WASTE TO ENERGY PLANT

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MANAGEMENT, HANDLING, AND RECYCLING OF MUNICIPAL, INDUSTRIAL, AND PATOGENIC SOLID WASTE IN THE AREAS OF:

Community Service

Solid Municipal Waste to

Electric Energy

and Cement Aggregates

Presented by:

MID WEST INTERNATIONAL GROUP, INC. ● MIAMI, FL.

MIDWEST INTERNATIONAL GROUP, INC.

INTRODUCTION

The new millennium has brought about a universal renaissance of the human race towards the environment.

People everywhere disapprove and condemn the attitudes and abuses committed by man through history, against the nature. It is thus, that since the last Earth Summit meeting in Rio de Janeiro, Brazil in 1992, movements have been generated to actively watch and fight against the spoiled and irresponsible behavior of small minorities that take advantage of a fearful and tolerant mankind.

The consumer society, product of the industrial revolution, contributes with the limitless physical presence and use of popular products, that captivate public opinion through sophisticated presentations that capture the imagination, made with raw materials of diverse origins, that day to day constitute a very substantial volume of tons of municipal and industrial solid waste.

There is a tremendous lack of information in Latin America and the Caribbean on the subjects of storing, harvesting, appropriate handling and final disposition of solid waste.

Throughout history, for solid waste disposition, the open air dump has prevailed, resources established from the times of the conquest. These solutions caused congregations of foreign people to the zone, giving rise to a progressive contamination of the environment, and in the process creating multiple areas in zones of exceptional natural wealth.

Once the main urban establishments are defined, the handling and solution to the disposition of solid waste is confined to the harvesting and public sanitation. These become well-known, when the community places its residues in the public thoroughfare to be picked up, and thus the necessity is created to establish a harvesting process, transport, storage, and final disposition.

Then, it became a habit to irresponsibly unloading residues of all types outdoors and also in the water streams, without realizing the contamination and deterioration of quality, contributing dramatically and significantly to the later reduction of volumes, situation that in due course, becomes a great National but also World wide problem.

From almost every country, voices are heard asking for a real solution, which apparently is distant, if we consider the difficult economic situation of our countries.

In most of the landfills dumps throughout Central, South America and the Caribbean, there exists a dramatic saturation and every day the insufficiency of the ability for sanitary disposition is move evident. These dumps have reached their limit insofar as the contamination and health risks which they create, because unless they have state of the art technology, most of the deposited solid waste will eventually contaminate the aquifers through the normal rain fall, which eventually contaminate the rivers, lakes, and wells, source of the potable water that is consumed.

Besides the toxic gases that the open air dumps produce, they are a dangerous source of contamination, not only for the people who live amongst the solid waste, but also for the adjacent districts, that are in the influence area and compose the communes where usually hundreds or thousands of people live. The effort to close many of these garbage dumps has not been possible inasmuch as there is no alternative that allows to solve the problem of final disposition for these cities.

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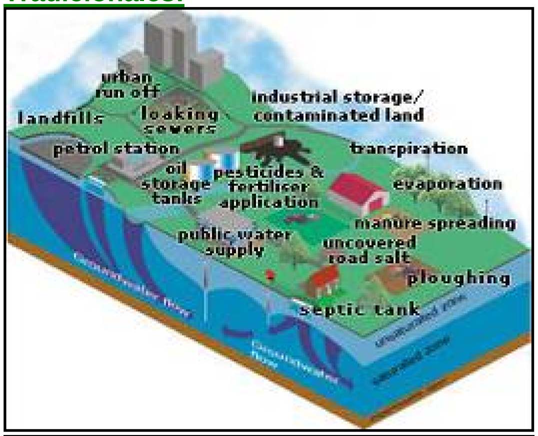
SITUACION ACTUAL

Technical Alternatives

At the present time, for final disposition of solid waste, mankind can accede to two choices of common use:

Tradicionales:



One of them is the evolution of the garbage. With high costs for the terrain preparation, which have to be lined with expensive materials to prevent the contamination by leachates and facilities for later capture and combustion of methane gas
This alternative would be justified for new open air garbage dumps, universal approved practices by environmental authorities . condemned to disappear for the danger that they represent.

Our Proposal

Highly industrialized countries like the U.S.A., and those that form the European Community have explored a new technical alternative, with visible and good results in the environmental order, besides capitalizing the advantage of several by-products that are obtained from the treatment by incineration of solid waste, using state of the art technology.

This technology conforms a recycling chain that provides different elements from significant added value for our civilization.

The particle incineration prepared to a suitable size, considerably reduces the final volume of waste and generates Good Combustion Practice (GCP).

Additionally with previous treatment of incinerated solid waste, organic fertilizers are obtained, and raw material for cement blocks. It is possible to say that this successful and proven technology of energy production constitutes the most novel, profitable, and adequate, to provide solutions with additional benefits, because it converts an expenditure into a lucrative operation, of high social content, by becoming a source of employment.

I. RECOLECTION

The harvesting activities should follow the following norms:

1. The harvesting should take place diminishing the environmental effects, especially the noise, and the fall of residues in the public thoroughfare. In case residues are spilled during the harvesting, the collector must effect the corresponding cleaning immediately.
2. The enterprise rendering the service must have back-up equipment to guarantee the normal benefit of the service of urban cleanliness in case of equipment failures. The service of garbage collection could not be interrupted by mechanical faults of the vehicles. Only through acts of God, or reasons within the legislation or by decree.
3. The service of harvesting should be performed in the frequencies and the schedules defined in the contract of uniform conditions.
4. In the zones wherein the harvesting system is by containers, the users must ask for the amount that is necessary so that the deposited solid waste does not overflow their capacity, and is in agreement with the harvesting frequency.
5. The compacting operation should take place in zones where it causes the least disruption to the residents where it takes place. This operation should not be done in front of educational centers, hospitals, clinics or any class of welfare centers.

II. RECYCLING

The residues begin their process, being transported through conductors where one first or second stage of recyclable product extraction is realised, separation of organic material from inorganic and its conduction of separated way to the following step.

Fulfilled the cycle of generation of energy by incineration of solid residues, is given rise to a secondary stage of our project, that although secondary perhaps constitutes most interesting by the social reaches that represent and the yield of by-products. “Mezzcrete” is a cement-like binder, obtained from the processing of elements that constitute industrial solid remainders, such as the ash of the coal, to which volcanic rock has been gotten up them, cuarcititas and silíceas sands, natural elements of great abundance in our geologic formation. The mixture exhibited to an industrial process of sophisticated technology, obtains a dry, as efficient end item as the concrete one elaborated on the basis of the Portland cement, and considerably economic.

III. INCINERATION

It is the part of the process that gives beginning to the recommended technique to realise the final disposition of solid residues.

IV. ENERGY

The gases produced during the combustion or incineration of the solid waste, are denominated poor gases. These gases warm up the water of the boiler thus producing steam to move the turbines and to generate electric energy, later they pass to a box or filter house ("bag house") equipped with electromagnetic filters and compaction that prevent airborne contamination by 98,5%. This energy is stored for later distribution.

V. SUB PRODUCTS

Fulfilled the cycle of generation of energy by incineration of solid waste, the second phase of our project comes into play, that although secondary perhaps constitutes the most interesting by the social impact that it represents and the yield of the by-products.

VI. MEZZCRETE®

The "mezzcrete" is a cement-like binder, obtained from the processing of elements that constitute industrial solid remainders, such as the ash of the coal, to which has been added cement, and pebbles, natural elements of great abundance in our geologic formation.

The mixture, exposed to an industrial process of sophisticated technology, obtains a dry final product, as efficient as concrete elaborated on the basis of Portland cement, and considerably more economic.

This product is obtained from the incineration of solid waste and dregs; solid residues of industrial processes that after being collected and being arranged, are transported on a conveyor belt to a hopper that activates a sprayer that reduces the particle size, to facilitate its later incineration, that finishes consuming between 30 and a 40% of activated charcoal, that has not been eliminated during the original industrial process.

The combustion, of course, give originates the production of poor gases which are later turned into electro energetic power.

The ashes and dregs fall within a fluidized chamber that maintain the flying particles in suspension, stimulated by the oxygen injections and natural gas that facilitate the combustion.

