



Combustion Byproducts Recycling Consortium

a program of West Virginia University
in cooperation with the U.S. Department of Energy
National Energy Technology Laboratory

January 23, 2008

Headquarters

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National Energy Technology Center
U.S. Department of Energy
PO Box 10940
Pittsburgh, PA 15236

Re: Cooperative Agreement DE-FC26-98FT40028

To Whom It May Concern:

Enclosed please find 3 copies of the quarterly status report for the Combustion Byproducts Recycling Consortium for October - December, 2007. I hope this report meets with your approval.

If you have any questions, please do not hesitate to contact me. I can be reached at (304) 293-2867 x 5448 or through email at Tamara.Vandivort@mail.wvu.edu.

Sincerely,

Tamara Vandivort
Program Coordinator

Enclosures

cc: William Aljoe, DOE-NETL COR

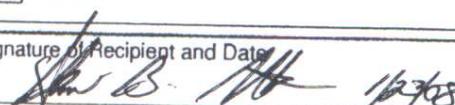
National Energy Technology Laboratory



U.S. DEPARTMENT OF ENERGY
FEDERAL ASSISTANCE PROGRAM/PROJECT STATUS REPORT

OMB Burden Disclosure Statement

Public reporting burden for this collection of information is estimated to average 47.5 hours per response, including the time for reviewing instructions, reviewing existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of Information Resource Management Policy, Plans, and Oversight, Records Management Division, HR-422 - GTN, Paperwork Reduction Project (1910-0400), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585; and to the Office of Management and Budget (OMB), Paperwork Reduction Project (1910-0400), Washington, DC 20503.

1. Program/Project Identification No. DE-FC26-98FT40028	2. Program/Project Title Combustion Byproducts Recycling Consortium	3. Reporting Period 10/1/07 through 12/31/07
4. Name and Address West Virginia Research Corporation 886 Chestnut Ridge Road, Room 202 PO Box 2845 Morgantown WV 26506-6845		5. Program/Project Start Date 9-24-1998
		6. Completion Date 8/31/07
7. Approach Changes <input checked="" type="checkbox"/> None		
8. Performance Variances, Accomplishments, or Problems <input checked="" type="checkbox"/> None		
9. Open Items <input checked="" type="checkbox"/> None		
10. Status Assessment and Forecast <input checked="" type="checkbox"/> No Deviation from Plan is Expected		
11. Description of Attachments <input type="checkbox"/> None		
12. Signature of Recipient and Date  10/3/08	13. Signature of U.S. Department of Energy (DOE) Reviewing Representative and Date	

Combustion Byproducts Recycling Consortium
Quarterly Status Report

for

October – December, 2007

Cooperative Agreement Number DE-FC26-98FT40028

Submitted to

U.S. Department of Energy – National Energy Technology Laboratory

Submitted by

Tamara Vandivort, Consortium Manager
CBRC National Center
West Virginia University

January 23, 2007

CBRC National Center Report

Awaiting Approval from DOE-NETL on Modifications to Project Statements of Work and Budgets

Last quarter, all 2005 project researchers submitted revised statements of work, budgets, and timelines to reflect the reduction in funding. In all cases, researchers received at least 75% of the value of year 1 funding from the DOE/CBRC program and were asked to bring their projects to a logical conclusion. The following table shows original year 1 allocations and subsequent reallocations. As soon as DOE-NETL approves the budget modification, all active subcontracts will be amended to reflect the reduced scope of work, revised budget, and adjusted timeline. The projects will be extended through June 30, 2007; the regional centers through July 31, 2007. This will allow the regional centers one month to review project final reports; and allow the national center one month to review regional center reports prior to expiration of the cooperative agreement between WVU and DOE-NETL.

Number	Title	PI	Original Year 1 Funding	Revised Year 1 Funding
05-CBRC-E08	National Network of Research and Demonstration Sites for Agricultural and Other Land Application Uses of FGD Products	Dick	\$116,338.00	\$105,000.00
05-CBRC-E18	Field Testing of Arsenic and Mercury Bioavailability Model from Land-Applied CCBs	Pier	\$23,530.00	\$17,648.00
05-CBRC-E19	Community-based Social Marketing: the tool to get target audiences to use CCBs	Buggeln	\$53,915.00	\$40,436.00
05-CBRC-M09	Cold In-Place Recycling of Asphalt Pavements Using Self-Cementing Fly Ash: Analysis of Pavement Performance and Structure Number	Misra	\$24,987.00	\$18,740.00
05-CBRC-M16	In Situ Stabilization of Gravel Roads with CCPs	Edil	\$65,180.00	\$48,885.00
05-CBRC-M20	New Technology Based Approach to Advance Higher Volume Fly ash Concrete with Acceptable Performance	Obla	\$132,502.00	\$113,974.00
05-CBRC-M23	Manufacturing building products with fly ash and advanced coal combustion byproducts	Chou	\$51,000.00	\$38,250.00
05-CBRC-W03	Evaluation of CCBs for In Situ Treatment of Acid Mine Drainage	Canty	\$13,645.69	\$11,610.00

