

Clean Coal Today

An Update of the U.S. Clean Coal Technology Demonstration Program

Office of Fossil Energy, U.S. Department of Energy

Debut of Clean Coal Today

Welcome to the first issue of **Clean Coal Today**. For the present, this update will be published quarterly. In the future, publication may become more frequent if events dictate. Each issue will provide project status reports, feature articles about certain projects and highlight key events concerning the U.S. Clean Coal Technology Demonstration Program.

This is a dynamic time for clean coal technologies, replete with challenges and opportunities.

The U.S. is facing the economic consequences of dependence on foreign oil; new Clean Air legislation has mandated emission caps for SO_2 in the face of growing energy demand; concerns over global climate change are deepening; and the public continues to have deep-seated reservations about coal as an environmentally acceptable energy option.

Although increased reliance on coal would appear to be a strategic and economic necessity, to become a reality,

See "Debut" on page 2

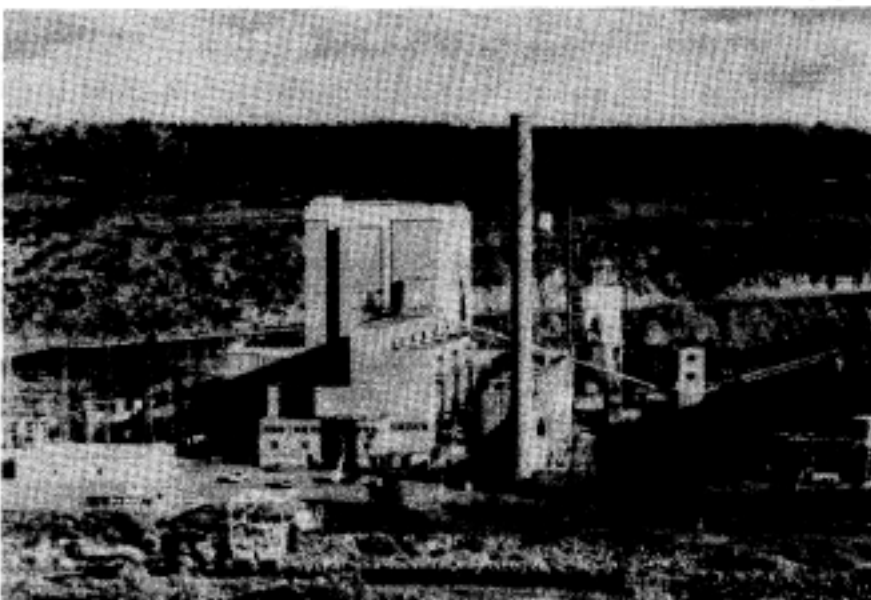
Colorado Fluid Bed Project Yields Both Power and Data

Colorado-Ute Electric Association's (CUEA) Circulating Fluidized Bed (CFB) Project, one of the first demonstration ventures to produce data in the Department of Energy's \$5 billion Clean Coal Technology Demonstration Program, has passed the 12,500-hour operating milestone.

Operations at the 110 MWe power generation facility near Nucla, CO, during the past two years have demonstrated that the advanced coal combustion technology can achieve New Source Performance Standards (NSPS) for sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions. The facility is the world's first utility scale atmospheric circulating fluidized bed boiler.

In-bed sulfur capture using limestone sorbent has consistently met or exceeded the Colorado environmental requirements for 70% removal, while NO_x emissions levels of about 80 parts-per-million have been achieved. The test runs, which have included steady-state performance tests under full and part load conditions, have been conducted primarily using Western subbituminous coals. With most of the operational goals achieved, DOE has agreed to continue cost-shared operations at the facility until March 1991, with future test runs concentrating on optimizing operating conditions and validating environmental performance with high sulfur coals.

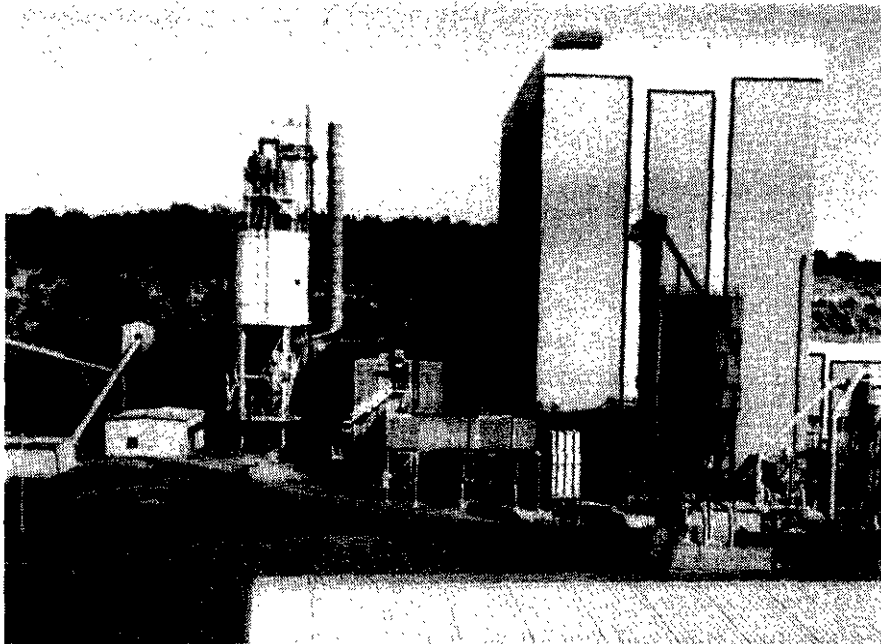
See "Nucla" on page 2



Colorado-Ute CFB Combustor Facility which Generates 110 MWe of Electricity. Nucla, Colorado

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Limestone and Ash Storage Silos and Lime Preparation Equipment, Part of the System to Inject Limestone Sorbent for SO₂ Control. Nucla, CO

Nucla...continued

Before being repowered, the plant consisted of three 12 MWe coal stoker-fired units built in 1959, which were taken out of service in 1984 due to low efficiency and high fuel cost. Anticipating a need for additional power in the early 1990s, and after review of many power generation alternatives, CUEA started construction of the repowered Nucla CFB plant in November 1984 and completed the project in May 1987.

