

Self-Scrubbing Coal™: An Integrated Approach to Clean Air

Participant

Custom Coals International

Additional Team Members

Pennsylvania Power & Light Company—host
Richmond Power & Light—host
Centerior Service Company—host

Locations

Central City, Somerset County, PA (advanced coal-cleaning plant)
Lower Mt. Bethel Township, Northampton County, PA (combustion tests at Pennsylvania Power & Light's Martin's Creek Power Station, Unit No. 2)
Richmond, Wayne County, IN (combustion tests at Richmond Power & Light's Whitewater Valley Generating Station, Unit No. 2)
Ashtabula, Trumbull County, OH (combustion tests at Centerior Energy's Ashtabula C)

Technology

Coal preparation using Custom Coals' advanced physical coal-cleaning and fine magnetite separation technology plus sorbent addition technology

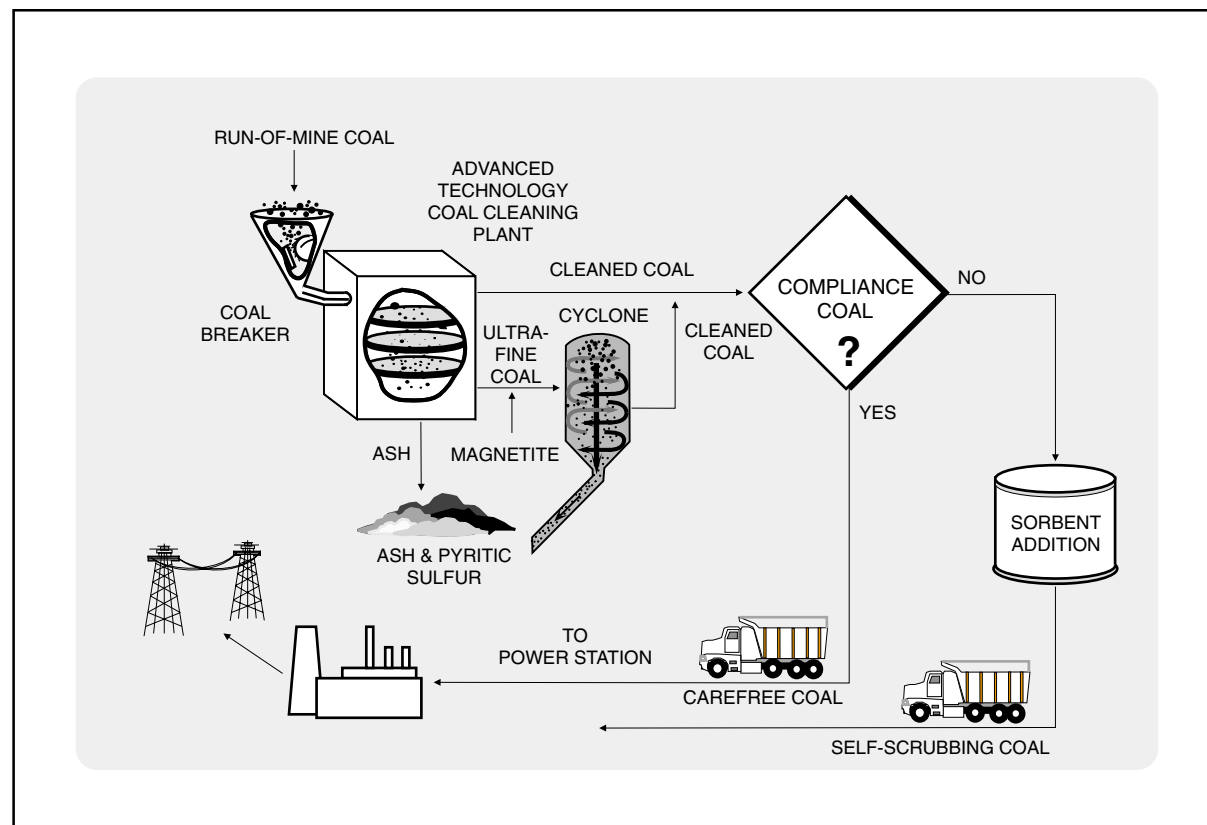
Plant Capacity/Production

500 tons/hr

Coal

Illinois No. 5 (2.7% sulfur); Lower Freeport (3.9% sulfur); and Lower Kittanning (1.8% sulfur)

Self-Scrubbing Coal and Carefree Coal are trademarks of Custom Coals International.



