BOSTON SOUTH BAY INCINERATOR — THE EVENTS LEADING TO ITS CONSTRUCTION

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(Presented at a meeting of the Sanitary Section, B.S.C.E., held on December 3, 1958.)

Municipal incineration has been a long time coming to Boston, and has finally arrived with the construction of the South Bay Incinerator.

The problem of an adequate and sanitary method of refuse disposal for the City of Boston has been the subject of studies and reports extending back to 1908 and possibly earlier. In 1908, a special Commission appointed by Mayor Hibbard to investigate the collection and disposal of refuse, and a second Commission appointed in 1910, reported that the present methods of disposal were unsatisfactory and objectionable, and recommended that the City construct incinerators.

In 1922, George A. Johnson, a consulting engineer, made a study and submitted a comprehensive report on the problem to the Commissioner of Public Works, in which he stated that—

> "The dumps in which these materials, often heavily mixed with garbage due to poor separation, are now being deposited, are rapidly nearing their capacity in many cases. In from one to three years some of the largest dumps now in use will have to be abandoned, necessitating much longer hauls to new points of deposit, and consequently increased cost of collection and transport."

and further stated in his conclusions that—

> "The evidence at hand admits of no other conclusion than that the existing procedures involving refuse collection and disposal in Boston are unsanitary, inefficient, unduly costly, and as a whole unsatisfactory to the people.
>
> "There is but one wholly satisfactory method of refuse disposal, and that is its complete destruction by fire."

Commissioner of Public Works, George G. Hyland, engaged the services in 1941 of the engineering firm of Metcalf & Eddy to make a study and report on refuse disposal in the so-called 10-year Contract Area—comprising the older sections of Boston—and in 1950 retained the Thomas Worcester Company—another engineering organization—

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to study and report on refuse disposal as it affected the entire City. Both engineering firms reported that the present practice of refuse disposal at open land dumps is unsanitary and a potential health menace and nuisance. Both recommended the construction of adequately designed incinerators as the best and only satisfactory solution to the refuse disposal problem.

Although the problem of refuse disposal has been under study for over fifty years, and all investigators have been unanimous in their recommendations that the City resort to incineration, we do not have one municipal incinerator operating in the City of Boston. There are several factors responsible for this delay, the chief ones being:

(1) The low cost of operating open land dumps (excepting the Spectacle Island operation) as compared with the high cost of constructing and operating incinerators.

(2) The continued availability of land dumping sites.

(3) The objections of residents and public officials to an incinerator being constructed within their district.

The first two factors have been discounted for most sections of the city due to the rapidly approaching exhaustion of land dumping sites. The opposition of citizens to the location of an incinerator anywhere in their district led to the selection of the South Bay section, an industrial area with unrestricted zoning, as the incinerator site, although it was known that subsoil conditions would result in a foundation problem.

In 1951, the firm of Metcalf & Eddy was engaged to submit a report on and to design the South Bay Incinerator. In their report, the engineers made the following recommendations:

1. The capacity of the plant should be 750 tons per day.

2. Mechanical stoking of the furnaces rather than hand-stoking should be provided.

3. The specifications should be so drawn as to permit competitive bidding by makers of chain-grate furnaces, Volund furnaces, and circular mechanically stoked furnaces.

4. Bids should first be received and the contract awarded for the purchase of the incinerator equipment. Thereafter, the building and other features of the plant should be designed and a separate contract awarded by competitive bidding.

5. No provision should be made for salvage of waste materials at the new incinerator.

6. Waste heat energy should be utilized by generating steam in the new incinerator. The steam should be transmitted to the City Hospital for use in that institution.

7. The burning of refuse in the incinerator should be confined to the five-day collection week. On Saturdays, Sundays and holidays when collections are not made, steam should be generated by burning oil under the new boilers in the incinerator.

8. The saving to the City in fuel and power bills by utilization of waste heat energy is estimated to be not less than $115,000 annually.

The selection of the South Bay area for location of the incinerator was influenced by the fact that it was zoned Unrestricted, was centrally located with respect to refuse hauling and was close enough to City facilities for effective waste heat utilization. Obtaining the plant site, however, was subject to several frustrating delays covering a period of over four years, from 1951 to 1955.