The incineration process continues until the total consumption of the present coal in dregs or ashes is verified.

In the same interior of the burner a staggered cooling begins, that moves the matter in combustion by means of a special transporter, resistant to the fire, causing the separation of the different sizes of particles, after passing to different sizes of sieves, obtaining from the finest, a dust with physical characteristics similar to cement.

The larger particles are subject to a new crushing, with the purpose of obtaining a pulverized, homogenous a mixture, technically denominated as “fly ash” and comparable in their final use to characteristic of consistency and compactness, to volcanic lava.

This pulverized mixture is lead to a silo, where a new cycle of cooling by precipitation takes place, fundamental to obtain an optimum product, ready to be bagged or sold in bulk.

With the end product, prefabricated construction products are elaborated, such as blocks, floor tiles, posts for lighting system, pipe for sewage system, besides works in particular tasks, such as plates and beams for laying foundations, columns, beams and mezzanine floors, water storage tanks, side walks, the layer of tread of the pavement and other applications wherein concrete is used in the different branches of construction.

This industrial process expresses an ecological connotation of first order, that seen from a simplistic view point, recycles polluting waste of difficult and expensive final disposition on the part of those that produce them.

THE PROPONENT

In order to develop this project, there has been an assembly of Engineering, Industrial Design, Industrial Manufacturing, Plant Assembly and processes of great social impact in America and the Caribbean and the organizational, creative and administrative capacity, in processes of economic reactivation, enterprise development and generation of economic models for the creation of companies and sources of communitarian well-being.

The first of the enterprises, Olivine Corp. Of Bellingham, Washington, U.S.A., founded in 1950, by P.E. Corliss Smith, Sr.

The second of the enterprises Mid West Waste Management of Lake Linden, Michigan, U.S.A., founded on 1994 by its president, P.E. George Lepisto.

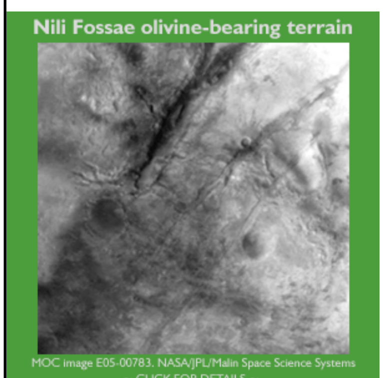
The third of the enterprises, Mid West International Group, Inc. of Miami, Florida, founded on 2000 by its president, P.E. Ysrael Fernandez

Our first company is the proprietor of the Olivine mine located in the Twin Sisters Mountains in the state of Washington, this material is very resistant to high temperatures;

▲ Jim Meyers (NASA) of the Columbia Reconstruction Project team places recovered Thermal Protection System tile on a tabletop mock-up of the wing of Columbia.

This material used by the agency of space exploration of the the United States government, known as N.A.S.A., is used to manufacture the tiles that protect the spaceships from the heat encountered in the reentry maneuver from outer space is extremely rare in our planet.

PLANETARY SCIENCE RESEARCH
PSRD Discoveries



Features

Pretty Green Mineral -- Pretty Dry Mars?
Written by Linda M.V. Martel

Hawaii's Institute of Geophysics and Planetology
--- The discovery of olivine-bearing rocks on Mars underscores the need to understand weathering rates of silicates in the Martian environment.

Spectra of the Martian surface from the Mars Global Surveyor Thermal Emission Spectrometer (TES) have been matched with laboratory
spectra of olivine. Todd Hoefen and Roger Clark (U. S. Geological Survey, Denver) and colleagues at Arizona State University and NASA
Goddard Space Flight Center reported a 30,000-square-kilometer area of olivine-bearing rock in the Nili Fossae region, northeast of Syrtis
Major. Olivine is the common name for a suite of iron-magnesium silicate minerals known to crystallize first from a magma and to weather first
in the presence of water into clays or iron oxides. The occurrence of olivine on the surface of Mars and its susceptibility to chemical weathering
has geochemists busy investigating how long it has been there and what that means about climate history.

Reference:

Hoefen, T. M., Clark, R. N., Bandfield, J. L., Smith, M. D., Pearl, J. C., and Christensen, P. R. (2003) Discovery of olivine in the Nili
Fossae region of Mars. *Science,* v. 302, p. 627-630.

Discovering Olivine on Mars

We can understand the eagerness in the search of this very valuable mineral, that was finally found on Mars, when it was explored by the robot some years ago.

The proponent through its partners has offices in Miami, Florida, Lake Linden, Michigan, and Bellingham, Washington, and companies associated in several countries of Latin America.

Its main objective is the technical assessment, diagnosis, design, construction and assembly of industrial projects of solid waste for development, as well as the operation and implementation of the same.

In order to take care of the public sector, our companies offer projects that provide solutions to environmental problems and of infrastructure with new American equipment guaranteed by the manufacturers, improving therefore the surroundings and the local infrastructure of an economic way, obtaining with them profits of great social impact, such as:

Treatments of solid municipal waste with generation of electric energy (1 to 20 Megawatts).

Aggregate elaboration to be used in the preparation of construction blocks and other necessary materials in the construction of urban infrastructure.

Our first company is dedicated to thedevelopment of environmental protection, was chosen to design the incinerators installed in a barge to clean and to incinerate the waste generated by the ecological disaster caused by the spill in the coasts of Canada, by the ExxonValdez, the greatest ecological disaster of our History

THE PROYECT

I. DEFINITION

Our company proposes to private investors, municipalities, organizations of the cooperative sector and the community in general, to create a company that mainly will be in charge of domiciliary, industrial and hospitable waste through technical incineration.

This project produces a series of interactions between all activities, that generate independent units of process and economy, all the keys in the harmonic development of the region and in the formation of a new culture of the businesses. The created employment directly and indirectly will significantly contribute to the well-being and social peace of all the area of influence.

The technical component is product of technologies of end, but especially of the capacity and experience of a maintenance battalion, that guarantees of in case its success. The nourished good list of cities in the world, the highest added value, the advantage of by-products in versatile applications, Be growing and being developed gradually and constantly in accordance with its own results.

The investment component is based on a series of creative and concrete formulas that facilitate the understanding and the commitment of resources in an excellent combination of own position and financing. Our experience allows to predict us with absolute security that this project is highly profitable from the ecological point of view. final disposition of the solid residues, is a great problem, that of not being solved with creative projects, of highest participating content, the states will have to face catastrophes of incalculable social and environmental consequences in very brief terms.

The partial solutions only delay the time in which they operate, creating conjunctures that become extremely expensive and cumbersome for the users and constant sources of conflict with all the active entities (states, environmental institutions and organizations, users, industralists, etc.).

The .private sector must and has the obligation to undertake these projects, in which it must put all their capacity, make them successful, and change them effectively to make them profitable, by one of its own nature, converting them in its handle of its developments. Recycling in all its forms is an obligation of survival, and the planned conservation of the productive resources.

II. MAIN CHARACTERISTICS

The focus of the proposed plant as an environmental solution, incinerating to diminish the impact of environmental contamination caused by these municipal and industrial solid waste (MISW), is to totally use all materials the compose the solid waste.

We wish to mention the economic impact in the municipal budget and of the local company of public services with the handling of the MISW in the future, because in the long run, we have converted an expense into revenue. For the private industry, it is an investment opportunity to participate in this development according to the environmental law.

With the new MISW, the classification for an appropriate recycling will take control, applying technical procedures for an adapted handling and final disposition. Incineration techniques will be applied with maximum reduction of weight and volume for household, industrial, and hospital waste, and even to those in the landfills. There will be the option to process agricultural waste from the zone, like rice husk, processed sugar cane, etc., using their calorific value to generate electricity and thereafter, the ashes can be used as raw material in the manufacture of construction related items for houses of social interest, public works, infrastructure maintenance, and other components in the construction industry.

