INTEGRATED WASTE MANAGEMENT IN BABYLON, NEW YORK

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ABSTRACT

The Town of Babylon, on Long Island, New York, has developed a Waste Management System that includes: municipal solid waste (MSW) and recyclables collection by a private consortium; a 750 ton-per-day (TPD) vendor-operated mass-burn facility producing 17 MW of power, which achieves zero discharge of wastewater; a facility to treat contaminated groundwater as makeup; a municipal landfill; and a lined ashfill.

This paper describes the elements of the Town of Babylon's integrated waste management system. It highlights the capabilities and performance data of the waste-to-energy facility and the methods used to continuously monitor the higher heating value (HHV) of the MSW.

BACKGROUND

In 1983, the Town of Babylon was faced with a New York State-mandated landfill closure law that imposed a 1990 deadline on the use of all landfills located in Suffolk County, Long Island. Faced with the likelihood that they would have no place to take their garbage after 1990, Town officials decided, in January 1984, to employ a consultant to prepare a Request for Proposals (RFP) for a resource recovery facility. The RFP was timed to meet a December 1985 contract-signing deadline on important tax advantages and to take advantage of the industrial revenue bonding capability set aside by New York State to finance the facility's construction. The RFP was issued in August 1984. Five firms submitted proposals in November. After intensive evaluations, the Town of Babylon selected Ogden Martin Systems, Inc., as the preferred developer and began to negotiate a contract to construct and operate a 750 TPD mass-burn waterwall waste-to-energy facility. The plant capacity was based on the population and projected rate of growth. Typical rates of waste generation were assumed.

After the contract was signed, a State- and Town-mandated Environmental Impact Statement (EIS) was prepared to study the environmental issues raised by the project at the proposed site at the Town-owned landfill, which was evaluated along with other potential sites. In July 1985, the first public meeting was held, and a public hearing was held in September. The EIS was presented to the Town Board in October and approved, and the Final EIS was submitted to the New York State Department of Environmental Conservation (NYSDEC) in November 1985.

To ensure that the resource recovery facility would be of the proper size, a week-long sampling was conducted of the amount of waste entering the landfill. It was found that out-of-town waste was being brought in, necessitating strong action and code enforcement.

Subsequent weighings of MSW using the newly activated Town scales collected weight data to obtain the seasonal pattern of waste flow. On the basis of this information, the required facility capacity was confirmed to be 750 TPD, as anticipated in the RFP.

The emission control system required by the RFP was a spray-dry scrubber followed by an electrostatic precipitator (ESP). In the course of the public hearings for the EIS, the Town was told that an ESP was not state of the art and that a fabric filter should be provided. Ogden Martin agreed to proceed with a scrubber/fabric filter system on the basis of its experience with this technology in its Marion County, Oregon, facility.

During the EIS process, environmental groups in Babylon insisted that a recycling program be established in the Town before a permit to construct be issued. The State wrote a requirement for 15% recycling into the permit.

The impacts of the 15% recycling requirement on the waste stream before combustion were investigated. The original RFP was issued without an accurate assessment of either the actual waste flow or the heating value of the waste. A heating value of 4450 Btu/lb was assumed for the 750 TPD capacity. Investigations using waste analyses performed in other communities indicated that a heating value of 5000 Btu/lb or more was likely (possibly 5100 Btu/lb, which is 15% higher than 4450 Btu/lb). This meant that the 750 TPD plant size would be appropriate even after institution of 15% recycling.

WASTE COLLECTION AND RECYCLING

Town of Babylon residential waste collection services were evaluated in 1985, and it was determined that collection costs could be reduced by as much as 37% if the Town established organized collection districts to replace the fragmented routes of the 12 separate companies serving different parts of the town. In response to an RFP, a consortium of private companies (Babylon Source Separation, Inc. [BSSI]) was formed to collect all of the waste. Services, which were initiated in October 1987, include the source-separated curbside collection of newspaper and commingled bottles and cans.

Note: To convert psig to MPa, divide by 145.

To convert tons to metric tons, divide by 1.1

To convert Btu/lb to Joule/gram, multiply by 2.325.

To convert grains per dry standard cubic feet to grams standard cubic meter, multiply by 2.29.

TABLE 1 QUANTITIES OF WASTE GENERATED BY TOWN OF BABYLON, 1988

Waste Type	Tons	Percent
Commercial waste	139,936	47
Residential waste	91,231	31
Concrete fill and cover	27,025	9
Town of Babylon (parks)	26,008	9
Paper	13,234	4
Leaves (weighed)	840	--
Bottles and cans collected[1]	23	--
TOTAL	298,297	100

[1]Does not reflect 1989 recycling activity.

Subsequently, a complete system has been implemented to collect other recyclables and transport them to a materials recovery facility, where they are prepared for market. The Town has established Wednesday as recyclables collection day with alternate weeks for newspapers and commingled bottles and cans. The recyclables are brought to the facilty, which acts as a receiving and transfer station to ship the materials to intermediate markets. The facility, which began operation in early 1989, also provides drop-off containers for tires, scrap metal, used oil, and plastics.

