

SECTION IV. TASK 4. APPLICATION OF INTEGRATED CODES

Objective

The objectives of this task are to evaluate the integrated comprehensive codes for pulverized coal and fixed-bed reactors and to apply the codes to selected cases of interest to METC.

Task Outline

This task will be accomplished in two subtasks, one for the entrained-bed lasting 45 months and one for the fixed-bed lasting 36 months. Each of these subtasks will consist of three components: 1) Simulation of demonstration cases on BYU computers; 2) Implementation on a work station at AFR; and 3) Simulation of demonstration cases on the workstation.

IV.A. SUBTASK 4.A. - APPLICATION OF GENERALIZED, PULVERIZED-COAL
COMPREHENSIVE CODE

Senior Investigators - B. Scott Brewster and L. Douglas Smoot
Brigham Young University
Provo, UT 84602
(801) 378-6240 and 4326

Objectives

The objectives of this subtask are 1) to simulate reactors of interest to METC and 2) to implement the comprehensive entrained-bed code at METC.

Accomplishments

This subtask has not been initiated.

Plans

No work is planned on this subtask during the next quarter.

IV.B. SUBTASK 4.B. - APPLICATION OF FIXED-BED CODE

Senior Investigators - Predrag T. Radulovic and L. Douglas Smoot
Brigham Young University
Provo, Utah 84602
(801) 378-3097 and (801) 378-4326

Graduate Research Assistant-Michael L. Hobbs

Objectives

The objective of this subtask is to apply the advanced fixed-bed code developed in Subtask 3.b. to simulate fixed-bed gasifiers of interest to METC.

Accomplishments

Fixed-bed data collection

During the last quarter, work continued on collecting fixed-bed design and test data by direct contact with organizations and individuals involved in fixed- or moving-bed gasification or combustion research or in research on non-reacting fixed- or moving-beds. Ninety answers to the fixed-bed data questionnaire have been received, forty-one have been positive, and twenty-five sets of data have been obtained to date. However, some of the most important data sets have not been obtained yet. Work also continued on collecting fixed-bed experimental data from the open literature.

Fixed-bed code validation

Further testing and validating of the advanced fixed-bed code developed in Subtask 3.b. was performed. The test cases included the test run of the Wellman-Galusha gasifier with Jetson high-volatile-B bituminous coal and the test run of the BGC/Lurgi gasifier with Illinois #6 high-volatile bituminous coal. Details of testing and evaluating the code are presented under Subtask 3.b. A paper presenting some of these results was submitted to Combustion Science and Technology and is included in the Appendix.

A presentation was given at the joint METC/AFR/BYU contract review meeting as well as a poster and a presentation at the annual ACERC review

meeting. Both the development and the application of the advanced fixed-bed code were presented.

Plans

During the next quarter, work will continue on collecting fixed-bed design and test data. The fixed-bed design and test data will be collected both from the open literature and by direct contact with organizations and individuals involved in fixed- or moving-bed gasification or combustion research or in research on non-reacting fixed- or moving-beds. Efforts will continue to identify additional test cases for simulation and validation. Further testing and validation of the code will be performed.

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