Appendix 2:

Installation Operational Plan

Metal Decontamination Process Description

Activities Falling Within Environmental Permitting Regulations 2010 Schedule 1

Chapter 2:	Production and Processing of Metals
Section 2.1:	Ferrous metals
Part B:	Heating iron, steel or any ferrous alloy (whether in a furnace or other appliance) to remove grease, oil or any other non-metallic contaminant (including such operations as the removal by heat of plastic or rubber covering scrap cable).

Process Description

1.1 Introduction

NMUK Metal Decontamination process was installed in 1987 to remove paint over-spray from components used in the coating process. The original process consisted of three (3) dip tanks, two (2) containing a hot caustic solution, one (1) wash tank. In 1993 the paint removal building was extended to house a Fluidised bed. The two metal decontamination operations were run independently of one another. The processes were regulated under a Part B Permit referenced within LA-IPPC/A2/1018-4/2020.

This application is for the installation of a Controlled Pyrolysis Cleaning Oven installation, which is required due to the fluidised bed approaching the end of useful life. Complex parts required for current and new models creates quality issues, with post-cleaning sand being retained in elbows, corners and joints of the tools. Cleaning by sand abrasion is now deemed unsuitable for the level of cleanliness required to meet the paint quality within the plant application process.

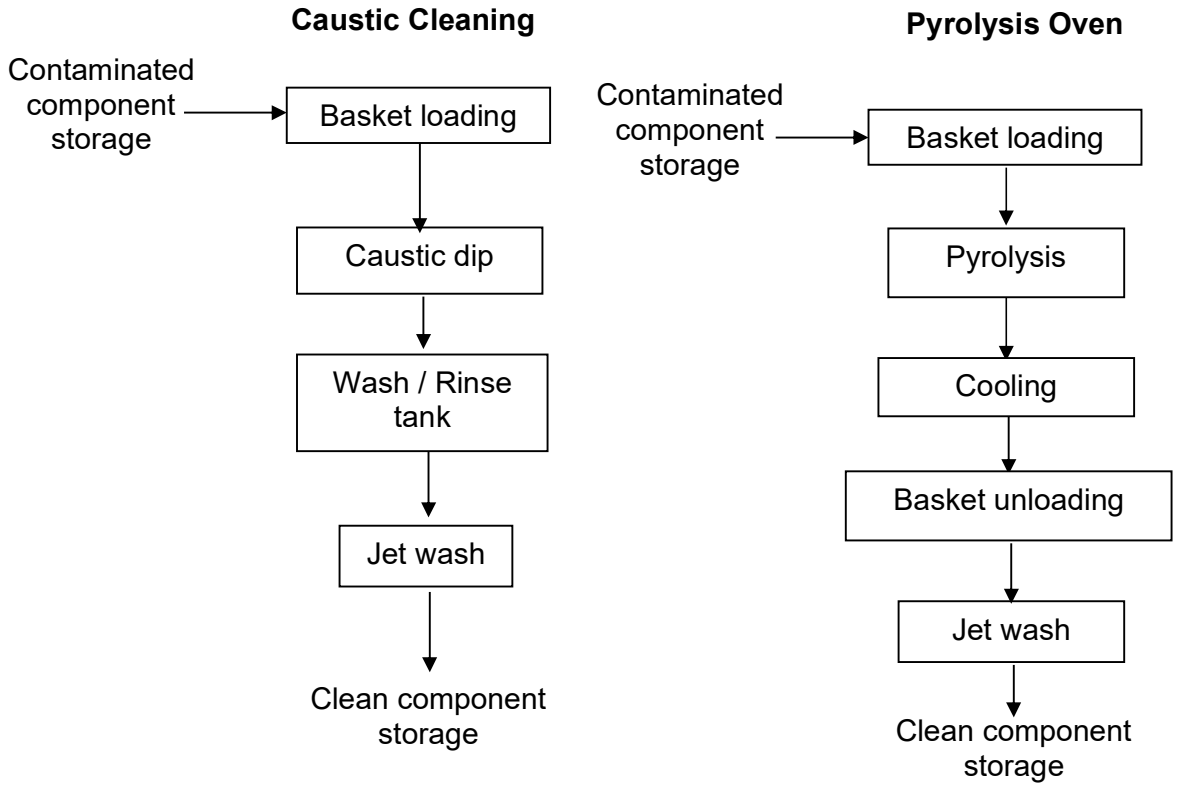
The Pyrolysis Oven process will provide a clean, safe and environmental compliant process. Three ovens in total will be installed, including two PTR675 models (58 kW heat up burner) and a smaller PTR92 model (58kW heat up burner).