The original boilers were replaced with a new Pyropower Corp. CFB boiler, a new high pressure 74 MWe steam turbine generator was installed, the three original 12 MWe steam turbines were refurbished, and a supplemental baghouse and coal-sorbent handling systems were erected. The new baghouse has been very effective and controls exhaust particulate emissions to 0.006-0.008 lb/MMBtu (99.96% removal efficiency).

Operating costs for the CFB are projected by CUEA to be about \$20 per MWe hour, which is promising for this scale of power generation. The installed cost of the CFB plant was \$1,123

per kw, which includes the credits for the existing steam turbines, and 40 percent of the required baghouse capacity already installed. CUEA estimates replacement of the original facility with conventional pulverized coal technology would have resulted in an installed cost of about \$1,700 per kw. A draft Public Design Report is under review, and should be available in the near future.

Net heat rates at Nucla have averaged 11,900 Btu/kwh. However, the heat rate reflects the partial load test conditions, and heat losses during shutdowns and restarts due to the demonstration nature of past operations. Improvement is expected when operations are optimized and largely steady state. Larger plants at the 200 MWe scale are projected to operate at heat rates of 10,100 Btu/hr.

During the past two years the project has experienced significant mechanical difficulties. These problems include: improper design of the primary air fan, erosion of boiler superheater and water wall tubes, spalling of boiler

refractory and failure of boiler feedwater pumps. Solving these problems and modifying the bottom ash handling system and bed air distribution nozzles, will provide the valuable experience base necessary for broader commercialization of the technology.

The Nucla CFB combustion technology offers many benefits. These include atmospheric pressure operation, reduced capital costs, competitive operating costs with excellent control of emissions, good sorbent utilization, longer bed residence time, high combustion efficiency and lower bed combustion temperatures (1600°F) that reduce NO_x formation. Test operations at Nucla will continue through early 1991 followed by complete documentation of the project effort in a final report.

Debut...continued

environmentally acceptable coal use options must be developed and accepted by the power generation industry and the public. Clean coal technologies offer a solution. However, public perception about coal use must change, and decision makers on energy options must be kept aware of available clean coal technologies, their commercialization timing, and basic economic and performance characteristics.

This publication is part of a broader outreach effort targeted to be responsive to those needs. With 29 projects awarded cooperative agreements, 3 more to be awarded in February 1991, pending Congressional approval, 6 projects in construction, 7 in operation, and 1 completed, the U.S. Clean Coal Technology Demonstration Program definitely has momentum. **Clean Coal Today** will capture the key program events as they unfold. To best meet the needs of the readership, comments on the content and format for this publication are welcome. (See Address on page 4.)

B&W's LIMB Operating; Coolside Tests Complete

Two dry sorbent injection processes — Coolside and Limestone Injection-Multistage Burner (LIMB) — are being demonstrated at Ohio Edison's Edge-water Station in Lorain, Ohio on a 104 MWe boiler, allowing for first-time comparison of the processes in the same boiler. Both processes are designed to remove more than 50% of the SO₂ at less cost than conventional scrubbers. The low-NO_x burners incorporated for LIMB testing also remove NO_x by multistage combustion.

The LIMB Demonstration Project Extension, proposed by Babcock & Wilcox (B&W), was one of the initial projects selected in the first round of the Clean Coal Technology Demonstration Program. In addition to DOE and B&W, co-funders are Consolidated Coal Company (CONSOL) and the

"Both processes are designed to remove more than 50% of the SO₂ at less cost than conventional scrubbers."

State of Ohio. This project extends EPA-sponsored tests, completed in 1989, of the LIMB process and includes testing of CONSOL's Coolside Process. The DOE project started in May 1987 with project completion scheduled for October 1991. The host boiler, normally fired with 1.5% sulfur pulverized coal, is a Carolina-type, wall-fired boiler. It is equipped with 12 XCL multistage low-NO_x burners that replaced the original circular burners.

In the Coolside process, lime is injected into the duct between the air preheater and the electrostatic precipitator (ESP). The ESP removes the spent sorbent along with the flyash. Humidification, accomplished by water spray

nozzles in the duct, enhances SO₂ capture and improves ESP performance. A sodium-rich additive used in the humidification water further enhances SO₂ capture by the lime.

The goal of the Coolside demonstration was to prove that the process could capture 50 to 80% of the SO₂ in the flue gas. During the Coolside tests, SO₂ removal rates up to 70% were routinely achieved with two different commercially available hydrated limes at a calcium to sulfur ratio of 2:1 while firing a 2.8% sulfur Ohio coal. Higher removal levels were achieved using higher sorbent rates and the addition of sodium hydroxide (NaOH) to the humidification water. In some tests, sorbent recycle was used to reduce sorbent and NaOH consumption.

