

## PUBLIC ABSTRACT

Applicant (primary) name: Alaska Industrial Development and Export Authority (AIDEA)

Applicant's address: 813 West Northern Lights Blvd., Anchorage, AK 99503  
Street City State Zip code

Team Members (if any): TRW Cleveland, OH 44193  
(listing represents only participants at time of application, not necessarily final team membership) Name City State Zip code

B&W/Joy Babberton, OH 44203  
Name City State Zip code

Foster Wheeler Clifton, NJ 08809  
Name City State Zip code

Harris Group Inc. Denver, CO 80202  
Name City State Zip code

Steigers Corporation Centennial, CO 80111  
Name City State Zip code

Framatome DE&S Lynchburg, VA 24506  
Name City State Zip code

D.V. McCrohan Sparks, NV 89436  
Name City State Zip code

Jack Hardgrove San Juan Capistrano, CA 92690  
Name City State Zip code

(Use continuation sheet if needed.)

Proposal Title: Slagging Combustor Testing And Commercialization Project (SCTCP)

Commercial Application:  New Facilities  Existing Facilities  
 Other, Specify: \_\_\_\_\_

Technology Type: TRW Clean Coal Combustion System and Babcock & Wilcox/Joy Spray Dryer Absorber (SDA) System

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

Total Estimated Cost: \$ 90,935,700

Estimated DOE Share: \$ 35,697,860

Estimated Private Share: \$ 55,237,840

**PUBLIC ABSTRACT (cont'd)**

Anticipated Project Site(s): Healy, Alaska 99743  
Location (city, county, etc.) State Zip code

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Location (city, county, etc.) State Zip code

Type of coal to be used: Waste coal from Usbelli Mine Midwestern High Sulfur Coal  
Primary Alternate (if any)

Size or scale of project: 1,200 T/Day \_\_\_\_\_  
Tons of coal/day input

And/or

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

Duration of proposed project: 42 Months  
(From date of award) (Months)

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

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Art Copoulos  
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Alternative Contact:

Dennis V. McCrohan  
Name

Consultant  
Position

\_\_\_\_\_  
Company

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Sparks, NV 89436  
City State Zip code

**PUBLIC ABSTRACT**  
**SLAGGING COMBUSTOR TESTING AND COMMERCIALIZATION**  
**PROJECT (SCTCP)**

Alaska Industrial Development and Export Authority (AIDEA) proposes partnering with the U.S. Department of Energy to test and commercialize the Clean Coal slagging combustor technology and the associated Babcock & Wilcox Joy SO<sub>2</sub> scrubber system (the Technology). The Technology integrates air pollution control processes designed to minimize emissions of NO<sub>x</sub>, SO<sub>2</sub>, CO, and particulates, while firing a broad range of coals. A commercial-scale facility incorporating the Technology was installed in response to a DOE Program Opportunity Notice issued in May 1989 for the Clean Coal Technology Program and was preliminarily tested at the Healy Clean Coal Project. Under the original demonstration program, the full range of testing needed for technology optimization and commercialization was not completed during the prescribed time frame. The SCTCP will improve and fully test and optimize the Technology to demonstrate its full environmental and commercial potential.

Technology highlights include:

- State-of-the-art fuel and air-staged combustion processes that generate low NO<sub>x</sub> and CO relative to competing technologies, including low-NO<sub>x</sub> burners and cyclone boilers;
- Three-stage sulfur removal process involving reaction of lime with SO<sub>2</sub> within the furnace, resulting in low SO<sub>2</sub> emissions;
- Innovative design incorporating precombustion and slagging combustion chambers and pneumatically-based coal feed systems that enable firing of widely varying coal types;
- High carbon burnout capabilities (up to 99%), resulting in increased boiler efficiency versus cyclone units and production of high-quality ash.

SCTCP will pursue the following objectives and goals:

- 1) Demonstrate unit reliability while burning waste coal (88% capacity factor)
- 2) Minimize NO<sub>x</sub> emissions (0.20 lb/MMBtu without SNCR, 0.12 with SNCR)
- 3) Increase plant power efficiency (efficiency 1% greater than cyclone boiler)
- 4) Estimate mercury removal
- 5) Minimize SO<sub>2</sub> removal system lime consumption (90% removal, 50% in furnace)
- 6) Demonstrate unit economic viability (3.80 cents/kWh production cost)
- 7) Affirm low CO and particulate emissions
- 8) Evaluate technical and economic benefits of bottom and fly ash

To achieve these objectives, the SCTCP will involve system testing and modification of several key system components in a series of phased capital improvements.

Technology benefits include:

- Application in new construction or for retrofits of existing industrial and utility scale coal- and oil-fired boilers to reduce NO<sub>x</sub> emissions, which will enable achievement of environmental compliance with no or minimal additional NO<sub>x</sub> control. In areas with strict emission limits, selective noncatalytic reduction (SNCR, which will be tested during the SCTCP) may be sufficient to reduce remaining NO<sub>x</sub> to acceptable levels instead of its more expensive counterpart selective catalytic reduction (SCR).
- Unprecedented ability to burn coals with widely varying properties that will create a market for otherwise unusable waste coals, high-sulfur coals, and fines. Many existing boilers are geographically positioned in areas with nearby but undesirable coal sources (waste coal in Pennsylvania and West Virginia and high sulfur coal in Illinois, Ohio, and other Midwestern states); these facilities often purchase high-moisture coal from Western sources over 1,000 miles away. In addition to the environmental and operating costs associated with such transportation, energy is required to offset the high moisture content of these coals, leading to lost efficiency and associated increases (up to 10%) in greenhouse gas emissions. Retrofitting a facility with the Technology will allow use of local high-sulfur and waste coals as fuel, reducing transportation and fuel costs, and eliminating energy penalties. These benefits can be realized by aging cyclone boilers at relatively low cost because of similar equipment configurations. There are approximately 62 operating cyclone boilers in Eastern and Midwestern U.S with combined capacities of 23,000 MW. Burning waste coal can also help rid local landscapes of unsightly waste coal piles and attendant environmental problems. Environmental and economic benefits extend internationally to countries with large quantities of low-quality coal such as China, Russia, and India, where U.S. companies can market the Technology.
- High carbon burnout that results in increased boiler efficiency compared to cyclone boilers and reduced operating costs. Resultant ash material is generally higher in quality than ash from typical coal-fired plants and can be readily incorporated into concrete mixtures, structural fill, or as a component of road base, reducing solid waste disposal problems.

Summary:

The SCTCP will be an important step towards achieving the goals of President Bush's Clear Skies Initiative while simultaneously realizing many other environmental and economic benefits and adding to the stability and security of the nation's energy supply by providing a means for utilizing abundant fuel resources that might otherwise be considered unusable.