AKRON RECYCLE ENERGY SYSTEM: AN RDF SUCCESS STORY

DAVID B. SPENCER
wTe Corporation
Bedford, Massachusetts

LINDA A. SOWA
Department of Public Service
Akron, Ohio

WILLIAM T. SLOOP
wTe Corporation of Ohio
Akron, Ohio

Discussion by

Anthony R. Nollet
Nollet Enterprises
Wilmington, Delaware

The reviewer considered this to be a good paper that makes a positive contribution to the literature of this industry. Let us hope that the good news presented in this paper continues in the years that lie ahead!

The reviewer has been, and remains a strong advocate of refuse-derived fuel (RDF) technology, as opposed to mass-burn technology. However, this paper highlights the major disadvantage of RDF technology as presently practiced in the United States: As they are presently configured, RDF plants must be much more selective about the wastes that they accept than do mass-burn plants.

In this particular case, every single source of waste must be vetted by two agencies of the City of Akron, and by wTe Corporation, a very severe restriction indeed. This precaution is necessary in order to reduce the likelihood of plant explosions caused by the receipt of containers of volatile liquids which, when subsequently opened by a shredder, can release explosive vapor concentrations through large areas of the plant. Mass-burn plants do not have to be as particular in this regard, because if a container of volatiles is dumped into a mass-burn furnace, an explosion will generally not occur because the volatile material will be burned as soon as there is sufficient oxygen to support combustion. It is virtually impossible for an explosive mixture of vapor and oxygen to accumulate in large quantity and then ignite as a deflagration. It appears that the challenge of the RDF industry is to develop systems that can accept as much of the entire waste stream as can be accepted by mass-burn units.

The authors are to be commended for presenting much obviously-candid data, from which the reader can draw logical inferences. For example, during the year 1986, a total of 186,243 tons of waste was processed, and this waste produced 1,754,695,000 lb of steam—or about 4.7 lb of steam per pound of refuse. Approximately 1040 btu is added to produce a pound of steam. Therefore, if the boiler efficiency was 70%, the fuel must have had a higher heating value of about 6640 Btu/pound, and if the boiler efficiency was 75% (not considered likely), the higher heating value must have been about 6200 Btu/pound. As the average higher heating value of U.S. municipal solid waste is about 4500 Btu/pound, it seems clear that the process for selecting acceptable waste generators in Akron seems to have resulted in excellent fuel. Certainly the mixing of 1.5% of shredded tires to the other shredded waste cannot account for the higher-than-normal heating value of the wastes processed in this plant.

The purpose of all the precautions that are taken in the selection of wastes and in the operation of this

plant is to reduce the likelihood and the intensity of plant explosions, and the authors describe in general terms the steps taken in the plant to accomplish this objective. The paper would be much more useful if details of these steps had been described:

(a) How were the vents within the shredder modified to give better relief, and yet prevent the vent from filling with RDF?

(b) How many vapor detectors were installed? At what percent of the lower explosive limit (LEL) for, say, gasoline, do the vapors trigger an alarm? At what percent of the LEL is feed to the shredders automatically stopped? At what percent of the LEL, if any, is the building evacuated? How much ventilation was installed—perhaps in terms of changes of air per minute?

Probably, however, the intent of the paper was to display the true costs of processing MSW through this facility. It appears that these costs are honestly and thoroughly presented—for which the authors are much to be commended.

In this reviewer's opinion, however, RDF plants will never be truly competitive with mass-burn plants until the RDF industry learns how to handle nearly 100% of the waste stream without causing plant explosions. Many of the principles outlined, but not specified, by the authors are steps in the right direction. But the real answer will lie with some device that automatically removes items that might cause an explosion—one version of which the reviewer has described in many technical papers.

AUTHORS' REPLY

wTe would like to thank Mr. Nollet for his positive comments and continued enthusiasm for the RDF technology. In response to several of Mr. Nollet's comments/questions, we would like to offer the following clarifications:

(a) Every single source of waste is not inspected prior to approval for disposal. The inspection/approval process is only administered for commercial accounts; including those which contain some residential waste.

(b) The data reported for 1986 annual tonnage processed and steam production are actuals. The discrepancy with above average fuel, higher heating values, is attributed to the accuracy of the steam meters. The replacement of existing steam meters with ones more compatible with expected steam flows is currently being evaluated and will likely be installed as part of the 1989 capital program.

(c) The original vent configuration was not modified, rather the bar grating at the vent entrance was replaced with blast matting. The grating would blind reducing the effective vent area. Blast mats, because of the tight weave, are not subject to blinding and were installed to release during an explosion.

(d) The vapor detection system consists of 14 sensors. Five each per processing line (shredder, infeed and discharge conveyor), three in the common pit area and one in a ventilation exhaust duct. At 20% lower flammable limit (LFL), a warning light is activated. At 40% LFL, an alarm light and audible alarm is activated. When this occurs, infeed to the shredders is discontinued and the shredder area is checked with a hand-held vapor detection unit. The majority of alarms have been false readings. The effectiveness of the vapor detection system is currently being evaluated by plant personnel and the equipment manufacturer.

(e) The shredder pit area is currently vented by two systems. A 15,000 cfm ventilation system operates continuously. A second 30,000 cfm fan system is available for use as a standby or in conjunction with the first system.

We hope this information has been of help to Mr. Nollet and fellow ASME members. As wTe continues to work with the City of Akron at the RES, we hope that similar opportunities exist for us to report on its continued success.