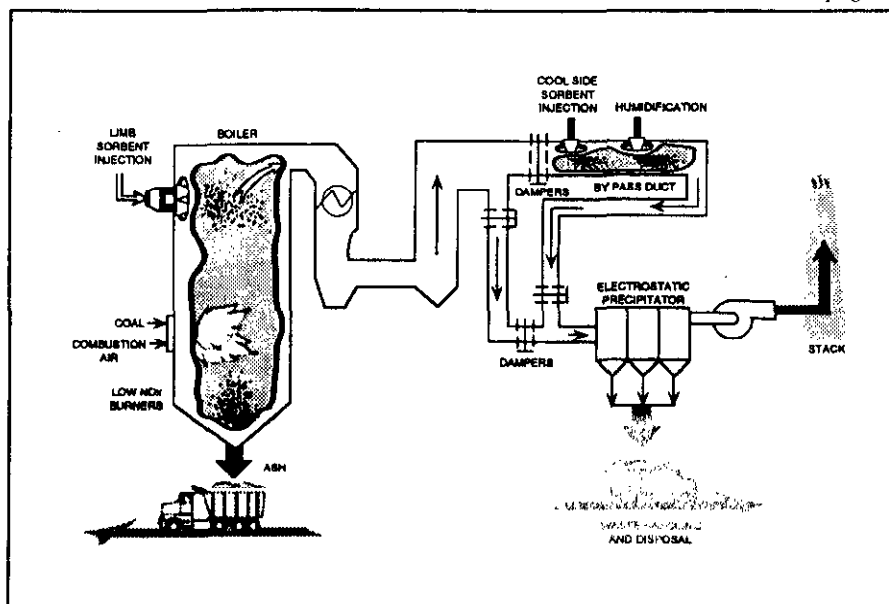
When testing concluded in February 1990, the system had operated for over 1,300 hours, including 265 hours of uninterrupted operation. The full-scale tests confirmed the results of pilot-scale tests carried out earlier in the project.

Testing of the LIMB process, under the DOE project, started in May 1990. The LIMB process uses multistage burners to reduce NO_x emissions and furnace sorbent injection to reduce SO₂ emissions. Sorbent is injected into the furnace, and when a limestone sorbent is used, it is calcined to lime by the high temperatures before reacting with the SO₂ in the flue gas. As with the Coolside process, sorbent and flyash are removed by the ESP and humidification can be used to enhance both SO₂ removal and ESP performance. The goals of the LIMB tests are to demonstrate a 50% NO_x emission reduction and a 50 to 60% SO₂ emission reduction while avoiding boiler fouling from high solids loading.

The EPA-sponsored LIMB demonstration tested one coal and one sorbent. The DOE project is testing additional coal/sorbent combinations. The sorbents include lignosulfonated lime, ground limestone, hydrated calcitic lime and locally available hydrated dolomitic lime.

Coals with nominal sulfur contents of 1.5 and 3.0% have been selected for testing. Tests with each coal/sorbent combination will last approximately one

See "Coolside" on page 4



LIMB/Coolside Process Flowsheet

Coal Tech Completes Combustor Operations

Coal Tech became the first project to complete operations under the Clean Coal Technology Demonstration Program. Test work was completed in May 1990 and a final report for the project will be published during the 1st quarter of 1991.

The Coal Tech Advanced Cyclone Slagging Combustor walls are cooled by the incoming combustion air. Other cyclone combustors are water cooled. This project retrofitted an air-cooled combustor to a 23 million Btu/hr package boiler that was originally designed to burn gas or oil at the Tampella-Keeler boiler factory in Williamsport, Pennsylvania. The Coal Tech combustor uses sorbent (limestone) injection to reduce SO_2 emissions, staged combustion to reduce NO_x emissions, and the cyclonic action of the combustor to remove ash/sorbent solids. Solids are removed from the combustor as a molten slag.

The goals of the Coal Tech project were to reduce SO_2 emissions by up to 90%, reduce NO_x emissions to 100 parts per million (ppm) within the combustor, and capture 90 to 95% of the solids (ash+sorbent) in the combustor. The project was intended to demonstrate the combustor at the industrial scale

and to provide data for scale-up to the utility boiler size.

The test program used coals ranging from 1.1 to 4.0% in sulfur content. In all, 900 hours of operation were attained, including 100 hours of operation as part of a separate ash injection project. The final long duration testing included four tests, each of four days duration. Preliminary results indicate that when sorbent is injected into the combustor, up to 10% of the sulfur is removed with the slag. SO_2 removal rates of up to 80% were achieved when sorbent was simultaneously injected into and downstream of the combustor. NO_x emissions were reduced by approximately two-thirds, to levels as low as 140 ppm. Solids removal rates -- representing percent removed from the combustor -- ranged from 65 to 90%, with an average of 80%.

Coal Tech believes that sufficient design and operational data have been obtained to permit scale-up to the combustor size required for utility boilers. The anticipated market for the size just tested is expected to be new industrial-

sized boilers, or retrofitting existing industrial boilers that now burn oil or gas.

Coolside...continued

month, with testing scheduled for completion in March 1991.

Both processes are intended to provide an economic way to remove pollutants from the flue gas of pre-NSPS coal-fired boilers. The primary market is expected to be boilers that are less than 40 years old with a capacity of at least 50 MWe. LIMB retrofit may be difficult with boilers that are not designed to tolerate high solids loadings. However, the Coolside process, which is installed downstream of the boiler, is applicable to any boiler that has a duct residence time of at least two seconds. Both processes are expected to be most economical for units with load factors of 45 to 65%.

