CONVERSION OF RED WING AND WILMARTH COAL FIRED STEAM GENERATORS TO RDF FUEL

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Discussion by

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In view of the failure of many of the early efforts to achieve the dream of burning garbage in utility boilers by preparing RDF, it is indeed gratifying to find Northern States Power energetically committed to this objective. Only the City of Ames, Iowa, pioneered and persisted in this solution to their waste problem, well over 15 years ago, in the face of insufficient garbage. After trying to burn RDF in their various stoker-fired boilers, they installed a dedicated B&W boiler, designed for the purpose.

Perhaps the authors would like to comment on their learning experience from Ames, their boiler in Lawrence, Massachusetts, and the new Biddeford boilers, in relation to their design modifications of Red Wing and Wilmarth.

The authors point out the need to increase the furnace volume to achieve a furnace liberation rate of 13,652 Btu/hr-ft^3, as compared with coal at 23,600 Btu/hr-ft^3, a substantial derating, in order to achieve a furnace exit gas temperature of 1500°F. They are emphatic about the need for air preheat in order to burn RDF.

Another major advance is careful attention to the location and intensity of overfire air to properly mix the reactants. I am puzzled by the statement that both the underfire and overfire air supplies are designed for 50% of total air. Obviously one or both can handle more so that the two sources can be modulated.

Perhaps the authors could explain why, after years of apparent indifference on the part of utilities, NSP has chosen to "re-power" these relatively old boilers, even at the low cost of replaced coal. Is the answer that NSP now gets paid to take the garbage, rather than the Counties expecting to get a revenue from burning the RDF?

The authors are to be commended for an excellent, detailed and informative paper describing a successful effort, based on many years of experience, correcting mistakes and making improvements.

AUTHORS' REPLY

As Mr. Hasselriis points out, the City of Ames, Iowa is successfully burning coal and RDF simultaneously in the same steam generator. That combination of fuels is also successfully utilized on our projects at the City of Lakeland, Florida (1982), a 350 MW pulverized coal fired unit with up to 20% of the total thermal input provided by RDF fuel, and at the Baltimore Gas & Electric, Crane Power Station (1984) where a 191

MW cyclone coal fired unit accepts up to 15% of its total thermal input from RDF.

The experience gained not only from Ames, but from all of our RDF designs currently in service, such as City of Nashville, City of Columbus, and City of Hamilton have been utilized in the design approach for the Northern States Power retrofit presently in service and the United Power Associates, Elk River retrofits currently under design.

The OFA system at NSP is designed to provide up to 55% of the total air required and the underfire air system is sized for up to 55% of the total air required.

The NSP decision to repower the old coal fired units was based upon the NSP charter which is to provide the electrical power for their franchise area. Northern States has been a fuel innovator for many years and produces or has produced power from nuclear, coal—both sub-bituminous and bituminous, wood, gas, oil, carbon black, coke and RDF in the past. Select utilities around the U.S. continue to experiment with unusual fuels to achieve lower cost power generation.

Thank you for your discussion.