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**DOWA PPLi**

## WASTE TREATMENT WITH INCINERATION

PT. Prasadha Pamunah Limbah Industri

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## PPLI Integrated Facility



## PPLI Incinerator

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## ABOUT PPLI INCINERATOR

The rapid increase of waste generation demands a technology that is able to provide quick solutions in a short time. Incineration is one of the answers. Incineration is a thermal waste treatment process that utilizes heat to incinerate waste. This process is carried out in a controlled manner at high temperature in a closed equipment called incinerator.

The heat used in the incineration process is not only capable of destroying the pollutants, but also able to significantly reduce both mass and volume of the waste. Initially, incineration technology was applied in solid waste management process as an effort to save airspace in the landfills. In its development, this technology is also widely applied in industrial waste treatment process, including hazardous waste.

Due to the market demands above, PPLI is currently expanding its services by developing incinerator. This strategy is in line with the development stages planned at the beginning of its establishment, whereas incinerator is the third and final stage of the entire development of waste management facilities at PPLI. Incinerator will enrich the waste management service menu to be offered, as well as provide flexibility for PPLI as a one-stop-service waste management for all industries in Indonesia.



## TYPE OF WASTE THAT CAN BE TREATED IN PPLI INCINERATOR

Waste incineration utilizes heat to destroy waste and its pollutants. Type of waste suitable to be treated by this method includes combustible organic waste, oily sludge, paint sludge, used rags, plastic waste, expired and off-spec materials and products, used drilling mud from oil and gas exploration, industrial WWTP sludge, expired chemicals and residual samples from laboratory, medical waste from healthcare facilities, persistent organic pollutants (POPs) such as polychlorinated biphenyls (PCBs), and any other wastes recommended to be incinerated such as pesticides.

## BUSINESS MILESTONE

1994

### **Established**

First and only licensed waste management facility in Indonesia

2000

### **Acquired by MAEH group**

MAEH 95%, Republic of Indonesia 5%

2000 - 2006

**Successful Turnaround and Commencement of Capacity Upgrade to improve facilities and increase capacity**

2007 - 2008

### **Significant Capital Investment**

Capacity Upgrade completed  
Collection Depots and Transfer Stations in strategic geographic locations across Indonesia  
Improved Services and Additional Service

2009 - 2020

### **MAEH acquired by DOWA Eco-System**

DOWA Eco-System Co. Ltd. is a subsidiary company of Dowa Holdings Co. Ltd. Established in October 2006 in order to focus more specifically on Environmental Management & Recycling. Dowa was originally established in Japan in 1884 as a mining & metal smelting/refining company.

DOWA Environmental Management & Recycling Division has the broad-based expertise and high level of technology that allows the recapture of over 20 (twenty) different metals, including gold and silver, derived from the refinement techniques developed in the metal mining and metal smelting/refining industry.

2021 Onwards

**Incinerator Operation**





## WHY PPLI INCINERATOR?

As the one and only integrated industrial waste management facility in Indonesia for both hazardous and non-hazardous wastes, PPLI is the most appropriate choice of waste management partner for industries. The waste generated from industries can be vary, both in terms of type and management method. By partnering with PPLI, most of those waste can be managed properly with various methods suitable with the clients needs as well as regulation requirement.



## WHY PPLI INCINERATOR?

The advantages of incinerator owned by PPLI include:

**1.** The type of incinerator used is vertical stocker. This type of incinerator is suitable for unsorted waste and waste with high moisture content, whereas these wastes can still be incinerated without fuels.

**2.** Armed with emission control equipment, thus can meet even the most stringent emission requirement, e.g. EU standard. The emission control equipment used includes:

**a** The use of ammonia or urea to control  $\text{NO}_x$  in the produced flue gas.

**b** The use of rapid cooling system for the quenching of flue gas to below  $200^\circ\text{C}$  within 2 seconds in order to prevent dioxin formation.

