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FOURTH QUARTERLY REPORT FOR THE PERIOD —
MAY 1 THROUGH JULY 31, 1988

INTEGRATED MHD BOTTOMING CYCLE

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Prepared for
The U. S. Department of Energy
Pittsburgh Energy Technology Center
Under Contract DE-AC22-87PC90281

Submitted by
The Babcock & Wilcox Company
Research and Development Division
Alliance Research Center

MASTER

August 1988

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The U. S. Department of Energy
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Work Performed Under Contract DE-AC22-87PC90281

The Babcock & Wilcox Company
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Alliance, Ohio 44601-2196

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1.0 EXECUTIVE SUMMARY

The Integrated MHD Bottoming Cycle project, DOE Contract No. DE-AC22-87PC90281, progress for May through July relates to Task 1 - Modification of the Existing Coal Pulverizer and Dryer System, and Task 2 - Design, Fabrication, and Installation of an Automated Spent Seed/Ash Handling System and Task 4 - Participation on the MHD Technology Transfer Integration and Review Committee. No activities were scheduled for Task 3 prior to or during this period.

The Preliminary Design Report for the Automated Spent Seed/Ash Handling System was submitted to DOE/PETC for review. The design combination of rotary seal valves, screw feeders, weigh tanks and pneumatic transport was considered acceptable. Modifications of equipment sizes and locations are required to accommodate additional hoppers to be added to the Superheater Test Module and maintain access to this equipment and existing equipment. We have issued requests for quotations for the screw conveyors and the pneumatic conveying systems required.

B&W received estimates from three vendors for pre-drying equipment for the modification of the existing coal pulverizer and dryer system. We had each vendor conduct coal characterization tests. The results will be used by the vendors to finalize their quotes and by us also in the vendor selection.

B&W located vendors who plan to submit quotations for dehumidification equipment needed to recycle inert gas with 3% oxygen to the pulverizer to complete the drying. These vendors have since failed to submit quotes. We have decided to use the once-through system originally planned.

The changes in requirements have resulted in substantial increases in the time and costs to complete.

2.0 INTRODUCTION

As per the Contract No. DE-AC22-87PC79670 dated September 11, 1987, the following quarterly report has been prepared. This quarterly progress report covers the period of May 1988 through July 1988.

The Project Description, Section 3.0, is an expansion of contract statement of work language to be used as a guide for WBS purposes, and is not intended to modify or replace contract language.

3.0 PROJECT DESCRIPTION

3.1 BACKGROUND

The Integrated MHD Bottoming Cycle project is part of the DOE MHD proof-of-concept program. Since 1985 the key aspects of the program have been:

- The design, construction, and operation of (1) an integrated topping cycle (i.e., an MHD power train), (2) an integrated bottoming cycle (i.e., a heat recovery/seed recovery subsystem), and (3) a seed regeneration system.
- Baseline subsystem development efforts to acquire the knowledge necessary to proceed with the integrated test facilities and the seed regeneration system.

These POC tests are critical to the advance of the technology to the retrofit stage.

Since 1985 the effort at the DOE Coal-Fired Flow Facility operated by the University of Tennessee at Tullahoma, Tennessee, has been directed toward preparing for and conducting long duration testing of the Integrated MHD Bottoming Cycle. To date, all the components of the bottoming cycle have been combined into an integrated bottoming cycle and 453 hours of testing have been completed with a high sulfur eastern coal, Illinois #6. Fourteen hours of testing have also been conducted with a low sulfur western coal, Montana Rosebud.

The major objectives of the current Integrated MHD Bottoming Cycle project, DOE Contract No. DE-AC22-87PC90281, are:

- Upgrading the DOE CFFF to permit continuous testing with Montana Rosebud coal. This requires modifications to the coal pulverizer and dryer subsystem.

- Addition of an automatic spent seed/ash removal system for seed recovery. The system will contribute to more efficient and prototypical, continuous, long duration testing.
- Providing a procurement-enabling package for an Intermediate Temperature Air Heater which will replace the existing vitiation heater, if necessary. This will contribute to more reliable and more prototypical long duration operation.
- Participation on the MHD Technology Transfer, Integration, and Review Committee.

3.2 TASK DESCRIPTION

An overall project work breakdown structure (WBS) is presented in Figure 1 as an overview of the DOE Integrated MHD Bottoming Cycle project.

The remainder of Section 3, Project Description, is a statement of work which provides a complete description of the tasks and subtasks of the project. The schedule for performing the tasks is shown in Figure 2.

