ITEM 8
MANAGER'S REPORT NO. 79
COUNCIL MEETING 84/12/10

RE: STATUS REPORT ON PROPOSED GVS&DD INCINERATION FACILITY BURNABY'S BIG BEND INDUSTRIAL AREA

MUNICIPAL MANAGER'S RECOMMENDATION:

1. *THAT the recommendation of the Director Planning & Building Inspection be adopted.*

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TO: MUNICIPAL MANAGER — 1984 December 04

FROM: DIRECTOR PLANNING & BUILDING INSPECTION — Our file: 15.601.1

SUBJECT: STATUS REPORT ON PROPOSED GVS&DD INCINERATION FACILITY BURNABY'S BIG BEND INDUSTRIAL AREA

RECOMMENDATION:

1. THAT Council endorse the concept of establishing a solid waste incinerator in Burnaby's Big Bend Industrial Area as outlined in this report.

2. THAT a further report be submitted to Council for its specific approval of this project following the selection of the size and type of the proposed facility and the provision of additional information as outlined in this report.

3. THAT a copy of this report be forwarded to:

Mr. D. L. MacKay, Commissioner
Greater Vancouver Sewerage & Drainage District
2294 West 10th Avenue
Vancouver, B. C. V6K 2H9

SUMMARY:

The following report provides Council with information responding to certain environmental and other factors associated with the proposed establishment of the GVS&DD solid waste incineration facility in Burnaby's Big Bend Industrial Area.

REPORT

1.0 BACKGROUND:

Council, on 1984 September 10, received a status report on the subject item (Manager's Report No. 55, Item 10). As a result of Council's consideration of this report and staff's attendance at the 1984 September 11 Special Joint Meeting which was held to hear presentations from the consortia bidding on the project, the GVS&DD was requested to respond to certain aspects of the incinerator proposal.

2.0 EXISTING SITUATION:

Pursuant to this request, they have submitted a report to Council dated 1984 November entitled "The History and Status of the GVS&DD Refuse Incineration Project". Staff from the GVS&DD will be available at the 1984 December 10 Council meeting to respond to any questions which may arise as a result of Council's consideration of this report.

For the purposes of our report, the matters raised previously by Council and staff are itemized in the following sections. Extracts from the GVS&DD report are then provided and followed by additional staff comment.

The appendices to the report are quite lengthy and, therefore, copies of the full report have only been provided to the members of Council with their agendas. Additional copies of the report, including the appendices, are available in the Planning and Building Inspection Department for review by other interested parties. These appendices are entitled:

> "Appendix A to Section on Air Pollution Control - A Brief Survey of Acid Gas Scrubbing Installations at Refuse Incineration Projects in Europe, Japan and North America".
>
> "Appendix B to Section on Air Pollution Control - Extract from Summary of Report by Working Committee on Thermal Reduction of the Lower Mainland Refuse Project - Dioxins and Furans in Relation to Incineration of Refuse".
>
> "Excerpt from Part 4 of Report by Thermal Reduction Committee, Lower Mainland Refuse Project - Expected cost of 228 t/d and 456 t/d Refuse Incineration Plant".

2.1 SITE SELECTION

2.1.1 Municipal Position

Council has previously been advised that several sites were under review in close proximity to the Belkin Paperboard plant at the foot of Wiggins Street in Burnaby's Big Bend Area, with preference being given to acquiring property from Belkin Paperboard. The GVS&DD had requested the Planning and Building Inspection Department to pursue the possibility of closing portions of the Thorne Street and Wheaton Street road allowances for inclusion in the incinerator site as illustrated on the attached Figure A.

As noted in the following section, Belkin Paperboard has agreed to participate in the project and, therefore the specifications for the performance, design features and operating requirements for the plant have now been drawn up for the Belkin site. The area of the redundant road allowances proposed for inclusion in the site has been revised as shown on the attached Figure B.

The road closure application which is in progress will be amended accordingly. Once we are in receipt of all of the technical responses a further report will be submitted to Council on this aspect of the proposal.

2.1.2 GVS&DD Report

(a) History

On 1981 October 21, a Solid Waste Subcommittee, established by the Administration Board in 1980 November to deal with and recommend on matters to do with solid wastes, recommended to the Water and Waste Management Committee a five part program. The third part of the program was as follows:

> "Acquire a site and prepare designs for the building of an incinerator with energy recovery."

The Subcommittee considered incineration as the only practical alternative to landfilling for disposal of wastes that cannot be recycled. Although it considered incineration to be expensive in comparison with landfilling, the Subcommittee felt that in order to prepare for the future and gain actual operating experience, the Region should undertake a refuse incineration project with energy recovery, but noted that only proven technology should be considered.

The Water and Waste Management Committee and the Board accepted the recommended five-part program, and accordingly proposals were invited on 1982 April 05 through a widely advertised formal "Request for Proposals" for the disposal of at least 70,000 tonnes per annum (t/a) of municipal wastes by incineration. Proposals for incineration were received from 15 companies or joint ventures, and in addition some proposals for other alternatives to landfilling were received.

All major technologies were represented among the 15 proposals for incineration, namely, in addition to mass-burning on grates (MBG), also modular (MOD) two-chamber incinerators and semi-suspension burning of refuse-derived fuel (RDF/SSB). Illustrations of the three major types are appended hereto as Figures 1 to 3 (attached). Figure 4 (attached) shows a simplified section through an MBG plant on which the major components have been identified. Figure 5 (attached) shows a sectional engineering drawing of a new plant in West Germany, also with components labelled. This gives an idea of the complexity of such plants which in that case includes the burning of sewage sludge and electric power generation.

After a lengthy process of detailed evaluation of ten of the proposals on the basis of 29 criteria grouped in five categories, the three proposals with the highest rating scores were the following consortiums:

Canadian General Electric/Volund
Dominion Bridge-Sulzer/Von Roll
GKN Birwelco/Martin

the first named Company in each case being responsible for the proposal and the second named being the supplier of the combustion system and specialized know-how.

The three European technology vendors offer systems for mass-burning on grates which have been installed in hundreds of incineration plants throughout the world, mainly since the early sixties, but some of the plants have been in operation for more than thirty years. The combined annual throughput of the more than 700 furnace units using the systems of these three vendors is over 40 million tonnes, i.e., about 40 times the total amount of refuse generated in the GVRD.

On 1983 January 19, the Board approved the commissioning of the said three joint ventures to prepare detailed designs and firm tenders for construction of an incineration plant and for its operation over a period of at least twelve years.

At the time when the RFP was issued, no specific user had been selected but four possible users of steam had been identified, all of them presently generating steam from natural gas, so that substitution by refuse-generated steam would qualify the incineration plant for a grant under the Federal Government's Forest Industry Renewable Energy (FIRE) program. In 1981, the FIRE program was extended to all biomass including refuse. It pays up to 20% of the capital cost of plant constructed before 1987 March. An application for a FIRE grant to benefit this project was made in 1983 April, and a request will now be made to the Minister of Energy asking that the deadline be extended on the grounds that the present termination date did not provide sufficient time for the development, permitting, and construction of refuse incinerators.

It may be mentioned in this connection that substitution of gas-generated steam by refuse-generated steam will yield a much greater revenue than generation and sale of electric power. This and the additional capital cost for electric generating equipment make co-generation of steam for process or heating use and electric power unattractive in situations where all the steam can be sold to a steam user.

The best among the four possible steam users clearly was the Belkin Paperboard plant in the Big Bend Area of Burnaby, because:

i) Belkin's steam requirement is continuous and fairly even all year, and

ii) Belkin's steam requirement is more than twice the output of a refuse incineration plant of the basic size considered, viz. 70 000 t/a throughput, which at the normal availability for refuse furnace/boiler plants of 85% of the time requires a daily throughput capacity of 228 tonnes.

Since Belkin agreed to participate in the project, the specifications for the performance, design features and operating requirements for the plant have been drawn up for the Belkin site.

(b) The Tender

Considering that Belkin Paperboard would be able to absorb the steam output from a plant of twice the size initially envisaged, viz. a plant of 2 x 228 = 456 t/d or 140 000 t/a capacity, and further considering that a large plant would require a lower capital cost per unit of capacity and a lower operating cost per tonne burned, the bidders are asked to prepare designs and submit tenders for three alternatives:

i) Tender B for the basic size (70 000 t/a)

ii) Tender L for a large plant of 140 000 t/a capacity

iii) Tender E for the basic size, but with provisions for future expansion including the receiving hall, bunker, and stack sized for the larger plant.

While portions of the technical specifications were issued to bidders in draft form since 1983 December, the documents could not be completed until 1984 October, after arrangements for the site were completed and an understanding with the steam user reached. Tenders will now be received on 1985 January 15.

As it is well known, a project to establish a Solid Waste Management Plan for the Lower Mainland under the provisions of the 1982 Waste Management Act of B.C. briefly known as Lower Mainland Refuse Project (LMRP) was initiated in the Fall of 1983. The project will determine whether incineration should be a part of the Lower Mainland Waste Management Plan, and will establish criteria for the pollution control measures which are to be used on any refuse incinerator(s) that may be included in the Plan. The Working Committee on Thermal Reduction of the LMRP has found that the Belkin site presents one of the two most favourable opportunities for incineration in the Lower Mainland for attaining the lowest unit cost, if not the best. The availability of firm tendered prices before formulation of the Waste Management Plan will facilitate a decision on the incorporation of the Belkin project in that plan.

2.1.3 Staff Comment

The case for the establishment of an incineration facility at the Belkin site is well founded and subject to satisfying the environmental aspects described in the following sections, it merits support. Once the final tenders have been received and a decision made on the actual type of incinerator to be employed, the GVS&DD will be in a position to provide more specific information.