**c** The use of lime and activated carbon to ensure that pollutants such as sulfur/  $\text{H}_2\text{S}$ ,  $\text{HCl}$ , and heavy metals meet the criteria.

**d** The use of turbo chemical baghouse filter that operates automatically and is connected to the continuous emission monitoring system (CEMS) facility. In this unit, organic pollutants, sulfur,  $\text{HCl}$ ,  $\text{HF}$ , and heavy metals will be filtered. Its connectivity with the CEMS will ensure that should the flue gas release out of the filter bag exceeds a certain limit, it will then be automatically cleaned.

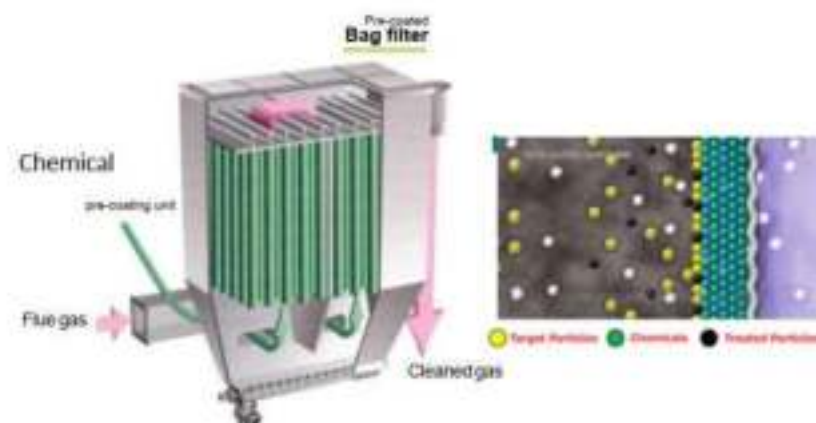
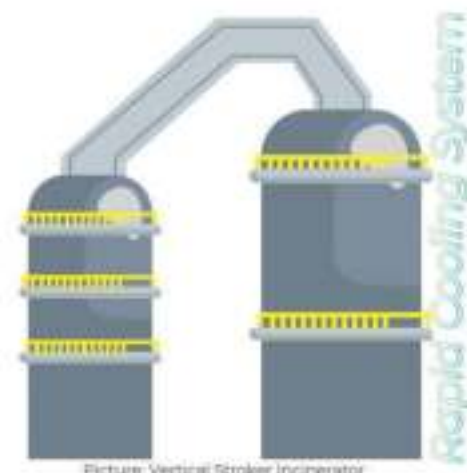


Image: Chemical bag filter precoated to ensure no pollutants are carried in flue gas



Picture: Vertical Stocker Incinerator

**e** The use of CEMS. PPLI's incinerator is equipped with CEMS which monitors not only temperature, flowrate,  $\text{O}_2$ , and  $\text{CO}_2$ , but also  $\text{HCl}$ ,  $\text{NO}_x$ ,  $\text{SO}_2$ ,  $\text{CO}$ , opacity,  $\text{CH}_4$ ,  $\text{HF}$ , dust concentration, and moisture. The use of CEMS to fully monitor parameters in the flue gas is the first and one-and-only in Indonesia at the moment.



Image: Use of software for chemical bag filter operation

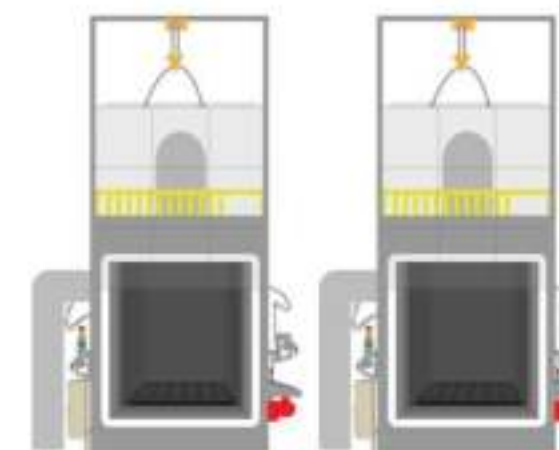
**3.** The pressure inside the incinerator is always kept lower than the outside, thus, there will be no leakage of combustion gases release without passing through the chimney.

