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Abstract

Activities in this project were initiated in April following a 7-month planning period; time needed to select suitable coal samples for testing, to identify the staffing needs of the project and to develop drafts of the Cost Management, and Work plans.

A draft work plan was submitted to the DOE TPO for review in April. Comments have been received and are being incorporated in the revised work plan. A major effort through the planning phase of this project was the selection of coals for testing. These coals have now been identified. Two of these coals, the Middle Wyodak coal from Wyoming and the Widow Kennedy coal from Virginia, have been selected as the primary coals for which much of the fundamental test work will be conducted. In turn, the Upper Freeport, Illinois #6 and Pittsburgh #8 coals are planned for testing in the final task of this effort -- Continuous Test Work.

The Middle Wyodak coal was received in June and efforts are now underway to crush, screen and riffle this coal into test-size samples. Preliminary sulfur and ash values from the sample splits indicate values within ASTM standards of acceptance. When the crushing and splitting is complete, these samples will be stored under nitrogen until needed in the test program. The second coal, the Widow Kennedy coal from Virginia, is on order and expected early next quarter.

Efforts through the next several months will continue to focus on samples acquisition, work-up and characterization.

Project Objectives

The objectives of this effort are (a) to learn the mechanisms by which the CECC process removes pyritic sulfur and ash from coal, (b) to learn more about the operating parameters of the process, (c) to collect engineering information for scale-up of the process, and (d) to test the CECC process on a bench-scale continuous operation.

Project Tasks

Task 1 -- Project Planning

In the three months since the initiation of this project, we have submitted final versions of the Cost and Management plans to the DOE TPO for approval and a draft of the Work Plan. Comments on the Work Plan have been received and are being incorporated. The final version of the Work Plan is due in July.

A key activity in this task has been the final selection of the coals for testing. Since one of the major objectives within this project is to develop an

understanding of the mechanisms governing the operation of the process, we felt that coal selection should be based on familiarity and experience. The DOE has requested our consideration of the Pittsburgh #8, Illinois #6 and/or Upper Freeport coals in the test program. After careful review of all test data, we have selected the Middle Wyodak and Widow Kennedy coals for use in the batch testing program and the Upper Freeport, Illinois #6 and Pittsburgh #8 coals for use in the continuous test program (Task 6).

The Middle Wyodak and Widow Kennedy coals have shown mineral matter reductions ranging from 40 to 60 percent. In view of these substantial ash reductions, and our familiarity with these samples, it was decided to base most of our developmental research work on these coals. We found very little test data for the three coals recommended by DOE. What we did find, however, indicated that the Upper Freeport coal responded fairly well to the CECC process with ash reductions of about 35%; whereas, the Illinois and Pittsburgh #8 responded with ash reductions that were generally less than 20% (the Pittsburgh #8 from Pennsylvania, however, showed ash reductions ranging from 20 to 50%). We would propose to test these three coals during Task 6 of the project, after we have had the opportunity to learn more about the operation of the process.

Task 2.1 -- Sample Acquisition, Preparation and Storage

A 55-gallon drum of Middle Wyodak coal was ordered from the Kerr McGee coal corporation in Gillette, Wyoming in May. The coal was received during the last week in June and sample work-up was initiated immediately -- using the approach outlined in the draft workplan. By the end of the quarter, the coal had been crushed to 12-mesh topsize in a hammermill and split into four parts; A1, A2, B1 and B2. Samples were collected from each of the parts for sulfur and ash analyses (the analytical basis we are using to determine representative sampling). Results of the sampling work are summarized in Table 1.

Table 1. Sulfur and Ash Analyses for Sample Splits of the Middle Wyodak Coal.

Sample No.	Sulfur (%)	Ash (%)	Deviation From Sample Avg. (0.472%)	Deviation From Sample Avg. (7.770%)
Sample A1	0.483	7.931	0.011	0.161
Sample A2	0.465	7.955	0.007	0.185
Sample B1	0.473	7.593	0.001	0.177
Sample B2	0.470	7.603	0.002	0.167

The results presented in Table 1 are preliminary and require a statistical analysis to determine accuracy and representativeness. For the most part, the data in Table 1 indicates very excellant agreement of sulfur and ash values within the "A" and "B" sample sets. Individual sulfur and ash deviations from the total sample average also appears very good.

Final crushing and screening of these sample parts should continue next quarter along with chemical and physical characterization of the samples. Only after confirmation of proper crushing and splitting (via sulfur and ash analyses) will these samples then be crushed to the required test-sample size and stored under nitrogen.