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2.2 DESIGN CONSIDERATIONS

2.2.1 Municipal Position

As the design proposed for the development will require municipal approval under the various By-laws and Codes the GVS&DD was advised that it would be beneficial for all concerned to have early contact and consultation with municipal staff in the design process. With reference to building siting, vehicular and emergency access, environmental considerations, site development standards, and the like, the GVS&DD was advised that we would be pleased to assist in providing information and contact with other pertinent municipal departments. In this way the plans and other necessary applications for the ultimately selected scheme may be prepared and approved in as direct and efficient a way as possible.

2.2.2 GVS&DD Report

(a) Appearance

The actual plant will occupy a relatively small part of the 1.8 ha site. Plan SF-1749, Sketch 14, (Figure C attached) which sets out principles for arrangement of access and roads, illustrates this.

The entire plant, including the receiving hall in which the trucks stand while discharging their load into the bunker, will be in a building enclosure, except for the electrostatic precipitators (ESP) which have metal enclosures that allow them to be exposed to weather.

The specifications require that the plant shall have a pleasing, attractive appearanace and be a visual asset to the developing industrial area in which the site is located. Going by examples of other plants designed by the bidders, there is no doubt that a satisfactory appearance will be achieved. An outstanding feature will be a stack of 60m height which, under the regulations of Transport Canada, has to be painted near the top with alternating orange and white bands. Occasionally a small plume of water vapour may be visible above the stack.

(b) Traffic

Assuming an average load per truck of 7 tonnes, about 46 truck loads of refuse have to be delivered on 5 days per week to keep the 70 000 t/a plant operating continuously. Most of the traffic will be during one hour in the late morning and during two hours in mid-afternoon. It will be via Marine Way and 1 500m of municipal roads through the industrial area from the nearest exit/access on Marine Way.

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2.2.3 Staff Comment

Once bids have been received on 1985 January 15 and a decision made as to the specific technology to be employed, we anticipate being in a position to pursue the requisite design considerations further with the successful consortium. In our view it is essential that this be done at an early stage to avoid any possible delays if a decision is made to proceed with construction.

2.3 PLANT NOISE

2.3.1 Municipal Position

The GVS&DD has been requested to prepare and submit a detailed acoustical study showing projected noise levels during the refuse incineration operation, both at the property line and within the nearby surrounding community.

2.3.2 GVS&DD Report

The plant is to be designed to fully comply with the requirements of the Burnaby Noise and Sound Abatement By-law. Observations by District staff at operating refuse incineration plants, some in sensitive urban areas, indicate that noise emissions should not be a problem. Equipment such as the forced draft fan and the fans of the air-cooled condenser which are external to the plant building enclosure can be satisfactorily baffled to reduce operating noise if that were necessary. Two illustrations from Switzerland (Figures 6 and 7 attached) show refuse incineration plants in relatively close proximity to residential apartment dwellings.

2.3.3 Staff Comment

The Chief Public Health Inspector has stated that the GVS&DD are predicting incineration noise emission levels at the plant property line will be in compliance with the Burnaby Noise or Sound Abatement By-law. The concern which is yet to be addressed by the GVS&DD is the predicted plant noise emission level within the surrounding residential communities.

Our experience has shown that the elevated embankment on the Burnaby South Slope residential area increases their reception of noise produced within the Big Bend. With certain portions of the South Slope residential area being in direct site of the proposed incineration plant and the 60 metre high stack, we are anticipating questions from residents within the concerned area as to whether they will be receiving noise emission levels due to the incineration plant operation.

In view of the foregoing it is our intention to request the GVS&DD to provide the Environmental Health Division with the predicted noise levels for the South Slope residential area which will be in direct line of sight to the incineration plant.

2.4 STORM AND SANITARY WATER QUALITY CONTROL

2.4.1 Municipal Position

Inasmuch as Burnaby conducts an extensive program of eliminating all industrial wastes to the storm water system, the GVS&DD has been advised that they will be expected to detail proper storm water quality control, which would eliminate any leachate from solid waste or ash entering the municipal storm sewer system.

The GVS&DD has been advised that we will require a detailed report showing the quality of effluent to be discharged to the sanitary sewerage system.

2.4.2 GVS&DD Report

Normally, only sanitary sewage and waste water free of solids from washing of surfaces will be allowed to be discharged from the site. The boiler blowdown will be used for ash quenching. Occasionally there may be an excess which will also be allowed to be discharged to the sanitary sewer after cooling. All discharges will be to the sanitary sewage system in the Big Bend area, which is connected to the GVS&DD Annacis Sewage Treatment Plant. Drainage from any short-term ash storage (maximum 4 days) will be recycled to the ash quench tank and will not be discharged off the site.

No water will be allowed to be discharged into the storm drainage system.

2.4.3 Staff Comment

The foregoing would appear satisfactory subject to final design of the facility.

2.5 EXCLUSION OF CHEMICAL INDUSTRIAL WASTES

2.5.1 Municipal Position

The GVS&DD has been requested to show their method and manner of excluding various types of industrial chemical wastes from being received and incinerated at the proposed plant.

2.5.2 GVS&DD Report

Most of the refuse going to the incineration plant will be from municipal collection of household refuse and pickup of wastes from small businesses along the route. This will be complimented by deliveries of refuse collected by commercial haulers which load containers. Preference will be given to containers coming from apartment and condominium developments. Exclusion of chemical industrial wastes will be the responsibility of the waste collector and of the Municipality which can regulate exclusion of unacceptable wastes through its refuse collection bylaw. The GVS&DD and the incineration plant operator will co-operate fully to keep unacceptable wastes from entering the plant.

2.5.3 Staff Comment

Satisfactory controls would appear to be able to be put into place. If a future problem should arise, the Municipality can regulate the exclusion of unacceptable wastes.

2.6 DIVERSION OF WASTES TO ALTERNATE FACILITY

2.6.1 Municipal Position

During Council's consideration of this subject on 1984 September 10 a question was raised as to the type of back-up systems which would be available in the event of a shutdown of the incinerator.

2.6.2 GVS&DD Report

In addition to unexpected shutdowns of the plant, each furnaceboiler line of an incineration plant must be shut down for several weeks each year for scheduled maintenance. These durations will exceed the storage capacity of the refuse bunker which can only buffer brief unscheduled interruptions. However, the incineration plant will be part of a larger waste management unit containing at least one transfer station and bulk transport sytem and a landfill. During long plant shutdowns, refuse will be diverted to the transfer station which will probably be close to the present temporary facility at Fraser Mills.

The specifications ask the plant operator to schedule overhauls and maintenance work for the periods of seasonally low generation of municipal refuse in order to minimize the amount of refuse to be diverted to an alternate facility.

2.6.3 Staff Comment

The foregoing appears to satisfactorily respond to Council's enquiry.

2.7 RESIDUE

2.7.1 Municipal Position

The Big Bend Area is within the Fraser River Flood Plan and one of the conditions of industrial development is the raising of the site grade to achieve a floodproof elevation. With the location of the incinerator in this area the potential to utilize residual slag as landfill material has been advanced.

While it would certainly be economically beneficial to utilize this material as landfill, we expressed concerns on its suitability for this purpose given the high water table and sub-soil conditions which prevail in the area. The GVS&DD was therefore, advised that we would require a detailed report confirming its suitability for this purpose if it is their intention to use this residue as landfill. As part of the analysis it was stated that it may prove necessary to prepare a migration model of effluent distribution and its potential effect on the surrounding environment.

2.7.2 GVS&DD Report

The residue from incineration weighs about 30% of the raw waste and occupies 1/6 of the volume of compacted and partially decomposed raw refuse in a landfill.

Precipitation percolating through a residue landfill will leach out pollutants, mainly salts. Field tests in Denmark and Bavaria have shown that the concentration of heavy metals in such leachate is quite low because of the high alkalinity of the ash.

Whether residue can be used for flood-proofing fill in the Big Bend Area without concern for pollution should be investigated in field tests. The contract requires the residue to be taken to a landfill. To make the residue more suitable as base material for roads and daily cover of raw wastes on a landfill, a coarse separation of metal is specified.

All glass appears in the residue and may amount to as much as 20% of it, by weight. Separate collection of glass or institution of a depot-container system in the incinerator source area would benefit operation of the incinerator. Depot containers for waste glass are common in Europe and achieve about 30% recovery with one compartmented containers or colour-coded sets of containers per 4000 to 5000 population.

2.7.3 Staff Comment

This aspect of the proposal is not a matter of concern at this point in time as the contract requires the residue to be taken to a landfill.

If in the future it is to be used as landfill, detailed studies will need to be undertaken prior to its being approved for this use.

2.8 AIR POLLUTION CONTROL

2.8.1 Staff Position

Inasmuch as the issue of air contaminants would be of concern to Burnaby's citizens, both surrounding and in the nearby vicinity to the plant, the Environmental Health Department has requested a detailed report addressing the issue of identification and quantity of any contaminants dispersed to the atmosphere. They have requested the GVS&DD to provide a model predicting the dispersal of any contaminants to nearby communities (similar to modernization programs at Burnaby refineries).

