

PUBLIC ABSTRACT

Applicant (primary) name: University of Kentucky Research Foundation

Applicant-s address: 201 Kinkead Hall, Lexington, KY 40506
Street City State Zipcode

Team Members (if any): LG&E Energy Corporation, Louisville, KY 40232
(listing represents only participants Name City State Zipcode
at time of application, not necessarily
final team membership)

University of Kentucky Center for Applied Energy
Research, Lexington, KY 40511
Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Advanced Multi-Product Coal Utilization By-Product Processing Plant

Commercial Application: XX New Facilities 9 Existing Facilities

9 Other, Specify: _____

Technology Type: Hydraulic classification froth flotation technology to produce advanced
high value materials from coal utilization by-products

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: \$ 8,916,739

Estimated DOE Share: \$ 4,450,163

Estimated Private Share: \$ 4,466,576

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Ghent Power Station, Ghent, KY 41045
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Pittsburgh coal _____
Primary Alternate (if any)

Size or scale of project: 800 tons per day of coal ash input
Tons of coal/day input
And/or _____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 48 _____
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, Dr. Thomas L. Robl
interested parties should contact: Name

Associate Director
Position

(859) 257-0272
Telephone Number

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Company

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Lexington, KY 40511
City State Zipcode

Alternative Contact: Mr. Kenneth Tapp
Name

Position

(502) 627-3154
Telephone Number

LG&E Energy Corporation
Company

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e-mail address Address

Louisville, KY 40232

City

State

Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

The installation of an advanced coal ash beneficiation processing plant is proposed by LG&E Energy, Corp at the 2,200 MW Ghent Power Plant in Ghent, Kentucky. The Ghent Power plant is owned by Kentucky Utilities Company, a regulated subsidiary of LG&E Energy, Corporation. The demonstration plant will be a near commercial scale installation and will produce:

- 156,000 tons per year of pozzolan which substantially exceeds ASTM C-618 criteria for loss on ignition (LOI), fineness and strength index.
- 16,000 tons per year of ASTM C-330 and C-331 compliant high grade lightweight aggregate.
- 16,000 tons per year graded fill sand.
- 1,500 tons per year of high quality polymeric filler.
- 8,000 tons of recycled carbon fuel.

The proposed plant represents the next step in coal utilization by-product (CUB) beneficiation, addressing the entire CUB stream and a wide array of quality issues. The process generates a pozzolan that can be used at higher portland cement substitution levels in concrete (i.e. 30% versus the current 20%), while producing better strength and performance than what is available from unprocessed ash.

Coarse ash is beneficiated to produce either lightweight aggregate, suitable for use in concrete masonry units such as blocks, or graded fill sand for construction applications while unburned carbon is concentrated for re-use as a supplemental fuel. The process also produces a clean, very fine-size material (~3 to 4 μm median particle size) suitable for use as a polymer filler or specialized pozzolan. With this suite of highquality, consistent products, the potential for total CUB utilization can be realized.

The manufacture of portland cement is one of the highest generators of CO₂ of any industrial process, releasing approximately 1 ton of CO₂ per ton of cement produced. The 156,000 tons of high quality pozzolan will displace an equivalent amount of portland cement, representing a direct and significant green house gas offset.

The process is based upon a hydraulic classification and froth flotation technology developed at The University of Kentucky CAER over the past decade. The technology, which incorporates several patents, can process both ash stored in existing disposal ponds and/or directly from the plant. Raw feed is classified by size into a pozzolan stream (-200 mesh) and a coarse stream (+200 mesh). These coarse materials are further classified and concentrated into a block sand product and coarse carbon product by spiral concentrators. The fine pozzolan stream is treated with a patented reagent system and the fine carbon is removed via froth flotation. The pozzolan stream is then concentrated, filtered and dried. A small stream from the froth cell is further processed hydraulically to produce a material with a finer particle size. This material is suitable for use in a number of applications including a polymer additive.