The progress during this quarter is detailed in Section 4, Project Status. Planned activities for the next quarter are presented in Section 5, Planned Activities.

3.2.1 Task 1 - Modification of the Existing Pulverizer and Drying System (WBS 1.1)

3.2.1.1 Subtask 1.1 - Preliminary Design (WBS 1.1.1)

B&W will perform the preliminary design of the system for modifying the existing pulverizer and drying system. B&W will arrange to have preliminary designs of components prepared as necessary. The preliminary design will include site preparations, foundations, support structure, access platforms, stairs, ladders, lighting, etc. as required.

B&W will schedule; provide drawings, calculations, and documentation as appropriate; and participate in a Preliminary Design Review per the DOE Design Review Manual. The design review will evaluate the capability of the components and system to meet the following requirements:

1. Safely pulverize and dry 3.5 tons per hour (nominal) of a mixture of seed and either Illinois No. 6 or Montana Rosebud coal to a moisture content of 3 to 4%.
2. Be capable of local or remote control from the CFFF control room including start-up, operation, and shutdown. Preclude operation from the control room while people are working on the system.
3. Be compatible with the CFFF system functionally and physically.
4. Be capable of operation in adverse weather conditions, including rain and below-freezing temperatures.
5. Meet all applicable building, construction, safety, and health codes.
6. Be designed and constructed to facilitate inspection and maintenance.

In compliance with the commitments and agreements reached during the Preliminary Design Review, B&W will modify the system design as required, prepare specifications for equipment, solicit bids, and, with DOE approval, release the selected vendor(s) to perform Preliminary Design (Title I) of the equipment. (Detailed Design, fabrication and delivery will be performed during Subtask 1.2, below.)

3.2.1.2 Subtask 1.2 - Final Design, Material and Component Procurement, Fabrication, and Delivery to the CFFF (WBS 1.1.2)

B&W will perform the final design of the modifications to the existing pulverizer and drying system. During this design phase, B&W will order certain long lead materials or components with DOE approval. At the 90% completion of the system design, B&W will submit the documentation, drawings, etc. required for a Critical Design Review (CDR) per the DOE Design Review Manual. B&W will

arrange the time for the design review, participate in the design review, and document the commitments and agreements reached during the design review.

B&W will arrange to have the components fabricated and delivered to UTSI. UTSI will provide receiving inspection and storage. The components will have been assembled into subassemblies, subsystems, and systems to the maximum extent practical.

The components supplied by B&W will include:

1. A pre-dryer.
2. An oil-fired inert gas generator consisting of an oil burner, lighter, combustion air blower, burner management system, and a means for cooling the inert combustion gas before these gases enter the pulverizer.
3. Instrumentation and wiring for local control, and wiring to a terminal for others to hookup a remote control system.
4. Needed valves, piping, fittings, insulation, heat tracing, wiring, etc. for internal system connections.
5. The pulverizer and drying system side of connections such as the remote control system, the No. 2 oil system, instrumentation air, and electrical power. B&W will replace the SD HCN46581-201 interior of an existing CPPI panel board with an SD HCM2373-4M interior.
6. Foundations, support structures and associated platforms, ladders, stairs, lighting, etc.

B&W will prepare a draft Operational Readiness Document (ORD) with checklists for mechanical checkout.

3.2.1.3 Subtask 1.3 - Installation at the CFFF and
Mechanical Checkout (WBS 1.1.3)

B&W will hire local contractors for site preparation, installation of foundation, erection of support structures, and stairs, ladders, etc.

B&W will use UTSI trades people as available for installing the equipment on the platforms, foundations, etc. and for installing connecting piping, wiring, etc.

B&W will participate in the mechanical checkout of the equipment. Any equipment which must be operated will be operated by UTSI personnel at no charge to B&W.

B&W will arrange to have any modifications, additions, etc. made to correct discrepancies or deficiencies found during mechanical checkout. B&W will update the ORD, if necessary.

B&W will prepare a draft Operation and Maintenance Manual. This will include Operation and Maintenance Manuals from vendors where applicable.

B&W will comment on a system shakedown test plan prepared by UTSI. B&W will work with DOE and UTSI to resolve any comments.

3.2.1.4 Subtask 1.4 - System Shakedown (WBS 1.1.4)

B&W personnel will be available during the system shakedown to make any recommendations and decisions on unforeseen events.

B&W will correct any deficiencies in the B&W scope of supply discovered during the shakedown testing.

B&W will finalize the ORD and update the Operation and Maintenance Manual as required.