Summary, Conclusions and Planned Future Work

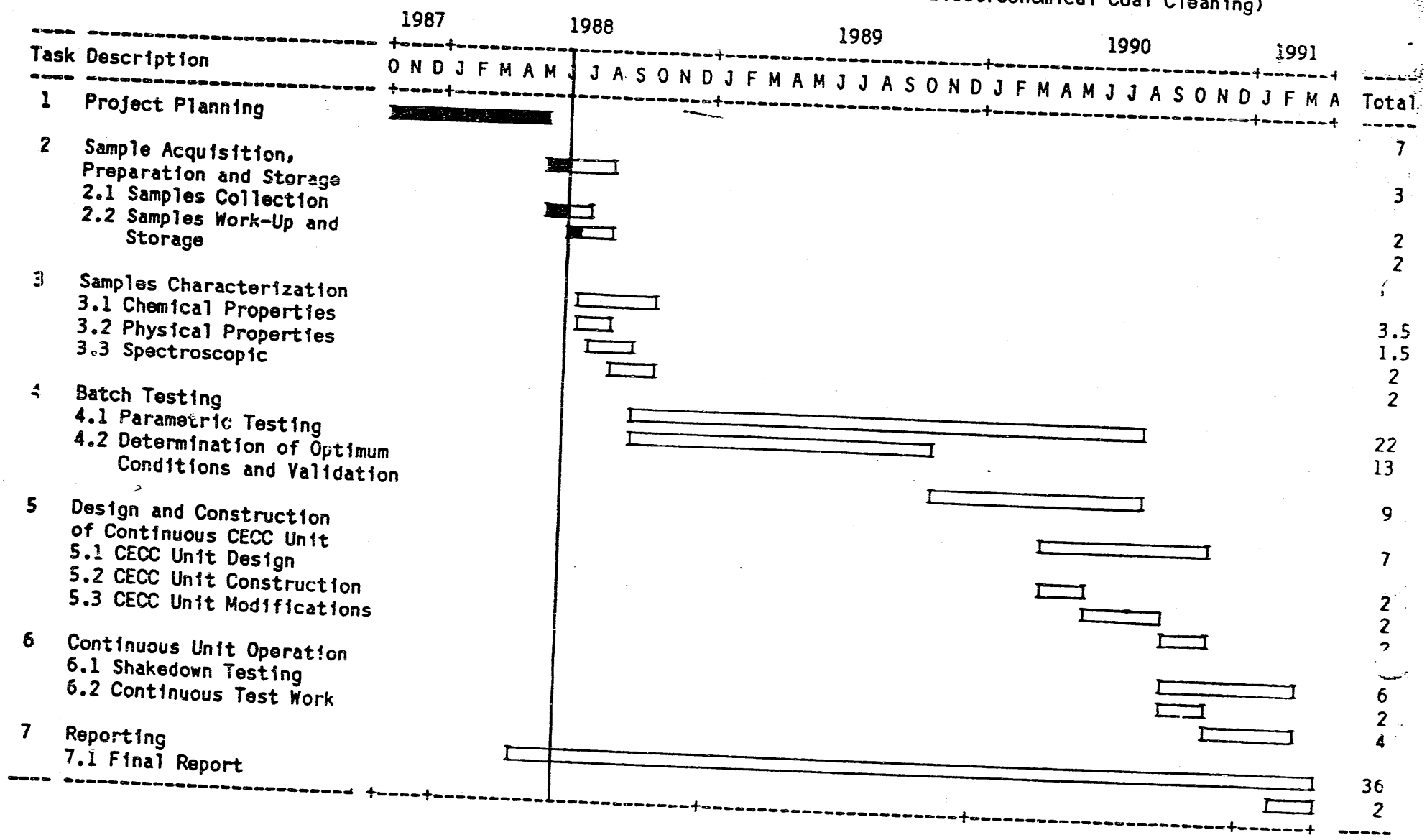
Activities in this project are now focused on samples acquisition, work-up and storage. These efforts should conclude early next quarter; followed by characterization of the samples.

The Middle Wyodak coal was received in June. Work-up of this sample is now well underway and should conclude early next quarter. Once work-up of this coal is complete, it will be stored under nitrogen until needed in the test program. Likewise, the Widow Kennedy coal is on order and expected early next quarter. This coal will be worked-up in the same manner as the Middle Wyodak. The three coals planned for use in Task 6 will be ordered at a later date.

Sample characterization (Task 3) is the next activity to follow sample work-up and storage. This effort, as outlined in the workplan, should commence early next quarter and possibly conclude in time for the next quarterly report. Representative samples of the coal will be collected during work-up for chemical and physical characterization.

This project is about on schedule in terms of work completed. The budget expenditures are running slightly behind, but this will change once the experimental work commences.

DETAILED SCHEDULE FOR PROJECT (OCTOBER 1, 1987 - MARCH 31, 1991) (Chemical and Electrochemical Coal Cleaning)



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