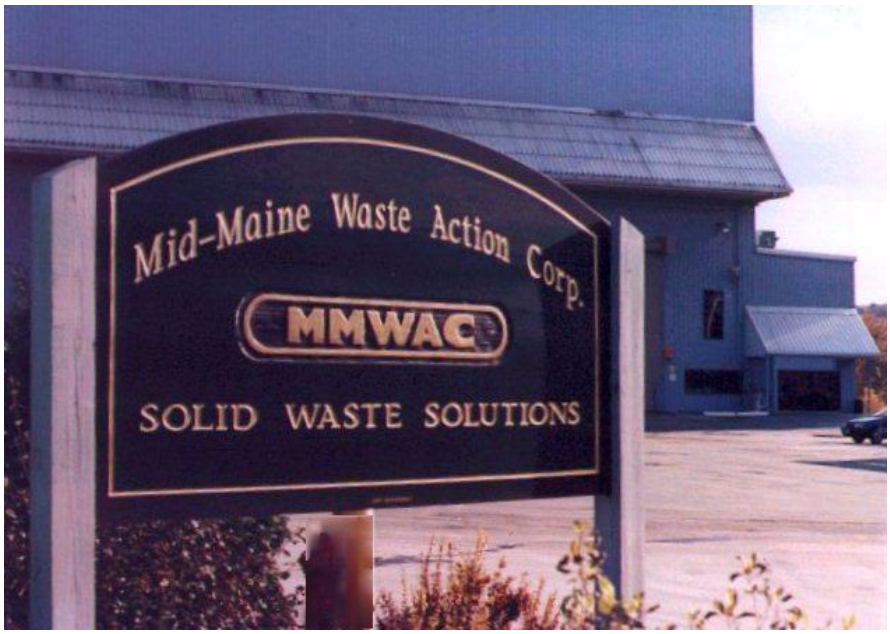
Mid-Maine Waste Action Corporation

Informational Brochure



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MID-MAINE WASTE ACTION CORPORATION (MMWAC) - BACKGROUND

MMWAC, or the Mid-Maine Waste Action Corporation, is a quasi-governmental organization, created as a not-for-profit corporation by twelve area municipalities in 1986. Those municipalities are: Auburn, Bowdoin, Buckfield, Lovell, Minot, Monmouth, New Gloucester, Poland, Raymond, Sumner, Sweden, and Wales. The Board of Directors of the corporation is composed of representatives of each of the twelve municipalities.

MMWAC was created to own and operate a solid waste system for the benefit of these twelve communities. Upon its creation MMWAC undertook a program that led to the replacement of the pioneering Auburn waste-to-energy facility, which had operated since 1981 using the Consumat technology. That plant was replaced with a 200-ton per day mass-burn incinerator, equipped with a 5-megawatt turbine generator, and advanced air pollution control equipment. The MMWAC plant is the newest waste-to-energy facility in the State and among the most advanced of its type in the Country. Air emissions are controlled with an effective combustion system assuring extremely high burnout and destruction of organics, lime slurry scrubbers to neutralize acid gases, a carbon injection system to remove mercury and organics, and a highly efficient baghouse to remove particulates.

This plant employs an energy recovery technology that complies with Maine's policy to encourage the following priority in waste management: waste reduction, waste reuse, recycling, waste-to-energy, and landfilling. The majority of municipal solid waste generated in Maine is processed in one of four different waste-to-energy plants. This is in contrast to the early-1980's and earlier when almost all municipal solid waste in the country was sent to landfills. Waste-to-energy plants were encouraged to reduce the need for landfilling solid waste in order to preserve land for higher uses, to reduce the threat of groundwater pollution from the older landfills, and to recover valuable energy from solid waste.

The MMWAC facility overcame an early history of problems that included equipment malfunctions and insufficient waste supply. Today it has become an industry leader in availability, which is a measure of its ability to operate reliably and at the highest possible capacity. Originally, the plant was projected to achieve an 88% yearly availability, processing 64,000 tons per year of solid waste. The plant has in recent years achieved 95% availability and has processed up to 73,600 tons per year. As reliability was proven year after year, new communities joined with MMWAC as contract customers to provide for their disposal needs. The plant produces its own electricity from the waste that is incinerated and sells excess power to the local electric grid.

MMWAC also operates a transfer station to efficiently transport construction and demolition waste (C & D) from local businesses and residents, other wastes not appropriate for incineration to secure landfills, and waste exceeding the plants capacity. This facility can process up to 25,000 tons per year. Lastly, MMWAC operates a recycling center for materials delivered by customers, as well as metal recovered from waste sent to the waste-to-energy process, diverting up to 2,000 tons per year from disposal.