2.8.2 GVS&DD Report

The report by the Thermal Reduction Committee of the LMRP lists the air contaminants emitted from refuse incinerators as:

(a)	particulate matter	[solid]
(b)	nitrogen oxides	[(b) to (f) gaseous]
(c)	hydrocarbons	
(d)	carbon monoxide	
(e)	sulphur oxides	
(f)	hydrogen chloride and fluoride	
(g)	trace elements	[(g) and (h) attached to particulates or in the vapour phase]
(h)	dioxins and furans	

Some of the contaminants can be minimized only by proper design of the combustion system and good operation, which assure sufficient residence time of the combustion gases at a high temperature and adequate oxygen levels. Some pollutants can be and are being controlled by add-on devices. In addition, a flue gas stack of sufficient height has an important function in achieving effective dispersal of pollutants that cannot be directly controlled and of residual pollutants that pass even the most efficient control devices.

Particulate emissions have traditionally been limited by regulations and controlled by particulate collectors. In the past, electrostatic precipitators (ESP) were predominantly used on refuse incinerators. West Germany, which now has 46 refuse incineration plants (RIP's) with an average plant throughput of 175 000 t/a, was the first country (1974) to require reduction of the emission of the so-called acid gases, hydrogen chloride (HCl) and hydrogen fluoride (HF), and in some specific cases also of sulfur dioxide (SO_2).

Many local jurisdictions in Japan subsequently also required HCl and HF reduction by scrubbing. In the last 2 or 3 years, several other countries have set emission limits which require scrubbing processes. HF in the raw gas is usually at or slightly above the controlled limit and by itself probably would not have led to a requirement for scrubbing. The main purpose of scrubbing is the reduction of HCl emission. Plastic wastes, particularly PVC, are the primary source of the chlorine in this compound.

Average raw gas concentrations of HCl in European RIP's are typically 2 to 3 times higher than in North American plants, probably due to greater use in Europe of plastics for packaging and a higher percentage of plastics in the refuse. Average HCl concentrations in Japan seem to be intermediate. The requirement for HCl scrubbing in some European countries and Japan has led to the development of a variety of scrubbing systems:

i) Wet scrubbing systems which produce waste water that has to be treated. The effluent contains dissolved salts. Also, wet scrubbing causes such a temperature drop of the gases that in most cases the gases have to be reheated to avoid corrosion, to prevent a large vapor plume coming

out of the stack and to provide sufficient buoyancy in the stack. Some of the wet scrubbing systems do not require separate efficient particulate removal equipment, such as ESP or fabric filters (FF). However, at least coarse removal of particulates in a cyclone is usually needed.

ii) Wet scrubbing systems which avoid the liquid waste treatment problems by evaporating the neutralized scrubbing liquid so that dry soluble salts are obtained.

iii) Dry systems or quasi-dry systems in which a dry alkaline powder or an alkaline slurry is injected into the flue gas stream. The reaction produces dry soluble salts, which are precipitated along with the fly ash in an efficient particulate collector. FF can achieve a somewhat higher removal efficiency than ESP and are now used in many cases, particularly where very low residual particulate concentrations in the treated gas are required. FF are more demanding of operator skill than the robust and well tried ESP, and the latter is used in many cases. Particularly in retrofit situations, existing efficient ESP are retained.[1]

The specifications for the RIP in Burnaby call for installation of an efficient ESP and for space to be provided so that a dry or quasi-dry scrubbing system can be installed if and when required. A stack height of 60m has been chosen to effect efficient dispersal of residual pollutants in the flue gas and to avoid the possibility of a "building downwash" effect. The US Environmental Protection Agency (USEPA) is making available a number of computer programs which simulate the dispersal of pollutants and calculate ambient concentrations over a grid of receptor points spaced over a distance of several thousand meters around a source. The input to the simulation includes unfavourable wind conditions and terrain information. Battelle Columbus Laboratories have carried out dispersal modelling for the GVS&DD project based on average HCl raw gas concentrations found in North America. The indicated maximum 1-hour concentration is below the ambient concentration limit specified by several jurisdictions generally known for their high standards. Even for the larger plant size, the calculated short-term concentration is below the long-term (annual average) ambient concentration established by the West German regulations to prevent a health risk, and is about one-third of the allowable short-term (1/2 hour) average under these regulations. It might be noted that the modelling with the sloping terrain model found the highest short-term concentration would occur under very stable atmospheric conditions and light wind about 3 km from the plant on the South Slope of Burnaby and would diminish rapidly going uphill with increasing distance from the source. Other results indicate that prevailing wind conditions make

[1] A brief survey of the usage of the several systems in Japan, Europe and North America will be found in Appendix A.

it unlikely that there would be any measurable effect at a distance of 2 or 3 km from the source over the southerly arc. The highest calculated short-term (1-hour) concentration within 100m of the source was about 20% of the annual average concentration which in West Germany is allowed as still not posing a health risk.

The Thermal Reduction Committee in its report to the Lower Mainland Refuse Project suggested that with respect to HCl the approach intended for the GVS&DD incineration project is a reasonable one. It is mainly based on continuous recording of HCl emissions from the plant and monitoring of ambient concentrations so that corrective action can be taken if and as required. This might simply consist of the relatively inexpensive addition of some agricultural lime to the refuse as it is being fed into the furnace or of blowing lime dust into the flue gas duct between boiler and ESP. An addition of 0.7% by weight of lime to the raw refuse at RIP Montreal has achieved a 50% reduction of the HCl emissions, which were much higher than found on average in North America. It was felt that with the actual raw gas concentrations known, just the right scrubbing system could be designed to meet the required emission limit and ambient standard. A system designed before the start of operation may be overly conservative and expensive, or else turn out to be inadequate.

Subsequent to receiving the report of the Thermal Reduction Committee, the Project Manager of the LMRP convened a four-member Working Committee on Incinerator Emissions with the task of:

i) reviewing relevant legislation and air pollution control requirements in various jurisdictions;

ii) reviewing emissions and control technology; and

iii) recommending emission requirements.

The Incinerator Emissions Committee (IEC) has this month (1984 November) submitted its report. A copy has just been received by the GVS&DD project staff and is being studied for its implications for the project. The recommendations appear oriented on the emission limits established or being considered for introduction by the most conservative jurisdictions in other countries (several States in the USA, West Germany, Switzerland, Sweden and local jurisdictions in Japan), and further on the views of some regulatory agencies in the western States of the USA as to the "best available control technology" (BACT), namely dryscrubbing for control of acid gas emissions combined with fabric filtration. It is obvious that acceptance of these recommendations would require the Belkin RIP project to be fitted immediately with an acid gas scrubbing system which would cost additional 3 to 4 million dollars to install and around $4 per tonne additional operating cost.

The information presented in Appendix A indicates that there is no consensus on BACT. It should be noted however, that the suggestive BACT concept is an American approach which does not have a counterpart in Europe or Japan, where in general the choice of "adequate control technology" to meet environmental protection requirements is left to the applicant. After careful study of the IEC Report, the GVS&DD intends to submit its comments on it to the Project Manager.

Among the trace organic substances found in incinerator emissions, the dioxins and furans have recently attained notoriety and become a cause of concern. The report on the Thermal Reduction Committee has presented a considerable abount of information on these substances. A four-page abridgement of the detailed presentation in the report and in supplementary notes thereto, taken from the summary, will be found in Appendix B. It might be added that recent information from Switzerland and Germany is confirming the conclusion in the TRC report that there is no cause for concern. An official of the Swiss Federal Environmental Protection Agency in personal communication advised that the recent measurements on a number of RIP's in Switzerland (results as yet unpublished) have shown concentrations of the same low order as earlier tests at a plant in Zurich, which had led to the conclusion that there is no health risk. In West Germany, a conference of the Ministers of Environment of the Provinces convened a broadly representative working group on "Dioxins in Refuse Incineration Plants". The group, after its meeting on 1984 August 29, issued a nine-page report which also is very reassuring. While no health risk caused by the trace emissions of dioxins is considered to exist, the proposed revision of the air emission regulations will include, as a precaution, additional operating requirements for assuring adequate burnout of combustion gases. These will include:

i) new requirements for minimum operating temperature and residence time,

ii) reduction of the emission limit for carbon monoxide (CO), and

iii) introduction of an emission limit for the sum of all organic trace compounds expressed in mg of total carbon per m^3 of flue gas.

The landfilling of solid residues containing dioxins at the low levels found in tests is considered, at the present state of knowledge, to be non-problematic.

2.8.3 Staff Comment

The Chief Public Health Inspector has advised that the GVS&DD report states the following concerning air emissions from the operation of the incineration plant:

"It might be noted that the modelling with the sloping terrain model found the highest short-term concentration would occur under very stable atmospheric conditions and light wind about 3 km from the plan on the South Slope of Burnaby and would diminish rapidly going uphill with increasing distance from the source. Other results indicate that prevailing wind conditions make it unlikely that there would be any measurable effect at a distance of 2 or 3 km from the source over the southerly arc. The highest calculated short-term (1-hour) concentration within 1000m of the source was about 20% of the annual average concentration which in West Germany is allowed as still not posing a health risk."

The Environmental Health Division would request the opportunity to review the computer model prediction data with GVS&DD officials in order that we can determine whether the above statement reflects a worse case scenario. In addition, the above statement points out the need for further discussions concerning the continuous monitoring of air emissions from the plant. Specifically, the Environmental Health Department would like to discuss the need for establishing air emission monitoring stations within the South Slope residential area for evaluating incineration plant emissions.

The Chief Public Health Inspector has also advised that he is currently awaiting receipt of additional information on dry scrubbers which will need to be evaluated before formulating a final recommendation in this regard.

3.0 CONCLUSIONS

The information provided by the GVS&DD in the main responds to queries raised by Council and staff. Prior to finalizing the municipal position on noise levels and the need for scrubbers to reduce flue gas emissions, it will be necessary to conduct further studies as more particularly described in the foregoing report.