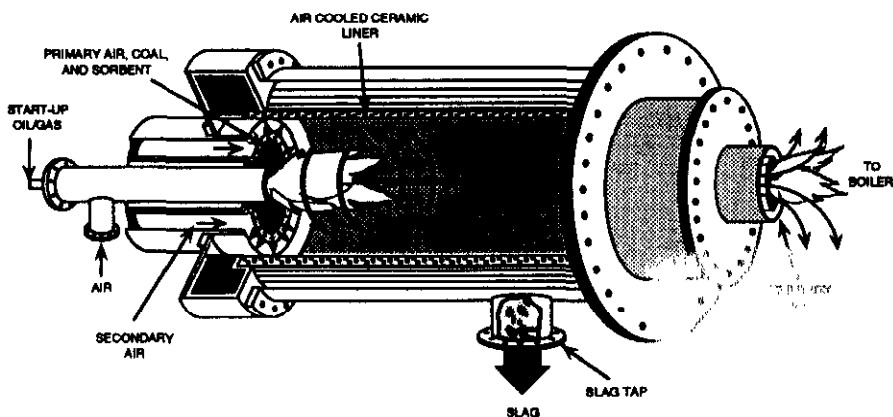
A great deal of information is being obtained for these technologies at minimum cost since much of the equipment for both processes was already installed for the EPA tests. The only new major equipment required was the Coolside sorbent distribution and injection systems, the humidifier, and the system for the humidification additive.

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Comments are welcome.
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Coal Tech Advanced Combustor

Fourth PON Release Near

DOE has issued the draft Program Opportunity Notice (PON) for public comment for the fourth competitive Clean Coal procurement in accordance with Public Law 101-512, signed November 5, 1990. Comments concerning the draft PON were received by December 14, 1990. DOE will solicit proposals prior to February 1, 1991. A pre-proposal conference to clarify issues or concerns of prospective proposers is

"A pre-proposal conference...is scheduled for February 5, 1991. Proposals...due no later than June 3, 1991,...selection of projects...no later than September 30, 1991."

scheduled for February 5, 1991. Proposals will be due no later than June 3, 1991, and selection of projects will occur no later than September 30, 1991.

Originally PON-IV was to be issued in June 1990. Preliminary public meetings to obtain views and recommendations on the PON were held earlier this year. However, because of uncertainty as to the content of pending Clean Air legislation, the supplemental appropriations for FY 1990 (Public Law 101-302) directed that PON-IV be delayed until September 1, 1991. This has been superseded by the Public Law 101-512 legislation.

The objective of PON-IV is to conduct cost-shared clean coal technology projects that demonstrate innovative, energy efficient and economically competitive technologies. The technologies selected must be capable of (1) retrofitting, repowering or replacing existing facilities while achieving significant reductions in emissions of sulfur and/or nitrogen oxides, and/or (2) providing for future energy needs through 2030.

TIDD Plant Produces Power: Operations Planned Early 1991

The TIDD pressurized fluidized bed combustor (PFBC) combined cycle facility in Brilliant, Ohio, has produced the first "combined cycle electricity" from the 70 MWe demonstration plant.

Following more than three-and-a-half years of design and construction activities, the \$185 million project began start-up testing in November 1990, and on December 7, 1990, hot coal combustion gases were channeled to the gas turbine generator for the first time to produce electricity. Steam generated by heat from the combustor also produced electricity in a steam turbine generator, accounting for the name "combined cycle."

The advanced power system will now be brought up to "full load operations" with

maximum power output expected to be achieved early in 1991. The facility will then be operated for about three years to commercially demonstrate the technology.

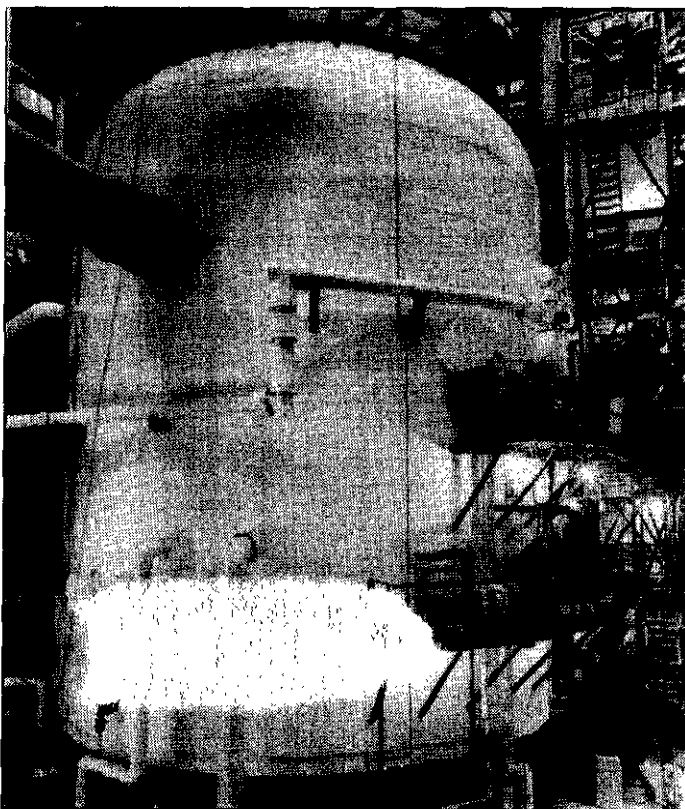
The project is cost shared by Department of Energy and Ohio Power Co., a wholly-owned subsidiary of American Electric Power Co., Inc., under the terms of a cooperative agreement signed in 1987. The PFBC technology is supplied by ASEA-Babcock.

The project repowers a mid-forties vintage generating station, shut down in 1976 for environmental reasons. The new unit will be the first U.S. PFBC plant to operate with an expansion gas turbine and a steam turbine generating electricity, and the first PFBC facility in the U.S. burning high-sulfur coal in full compliance with existing environmental requirements.

Project objectives are to demonstrate the technology at the 70 MWe scale, proving

it cost effective, reliable, and environmentally superior to conventional coal-fired electric power generation with flue gas desulfurization. The test program will provide a database useful for design, operation, control, and maintenance of PFBC plants. Data from in-service monitoring of steady-state and transient operations will help establish optimum operating conditions for the system, and periodic equipment inspections will allow for judgment of materials durability.