III.. PARTICIPANTS

For the development of this first draft, the proponent will have to be associated with the users and the private investors, with the industries that will provide and guarantee the amount of solid and industrial wastes (MISW) to process, the guarantees and documents necessary to facilitate the financial proceedings, of licenses and permissions. This new society or enterprise will be responsible to execute the project described herein. This enterprise will be in charge of the detailed Feasibility study, Development, Construction, Operation and Administration applying therefore a mixed or private enterprise model that works according to the law. The industries and municipalities can contribute with contracts of harvesting and final disposition. This will facilitate the creation and the operation of the new companies of public services that will emerge to affiliate themselves with this partnership.

IV. APPLICATION OF TECHNOLOGIES

The **INCINERATION** process, technique of domiciliary as well as industrial and hospital solid waste, begins with the preparation of the materials through classification and recycling, which uses a special mill of high resistance hammers. Thereafter it goes to the incinerator depending on the type of waste, if it is pathogenic or toxic, industrial, domestic or agricultural. The originating gases of this incineration warm up the water of the boiler that will produce steam to move the turbine that is used for the generation of electrical energy from 1 to 20 megawatts per hour by line of process. Later the ash is classified to prepare it and use it as raw material to create prefabricated concrete.

These prefabricated can be used for public works in maintenance and construction of routes, house of social interest, parks, schools or simply to offer them to other municipalities at low prices, only for their own developments.

This process is widely used in developed countries where they count with million dollars for these projects. We have adapted this so expensive technology to our needs according to the nature of the raw material, our waste and the volume.

The culture of extreme shortage and poverty in which we live, forces a group of the population to live on the landfills; many recycle in their homes, due to the shortage of capitals to be able to take advantage of a state of the art technology causing environmental deterioration for lack of solutions and technology.

All these factors and deficiencies guided us to create a system with high possibilities of success within our limitations, using state of the art technology with our low volumes, low level of investment with high and strict environmental control with good ROI and an excellent social investment in the matter of education, house and employment.

Thus it is especially important to avoid the creation of new landfills which are used without compaction where all the solid waste is stored and piled up, developing breeding grounds for rats and other types of vermins, foul odors, diseases, infections, and all types of miseries.

We make special emphasis that when organic materials decompose, they become methane gas, and in Latin America, 75% of the solid waste is of organic nature, which produces high leachate amounts which can filter to the phreatic mantles causing permanent ecological disasters. Foreign companies have erroneously recommended to the underdeveloped countries that they must apply the technology of volume reduction and how to cope with landfills, but have omitted to tells us about the disasters that these have caused in their countries.

The greater problem is the high cost of operating the landfill, its operation and maintenance is excessively high for our economies and it almost does not generate employment.

The other problem obstacle of the underdeveloped countries is the shortage of available low cost capital for these projects. It is necessary to consider the financial statements of our municipalities and their ability for indebtedness.

The landfill system for solid waste disposal is one of the oldest, since without technology for control and advantage of gases and leachates, it is the simplest and less expensive since it consists in digging a hole and burying the wastes just as other mammals like the cat do.

The great problem starts when we find the damage to the surroundings and see the environmental cost that we have created when burying our waste and those of our civilization.

The **INCINERATION** solution of domiciliary, hospitable and industrial waste, has been used and tested at world-wide level, and is the product of application of technologies of our industrial revolution, especially in the developed countries that produce high levels of solid waste.

Foreign companies erroneously have recommended that the developing countries must apply the technology to create landfills with obsolete technology for the treatment of landfills since it does not include the process of volume reduction and special treatment for its handling.

The last technology in landfills is the one of volume reduction. These companies do not reveal to us the disasters that landfills have caused in their countries. The greatest problem is in the environmental impact and the second is the cost of investment of the sanitary landfill, its operation and maintenance is excessively high for any economy, and more, for our economies. Another problem is the shortage of low cost capital for the development of these projects, and we must consider the financial statements of the majority of the municipalities in Latin America and their capacity of actual indebtedness.

This recommendation takes into account the difference of the solid waste handling in developed countries and their handling in Latin America and the Caribbean, since more than 75% of the solid waste is of an organic nature, which indicates a high generation of leachates which filters to the phreatic mantles causing the consequent ecological disaster of contamination to our rivers; thus the importance to avoid the creation of new landfills without technology where simply the waste is stored increasing the public problems as well as the health problems.

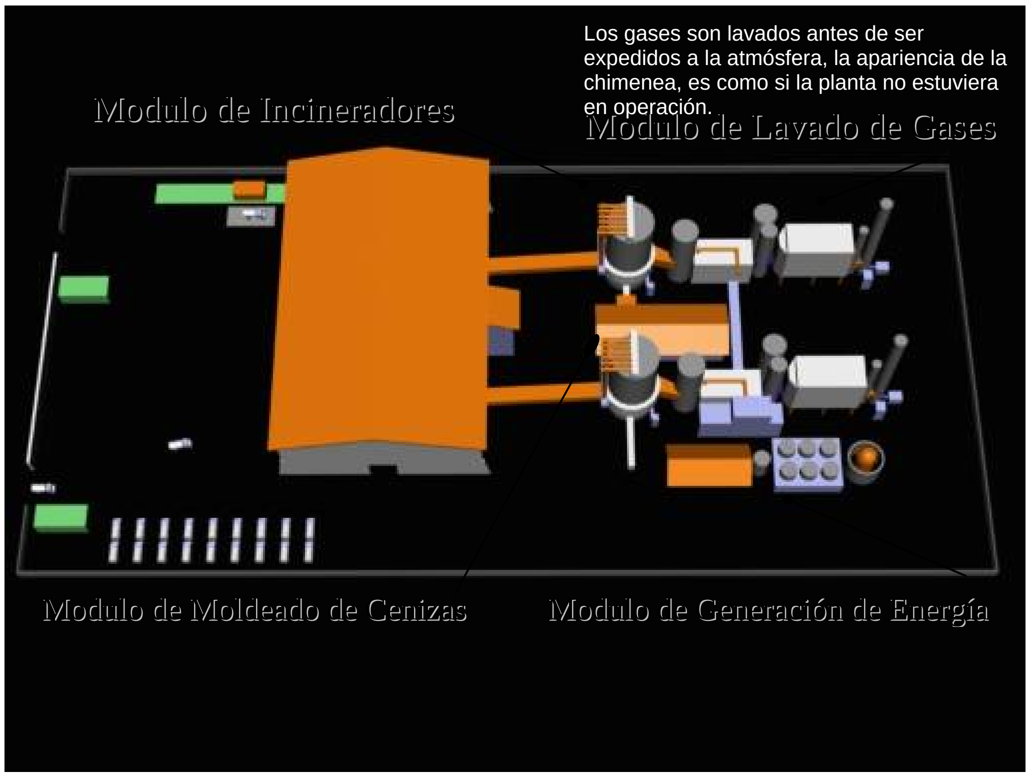
The present project of technical incineration with energy generation takes into account all those difficulties. The necessity to solve the increasing problem of environmental contamination and health generated by the final disposition of urban, industrial and hospital waste without having to pospone it, so that future generations are not faced with the very serious consequences that inaction would bring.

Against this type of problem we must be radical since our survival depends on it.

Let us then analyze the landfill technologies and compare them with the technologies of incineration to find the advantages and disadvantages of each of these systems.

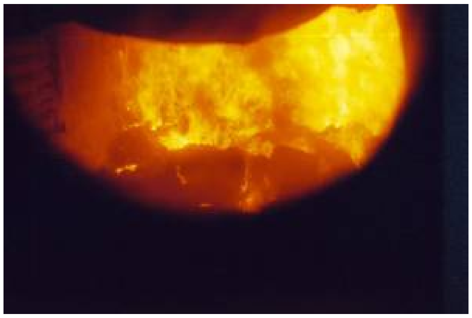
We will then evaluate the technological, economic and environmental variables.

TECHNOLOGY



1) INCINERATION SYSTEM

This system is based on the culture of environmental protection and recycling having used 100% of the waste.
Technologies used allow:
The use of less land than a landfill, no more than 5 hectares.