THE WASTE-TO-ENERGY PROCESS AT MID-MAINE WASTE ACTION CORPORATION AUBURN, MAINE

Currently, much of the residential and commercial waste generated within 20-30 miles of the plant is transported to the waste-to-energy plant in Auburn, Maine. The plant is run by an organization called the Mid-Maine Waste Action Corporation (MMWAC), which is jointly owned by twelve towns in this region. The plant also services the solid waste disposal needs of many other towns and businesses in this area.

MMWAC's waste–to-energy plant has two identical process trains, each with a design capacity of 100 tons per day of municipal solid waste. The plant operates 7 days per week and 365 days per year. The waste-to-energy process converts solid waste into an inert ash residue, which minimizes landfill reliance in the State, and produces electricity from the fuel value of the trash. The enclosed diagram traces the waste-to-energy process.

Trucks are weighed and screened at the scale house before entering a covered "tipping area" (1). This is done to make sure the waste is acceptable for the plant to process, to determine where it came from, and to provide for billing. Trucks unload garbage into a pit (2) large enough to hold approximately 600 tons of solid waste, which is equal to three days supply for the furnaces.

An overhead crane or "grapple" (2) transfers the garbage into a chute, or "feed hopper" (3) that feeds the furnace. The waste is fed into the furnace by a "ram feeder" (4), which carefully controls the amount of waste introduced. This grapple is also used to remove any unacceptable waste from the plant that has accidentally been dumped into the pit.

Once in the furnace or "combustor" (5), the waste constantly tumbles to assure complete combustion. This tumbling is accomplished by the entire combustor rolling, or "oscillating" within a 210 degree arc causing the trash to tumble some 40 times during the typical one-hour combustion cycle.

Large combustion air fans draw air into the plant from the tipping area and pit, and then into the furnace. This causes a negative pressure inside the pit and tipping area, which prevents odors and dust from escaping. The air is used to maintain the furnace's high temperature, which provides for a very efficient and complete combustion process.

Combustion occurs in the furnace (5) and tranquilization chamber (6) where temperatures are maintained at 1,800-degrees Fahrenheit to destroy odors and organic compounds.

Hot ash residue tumbles to the bottom of the furnace and falls into a water-filled tank where it is "quenched". This area is called the ash extractor (11) and is the beginning of the ash conveyor system (12), which transports the ash residue to a metal scalper, which removes recyclable material. Fly ash is conditioned to eliminate dusting. The combined ash streams are then conveyed to a container for transport to a secure landfill.

The combustion process eliminates about 90% of the refuse volume by reducing it to ash. The remaining ash is sent to a state-of-the-art landfill. The landfill that is used has a multiple liner system, which collects leachate (contaminated liquid runoff) for treatment, preventing it from entering the groundwater below the landfill.

The 1,800-degree combustion gases in the tranquilization chamber (6) flow through several boiler sections where the heat is extracted from it to convert water to steam. The water to steam loop is within numerous parallel boiler tubes. The first section where this occurs is in the radiant section of the waterwall boiler (7), followed by the superheater (8), then the evaporator (9), and finally the economizer (10). The steam that is produced in this process is approximately 750 degrees Fahrenheit and 650 pounds per square inch pressure. This high temperature/high pressure steam flows through a turbine generator where up to 5 megawatts of electric power can be produced. Some of this power is used to run plant machinery, and the remainder is sold to the power utility offsetting the need for new power plants.

The turbine extracts much of the energy from the steam, which then condenses back into water in a section called the air cooled condensor. This section utilizes large, 12 foot diameter fans, to cool the water in the condensor tubes to optimum temperature and pressure. This section works much like a radiator in an automobile.

After the gases pass through the boiler sections, the temperature has been reduced as energy is transferred to the boiler tubes. This allows the gases to now be cleaned before they are released from the plant.

