

**APPLICATION INFORMATION REQUIREMENTS FOR THE SUBMISSION OF AN APPLICATION FOR AN AIR EMISSIONS LICENCE IN TERMS OF S22A OF THE NEM:AQA (NO. 39 OF 2004) FOR PRECIOUS METAL RECOVERY AT CAPE PRECIOUS METALS, ERF 5086, MONTAGUE GARDENS, CAPE TOWN**

INFORMATION REQUIREMENT	RESPONSE
<b>EIA Reference</b>	
Construction or Modification Date	
EIA Reference Number	14/2/3/A1/20/0004/19
Competent Authority	Department of Environmental Affairs and Development Planning
Have you been issued with an EA?	Yes/No
Date of receiving EA	30/10/2019
<b>Project Description</b>	
<p>The activity entails the construction of a precious metal recovery facility on Erf 5086, Montague Gardens which was completed in 2000. No additional components need to be added. The process involves the recovery of precious metals from jewellers waste (bars, sweeps and filings) by means of pyro-metallurgy and wet chemical methods using aqua regio and nitric acids.</p> <p>There are five rooms involved in the process, namely the furnace area, assay room, incinerator (no longer in use), smelting room and laboratory. In order to accommodate emissions at various points in the process, the furnace room is fitted with an extraction vent and the laboratory is equipped with a scrubber stack (approximately 10m high). The incinerator is no longer in use and will not be used in the future.</p> <p>The jewellers waste is first melted into ingots in the furnace room which are sampled and assessed in the assay room. They are then granulated. Emissions at this stage consist of particulate matter which is emitted from the extraction vent. The granules are then dissolved using nitric acid and aqua regia. During this process, mono-nitrogen oxides (NOx) and Chlorine are emitted. The precious metals are then precipitated chemically into their pure form.</p>	
<b>GENERAL INFORMATION</b>	
<b>A.1. Application Information</b>	
Current AEL Number	WCCT070
Application Reason	New Application  <b>AEL Section 22A</b>
Licensing Authority	City of Cape Town Municipality
<b>A.2. Facility Information</b>	
Facility/Property	Cape Precious Metals (Pty) Ltd

SRN	WCCT070
Facility Address	13 Link close, Montague Gardens, Cape Town
Province	Western Cape
District Municipality	City of Cape Town Metropolitan Municipality
Postal Code	7441
Latitude	-33.860825
Longitude	18.526734
<b>ACO Information</b>	
First Name	Jolandie
Last Name	Binneman
Phone number	021 551 2066
Cell Phone Number	082 444 8820
Fax	021 552 7792
Email	Jolandie@cpmct.co.za
Company Registration Number	2009/000145/07
After hours contact details	082 444 8820
Land use zoning as per town planning scheme	General Industrial 1
Does your facility have a complaints register	<b>Yes/No</b>
SIC Code	24 (Description: Manufacture of basic metals)
<b>A.3. Location and Extent of Plant</b>	
Latitude of approximate centre of operations	31° 51'39.00" S
Longitude of approximate centre of operations	18° 31'36.29" E
Extent (km2)	0.001km <sup>2</sup>
Elevation above mean sea level (m)	16m
Designated Priority Area	<b>NA</b> Highveld Priority Area Vaal Triangle Airshed Priority Area Waterberg Bonjanala Priority Area
Description of surrounding land use within a 5km radius, specifically noting the names of residential and commercial areas in relation to the site of the works	
The Cape Precious Metals facility is located within the Montague Gardens Industrial Area. Industrial	

development is also present in Killarney Gardens (approximately 3 km north of the site). A railway line and the N7 freeway are situated immediately east of the Cape Precious Metals establishment. The closest residential area is Bothasig, across the N7 and approximately 350 m east of the site. Other residential areas further afield, but within a 5 km radius of the property include Richwood, Dunoon, Edgemead, Summer Greens, Wingfield and Milnerton. A number of schools are located in the surrounding area (e.g. Edgemead, Bosmandsdam and Milnerton). Several shopping centres are located in the vicinity of the industrial area, the closest of which to the subject property is the Bothasig Checkers Centre (approximately 900 m south-east) and the Edgemead Shopping Centre (approximately 2 km south-east). The facility lies approximately 2.5 km south-east and east of the Diep River and Rietvlei Nature Area at its closest point.