Table 1 summarizes actual quantities of waste received by the Town in 1988. Figure 1 shows the monthly variation as a percent of the annual total. Nearly half of the total waste comes from the commercial sector—multifamily dwellings, restaurants, shopping malls, industrial facilities, and so on. Another 30% is residential, collected at the curbside by the Town's contracted carter, BSSI. The remaining 20% is from Town-sponsored collection from the highway department, lot clean-up, and parks. Thus, 87% of the waste weighed is available for the waste-to-energy facility. Not all is acceptable for burning, however. The concrete fill and cover category represents materials that are used on the landfill for roads and temporary landfill cover.

The monthly variation in waste disposal, shown in Fig. 1, is attributable to several factors. The higher disposal quantities in the summer months result from leaf and yard waste, from residences, cemeteries, parks, and so on. Spring cleaning and Town-sponsored lot clean-ups cause a rise in early spring. The generally lower amounts of waste in the winter months allow time for routine plant maintenance and inspection.

THE WASTE-TO-ENERGY FACILITY

The design parameters of the waste-to-energy facility are listed in Table 2. Waste is delivered to the facility

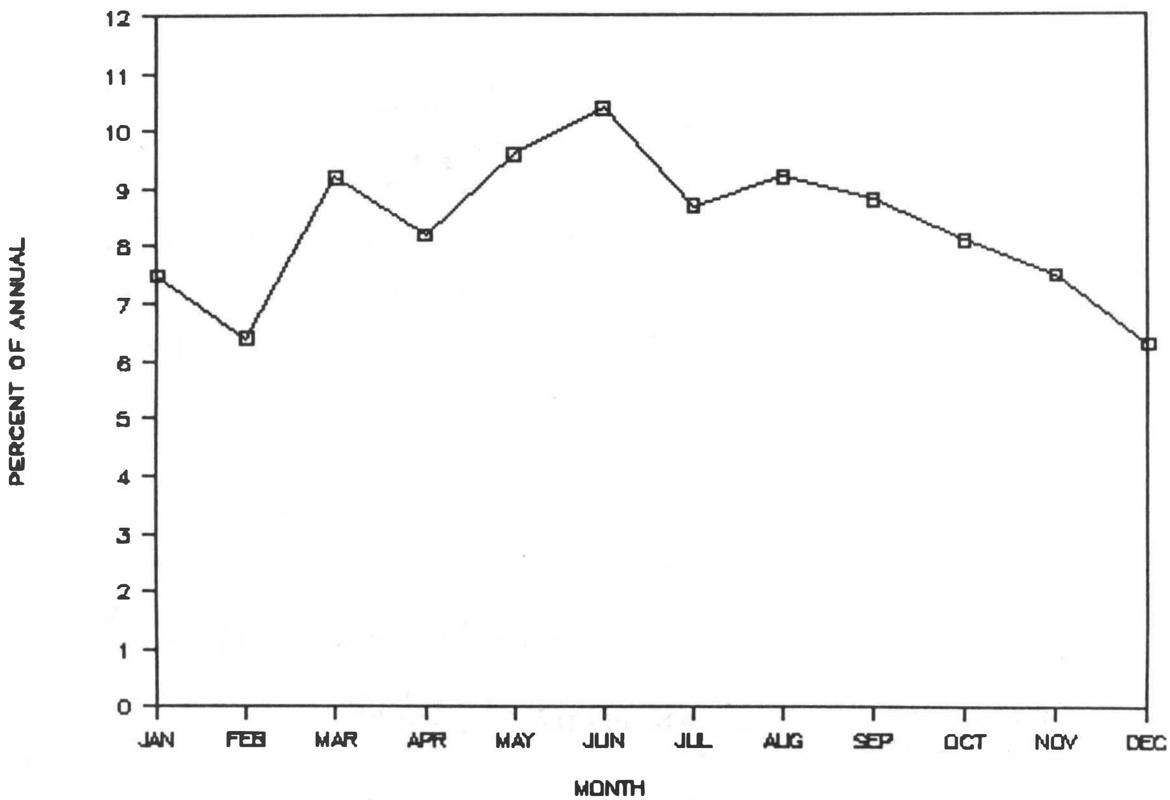

FIG. 1 MONTHLY VARIATION IN WASTE GENERATION IN BABYLON

by compactor trucks and weighed before being delivered to the enclosed receiving building, where it is discharged into a pit having a nominal capacity of 2500 tons. Two overhead cranes mix the waste and lift it to the charging hoppers of the two waterwall furnaces each of which has a design capacity of 375 TPD. Hydraulically operated rams feed the waste into the furnaces. Reverse-reciprocating grates advance the waste over the grate and provide underfire air to initiate combustion. Secondary combustion air is introduced in the front and rear walls to produce intense flame turbulence and prevent escape of unburned gases from the primary furnace. The boilers are constructed with two furnace passes, followed by a convection pass, the superheater, and an economizer. Steam is produced at 655 psig and 700°F (373°C) to drive the turbine-generator.