**4.** Having several inlets. These variations of inlets will facilitate the treatment process of various types and properties of waste, viz. solids, liquids, sludge, and infectious.

**5.** Equipped with a fixed grate furnace, for waste to be destroyed along with its packaging, for example, mercaptan waste which has a very strong smell or waste whose combustion residue will be further recycled, for example electric vehicle battery waste or e-waste.

**6.** Capable to reach 99.997% of burning efficiency (BE) with 99.99997% destruction removal efficiency (DRE) for principal organic hazardous constituents (POHCs) as confirmed by trial burning test (TBT).

**7.** Fully permitted from the Ministry of Environment and Forestry of the Republic of Indonesia (Technical Approval No. S.574/PLB3/VPLB3/PLB.3/10/2021).



Picture: Fixed Grate Furnace



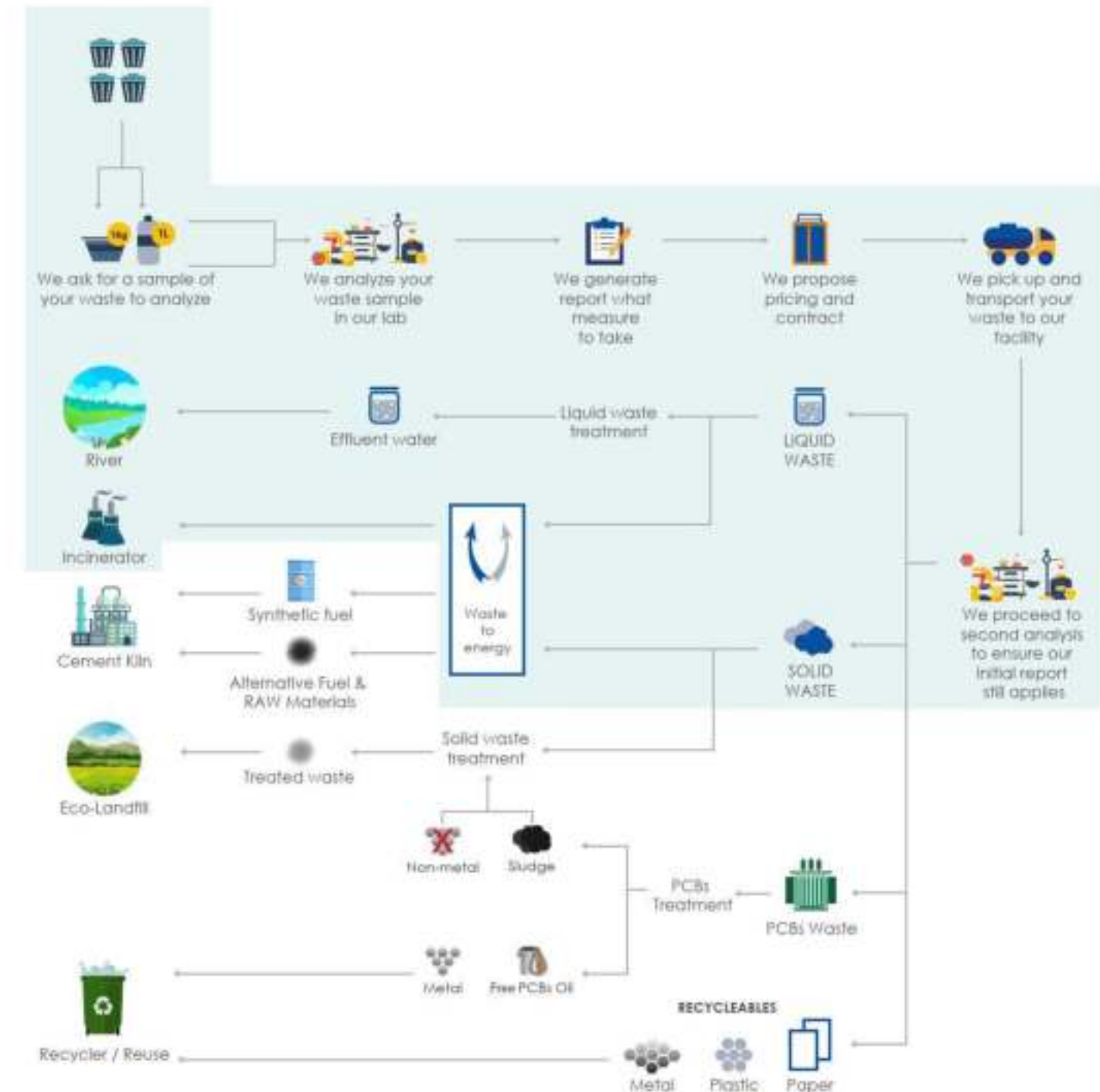
## PRE-ACCEPTANCE PROCESS



Before the waste is accepted, PPLI will first characterize its sample in order to evaluate its characteristic, content, hazard potential, and suitability for incineration process.

This characterization is essential to determine the proper packaging of the waste, including the proper transportation vehicle as well as its occupational safety and health aspects. In addition, the pre-acceptance process also serves to ensure the compliance to the legal aspects based on the Technical Approval of Hazardous Waste Management of PPLI. The results of this pre-acceptance process will be the basis to determine the costs and the preparation of contract agreement with the clients. Once the contract agreement is signed by both parties, the waste collection will be scheduled.

## ACCEPTANCE PROCEDURE INCINERATOR WASTE







## WASTE TRANSPORTATION

### I. Packaging, Labeling and Security of Waste for Transportation

PPLI staffs provide services in packaging, labelling, and securing containers to ensure the waste is ready for collection, and transportation can be arranged in accordance with Indonesian laws. Electronic manifest is completed by PPLI staffs prior to dispatch, in accordance with relevant transportation and environmental regulations.