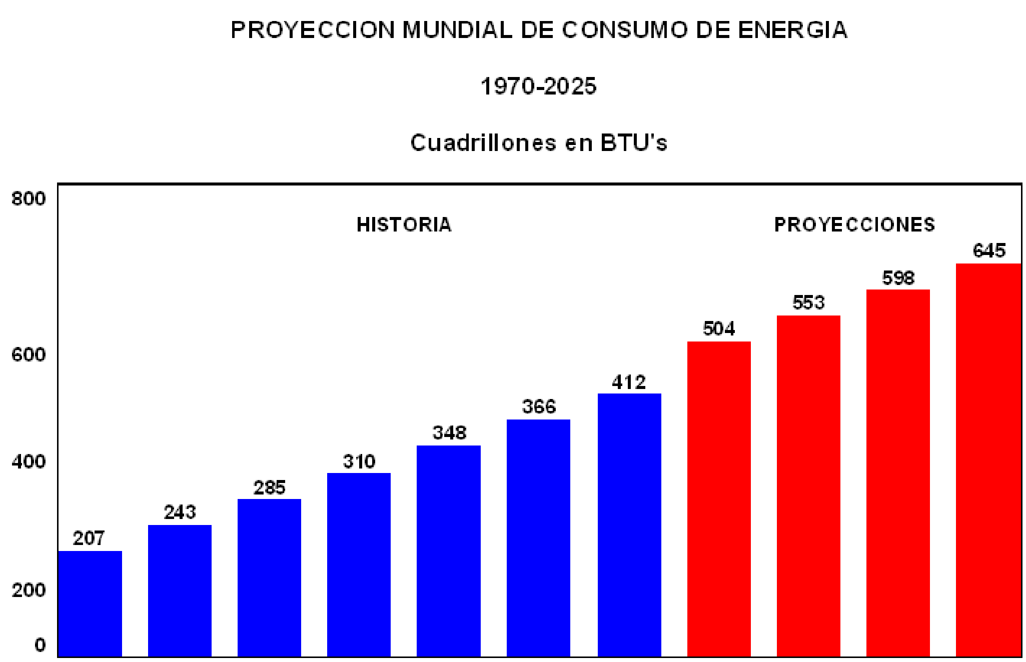
The land preparation for this operation is simply to make warehouses for the storage of recycling material, offices, and machineries.
The mill, the incinerator, the boiler and the electricity generators are the necessary equipment to convert solid waste into energy and eliminate contamination.

The leachates disappear completely.

The steam is used to generate electricity.

The ashes are used as part of the aggregate to create mezzcrete® and all the products used in the construction industry.

2) ECONOMY



Bibliografía: History: Enjergy Information Administration (EIA) Int'l. Energy Annual 2002, 2002, DOE/EIA-0219 (2002) (Washington, DC, March 2004), web site www.eia.doe.gov/iea/. Projection: EIA , System for the Analysis of Global Energy Markets)2005)

is very important to recognize the high level of the initial investment and the long term cost, in the handling and operation of a landfill. The organic waste has an approximate a life of

100 years, and during this period, it will be generating gases and leachates. This is considered a highly expensive operation since it depends on state of the art technology in handling of leachates and recycling, that if inefficiently applied or not being applied at all, We must also consider the fact that the organic materials, that are part of the municipal solid waste, besides releasing leachates, release between 60 to 80 cubic meters of methane gas methane per ton per year. The handling of these gases also requires expensive technology that must be evaluated against the natural gas availability in the region. This indicates that the municipalities can take advantage of the availability of their own gas in other applications such as generation of energy for its lighting system, thus will be able to reduce the tariff of electrical energy and to attract industries to the region, increasing the availability of cash in the municipal budget. Anyway this also implies an investment outside the reach of the municipalities in its present financial situation.

By the difficulties that can be experienced in the long run in terms of environmental risk in the handling of leachates and gases, it is necessary to consider that in the future any environmental disaster would be subject to penalties and fines that could ruin the municipality. The shortage of low cost capital, the high investment, the high cost of operation and maintenance of landfills for over 60 years, after having reached its peak after 25-30 years of use, is but economic and recommendable to make an immediate final disposition through systematic incineration. This incineration has an initial and global investment lower than the landfill, and is less expensive to operate since it is eliminated of an almost immediate way, compared with the organic life of waste (100 years), the production of leachates and gases produced by this organic material. The incineration gives an advantageous opportunity for the generation of electrical energy that can be incorporated to the electric grid, reducing costs to the municipality or simply reducing the municipal tariffs, to attract industries. This energy generation implies additional revenues.

From the incineration process, there remains fly ash, which is used as part of the raw material in the fabrication of mezzcrete® which is used in construction materials. This would also represent an additionalsource of revenue.

This method offers advantages by its complete elimination and recycling of usable materials, with a reduced initial investment, which pays for itself with the sale of all its by products, which is advantageous to the municipal government, the environment and the general public.

It is clear that the best way is to reduce the volume of the municipal solid waste to its minimum expression with optimal operational costs and maintenance.

3) ENVIRONMENTAL

It is easy to see the environmental benefits of the incineration process since with electric generation they are superior in technology, economically, and socially, as well as environmentally.

The benefit to the environment generates the promotion of an ecological culture that also gives opportunities of use in the field of recycling of different materials and the stimulus in the construction using the ashes to make residential projects of social interest, creation of recreation parks, schools and better maintenance of the routes.

The incineration system gives better benefits to the environment that a landfill and we see it in:

1. The use of the amount of land.
2 The terrain preparation and the effect of its use in the long term.
3. The incinerator, the boiler and the generating plants of energy are the necessary equipment in order to turn waste into energy practically leaving:
4. No contamination and complete and final disposition of solid waste.
5. The leachates disappear completely.
6. The steam is used to generate electricity.

7. The ashes are used as raw material for mezzcrete® which is used for the construction industry.

4) ANALYTICAL SUMMARY OF THE PROCESS

The incineration proposal is based on a system of technical recycling and crushing to realise an incineration without air pollution with special filters being a state of the art system. This process has the following stages:

1. Sweeping and cleanliness of public streets, domiciliary harvesting with environmental compacting equipment: The design of the sweeping plan will be realised and executed by the municipalities and/or a local company with great experience in the region. The company trucks will haul the sweepings from designated locations to the plant processor where they are received, weighed, and classified.

2. The reception of the solid waste: It enters an area where the process of classification for recycling in an aseptic and hygienic way is carried out, by expert recyclers according to the requirements of the “Environmental Protection Agency” (EPA). Thereafter, the products are stored in a warehouse for its elaboration and commercialization according to the ultimate use. If the wastes are highly organic such as those of local stores and markets, they could be dehydrated and ground to use as fertilizer. The recycling must begin in the homes, which is accomplished through campaigns of environmental education.

3. Mills: The waste that does not have recyclable value passes through the mill reducing the waste to uniform particles, preparing it for a more effective incineration leaving reusable ashes.