B&W will prepare a draft Acceptance Document. B&W will obtain the advice of vendors as deemed appropriate. The document will contain design and expected performance data, and data to be taken during test to evaluate equipment acceptability. To the extent practical, these specifications and predictions will be organized by component and subsystem to permit acceptance of individual components or subsystems.

3.2.1.5 Subtask 1.5 - Final System Acceptance Test (WBS 1.1.5)

B&W and selected vendor representatives will witness the Acceptance Test conducted by others. The vendor representatives may not be required in all cases. Need for vendor representatives will be identified on a case-by-case basis. B&W will correct any deficiencies discovered during the acceptance test.

B&W will finalize the Operation and Maintenance Manual.

3.2.1.6 Subtask 1.6 - Management (WBS 1.1.6)

B&W will use its existing management system to monitor and control the schedule and costs. The B&W system provides for monitoring and controlling schedule and costs by task and subtasks.

As part of this task, B&W will work closely with DOE and UTSI to minimize interference with the testing at the CFFF.

3.2.2 Task 2 - Design, Fabrication, and Installation of an Automated Spent Seed/Ash Handling System (WBS 1.2)

3.2.2.1 Subtask 2.1 - Preliminary Design (WBS 1.2.1)

B&W will perform the preliminary design of an automated spent seed/ash handling system (SS/A HS). B&W will arrange to have preliminary designs of components prepared as necessary. The system will include site preparation, foundations, support structures, access platforms, ladders, etc. as required.

B&W will schedule, provide documentation, and participate in a Preliminary Design Review per the DOE Design Review Manual. The design review will evaluate the capability of the components and system to meet the following requirements:

1. Safely and automatically collect the spent seed/ash from 16 hoppers and, if practical, a 17th hopper, of the Superheater Test Module of the CFFF, weigh the spent seed/ash, and convey it to an existing storage hopper. Provisions are required to discharge the spent seed/ash to alternate storage.
2. Safely and automatically collect the spent seed/ash from the two baghouse hoppers, weigh the spent seed/ash, and convey it to the existing storage hopper or alternate storage.
3. Safely and automatically collect the spent seed/ash from the four electrostatic precipitator hoppers, weigh the spent seed/ash, and convey it to the existing storage hopper or alternate storage.
4. Be capable of local or remote control from the CFFF control room including start-up, operation, and shutdown. Preclude operation from the control room while people are working on the system.
5. Be compatible with the CFFF system functionally and physically.
6. Be capable of operation in adverse weather conditions, including rain and below-freezing temperatures.
7. Meet all applicable building, construction, safety, and health codes.
8. Be designed and constructed to facilitate inspection and maintenance.

B&W will document the commitments and agreements reached during the design review.

3.2.2.2 Subtask 2.2 - Final Design, Material and Component Procurement, Fabrication, and Delivery to the CFFF (WBS 1.2.2)

B&W will perform the final design of the automated spent seed/ash handling system. During this design phase, B&W will order certain long lead materials or components with DOE approval. At the 90% completion of the system design, B&W will submit the documentation, drawings, etc. required for a Critical Design Review (CDR) per the DOE Design Review Manual. B&W will arrange the time for the design review, participate in the design review, and document the commitments and agreements reached during the design review.

B&W will arrange to have the components fabricated and delivered to UTSI. UTSI will provide receiving inspection and storage. The components will have been assembled into subassemblies, subsystems, and systems to the maximum extent practical.

The components supplied by B&W will include:

1. Valves at each SHTM hopper to prevent excessive entrance of air or discharge of combustion gases as the hoppers are emptied.
2. Spent seed/ash grinder/crushers to process the hopper discharge to facilitate transport.
3. A system of conveyors to transport the spent seed/ash to a bin for weighing.
4. A conveying system to transport the spent seed/ash from the weighing bin to the storage hopper. The system will be equipped to divert the spent seed/ash to alternate storage.

5. Instrumentation and wiring for local control, and wiring to a terminal for others to a hookup to the remote control system. The instrumentation will provide a signal which will allow the above weights to be displayed in the control room.
6. Needed valves, piping, fittings, insulation, heat tracing, wiring, etc. for internal system connections.
7. The spent seed/ash handling system side of connections such as the remote control system, instrumentation, air, and electrical power.
8. Foundations, support structures and associated platforms, ladders, stairs, lighting, etc.

B&W will prepare a draft Operational Readiness Document (ORD) with checklists for mechanical checkout.

3.2.2.3 Subtask 2.3 - Installation at the CFFF and
Mechanical Checkout (WBS 1.2.3)

B&W will hire local contractors for site preparation, installation of foundation, erection of support structures, and stairs, ladders, etc.

