

Commonwealth of Pennsylvania
PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY

ANNUAL REPORT
FOR FISCAL YEAR 1985-86
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PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY

CHRONOLOGICAL HIGHLIGHTS

FY 1985-86

The Pennsylvania Energy Development Authority's activities and progress in its second full year of operation are summarized below. The Board of Directors reports the following progress:

July 11, 1985 - The Board receives an application from Continental Cogeneration requesting revenue bond financing of \$39 million for a cogeneration project at the Humboldt Industrial Park in Hazleton. A total of \$1.3 million was appropriated for fiscal year 1985-86, earmarked for coal-related projects.

September 12, 1985 - The Board unanimously approves the inducement of the Continental Cogeneration Project. The inducement resolution for Harrisburg Energy Company is rescinded by the Board.

December 10, 1985 - Seven projects totalling nearly \$400,000 and involving a wide range of coal-related topics or technologies approved by the Board. The Erie School project was successful in stimulating gas production, and the Authority can anticipate receiving royalty funds.

December 16, 1985 - The Board's first successful revenue bond financing was concluded for the \$39 million Continental Cogeneration Project.

February 11, 1986 - The Board approves the reallocation of funds within the Anthracite Industry Association project to assist in funding the Dallastown School Demonstration Project.

April 8, 1986 - The Board approves its first venture capital project to Kipin Industries. The Board approves support for three clean coal projects that will be applying to the U.S. Department of Energy for funding.

June 10, 1986 - The Board induces two revenue bond projects totalling more than \$123 million. Both projects involve use of bituminous coal waste in fluidized bed boilers - a relatively new, efficient and environmentally beneficial coal burning technology.

INTRODUCTION

This report is prepared pursuant to the Pennsylvania Energy Development Authority and Emergency Powers Act of 1982, P.L. 1213, No. 280 (hereafter referred to as the "Act"). The Act requires the Board of Directors to make an annual report to the Governor and the General Assembly on the Authority's activities. This report is for the fiscal year July 1, 1985 through June 30, 1986 (FY 1985-86) and is the statement of program results and financial status for that period.

FY 1985-86 marks the second year of operation for the Authority. The Board is pleased to report the Authority accomplished its primary mission of providing financial assistance to energy projects by allocating more than \$1,791,980 in Commonwealth monies to 22 energy projects, and by inducing more than \$162 million in revenue bonds to finance three commercial cogeneration and small power production projects.

FINANCIAL ASSISTANCE FOR ENERGY PROJECTS

The Authority's basic mission is to provide financial assistance to energy projects which develop, promote or efficiently use Pennsylvania energy resources. Forms of financial assistance include loans based on proceeds from Authority revenue bond issuance and loans and grants based on non-bond monies in the Energy Development Fund.

In its determination to allocate financial assistance to energy projects, the Board relies on the core criteria presented in the Energy Development Plan. For the financial assistance applications considered during FY 1985-86, the Board applied the following key criteria:

- o development or conservation of indigenous energy resources potential;
- o need for Authority assistance; and
- o matching funds commitments.

Additionally, the Board considered factors such as commercial potential of proposed projects and qualifications of applicants.

The Authority announced its first round of financial assistance programs for FY 1985-86 in the September 28, 1985 "Pennsylvania Bulletin". Application deadlines for FY 1985-86 were set at November 1, December 12, February 13, April 10 or June 29.

The Authority received 33 applications during the 1985-86 fiscal year. The total request amount was \$3.3 million. Of these requests, the Board allocated \$1,791,980 to 22 projects. For the 22 projects now under contract, a total effort of \$8,570,290 is realized as a result of Authority financial assistance. This leverage allows a greater level of project activity than would be possible if the Authority provided all project funding.

The Authority also induced resolutions authorizing sale of \$162,253,600 of Authority Revenue Bonds to finance a total of \$197,567,000 in costs for projects. On December 16, 1985, the Authority closed on the Continental Cogeneration project in Hazleton - its first revenue bond closing. Two remaining projects await final decision on revenue bond allocations.

In support of the Authority's interest in promoting clean coal projects, three applications to the U.S. Department of Energy's Clean Coal Technology Program were supported. Two projects received a total commitment of \$550,000 from the Authority contingent on approval by the Department of Energy. The third project received the Authority's written support. Of the three projects, two were deemed successful applicants by the Department of Energy.

In FY 1985-86, the Authority approved a venture capital project. This is the first venture capital project contracted by the Authority. A company was awarded \$200,000 to develop a waste fuel burning facility in western Pennsylvania.

In its evaluations, the Board considers qualified projects consistent with the Plan to be of utmost importance. The Board will continue to allocate available funds to projects meeting Energy Development Plan criteria and other relevant factors.

FUNDS AVAILABLE FOR FINANCIAL ASSISTANCE

In support of its FY 1985-86 financial assistance programs, the Board adopted the following program budget:

<u>Purpose</u>	<u>Amount</u>
Anthracite Coal Development	\$ 300,000
Interest Reduction Program	300,000
Guaranteed Coal Loans	500,000
Coal Pilot and Research Projects	200,000
Other Coal Projects	<u>1,484,000</u>
Total Available	\$2,784,000

PENNSYLVANIA ENERGY DEVELOPEMENT AUTHORITY
1985-86 YEAR END STATUS REPORTS

SECTION I - COMPLETED PROJECTS

PROJECT NUMBER 84003 (Bituminous Development)
FRANCIS G. MILLER P.E.