#### **A.4. Nature of Process**

##### Overview Facility-wide Process Description

The process involves the recovery of precious metals from jewellers' waste (bars, sweeps and filings) by means of pyro-metallurgy and wet chemical methods using aqua regia and nitric acids. The melting station refinery facilitates smelting processes, using a blow torch, to melt metal (i.e. the jewellers waste) before taking it to the furnace room. The furnace room contains four furnaces: an induction furnace, two electric furnaces and one gas furnace. Metal inputs are melted in the furnace room and casted into ingots. The ingots are then weighed and sampled in the assay room to determine the composition and purity of the metal. Emissions at this stage consist of particulate matter which is emitted from the extraction vent. The inputs required at this point are gas and electricity.

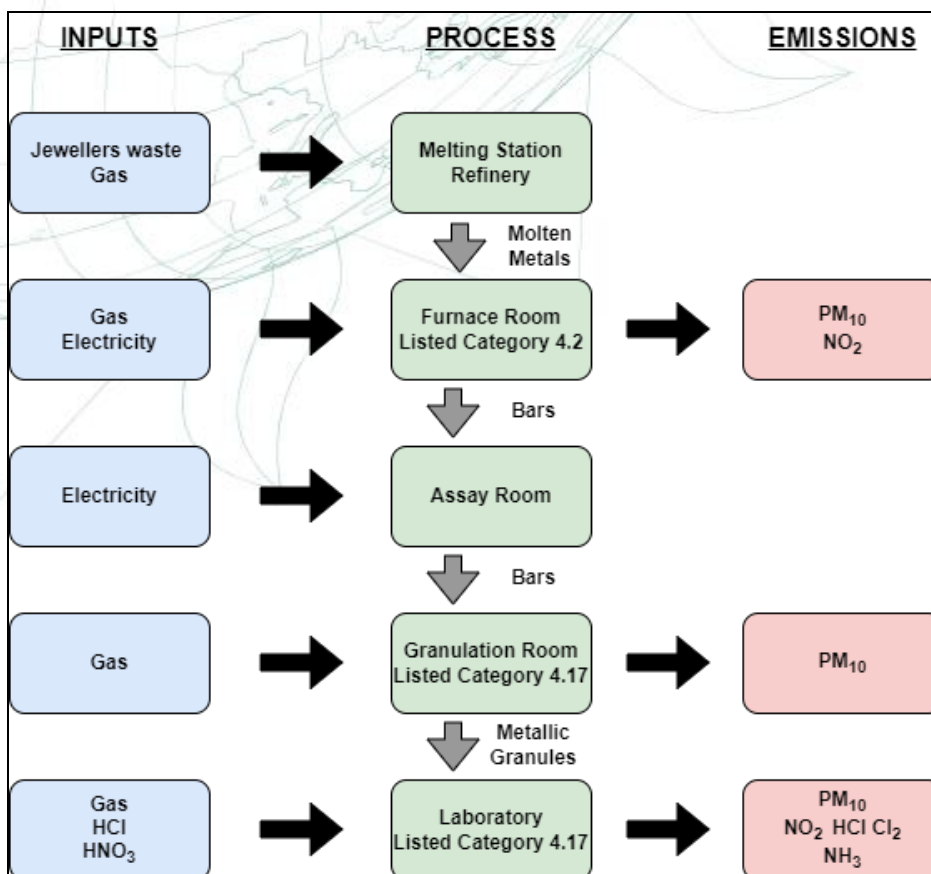
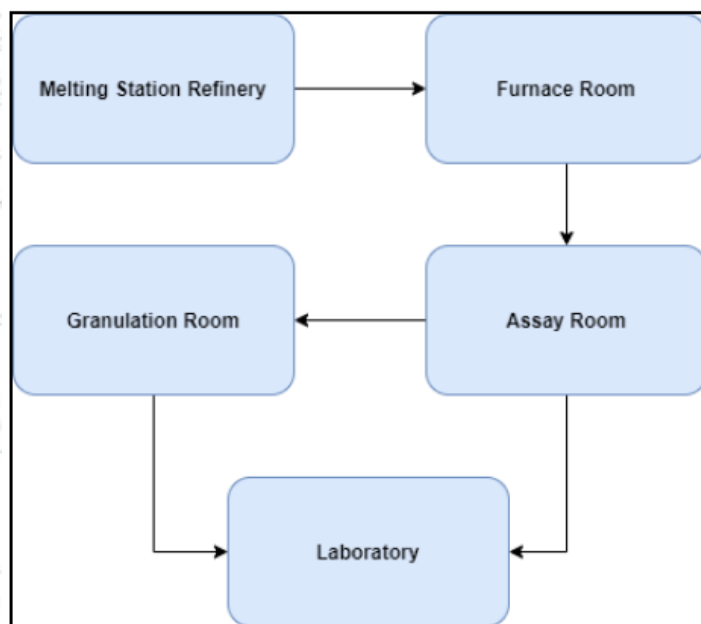
Following this they are granulated. The granulation room facilitates the slow melting of ingots to form molten droplets. The droplets are caught in a water container placed below the ingot. The droplets then cool and form metallic granules. The laboratory is made up of eleven Bunsen burners used when dissolving the granules and ingots in nitric acid (HNO<sub>3</sub>) and aqua regia to further refine the metal. The laboratory stack is equipped with a wet scrubber, which undergoes regular monthly maintenance by CPM as well as regular maintenance by an external company.