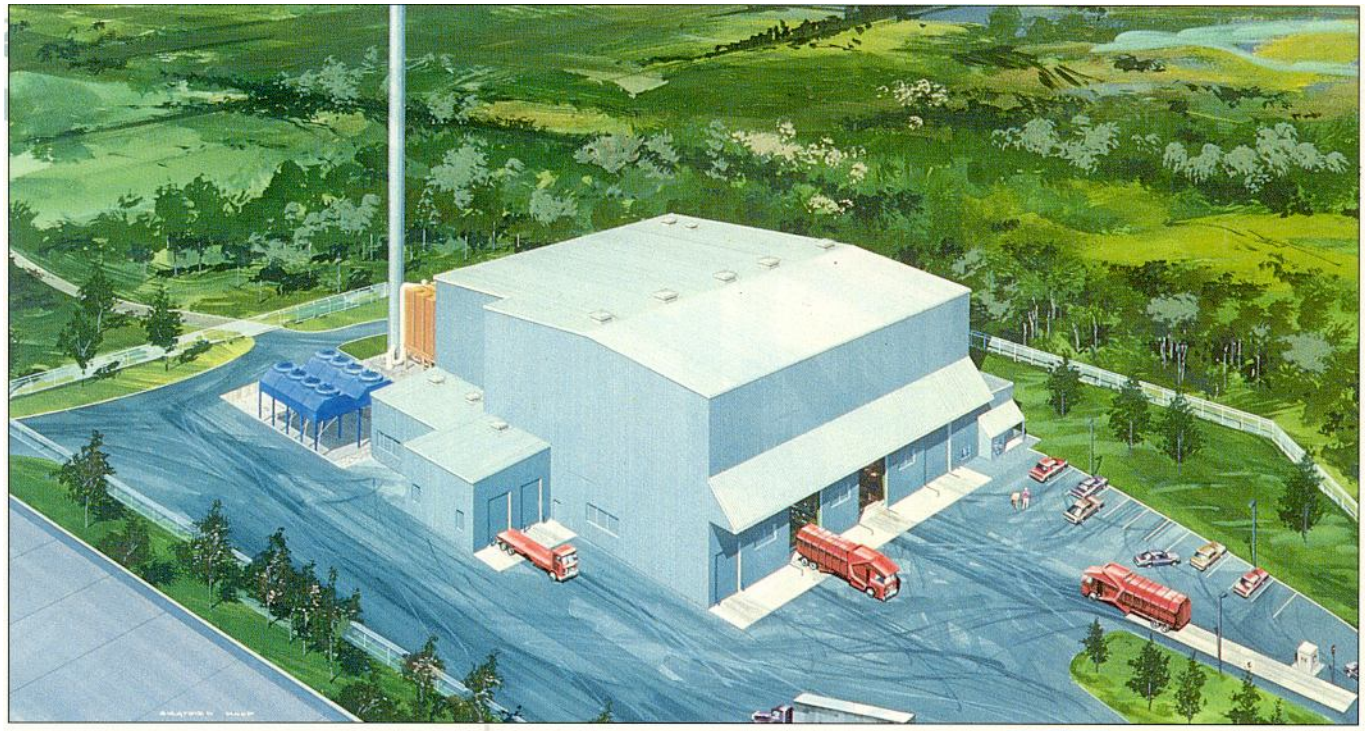
Acid gases are removed by modern equipment called a dry spray scrubber (13), where the gases are sprayed with the lime/water mixture and “scrubbed” clean. Activated carbon (13A) is injected into the scrubber to remove mercury and dioxin. The gases are next drawn through large fabric filters (14), which are not unlike huge vacuum cleaner bags. These bags are located in the “bag house” which contains hundreds of these specially designed fabric filter bags. Particles captured by the filters are collected at the bottom of the unit and are mixed with the furnace ash residue for landfilling.

An induced draft fan (15) then exhausts the cleaned gases to the 213 foot tall stack (16). During relatively dry, warm weather the stack emissions are virtually invisible. During colder or more humid conditions a whitish “plume” is visible which is primarily composed of water vapor from the lime/scrubbing stage.

MMWAC welcomes inquiries concerning its operations and encourages group tours. If you have any questions or would like to arrange for a tour, please call our facility at (207) 783-8805.

MID-MAINE WASTE ACTION CORPORATION

WASTE - TO - ENERGY FACILITY
AUBURN, MAINE



GENERAL INFORMATION

Service Area

Communities throughout the Mid-Maine Region

Ownership/Operations
Public by Mid-Maine Waste Action Corporation (MMWAC)

Financing
Revenue bonds

Schedule
Acceptance August 1992; currently full operation

Capacity

Daily 200 tons; Annual 69,000-72,500 tons per year

ENVIRONMENTAL

Air Pollution Control Systems
Spray dryers for acid gas neutralization, carbon injection for mercury removal, and fabric filters for particulates

Residue Handling
Quench tanks, ram extractors, vibratory belt, and chain drag conveyors, ash conditioner, and metal scalping

Water System
Closed loop with zero process water discharge

COMBUSTION SYSTEM

Technology

Laurent Bouillet oscillating combustors with tranquilization chambers

Process Lines
Two at 100 tons per day

Boilers
Steaming rate of 50,000 lbs. per hour with 5200°F BTU waste; conditions 650 psig/750°F

Waste Handling
Storage pit with 600 ton capacity; two pit cranes with average
capacity of 1 - 1.5 tons