PURPOSE: Coal Preparation
ALLOCATION: \$16,500
COMPLETED: 10/85

PROJECT SUMMARY:

Three well-received seminars were held at Clearfield, Indiana and Johnstown. Paid attendees for these seminars totaled 68, representing miners, producers, equipment manufacturers, researchers, consultants, unions, brokers, utility users, government and media representatives.

A wide range of valuable ideas was communicated and, based on comments of those in attendance, additional seminars which provide in-depth coverage of specific topics would be a desired next step.

PROJECT NUMBER 84006 (Bituminous Development)
PA. COKE TECHNOLOGY INC.

PURPOSE: Improve Non-recovery Coke Process
ALLOCATION: \$67,965
COMPLETED: 12/85

PROJECT SUMMARY:

Objectives of this project were to evaluate Pennsylvania coals as potential feedstocks to the PACTI non-recovery coke making process and to establish techniques for selecting coals and measuring performance.

Key findings were as follows:

- o A wide variety of Pennsylvania coals and coal blends was found to be adaptable to this coke/energy production method. Pennsylvania medium-volatile coals are ideal candidates.

- o Significant coke quality improvements were found with PACTI process modifications in coal bulk density, coal additives (coke breeze and anthracite) and coal briquetting. These additives and modifications are especially helpful for producing quality coke from low volatile Pennsylvania coals.
- o Energy cogeneration studies demonstrated the ability of the proprietary Westinghouse system to add environmental benefits with new desulfurization techniques and add economic benefits to the coal/coke conversion costs.

This has been a successful project for PACTI, Westinghouse and PEDDA.

PROJECT NUMBER 84007 (Anthracite Development)
ANTHRACITE INDUSTRY ASSOCIATION

PURPOSE: Anthracite Marketing and Demonstrations
ALLOCATION: \$453,780
COMPLETED: 8/86

PROJECT SUMMARY:

This was a large, high impact project. Objectives were to increase anthracite usage and employment opportunities through a market promotion program.

Project objectives have been carried out through marketing communications efforts in association with Myers CommuniCounsel, a marketing communications firm based in New York, as well as through demonstrations of applications and innovative equipment for anthracite use. A logo, press kit, brochure and film were developed as part of the project's ongoing media activities. Media efforts have been productive. The new AIA logo was well received and media placements, such as the press kit which was mailed to 400 newspapers, have been tracked to reach more than two million people. A five-page release was completed to announce the Dallastown school project. This effort involved development of a computer-operated anthracite unit, billed in the release as a modern, unique anthracite burning unit.

Demonstrations included the Dallastown School project, the Sargent Art industrial building in Hazleton, which showed co-firing of coal and gas, and the Polish American Fire Station in Shenandoah which converted from oil to anthracite.

First year project activities have been completed with positive impact. Additional funds have been granted to AIA to continue this project.

PROJECT NUMBER 84024 (General Energy)
SCHOOL DISTRICT OF ERIE

PURPOSE: Hydraulic Fracture of Devonian Shales
ALLOCATION: \$37,500
COMPLETED: 2/86

PROJECT SUMMARY:

The purpose of this project was to stimulate gas production from a thin, but potentially rich, Devonian shale formation using a new hydraulic fracturing technique. Results show three depleted wells produced at various levels with different treatments. The contractor will continue to monitor the wells for stability before drawing final conclusions as to well productivity.

The wells produce 3, 10, and 15 mcf per day. This is less than a commercial well, but adequate in meeting the needs of the Erie School District.

This award was a royalty grant and repayment is expected.

PROJECT NUMBER 84025 (General Energy)
JOHNSTOWN CORPORATION

PURPOSE: Coal Conversion, Cogeneration, Waste to Energy
ALLOCATION: \$28,715
COMPLETED: 5/86

PROJECT SUMMARY:

A cogeneration feasibility study was carried out by Warren L. Custer Company, Inc., for Johnstown Corporation to evaluate the potential of cogeneration, process heat recovery and heat generation options to reduce energy/operating costs and increase profitability of steel-making and fabrication operations.

Thirteen cogeneration plant configurations and energy selling options were initially evaluated. Of these, five specific cases were identified for further consideration. These five options were for producing 10 mw of electric power and 180,000 pounds of steam. Results indicated the all coal-firing option presented the greatest return on investment as well as meeting the target level for steam sales and generating revenue needed to support debt and operating expenses.

Johnstown Corporation views this study as the initial step in providing low-cost energy for their own use and attracting new industry to the Johnstown region.

PROJECT NUMBER 84026 (General Energy)
ST. FRANCIS COLLEGE

PURPOSE: Cogeneration, Waste to Energy
ALLOCATION: \$7,500
COMPLETED: 7/86

PROJECT SUMMARY:

The goal of this project was to determine the feasibility of upgrading the existing coal-fired boiler and steam heating system to use both coal and municipal solid waste and to generate electricity.

The feasibility study was done by Schneider Consulting Engineers. The college engineers have already complied with several of the recommendations of the report. One recommendation was to maintain the operation of the existing coal-fired boilers because it is reported to be more cost effective than burning more expensive coals in a higher efficiency boiler. St. Francis personnel are considering boiler replacement within two years. Additionally, they intend to reevaluate feasibility of cogeneration and waste-to-energy processes in five years.

