

Plant Design Data

Incineration Capacity	3,000 tonnes per day
Steam Generation per Boiler	105 tonnes per hour, 35 barG at 370 °C
Condensing Pressure	0.17 barA
Power Generation Capacity	80 MW, 10.5kV generator voltage

Main Plant Equipment

Waste Handling	8 weighbridges of 50 tonnes capacity each 24 waste discharge bays and 2 waste screening bays served by a hydraulic polyp grab 4 bulky waste rotary shears with 25 tonnes per hour capacity 2 bulky waste cranes and 4 waste cranes of 10m³ each (wire rope operated) 2 separate waste storage bunkers and 1 bulky waste storage pit
Waste Incineration and Steam Generation	6 stoker / furnace units with integral boilers
Flue Gas Handling	6 two-zone electrostatic precipitators 6 ten-compartment catalytic bag filters each comprising 2,240 fabric bags 2 concrete chimneys of 150m height with ceramic brick inner lining 2 lime silos and 2 reaction product silos
Ash Handling (each incinerator unit)	2 pusher-type hydraulic slag extractors and vibrating conveyors
Scrap Metal Recovery	2 magnetic separators to each incinerator unit
Ash / Scrap Loading	3 overhead wire rope operated cranes of 3.5 m³ each
Power Generation	2 condensing steam turbines coupled to generators (max. rating of 66.3MW each)
Steam Condensation	2 air-cooled condenser systems with 12 fans each
Cooling	Closed-loop system with treated water
Rain Water Collection	2 rain water buffer basins with 7,000m³ storage capacity
Boiler Feedwater Treatment	NEWater is polished with activated carbon, multi-gravel filters and is treated with cation, anion and mixed bed ion exchangers

TSIP Environmental Policy

TSIP is committed to carry out our activities with minimal impact on the environment. We value the well being of our employees, customers, contractors, members of public and the environment in which we live in and are committed to:

1. Establish and implement an effective environmental management system and ensuring that our operations comply with the relevant local environmental regulations and requirements.
2. Minimize pollution through adoption of new technology where feasible and proper management of flue gas emission, waste disposal and wastewater discharge.
3. Improve continually our environmental performance and operating conditions by reviewing objectives and targets periodically.
4. Train, educate and encourage our employees, contractors and customers to conduct their activities in an environmentally responsible manner.
5. Seek to communicate the environmental policy to employees, contractors, customers and the public.

Plant Emission Data for 2021

(units in mg/Nm³ except otherwise indicated)

Parameter	Limit*	Plant Level
Particulate substances	50	7.52
Hydrogen chloride	200	162
Sulphur dioxide	1700	92
Carbon monoxide	250	17
Dioxin and furans**	1 ng TEQ/Nm³	0.105 ng TEQ/Nm³
Mercury and its compounds	0.05	0.00085

** for waste incinerators commissioned before 1 Jan 2001

*Environmental Protection & Management (Air Impurities) Regulations

National Environment Agency
Safeguard • Nurture • Cherish



TUAS SOUTH INCINERATION PLANT

Tuas South Incineration Plant is the fourth and one of the largest waste-to-energy plants in Singapore. Built at a cost of S\$890 million and completed in June 2000, it was designed to incinerate 3,000 tonnes of waste daily. The Plant is sited on 10.5 ha of reclaimed land and enables incinerable waste generated in Singapore to be disposed of by incineration. The Plant was built with state-of-the-art technology. The various processes are highly automated and controlled via a distributed control system. Modern equipment incorporating advanced technology is used in the Plant to ensure a high level of efficiency and reliability.

Incineration achieves about 90% reduction in volume of the waste. Hence, all incinerable wastes are disposed of at the waste-to-energy plants while non incinerable waste and ash from the waste-to-energy plants are disposed of at the Semakau Landfill. This helps to conserve the use of scarce land in Singapore. Tuas South Incineration Plant, together with the other waste-to-energy plants and the Semakau Landfill, will meet the waste disposal needs of Singapore and help in achieving a clean living environment for all Singaporeans.



1 Incoming waste collection vehicles are first weighed at the weighbridges. They are then driven up to the reception hall where their waste is unloaded into one of the two waste bunkers. The empty trucks are weighed again before they leave the Plant to determine the weight of waste disposed of.



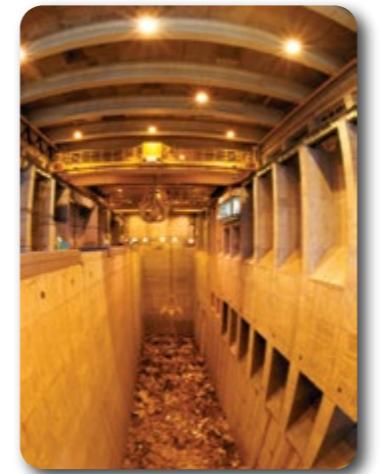
8 Modern equipment utilising advanced technologies are used in the various processes in the Plant. The control and monitoring of these processes are done using an advanced Distributed Control System (DCS) in the Central Control Room. The DCS not only increases the efficiency of operations through a higher degree of automation but also allows more equipment to be operated and monitored simultaneously. The Central Control Room is manned round the clock every day by a lean force of trained operators working on rotating shifts.