The information contained in this report provides a good understanding of the incineration proposal and should assist Council in reviewing the merits of establishing such a facility in Burnaby's Big Bend industrial area. Once bids have been received and a preferred technology established, we anticipate that the GVS&DD will then be in a position to provide Council with a further report containing more definitive information. At that time we expect Council will be requested to provide approval to the project if it is concluded that it is to be advanced.

A.L. Parr
DIRECTOR PLANNING &
BUILDING INSPECTION

PB/mcb
Attachs:

cc: Chief Public Health Inspector
Director Engineering

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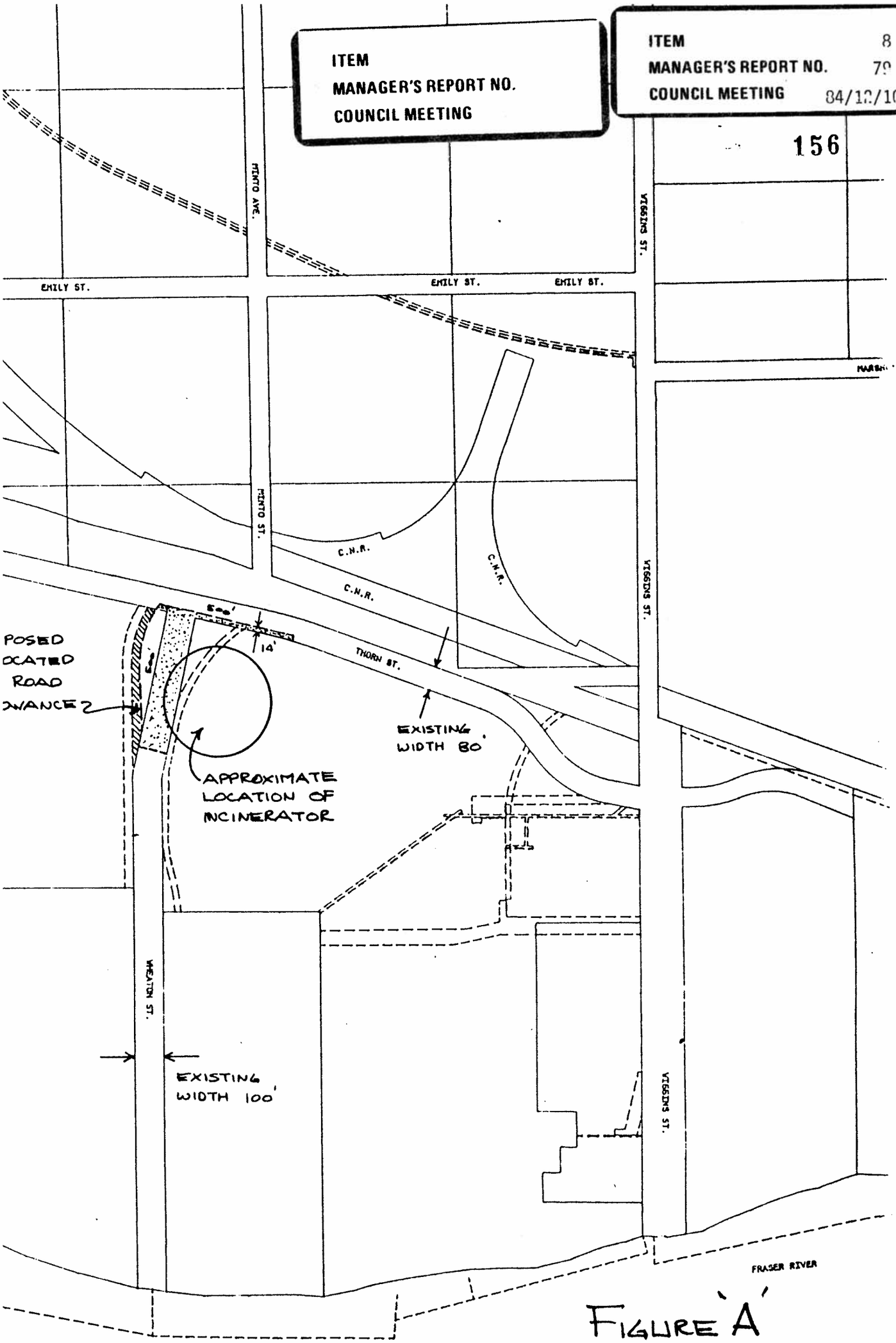

FIGURE 'A'

ROAD ALLOWANCES PROPOSED TO BE CLOSED & CONSOLIDATED WITH INCINERATOR SITE.