The combustion controls use both furnace temperature and oxygen measurements to control combustion. The rate of feed and stoker action is controlled by steam flow, with air flow following to maintain optimum combustion conditions. Under actual combustion conditions, the flame temperature can be maintained above the prescribed 1800°F (982°C), while oxygen measured at the boiler outlet varies from 7% to 9% on a dry basis.

After leaving the steam generators, the combustion gases pass through spray-dry scrubbers and baghouse-type fabric filters for removal of acid gases and particulates prior to discharge through the 170 ft (52 m) high stack. The stack contains three flues, one for a possible third furnace line.

Bottom ash and grate siftings discharge into a water-quenched ash discharger, which pushes the bottom ash onto a vibrating conveyor. Fly ash, containing scrubber residues, is mixed with the bottom ash at the discharger outlet. An emergency belt conveyor and diverter assemblies are provided to bypass the vibrating conveyor. The residues are conveyed over a grizzly to remove oversize objects. The residues are then conveyed by means of a vibrating transfer conveyor to a pair of redundant inclined and covered belt conveyors to the ash handling building. There, two trommel and magnet systems remove ferrous metals before the ash is dropped to the storage floor below. Front loaders place the ash in containers, which are hauled to the ashfill

TABLE 2 DESIGN PARAMETERS OF THE FACILITY

Milestones	Consultant hired:	January 1984
	Request for Proposals:	August 1984
	Contracts signed:	December 1985
	Construction started:	June 1986
	Commercial operation:	April 1989
Stokers	Two reverse reciprocating grates. Martin GmBH	
Combustion units	Two waterwall furnaces. Zurn Industries	
Refuse cranes	Two 1,125 TPD cranes, 5.5 cu. yards (.16 cu. meter) each grapple	
Refuse burning capacity at 4,450 Btu per pound	375 tons per day each, 750 TPD combined	
Design capacity	228,115 tons per year at 4,450 Btu per pound	
Guaranted waste delivery	225,000 tons per year at 4,450 Btu per pound	
Boiler steam output at Maximum Continuous Rating (MCR)	86,110 pounds per hour (39,060 Kg/hr) each, 172,220 pounds per hour (78,119 Kg/hr) combined	
Steam conditions at outlet of superheater	655 psig/700°F (4.5 MPa/372°)	
Turbine/Generator	Rated at 17 megawatts, 19 KVA/13.8 KV, controlled and uncontrolled extraction and condensing. Elliott/United Technologies	
Air pollution control equipment	Two spray-dry scrubbers with baghouse filters. Belco Pollution Control Corporation	

on the adjacent landfill site. The residue storage area also has a compartment to store ferrous metals while awaiting transport to market.

Process water for use in the cooling tower and the ash quench system is obtained from wells placed so as to draw water from the upper aquifer within the influence of the percolation from the landfill, thereby somewhat reducing "leachate" concentrations in the groundwater. The well water undergoes treatment to remove impurities and render it suitable as makeup for the cooling tower, ash quenching, and the spray dryer system. The water from drains and blowdowns is also used to provide makeup to the ash discharges, which quench the ash residues. The total system enables the facility to operate with zero water discharge. The treatment system degassifies, clarifies, filters, flocculates, demineralizes, and buffers the various water streams. To prevent buildup of salts in the cooling tower circulating system, an electrodialysis unit removes salt as needed. This system has been described by Goldate and Irani [1].

ACCEPTANCE TESTING OF THE FACILITY

Test Procedures

The waste-to-energy facility was tested during continuous operation over a 7-day period. The testing program consisted of a capacity test, an energy efficiency test, an electric usage test, a process residue quality test, and a ferrous recovery test. Environmental compliance tests were carried out both prior to and after the acceptance tests.

The capacity test required the burning, in the 7-day test period (168 hr), of not less than 4909 tons (93.5% of design capacity) of acceptable waste with an average energy content of 4450 Btu/lb. The range of the heating value of acceptable waste was to be not greater than 5200 Btu/lb and not less than 3800 Btu/lb.

The energy efficiency test required proof that a minimum of 448 kWh of electrical energy per ton of reference composition acceptable waste could be produced for export. The electric usage test had to demonstrate that a maximum of 79 kWh per ton of reference waste would be consumed in the plant during an 8-hr period.

The process residue quality test had to demonstrate that the facility would not produce more 10% dry residue than was input, including scrubber lime; not more than 4% by dry weight of combustible matter; not more than 0.3% putrescible matter; and zero percent free moisture during an 8-hr test. The ferrous recovery test had to prove that the ferrous recovery system could recover at least 80% of the ferrous metal in the unprocessed ash residues.