### II. Customer Service Group

We recognize the imperative of providing a high-quality customer service in PPLI's business today and in the future. PPLI's Customer Service Group (CSG) is dedicated to achieving the highest level of service excellence. CSG performs many aspects of coordination, incl. assisting with both technical and administrative issues, as well as receiving feedback from the Customers.

### III. Collection and Transportation

Collection services are scheduled, based on customer requirements. PPLI staff coordinates with customers to arrange the appropriate collection frequency.

PPLI operates various transportation equipment to best meet the demands of its Customers, that include:

- Hook Lifting Truck
- Tow Truck
- Vacuum Truck
- Prime Mover
- Drum Van
- Gull wing
- Flat Deck, and
- 20' and 40' semitrailers suitable for marine containers and large packaging of various sizes
- Roll-off boxes, and ISO tanks and blow tanks.

PPLI can also manufacture special containers, certified lift and load, to meet specific customer requirements. Waste containers are available in various sizes and types. Examples include:

- Roll of Boxes
- Compact or boxes
- ISO tanks of various sizes
- 15 Box Lugger
- Drill cutting box



All incoming and outgoing vehicles are monitored using CCTV, GPS, and hazardous waste electronic manifest (Festronik) to ensure safe and smooth waste transportation from the Customers location to PPLI facility. The drivers are trained to respond properly in the event of emergencies during the course of transportation.



#### IV. Hazardous Waste Transportation Breakthrough



The train departs from Kalimas Station, Surabaya  
Carrying Hazardous Waste

As part of the progress and development in the environmental and logistic industry, PPLI has now commenced hazardous waste railway shipment.

This breakthrough was initiated by PPLI, PT Kereta Api Indonesia (KAI), and PT Kereta Api Logistik (KALOG) to reduce the loads of waste transportation on the highway, as well as to reduce the density of congestion.