NORTH

SCALE 1:5000

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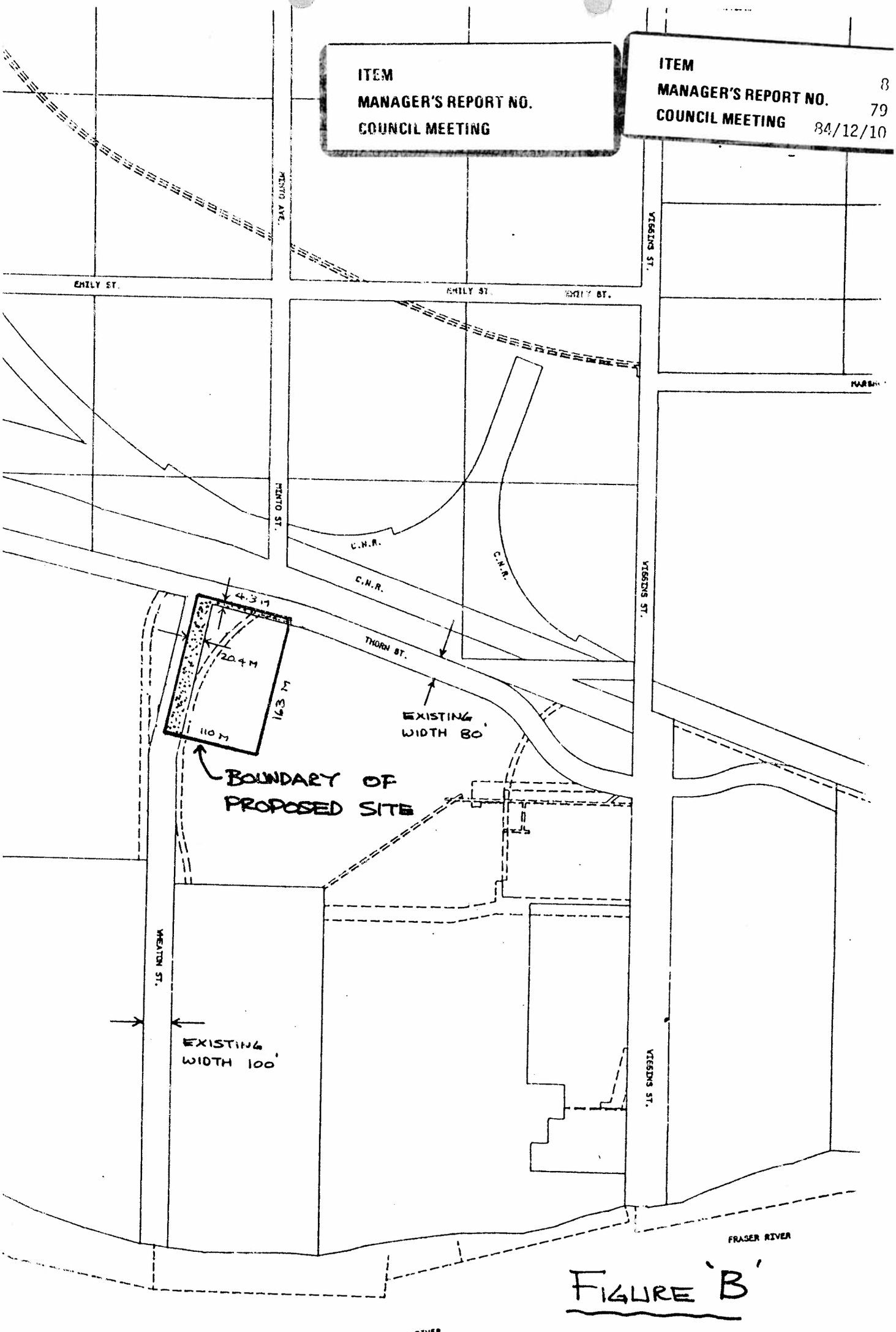
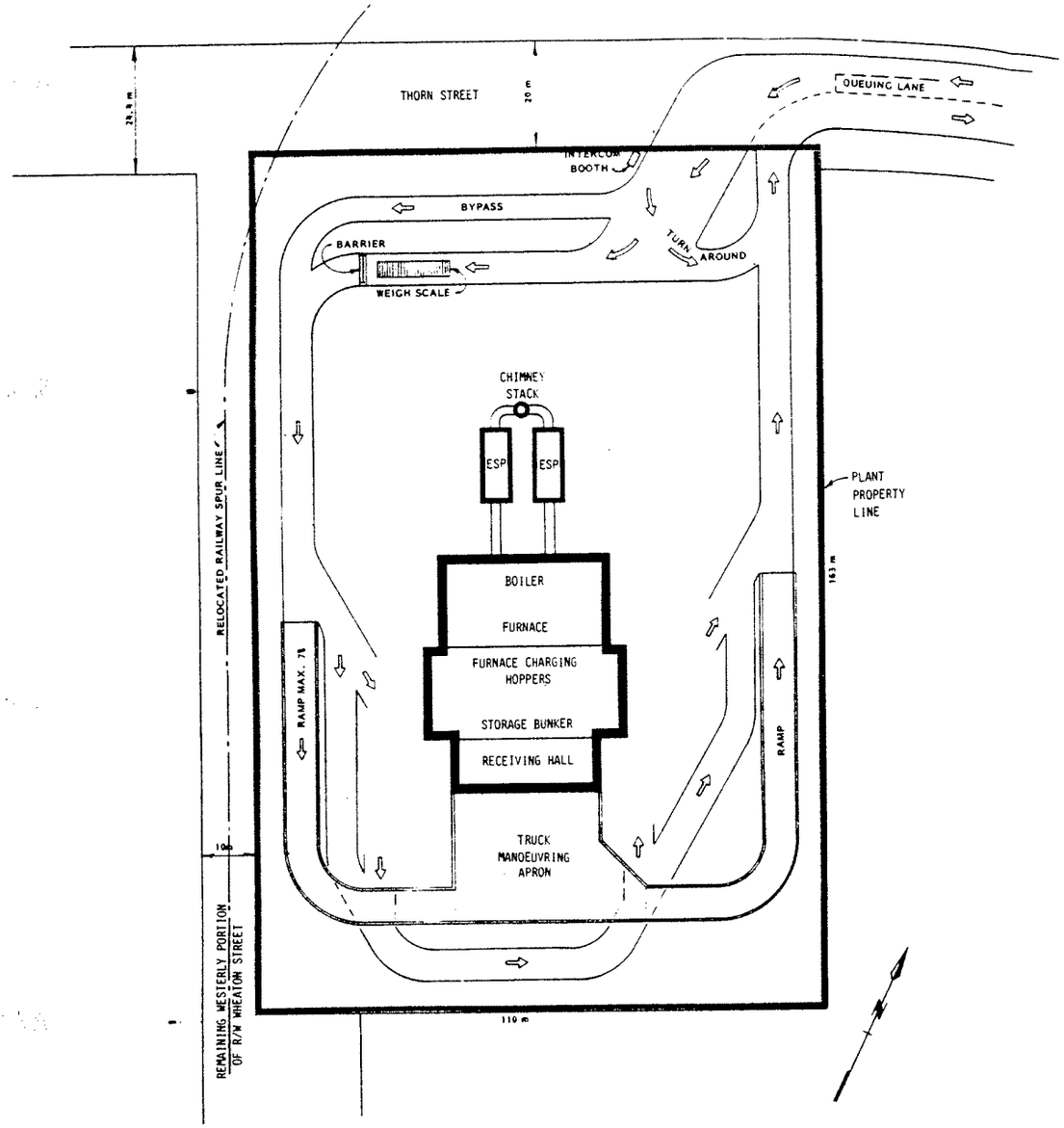
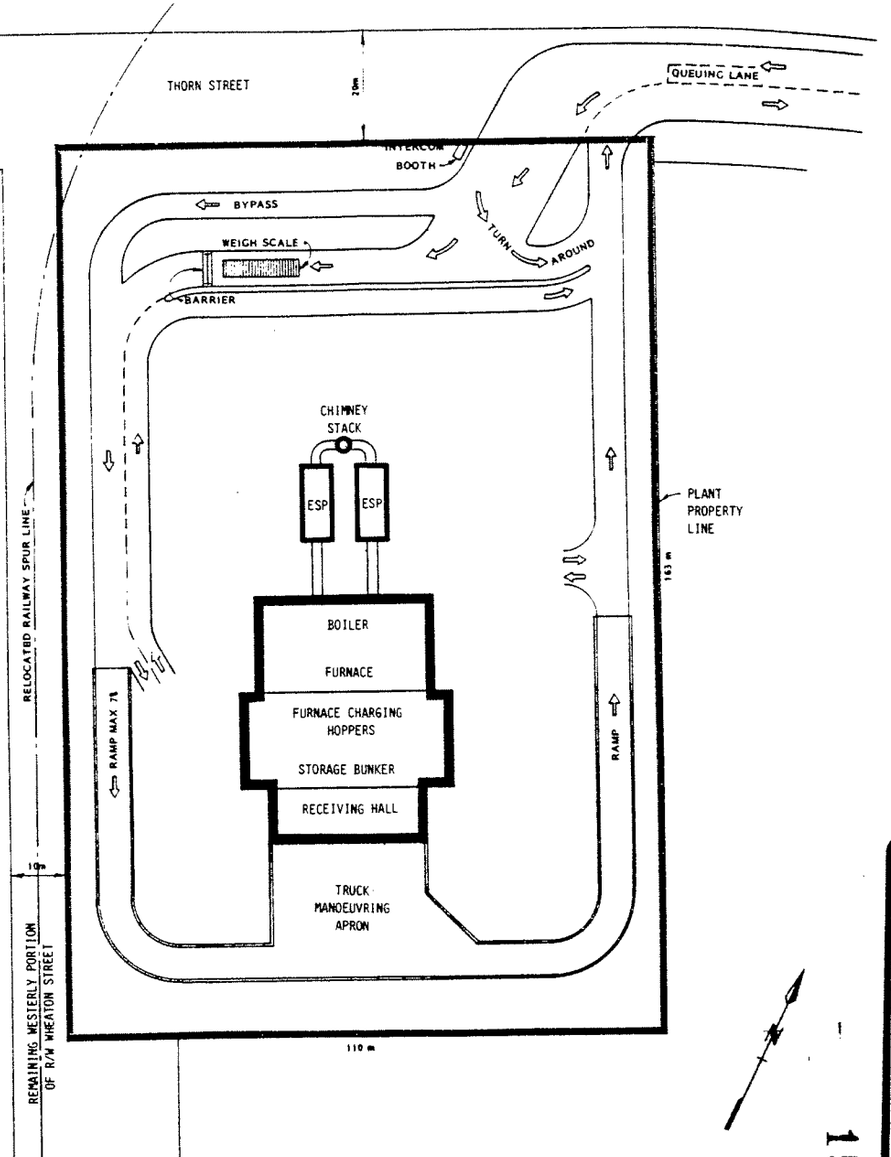


FIGURE 'B'

ROAD ALLOWANCES PROPOSED TO BE CLOSED & CONSOLIDATED WITH INCINERATOR SITE



ALTERNATIVE 1



ALTERNATIVE 2

FIGURE C.

THIS DRAWING REDUCED

Issue	Date	Desn	Drn	Chkd	Appd	Description
B	84-09-14					TURNING APRON FLARE CORRECTED

GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT

Design
Des chkd
Drawn/Tr MWD
Dwg chkd
Submitted
Engineer

CONTRACT No. 300
FOR
REFUSE INCINERATION PLANT
IN BURNABY
ENTRANCE CONTROL AND
ROADWAYS ON SITE

SCALE 1:500
DATE NOVEMBER 1984
SKETCH 14
DRAWING NO SF-1749

SUPERSEDES PRINTS OF THIS NUMBER WITH LETTERS PREVIOUS TO → B

ITEM 8
MANAGER'S REPORT NO. 84/12/10
COUNCIL MEETING 79

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ITEM 8
MANAGER'S REPORT NO. 79
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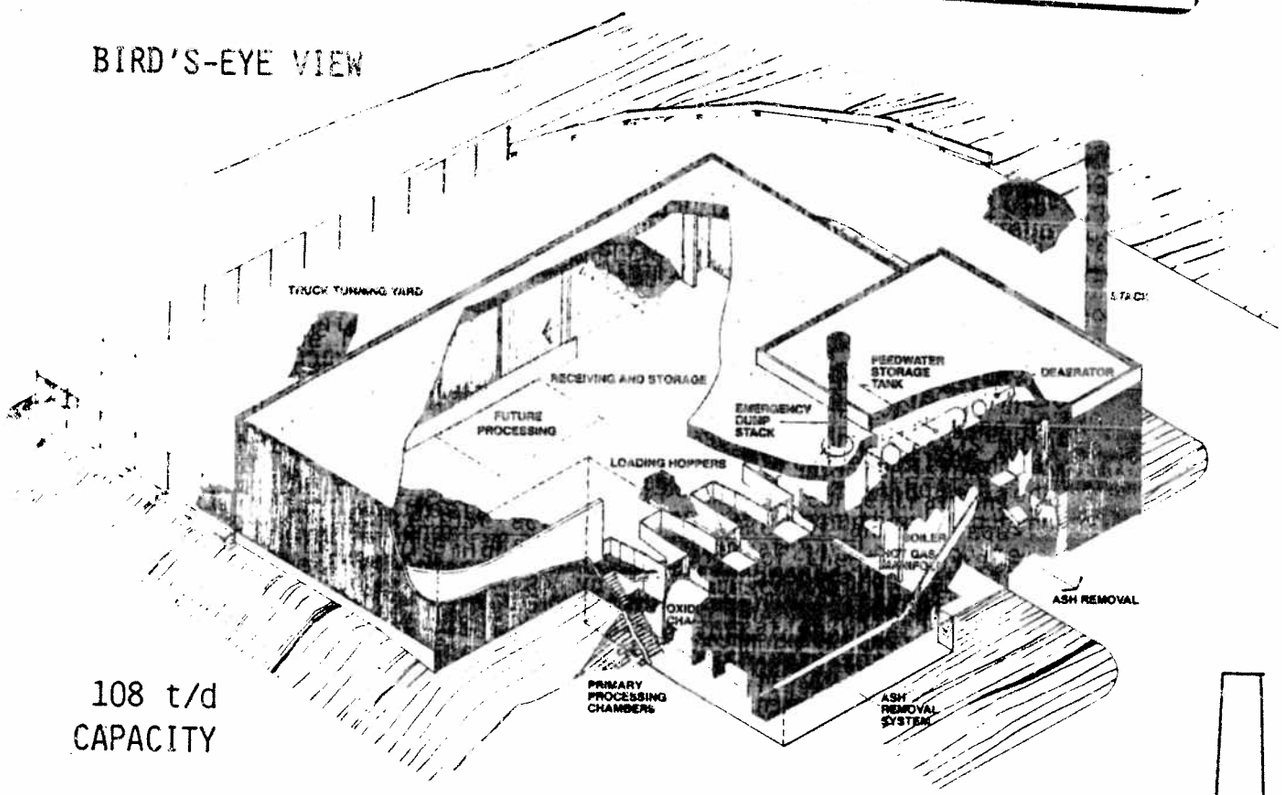
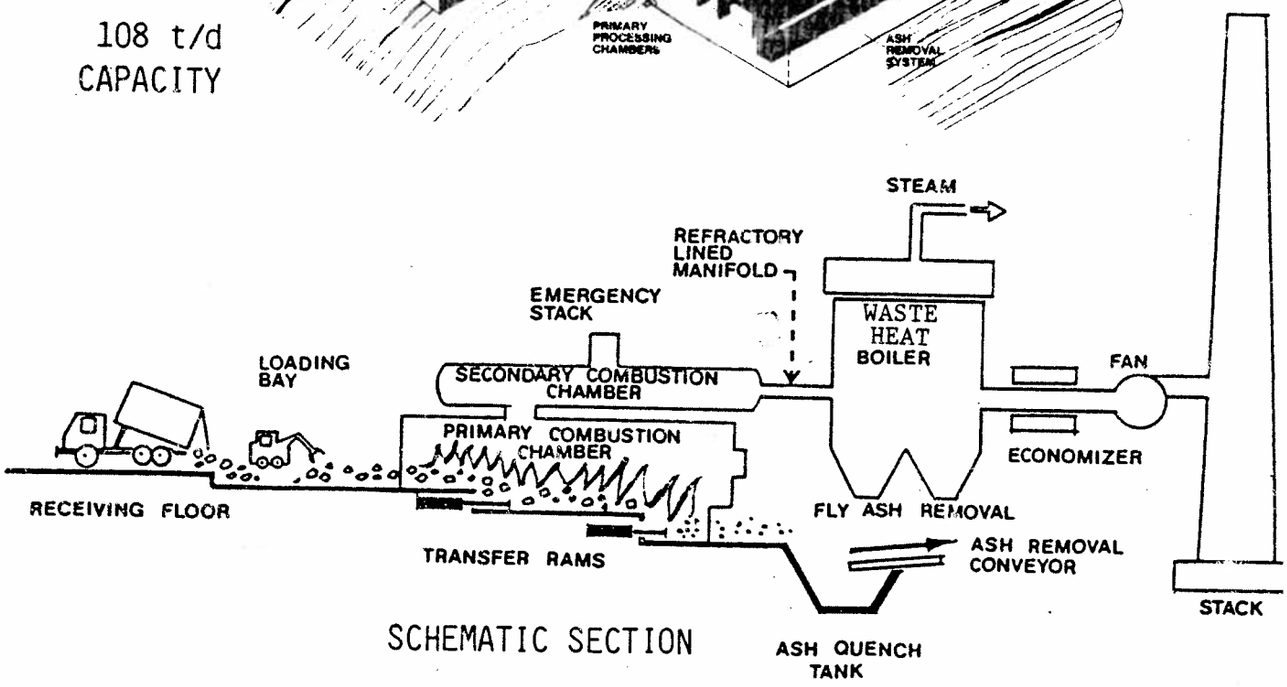
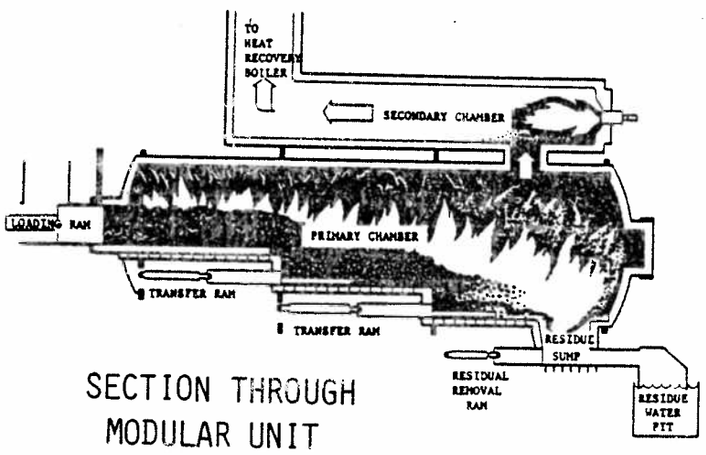
BIRD'S-EYE VIEW