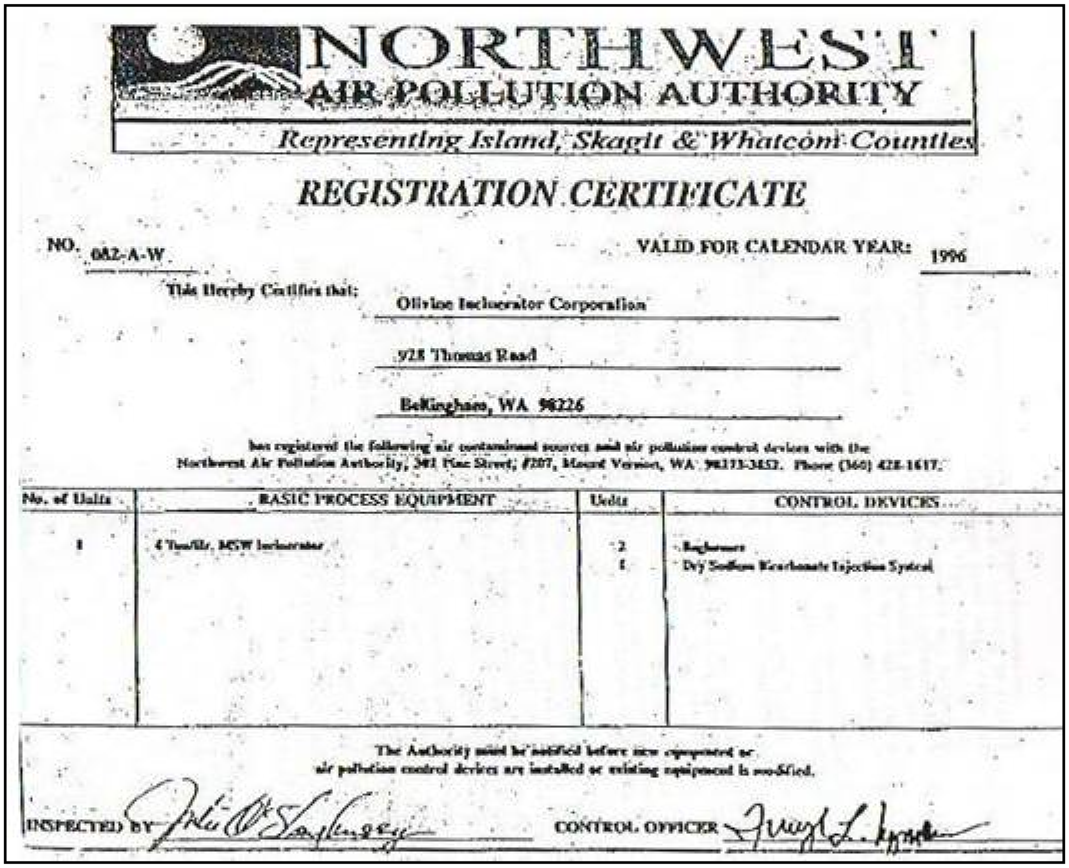
4. Incinerating Fluidized Chamber: Upon entering the incinerator the uniform small particles are received by temperatures that oscillate between 1.800° to 2.200° Fahrenheit degrees depending on their humidity and is thus reduced to 5% of the initial volume in ashes. The industrial and pathogenic waste can be treated directly to 1.800° Fahrenheit degrees in this same incinerator and to eliminate any type of pathological contamination, the equipment has a house of high tech filters cleaning 95% in its chimney.

5) MARKETING

The conservation and recovery of the environment, generation of energy, construction of houses of
social interest, will cause that the municipalities can guarantee the development of certain industries diminishing their environmental impact.

Also other municipalities can be associated that contribute the daily solid waste. For the possibilities of public service, consciousness will be raised in other neighboring municipalities
in the matter of recycling, hygiene and sanitary behavior. The harvesting service could be offered for Them the service of harvesting including the private companies used for MISW.

6) ENVIRONMENTAL IMPACT



NORTHWEST
AIR POLLUTION AUTHORITY
Representing Island, Skagit & Whatcom Counties

REGISTRATION CERTIFICATE

NO. 082-A-W VALID FOR CALENDAR YEAR: 1996

This Hereby Certifies that: Olivine Incinerator Corporation

928 Thomas Road

Bellingham, WA 98226

has registered the following air contaminant sources and air pollution control devices with the Northwest Air Pollution Authority, 302 Pine Street, #207, Mount Vernon, WA 98273-3852. Phone (360) 428-1617.

No. of Units	BASIC PROCESS EQUIPMENT	Units	CONTROL DEVICES
1	4 Ton/Hr, MSW Incinerator	2	Baghouses
		1	Dry Sodium Bicarbonate Injection System

The Authority must be notified before new equipment or air pollution control devices are installed or existing equipment is modified.

INSPECTED BY CONTROL OFFICER

The objectives presented here contribute to a socio-economic and environmental solution required by the international community to the municipal needs regarding health. The international laws compel governments to assume responsibilities in the final disposition of municipal solid waste, and control of the environment with penalties and fines clearly established for the good of the community, the mother country, and the whole planet.

7) EMPLOYMENT SOURCES

In the overall operation of the industry, numerous jobs will be created direct and indirectly in the work to recycle plastics, paper, glass, etc. Recycling will create worthy jobs of subsistence.

PECULIARITIES OF OUR SYSTEM

No one in the industry offers a simpler and long lasting combustion chamber where the refractoryh panels are easily replaced.

No one offers a conditioning tower of refractory solid panels HAC ("High Aluminuous Content"), which is not affected by excessive heat and environment with high humid chemical agent content.

Our furnace design in total olivine panels is unique in the market, has demonstrated to be superior in the handling of ashes and especially for the ease of maintenance, if compared with the movable grids of other systems.

Our HAC refractory panels allow to at low cost combustion chambers. This also is an aspect important to obtain an efficient incineration allowing a greater retention time (more than five seconds in the main camera). All the injurious derivatives of the combustion tend to disappear due to on exhibition to high temperatures and a combination of high pressures and secondary air of combustion. The tests also indicate that this design allows a minimum production of "NOX" and a recyclable ash accumulation of good quality with a reduction in the volume of more of 90%.

A) Main Combustion Chamber

1. A combustion chamber of 21' diameter and 30' high.

2. Collector of air distribution with sanitary opening and characteristics of manual air handling.

3. Collector of four port secondary high pressure air distribution of high pressure.

4. Main and secondary boilers with motors and butterfly floodgates.

5. Refractory furnace in V.

6. Computerised combustion, waste and ash handling.

7. Auxiliary burner for the ignition and temperature maintenance.

8. Spare refractory panels.

B) Secondary Chamber

1. A secondary combustion chamber of 20' diameter and 42' high.

2. Secondary conduit.

3. Hydraulic ash disposal.

C) Waste handling and Ashes

1. System of automatic loading of remainders.

2. Hydraulic piston of ash collection, cylinders and control valves.

3. Ash deposits.

4. To be able hydraulic engineer and control system.

5. Assorted spare parts.

D) Gas cooling/Recovery of Energy

1, Boiler, 38.000 lb./hr. with sliding base, conduits of entrance and exit, constructed under the ASME guidelines (American Association of Mechanical Engineers), with excellent quality, low water consumption, safety valves and sanitary floodgates.

2. Cooling tower, deoxidized condenser, dual pumps (includes an emergency pump).

3. Pumps, controls.

4. Water system treatment for the boiler.

5. Soot ventilators.

E) EMISSION CONTROL

1. Conditioning tower with automatic temperature protection control.

2. Dry charcoal injection activated dust system.

3. Control system of acid gases by dry caustic absorbent.

4. Filter house, fiberglass sealed bags, with ongoing rotation ash removal, with air compressor.

5. Chimneys of up to 50' with sampling portholes.

6. Continuous supervision, recording and control of O^2C, SO^2 and diverse temperatures.

7. Mid West will supervise the plant operations by computer.

F) Engineering and Qualification

1. Engineering and design work.

2. Drawings of the proyect plans.

3. Technical support for local permits.

4. Supervision of the facilities from the beginning.

5. Internal training of plant staff.

6. Supervision of plant operation for one year.

7. Mid West will supervise the plant operations by computer.

Mid West will design the engineering distribution of the plant and the buildings. Minimum size of construction site should be three hectares. The structure will have approximately 30,000 square feet, capable of a three day solid waste storage. (The owner is responsible for the structure building).

G) Cogeneration

Also co-generation can be provided and you will be able to see that also she will provide a very attractive yield. He has approximately 1 to 20 MgW of electricity and 25.000 up to 35.000 lbs/hour of steam.

If an extraction turbine is chosen and the steam is used for some type of heating, the electrical energy available is smaller, but the value of all the energy that recovers is considerably greater.

The turbine generator of steam will be provided by Murray Turbomachinery or some similar supplier. The equipment will be installed under the supervision of Murria and they would provide the maintenance during the first year. As we do not know his exact steam requirements and electricity it is very difficult to calculate a budget. As the project advances, we will be identifying the specific equipment and the final price will be established.

The plant ("waste to Energy") is designed to operate 8.000 hours that is 336 days to the year. This allows that each train of combustion receives maintenance during 1 or 2 days every month.

It is considered that during the 12 months of the year there is available a good amount of water without trying. In order to pump water without trying to the plant about energy and the tank of first filtrate, it is required of a pumping station with four pumps to the 100% of capacity. If the water without trying is insufficient, a cooling tower is necessary, which will have an additional cost.

H) Operating Expenses

The following expenses of operation are required:

1. Minimum of six men in turn, two workers is recommended, two assistants and two stop maintenance. Also it will be needed a head plant (engineer) and two employees of office/plants.