The process will be utilised to clean a large volume of varied parts, approximately 3000 floor grids, 300 radcores, 1500 slaves, springs, plates, jigs, formers and tooling. Component parts will be loaded in various batch sizes and combinations dependent on the part type. The provision of three ovens allows for a process throughput that will facilitate NMUKs peak production capacity. NMUK achieved peak capacity in 2018 with a vehicle production volume of 415,000 per annum. Current annual production stands at 270,000 vehicles, allowing sufficient process contingency within the three provisioned ovens. In the event vehicle production volume is planned to exceed the production peak, additional component cleaning contingency will be considered.

The caustic cleaning process will remain, complementing the new pyrolysis process. Caustic cleaning process is not in itself a scheduled activity. The Pyrolysis Oven itself a scheduled activity.

The main process steps are outlined in Figure 1.1

Figure 1.1 Metal Decontamination



Operation and staffing of the facilities

The two facilities described in this section of the application will be staffed and operated under contract to NMUK. Staff at all levels will hold the necessary training and instruction in their duties relating to the control of the process and emissions to air.

The pyrolysis oven process will operate in line with the NMUK Health and Safety Policy, ensuring the operation will not put a risk the health, safety or welfare of people at work or those who may be harmed by the work activity.

Delivery and storage of raw materials and components

Raw Materials
Raw materials delivered within the paint removal building will be predomiantly liquid. Liquid materials used in the caustic cleaning process will be delivered to site in 1000L IBC and manually decanted into the tanks as required.

The following general conditions are applied:
-All delivery containers provided by the material suppliers.
-All deliveries to be supervised by the facility operators.
-All materials to be stored at designated locations.
-All drains in the process and storage areas will flow into the effluent treatment plant concentrates tanks.
-All storage areas are hard surfaced.

Raw Material Inventory

The following raw materials have been idenitified for the NMUK metal decontamination process shown in Table 1.1

Table 1.1 Raw Material Inventory

Raw Material	Typical Composition	Interaction	Potential Impact	
			Transboundary	Local
Fuel - Natural Gas	Natural gas	Combustion gases to atmnosphere	✓	
Compressed Air	Electricity consumption to run compre	Off site pollution potential at power station	✓	
Electricity	Electicity	Off site pollution potential at power station	✓	
Caustic Cleaning: Caustic	Caustic	Discharge to effluent treatment plant; Waste caustic sludge		✓
Rinse	Water	Discharge to effluent treatment plant		✓
Pyrolysis : Rinse	Water	Discharge to effluent treatment plant		✓

Components
Componenets comtaminated with paint over spray will be collected from the coating processes and delivered to the Paint Removal Building by fork lift truck. Components will be stored in designated locations. Components which are coated in PVC containing materials and those which will not tolerate a hot process are separated from all others. Those separated componenents will not be put through the pyrolysis process, they will be cleaned in the caustic cleaning process.

Environmental Impact

Activity	Raw Materials	Potential impact	Control systems
Material and component delivery and storage	– Caustic	– Spillage of materials into drains and onto land – Waste packaging	– Designated storage areas – Storage undercover whenever possible – Drainage flows into effluent treatment plant – EMS procedures for spillage prevention and control – Waste segregation system – High housekeeping standards to reduce risk of washout into drains

1.2 Caustic Cleaning

Components are manually loaded into baskets suspended from an overhead hoist. The components are then dipped into the caustic solution. The Caustic solution is heated using an indirect gas burner to a temperature of approximately 120 to 126 ^{o}C. The paint is denatured and removed from the component. Following caustic dip, the baskets are dipped in a wash tank, then sprayed with water to remove any remaining debris and excess caustic before air drying. No components from the caustic cleaning facility will enter the pyrolysis oven.

Environmental Impact

Activity	Raw Materials	Potential impact	Control systems
Hoist	– Electricity	– Not significant	– Not significant
Caustic Cleaning	– Caustic – Water – Natural gas – Wash chemicals	– Spillage of materials into drains and onto land – Combustion gas to atmosphere – Water vapour to atmosphere	– Temperature control – Waste segregation system – Quality control of tank contents – Effluent treatment plant – Stack height 11m – Floor gullies draining to effluent treatment plant – Designated storage areas – Storage undercover whenever possible – EMS procedures for spillage prevention and control – High housekeeping standards to reduce risk of washout into drains. – Tanks with closing lids