B&W will use UTSI trades people as available for installing the equipment on the platforms, foundations, etc. and for installing connecting piping, wiring, etc.

B&W will participate in the mechanical checkout of the equipment. Any equipment which must be operated will be operated by UTSI personnel at no charge to B&W.

B&W will arrange to have any modifications, additions, etc. made to correct discrepancies or deficiencies found during mechanical checkout. B&W will update the ORD, if necessary.

B&W will prepare a draft Operation and Maintenance Manual. This will include Operation and Maintenance Manuals from vendors where applicable.

B&W will comment on a system shakedown test plan prepared by UTSI. B&W will work with DOE and UTSI to resolve any comments.

3.2.2.4 Subtask 2.4 - System Shakedown (WBS 1.2.4)

B&W personnel will be available during the system shakedown to make any recommendations and decisions on unforeseen events.

B&W will correct any deficiencies in the B&W scope of supply discovered during the shakedown testing.

B&W will finalize the ORD and update the Operation and Maintenance Manual as required.

B&W will prepare a draft Acceptance Document. B&W will obtain the advice of vendors as deemed appropriate. The document will contain design and expected performance data, and data to be taken during test to evaluate equipment acceptability. To the extent practical, these specifications and predictions will be organized by component and subsystem to permit acceptance of individual components or subsystems.

3.2.2.5 Subtask 2.5 - Final System Acceptance Test (WBS 1.2.5)

B&W and selected vendor representatives will witness the Acceptance Test conducted by others. B&W will correct any deficiencies discovered during the acceptance test.

B&W will finalize the Operation and Maintenance Manual.

3.2.2.6 Subtask 2.6 - Management (WBS 1.2.6)

B&W will use its existing management system to monitor and control the schedule and costs. The B&W system provides for monitoring and controlling schedule and costs by task, subtasks, B&W labor category, and purchases.

As part of this task, B&W will work closely with DOE and UTSI to minimize interference with the testing at the CFFF.

3.2.3 Task 3 - Preparation of a Procurement/Installation Enabling Package for an Intermediate Temperature Air Heater (ITAH) System (WBS 1.3)

3.2.3.1 Subtask 3.1 - Design (WBS 1.3.1)

B&W will solicit additional information from the bidders to the B&W request for proposals for the ITAH. B&W will evaluate this information and the information previously obtained and recommend a vendor. A package including the bid request, the responses, the recommended vendor, and the reasons for the selection will be forwarded to DOE PETC.

With DOE/PETC concurrence, B&W will issue a purchase order for preliminary design of the ITAH. B&W will obtain information from the vendor sufficient to proceed with the preliminary design of the remaining portions of the system. B&W will provide a document package and arrange for a Preliminary Design Review per the DOE Design Review Manual. B&W will document the commitments and agreements reached during the design review.

B&W will revise the ITAH system design to reflect the commitments and agreements reached during the PDR. B&W will provide a revised document package and arrange for Critical Design Review meeting per the DOE Design Review Manual. The package will include specifications, sketches, drawings, calculations, catalogs, brochures, and other appropriate data for all the equipment including instruments, controls, support structures, and foundations. All interfaces will be defined.

B&W will prepare a draft Operational Readiness Document and a draft Operation and Maintenance Manual.

B&W will document the commitments and agreements reached during the design review and revise the draft documents as appropriate.

B&W will participate in a Design Readiness Review (DRR). B&W will document commitments and agreements reached during the DRR.

B&W will incorporate the changes as necessary to the system documentation package and include this in the Procurement/Installation Enabling Package. B&W will deliver this package with the Draft Final Report.

3.2.3.2 Subtask 3.2 - Cost Estimate for Procurement, Installation,
and Checkout Testing (WBS 1.3.2)

B&W will re-estimate the costs for procurement, installation, and mechanical checkout of the system. The estimate will consider the changes made to the design as a result of the reviews.

3.2.3.3 Subtask 3.3 - Management (WBS 1.3.3)

B&W will use its existing management system to monitor and control the schedule and costs. The B&W system provides for monitoring and controlling schedule and costs by task, subtasks, purchases, and B&W labor category.

As part of this task, B&W will work closely with DOE and UTSI to minimize interference with the testing at the CFFF.

3.2.3.4 Task 4 - Participation on the MHD Technology Transfer,
Integration, and Review Committee (WBS 1.4)

B&W will support the efforts of and participate on the MHD Technology Transfer, Integration, and Review Committee. This will include:

- Distribution of B&W technical, topical, and progress reports to other members of the Committee as directed by DOE.
- Documentation of results of informal discussions with other members of the Committee to define interface properties.
- Attendance at periodic meetings of the Committee.

