THE EFFECT OF COAL/d-RDF CO-FIRING ON STACK EMISSIONS AT MILWAUKEE COUNTY INSTITUTIONS’ POWER PLANT

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The authors have presented a paper that clearly indicates the frustrations that go with full-scale testing in a facility not designed for the use being tested. The difficulty in getting the facility to just burn the densified RDF (d-RDF) much less measure the air quality impacts, appears to have been significant. Information that would have been helpful to the reader in understanding these problems includes the characteristics of the RDF subjected to densifying. Also, inerts and ash content of the material fed to the cuber might also clarify whether the wear problem encountered was specific to that RDF or generic.

The authors state that the heat input from RDF was 15 percent. The method of determining that 15 percent of the heat input was from the d-RDF is not clear. Separation and stratification of coal and d-RDF was reported to have occurred in the bunkers. The quantification of the variations in coal/d-RDF ratios exiting the bunkers would be helpful.

Burnout and clinkering problems encountered when feeding d-RDF may have been alleviated if grate speed and/or air ratios had been modified. The control of these parameters is not presented.

The CO₂ levels measured in the stack-gases indicate a very slight reduction in excess air levels when burning the mixture. The set points and control mechanisms used for excess air control could prove important in interpreting such descriptions. Also, the 10 fold increase in Cadmium level @ 20 percent input seems worthy of some supposition if not conclusion.

The lack of difference in SO₂ emissions with d-RDF burning is questioned in the paper. The sulfur content of the fuels could well be similar on an S to 10⁶ Btu ratio. Again, exact measurement methods of the Btu input or estimate approach would prove helpful in interpreting results.

The detection of mercury vapor and the increase in HCl levels in the stack-gases from the d-RDF burning should be addressed and their respective levels of significance as potential regulated emissions should also be addressed.

The authors have presented an interesting and candid description of a difficult testing effort. The results presented will prove useful so long as the reader remembers the specific conditions under which the samples were taken.

AUTHORS’ RESPONSE

Mr. Elliott asks some very pertinent questions concerning the test program carried out at Milwaukee County Institutions.

Our paper is an attempt to isolate the stack emission portion of an extensive demonstration program. The Report for the entire program is Ref. [2]. Unfortunately, because of funding cut-
backs, the Environmental Protection Agency has not been able to publish the main Report. We hope it will be released in the NTIS system soon. Most of the questions raised by Mr. Elliott are addressed in the Report.

With regard to the characterisitics of the RDF densified, analyses of 40 samples are included in the main Report. There was considerable variation in the RDF used. However, in general, moisture content ranged from 15 to 30 percent, ash content ranged from 14 to 22 percent, and for the latter half of the test program 90 percent of the material passed a $\frac{3}{4}$ in. ring.

In order to determine the percent heat input in the coal/d-RDF mixture, 45 mixture samples were hand sorted to determine the percent coal and d-RDF by weight, and the adjustment for heat content was made by means of daily measurements of heat content in coal and d-RDF samples. The comments regarding separation and stratification of coal and d-RDF were visual observations in the bunker and of the mixture flowing to the feeders.

Prior to actual testing, there was one week of continuous, 24 hr/day firing of the coal d-RDF mixture. During that time, the operators learned a great deal about the mixture's idiosyncracies. Had more time been available, perhaps they could have learned more.

When firing the mixture, the fuel and air controls were set on manual. Charts were monitored regularly and adjustments made as required.

The increase in trace cadmium emission is of concern. As stated in the paper, cadmium emission will have to be examined very carefully in plants where larger percentages of refuse derived fuels are burned. However, concentration of cadmium in the stack gas (at standard conditions) is less than the promulgated threshold limit value for work room air. Of course, once out of the stack, cadmium concentration will be reduced by several orders of magnitude.

The sulphur content in the fuels can be compared on a Btu basis. During the test period, there were 0.016 lb of sulphur per 10,000 Btu in coal and 0.0045 lb of sulphur per 10,000 Btu in the d-RDF.

With regard to mercury vapor, the concentration reported in the stack is two orders of magnitude less than the threshold limit value promulgated for the work room.