PROJECT NUMBER 84034 (General Energy)
COUNCIL FOR LABOR AND INDUSTRY

PURPOSE: Conservation Improvements
ALLOCATION: \$15,000
COMPLETED: 12/85

PROJECT SUMMARY:

Project objectives were to identify cost effective conservation improvements to the building envelope, and to suggest renovations to the physical plant of the 60-year-old Wissahickon Industrial Center to improve the building's energy efficiency and to reduce costs.

The study identified equipment deficiencies and inefficiencies in the building, estimated costs to repair or replace existing equipment, and determined added energy consumption caused by the building envelope's poor condition.

The study also highlighted financing options. Hence, an energy management corporation is considering an investment of \$4.5 million in heat and electrical cogeneration. Facility improvements amounting to at least \$4 million are also a possibility.

PROJECT NUMBER 84041 (General Energy)
BELLEFIELD BOILER PLANT

PURPOSE: Cogeneration
ALLOCATION: \$21,000
COMPLETED: 8/86

PROJECT SUMMARY:

The purpose of the Bellefield Boiler project was to examine the economic feasibility of upgrading the Bellefield Boiler Plant. This plant provides heat to the University of Pittsburgh, Carnegie-Mellon University, Carnegie Institute and several nonprofit institutions in the area.

The study was conducted by Bituminous Coal Research National Laboratory and resulted in five recommendations for the Bellefield facility:

1. Develop detailed plans to install a 500-600-kw cogeneration system at the BBP/Library/Museum complex to serve as a peak shaving or base loaded unit with hot water heating and, perhaps, absorption cooling. Investigate use of thermal storage to take advantage of off-peak electric rates.
2. Develop detailed plans to install a two-unit base-loaded gas turbine cogeneration system that will produce five to eight MW and 80 to 100% of the summer steam load. Investigate possible use of the heat recovery steam generator exhaust to improve performance of existing boilers.
3. Initiate a program to evaluate a change to hot water distribution.
4. The University of Pittsburgh and Carnegie-Mellon University should investigate use of thermal storage and liquid ice systems to take advantage of off-peak electric rates and reduce life cycle costs of central chill systems.
5. A second phase cogeneration plan should consider use of one or two fluidized bed combustion steam generators that produce 100,000 to 200,000 PPh with an extraction/condensing steam turbine. This study should be started in one year.

Installation of the cogeneration unit will increase the Bellefield system steam generation capacity in addition to the reduction of operating costs resulting from the sale of electricity. The net effect of these cogeneration cycles would be the addition of about \$1 million in revenue to the boiler operation. Depending on user participation, it could save the University of Pittsburgh about \$500,000 in operating costs, save Carnegie-Mellon \$200,000 and other users a proportionate share.

PROJECT NUMBER 84047 (General Energy)
ENERCO ASSOCIATES

PURPOSE: Pyrolysis of Waste Tires
ALLOCATION: \$302,268
COMPLETED: 2/86

PROJECT SUMMARY:

Enerco Associates has developed a unique modular tire pyrolysis technology capable of extracting oil, gas and carbon black with more than 80% efficiency from waste tires. In Pennsylvania alone, 12 million tires are discarded from which the energy equivalent of 894,00 barrels of oil could be recovered. Given the economics at the time of the project, it was demonstrated that this concept could be commercially viable as well as an innovative method of turning a great waste into a valuable resource. Currently, Enerco is experiencing some sales difficulties because of the oil market situation, however the project was a success within the parameters of PEDA funding of the demonstration. The project proved it is feasible to process six tons of waste tires per day and, over a 100-day period, to generate 127 billion BTU in oil and gas and save 170 billion BTU in oil required for manufacture of carbon black.

PROJECT NUMBER 84050 (General Energy)
CONTROL TECHTRONICS

PURPOSE: Computerized Combustion Controls
ALLOCATION: \$15,000
COMPLETED: 2/86

PROJECT SUMMARY:

Project objectives were outlined as a speed-up introduction to the marketplace of a microprocessor-based combustion controller designed to increase combustion efficiency of oil and gas boilers and furnaces.

Units were placed at eight locations in institutional, commercial and industrial applications. The eight sites were: TRW Heavy Duty Parts (on an industrial forge furnace), Domolite Brick Division of J.E. Baker Co. (on a brick kiln), Harrisburg Hospital boiler system, Masland Carpet industrial water tube boiler, U.S. Steel heat treating furnaces, Ellison Equipment Co. forge furnace, Shadysside Hospital incinerator and York Shipley on a demonstration boiler.

Most units were still being completed as of the project completion date. The company plans to inform PEDA of the results of this innovative project.

PROJECT NUMBER 85003 (Bituminous Development)
ANTRIM MINING

PURPOSE: Fluidized Bed Combustion/Cogeneration
ALLOCATION: \$10,000
COMPLETED: 4/86

PROJECT SUMMARY:

Project 85003 is a feasibility study to determine the financial viability of constructing an atmospheric fluidized bed system to provide steam for small power production or cogeneration. The study included a survey of available fuel close to the project site.

Most mining companies within fifty miles of the investigation are eager to become the fuel supplier for the Milesburg project. The preliminary investigation for the project used a best and worst case scenerio for fuel quality. The best case scenerio used blended bituminous refuse with an average value of 8,000 Btu's per pound, 4% sulfur and 36% ash. The worst case scenerio changed fuel parameters to 6,000 Btu's per pound and 5% sulfur. The seventeen mining operations surveyed generate the project's total fuel requirement from preparation plant reject alone.