4.0 PROJECT STATUS

The period covered by this initial project quarterly report is May 1988 through July 1988. Progress will be discussed on a task and subtask basis.

4.1 TASK 1 - MODIFICATION OF THE EXISTING COAL PULVERIZER AND DRYER SYSTEM (WBS 1.1)

4.1.1 Subtask 1.1 - Preliminary Design (WBS 1.1.1)

The existing coal pulverizer and dryer system was designed to pulverize Illinois No. 6 coal which, as-received, contains about 10% moisture and is relatively non-flammable when dried. The system is to be modified to dry Montana Rosebud coal from a nominal 25% moisture to a nominal 3% moisture.

In Quarterly Progress Report No. 2, we concluded that a pre-dryer upstream of the pulverizer would be needed. The pre-dryer and pulverizer combination are necessary to reduce the moisture in the pulverized Montana Rosebud coal to 3%.

Late in the previous report period we received quotations from three vendors for pre-dryers to dry Montana Rosebud coal from 30% moisture to 7% moisture. We reviewed the quotations and supporting information and discussed the information with the vendors. The vendors' experience is limited in drying low rank coals to low moisture contents, i.e. with substantial removal of other than free surface moisture. We also obtained data from personnel at the CDIF which shows that the CDIF drying system does not meet its design performance. During this period each vendor performed drying characterization tests with Montana Rosebud coal supplied by DOE from the CDIF. One of the vendors has analyzed his test results and supplied a report. The data shows that his equipment, a tray dryer can dry the coal with minimal fines production. The other vendors are analyzing their test data.

Four different pre-dryer designs have been proposed by the three vendors. These designs are a direct contact gas-solid dryer, a steam tube dryer, a multiple tray dryer and a fluid bed dryer.

The direct contact gas-solid dryer is a parallel current kiln dryer. The drying gas and solid are in contact. The hottest gas and the cold solid enter the kiln at the same end and the cooled gas and warmed solid leave at the other end. This arrangement keeps the solid at lower temperatures. The residence time is determined by the length of the kiln.

The steam tube dryer is similar to the dryer at the CDIF. Steam at 100 to 150 psig in an array of tubes is used as the heat source instead of the high temperature organic fluid used in the CDIF. The lower temperature steam will reduce the possibility of fires and hot spots within the coal. The equipment will be much larger than the CDIF pre-dryer to obtain longer residence times needed with the reduced differential temperature between the heating fluid and the water evaporating from the coal.

The tray dryer consists of a large number of trays arranged vertically one above the other. The coal is fed into the top tray at the desired rate. The tray rotates under a spreader bar to distribute the coal into a thin layer. Drying gas is allowed to pass over the spread out coal. As the tray approaches 360 degrees of rotation, a scraper causes the coal to enter a hole and fall to the tray below where it is again spread out, exposed to drying and transmitted to the tray below. The residence time is controlled by the diameter and number of trays.

The fluid bed dryer is a bubbling bed dryer with overbed coal feed and underbed gas feed. Residence time is controlled by the bed dimensions. For a fixed bed diameter the residence time is proportioned to the bed height.

Even with the pre-dryer, inert gas will be required in the pulverizer. To reduce burner size and oil consumption, we had decided to evaluate a system with recycle of the inert gas through a dehumidifier. During phone discussions with several vendors, three were found who expressed an interest in the dehumidifier, one subsequently formally declined to bid. The other two, after four months, were asked to submit a verbal or written bid late in this period. A no response would be considered a no bid. We have had no responses.

We now plan to proceed with our original concept of using a once through inert gas system.

4.1.2 Subtask 1.2 - Final Design, Material and Component
Procurement, Fabrication, and Delivery (WBS 1.1.2)

Activity on this task has been delayed until the needed equipment has been defined.

4.1.3 Subtask 1.3 - Installation at the CFFF and
Mechanical Checkout (WBS 1.1.3)

No activity scheduled on this task to date.

4.1.4 Subtask 1.4 - System Shakedown (WBS 1.1.4)

No activity scheduled on this task to date.

4.1.5 Subtask 1.5 - Final System Acceptance Test (WBS 1.1.5)

No activity scheduled on this task to date.

4.1.6 Subtask 1.6 - Management (WBS 1.1.6)

The project team has been assembled, and lines of communication have been developed. The project organization is shown in Figure 3. The project team will be responsible for the management of this and the other tasks in the project.

