

# **Advanced Multi-Product Coal Utilization By-Product Processing Plant**

Technical Progress Report for the Period: January 1, 2007 to March 31, 2007

Principal Author:  
Thomas Robl and John Groppo  
UK Center for Applied Energy Research

April 30, 2007

U. S. Department of Energy Cooperative Agreement No. DE-FC26-05NT41781

Center for Applied Energy Research  
2540 Research Park Drive  
University of Kentucky  
Lexington, KY 40511

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of the authors expressed herein do not necessarily state or reflect that of those of the United States Government or any agency thereof.

## **ABSTRACT**

The objective of the project is to build a multi-product ash beneficiation plant at Kentucky Utilities 2,200-MW Ghent Generating Station, located in Carroll County, Kentucky. Phase 1 was completed successfully, but the project did not continue on to Phase 2 due to withdrawal of CEMEX from the project. Attempts at replacing CEMEX were not successful. Problematic to the continuation of the project was its location in the Ohio Valley which is oversupplied and has low prices for fly ash and the change in CEMEX priorities due to merger and acquisitions. Thus, CAER concurred with the DOE to conclude the project at the end of Budget Period 1, March 31, 2007.

## TABLE OF CONTENTS

Section	Page No.
Disclaimer.....	2
Abstract.....	3
Executive Summary.....	5
Introduction and Background.....	6
Activities During the Quarter.....	6
Lessons Learned.....	7

## **EXECUTIVE SUMMARY**

The project area is located in Carroll County, Kentucky, approximately one mile northeast of Ghent, Kentucky. The lower ash pond is situated immediately adjacent to U.S. Highway 42 on the southwest corner of the Ghent power plant site. Disposal of ash into the 120-acre pond began when the Ghent power plant became operational in 1973 and continued over a period of 20 years until the upper ash pond became operational in 1993.

This quarterly report focuses on the results of attempts to replace CEMEX in the project with another participant after they withdrew from the project. Several ash marketers and other companies in related industries were contacted and presentations were made to the relevant groups. We were not successful in replacing CEMEX in the time frame available. The knowledge gained from the Phase I experience as well as this effort was invaluable however.

The project did not advance beyond Phase I for a number of reasons. First, CEMEX priorities had changed during the project due to internal reorganization and the acquisition of an ash marketer that had prior existing ash beneficiation technology; also the CEMEX/MRT marketing group was brought in too late for the results of the study to have an impact on product strategies. Of particular importance was the nature of the local market, which is heavily oversupplied and under priced. Other factors include the production of the multiple products which several companies thought made the project more complex than was desirable and the size of the project, which may have been too small for the complexities of the CCPI program.

## **INTRODUCTION AND BACKGROUND**

As of the end of Phase I, CEMEX had decided to opt out of the project. The reason given was that they did not consider the market conditions to be sufficient to justify the risk associated with the project.

Their assessment of the local market for pozzolan suggested that it is already oversupplied and undervalued and additional supplies will only further deteriorate market pricing. The local pozzolan Fly Ash market (fly ash used as a partial replacement for Portland Cement) has 500,000 tpy more supply than the current demand and Unit 2 at Trimble County will add about 125,000 additional tons to that surplus supply in 2008. The local price is \$10 to \$14 per ton. The main competition for Ghent would be the LG&E Trimble County Station. The ash from this plant is marketed by CEMEX/MRT.

Consideration of exporting the pozzolan to more distant markets was more promising but still problematic. Most markets outside of Florida are adequately supplied, as of now, by local producers. Significant quantities of pozzolan are shipped into the Florida market. It was concluded however that the markets that supply Florida are oversupplied and a beneficiated pozzolan would have a competitive disadvantage in the longer term.

The markets for the ultra fine fly ash (UFFA) were somewhat different. There is some UFFA on the market and the State of Texas DOT has some relevant specifications. It was considered to be a niche product with limited demand. Competing materials include silica fume and metakaolin. The total demand in the United States for ultra fine pozzolans is in the range of 100,000 tpy, and that is currently equal to the supply. The current price for ultra fine pozzolans including UFFA is in the range of \$200 to \$300 per ton. They concluded that there was no reason to expect demand to depart from its historical relationship to Portland cement consumption. In addition it was noted that CEMEX/MRT did not have sales experience in for this kind of material and considerable effort would have to be expended to hire and train sales staff.

## **ACTIVITIES DURING THE QUARTER**

The UK CAER proposed replacing CEMEX on the project and/or possibly moving the project to another site. The time frame agreed upon for the effort included a 6 month not cost project extension which expired on March 30, 2007. Meetings were held with both large and small fly ash marketers as well processors and marketers of specialized materials such as polymer fillers and high performance grouts. A great deal was learned about the market for ash materials and impediments to developing new markets. The conclusions reached from this experience are presented here.

## LESSONS LEARNED

1. Corporate Strategies, Priorities and Organization Change. Often rapidly. Cemex's participation in the project was initiated by a technical group within the company before the acquisition of an ash marketer (MRT). The ash marketer already had contracted technology for ash beneficiation and therefore the need to acquire new technologies in the area of ash beneficiation was less urgent. During the period of the study Cemex made a multi-billion dollar purchase of another company (RMC) and reorganized itself. We lost the management team that started the project to another division and someone wholly new was put in charge of the project.

Considering the magnitude of the changes made, it would have been wise to pause and call a meeting all of the participants to review the objectives of the effort and renew the buy in of all parties.

2. The Corporate Marketing Group was Brought in Too Late. Marketing people are face with issues of moving material in the short term. New product markets take time to develop. The marketing group was not prepared to examine the viability of the entire slate of products, which could have included specialized materials such as oil field cements, grouts etc.

Bringing in the Cemex/MRT marketing group at the end of the project was a mistake. Dialog could have been productive in both the technical program and the marketing study.

3. The Project May Have Been too Complex for a Single Owner/Operator. Several corporate groups told us that a multi-product slate could be marketed, but only in the longer term. It was suggested that additional products should be added sequentially only after a primary market was established for one or two products. Also, no single entity was comfortable selling into multiple markets, such as specialty cement or polymer filler and the concrete ready mix industry. Also the personnel and expertise in operating the processing plant was not present.

A plant operator with knowledge of marketing other materials such as polymer filler, in addition to a pozzolan marketer, would have been of value. Also, Cemex had no experience actually operating this kind of plant. The participation of someone more familiar with this kind of process was lacking and probably needed.

4. Site Selection is Critical. After many hours of discussion, at least in regard to marketing products for the ready mix concrete industry, it is better to have a marginal ash in a strong market than the best ash available in a weakly priced market.

The site was chosen with regard to the needs of the utility not the needs of the market. The market proved to be more critical in the economic viability of the project.

5. DOE Involvement May Not Be a Critical Factor For This Project. The dollar value of the project may have been too small for participation in the U.S. DOE CCPI program. As a result, none of the potential project participants viewed the involvement of the U.S. DOE as a critical factor in their investment. Because of the payback clause, U.S. DOE was regarded as a “friendly banker” and not as a reducer of risk. To explain, all of the parties which we talked to regarded the government’s participation as adding to “overhead”. The added burden to insure that all accounts and records meet with government standards and needs, is an example of this. The savings on interests for a \$4 million dollar investment was not seen as offsetting the added complexity of the government’s participation.

The U.S.DOE may wish to consider a minimum \$ size for CCPI projects and awards.