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R0645577

WSRC-MS-91-473X

## DYNAMIC SIMULATION STUDY OF THE CIF INCINERATOR (U)

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An abstract proposed for presentation at the  
*Incineration Conference*  
Albuquerque, New Mexico  
May 11 - 14, 1992

and publication in the proceedings

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# Dynamic Simulation Study of the CIF Incinerator

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## ABSTRACT

The Savannah River Site (SRS), operated by Westinghouse Savannah River Co. for the U.S. Department of Energy, plans to start up the Consolidated Incineration Facility (CIF) in 1994. The CIF will treat liquid and solid low-level radioactive, mixed, and hazardous wastes generated at SRS. A computer model was developed to simulate the transient responses of the CIF to fluctuations in the solid waste feed or equipment upsets. Of particular interest was the performance of the two independent pressure control loops in the system to maintain the required vacuum throughout the fluctuations. The model is capable of predicting the dynamic behavior of all components (rotary kiln, secondary combustion chamber, quencher, scrubber & cyclone, mist eliminator, HEPA filters, and ID fans).

Simulations were carried out to cover different aspects of the CIF including normal operations, the trial burn, ram feeder failure. The effects of key process variables such as weight per solid waste charge (50% variation), heat content per charge (7,000 -16,000 BTU/lb), and burn time per charge (10 - 20 minutes) on the CIF dynamic responses were studied. The lower heat content value was for charges mainly containing paper and cardboard, and the higher for charges of plastic material. The results show that variation in weight/charge has a direct impact on the kiln pressure, while the heat content primarily affects the kiln temperature. Simulation of burning a large charge of high heat content solid wastes indicates a kiln temperature increase to 2,000°F and a positive pressure surge, although the surge magnitude is small with a time duration less than the period causing kiln shutdown. Hence, under the simulation conditions, the model predicts the CIF can operate successfully with significant variation in waste feed composition.