1.3 Pyrolysis Oven

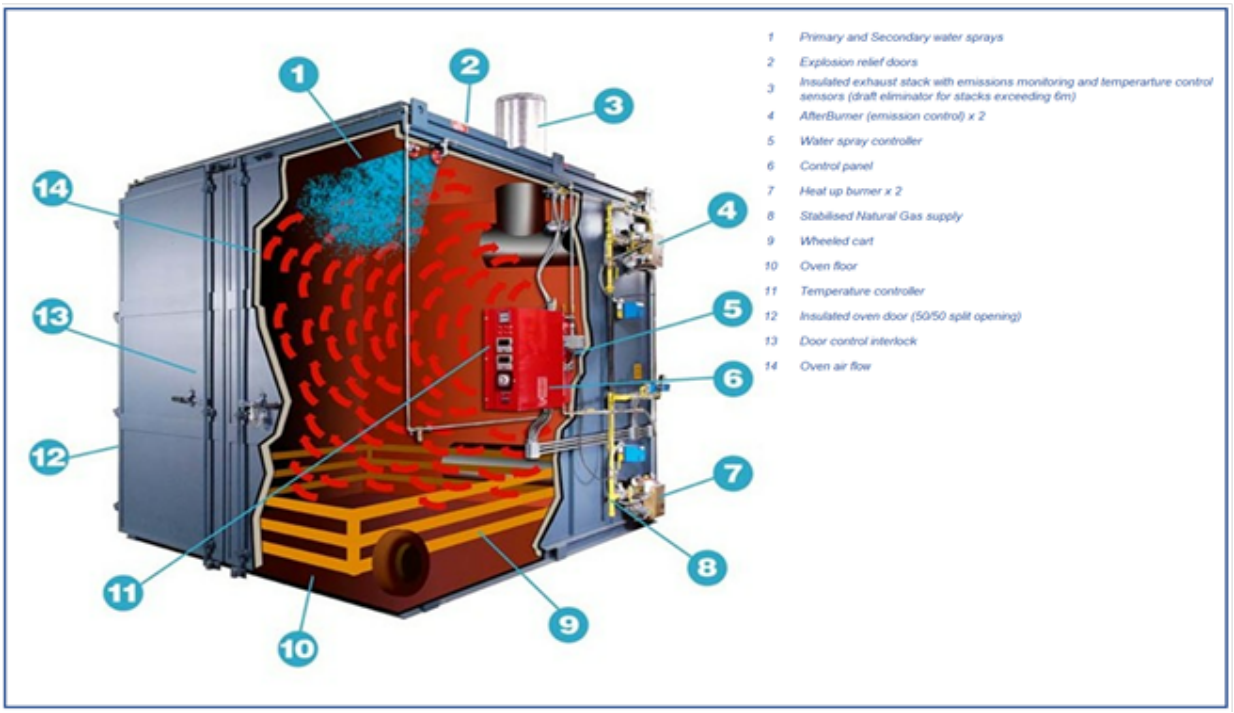
The pyrolysis is oven is to be used to clean paint contaminated components. The length of the cleaning cycles depends on the size, quantities and amount of paint on the component parts being cleaned.

The main steps in the process are:
- Components will be manually loaded into baskets in the load/unload area.
- Baskets will be transferred to the pyrolysis oven using a forklift truck and subsequently loaded onto a track system to be wheeled into the ovens.
- The water spray nozzles are tested and then the left-hand door is closed and fastened whilst the other door stays open.
- The cleaning cycle-timer is set at the time required, the start button pressed and the cleaning cycle begins. Cycle time to be determined dependent on paint loading of components. Consideration will be taken to ensure that the decontamination unit is not overloaded in order that maximum efficiency is achieved and to minimise the production of smoke and other products of incomplete combustion.
- The afterburner comes on after a 45-second purge and then 45 seconds later the primary burner is ignited.
- After checking that both burners are operating, the other door is closed and fastened.
- The cycle time for each load is between 3 to 5 hours.
- Upon completion of the cleaning cycle plus cooling time, the doors can be opened.
-The baskets can be removed from the oven via the track system.

- Loaded baskets are transferred to the load/unload area to cool.
-The components may be jet washed to remove any remaining debris. Components will remain in baskets for this process or unloaded if required.
-Baskets containing clean components will then be transported back to the relevant Paint process areas.
- Dry waste ash direct from the ovens will be removed manually and placed in suitable containment to be disposed off offsite at permitted facility.
-Residual ash removed from components through using a jet wash will form a combination of water and ash that will be discharged via sealed drainage to the site trade effluent facility for further treatment. See Appendix for drainage plan 1b.

Abatement
The Pyrolysis ovens consists of one single chamber, containing a heat up zone and afterburner zone. See Figure 1.2 Oven Features

Figure 1.2 Oven Features



Within the heat up zone, components are heated with a low level of oxygen, removing paint contamination by thermal decomposition of the material through thermal heating in a low oxygen environment.