108 t/d
CAPACITY



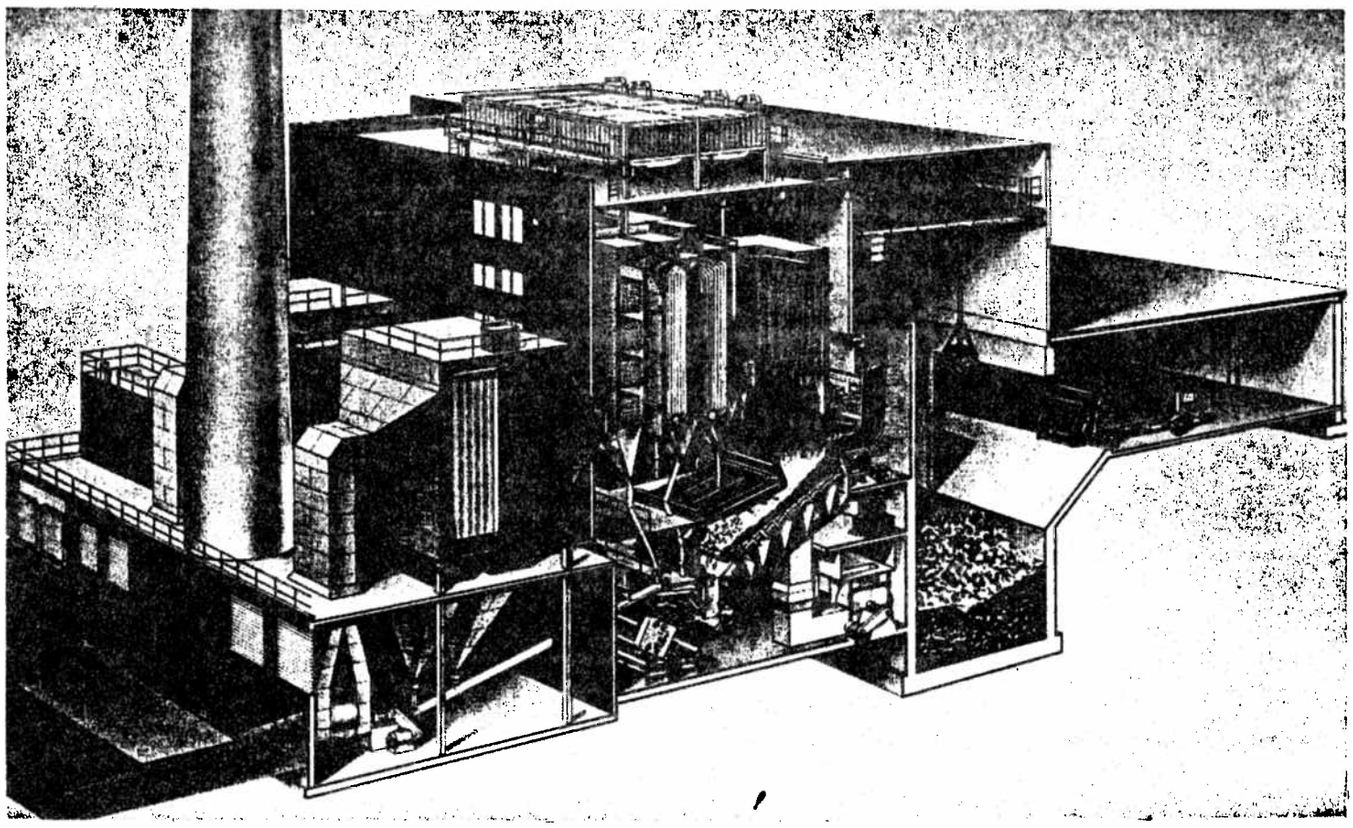
SCHEMATIC SECTION



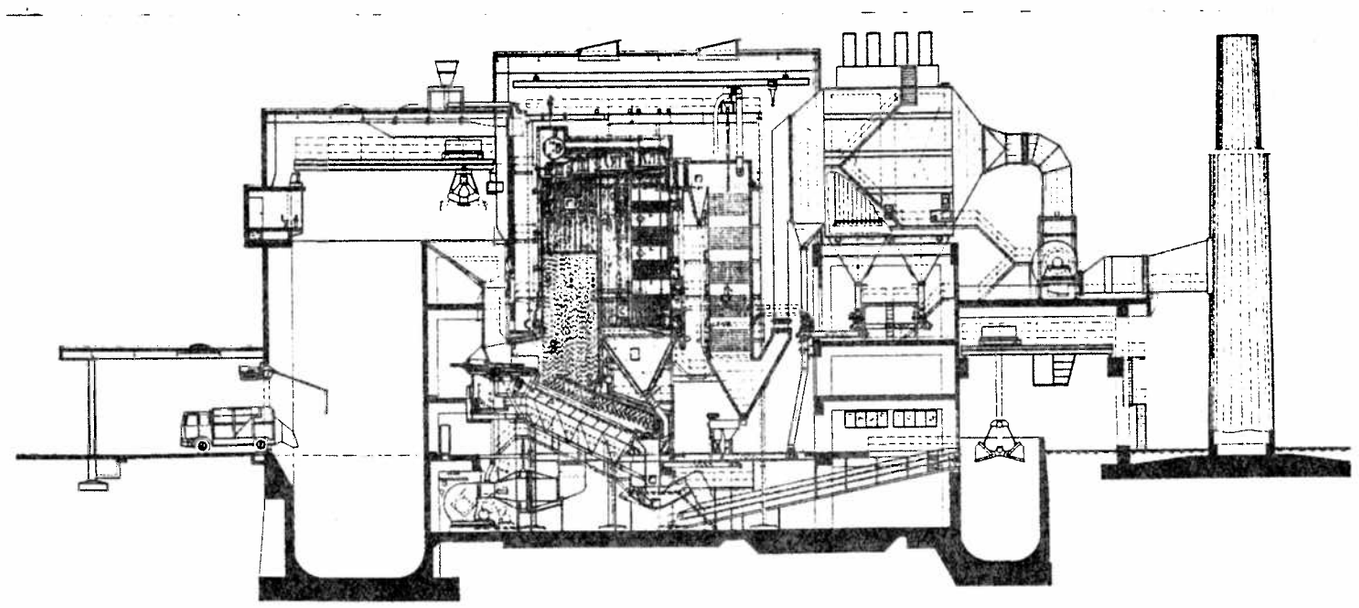
SECTION THROUGH
MODULAR UNIT

MODULAR INCINERATION PLANT
WITH ENERGY RECOVERY-
MODER
(CHARLOTTETOWN P.E.I.)

FIG. 1



RIP HARRISBURG PA (660 t/d - 2 UNITS)



RIP ZURICH-HAGENHOLZ (450 t/d - 1 UNIT)

M B G PLANTS

FIG. 2

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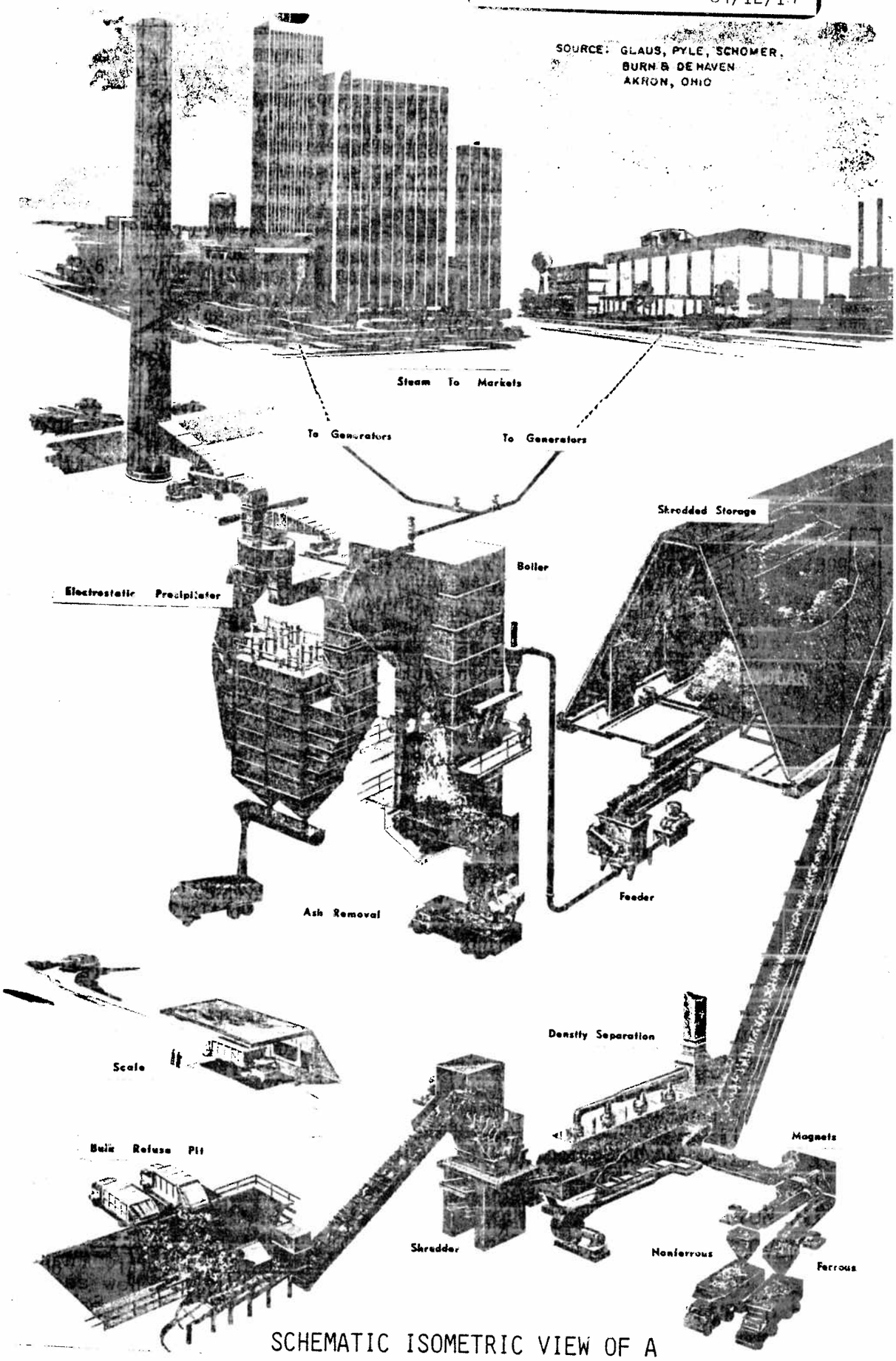
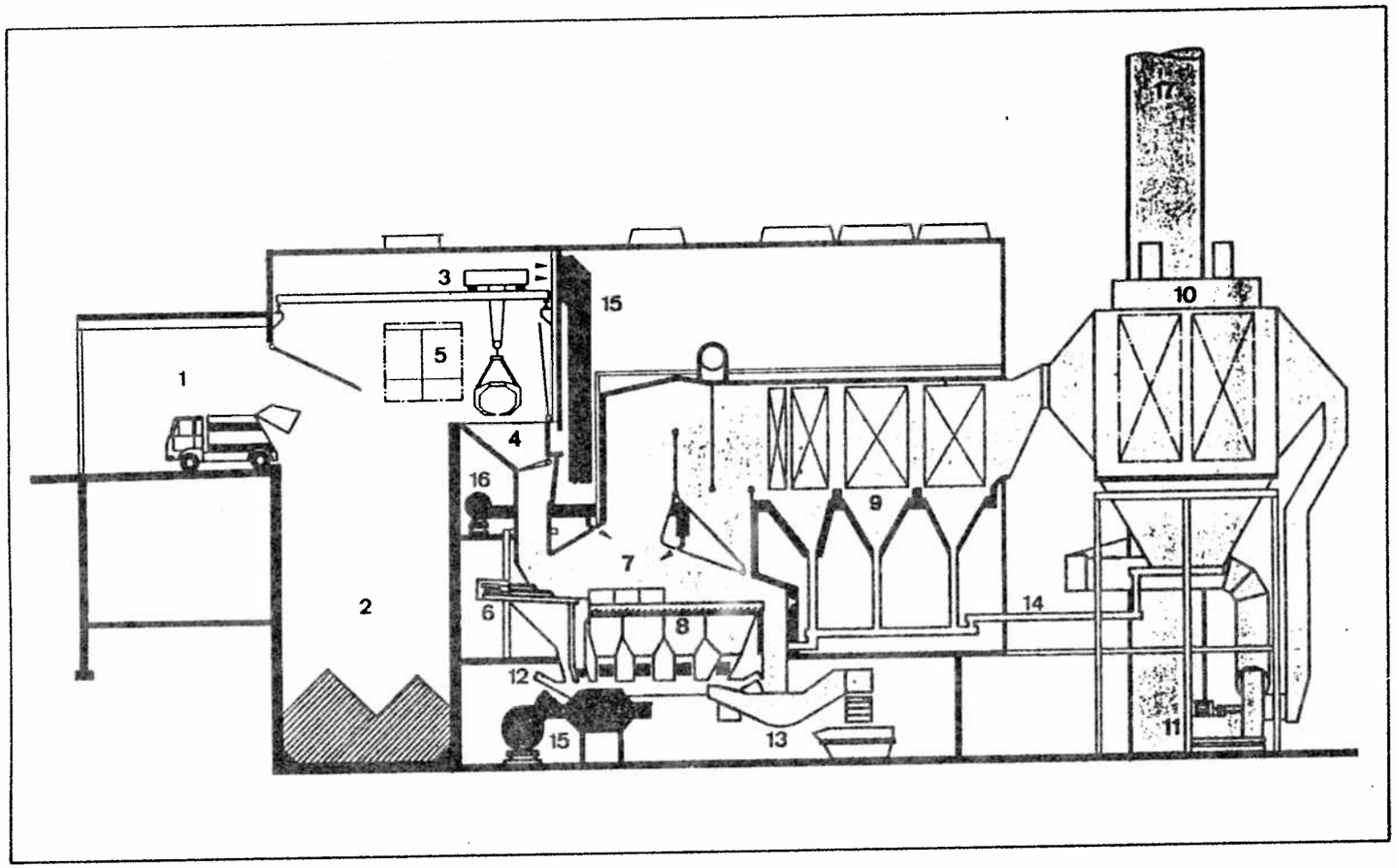


SCHEMATIC ISOMETRIC VIEW OF A RDF/SSB PLANT (AKRON, OHIO)

