

P R O J E C T facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
FEDERAL ENERGY TECHNOLOGY CENTER

ADVANCED CLEAN/EFFICIENT
POWER systems

PS002.0697

NON-EQUILIBRIUM SULFUR CAPTURE AND RETENTION IN AN AIR-COOLED SLAGGING COAL COMBUSTOR

PRIMARY PROJECT PARTNERS

Coal Tech Corporation
Marion Station, PA

MAIN SITE

Coal Tech Corporation
Philadelphia, PA

TOTAL ESTIMATED COST

\$250,000

COST SHARING

DOE	\$200,000
Non-DOE	\$50,000

Project Description

Testing is being conducted in a 20 MMBtu/hr air-cooled slagging cyclone coal combustor to determine the degree of sulfur retention by calcium-based sorbent particles captured in a slag layer coating the combustor walls. To keep the sulfur from re-evolving out of the slag and back into the combustion gases the slag must be quickly removed and cooled. Up to 20 one-day tests will be conducted to determine the optimum conditions for sulfur capture in the combustor's slag flow.

This project will run for two years, from September 1995 to September 1997. The combustor is located in Philadelphia, PA. As of October 1996, 12 of the 20 tests were completed with sulfur capture and retentions up to 75%.

Program Goals

This program strives to develop advanced coal systems for industrial and commercial scale applications. The systems will improve efficiency, lower emissions, and lower costs to a level competitive with natural-gas powered systems. In addition to meeting all of these program goals, the Coal Tech combustor also can use high ash coals and can dispose of potentially hazardous solid wastes by encapsulating them within environmentally inert slag.

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CONTACT POINTS

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Project Benefits

The demonstration of non-equilibrium sulfur retention in slag will enhance the commercial potential of Coal Tech's slagging combustor technology. The Coal Tech combustor, which is expected to be market ready by the end of this project, has very low capital and operating costs, comparable to that of gas-turbine power plants. As a part of this project it has been shown that Coal Tech's in-combustor SO_x removal can lower SO₂ emissions to 1/2 of today's allowable levels. With supplemental flue-gas scrubbing SO₂ emissions can be lowered to less than 1/10 of today's allowable levels. The Coal Tech combustor is well suited to handling high ash coals which makes it attractive to overseas markets. It is also suitable for retrofit to existing coal, oil, or natural gas combustors.

In May 1994, the U.S. Supreme Court ruled that incinerator ash must be treated as a hazardous waste if it does not meet RCRA leach test regulations. There currently is no ruling on fly ash. However, disposal of hazardous waste can cost several hundred dollars per ton. The Coal Tech combustor encapsulates sulfides in molten slag, thereby eliminating the possibility of leaching. In this project the Coal Tech combustor will also be tested for encapsulating other potentially hazardous substances that may be present in the solid wastes from the coal combustion process. Slag also can be sold as a construction material, yielding an income rather than incurring hazardous waste disposal costs.

Cost Profile

(Dollars in Thousands)

	Prior Investment	FY95	FY96	FY97	Future Funds
Department of Energy*	—	—	\$200	—	\$200
Private Sector Partners	—	—	\$50	—	\$50

* Appropriated Funding

Key Milestones