Project Funding

Total project cost	\$87,386,102	100%
DOE	37,994,437	43
Participant	49,391,665	57

Project Objective

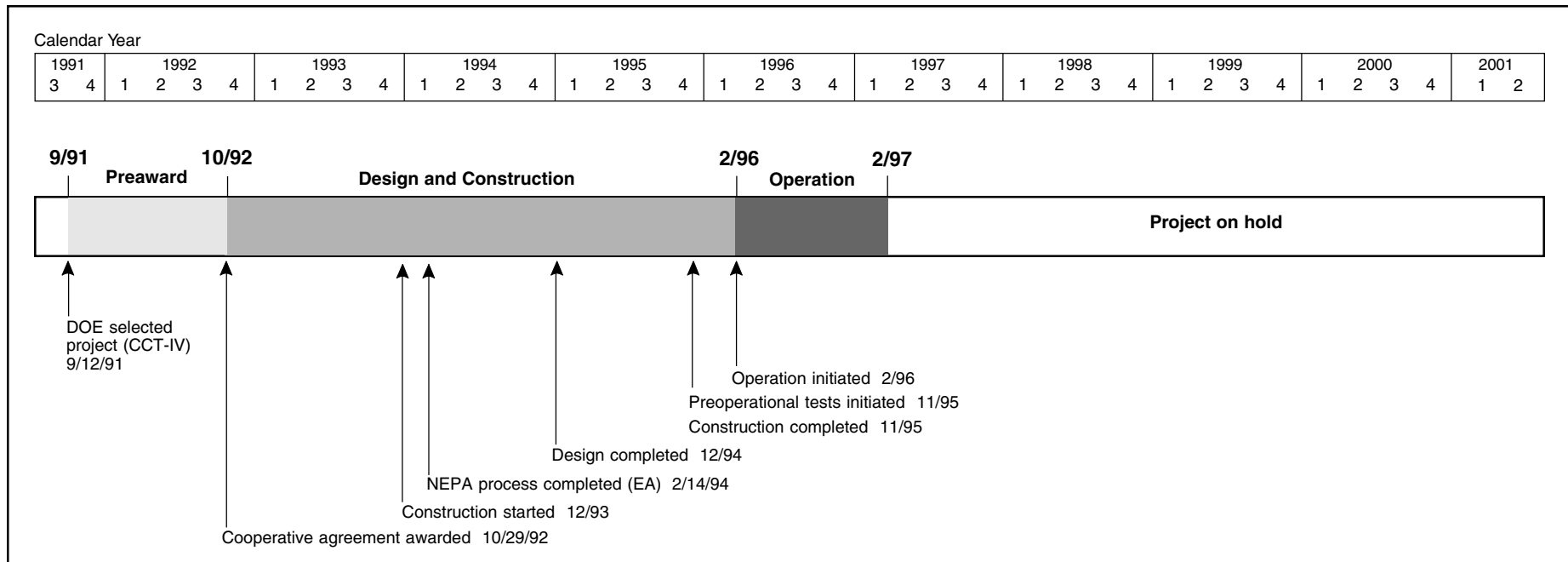
To demonstrate advanced coal-cleaning unit processes to produce low-cost compliance coals that can meet the requirements for commercial-scale utility power plants to satisfy provisions of the CAAA.

Technology/Project Description

An advanced coal-cleaning plant has been designed, blending existing and new processes, to produce two types of compliance coals—Carefree Coal™ and Self-Scrubbing Coal™—from various feedstocks.

Carefree Coal™ is produced by breaking and screening run-of-mine coal and by using innovative dense-medium cyclones and finely sized magnetite to remove up to 90% of the pyritic sulfur and most of the ash. Carefree Coal™ is designed to be a competitively-priced, high-Btu fuel that can be used without major plant modifications or additional capital expenditures.

Self-Scrubbing Coal™ is produced by taking Carefree Coal™, with its reduced pyritic sulfur and ash content, and adding to it sorbents, promoters, and catalysts. Self-Scrubbing Coal™ is expected to achieve compliance with virtually any U.S. coal feedstock through in-boiler absorption of SO₂ emissions. The reduced ash content of the Self-Scrubbing Coal™ permits addition of relatively large amounts of sorbent without exceeding ash specifications of boilers or overloading electrostatic precipitators.



Project Status/Accomplishments

Startup began in late December 1995, and the first coal was processed in February 1996. In May 1996, the facility reached its design capacity. Equipment and circuit optimization testing began immediately thereafter and continued throughout 1996.

A Carefree Coal™ test burn (cleaned Lower Kittanning coal) at Martin's Creek Power Station was conducted in mid-November 1996. Although plant optimization was not completed, the overall product made for the test was consistent with the current quality of the plant feed coal. The unit experienced some opacity problems due to the low sulfur in the coal and a marginal electrostatic precipitator.

High organic sulfur in the raw coal created problems with the ability to produce compliance quality clean coal. Further, difficulties with the plant resulted in an excessive amount of material going to the refuse pond, and plant operation was suspended in February 1997. Financial problems ensued and, despite efforts to resolve the matter, the project was placed in Chapter 11. Due to Custom

Coals' inability to find a buyer for the facility, the Custom Coals Laurel facility was sold at auction on December 16, 1998, to C.J. Betters Enterprises of Monaca, Pennsylvania. C.J. Betters has met with DOE to discuss continuation of the project and was working to complete a continuation package. However, C.J. Betters was unable to locate a suitable partner to assist with the completion of the project. The project's performance period has expired. Prior to the publication of this report, the project has completed closeout procedures and is no longer active.

Commercial Applications

While many utilities can use Carefree Coal™ to comply with SO₂ emissions limits, others cannot due to the high content of organic sulfur in their coal feedstocks. When compliance coal cannot be produced by reducing pyritic sulfur, Self-Scrubbing Coal™ can be produced to achieve compliance.

Commercialization of Self-Scrubbing Coal™ has the potential of bringing into compliance about 164 million

tons/yr of bituminous coal that cannot meet emissions limits through conventional coal-cleaning. This represents more than 38% of the bituminous coal burned in 50-MWe or larger U.S. generating stations.