PFBC Pressurized Containment Vessel Installed at the TIDD Facility - Repowered to Generate 70 MWe of Electricity



Status of Clean Coal Technology Demonstration Projects

CCT-I Projects

Status

Advanced Cyclone Combustor with Integral Sulfur, Nitrogen, and Ash Control. Coal Tech Corp., Williamsport, PA.

All operations completed. The Participant feels that sufficient information is now available for scale-up for commercial applications. A draft final report is scheduled for January 1991.

Enhancing the Use of Coals by Gas Reburning and Sorbent Injection. Energy and Environmental Research Corporation, Hennepin and Springfield, IL.

Construction has been completed at the Hennepin site (tangentially fired boiler). Start-up and checkout activities are underway. Civil construction work started at the Springfield site (cyclone fired boiler) in November 1990.

LIMB Demonstration Project Extension. The Babcock & Wilcox Co., Lorain, OH.

Duct injection tests (1,729 operating hours) have been successfully completed with up to 70% SO₂ removal. A topical report on the Coolside tests is due in early 1991. LIMB testing is continuing.

Nucla CFB Demonstration Project. Colorado-Ute Electric Association, Inc., Nucla, CO.

Operation of the 110 MWe facility over the past two years (12,500 operating hours) has demonstrated New Source Performance Standards reductions for NO_x and SO₂ emissions. Delays during start-up will extend the overall test program completion to March 1991. A draft Public Design Report is under review.

Prototype Commercial Coal/Oil Coprocessing Project. Ohio Clean Fuels, Inc., Warren, OH.

Participant is proceeding with project development at own expense. Principal objective is integration with a high conversion refinery to reduce capital cost and enhance refinery production.

TIDD PFBC Demonstration Project. American Electric Power Service Corp. on behalf of Ohio Power Co., Brilliant, OH.

Facility now in start-up phase and power has been generated. Demonstration operations expected to start in early 1991.

Advanced Coal Conversion Process Demonstration. Western Energy Co., Colstrip, MT.

The Cooperative Agreement was awarded September 21, 1990. The joint venture was entered into with NRG Group, a subsidiary of Northern States Power Company, accelerating the project schedule. Construction will begin in early 1991 with operation initiated in 1992.

Development of the Coal Quality Expert. Combustion Engineering, Inc. & CQ, Inc., Homer City, PA.

Field testing of baseline coals (100% WY, 90% WY, 10% OK) on a large utility scale of operation have been completed. Samples have been shipped for pilot tests.

Arvah B. Hopkins Circulating Fluidized Bed Repowering Project. The City of Tallahassee, Tallahassee, FL.

The Cooperative Agreement was awarded November 30, 1990. A public scoping meeting has been conducted as part of the NEPA process leading to a CIG. Design activities are underway.

CCT-II Projects

Status

Advanced Flue Gas Desulfurization Demonstration Project. Pure Air, a Joint Venture, Co., Gary, IN.

Project activity is proceeding on schedule for start of operations in the summer of 1992. Design is essentially complete and construction is well underway with erection of the 480 foot stack nearly complete. Fabrication of the scrubber vessel is in process.

180 MWe Demonstration of Advanced Tangentially-Fired Combustion Techniques for the Reduction of NO_x Emissions for Coal-Fired Boilers. Southern Company Services, Inc., Lynn Haven, FL.

Cooperative Agreement was awarded September 20, 1990. Instrumentation, sampling systems, and various support equipment has been installed and baseline diagnostic and performance tests have been conducted.

Demonstration of Advanced Combustion Techniques for a Wall-Fired Boiler. Southern Company Services, Inc., Coosa, GA.

The Advanced Overfired Air (AOFA) system has been installed, and start-up diagnostic tests completed. Long-term AOFA testing for evaluation of NO_x reduction began in October 1990. Next, Low NO_x Burners (LNB) will be installed and evaluated. Then the combined LNB/AOFA installation will be evaluated in long term tests.

Cement Kiln Flue Gas Recovery Scrubber. Passamaquoddy Tribe, Thomaston, ME.

Design was completed in April 1990 and all major construction was accomplished by the end of 1990. The reaction tank was run on flue gas in December 1990 with promising results. Fully integrated operation of the facility will begin in early 1991.

Demonstration of Coal Reburning for Cyclone Boiler NO_x Control. The Babcock & Wilcox Co., Cassville, WI.

Baseline testing on the cyclone boiler has been completed verifying the computer model. Design activities are continuing. The Environmental Assessment to support construction activities has been submitted for DOE approval.

Innovative Coke Oven Gas Cleaning System for Retrofit Applications. Bethlehem Steel Corp., Sparrows Point, MD.

Phase II construction activity is proceeding essentially on schedule with planned operation in early 1992.

Demonstration of Innovative Applications of Technology for the CT-121 FGD Process. Southern Company Services, Inc., Newnan, GA.

Design activities continue. Phase II construction activity has been initiated. The fiberglass reinforced reaction vessel is being fabricated.

Combustion Engineering IGCC Repowering Project. Combustion Engineering, Inc., Springfield, IL.

Cooperative Agreement was awarded November 21, 1990. Design activities are underway.

Low NO_x/SO_x Burner Retrofit for Utility Cyclone Boilers. TransAlta Resources Investment Corp., Marion, IL.

Preliminary engineering continued with emphasis on equipment specifications. Boiler baseline tests were conducted and site civil engineering activity was started.

PFBC Utility Demonstration Project. American Electric Power Service Corp., as agent for The Appalachian Power Co. and the Ohio Power Co., New Haven, WV.

Comparative analyses of greenfield and repowering options for project direction are being developed. Project Management and Evaluation Plans have been approved. Major design activities scheduled for 1993 await operation of the TIDD (CCT-I) plant.