To establish the higher heating value (HHV) of the waste burned during the 7-day period, four 8-hr heating value tests were performed, using the boilers as a calorimeter, according to ASME procedures. While 8-hr HHV tests were prescribed, they were broken into 4-hr tests to increase the number of data points and avoid loss of test data should the test be interrupted during the 8-hr period. Actually nine complete 4-hr tests were run during the week of February 21, 1989.

During the HHV tests, all waste fed to the furnaces was weighed by load cells on the cranes and checked by weights of waste received over the scales. Grizzly (oversize residue), ferrous, and ash residues were weighed before disposal. At the same time, stack gas flow and composition were measured during each test, and steam flow and other plant data, including power produced and consumed, were recorded by a datalogger. The water consumed by the quench tanks was metered to permit making a water balance.

Samples of the ash residues were taken from the vibrating conveyor before the drop to the floor, where a complete swipe of the conveyor could be taken with a shovel. These samples were collected every 10 min for 4 hr, and a sample weighing about 40 lb was taken each hour, then combined to form a composite 4-hr sample. Other samples were taken to represent each day's operation. All samples were sent to the laboratory for analysis of moisture and unburned carbon.

Test Results

The throughput capacity achieved was 5393 tons over a 7-day period. When adjusted to the reference composition waste, the design capacity was exceeded by 3% (5250 tons), the test requirement by almost 10% (4909 tons).

During the energy efficiency test, steam from the boilers at 175,000 lb/hr (79,380 kg/h) entered the steam turbine at about 640 psig (4.41 MPa) and 702°F (372°C) to produce 16.7 MW of gross power, of which about 14 MW was sold to Long Island Lighting Company. Corrected for reference waste composition, the gross electricity produced for sale was 489.5 kWh/ton, and electricity usage was 76 kWh/ton.

The results of the laboratory analyses of the ash residues showed that the unburned carbon content averaged less than 2% (by weight), and the moisture content averaged 13%. This low moisture content, resulting from blending in the fly ash outside of the quench tank, ensures that the ash residues can be handled and transported without liquid runoff, and that there will be no dusting.

During the acceptance tests, an average of 24% of the waste burned was weighed out as ash residue, including acid gas control residues. The combined ash residue had an average moisture content of 12.3% of total weight. The total weight of over-size materials removed by the grizzly screen and ferrous metals removed by the magnets averaged 3.5% of the incoming waste. Data obtained from subsequent operation of the facility are consistent with the acceptance test data.

THERMAL CHARACTERISTICS OF THE FACILITY

The amount of steam produced per pound of MSW is a convenient parameter, or thermal characteristic, for following the performance of a waste-burning facility. The specific steam ratio (SSR), or pounds of steam generated per pound of MSW, is dependent on the higher heating value (HHV) and the moisture content of the fuel. The relationship is complicated by the fact that boiler efficiency is sensitive to the moisture in the fuel. Other factors, such as the amount of excess air used to burn fuel of different moisture contents, may also play a role. In spite of this complexity, the SSR is a useful measure of the HHV of the waste, since it can be determined on a daily basis from measured steam flow and fuel consumption.

The acceptance tests provide a means of calibrating the relationship of HHV to SSR for a given facility. The relationship determined during the 7-day test at Babylon is shown in Fig. 2. The points show a fairly consistent relationship to the line that was determined by regression analysis of the data. It is noted that the