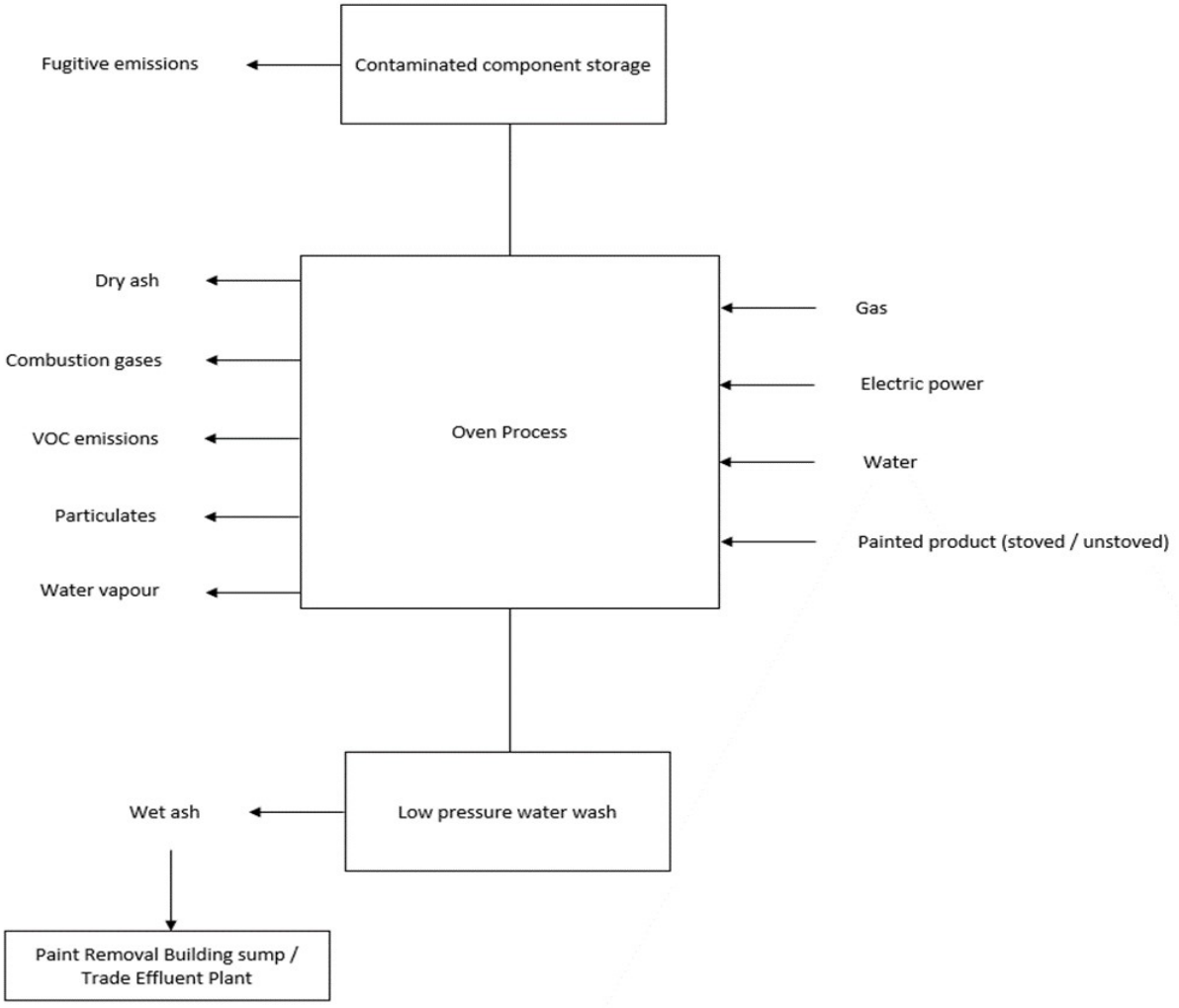
Pyrolysis smoke and gases generated by the process is drawn into an integral afterburner zone, where its temperature is raised and the smoke is completely burned at 850°C. The afterburner is designed to have a residence time of more than 2 seconds to ensure complete combustion. The VOCs and TPMs produced are removed by the heating process with the energy efficient afterburner zone ensuring compliant stack emissions.

The required 2 second residency time is explained Appendix 2b with calculations required for each oven model demonstrated in Appendix 2c and 2d.