2. The electrical consumption will be of 290 installed HP but 200 HP operating.

3. We suggest to assign a dollar by ton for general maintenance.

4. We do not have budget for the materials that absorb the gas acid not to have requirements of emission of its country.

5. The remainders of low calorific value will need additional fuel to conserve suitable temperature and a good combustion.

6. Ash elimination. The ashes can be used in the construction of blocks of cement like aggregate.

SUMMARY OF THE PROCESS

The largest incineration hardware of solid waste of Mid West great include the combustion chamber, reception structure, solid waste delivery, ash extraction facilities, waste disposal heater, conditioning tower, dust activated charcoal injection, dry acid gas injection system, fabric filter deposits, ID fan, manifolds, controls and continuous supervision of emissions. All are based on real time designs in order to create a simple, practical and reliable plant.

The process begins with the shipment of solid waste to the plant using hauling trucks. The solid waste is normally weighed and soon they are unloaded unto the floors, where it is slightly reviewed for the removal of materials that cannot be incinerated (like forbidden waste like batteries, lead, acids). They are segregated, are mixed to give major uniformity, they are grouped together to be stored and to make room for other similar types of waste.

A forklift places the waste in the feeding system. This begins with a horizontal mover big enough to accommodate difficult to handle material such as old tires and sofas that cannot be reduced in size. This horizontal mover can be elevated so that there is space for recycling stations. The mover takes the solid waste to a hydraulic ram, which pushes it to the combustion chamber. A fire resistant door, at the entrance of the chamber, separates the heat from the system.

The combustion chamber used by Mid West is a derivation of the powerful incinerators of industrial waste that were developed more for the first time more than 25 years ago. It is a vertical HAC refractory cylinder of refractory BEAM of precise dimensions to reach the required capacity. It can withstand temperatures over 2,600° Fahrenheit. The solid waste is fed near the superior part of the "V" shaped furnace. The waste is expelled by conductor of the hydraulic ram thereafter lowering to a side of the "V" furnace. This represents from one to four tons of incinerated waste remainders that leave the furnace converted into ashes.

The main combustion air is introduced underneath throughout the feeding section of the furnace through a distribution of ports, which can be cleaned from the outside. The secondary air is injected through several floodgates that are located approximately ten feet above the bed of combustibles, distributed uniformly around the perimeter of the combustion chamber. The secondary air is injected at high speed and pressure to penetrate and to mix themselves with the heat and viscous gases of the chamber. This is a critical factor for a safe cleaning and an efficient combustion.

During the combustion of the solid waste peculiar to a city, the volume is reduced by more than 90% and the weight by 70% (the reduction can be greater depending on the solid waste composition and the extent of the recycling). The ash residues are removed from the incinerator to a water tank through a hydraulic system. The water tank cools the ashes and controls the escapes during the manipulation. After multiple cycles of hydraulic ram, which fills the ash deposit, an internal door between the ash deposit and the combustion chamber is closed, and the ash is removed by forklift and taken to the landfill (if it is not going to be used like aggregate for construction blocks). Another option is to use a mechanical transporting ash band that automatically transports ashes from the deposit to a truck.

The gases of the combustion chamber pass to the boiler. The steam that is recovered from the heat is used for electric generation, or is used for lumber drying, or any type of drying. The cooling process is also required to prepare the gases for the absorption and filtrate of emissions. The acid gases that are released by the combustion are controlled through the upper injection of dry caustic absorbent (hydrous Lime or sodium bicarbonate) of the deposit which recovers the residual neutral salt and the absorbent excess.

The particles generated by the combustion process are called flying ashes and are transported by the airflows towards the storage area. The bags with the caustic absorbent that was injected are accumulated creating a layer that acts as a primary filter. This layer is expelled periodically towards the feeding tank by the released air and compressed by a feeder for its elimination. The organic and metallic controls work in tandem with a particle harvesting system. As the metallic vapors are condensed when cooling off, small particles form that united with other particles in the gas flow are accumulated in storage. The organic compounds like phenol are also condensed at a lower temperature for the accumulation in the storage. An ID fan (reduced airflow) moves the gases through a complete system and maintains a low negative pressure in the combustion chamber.

1) GOOD COMBUSTION PRACTICE (GCP)

The primary control mechanism of an incinerator by emissions and hydrocarbons is the complete destruction during combustion, that is to say the Good Combustion Practice (GCP). The following elements constitute GCP.

Totally mixed layer.

As part of the demonstration that the main combustion chamber of Mid West fulfills Good Combustion Practice, a thorough study was made, and exhaustive tests conducted to optimize and to show that there are totally mixed layers where the oxygen is never below 3% of moisture and the temperature is over 1,800° Fahrenheit in each spot of the layer. There is complete combustion when it leaves the layer, that the gases stay in the layer at least a second, and that these conditions of ash elimination exist. This test was done first with a model to scale of cold flow and then, during all the operation in the incinerator in question processing 125 tons per day, using water cooled sounding.

The layer totally mixed is created by the high speed of the air happening through the fuze, which injects air in the combustion chamber to high pressure. This gives rise to hot gases very mixed with I oxygenate. The fuzes possibly are located around the directed combustion chamber and so that they can extract the gas in the form of eddy. The burning fire of gases hydrocarbons is freed of I milk warms up of the MSW that begins near the bottom of the layer and reflects their completion in the part superior of the layer.

2) Combustion Totality

The totality of combustion that happens in the main chamber is demonstrated by measuring the unburned components in the expelled gases. The compound that presents the greater concentration is the CO.

When the combustion is complete, the CO forms CO_2. Also it is possible to indicate the presence of some hydrocarbon compounds, of which but the easy one to burn it is the methane (CH_4). These CO_2 concentrations are compared with the values measured in other incinerators of reported MSW and in Table V (U.S.E.P.A. 1989). The system Mid West measured a relative value under CO from 3 to 20 ppm (to 7% of O2). These values are between lowest of the rank of the reported values, demonstrating a very complete combustion.

3) Time and Temperature of Retention

The retention time of the product of combustion to the required temperature can be calculated from the measured volumetric flow of the liberation of gases and the physical dimensions of the camera. To 1.800 degrees F., the time to cross the layer totally mixed this designed so that it is but of two seconds and it delays but of five seconds to leave the main combustion chamber.

At such elevated temperatures with five second retention time, the most difficult organic compounds are completely destroyed.

4) Automatic Controls

One of the elements of the Good Combustion Practice is a computerized system to control the air combustion and the solid waste flow. The Mid West system is based on temperature settings and O_2 when exiting the combustion chamber. The temperature setting and the measurement of the primary air control the flow of the Municipal Solid Waste. The O_2 reading is the main control of the air. Simplistically explained, while the temperature decreases, the inner air increases, as the O_2 increase, so does the provision rate, and when the 0_2 diminishes, the upper air increases.

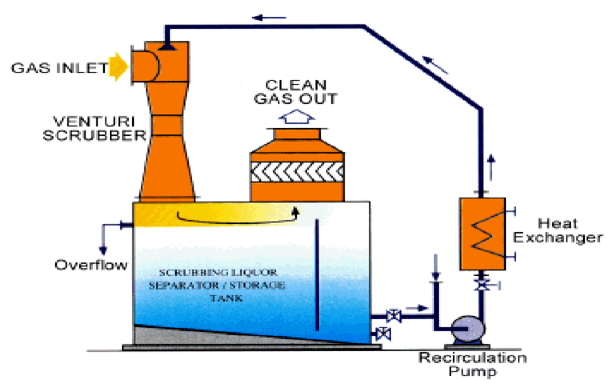
If the temperature cannot stay above the desired minimum objective due to the value of the humidity or the low heat production of the waste, an auxiliary burner will ignite automatically. The optional equipment of preheated combustion air is also available one when the solid waste is always moist.

Nevertheless, an automatic but complete system can be accomplished for a number of possibilities without the assistance of an operator. The variables of moisture content, BTU content, can be diminished through a conscious mixture by the assistant in an inclined floor, but manual adjustments may be occasionally required by an operator who supervises the fire, the size of the volume to incinerate, the temperature, emissions and other parameters. A combustion chamber is included that is very useful for the supervision and control of the combustion.