The first site selected was found to interfere with plans of the Massachusetts Market Authority for a wholesale meat market in this area. A second choice was objected to by the New Haven Railroad—which had taken over the market development from the Commonwealth—as it would be located in a proposed wholesale produce market area. A third site was selected on vacant land owned by the Commonwealth.

This latter site was under jurisdiction of the State Department of Public Works. Their plans for expressway construction in this area included using part of this land. When they had determined what land could be allotted to the City for an incinerator site, permissive legislation was filed in the General Court providing for the transfer of title to this land from the State to the City. Coincidentally, the City, in January 1955, made a taking of an adjacent parcel of 94,110 square feet from the New Haven Railroad.

Unfortunately, 1955 was an election year, the incinerator site became a political issue, and the bill was defeated. The City then made an additional taking from the New Haven Railroad in November, 1955 of 30,711 square feet, the only remaining land adjacent to the original taking and not owned by the State or needed for the expressway location. The total area of 124,821 square feet provides a

compact but adequate site. To obtain additional space for equipment and materials during construction, a 100-foot wide strip adjacent to the site has been leased from the Commonwealth for a five-year period.

About the time these takings were made, a petition signed by the wholesale meat dealers and processors in the area, strenuously objecting to this location for the incinerator, was submitted to City officials. They stated that the incinerator would be detrimental to their business in spite of the fact that state and local health authorities had approved the incinerator site, and the local Federal Meat Inspection Bureau was not opposed to it. A few days after the petition was filed, I toured the market area and counted over twenty barrels with burning trash in front of the petitioners' establishments, all actively polluting the air.

There are several junk yards in the plant vicinity where extensive burning of automobile bodies is carried on, and which produces dense clouds of black smoke. Smoke emission is heavy at times from some industrial stacks in view of the site. We have taken pictures showing some of these occurrences. The State Department of Public Health has placed air sampling stations at various points to measure the amount of particulate matter in the atmosphere around the incinerator site. It will be interesting to see how these samplings compare with those taken after the incinerator is placed in operation.

All of the recommendations made by the engineers were accepted by the City, but, as the preliminary design proceeded, some changes were made. Failure of all the metropolitan communities, excepting Boston, to accept Chapter 559, Acts of 1952, which provided for the Metropolitan District Commission to construct and operate incinerators for the disposal of refuse from communities accepting the Act, and failure of the Boston City Council to approve a site in Dorchester for an M. D. C. Incinerator indicated the advisability of increasing the capacity of the South Bay Incinerator from 750 to 900 tons per twenty-four hours.

During the four years spent in acquiring a site, construction costs increased to a point where it was deemed advisable to take bids on furnishing four as well as six 150-ton per day furnaces. This was done in order to keep within the available appropriation by purchasing only four furnaces—if necessary—and constructing a building to house six furnaces, the other two furnaces to be installed at a later date when money became available.

Bids were opened on December 2, 1955 of proposals that could be made for furnishing four, five or six furnaces with combustion chambers, tubular waste heat boilers, fly-ash arrestors and other appurtenances, with four alternate types of mechanically stoked furnaces, namely; rectangular, circular, traveling grate and rotary kiln. No bid was submitted on a rotary kiln furnace. The traveling grate prices were high, and the award lay between the rectangular and circular grate furnaces, the low bids on both types being very close.

It was decided that, of the two, the rectangular furnace was better suited for the refuse burning and steam generating requirements at this plant, and, as the slight difference in price of $2,300 in a contract totaling $963,000 did not warrant an award based on price alone, the contract for four furnaces with Flynn & Emrich stoking grates was awarded to the George Allen Company. Exception to this award was made by one of the circular furnace bidders, who commenced litigation which delayed the final approval of this contract until May 28, 1956.

Additional appropriations were made for the incinerator, and two more furnaces were contracted for in April, 1957 at the price bid on December 2, 1955. The equipment contract was at this time assigned to the Tynan Incinerator Company.

The design of the building proceeded during the aforementioned litigation, and when it had advanced to a stage where the foundation could be designed, it was decided to award separate contracts for the pile foundation and for the refuse storage bin in order to have no delay in start of construction while awaiting completion of the detailed plans and specifications of the remainder of the plant.