The cost investigation found freight-on-board pit cost for potential fuel identified in this report depends upon incremental mine costs as well as future supply and demand factors. Transportation costs depend as much on road conditions as miles; costs used in the site study were based on 80¢ per ton plus 8¢ per mile.

The report's conclusion is that the quality and quantity of bituminous refuse available within 50 miles of the Milesburg Project meet the plant's needs.

Information prepared as a result of this project has been used to support a proposed 45-megawatt energy facility. The applicant has received financial commitments and is currently in the final stages of negotiating a power purchase contract with the local utility.

SECTION II - CURRENT PROJECTS

PROJECT NUMBER 84002 (Bituminous Development) PENNSYLVANIA COAL MINING ASSOCIATION

PURPOSE: Improve Marketability of PA bituminous coal
ALLOCATION: \$411,000 EXPENDED: \$268,297
EXPIRES: 5/87

PROJECT SUMMARY:

This project has three phases. Phase I is a multitask evaluation of Pennsylvania bituminous marketability and has reached completion. Geological data were entered into an IBM PC/at computer system to provide easy data manipulation. The system calculates average quality values for every seam in each county and assigns seam ratings (level 1-raw basis, 2-coarse cleaning, 3-fines prep). When a seam meets utility specifications, that seam and the lowest level of cleaning are listed. The Pennsylvania Coal Mining Association believes the system developed in Phase I can be used as a direct guide for defining new utility markets. The computerized database will soon be available for outside use through the Pennsylvania State University, Pennsylvania Coal Mining Association, and Governor's Energy Council and thus help the operator rapidly focus market opportunities. As of the June 1986 progress report, several requests for competitive analysis were received from PCMA member companies. The database was used and responses from the participating companies have been extremely favorable.

Phase II objectives are (1) to develop correlations between explored and mined coal quality; and, (2) to generate a predictive model for projecting coal characteristics from drill core and channel sample analyses. Ultimately, summary tables and graphs will be created to visually highlight coal quality characteristics and other relevant information.

The task of Phase III is to establish a coal resource databank for mine operators. When complete, this effort will provide an unmatched planning tool to aid development and sales of Pennsylvania coals.

A recent amendment has been approved by PEDDA to allocate an additional \$22,000 to this project to computerize the coal demand data to complete the market potential picture for Pennsylvania bituminous coals.

PROJECT NUMBER 84016 (Coal Desulfurization)
LEHIGH UNIVERSITY

PURPOSE: Improve Coking
ALLOCATION: \$25,000 EXPENDED: \$17,347
EXPIRES: 10/86

PROJECT SUMMARY:

First and second quarter status reports have been received. First quarter work consisted largely of the development of an experimental procedure. Time was spent acquiring desired coals and setting up laboratory equipment. During the second quarter, various technical analyses were completed consistent with the project's work plan.

PROJECT NUMBER 84017 (Coal Desulfurization)
LEHIGH UNIVERSITY

PURPOSE: Multistage Air Fluidized Bed Coal Cleaning
ALLOCATION: \$80,530 EXPENDED: \$26,905
EXPIRES: 8/87

PROJECT SUMMARY:

Project objectives are to study the physics of solids segregation in a ternary fluidized bed and to develop a conceptual design of a pilot-scale fluidized bed coal cleaning system. Two reports have been received on this project's progress.

First quarter project activities concentrated on fluidization experiments with model materials. Segregation experiments were carried out using mixtures of magnetite and plastic particles, and mixtures of coal and magnetite particles to determine effects of density difference and fluidization velocity on ability to achieve segregation.

In the second quarter, experiments were carried out in the six-inch diameter bed to determine the effect of bed depth on time required for the bed to achieve steady-state conditions. In these experiments the mixture of coal and magnetite was added to the bed and the bed was fluidized at near minimum bubbling velocity for different periods. Fluidization time was increased and the experiment repeated. This procedure was continued until concentration distribution remained unchanged within experiment duration. As expected, results showed the time it takes the bed to come to steady-state conditions is two to three minutes. These results are very important; they provide extremely crucial information needed for design of the cleaning system. Results also showed depth of the bed may not affect efficiency of separation. Its primary effect seems to be the length of time the bed needs to be operated in order to achieve segregation.

A magnetic separation device was ordered. This equipment, which is now being set up in the laboratory, will make it possible to use magnetic properties of magnetite to separate pyrite from the magnetite fractions. Also, an inclined fluidized bed was designed where coal and magnetite will be fed at one end and segregated mixture removed at the other end.

Present findings show it is possible to achieve segregation between coal and magnetite, but careful attention needs to be given to size of magnetite material and feed coal.

PROJECT NUMBER 84020 (Coal Desulfurization)
COAL TECH CORPORATION

PURPOSE: Advanced Cyclone Coal Combustor
ALLOCATION: \$150,00 EXPENDED: \$42,765
EXPIRES: 10/86

PROJECT SUMMARY:

This project involves testing a commercial-scale cyclone coal combustor as an add-on to an existing oil-designed, industrial boiler using coal-water slurries as fuel. The combustion is designed to use limestone injection for sulfur absorption and to remove reacted sorbent with the slag.

Coal Tech Corporation and Keeler/Dorr-Oliver, a boiler manufacturer in Williamsport, Pennsylvania, have negotiated terms under which the test will be performed.

Coal Tech Corporation requested original Department of Energy funds be reprogrammed from Pittsburgh Energy Technology Center in Bruceton (the original test site) to Keeler Dorr Oliver in Williamsport. This change required resubmission of the proposal to DOE. As part of the revision, it was included that tests in Williamsport will cost about \$160,000 less. Therefore, they require only an additional \$40,000 to implement the test.