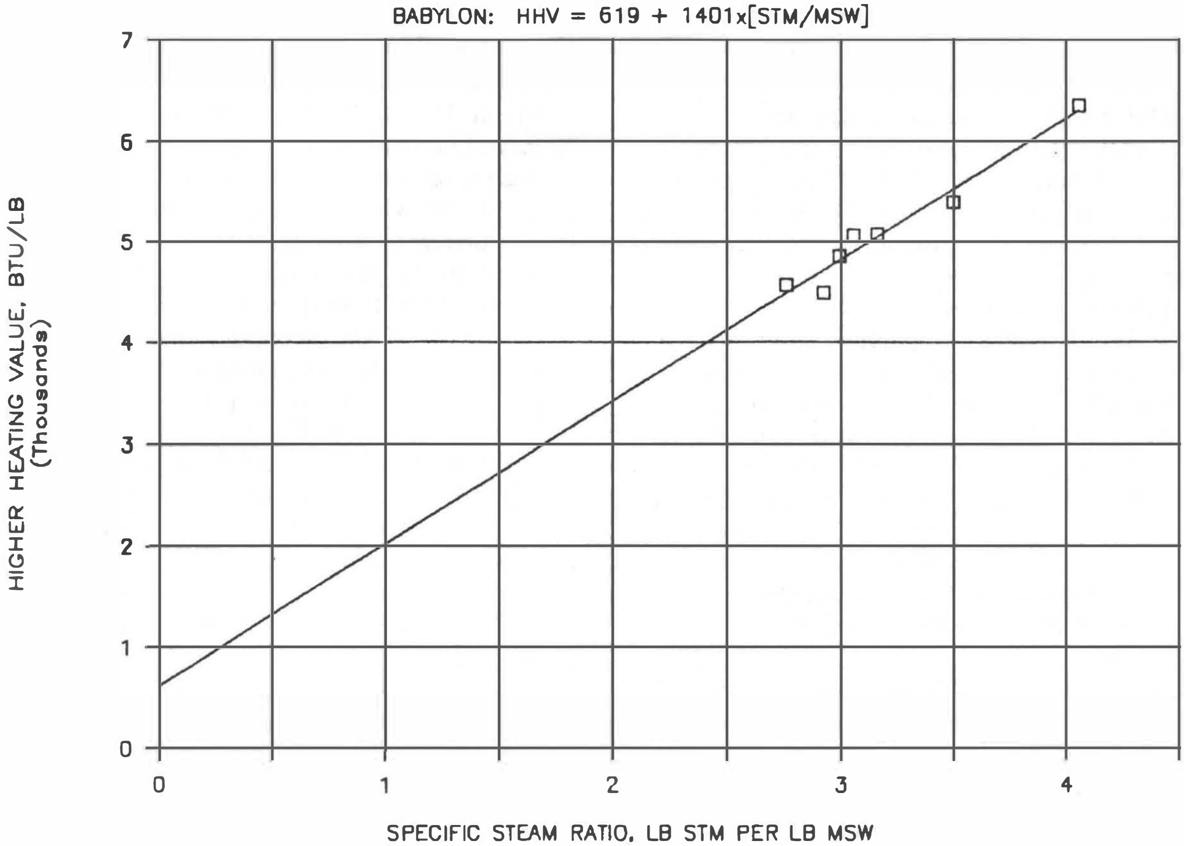

FIG. 2 CORRELATION OF SPECIFIED STEAM PRODUCTION WITH HHV

line has a zero intercept, which shows that when no steam is produced per pound of waste, there is a heating value of about 900 Btu/lb that is not recovered. This intercept reflects the heat that cannot be recovered because of the inability of the recovery boiler to condense the water vapor that leaves the combustion process. The correlation coefficient of the test data was over 95%, indicating that the data were very consistent.

The HHV determined during the seven 4-hr tests ranged from 4485 Btu/lb to a maximum of 6354 Btu/lb, and averaged 5100 Btu/lb. The individual estimates of HHV are sensitive to various errors or discrepancies in weighing, quench tank moisture, and other factors, but overall the correlation is excellent. The range of heating values resulted from household waste coming in on certain days when it was raining or foggy, as compared with commercial waste that came in on dry and cold days. The tests were run during the last week of February 1989.

The boiler efficiency is calculated from the test data using the procedures set forth in the ASME Power Test Code 4.1/1979 to obtain the HHV. The boiler efficiency is calculated and used to relate the energy output in the steam to the energy input from the MSW, thus determining the HHV of the MSW. The effect of heating value on boiler efficiency is shown in Fig. 3, where it is noted that a severe drop in efficiency would take place below 4000 Btu/lb.

By using the equation of the correlation, plant data collected during normal operation can be input to the computer as part of record keeping, provided a profile of daily variations in heating value of the MSW burned. The use of operating parameters for continuously monitoring facility performance has been described by Scherrer [2].

Figure 4 shows HHV data obtained by these methods for a typical month. Averages for individual days ranged from 4000 to 5700 Btu/lb. The instantaneous values of HHV cannot be determined, but they must have even wider variations.