FIG. 3



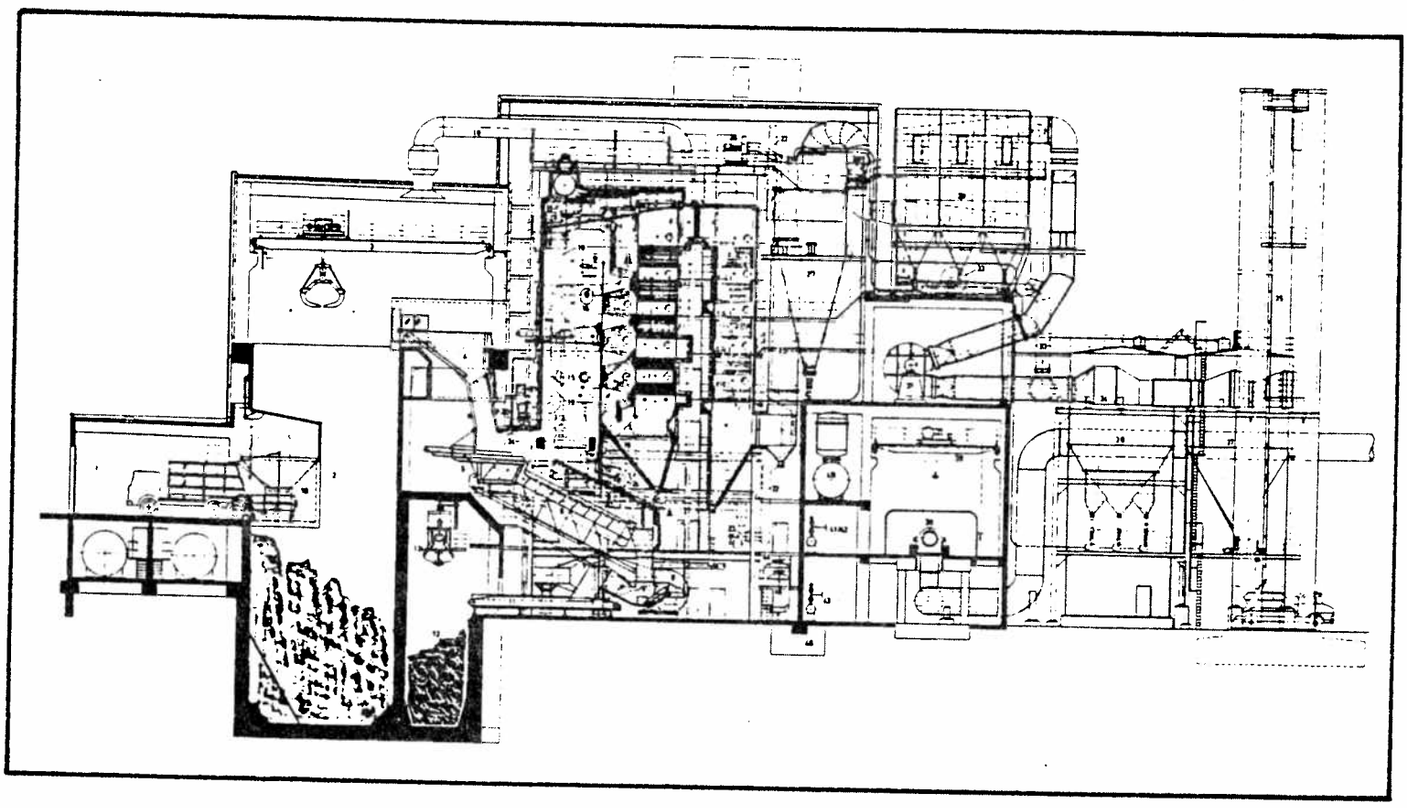
MBG RIP

BADEN-BRUGG

(SWITZERLAND)

1 Tipping area
2 Refuse bunker
3 Crane
4 Charging hopper
5 Crane control room
6 Feeding device
7 Combustion chamber (furnace)
8 Grate
9 Steam boiler
10 Electrostatic precipitator
11 Flue gas fan
12 Grate siftings chain conveyor
13 Residue discharger
14 Fly ash transport system
15 Primary air system with air preheater
16 Secondary air system
17 Stack

FIG. 4



REFUSE FIRED POWER AND HEATING STATION
RIP WÜRZBURG (MBG), WEST GERMANY

LEGEND

1 Tipping hall
2 Refuse storage bunker
3 Refuse handling crane
4 Charging hopper
5 Feeder
6 Stoker grate
7 Residue discharger
8 Forced draft fan
9 Steam air preheater
10 Rotor shear for bulky refuse
11 Residue conveyor
12 Residue bunker
13 Residue handling crane
14 Boiler
15 Oil burners
16 Hot flue gas recirculation
17 Fly ash conveying system
18 Combustion air intake duct
19 Sludge drying plant
20 Sludge feeding point
21 Drag chain sludge conveyor
22 Secondary air intake duct
23 Secondary air fan
24 Secondary air headers
25 Conditioning tower
26 Additive injection fan
27 Reactor
28 Flue gas duct
29 Fabric filter
30 Clean flue gas duct
31 Induced draft fan
32 Filter preheating fan
33 Emergency bypass
34 Silencer
35 Multi-flue chimney
36 Additive silo
37 Fly ash silo
38 Turbine house crane
39 Turbo-alternator
40 Feedwater storage tank
41 Low-pressure steam manifold
42 High-pressure steam manifold
43 Start-up manifold
44 Condensate storage tank
45 Flash tank
46 Mixing and cooling basin

FIG. 5

RIP BERN, SWITZERLAND (VON ROLL)

STAGE I 2 x 100 t/d - 1954

STAGE II 2 x 240 t/d - 1976

FIG. 6

Baden-Brugg
(Switzerland)

Resource recovery facility

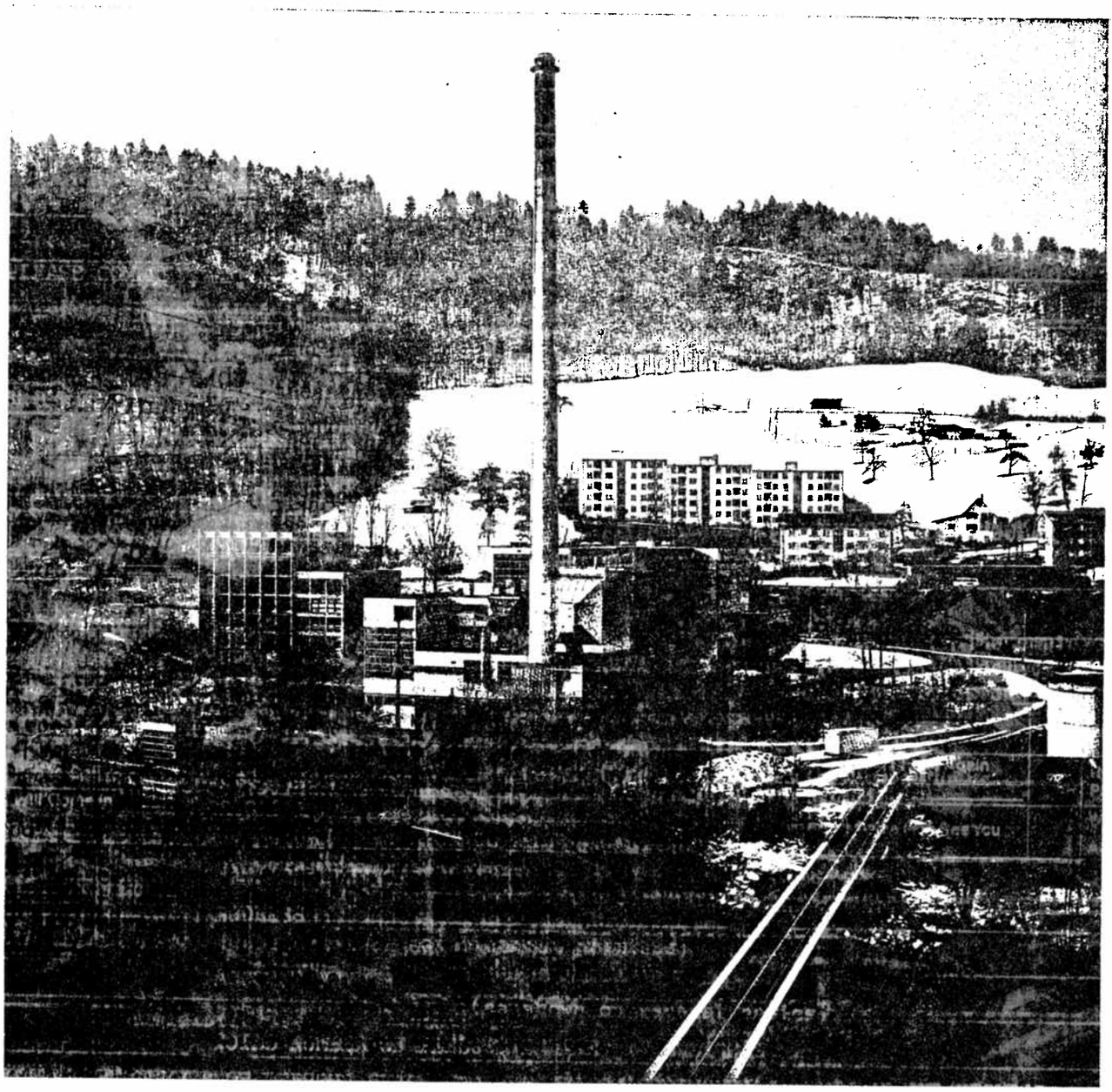


FIG. 7