5) "V" SHAPED FURNACE

The unique "V" shaped configuration for the bottom of the combustion chamber is vital for the simplicity, durability and facility of maintenance of the Mid West International system. It also includes a dual combustion process, that is to say a combustion home of the totally mixed gases. This is probably the reason for the low level of NOx emissions. The ash elimination is simpler due to the configuration of the simple design of the combustion chamber that avoids the high maintenance problems which can occur with the use of moving metal grids in almost all the incinerators.

6) ACID GAS CONTROL USING DRY ABSORBENT INJECTION



The process consists of continuously injecting finely ground caustic absorbent within the post-combustion conduit before the particle control equipment. The absorbent reacts with acid gases to form neutral salts, which are captured with the excess absorbent and stored in the corresponding bin.

The advantage of the dry injection process gives the most economic technology of control for the majority of applications. Some of these advantages are:

a) Minimum capital investment.
b) Low space requirements space.
c) Simplicity and reliability of operation.

d) Low maintenance costs.
e) Water is not required.
f) Maximum use of absorbent.

The levels of HCI and SO_2 that leave the main chamber are due to the conditions of incineration of the chamber. High concentrations of SO_2 can be generated by old tires or other waste that contain sulfur in the system. There also appear low concentrations of O_2 in the main chamber for correlations with the high concentrations of SO_2. The plaster and other sulfated materials in the mix can be released as reduced sulfur under low O_2 conditions. These gases would be oxidized in the flame to SO_2. Under normal high conditions of O_2 (oxidation), these materials would remain in the system as sulfated ash and would be discarded to the ash storage bin. Plastics and other materials with chlorine cause high concentration of HCL in the expelled gases. Therefore, the control of acid gas only requires absorbent injection.

7) FILTRATION SYSTEM

Of the two absorption options, the most common for the MWC's is the high performance technology obtained from the fabric filters (deposit), compared with the ESP (electro static precipitator). The storage obtains a better control of particles as well as the organic, mechanical controls and acid gas.

The particles are store in an area of multiple cells contiguous to the gas and acid control system. The multiple cells in large facilities allow continuous maintenance allowing individual isolation of cells when needed. The air/fabric correlation used will be approximately 4 to 1. The standard used bags are made of woven fiber glass with acid resistant finish. The design of the pressure drop through the cylinder is approximately 5 inches H_2O and will be regulated by automatic controls to reduce the cleaning and the wear and tear of the bags. The maintenance of these pressure drops is important to assure the retention of a particle filtrate layer in the bags. This layer not only protects the bags but it also improves the filtration efficiency.

The structure has its own isolation. Optional heaters of the hopper keep the cells dry and allow them to warm up quickly at the start and to cool off slowly when turned off to avoid condensation.

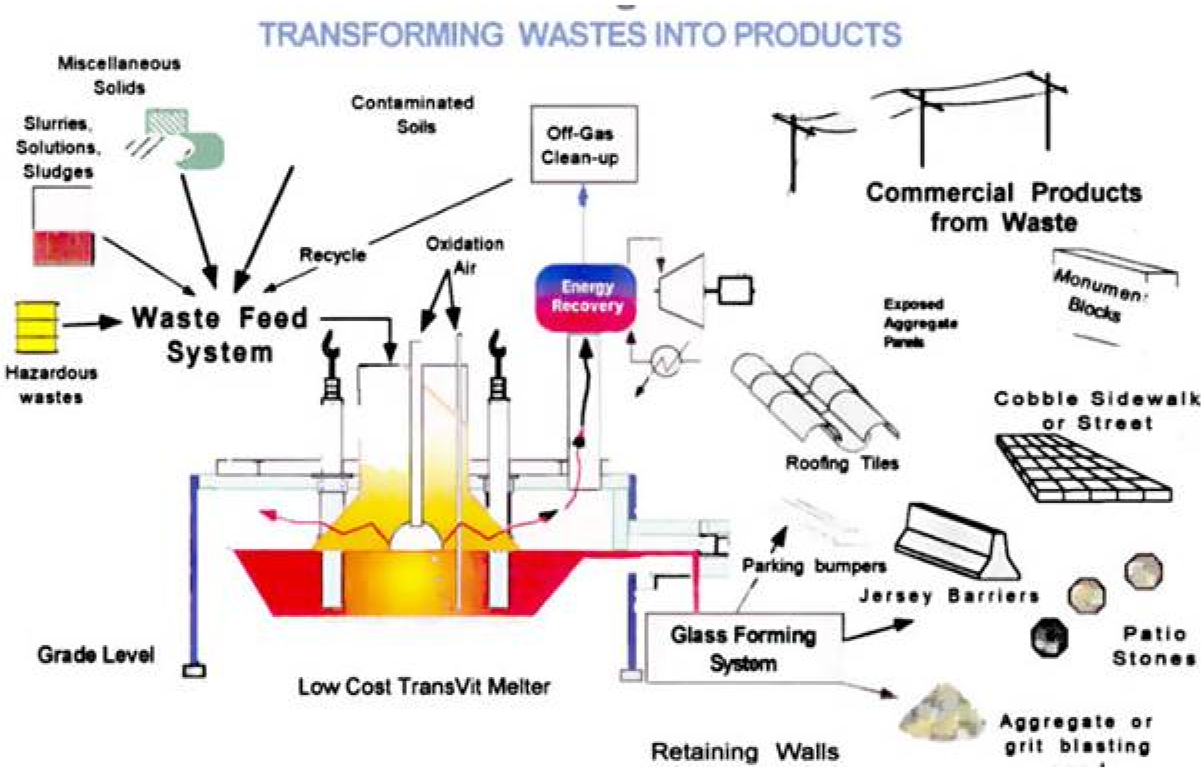
8) ID FANS, MANIFOLDS AND DUCT SYSTEM

The ID fan is placed in the clean side of the filtrate storage. Its entrance (with a variable speed control) is regulated using a signal to maintain low negative pressure in the main combustion chamber. This adjustment automatically regulates the combustion speed to the gas flow. The manifold connected to the ID fan is isolated or the refractory is aligned due to the relatively cool nature of gases at this point and to the corrosion tendency. All gas conduits are isolated to protect them from condensation.

9) COGENERATION

The co-generation can provide and usually it makes a yield very attractive. DSMI are very valuable remainders if a productive use becomes of the same for the steam and energy generation. The efficiency of the co-generation energy is twice the one of a plant of greater fossil fuel energy.

If an extraction turbine is chosen and the steam is used for some type of heating, the electrical energy available is smaller, but the value of all the energy that recovers is considerably greater. With the recent world-wide news in the negative effects of the emissions of O2 and in the global heating, it is important to notice that combustion DSMI emits a much smaller amount of harmful gases than they produce greenhouse effect that the emitted one by the remainders that are left for their decomposition in a sanitary filling.



TABLE

The concentration of Carbon monoxide (CO), oxygen (O_2) and hydrocarbons in the totally mixed layer of the main burner is measured with a refrigerated water probe at different distances from the wall.

LOWEST LEVEL OF THE TOTALLY MIXED ZONE

(Before introduction of secondary combustion air)

		CO/O_2		CH_4	C_2H_4	C_2H_2
6”	29/7.0			0	0	0
2’	11/7.4	13/10.8	122/9.4	261	44	260
4’	33/5.2	2/11.7	<100/10.1	0	2	0
6’	552/5.3	40/9.4				
8’	167/6.9	1500/7.3*		178	5	89
8’				1	0	0

HIGHEST LEVEL OF THE TOTALLY MIXED ZONE

(After introduction of secondary combustion air)

				CO/O_2		CH_4	C_2H_4	C_2H_2
6”	10/8.7	13/6.6		100/9.2		0	0	0
2’	02/9.2	12/7.5	0.7.0	8/6.1	<100/10.1*	0	0	0
4’	0/12.1	15/7.3	0/4.3					
6’	0/11.6	10/7.4	0/5.1	8/5.9	<100/10.0*	0	0	0
8’				<100/1.25		1	0	0

Note: The CO values (ppm)/02 (%) were obtained with direct readouts of instruments, except the ones with the asterisk which were obtained through the hydrocarbons reflected by Gas chromatography. The lowest reading in the GC for CO is 100 ppm.

