000
EERC-DOE JSRP	\$128,791
NDIC	<u>\$125,000</u>
Total Cost	\$378,791

Project Schedule – 14 months

Contract Signed – 2/15/08

Start Date – 2/1/08

Completion Date – 3//31/09

Project Deliverables

Status Reports:

4/30/08(✓); 7/31/08(✓);

10/31/08(✓);

Draft Final Report: 1/31/09(✓);

Final Report: 3/31/09(✓)

### OBJECTIVE / STATEMENT OF WORK:

Demonstrate environmentally sustainable (green) roadbuilding using multiple coal combustion product (CCP) utilization applications and, in the process, educate North Dakota industry, state agencies, and the public about environmentally sustainable construction. This project will apply technologies in a single site to demonstrate that a North Dakota product, CCPs, can be effective in constructing durable roads that meet North Dakota transportation needs and meet environmentally sustainable or green roadbuilding objectives: 1) watershed-driven storm water management, 2) reuse and recycling of materials, and 3) conservation and protection of ecosystems.

### FINAL REPORT SUMMARY

**Purpose of the Project:** The Energy & Environmental Research Center (EERC) performed this project in order to demonstrate environmentally sustainable (green) roadbuilding using multiple coal combustion products (CCP) utilization applications and, in the process, to educate North Dakota industry, state agencies, and the public about environmentally sustainable construction.

**Work Accomplished:** Two different high-volume fly ash (HVFA) concrete mixes (50% and 70% fly ash concrete) were selected for paving in walkways requiring 4-inch pavement and for driving and parking areas requiring 6-inch pavement. A plan for placement was developed with the project contractors, and the HVFA concrete was placed and finished at the Medora Foundation Burning Hills Amphitheater site. In a second phase of the project, use of fly ash for base and subgrade stabilization for the soils under additional driving and parking areas at the amphitheater were identified for future construction. Work on the engineering design was performed under this project to allow project engineers to become familiar with the use of fly ash in soil stabilization. Information on the use of fly ash was provided to a commercial engineering firm, and EERC staff worked with the firm to facilitate an understanding of equipment needs for placement, blending, and compacting of fly ash-soil mixtures, additions of fly ash for various soil types, environmental requirements in the state of North Dakota, fly ash costs, fly ash delivery costs, and soil testing needs.

**Project Results:** Four CCP-based green roadbuilding technologies were planned and designed for a site in Medora, North Dakota. The concrete applications were completed, and the soil stabilization applications were fully planned and designed for accomplishment in 2010 and beyond. North Dakota contractors were made aware of the sustainability of using CCPs in road construction, and a determination of the sustainability of the project based on standard construction technologies compared to CCP utilization applications was completed showing that the CCP technologies offer advantages especially in the area of concrete paving.

**Potential Applications of the Project:** The potential for this project is for CCPs to be incorporated into additional road construction applications especially in soil stabilization. The EERC is currently working with the U.S. Environmental Protection Agency Region 8 Resource Conservation Challenge to hold an educational event in North Dakota on the use of CCPs, and the target audience is state and local Department of Transportation engineers as well as contractors and engineers. A representative of the North Dakota Department of Health will participate as will other project partners. It is anticipated that the use of green roadbuilding technologies will be considered for future North Dakota and regional road construction projects.