FY97-XXVII-76
OPTIMIZING PERFORMANCE OF THE HESKETT STATION

CONTRACTOR: Energy & Environmental Research Center

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PARTICIPANTS

Sponsor	Cost Share
Energy & Environmental Research Center/USDOE	$ 73,000
Montana-Dakota Utilities Co.	55,000
ND Industrial Commission	55,000
Total Project Cost	$183,000

Project Schedule – 14 Months
Contract Date – 6/5/97
Start Date – 5/1/97
Completion Date – 6/30/98

Project Deliverables
Status Report - 3/9/98 ✓
Final Report – 6/30/98 ✓

OBJECTIVE / STATEMENT OF WORK

The objective of this project is to evaluate the use of limestone as the bed material in MDU's Heskett fluidized-bed combustor (FBC). Currently, the Heskett station is burning North Dakota lignite from the Beulah mine in the FBC using river sand as the bed material. The Heskett station is burning a low-sulfur coal from the Beulah mine to meet sulfur emissions criteria. However, the low-sulfur coal is high in sodium content, which creates bed agglomeration problems and limits operation. A low-sodium coal is available, which has a higher sulfur content. The limestone, which has a higher sulfur capture capacity, may allow the station to burn the low-sodium coal while meeting sulfur emission criteria. The purpose of this project is to determine if the Heskett station can switch to limestone, improve efficiency and reduce costs. The project involves two principal tasks: pilot-scale testing at the EERC, and full-scale testing at the Heskett station.

STATUS

A series of pilot-scale tests were done at the EERC evaluating feed material, sources of limestone, and operating parameters. Three limestone beds or sorbents were tested: Montana limestone, Camas dolomite, and Fisher limestone.

The following conclusions can be made regarding the results of the pilot-scale testing at the EERC:

- All three sorbents are acceptable candidates as bed materials. While sulfur capture performance varied, the difference was small and outweighed by significant differences in cost.
- The use of limestone or dolomite will lower SO_2 and NO_x emissions.
- The limestone and dolomite inhibit bed agglomeration.
- Reducing top size of the fresh bed material reduces the potential for agglomeration.
- Limestone and dolomite may increase fines production, resulting in an increased ESP loading.
- Limestone and dolomite ash resistivity is comparable to river sand resistivity; therefore, ESP performance should not be compromised.

Based on the pilot-scale testing, the EERC recommended proceeding with the full-scale testing. Full-scale testing, FBC operation, and economics are the subject of the ongoing study.