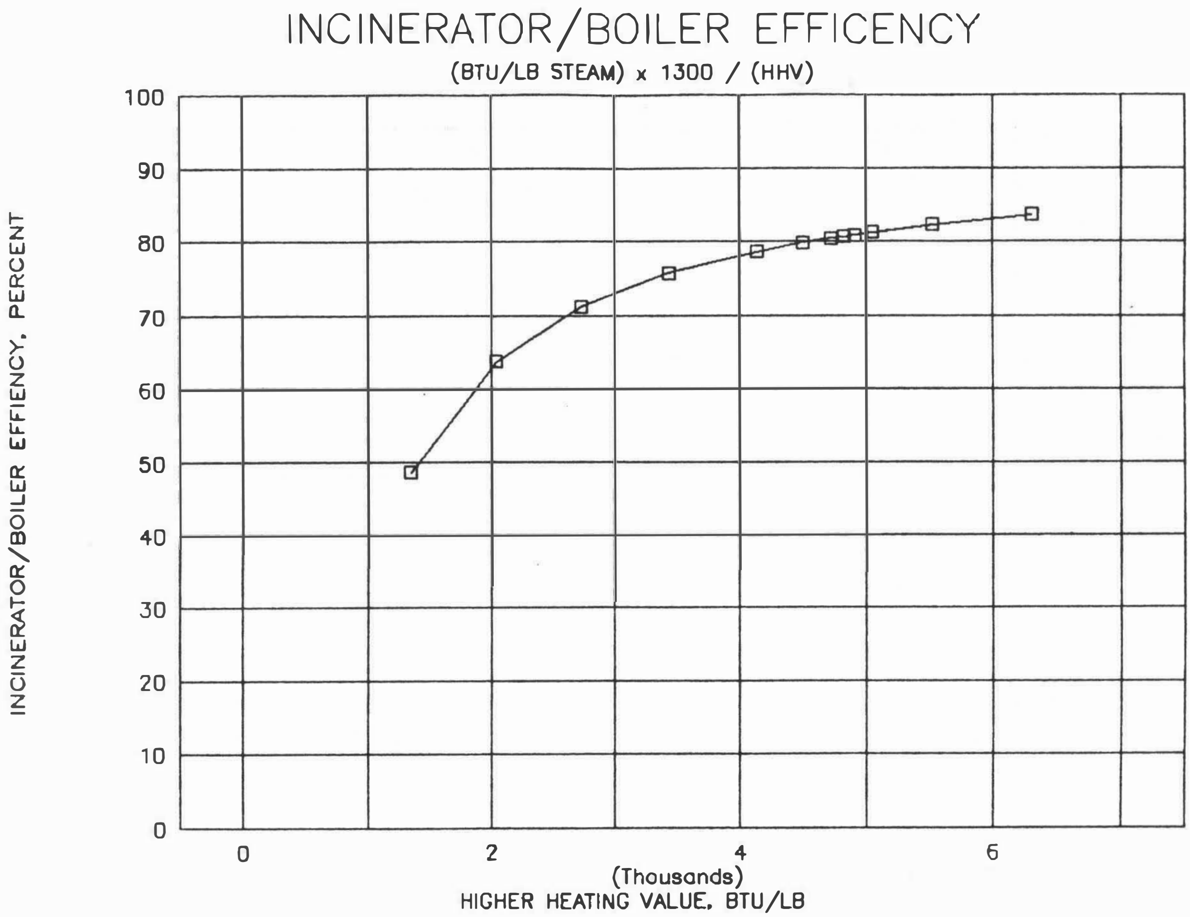

FIG. 3 EFFECT OF HEATING VALUE ON BOILER EFFICIENCY

EMISSIONS

The permit to construct the Babylon facility listed the emissions that were regulated by the State and, in addition, emissions of noncriteria emissions rates, which were suggested by Ogden Martin in the application, derived from conservative estimates based on tests of plants with ESP emission controls. Because of the use of state-of-the-art emission controls, it is not surprising that their actual emissions were substantially lower.

The emissions tests were performed at the Babylon facility by NYSDEC, along with Ogden Martin Systems, to satisfy the requirements of a permit to operate.

(a) Particulate emissions averaged 0.00145 grains per dry standard cubic foot (gr/dscf) as compared with the permit conditions of 0.015 gr/dscf.

(b) Hydrogen chloride emissions, required to be less than 50 parts per million by volume (ppmv) corrected to 7% oxygen, actually averaged 34 ppmv. Test data reflected 95% control.

(c) Sulfur dioxide emissions, which are automatically controlled in this facility, averaged 29 ppmv, as compared with the State requirement of 50 ppmv, corrected to 7% oxygen. Test data reflected 80% control.

(d) Carbon monoxide averaged 14 ppmv, as compared with the permit condition of 50 ppmv averaged over 7 days, and an 8-hr average of 100 ppmv.

A comparison of listed emissions with actual emissions is provided in Table 3. Most of the metals were below the detection limit, mercury being the only metal to exceed the level predicted in the permit. Emissions of dioxins, furans, and other trace organics were extremely low, and PAH and PCB emissions were below detection limits.

ENVIRONMENTAL RISK ESTIMATES

A requirement of the NYSDEC permit was to provide a health risk analysis using the actual emissions test data, rather than estimates based on other facilities.

