

Advanced Multi-Product Coal Utilization By-Product Processing Plant

Project Withdrawn

Participant

University of Kentucky Research Foundation Center for Applied Energy Research (CAER)

Additional Team Members

Kentucky Utilities (a subsidiary of LG&E Corporation) — host

Location

Ghent, Carroll County, KY (Kentucky Utilities' Ghent Power Station)

Technology

CAER's hydraulic classification and froth flotation beneficiation process (Fast Float™)

Project Capacity/Production

197,500 tons/yr of high quality marketable products from coal ash

Coal

Pittsburgh bituminous

Project Funding

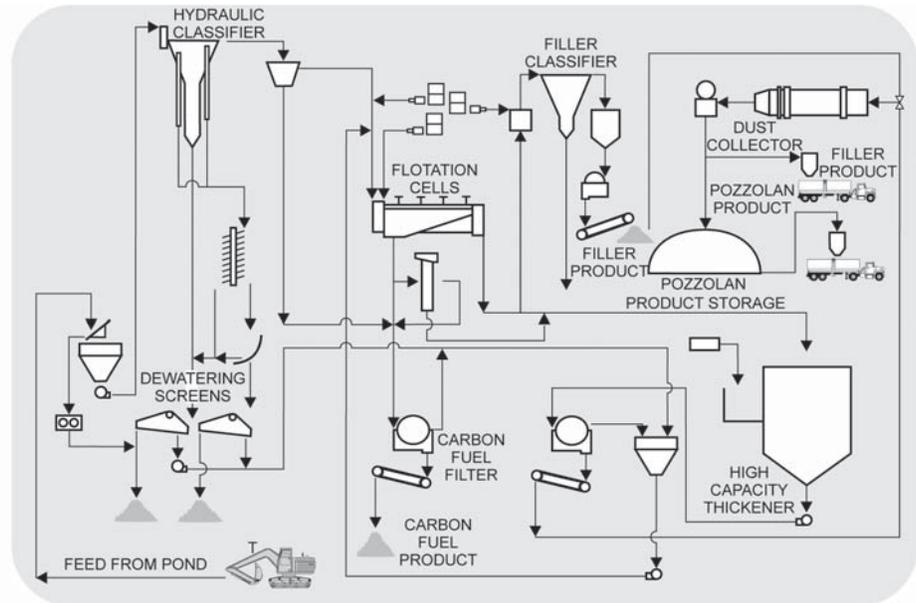
Total	\$1,245,305	100%
DOE	621,407	50
Participant	623,898	50

CCPI-1

Industrial Applications

Direct Coal Use

By-Product Use



Objective

To demonstrate that the coal utilization by-product (CUB) beneficiation process developed by the University of Kentucky Research Foundation's Center for Applied Energy Research (CAER) can convert nearly the entire CUB produced by the Ghent Power Station into a variety of useful products, including:

- 156,000 tons/yr of high quality, cementious pozzolan;
- 16,000 tons/yr of high grade, lightweight aggregate;
- 16,000 tons/yr of graded fill sand;
- 1,500 tons/yr of high quality polymeric fill; and
- 8,000 tons/yr of recycled carbon fuel.

Technology/Project Description

The project will utilize the CAER beneficiation process technology that is based on hydraulic classification and froth flotation (Fast Float™). Raw coal ash feed will be reclaimed from the Ghent Power Station's ash storage ponds. The feed enters a hydraulic classifier where material is separated into two basic sizes — a -200 mesh fine size and a +200 mesh coarse size. Coarse materials enter spiral concentrators that classify (separate by size and weight) and concentrate the incoming material into a lightweight aggregate suitable for masonry block, graded fill sand, and a coarse carbon fuel. The -200 mesh fine material is treated with a patented reagent before entering froth flotation cells where fine carbon is separated, leaving a stream of pozzolan material. The bulk of the pozzolan stream is subsequently concentrated and dried to produce a high-quality substitute for Portland cement. A fraction of the pozzolan stream is further processed hydraulically to produce a 9- to 4-micron size material for use as a polymer additive or other filler applications.

Project Duration 29 Months	Period of Operation <i>Project Withdrawn</i>	Status/Schedule *Estimated date
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Benefits

Each year the U.S. electric utility industry generates about 100 million tons of CUB, including flyash, scrubber sludge, and bottom ash. Currently, less than one-third of these waste products are used. The remainder is disposed of in impoundments or in landfills. Greater reuse of CUB can offset future land use and minimize the production of greenhouse gases. Portland cement manufacturing releases approximately 1 ton of CO₂ per ton of cement produced, equating to an annual emission rate of approximately 47 million tons. The CAER beneficiation process produces a high-quality pozzolan that can be used at higher cement substitution levels in concrete (*i.e.*, 30 percent versus 20 percent). The demonstration project alone is targeted to produce 156,000 tons/yr of high-quality pozzolan. This increased utilization rate represents a significant greenhouse gas avoidance potential.

Status/Accomplishments

The National Environmental Policy Act (NEPA) requirement was met with an Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) in November 2004. The project was awarded a cooperative agreement in November 2004.

Ash pond core sampling, analysis, and mapping have been completed. Results indicate the pond volume exceeds 200 million cubic feet and contains more than 7 million tons of ash. In May 2005, it was decided that the demonstration project will be fed entirely from the ash pond as opposed to directly from the power station.

A mobile field system was operated at Ghent to evaluate unit processing configurations and to process about 140 tons of material for product evaluation. CAER conducted parametric tests on the primary and secondary classifiers, and evaluated a series of retention times and dispersant dosages on the secondary classifier to produce an ultra-fine ash product.

In November 2006, a financial and commercialization partner decided not to continue participation in the project. CAER sought other potential partners; however, none was willing to commit to the funding necessary for the project to proceed. CAER withdrew from the project in March 2007.

Contacts	
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S T A T U S	R e p o r t	<i>Final Report Issued</i>	<i>N/A</i>
		<i>Draft Report Issued</i>	<i>N/A</i>
	O p e r a t i o n	<i>Operation Completed</i>	<i>N/A</i>
		<i>Operation</i>	<i>N/A</i>
	C o n s t r u c t i o n	<i>Construction</i>	<i>N/A</i>
		<i>Withdrawn</i>	<i>3/07</i>
	D e s i g n	<i>Award NEPA Completed (EA and FONSI)</i>	<i>11/04</i> <i>11/04</i>
		<i>Selection</i>	<i>1/03</i>
	P r e A w a r d		