05-CBRC-W04	Using Class C Fly Ash to Mitigate Alkali-Silica Reactions in Concrete	Dockter	\$50,000.00	\$37,500.00
05-CBRC-W08	Evaluation of the Durability and Commercial Potential of 100 Percent Fly Ash Concrete	Stephens	\$71,634.00	\$71,634.00

Researcher Quarterly Reports

Until the modification is approved by DOE-NETL, research projects are on hold with the exception of Stephens (05-CBRC-W08). We anticipate the modification to be approved next quarter at which time researchers will be notified to resume work with the revised statements of work, budgets, and time lines.

Final Reports

No final reports were received this quarter.

Outreach

A program promotional package (cover letter; fact sheet; draft letter to Congress) was distributed via CBRC list serve; ACAA membership; and placed on the CBRC web site.

Plans for Next Quarter

Subcontract Amendments

Amend project subcontracts listed in the table above once WVU receives approval on the modification from DOE-NETL.

Web Site

- Continue updating with upcoming events and final reports as received.

**Eastern Regional Center
University of Kentucky
James Hower, Director**

No report received this quarter.

**Midwestern Regional Center
Southern Illinois University
Y. Paul Chugh, Director**

No report received this quarter.

**Combustion Byproducts Recycling Consortium (CBRC)
Western Regional Center
Quarterly Progress Report October 1 – December 31, 2007**

**Submitted by
Debra F. Pflughoeft-Hassett, Director
CBRC Western Regional Center**

Task Description

The Energy & Environmental Research Center (EERC) will perform two primary tasks as the CBRC Western Regional Center:

1. Technical administration of CBRC projects in the Western Region, including:
 - Participating in national CBRC meetings, conference calls, and other communications.
 - Facilitating communication within the region with the Regional Chair and Review Committees.
 - Facilitating the proposal submittal and review process.
 - Facilitating project activities and reporting and coordinating with the national CBRC office.

2. Financial administration of the research contracts awarded in the Western Region during the first-round regional and national competition and review.

Accomplishments for the Quarter

As with all FY06 CBRC projects, Western Region projects were on hold for the fourth quarter of 2007. No activity was reported for the projects noted below:

**05-CBRC-W03 “Evaluation of CCBs for In Situ Treatment of Acid Mine Drainage”
CC Environmental LLC**

**05-CBRC-W04 “Using Class C Fly Ash to Mitigate Alkali–Silica Reactions in
Concrete” University of North Dakota Energy & Environmental Research Center**

**05-CBRC-W08 “Evaluation of Durability and Commercial Potential of 100% Fly Ash
Concrete” Montana State University**

Western Region Directorate Administrative Activities

The Western Region Director kept in contact with Western Region CBRC principal investigators and fielded questions as needed.

Technical Progress

05-CBRC-W03 “Evaluation of CCBs for In Situ Treatment of Acid Mine Drainage” CC Environmental LLC

No technical activity.

05-CBRC-W04 “Using Class C Fly Ash to Mitigate Alkali–Silica Reactions in Concrete” University of North Dakota Energy & Environmental Research Center

No technical activity.

05-CBRC-W08 “Evaluation of Durability and Commercial Potential of 100% Fly Ash Concrete” Montana State University

No technical activity.

Plans for the Next Quarter

The CBRC Western Region Director will work with the national CBRC director and regional investigators to reinitiate work on continuing projects and to get project deliverables submitted.

Financial Information

A financial report is being submitted under separate cover.

CBRC Technical Progress Report

Project No.: 05-CBRC-W08

Project Title: Evaluation of the Durability and Commercial Potential of 100 Percent Fly Ash Concrete
Reporting Period: October 1, 2007 to December 31, 2007
Technical Contact: Jerry Stephens (406-994-6113, jerrys@ce.montana.edu)
Civil Engineering Dept., Montana State University, Bozeman, MT 59717

Introduction

Under the revised scope of work, the objective of this project is to determine the long term durability of a new concrete construction material that uses fly ash rather than Portland cement as the binder. Important durability issues that will be studied are the freeze-thaw, sulfate, and hydrogen sulfide resistance of this new material, and its performance with alkali-silica reactive aggregates. These properties will be determined by laboratory testing of the material (Task 1, original proposal). The project findings will be fully documented in a final report, and an article summarizing the project and these findings will be submitted for publication in Ashlines (Task 4, original proposal). The results will be further disseminated as appropriate through conference presentations, and trade and journal articles.