Loading at Nambo Station, Bogor

The initial departure of hazardous waste railway shipment starts from Kalimas Station, Surabaya, East Java to Nambo Station, Bogor, West Java, for further management at PPLI integrated waste management located in Gunung Putri, Bogor.

This type of shipment will be routinely carried out twice a week with a total of 10 Twenty-Foot Equivalent Units (TEUs) of 5 Flat Decks (PPCW) or equivalent to 180 tons for each shipment. The target of this service is waste generators from the eastern area of Java, mainly East Java and Central Java.

## INFECTIOUS WASTE

### Collection and Transportation



PPLI provides sub-zero refrigerated trucks to ensure the infectious waste transportation is in accordance to the national and international standards.

### Packaging and Labeling



PPLI staffs provide services in packaging, labelling, and safe placement to ensure the waste is ready to be transported, and the transportation course can be arranged in accordance to the national and international standards. The hazardous waste electronic manifest will be completed by PPLI staffs prior to departure according to the fleet stipulated in the applicable regulation.



## TREATMENT PROCESS



Upon arrival at PPLI facility, the incoming waste will be re-evaluated through a finger print test. Finger print test is a qualitative laboratory analysis aims to ensure that the parameters being tested meet permit requirements and fall within acceptable limits for effective treatment and management, as well as to verify that the incoming shipment matches the manifest and is the same waste that was approved during pre-acceptance. Once the evaluation is completed, the incoming waste will be temporarily stored in the waste storage warehouse while waiting for the treatment recipe.

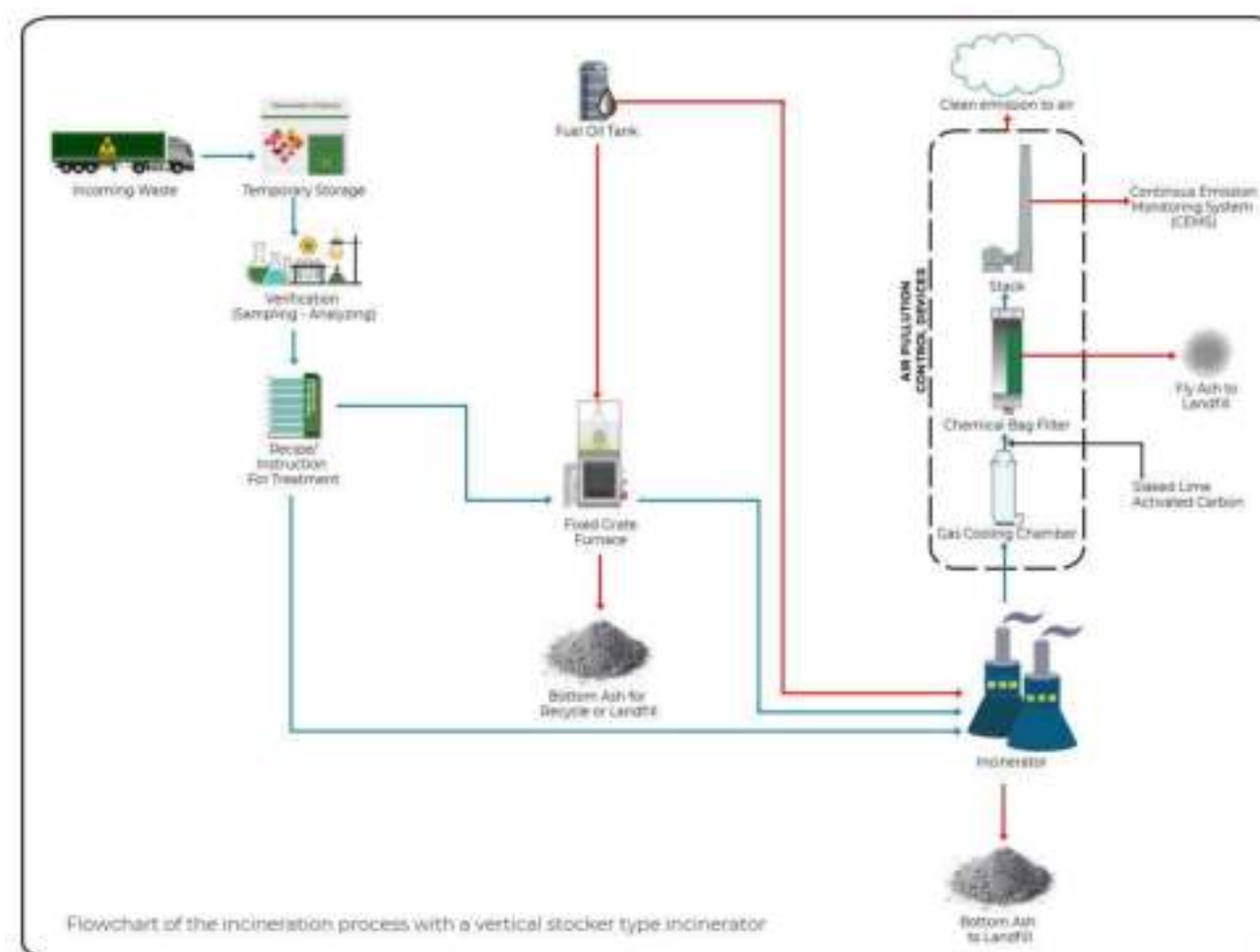
In the incineration process, the waste will be incinerated at high temperatures to destroy its pollutants into simple compounds in the form of gases that can be released into the environment. This process also generates residue in the form of ashes, which will later be disposed into the landfills.