The Integrated MHD Bottoming Cycle project team is headed by Mr. P. B. Probert of B&W's Research and Development Division. As Project Manager, Mr. Probert directs the work of the B&W team and coordinates the project activities with DOE and within the B&W Company. He is the Project Manager on the MHD Heat Recovery Seed Recovery project, thus maintaining excellent continuity of B&W's participation in the DOE MHD program. Mr. Probert is assisted by Mr. S. C. Datsko on all day-to-day technical activities.

Mr. C. H. Smith from B&W's Contract Research Division is the Contract Manager and is responsible for the financial and contractual aspects of the project.

Within B&W, Mr. J. D. Martin, Hudson Engineering, is responsible for the design and construction of foundations, structural supports, and for installation of the equipment at the CFFF. In addition, Messrs. G. D. Lindstrom, R. R. Piepho, and R. Bruckner will coordinate engineering or procurement activities in their areas of expertise.

Mr. C. W. Wurst of UTSI will supervise UTSI trades personnel during installation of the equipment at the CFFF. He will receive direction from the B&W on-site supervisor. In addition, Mr. Wurst will be responsible for providing information on current and planned site configurations to assist in the location of the equipment to be furnished during the Integrated MHD Bottoming Cycle project.

The Management Plan, including the Work Plan, the Milestone Schedule Plan, and the Cost Plan was submitted for review during the previous report period.

4.2 TASK 2 - DESIGN, FABRICATION, AND INSTALLATION OF AN AUTOMATED SPENT SEED/ASH HANDLING SYSTEM (WBS 1.2)

4.2.1 Subtask 2.1 - Preliminary Design (WBS 1.2.1)

The Preliminary Design Review package was revised during the previous period and the Preliminary Design Review meeting was conducted.

During the meeting UTSI explained the need for additional cooling sections in the Superheater Test Module/Air Heater system. The review team agreed on the need and B&W/Hudson Engineering were requested to revise the design to accommodate removal of ash from these cooling sections. The design review team agreed that moving the existing ash/spent seed storage tank to a

location near the electrostatic precipitator would facilitate access to this system and existing components. B&W/Hudson Engineering with assistance from UTSI will determine the details of rerouting the conveying systems.

4.2.2 Subtask 2.2 - Final Design, Material and Component Procurement, Fabrication, and Delivery to the CFFF (WBS 1.2.2)

The changes resulting from the Preliminary Design Review are being incorporated into the final plot plan and P&ID drawings.

We have issued purchase orders and made arrangements with UTSI to ship samples of spent seed/ash to vendors. These vendors will characterize the transport properties of the spent seed/ash for flow from tanks, behavior in screw conveyors and in pneumatic transport equipment. This information will be used in the final sizing and configuring of the equipment and the selection of the supplier.

We have issued requests for quotations to the vendors of screw conveyors and to the vendors pneumatic conveyor systems.

4.2.3 Subtask 2.3 - Installation at the CFFF and Mechanical Checkout (WBS 1.2.3)

No activity on this subtask to date.

4.2.4 Subtask 2.4 - System Shakedown (WBS 1.2.4)

No activity on this subtask to date.

4.2.5 Subtask 2.5 - Final System Acceptance Test (WBS 1.2.5)

No activity on this subtask to date.

4.2.6 Subtask 2.6 - Management (WBS 1.2.6)

See 3.2.6 for general management activities. The Management Plan included the work plan, etc. for this task as well as Task 1.

4.3 TASK 3 - PREPARATION OF A PROCUREMENT/INSTALLATION-ENABLING PACKAGE
FOR AN INTERMEDIATE TEMPERATURE AIR HEATER SYSTEM (WBS 1.3)

No activity on this task to date.

4.4 TASK 4 - PARTICIPATION ON THE MHD TECHNOLOGY TRANSFER,
INTEGRATION, AND REVIEW COMMITTEE (WBS 1.4)

Paul Probert participated in the first meeting of the Committee in June, 1988.

5.0 ACTIVITIES PLANNED FOR NEXT QUARTER

Planned activities for May, June, and July 1988 will focus on completion of the preliminary design of the revised coal pulverizer and dryer system and completion of the final design of the spent seed/ash handling system.

Significant plans in each task are:

Task 1 - Modification of the Existing Pulverizer and Dryer System (WBS 1.1)

The key activity is to secure bids from vendors of pre-dryers and inert gas generators and select the drying system for final design. The vendor information is needed to provide design information for the preliminary design review and initiation of final design and fabrication.