Task Description

Task 1: Laboratory Tests

The primary objectives of the laboratory testing portion of this effort are threefold 1) to investigate the potential of selected ashes to be used as the binder in 100 percent fly ash concrete, 2) to develop concrete mixes for precast applications, and 3) to evaluate the durability of 100 percent fly ash concrete under freeze thaw action, and exposure to sulfates and hydrogen sulfides.

Summary of this Quarter's Accomplishments and Significant Events

- 1) Notice was received that work could resume on this project in late November. Following this notification,
 - a. The work completed earlier during the year (January through March) was reviewed,
 - b. plans were made for continued work on Task 1 activities beginning in January of the new year,
 - c. the operational fitness of the freeze-thaw test apparatus was assessed, and
 - d. sampling/testing protocols were reviewed and refined for the freeze-thaw and hydrogen sulfide test efforts.

To-Date Accomplishments

Task 1: Laboratory Tests: 35 percent complete

Technical Progress

Task 1: Corette Based Mixes – set time and air entrainment

Prior to the suspension of work last March, the basic set time behavior of the Corette fly ash being used in this investigation was characterized using eight mortar mixtures made with varying

amounts of borax. Work was done on a series of trial mixtures to investigate entraining air in 100 percent fly ash concrete mixtures. This work was done using the Corette fly ash and mixtures with water-to-fly ash ratios (w/fa) of 0.20 and 0.24. Relative to dosage rate, it was found that the percent of entrained air was approximately linearly proportional to admixture amount, with 1.5 ounces per hundred weight of fly ash resulting in approximately 7 percent air in the mixture (generally consistent with expectations based on the dosage rate/range provided by the manufacturer for Portland cement). Relative to its properties in the fresh state, entrained air was found to increase the “stickiness” and decrease the bleed water in the fly ash concrete mixtures, similar to its effect on Portland cement concretes. Unlike Portland cement concretes, however, the workability of 100 percent fly ash concretes was found to be relatively unaffected by the presence of entrained air. Relative to performance in the hardened state, the compressive strength of 100 percent fly ash concretes is reduced by entrained air, as is also observed in Portland cement concretes. The strength loss for these concretes per percent of entrained air is toward the 6 percent end of the 2 to 6 percent range reported for Portland cement concretes.

Also prior to the suspension of work in March, trial concretes were made with the Dave Johnston fly ash. These mixtures had properties in the fresh and hardened states similar to those seen using the Corette fly ash.

Task 1: Test Protocols: freeze-thaw and hydrogen sulfide testing

Work was done during this reporting period on refining the test protocols to be used in conducting the various durability tests in the laboratory phase of this project. Sufficient time remains to subject one and hopefully two sets of test specimens to 300 freeze-thaw cycles. Each set of specimens will look at five different mixtures (using three specimens per mixture).

Mixtures to be tested are:

Corette ash	0, 3, and 6 percent air, w/fa = 0.24
Dave Johnson ash	0 percent air, w/fa = 0.24
Portland cement,	0 percent air, multipurpose 4,000 psi mix

Once these tests are complete, a second set of samples will be tested. The specific mixtures to be evaluated in the second set of tests will be determined in part based on the results obtained from the first set of tests.

Co-incident with the freeze-thaw tests, the above mixtures will also be subjected to ASR, sulfate, and hydrogen sulfide testing. While it was anticipated that the hydrogen sulfide testing would be conducted using 2-in by 4-in cylindrical concrete specimens, the specimen configuration has been changed to 5-in by 1-in by 3/8-in bars, to increase potential reaction activity by increasing the surface area to volume ratio of the specimens. These specimens will be suspended in solution in bioreactors.

Plans for Next Period

Task 1: During the next reporting period, work will continue on Task 1, Laboratory Tests.

Freeze-thaw testing will be completed on the first set of concrete specimens in March.

Testing is expected to take approximately 60 days, during which the specimens will be subjected to 300 freeze-thaw cycles. Toward the end of the next reporting period,

testing of the second set of specimens should begin. The reactors for the hydrogen sulfide tests will be completed, and these tests will begin. Permeability and alkali-silica reactivity tests will be conducted concurrently with the above testing, using 4-in by 8-in cylinders cast when the freeze-thaw specimens are prepared.

Issues: During shakedown operation of the freeze-thaw test equipment, it was discovered that the cooling plate for this apparatus is seriously pitted and corroded, and some of the internal electrical connections require refurbishment. The Civil Engineering Department is contributing costs associated with the operation and use of the freeze-thaw machine to the project. The estimated cost of the new cooling plate and some other supplies is approximately \$2,600 (plus indirect costs), which is being paid by the Civil Engineering Department. It seems appropriate to use this expense toward the Department's cost share on the project (which had shown a freeze-thaw test apparatus cost of \$1,750 (plus indirect costs)).