7 The heat from combustion is used to generate steam in boilers. The steam drives two steam turbines coupled to generators to produce electricity. The Plant consumes about 20% of the electricity it produces and the excess 80% is sold. The exhaust steam from the two turbines is cooled by air condenser fans. The condensate is then pumped back into the boilers, forming a closed-loop system.



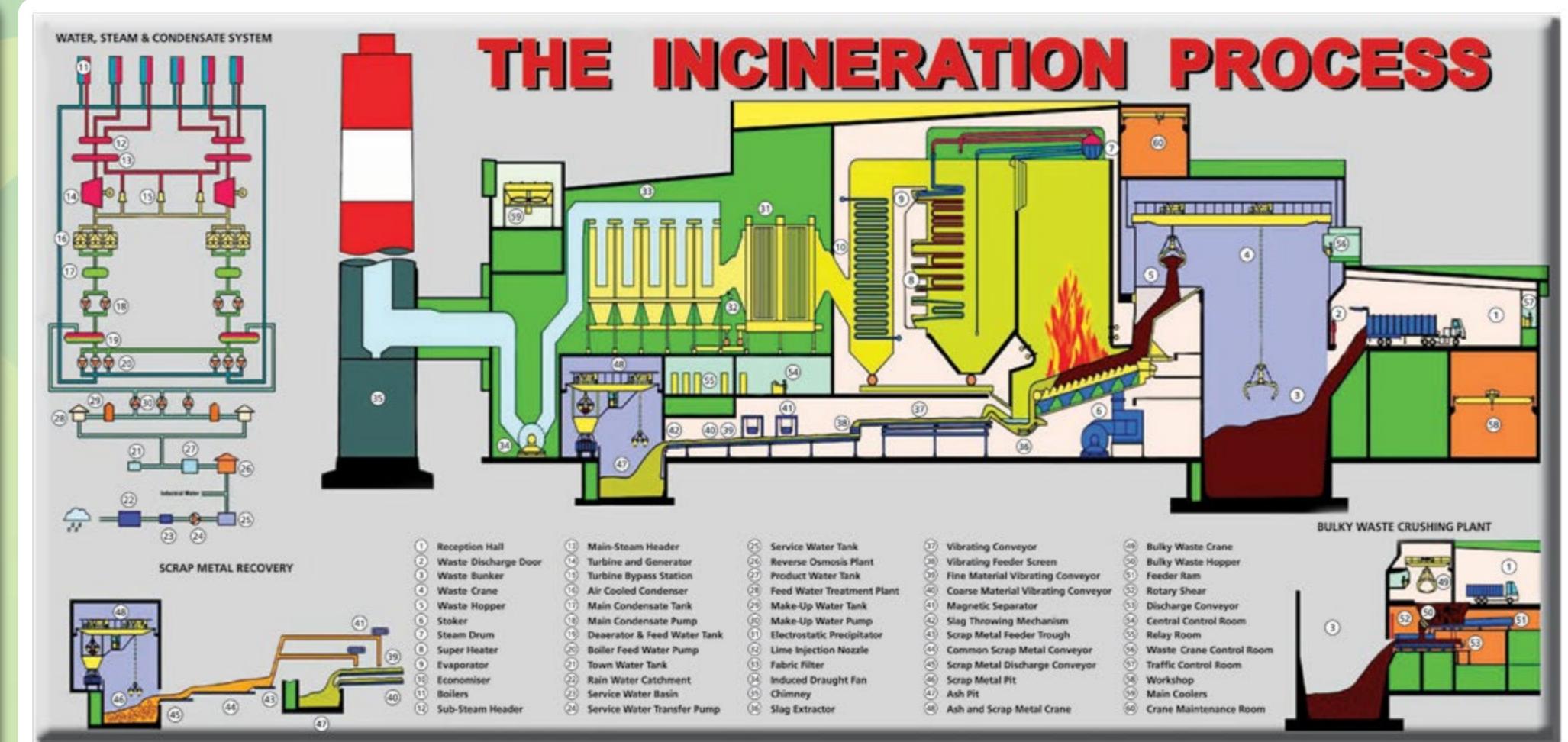
2 The pressure in the two waste bunkers is kept below atmospheric pressure to prevent odours from escaping. The waste in the bunker is fed by waste cranes into the six incinerators.



3 The Plant has four high capacity rotary bulky waste crushers integrated in the waste reception hall so that waste trucks are able to discharge their loads directly into the crushers. A bulky waste pit, which is a temporary storage facility, allows peak intake of bulky waste to be stored and crushed during off-peak hours.



THE INCINERATION PROCESS



6 The ash and slag from the incineration process are transported via vibrating conveyors to the ash pits. Ferrous scrap metal is picked up by electro-magnetic separators and transported via vibrating conveyors to the scrap pits. These scrap metal are sent to a local steel mill for recycling. The ash and slag are loaded onto trucks and sent to the Tuas Marine Transfer Station where they are unloaded onto barges and transported to the offshore Semakau Landfill for disposal.



4 Advanced combustion control systems regulate the waste feeding and combustion rate to achieve a complete burnout of the waste.



5 A catalytic fabric filter system is installed after a 2-zone electrostatic precipitator to clean the flue gas. The cleaned flue gas then passes through the two 150m tall chimneys that maximise the flue gas dispersion into the atmosphere.