It is expected that upon the completion of negotiations, combustor installation should occur in August 1986.

In conjunction with this project, Coal Tech Corporation has been awarded a grant from the U.S. Department of Energy's Clean Coal Technology Program. Coal Tech was supported by a \$200,000 commitment from the Pennsylvania Energy Development Authority.

PROJECT NUMBER 84038 (General Energy)
CDA INTERNATIONAL

PURPOSE: Hospital Operation Room Energy Conservation
ALLOCATION: \$35,000 EXPENDED: \$13,270
EXPIRES: 12/86

PROJECT SUMMARY:

CDA is documenting energy savings achievable in hospital operating rooms using a computer control system to adjust for occupancy and load demands.

The test site has been switched from York Hospital to Lock Haven Hospital to avoid project delays.

Monitoring equipment and software have been received and checked out. Control and monitoring plans are complete. Design of the retrofit is underway. However, pre-retrofit monitoring could not be started because the hospital was installing an Energy Management System. This EMS will monitor several areas affected by the retrofit, making it necessary to complete EMS installation prior to installing the monitoring equipment.

A contract extension was granted until 12/86.

PROJECT NUMBER 84042 (Coal Desulfurization)
BCR NATIONAL LAB

PURPOSE: Reactive Gas Desulfurization
ALLOCATION: \$120,241 EXPENDED: \$101,395
EXPIRES: 8/86

PROJECT SUMMARY:

Bituminous Coal Research National Laboratory has provided the Authority eleven progress reports. The project objective is to evaluate a novel process for coal desulfurization which involves chemical oxidation of sulfur in the presence of a reactive gas at ambient conditions.

At this point, work completed includes a comprehensive technical and cost proposal, modifications of a new slurry system, and initiation of a literature search.

The contractor believes he is only beginning to understand the kinetics of pyrite/ozone systems and recommends strongly this fundamental research be continued.

A supplemental grant was approved to continue this project's research.

PROJECT NUMBER 84043 (Coal Desulfurization)
BCR NATIONAL LAB

PURPOSE: Reichert Spiral Evaluation
ALLOCATION: \$50,000 EXPENDED: \$19,602
EXPIRES: 8/86

PROJECT SUMMARY:

The scope of this project includes three tasks:

1. Construct a spiral test facility, and process selected Pennsylvania coal samples. Establish optimum operating parameters and the method's effectiveness for removing sulfur and ash.
2. Generate washability performance curves and compare performance with alternative cleaning methods.
3. Demonstrate the device at three to five commercial preparation plants. (Only this portion of the project is supported by PEDDA.)

Tests of Rochester and Pittsburgh fine coal were completed and reports issued to both Rochester and Pittsburgh Coal Company and PEDDA. Results are encouraging.

Draft agreements and budget have been prepared with the president of Pennsylvania Coal Reclamation Inc., to complete project phase I and II. However, the coal market has softened and the company will wait until better markets exist before making financial commitments. Other companies are currently being contacted in the event Pennsylvania Coal Reclamation is unable to participate in the spiral program.

Bituminous Coal Research National Laboratory also is working with Mechanical Data, Inc. of Knoxville, Tennessee to generate a computer model of spiral performance and to analyze circuits with and without spirals.

PROJECT NUMBER 85004 (Coal Desulfurization)
NORTON HAMBLETON INC.

PURPOSE: Advanced Physical Coal Cleaning
ALLOCATION: \$200,000 EXPENDED: \$ 87,514
EXPIRES: 2/87

PROJECT SUMMARY:

Norton Hambleton, Inc., and Deister Concentrator Company teamed with Emway Resources Inc., to demonstrate their Advanced Physical Coal Cleaning Process (or Reverse Column Flootation Process) in the Emerald Plant located in Waynesburg, Pennsylvania.

Since the project has just recently begun, no information has yet been received on its status.

PROJECT NUMBER 85005 (Coal Desulfurization)
PENN STATE UNIVERSITY

PURPOSE: Low Temperature Pyrolysis of coal
ALLOCATION: \$35,000 EXPENDED: \$ 0
EXPIRES: 4/87

PROJECT SUMMARY:

This project hopes to develop a novel process to reduce coal's sulfur content to levels that will allow for subsequent combustion to be environmentally acceptable and cost effective. The process will involve low-temperature pyrolysis of coal using a mixture of superheated steam and methane. The purpose is to create conditions such that sulfur is selectively removed by reacting with hydrogen while suppressing gasification of carbon.

If successful, the proposal offers great potential to be cost effective and technically advantageous over conventional desulfurization methods.

PROJECT NUMBER 85006 (Bituminous Development)
R.A. SYSTEMS

PURPOSE: Water Jet Assist Cutting, Safety in Underground Mines
ALLOCATION: \$27,000 EXPENDED: \$ 0
EXPIRES: 4/87

PROJECT SUMMARY:

This project involves implementation of a pressure intensifier into a cutting drum. The intensifier, powered by the drum, solves the current technical problem of distributing high pressure water to the cutting drum of coal winning machines.

The project will involve three steps:

1. bench testing of the main components,
2. surface testing of a shearer cutting drum, and
3. underground test in a longwall mining operation.