STACK EMISSION LIMITS
CONVERSIONS TO METRIC

From stack emission testing done for Olivine Corporation, Bellingham, Washington, USA, by Emission Technologies, Inc., Burlington, Washington. Several test dates.

	results @ 7% O2	conversion @ 11% O2	BC Standard @ 11% O2
Total Particulate	.0088 gdscf	14.33 mg/m3	20 mg/m3
CO	16.9 ppm	19.6 mg/m3	55 mg/m3
SO2	10.7 ppm	20.26 mg/m3	250 mg/m3
NOX	139.6 ppm	189.6 mg/m3	350 mg/m3
HCl		12.9 mg/m3	70 mg/m3
HF	not tested		
CH4	0 ppm		40 mg/m3
As	not tested		
Cd	not tested		
Cr	not tested		
Pb	not tested		
Hg	not tested		
Chlorophenols	not tested		
Chlorobenzenes	not tested		
PAH	not tested		
PCB	not tested		
PCDD & PCDF		0.456 ng TE/Nm3	0.5 ng/m3
Opacity	1.06% by opacity monitor 6 minute average for 29 days		5% 1 hr ave

TABLE V (U.S.A. E.P.A. 1989)

Concentration averages of reported CO in different MSW incinerators (normal operating conditions corrected at 7% de O_2).

Plants	CO (ppm)	Plants	CO (ppm)
Milbury, MA	38	Tulsa, OK	22
Pinellas County, FL	4	Chicago, IL	215
Westchester County, NY	15	Hampton, VA	24
Saugus, MA	40	Claremont, NH	55
North Andover, MA	43	Long Beach, CA	118
Commerce, CA	16	Quebec City, Quebec	33
Marion County, OR	18	Portland, ME (north unit)	41
Alexandria, VA	18	Portland, ME (south unit)	75

The previous tables show the enormous effectiveness of the Completely Mixed Zone to obtain a Good combustion.

The CO and hydrocarbon levels are very low when coming out of this combustion zone. The conditions of this combustion and the long retention time produce the lowest emissions that can be found.

MUNICIPAL PLANT FOR SOLID WASTE DISPOSAL AND ENERGY GENERATION.

COMPARISON BETWEEN EXPECTED EMISSION RESULTS AND REAL RESULTS.

Emission Parameters	USA/EPA*	MID WEST
Particles	45 mg/Nm	5mg/Nm
Opacity	<10%	< 5%
Hydrochloric Acid	55mg/Nm (95%)	<55mg/Nm (95%)
Sulphur dioxide	115mg/Nm (80%)	<115mg/Nm (80%)
Oxide from	412mg/Nm	<412mg/Nm
Organics	13ng/Rm3	<0.15/Rm3
Hydrocarbons	NO	<25mg/Nm
Metals	YES	YES

*Supervisión continua	USA/EPA*	MID WEST
Sulphur Dioxide	YES	YES
Hydrogen Chloride	NO	NO
Opacity	YES I	YES I
Carbon Monoxide	YES I	YES I
Combustion Temperature	NO	YES I
Gas/expulsión Temperature	NO	YES I
Main oxigen chamber	NO	YES I
Air flow for combustión	NO	YES I
Control equipment duct	NO	YES I

"Good Combustion Practice". (GCP)

	USA/EPA	MID WEST
Temperature	NO	> 1,800° F
Residence time	NO	> 2 seconds
Oxigen in the main combustion chamber	NO	> 6% (moist)
Maximum ignition ratio	110%	110%
Gas expulsión temperature	450 F	Depends
Carbon Monoxide	67mg/Nm	< 50mg/Nm
Operation Manual	SI	SI
Air/combustión controls	NO	SI
Total mix zone	NO	SI
Automatic combustión controls	NO	SI
Operator Training	SI	SI
Ash storage	NO	SI

NOTE: The emission and operation requirements can vary according to each country.

Summary

There is no available incinerator that has better general characteristics.
We distinguished ourselves in three specialized categories in comparison.

PARTIAL LIST OF INSTALLED INCINERATORS

Spray Lake – Cochrane, Alberta, Canada May 1987

Westar Timber Ltd., Smithers, B.C., Canada September 1987

McRae Lumber, Whitney, Ont., Canada October 1987

Wyndell Box & Lumber, Wyndell, B.C., Canada November 1987

Gorman Bros. Lumber, Westbank, B.C., Canada November 1987

Bell Pole Co., Terrace, B.C., Canada – May 1988

Canadian Foret Products, Grande Prairie, Alberta, Canada – June 1988

Pope & Talbot, Ground 3, R.C., Canada – July 1988

Georgia Pacific, Cache Creek, B.C., Canada – Sept. 1988

Pinette & Therrien Mills Ltd., Williams Lake, B.C., Canada – October 1988

West Fraser Mills Ltd., Williams Lake, B.C., Canada – November 1988
Fredk Ladner – Australia November 1988

West Fraser Mills Ltd., Williams Lake, B.C., Canada – November 1988

E.B.Eddy Nairn Centre, Ont., Canada – December 1988

Crestbrook Forest Ind., Cranbrook, B.C., Canada – January 1989

Goodwood Inc. – Borneo January 1989

Daw Forest Products, Albeni Falls, ID February 1989

Adams Lake, Chase, B.C., Canada – March 1989

Ainsworth Lumber, Savona, B.C., Canada – April 1989

Seley Corp (Barge Mounted – Sludge) Valez, AK May 1989

Fredk Ladner, Freemantle, Australia – June 1989

Rineco Chemical Ind., Inc. – Hazardous Waste – Benton, AR September 1989

Goodwood Inc. – Borneo – October 1989

Canadian Chop Stick Mfg., Inc., Fort Nelson, B.C., Canada – October 1989

Angelo Mfg. – Jonesboro, AR – November 1989

MacMillan Bloedel, Vancouver Island, B.C. – February 1990

Sundance Forest Products, Edson, Alberta, Canada – April 1990

Northwood Pulp & Timber Ltd., Upper Fraser, B.C., Canada – August 1990

WI Forest Products – Thompson Falls, MT – September 1990

Car Win Shake, Forks, Washington – October 1990

Tabwood – Sarawak, East Malaysia – December 1990

Bintulu, Sarawak, E. Malaysia – March 1991

ITT Rainier, Camp Burner Ketchikan, AK – May 1991

Norpex, Kasaan, AK - July 1991

Westside Liquidators, Inc., Kelowna, B.C., Canada – September 1991

ITT Rainier, Camp Burner, Ketchikan, AK – October 1991

Millar Western Pulp Ltd., Meadow Lake, Sask., Canada – October 1991

Louisiana Pacific – Deer Lodge, MT – November 1991

Ainsworth Lumber, Chasm, B.C., Canada – November 1991

Goodwood Management Corp., Kuching, Sarawak, E. Malaysia – November 1991
WI Forest Prtoducts, Bonners Ferry, ID - January 1992

Aserraderos Mininco, S.A., Santiago de Chile, Chile – March 1992

ITT Rainier, Camp Burners Ketchikan, AK – March 1992

Goodwood Management Corp., Sampadi, Kuching, Sarawak – March 1992

Louisiana Pacific, Walden, CO – May 1992

Goodwood Management, Sibu, Sarawak – July 1992

Dri-All, Victoria, Australia – March 1997

Fred K. Ladner Burner Systems, Queensland, Victoria, Australia – October 1993

Kao Yanq, Sarawak, Malaysia – August 1993

Bonuskar Timber Processors, Sandton, South Africa – August 1994

Zosel Lumber, Orovill, WA – November 1994

Goodwood Kabacdiibt, Cebu, Phillippines – June 1997

Goodwood Management – Lintulu, Sarawak, Malaysia – April 1996

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Northwood Pulp & Timber Ltd., Upper Fraser, B.C., Canada – August 1990

WI Forest Products – Thompson Falls, MT – September 1990

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Goodwood Management – Lintulu, Sarawak, Malaysia – April 1996

PARTIAL VIEW OF THE OLIVINE ORE DEPOSIT

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