Task 2 - Design, Fabrication, and Installation of an Automated Spent Seed/Ash Handling System (WBS 1.2)

The key activities planned for the next quarter are relocating the storage hopper and the routing of conveyors, from existing hoppers and the hoppers to be added, to the storage tank. Final plot plan, elevation and P&ID drawings will be prepared. Quotations will be obtained from vendors for equipment. Evaluation of the quotations will be initiated.

Task 3 - Preparation of a Procurement/Installation-Enabling Package of an Intermediate Temperature Air Heater (WBS 1.3)

No activity is planned for this task at this time.

Task 4 - Participation on the MHD Technology, Transfer, Integration, and Review Committee (WBS 1.4)

B&W plans to participate in the meeting scheduled for June 1988.

6.0 SUMMARY

Integrated MHD Bottoming Cycle project progress for May 1988 through July 1988 was in obtaining and reviewing vendor quotes for the pre-dryer and revised inert gas generator equipment for the pulverizer/dryer system modification, and in preparing the package for the Preliminary Design Review of the Automated Ash/Seed Handling System and conducting the Preliminary Design review.

Vendor quotes for the pre-dryer were received. We concluded that the vendors should conduct drying tests before finalizing their designs and prices. Coal was shipped to the vendors, and drying tests were run. Test results will be reviewed, final quotations secured, and a purchase order issued for the coal dryer system.

We will incorporate the comments received and agreements reached at the Preliminary Design Review into the final drawings of the Ash/Seed Handling System and solicit vendor quotations on the equipment.

Integrated 1.0
Bottoming Cycle
Project

TASK 1 1.1
Modification of the
Existing Pulverizer
and Dryer System

1.1.1
Subtask 1.1
Preliminary Design

1.1.2
Subtask 1.2
Final Design,
Material and Compo-
nent Procurement,
Fabrication, and
Delivery to the CFFF

1.1.3
Subtask 1.3
Installation at CFFF
and Mechanical
Checkout

1.1.4
Subtask 1.4
System Shakedown

1.1.5
Subtask 1.5
Final System
Acceptance Test

1.1.6
Subtask 1.6
Management

TASK 2 1.2
Design, Fabrication,
and Installation of
an Automated Spent
Seed/Ash Handling
System

1.2.1
Subtask 2.1
Preliminary Design

1.2.2
Subtask 2.2
Final Design,
Material and Compo-
nent Procurement,
Fabrication, and
Delivery to the CFFF

1.2.3
Subtask 2.3
Installation at CFFF
and Mechanical
Checkout

1.2.4
Subtask 2.4
System Shakedown

1.2.5
Subtask 2.5
Final System
Acceptance Test

1.2.6
Subtask 2.6
Management

TASK 3 1.3
Prepare a Procurement/
Installation Enabling
Package of an Inter-
mediate Temperature
Air Heater

1.3.1
Subtask 3.1
Design

1.3.2
Subtask 3.2
Cost Estimate for
Procurement, Installa-
tion, and Checkout
Testing

1.3.3
Subtask 3.3
Management

TASK 4 1.4
Participation on the
MHD Technology
Transfer, Integration
and Review Committee

SU-358

DESCRIPTION	1987				1988									1989									
	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
MODIFICATION OF EXISTING COAL PULVERIZER AND DRYER SYSTEM	[Solid black bar]																						
PRELIMINARY DESIGN	[Solid black bar]																						
FINAL DESIGN, MATERIAL AND COMPONENT PROCUREMENT, FABRICATION AND DELIVERY TO THE CFFF					[Solid black bar]																		
INSTALLATION AT CFFF AND MECHANICAL CHECKOUT										[Solid black bar]													
SYSTEM SHAKEDOWN													[Solid black bar]										
FINAL SYSTEM ACCEPTANCE TEST																[Solid black bar]							
MANAGEMENT	[Solid black bar]																						
DESIGN, FABRICATION AND INSTALLATION OF AUTOMATED SEED/ASH HANDLING SYSTEM	[Solid black bar]																						
PRELIMINARY DESIGN	[Solid black bar]																						
FINAL DESIGN, MATERIAL AND COMPONENT PROCUREMENT, FABRICATION AND DELIVERY TO THE CFFF					[Solid black bar]																		
INSTALLATION AT CFFF AND MECHANICAL CHECKOUT										[Solid black bar]													
SYSTEM SHAKEDOWN													[Solid black bar]										
FINAL SYSTEM ACCEPTANCE TEST																[Solid black bar]							
MANAGEMENT	[Solid black bar]																						
DESIGN OF A PROCUREMENT/INSTALLATION ENABLING PACKAGE OF AN INTERMEDIATE TEMPERATURE AIR HEATER	[Solid black bar]																						
DESIGN										[Solid black bar]													
COST ESTIMATE FOR PROCUREMENT, INSTALLATION AND CHECKOUT TESTING													[Solid black bar]										
MANAGEMENT	[Solid black bar]																						
CONTRACTOR PARTICIPATION ON THE MHD TECHNOLOGY TRANSFER, INTEGRATION AND REVIEW COMMITTEE	[Solid black bar]																						