PROJECT NUMBER 85007 (Anthracite Development)
SEDA COUNCIL OF GOVERNMENTS

PURPOSE: Anthracite Information Booklet
ALLOCATION: \$29,000 EXPENDED: \$ 0
EXPIRES: 4/87

PROJECT SUMMARY:

SEDA proposes to write, plan, and distribute 30,000 booklets instructing homeowners and other small heating customers on the merits, characteristics and advantages of using anthracite as heating fuel.

Upon completion of the booklet, quantities will be distributed to Pennsylvania Energy Centers that provide energy information to the public.

An increase in anthracite use and production is the goal of this project. The booklet hopes to dispel misconceptions on coal use, and enlighten the public with facts that will lead to increased coal use.

PROJECT NUMBER 85009 (Bituminous Development)
PENNSYLVANIA COAL MINING ASSOCIATION

PURPOSE: Increase sales of coals with non-sulfur related quality problems.
ALLOCATION: \$58,783 EXPENDED: \$ 0
EXPIRES: 2/87

PROJECT SUMMARY:

The project's primary objective is to increase coal sales through dealing with quality problems beyond sulfur content. This will be accomplished by evaluating boiler potential and conducting a full scale test burn demonstration at a selected utility to illustrate technical and economic viability of coal quality switching. Results will be dispersed to utility companies throughout the market region for Pennsylvania coals.

PROJECT NUMBER 85010 (Anthracite Development)
ANTHRACITE INDUSTRY ASSOCIATION

PURPOSE: Anthracite Marketing and Demonstrations
ALLOCATION: \$169,380
EXPIRES: 11/86

PROJECT SUMMARY:

This is a continuation of the earlier AIA project, 84007.

This continuation of the anthracite development program will take advantage of the momentum generated, expand on it, and provide much of the impetus that will ultimately permit the private sector to continue expansion of anthracite conversions and other markets without government assistance. Activities will include a semi-annual newsletter, media contact, major market news releases, promotional releases on first year demonstrations and a two-day trade show. Also, technical support for potential conversions will be provided.

PROJECT NUMBER 85011 (Anthracite Development)
CONTINENTAL COGENERATION CORPORATION

PURPOSE: Improve the economics of cogeneration from anthracite waste

ALLOCATION: \$35,000 EXPENDED: \$ 0

EXPIRES: 2/87

PROJECT SUMMARY:

This project's purpose is to increase efficiency and commercial feasibility of making producer gas from anthracite waste. Investigators will survey all sources of anthracite waste for Continental Cogeneration Corporation, characterize the mineral constituents of these materials and fire them in full scale tests at the gas plant. They will then compare data generated from advanced analytical techniques with gasification results and use all data to develop quality control and operating parameters which will result in the most efficient, trouble-free and inexpensive operation.

PROJECT NUMBER 85015 (Anthracite Development)
HESS AND FISHER ENGINEERS INC.

PURPOSE: Alternative Erosion and sedimentation control for Reduced Surface Mining Cost

ALLOCATION: \$31,475 EXPENDED: \$ 0

EXPIRES: 2/89

PROJECT SUMMARY:

The main purpose of this study is to evaluate sediment and erosion control methods identified in Mining and Reclamation Council's and Hess and Fisher's "Handbook of Alternative Sediment Control Methodologies for Mined Lands."

Hess and Fisher will obtain quantifiable data that will provide regulatory agencies with documentation necessary to justify use of innovative sediment control alternatives. Results will be disseminated to the Pennsylvania surface mining industry.

PROJECT NUMBER 85016 (Coal Desulfurization)
UNIVERSITY OF PITTSBURGH

PURPOSE: Liquid carbon dioxide cleaning for ultrafine coal
ALLOCATION: \$31,961 EXPENDED: \$ 0
EXPIRES: 7/87

PROJECT SUMMARY:

The objective of this project is to develop an improved physical coal cleaning technique for producing premium quality (low sulfur and ash) clean coal product with high BTU recovery and low moisture content. An experimental program will be carried out over the next year to determine (1) the mechanism of the proposed coal cleaning process, (2) the process efficiency and degree of cleanness, (3) optimum operating conditions, and (4) criteria for commercialization.

PROJECT NUMBER 85020 (Bituminous Development)
SEDA-COUNCIL OF GOVERNMENTS

PURPOSE: Feasibility studies of coal conversions
ALLOCATION: \$10,000 EXPENDED: \$ 0
EXPIRES: 12/86

PROJECT SUMMARY:

This project consists of engineering feasibility studies to determine practicality and financial advisability of converting oil-fired or electric resistance heating systems in public school buildings to coal.

One study taking place at the Milton School District will include an investigation to utilize existing system components with Pennsylvania bituminous coal, and renovation of system components to use anthracite if enviromental or technical constraints preclude use of bituminous coal.

A second study at Selinsgrove School District will include conceptual layout of a stoker/boiler and an investigation to determine practicality of converting existing electric resistance equipment to hydronic equipment. Effects of the proposed conversion on electric utility rates will be included in the site study.

PROJECT NUMBER 85024 (Bituminous Development)
KIPIN INDUSTRY

PURPOSE: Coal Based Cogeneration/Coal Improvement
ALLOCATION: \$200,000 EXPENDED: \$ 0
EXPIRES: 5/87

PROJECT SUMMARY:

Kipin Industries has developed technology to process liquid and solid hydrocarbon waste such as tar and petroleum oil including tar and oil sludges in combination with waste or low grade coal to produce a quality product that is marketable.

Work under this venture capital project will characterize waste materials and evaluate to what extent they can be combined with coal to be used in conventional boilers.