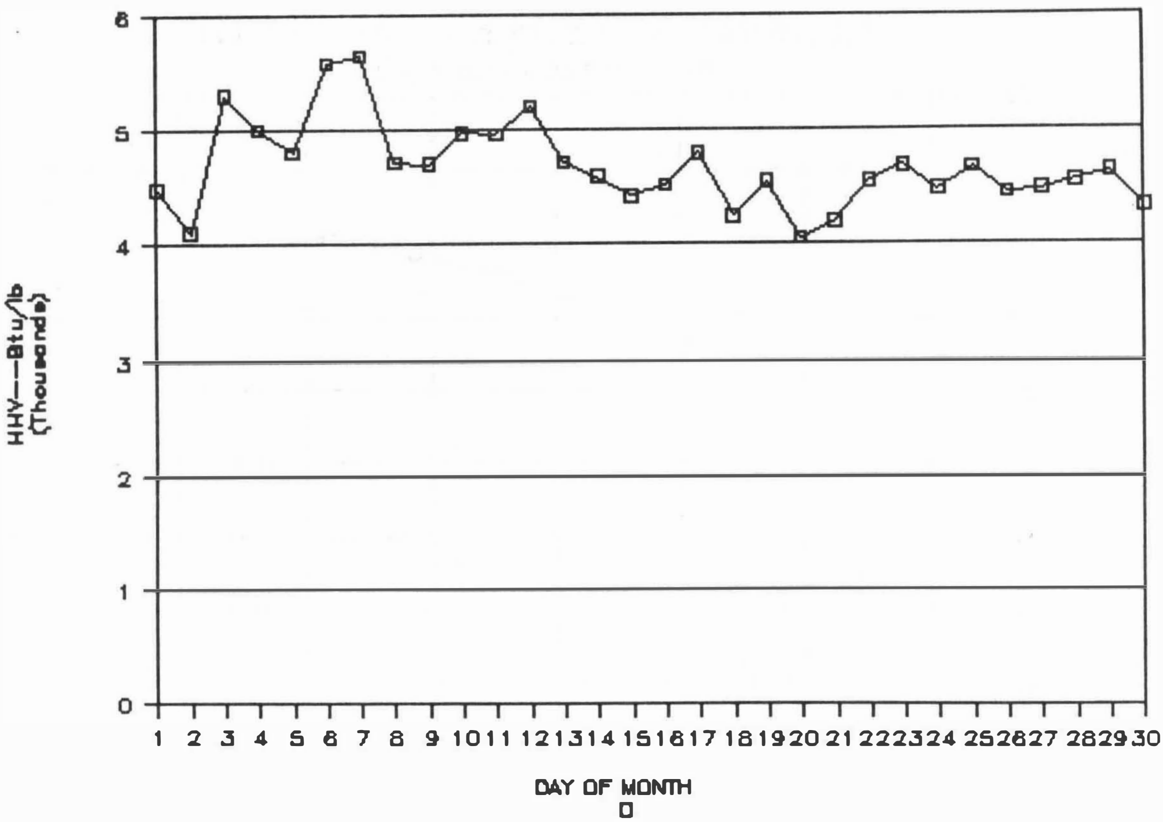

FIG. 4 VARIATION IN AVERAGE DAILY HEATING VALUE IN ONE MONTH

The risk analysis considered the contributions of heavy metals, trace organics, and the toxic equivalent of dioxin and furans (TCDD and TCDF).

The risk analysis summary is presented in Table 4. The predicted risk estimate (Case A) is based on the estimated emissions of a MSW combustor with electrostatic precipitators and no scrubber. The risk estimate (Case B) is based on actual emissions from the Babylon facility with a spray-dry lime scrubber and fabric filter (baghouse). The risk estimate total, shown as the number of predicted additional cancer cases per million people exposed to the maximum concentration over a 70 year period, is substantially lower than the predictions, by a ratio of four in this case.

It is interesting to note that the various components of the risk estimate were of approximately equal magnitude, and that the total actual risk (Case B) was less than one additional cancer case per four million persons exposed over a lifetime of 70 years at the point of maximum impact.

FACILITY OPERATIONS MONITORING

The throughput capacity of the waste-to-energy facility, including tons processed and power generated and sold, is an important element of the facility operating contract. To evaluate the throughput capacity in terms of reference waste HHV of 4450 Btu/lb, it is necessary to compare it to the actual HHV each month. It is also useful to observe the range of heating values reported during the month, since extreme values may create problems in burning the waste. For instance, the service agreement states that the furnaces can burn wastes ranging from 3800 Btu/lb to 5200 Btu/lb, outside of which capacity corrections are applied.

The daily heating values (see Fig. 4) show that the average for that particular month was indeed 4700 Btu/lb, but it ranged from as low as 4200 Btu/lb to as high as 5600 Btu/lb.

The continuous emissions monitor (CEM) provided at the facility records carbon monoxide, sulfur dioxide,

TABLE 3 COMPARISONS OF LISTED EMISSIONS WITH TEST RESULTS

	Listed in NYSDEC Permit lb/hr (lb/yr)	Actual Data lb/hr (lb/yr)
Total Particulates	5.75	0.46
Sulfur Dioxide	28.1	6.7
Carbon Dioxide	30.5	1.3
Nitrogen Oxides	266.0	66.0
Hydrochloric Acid	16.0	3.5
Fluorine	0.155	NM
Hydrocarbons	2.34	NM
Sulfuric Acid Mist	0.625	NM
Antimony	0.013	<0.0008
Arsenic	0.002	<0.0001
Beryllium	(1.8)	<0.0001
Cadmium	0.009	<0.0001
Chromium	0.005	<0.0002
Cobalt	0.004	<0.0004
Copper	0.008	<0.0002
Lead	0.625	0.00017
Mercury	0.032	<0.051
Manganese	-.---	<0.00001
Nickel	0.004	<0.0004
Selenium	-.---	<0.0001
Vanadium	-.---	<0.0016
Zinc	0.476	<0.0018
Dioxin (Toxic Equivalent)	(0.0082)	(0.00046)
Furans	(0.103)	(0.03)
PAH	0.008	<0.0008
PCB	-.---	<0.0001
Formaldehyde	1.111	NM

NM = not measured

Symbol "<" indicates less than. Number following is the detection limit.