Borings taken by the Raymond Concrete Pile Company in August and September of 1956 showed a very deep bed of soft blue clay between a top twenty-foot layer of loose fill and hard pan at a depth averaging 165 feet. One boring was driven 249 feet before encountering rock.

A contract for driving approximately 65,000 linear feet of concrete filled 12-inch steel piling was awarded the J. F. White Contracting Company. Work started in December, 1956 and finished in June, 1957. The contract for construction of a refuse storage bin was awarded the Coleman Brothers Corporation in April, 1957, and the work was completed in January of 1958. The John Bowen Com-

pany was low bidder on the building contract which was awarded in November, 1957, and this construction is still in progress.

Plans and specifications for construction of a 12-inch steam main from the incinerator to the Boston City Hospital are completed and invitations for bids on this work will be advertised soon. As part of this pipe line will be located under the Fitzgerald Expressway and Southeast Expressway interchange, construction will have to be co-ordinated with the highway work. In addition to furnishing all the steam requirements of the hospital, it is probable that the surplus steam will be sold to the Boston Edison Company under an agreement now being negotiated.

The total cost of construction will be approximately $5,500,000, comprising the following main items:

Engineering and Inspection	$ 275,500
Land (Estimated)	75,000
Pile Foundation	418,900
Refuse Storage Bin	412,600
Equipment—Furnaces and Appurtenances	1,456,000
Building and Site Work including Steam Main	2,855,000
Miscellaneous, including Borings, etc.	7,000
Total	$5,500,000

The annual operating cost, not including amortization, is estimated to be $560,000, the largest item being operating personnel at $367,000 yearly. Fuel oil for burning over week-ends and as supplementary fuel on days of peak hospital demand will cost approximately $113,000; electric power, $46,000; and maintenance $32,000 per year.

The South Bay Incinerator will dispose of the refuse produced in the older sections of the City, namely: South Boston, Charlestown, Roxbury and the City Proper, including the North End, West End, South End and the Back Bay. These districts have a combined area of thirteen square miles, approximately one-third of the City's area, and a population of 380,000, approximately fifty percent of that of the entire city.

When construction of the South Bay Incinerator was recommended in 1951, the adoption of this method of disposal in place of the present method indicated a saving to the City of approximately $357,000 per year. Since that time, the reduction of $199,000 per

year in the disposal contract price and the increase in construction and operating costs show no appreciable savings to the City by incineration.

The following table shows that the sum of the present cost of refuse disposal and the cost of generating steam at the hospital equals approximately the net cost of incineration including the cost of amortization and taking credit for income from private dumping and sale of surplus steam.

COMPARISON OF REFUSE DISPOSAL COSTS—PRESENT METHOD VS. INCINERATION

PRESENT DISPOSAL COSTS	
Scow and Dump Contract	$372,000
Labor at Wharf Station	30,000
Rental of Dump Site	24,000
	$426,000
Generating Steam at Hospital	
Fuel Oil	$245,000
Labor	83,000
Maintenance	30,000
	$358,000
Total Yearly Cost with Present Disposal Method	$784,000
ESTIMATED COST WITH INCINERATION	
Incineration Amortization	$358,000
Operation and Maintenance	560,000
	$918,000
Generating Steam at Hospital	0
Income at Incinerator	
Dumping Privilege	$ 75,000
Sale of Surplus Steam	60,000
	$135,000
Total Yearly Cost with Incineration	$783,000

Neither economics nor sanitation was the determining factor in adopting incineration for refuse disposal. The prime factor was the

rapidly approaching exhaustion of refuse dump sites in the City. Neighboring communities, with one exception, do not have adequate capacity in their disposal sites for Boston's refuse. The relatively small remaining capacity at dumping sites in Boston must be reserved for incinerator residue. However, the increase in opposition to open land dumps and the tendency to legislate restrictions on them eventually may have forced Boston—if the incinerator was not built—to resort to all disposal on the Boston Harbor islands, at a cost considerably greater than incineration.

As stated in the beginning, municipal incineration has been a long time coming to Boston. However, the administrative officials of the City believe that once the leaders and members of civic organizations have an opportunity to inspect and observe a modern incinerator in operation, much of their former opposition to this facility will decrease, and we shall be able to obtain funds and sites for the additional incinerators needed to eliminate entirely the nuisance of land dumps in the City of Boston.