Facts Sheet: Catalytic Combustor for Fuel Flexible Gas Turbine (DE-FC26-03NT41891)

I. PROJECT PARTICIPANTS
- A. Siemens Westinghouse Power Corporation
- B. Caterpillar/Solar Turbine
- C. Penn State University
- D. Southern Company Services

II. PROJECT DESCRIPTION
- A. Objective: To develop and demonstrate a cost effective, fuel flexible (syngas/natural gas) catalytic combustor that will achieve ultra low NOx emissions (2ppm) at the exit of the gas turbine and without the use of backend cleanup in Integrated Gasification Combined Cycle (IGCC) application.
- B. Background/Relevancy
  1. Background: Catalytic combustion has been shown to achieve lowest emissions in conventional gas turbine application (natural gas only). Available technical data indicate that it can be effective for syngas application. This program, incorporating advanced materials and combustion sciences and improved component design, will provide the basis for a catalytic combustor for IGCC application and meet DOE Turbine and Vision 21 program goals.
  2. Relevancy: National energy policy emphasizes fuel diversity in high efficiency, cost effective power plant application, including coal based IGCC. Highest energy efficiencies and lowest capital and operating costs are accomplished utilizing advanced gas turbine technologies without backend cleanup. Coal based IGCC will benefit significantly with the development of an ultra low NOx, fuel flexible catalytic combustor.

III. PROJECT COSTS

	BUDGET PERIOD 1	BUDGET PERIOD 2*	BUDGET PERIOD 3*	TOTAL
DOE SHARE	$265,714	$3,814,798	$1,236,434	$5,316,946
RECIPIENT SHARE	$66,429	$953,699	$309,109	$1,329,237
TOTAL	$332,143	$4,768,497	$1,545,543	$6,646,183
Period of Performance	4 months	22 months	10 months	36 months

*Budget Period 2 and 3 numbers are budgetary estimates only based on the Recipient's application dated February 27, 2003, and will be finalized during negotiation of a continuation application, if appropriate

IV. MAJOR ACCOMPLISHMENTS SINCE THE BEGINNING OF THE PROJECT
- Contract required kickoff meeting with DOE/NETL. This meeting provided DOE personnel full disclosure of program structure, goals and key technology issues. (11/03)

V. MAJOR ACCOMPLISHMENTS PLANNED DURING THE NEXT 6 MONTHS
- Complete Implementation Plan including IGCC fuel and process specifications. This plan will benchmark technology options, establish the feasibility of catalytic coal derived syngas combustion, and define the test program needed to resolve the technical and market issues. (02/04)
- Submit Phase 2 (Budget Period 2) continuation application. (02/04)

VI. MAJOR ACCOMPLISHMENTS PLANNED IN OUTYEARS (6-18 MONTHS)

- Complete evaluation and downselect catalytic combustor concepts that meet syngas criteria. This will serve to focus subsequent design and test activities. (04/04)
- Complete testing of first generation catalytic coatings demonstrating light off and activity on syngas. Complete initial accelerated aging tests on candidate coatings. This work provides data relating to coating development progress and needs. (5/04)
- The potential to achieve ultra low NOx and CO burnout under W501FD operating conditions is demonstrated in test programs. This work will benchmark technology for syngas IGCC development and engine integration. (6/04)
- Complete reactor testing and downselect fuel flexible catalytic module design concept. This work resolves design issues related to flashback, mixing and specific module configuration based on syngas and natural gas testing. (10/04)
- Final design of full-scale catalytic module tested (syngas/natural gas). This work will confirm viability of basic building block needed to design and construct fuel flexible catalytic combustor. (3/05)

VII. MAJOR MILESTONES FOR ENTIRE PROJECT

- Complete Technology Plan (2/04)
- The potential to achieve ultra low NOx and CO burnout under W501FD operating conditions and residence times is demonstrated in test programs. (6/04)
- Test final design of full-scale catalytic module (syngas/natural gas), meeting performance goals. (3/05)
- Durable, low cost catalytic coating for syngas and natural gas is demonstrated in test rigs (6/05)
- Complete successful test of full scale, fuel flexible W501FD catalytic combustor. (10/05)
- Delivery of a catalytic burner for the PSDF. (3/06)

VIII. ISSUES

None

IX. ATTACHMENTS

None