TABLE 4 CANCER RISK ESTIMATES FROM MSW COMBUSTER EMISSIONS

	Inhaled	Ingested	Dermal	Case A Predicted Emissions Total	Case B Actual Emissions Total
Cadmium				0.013	0.005
Chromium				0.006	0.000
Arsenic				0.0057	0.045
Beryllium				0.00003	0.008
Nickel				0.000004	0.004
PCDD + PCDF				1.020	0.074
PCB				0.0001	0.005
PAH				0.0004	0.041
Others				-.------	0.078
Total:	0.667	0.378	0.0025	1.045234	0.260

Note: The Risk Analysis that was prepared included estimates of particulates that were inhaled, ingested, or absorbed by dermal contact. Values represent the number of predicted additional cancer cases per million population exposed to the maximum concentration over a 70-year period.

and nitrogen oxides on a continuous basis for the two combustion lines and reports time averages on daily and monthly bases. The records obtained from monthly reports show that the sulfur dioxide emissions could be controlled to average less than the permit limit of 50 ppmv, and that carbon monoxide also averaged consistently below the limits. Nitrogen oxides ranged from about 225 to 375 ppmv, but generally averaged less than 300 ppmv.

After about 8 months of operation, the waste-to-energy facility has shown that it can meet or exceed the operating parameter required by the service agreement. Steam and electric power generation rates (per ton of waste) are commensurate with predicted performance, and the HHV is averaging about 4500 Btu/lb.

LANDFILL AND ASHFILL DESIGN AND ACTUAL LEACHATE ANALYSIS

The management of the landfill and ashfill was organized to accept unprocessed MSW during the construction period and bypass waste and ash residues during operation. In addition, several problems had to be resolved. Poor conditions on the existing landfill, such as excessively steep slopes and unstable subgrade conditions had to be remedied, and a plan to close the landfill as various portions reached permissible limits and capacity had to be implemented.

Before the new ashfill with a double-composite lining system and leachate collection system was constructed, an interim ashfill was built on top of the existing landfill. The interim ashfill was provided with a HDPE liner and a means for leachate collection.

As soon as the interim ashfill began operating, it became clear that the ash could be readily compacted after placement, and trucks could drive over it immediately. Developing practical methods for ash placement and compaction will be valuable ways to achieve optimum ash density, thus saving ashfill volume. Such a process will also reduce the amount of water passing through the ashfill.

The actual leachate accumulated in the collection pond of the interim ashfill is a mixture of percolated water and rainwater runoff. Because this ash has low permeability, runoff would predominate, and would vary with rainfall.

An analysis of leachate from the interim ashfill pond and an EP Toxicity analysis of the mixed bottom ash/flyash residue is compared with USEPA drinking water standards in Table 5. It is apparent that with the exception of lead, all of the metals show concentrations less than the drinking water standard. The runoff lead concentration of 0.85 mg/L was one-sixth the EP Toxicity limit of 5.0 mg/L for lead. The EP extracts did not exceed the EP limit for any of the metals.

TABLE 5 BABYLON ASHFILL LEACHATE VERSUS DRINKING WATER STANDARD

Parameter	Analysis, mg/l or parts per million		
	Actual Runoff[1]	Ashfill EP Extract[2]	USEPA Drinking Water Standards
pH	6.5-7.0[3]		6.5 - 8.5
Manganese	0.04	0.04	0.500
Zinc	0.02	0.22	5.000
Copper	0.08	0.08	1.000
Nickel	0.10	0.10	
Cadmium	<0.001	0.007	0.010
Chromium	0.04	0.02	0.050
Lead	0.85	0.10	0.050
Arsenic	<0.002	<0.005	0.050
Silver	<0.03	0.02	0.050
Mercury	<0.0002	0.008	0.002

[1]Runoff collected in leachate pond at center of ashfill.
[2]EP extract of ash combined flyash/bottom ash according to USEPA EP Toxicity procedure 40 CFR Part 261-Appendix II.
[3]Typical range of values.

CONCLUSIONS

The facility was built and in commercial operation within 39 months of the time a contract was signed and 63 months from the time the Town of Babylon hired the consultant to proceed with procurement of this total waste management system. Factors that extended the construction time were the requirements for treatment of contaminated ground water and the zero discharge system.

Facility performance, after about 8 months of commercial operation, has been satisfactory with steam and electric power generation rates generally as expected. The HHV of the waste has averaged about 4500 Btu/lb over that period as compared to a design HHV (Reference Waste) of 4450 Btu/lb.

The waste collection and recycling systems were successfully established within the time frame required before the burning facility went commercial, with the efforts of Town personnel. The design, permitting, and construction of the interim and final ashfills also were achieved with the cooperation of the NYSDEC, without any delay to the project.

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Key Words: Acceptance Leachate; Combustion; Efficiency; Emissions; Grate; Heating Value; Intergrated Composit Liner; Risks; Waste Generation; Waste Management