PROJECT NUMBER 85025 (Bituminous Development)
MEADVILLE AREA INDUSTRIAL COMMISSION

PURPOSE: Coal Based Cogeneration, Feasibility
ALLOCATION: \$10,000 EXPENDED: \$ 0
EXPIRES: 11/86

PROJECT SUMMARY:

The Meadville Area Industrial Commission intends to acquire a coal-based cogeneration plant from Avtex Fibers, Inc. The cogeneration plant consists of four coal burning boilers which supply steam for industrial processes, space heating and steam turbines for an electrical generating capacity of 15 MW. If the commission does not continue to operate the plant, it will be abandoned, resulting in a loss of 20 jobs and 146,000 tons of coal usage per year.

PROJECT NUMBER 85026 (Coal Desulfurization)
PENNSYLVANIA COKE TECHNOLOGY, INC.

PURPOSE: Coke/Energy Production Systems Development
ALLOCATION: \$350,000 EXPENDED: \$ 0
EXPIRES: (no contract)

PROJECT SUMMARY:

This proposal was for part one of a three-phase demonstration plant using the company's innovative coking technology being proposed for federal government cost sharing under the Clean Coal Technology Program Fund. As of June 30, 1986, no final decisions have been made by the U.S. Department of Energy.

PROJECT NUMBER 85027 (Coal Desulfurization)
COAL TECH CORPORATION

PURPOSE: Advanced Cyclone Coal Combustor
ALLOCATION: \$200,000 EXPENDED: \$ 0
EXPIRES: (No contract)

PROJECT SUMMARY:

Coal Tech Corporation has applied to the U.S. Department of Energy's Clean Coal Technology Program for an \$800,000 test of the cyclone combustor. This project is for a 1,000-hour test of an advanced, air-cooled, cyclone combustor on a 23-million BTU/hr oil designed package boiler, located at the Keeler/Dorr-Oliver Plant in Williamsport, Pennsylvania. In prior research and development on this technology, Coal Tech Corporation developed a research database which strongly supports the conclusion this combustor can be used to remove up to 90% of the coal ash, as well as reduce emissions of oxides of nitrogen and sulfur to meet New Source Performance Standards.

Following completion of this project, it is planned to offer the combustor to the industrial oil to dry coal boiler conversion market. As of June 30, no decision has been issued by the U.S. Department of Energy.

PROJECT NUMBER 85028 (Coal Desulfurization)
PENNSYLVANIA STATE UNIVERSITY

PURPOSE: Fluidized Combustion of High Sulfur Coals
ALLOCATIONS: \$25,000 EXPENDED: \$ 0
EXPIRES: (contract being prepared)

PROJECT SUMMARY:

Work under this project will assess performance of different limestones in reducing sulfur dioxide emissions during fluidized bed combustion of coal. Based on this objective, effects of sorbent properties residence time, sorbent particle size and bed temperature on sulfur capture efficiency during fluidized combustion of a high sulfur Pennsylvania coal will be determined.

PROJECT NUMBER 85030 (Coal Desulfurization)
EXPORTECH COMPANY INC.

PURPOSE: Desulfurization through New Magnetic Technology
ALLOCATION: \$15,933 EXPENDED: \$ 0
EXPIRES: (contract being prepared)

PROJECT SUMMARY:

EXPORTEch will investigate feasibility of coal desulfurization via use of magnetic technology. Survey measurements will be made on five Pennsylvania coals of commercial significance to determine their potential for magnetic desulfurization.

PROJECT NUMBER 85031 (Coal Desulfurization)
LEHIGH UNIVERSITY

PURPOSE: Evaluate the Potential of Sulfolobus Acidcaldarius as a Means of Removal of Organically Bound Sulfur
ALLOCATION: \$50,000 EXPENDED: \$ 0
EXPIRES: (contract currently being prepared)

PROJECT SUMMARY:

Lehigh personnel will conduct basic research to establish that sulfolobus acidcaldarius is capable of non-destructive desulfurization. Lehigh personnel feel this research is a vital step in the fundamentally important task of discovering new and efficient ways of ridding coal of its toxic elements.

PROJECT NUMBER 85032 (Bituminous Development)
PENNSYLVANIA STATE UNIVERSITY

PURPOSE: Remining for maximum resource recovery and environmental improvement
ALLOCATION: \$43,477 EXPENDED: \$ 0
EXPIRES: (contract being prepared)

PROJECT SUMMARY:

Pennsylvania is confronted with thousands of acres of abandoned coal lands which have been estimated to cost \$15 billion to reclaim. A way of dealing with this problem is to provide a mechanism by which the active mining industry can remine certain of these abandoned mines. The objective of the work on this project is to modify and to integrate existing main frame computer models into a surface

mining simulation package that will operate on microcomputers and that will predict cost and productivity for competitive surface mine schemes on remaining sites. The purpose of the model will be to assess suitability of such schemes for mining difficult or problematic coal mine reserves.

PROJECT NUMBER 85035 (Anthracite Development)
ANTHRACITE AND COMMUNITY DEVELOPMENT INSTITUTE, WILKES COLLEGE

PURPOSE: Coal Operator Management/Technical Assistance
ALLOCATION: \$125,000 EXPENDED: \$ 0
EXPIRES: (contract being prepared)

PROJECT SUMMARY:

The Coal Operations Assistance Program will provide multifaceted assistance to small anthracite coal operators who lack access to such assistance. The project will help to reduce the number of small coal operator failures in the Commonwealth, support growth and viability of small coal operations, improve small coal management skills and target and address management and technical assistance needs of small coal operators.