Demonstration of Selective Catalytic Reduction Technology for the Control of NO_x Emissions from High-Sulfur Coal-Fired Boilers. Southern Company Services, Inc., Pensacola, FL.

Preliminary engineering and environmental tasks are underway. Baseline flue gas conditions for two units have been compiled.

SOX-NOX-ROX Box Flue Gas Clean-Up Demonstration Project. The Babcock & Wilcox Co., Dilles Bottom, OH.

Design is approximately 40% complete. Supporting pilot plant tests are being conducted. Key long lead time equipment items have been ordered.

WSA-SNOX Flue Gas Cleaning Demonstration Project. Combustion Engineering, Inc., Niles, OH.

Project design activities continued with construction initiated in December 1990. Long lead equipment items are being purchased.

CCT-III Projects

Status

Blast Furnace Granulated Coal Injection System Demonstration Project. Bethlehem Steel Corp., Burns Harbor, IN.

The Cooperative Agreement was awarded November 26, 1990. A conceptual design has been completed and environmental data required for the NEPA compliance process has been prepared. Construction is scheduled to begin in October 1992.

Confined Zone Dispersion Flue Gas Desulfurization Demonstration. Bechtel Corp., Indiana County, PA.

The Cooperative Agreement was awarded October 13, 1990. Preliminary design has been completed. Detailed design is scheduled for completion in January 1991. Specialized equipment has been purchased and construction will begin in March 1991.

10 MW Demonstration of Gas Suspension Absorption. AirPol, Inc., Paducah, KY.

Cooperative Agreement was awarded October 11, 1990. Preliminary design is in progress with preparation of flow diagrams and layout drawings and sizing of major equipment.

Healy Clean Coal Project. Alaska Industrial Development and Export Authority, Healy, AK.

Negotiations were completed in December 1990. Award of the Cooperative Agreement is expected in February 1991 pending Congressional approval.

Integrated Dry NO_x/SO₂ Emission Control System. Public Service Company of Colorado, Denver, CO.

Negotiations were completed in December 1990. Award of the Cooperative Agreement is expected in February 1991 pending Congressional approval.

Air-Blown/Integrated Gasification Combined Cycle Project. Clean Power Cogeneration, inc., Tallahassee, FL.

Negotiations are expected to be completed in early 1991.

LIFAC Sorbent Injection Desulfurization Demonstration Project. LIFAC North America, Richmond, IN.

The Cooperative Agreement was awarded on November 20, 1990. Design of the LIFAC system is in progress with flow sheets and general arrangement drawings in preparation, and detailed design being accomplished for key components needed for a scheduled March 1991 outage.

Liquid Phase Methanol Process. Air Products and Chemicals, Inc., Dakota Gasification Co., Beulah, ND.

Negotiation schedule has been extended to Fall 1991 to evaluate an alternative site.

Full-Scale Demonstration of Low-NO_x Cell Burner Retrofit. The Babcock & Wilcox Co., Aberdeen, OH.

Cooperative Agreement was awarded October 11, 1990. Pre-retrofit testing was completed in November 1990, and analysis of the data is underway. Fabrication of the low-NO_x cell burners is in progress.

ENCOAL Mild Coal Gasification Project. ENCOAL Corp., Gillette, WY.

Cooperative Agreement awarded September 17, 1990. The NEPA process has been completed. Groundbreaking occurred on October 26, 1990, and a concrete pour of record proportions was completed in December 1990 for the process derived fuel building.

Commercial Demonstration of NOXSO SO₂/NO_x Removal Flue Gas Cleanup System. MK-Ferguson Co., Niles, OH.

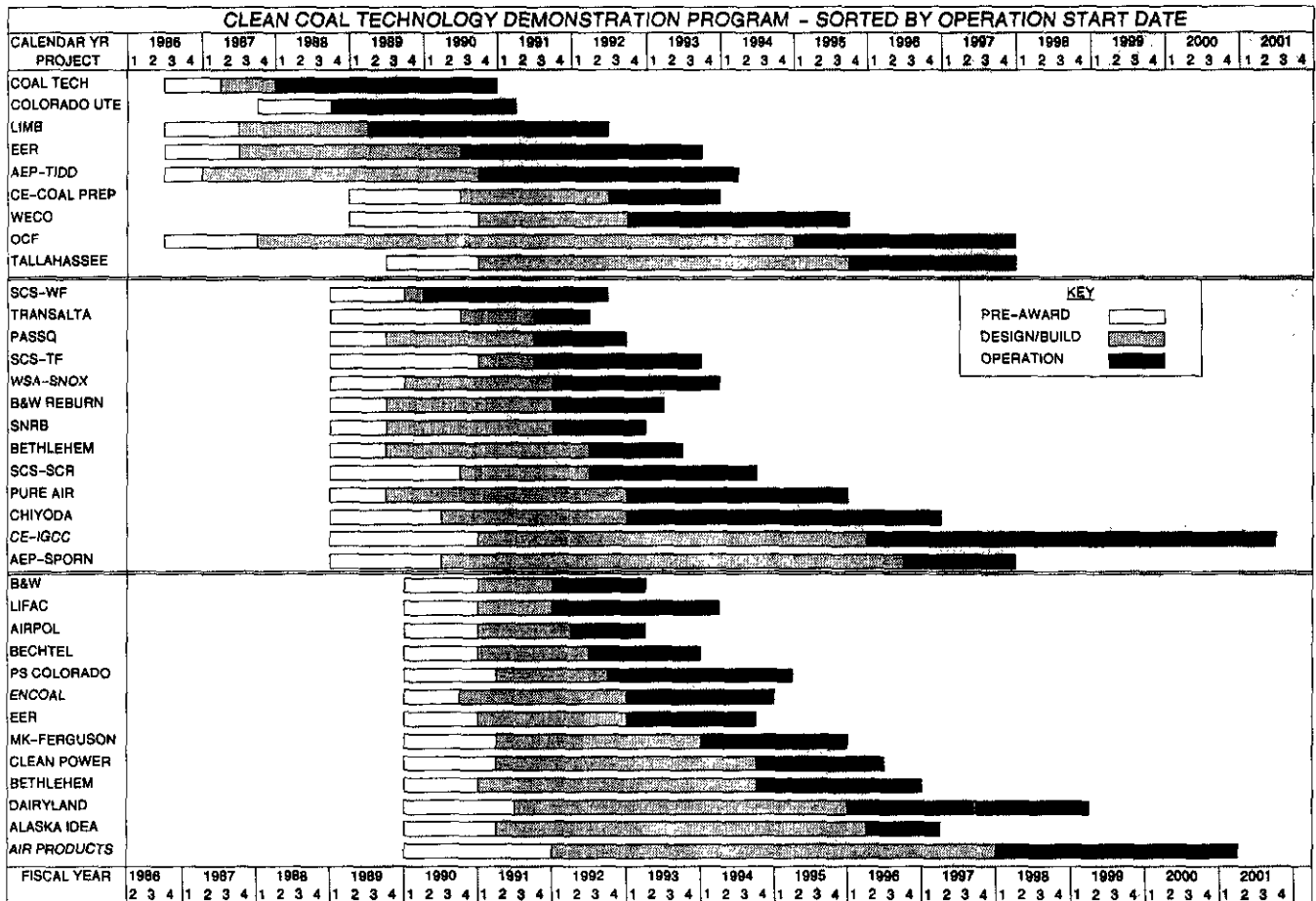
Negotiations were completed in December 1990. Award of the Cooperative Agreement is expected in February 1991 pending Congressional approval.

