PUBLIC ABSTRACT

Applicant (primary) name: Xiong Cheng-Rui

Applicant=s address: Wu Si Dong Lu # 110 2-2-303 Bao Ding He Bei 071000 P.R.China
Street City State Zipcode

Team Members (if any):
(listing represents only participants
at time of application, not necessarily
final team membership)

Name City State Zipcode
Name City State Zipcode
(Use continuation sheet if needed.)

Proposal Title: An Igniting and Self-Stabilized pulverized-coal Burner

Commercial Application: New Facilities Existing Facilities
Other, Specify:

Technology Type:

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

Total Estimated Cost: $ 192,000

Estimated DOE Share: $ 192,000

Estimated Private Share: $ 0.00

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s):

Location (city, county, etc.) State Zipcode
Location (city, county, etc.) State Zipcode
Location (city, county, etc.) State Zipcode

Type of coal to be used: bituminous

Primary Alternate (if any)

Size or scale of project: 3.0 tons/test 2 times/week

Tons of coal/day input

And/or

Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project:

(From date of award) 72 (Months)

PRIMARY CONTACT:
For additional information,
interested parties should contact:

Name

Position

( )
Telephone Number

Company

e-mail address Address

City State Zipcode

Alternative Contact:

Name

Position

( )
Telephone Number

Company

e-mail address

Address

PUBLIC ABSTRACT (cont=d)

An Igniting and Self-Stabilized Pulverized Coal Burner

By Xiong Cheng- Rui

In coal fired power plant, when boiler starts up, as the pulverized coal-air flow is not as easy to be ignited as gas or oil, and as the temperature in furnace is very low, gas or oil must be used for heating the furnace during start-up. In addition, when boilers operate under low load, the furnace temperature decreases so that stable combustion can not be kept. Gas or oil is also used to stabilize the combustion in the furnace. As the power demand varies in cycle within 24 hours in a day and in a week, a number of boilers must shut down in midnight or weekend and start up again in the morning or Monday morning or operate under low load during that period. This is called cycling. Thus a large quantity of gas or oil is expended on cycling.

To save the gas or oil, expended in cycling. This proposer [1] ,applied karlov,itz's flame theory [2] [3] to pulverized coal worked out a burner, which can ignite pulverized coal-air flow and stabilize its flame by using simple electric heating with small amount of energy consumption and without any assistance of gas or oil,. a "Proof-of-Concept-Test" was successfully completed. In a power plant with full scale, the expected functions were obtained [4][5][6]. However, it needs a further commercialization test to make the burner applicable for boiler practice. It will save at least 3.77 million tons oil (only from utility in U.S.) a year which can supply space heating to 4.6 million families.

More important significance of the burner lies in that it can also avoid flame failure, burn low grade coal including anthracite and coke on existing and new pulverized coal-fired boilers, and control NO_x and SO_2 emissions.

To get the four functions we do not need four research program of four times test work to be done. As long as the first function (saving oil) is obtained the other three functions can be obtained simultaneously. Of course optimization is needed to get an all-round balanced four functions.

To complete the application test, the main research work is a practical one. It can be performed in a vintage boiler first, a $ 0.192 million investment can get $ 6.6 million commercial benefit very easily from deploying the research result to existent 20-55 MW coal-fired units in U.S. utility and totally $ 361.5 million from the 20-600 MW units.

Till now, only that boiler with Fluidized—Bed Combustor (FBC) can burn LGC and control NO_x/SO_2 simultaneously well. However these FBC have not formed a large scale for electric power generation, and research on FBC has expended a large amount of funds in the past two decades.

The proposed work is a simpler and better and cheaper way of burning LGC and controlling, NO_x/SO_2 emission simultaneously than FBC.

As this burner has a high and unique flame stability. It will be helpful to develop other advanced combustion technology, for example, the limestone injection into furnace for capturing SO_2 and getting a chemical product calcium sulfate.

As this burner is for pulverized coal use, and pulverized coal is and will be the main fuel for power generation and will be used continuously in DOE's "Combustion 2000", a coal—related R&D program, and according to available information there has been no such a pulverized –coal burner which has such an excellent multi-function as the proposed burner has. So this burner will have a long viability in commercial applications.

Saving oil (low cost), enhancing reliability, burning low grade coal(low cost).and improving NO_x/SO_2 control, all these meet closely the DE—PS26—02NT41428—Solicitation the Clean Coal Power Initiative.