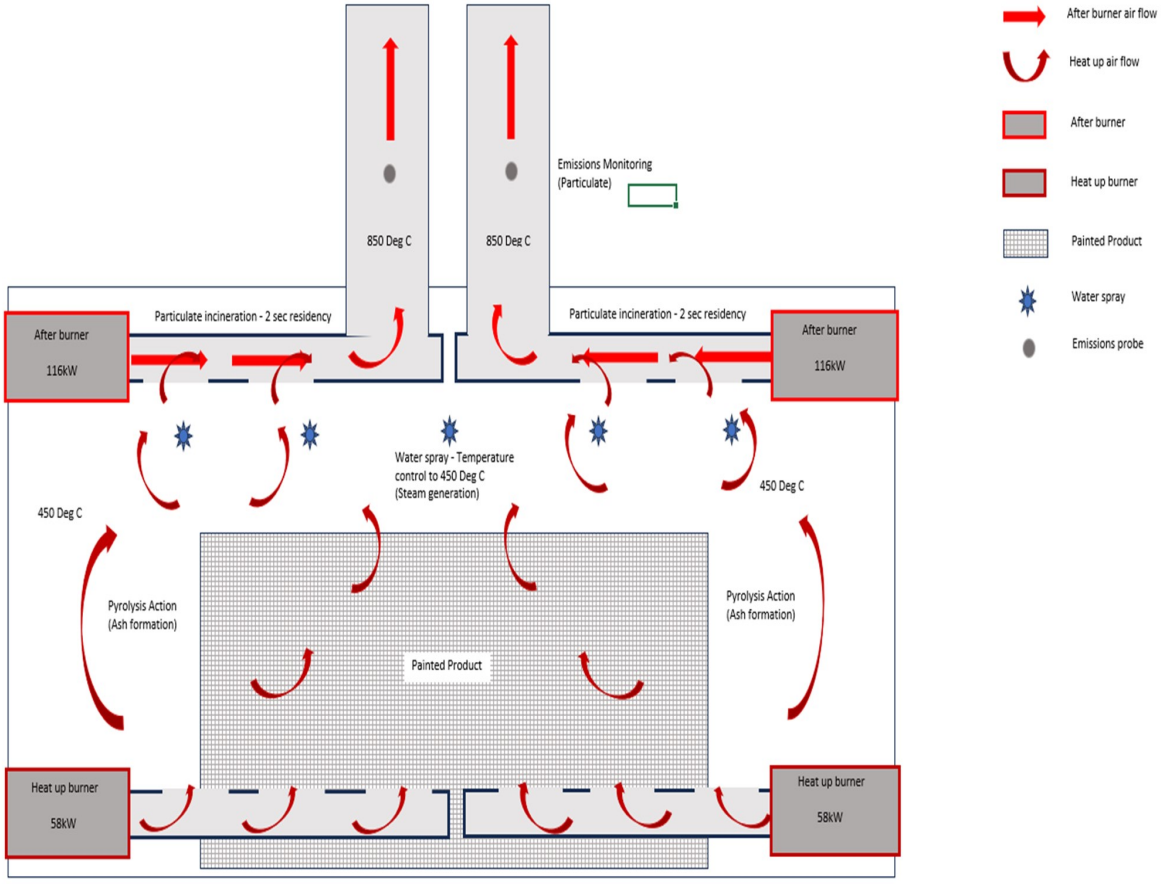
Pyrolysis ovens have smaller burners and uses modulation of gas, to maintain the oven at the correct operating temperature. The heat up zone and the temperature of the afterburner zone are interlocked to prevent pyrolysis if the afterburner is not operating at an appropriate temperature.

Over temperature of the stack is prevented by primary and secondary water spray systems controlled by set points within the stack temperature controller. If secondary water sprays are activated this will also cut out the primary burner to prevent any further heat input.

Pyrolysis Process Flow



Pyrolysis Operational Flow



Environmental Impact

Activity	Raw Materials	Potential impact	Control systems
Hoist	– Electricity	– Not significant	– Not significant
Pyrolysis Oven	– Natural gas – Electricity – Paint contaminated grids – Ash handling and transfer – Jet wash wastewater	– Spillage of ash into drains and onto land – Combustion gas to atmosphere – VOC to atmosphere – Particulate matter to atmosphere	– Temperature control – Waste segregation system – System to control the number of components cleaned in any one batch – System to control type of coating contamination cleaned in bed – VOC abatement – Particulate matter abatement – Interlock between heat up and afterburner temperature – Effluent treatment plant to receive wastewater – Stack height minimum 11.5 meters from ground level. – Designated storage areas – Storage undercover whenever possible – EMS procedures for spillage prevention and control – High housekeeping standards to reduce risk of washout into drains