PROJECT SCHEDULE

FIGURE 2

Integrated MHD Bottoming Cycle

Project Organization

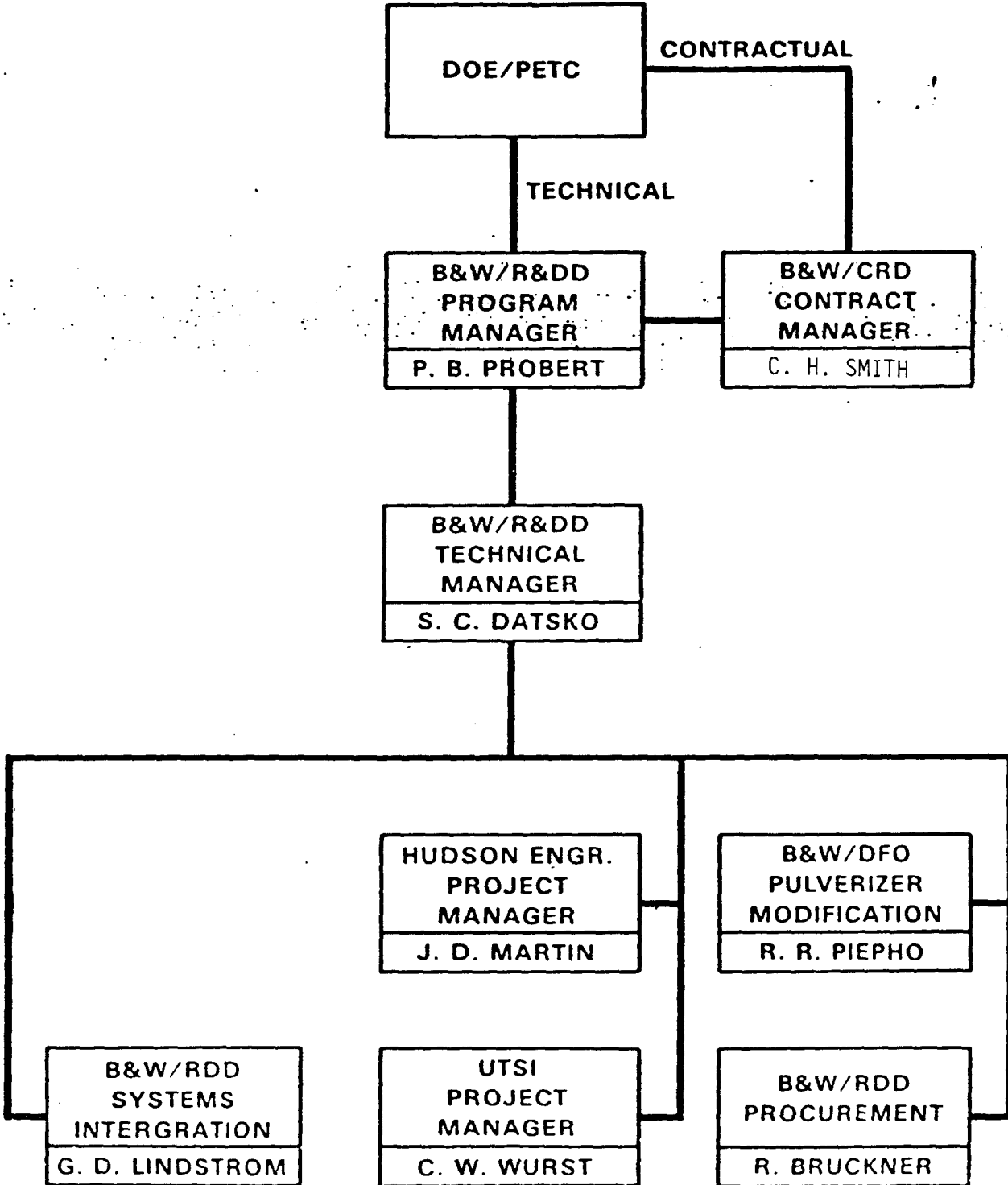


FIGURE 3