FINANCIAL RESULTS

The Authority concluded its second full year of operations with a net available balance of \$989,595. Though there is a total cash balance of \$3,424,997.83, there are \$2,278,854.47 in outstanding grant commitments which have been encumbered but not yet expended.

For FY 1985-86, costs of administration, including personnel, operating and fixed assets expenses totalled \$219,448. However, the Authority received \$260,370 in interest from funds invested by the State Treasurer. The Board is pleased to report the Authority's operations imposed no cost to taxpayer monies and the full amount of Commonwealth funds was available for program purposes.

The following financial summaries show the financial results of the Authority's first year of operation. These statements were prepared by the Comptroller's Office, Commonwealth of Pennsylvania.

PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY

BALANCE SHEET

JUNE 30, 1986

ASSETS

Cash	\$ 17,691.20
Short Term Investments	3,369,058.34
Accrued Interest Receivables - Investments	<u>38,248.29</u>
TOTAL ASSETS	<u><u>\$3,424,997.83</u></u>

LIABILITIES & NET WORTH

LIABILITIES	
Accounts Payable	\$.00

NET WORTH	
General Fund Appropriations	\$ 4,700,000.00
Grant Disbursements	<u>(1,499,049.53)</u>
	\$3,200,950.47
Net Earnings From Operations	<u>224,047.36</u>
	<u><u>\$3,424,997.83</u></u>
TOTAL LIABILITIES AND NET WORTH	<u><u>\$3,424,997.83</u></u>

PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY

COMPARATIVE STATEMENT OF FUNDS AVAILABLE

FOR THE TWELVE MONTH PERIOD
ENDING JUNE 30

	<u>1985</u>	<u>1986</u>
TOTAL AVAILABLE FUNDS - July 1	\$1,893,270	\$3,470,686
<u>RECEIPTS</u>		
Transfer from General Fund	\$1,500,000	\$1,300,000
Interest on Securities	244,084	260,370
Commitment Fees		25,000
Application Fees	2,450	2,200
Total Receipts	<u>\$1,746,534</u>	<u>\$1,587,570</u>
AVAILABLE FOR DISBURSEMENT	\$3,639,804	\$5,058,256
<u>DISBURSEMENTS</u>		
Grants/Venture Capital	\$ 46,991	\$1,452,059
Operating Expenses	122,128	219,448
Total Disbursements	<u>\$ 169,119</u>	<u>\$1,671,507</u>
GROSS FUNDS AVAILABLE	\$3,470,685	\$3,386,749 (a)
<u>COMMITMENTS</u>		
Grants/Venture Capital	\$1,989,295	\$2,278,854
Operating		118,300
Total Commitments	<u>\$1,989,295</u>	<u>\$2,397,154 (b)</u>
NET FUNDS AVAILABLE	<u>\$1,481,390</u>	<u>\$ 989,595 (c)</u>

(a) Cash - \$17,691 and Investments - \$3,369,058

(b) Grants/Engineering Services committed for future disbursements

(c) Unexpended/uncommitted funds at close of fiscal year

PENNSYLVANIA ENERGY DEVELOPMENT AUTHORITY

RECONCILIATION OF COMMITMENTS

JUNE 30, 1986

	<u>Commitments</u>	<u>Disbursements</u>	<u>Balance</u>
PA Coal Mining Association	\$ 411,000.00	\$257,668.22	\$ 153,331.78
Anthracite Industry Association	453,780.00	297,749.18	156,030.82
Lehigh University	25,000.00	9,973.11	15,026.89
Lehigh University	80,530.00	17,386.57	63,143.43
Coal Tech Corporation	150,000.00	38,090.64	111,909.36
Johnstown Corporation	28,715.00		28,715.00
St. Francis College	7,500.00		7,500.00
CDA Int'l. Inc.	35,000.00	13,269.53	21,730.47
Bellefield Boiler Plant	21,000.00	17,003.52	3,996.48
BCR National Lab	120,241.00	96,911.57	23,329.43
BCR National Lab	50,000.00	16,737.79	33,262.21
Antrim Mining, Inc.	10,000.00	4,266.40	5,733.60
Norton Hambleton, Inc.	200,000.00	74,960.00	125,040.00
Penn State University	35,000.00		35,000.00
R. A. Systems	27,000.00		27,000.00
SEDA - COG	29,000.00		29,000.00
PA Coal Mining Assoc.	58,783.00		58,783.00
Continental Cogeneration Corp.	35,000.00	9,875.00	25,125.00
Hess and Fisher Engineers, Inc.	31,475.00		31,475.00
University of Pittsburgh	34,961.00		34,961.00
SEDA - COG	10,000.00		10,000.00
*Anthracite Industry Association	259,380.00		259,380.00
Kipin Industries, Inc.	200,000.00		200,000.00
Meadville Area Industrial Commission	10,000.00		10,000.00
Pennsylvania Coke Technology	350,000.00		350,000.00
Coal Tech Corporation	200,000.00		200,000.00
*Penn State University	25,000.00		25,000.00
*Exportech Company, Inc.	15,934.00		15,934.00
*Lehigh University	50,000.00		50,000.00
*Penn State University	43,447.00		43,447.00
*Wilkes College	125,000.00		125,000.00
 Total	 <u>\$3,132,746.00</u>	 <u>\$853,891.53</u>	 <u>\$2,278,854.47</u>

* Grant Commitments - Unencumbered