Gas Temperatures
1800°F with 2 second gas residence time

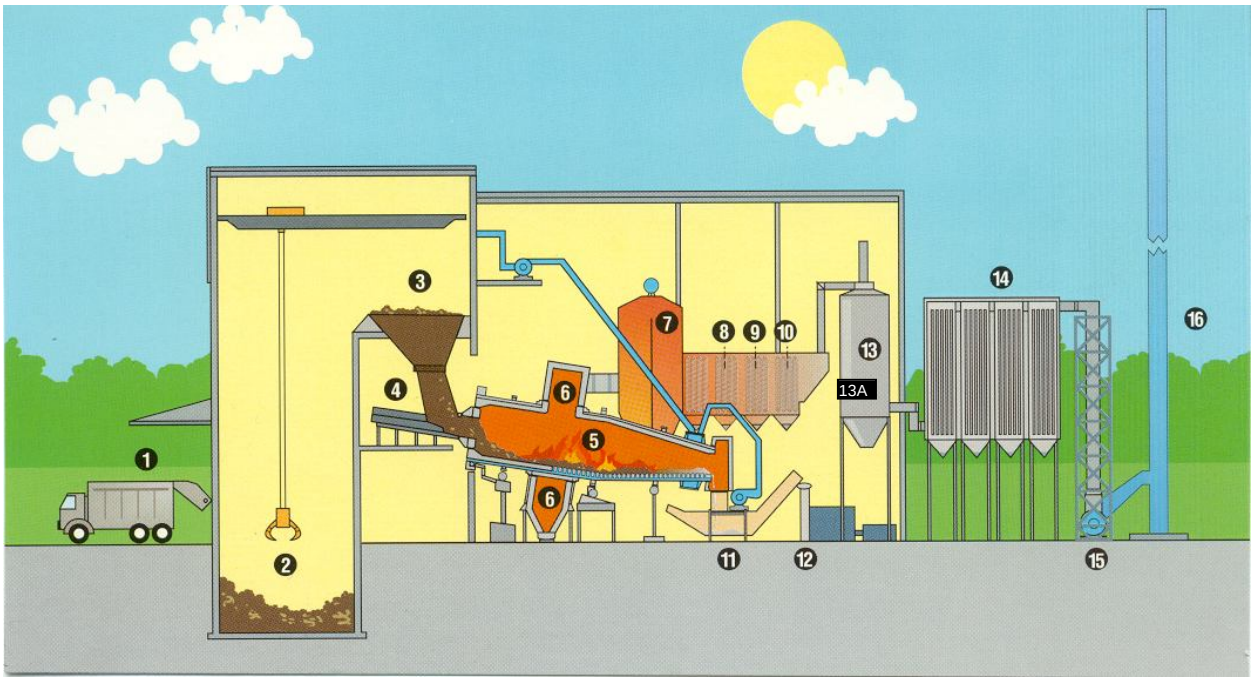
Operations
24 hours per day, seven days per week

ENERGY RECOVERY

Type
Electricity sold to Central Maine Power

Turbine Generator
3.6 megawatt output

Cooling System
Air cooled finned tube condenser

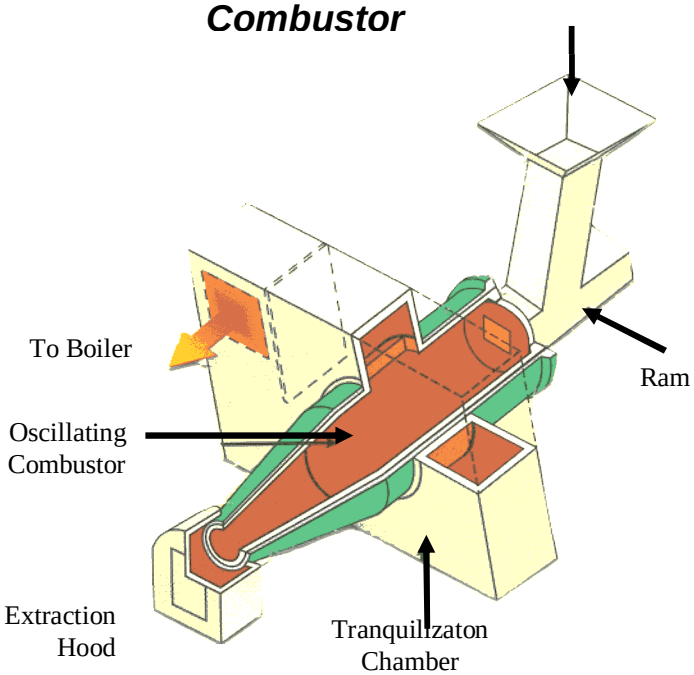


1. Tipping Area
2. Refuse bunker/crane grapple
3. Feed hopper
4. Ram feeder
5. Combustor
6. Tranquilization chamber
7. Waterwall boiler
8. Superheater
9. Evaporator
10. Economizer
11. Ash extractor
12. Ash conveyor
13. Dry scrubber

13A Carbon Injection

14. Fabric filter
15. Induced draft fan
16. Stack
17. Turbine generator (not shown)

MMWAC Facility
Solid Waste Solutions

Auburn, Maine

Laurent Bouillet Combustor