Alma PCFB Repowering Project. Dairyland Power Cooperative, Alma, WI.

Negotiation schedule has been extended to mid-1991 to evaluate an alternate site.

Evaluation of Gas Reburning and Low-NO_x Burners on a Wall-Fired Boiler. Energy and Environmental Research Corp., Denver, CO.

The Cooperative Agreement was awarded October 13, 1990. Process design and program planning tasks are in progress.



CLEAN COAL TECHNOLOGY PROGRAM REPORT LISTING (Winter 1990)

Dec 87	DOE/FE-0107	Clean Coal Technology Demonstration Program: Annual Report to Congress
Feb 89	DOE/FE-0125	Clean Coal Technology Demonstration Program: Annual Report to Congress
Mar 90	DOE/FE-0195P	Clean Coal Technology Demonstration Program: Annual Report to Congress
Aug 86	DOE/FE-0070	Comprehensive Report to Congress on Proposals Received in Response to the Clean Coal Technology Program Opportunity Notice
Oct 88	DOE/FE-0114	Comprehensive Report to Congress: Proposals Received in Response to the Innovative Clean Coal Technology Program Opportunity Notice
Feb 90	DOE/FE-0163	Comprehensive Report to Congress: Proposals Received in Response to the Clean Coal Technology III Program Opportunity Notice
May 85	DOE/S-0034	Report to Congress on Emerging Clean Coal Technologies
Aug 85	DOE/MC/22121-1	Supplemental Report to Congress on Emerging Clean Coal Technologies
Oct 86	DOE/FE-0072	Report to Congress on the Relationships Between Projects Selected for the Clean Coal Technology Program and the Recommendations of the Joint Report of the Special Envoys on Acid Rain
Mar 87	DOE/FE-0082	Summary Report to Congress on Emerging Clean Coal Technologies Capable of Retrofitting, Repowering, or Modernizing Existing Facilities
May 87	DOE/FE-0086	Second Report to Congress on Emerging Clean Coal Technologies Capable of Retrofitting, Repowering, or Modernizing Existing Facilities
1987	DOE/FE-0090	Background Information - Public Meetings for Views and Comments on the Conduct of the Innovative Clean Coal Technology Solicitation
1989	DOE/FE-0112	Background Information - Public Meetings for Views and Comments on the Conduct of the 1989 Clean Coal Technology Solicitation
Feb 90	DOE/FE-0157	Background Information - Public Meetings for Views and Comments on the Conduct of the 1990 Clean Coal Technology Solicitation
Nov 87	DOE/FE-0094	Summary Proceedings: Public Meetings for the Views and Comments on the Conduct of the Innovative Clean Coal Technology Solicitation
Dec 88	DOE/FE-0113	Summary Proceedings: Public Meeting on Increasing Western Participation in the 1989 Clean Coal Technology Solicitation
Jul 89	DOE/FE-0140	Summary Proceedings: Public Meetings for Views and Comments on the Conduct of the 1989 Clean Coal Technology Solicitation
Apr 90	DOE/FE-0171	Summary Proceedings: Public Meetings for Views and Comments on the Conduct of the 1990 Clean Coal Technology Solicitation
Sep 88	DOE-PEIA-0002	Programmatic Environmental Impact Analysis (PEIA)
Nov 89	DOE/EIS-0146	Clean Coal Technology Demonstration Program Final Programmatic Environmental Impact Statement
Jul 89	DOE/FE-0193P	Clean Coal Technology - The New Coal Era
Mar 90		Clean Coal Technology Topical Report Number 1-TIDD: The Nation's First PFBC Combined-Cycle Demonstration
Sep 90		Clean Coal Technology Topical Report Number 2 - Coolside and LIMB: Sorbent Injection Demonstrations Nearing Completion

COMPREHENSIVE REPORTS TO CONGRESS FOR CLEAN COAL TECHNOLOGY PROJECTS

Included in the enabling legislation for the CCT program is the requirement that a comprehensive report for the project be submitted to Congress for review and approval prior to DOE signature of the cooperative agreement for the project. The following reports are currently available.