Waste feeding into the vertical stocker incinerator is carried out in various ways, namely :

1. Through a conveyor belt for solid waste or sludge without any free liquids. To facilitate homogenization, the waste will first be mixed in the mixing pit.
2. By reversing device for the feeding of infectious waste.
3. Direct pumping for liquid waste, e.g. waste oil, solvent, alkali waste, and acid waste.
4. Direct feeding for laboratory reagent waste with size less than 0.5 liters.

All waste will enter the first combustion chamber with a minimum temperature of 800° C. The waste residence time in this chamber is ca. 2-6 hours. From the first combustion chamber, the produced flue gas will flow to the second combustion chamber which has a combustion temperature 850-1000° C with a residence time of at least 2 seconds. The flue gas produced in the second combustion chamber will then be quenched in the cooling tower to prevent dioxins formation.

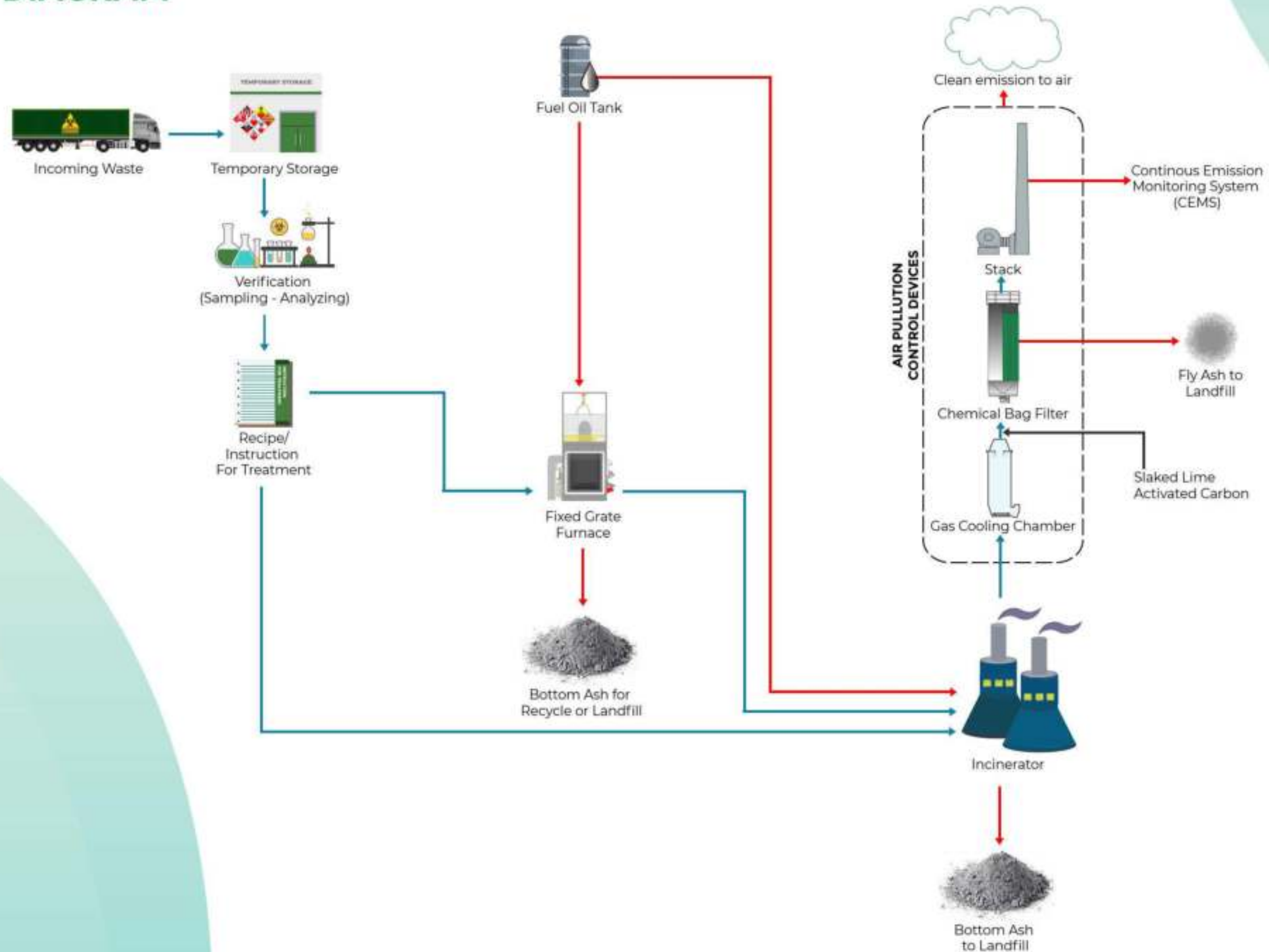
This quenching process is carried out by spraying water; thus, the gas temperature can rapidly decrease to below 200° C in ca. 2 seconds. The quenched gas will then be treated with lime and activated carbon prior filtration which is controlled by a computer system through specific programming. Emission monitoring is carried out continuously for the parameters of NO<sub>x</sub>, SO<sub>x</sub>, HCl, CO, CO<sub>2</sub>, and O<sub>2</sub>. The incineration process is illustrated in the following figure:



Waste incineration process will generate ca. 10-20% of hazardous waste in the form of fly ash and bottom ash that will be safely disposed into the landfills. Leaching characteristic of the ashes will be analyzed periodically by TCLP.



# INCINERATION PROCESS FLOW DIAGRAM







## ABOUT PPLI

PT. Prasadha Pamunah Limbah Industri (PPLI) is an Indonesian company that has been in operation since 1994 providing services for the collection, recycling, treatment and disposal of hazardous and non-hazardous waste.

PPLI is 95% owned by DOWA and 5% by the Government of Indonesia. PPLI's parent company, Dowa Eco-System Co. Ltd., is a company dedicated to environmental management and recycling, and is a wholly owned subsidiary of Dowa Holdings Co. Ltd. The group was founded in 1884 as a metal mining and smelting/refining company in Japan. Dowa Eco-System Co. Ltd. business centered on resource recycling, waste management, soil remediation and environmental consulting.