CCT-I

Feb 87 DOE/FE-0077 Advanced Cyclone Combustor With Integral Sulfur, Nitrogen and Ash Control (Coal Tech)
Feb 87 DOE/FE-0078 TIDD PFBC Demonstration Project (AEP)
Apr 87 DOE/FE-0085 LIMB Demonstration Project Extension (B&W)
May 87 DOE/FE-0087 Enhancing the Use of Coals by Gas Reburning and Sorbent Injection (EER)
Oct 87 DOE/FE-0092 Prototype Commercial Coal/Oil Co-Processing Plant (OCF)
Jul 88 DOE/FE-0106 Nucla CFB Demonstration Project (Colorado-Ute Electric Association, Inc.)
Oct 88 DOE/FE-0108 Advanced Slagging Combustor Utility Demonstration Project (TRW)
May 90 DOE/FE-0174P Development of the Coal Quality Expert (CE/CQ, Inc.)
Jul 90 DOE/FE-0192P Advanced Coal Conversion Process Demonstration (Western Energy)
Oct 90 DOE/FE-0208P Arvah B. Hopkins Circulating Fluidized-Bed Repowering Project (Tallahassee)

CCT-II

Aug 89 DOE/FE-0137 Innovative Coke Oven Gas Cleaning System for Retrofit Applications (Bethlehem Steel)
Nov 89 DOE/FE-0145 SO_x-NO_x-RO_x Box Flue Gas Clean-Up Demonstration Project (B&W)
Nov 89 DOE/FE-0146 Demonstration of Advanced Combustion Techniques for a Wall-Fired Boiler (Southern Company Services)
Nov 89 DOE/FE-0150 Advanced Flue Gas Desulfurization (AFGD) Demonstration Project (Pure Air)
Nov 89 DOE/FE-0151 WSA-SNOX Flue Gas Cleaning Demonstration Project (Combustion Engineering)
Nov 89 DOE/FE-0152 Cement Kiln Flue Gas Recovery Scrubber (Passamaquoddy Tribe)
Feb 90 DOE/FE-0157 Demonstration of Coal Reburning for Cyclone Boiler NO_x Control (B&W)
Feb 90 DOE/FE-0158 Demonstration of Innovative Applications of Technology for the CT-121 FGD Process (Southern Company Services)
Feb 90 DOE/FE-0159 PFBC Utility Demonstration Project (AEP)
Apr 90 DOE/FE-0160P Low NO_x/SO_x Burner Retrofit for Utility Cyclone Boilers (TransAlta Resources)
Apr 90 DOE/FE-0161P Demonstration of Selective Catalytic Reduction (SCR) Technology for the Control of Nitrogen Oxide (NO_x) Emissions from High-Sulfur Coal-Fired Boilers (Southern Company Services)
Jul 90 DOE/FE-0191P 180 MWe Demonstration of Advanced Tangentially-Fired Combustion Techniques for the Reduction of Nitrogen Oxide (NO_x) Emissions for Coal-Fired Boilers (Southern Company Services)
Oct 90 DOE/FE-0201P Combustion Engineering IGCC Repowering Project (CE, Inc.)

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Jun 90 DOE/FE-0194 Encoal Mild Coal Gasification Project (Encoal Corp.)
Jul 90 DOE/FE-0197P Full-Scale Demonstration of Low-NO_x Cell Burner Retrofit (B&W)
Jul 90 DOE/FE-0198P 10 MW Demonstration of Gas Suspension Absorption (Airpol, Inc.)
Sep 90 DOE/FE-0203P Confined Zone Dispersion Flue Gas Desulfurization Demonstration (Bechtel)
Sep 90 DOE/FE-0204P Evaluation of Gas Reburning and Low-NO_x Burners on a Wall-Fired Boiler (EER)
Oct 90 DOE/FE-0206P Blast Furnace Granulated Coal Injection System Demonstration Project (Bethlehem Steel)
Oct 90 DOE/FE-0207P LIFAC Sorbent Injection Desulfurization Demonstration Project (LIFAC)

**Copies of the publications and Reports to Congress are available from the
National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161**

Upcoming Events

Date	Event	Contact
February 5, 1991	<u>CCT-IV Pre-Proposal Conference</u> , U.S. Department of Agriculture, Thomas Jefferson Memorial Auditorium, Washington, D.C.	H. Watkins 202-586-1026
February 6 - 9, 1991	<u>World Coal Conference</u> , Westin Canal Place, New Orleans, LA.	S. Wingfield 504-566-1001
April 22 - 25, 1991	<u>16th International Conference on Coal and Slurry Technologies</u> , Sheraton San Key, Clearwater, FL.	B. Sakkestad 202-296-1133
April 22 - 26, 1991	<u>11th International Conference on Fluidized Bed Combustion</u> , LeGrande Hotel, Montreal, Canada. (Energy, Mines and Resources)	Dr. E. J. Anthony 1-613-996-2868
July 11 - 12, 1991	<u>Coal and the Environment - Asia 2010. Conference</u> , East-West Center, Honolulu, HI.	S. Walbridge 202-586-7735
Spring/Summer 1991	<u>Seminar on Economics and Commercial Implementation of Clean Coal Technologies in the International Marketplace</u> , Argonne National Laboratory, Argonne, IL.	S. Walbridge 202-586-7735
Spring/Summer 1991	<u>Conference on Technology Options for Clean Air Act Compliance</u> , Pittsburgh, PA.	J. Lerch or F. Cline 202-586-7320

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