The granules are then dissolved using nitric acid and aqua regia. During this process, mono-nitrogen oxides (NO<sub>x</sub>) and Chlorine are emitted. The precious metals are then precipitated chemically into their pure form. Inputs in this process are gas, nitric acids, and hydrochloric acids, while emissions via the scrubber stack include hydrochloric acids and hydrochloric NO<sub>x</sub>.

In terms of emissions, five-point sources are located on the facility, namely, an induction furnace stack (IS), a gas furnace stack (GS), an electric furnace stack (ES), the laboratory stack (LS) and the granulation room vent (GV). Based on process inputs all five stacks were characterised as sources of particulate matter with an aerodynamic diameter less than 10microns (PM<sub>10</sub>) emissions. The gas furnace stack has the potential to emit both PM<sub>10</sub> and nitrogen dioxide (NO<sub>2</sub>) and the laboratory stack has the potential to emit PM<sub>10</sub>, NO<sub>2</sub>, Hydrogen chloride (HCl), chlorine (CL<sub>2</sub>) and ammonia (NH<sub>3</sub>).

The plant operates from 08h00 to 16h00 from Monday to Thursday and from 08h00 to 15h00 on Fridays, which averages about 39 hours a week. Only the laboratory has an average of eight operational hours per week.

The incinerator remains out of use.



#### A.5. Facility wide Listed Activities with Regulatory Applicability

Listed Activity Number	Category of Listed Activity	Sub-category of the Listed Activity	Name of the Listed Activity	Description of the Listed Activity
4(17)	4	4.17	Precious and base metal production and refining	The production or processing of precious and associated base metals through chemical treatment (Excluding Inorganic Chemicals-related activities regulated under Category 7).



				- All installations
4(2)	4	4.2	All combustion installations (except test or experimental).	Combustion installations not used for primarily for steam raising and electricity generation (except drying)

Facility Wide Air Pollutant Emissions

1 - 10 of 10 item(s)

Delete	SEC21 Code	Pollutant Name	Minimum Emissions Standards (mg/Nm <sup>3</sup> )(Existing)	Minimum Emissions Standards (mg/Nm <sup>3</sup> )(New)	Reference Conditions
	SA0402	PM	100.00	50.00	
	SA0417	CHLORINE	50.00	50.00	
	SA0417	PM	100.00	50.00	
	SA0402	OXIDES OF NITROGEN	2000.00	500.00	
	SA0417	AMMONIA	100.00	100.00	
	SA0417	HCL	30.00	30.00	
	SA0417	HF	30.00	30.00	
	SA0417	OXIDES OF NITROGEN	500.00	300.00	
	SA0417	SO2	400.00	400.00	
	SA0402	SO2	500.00	500.00	

**CONTACT INFORMATION**

First Name	Jolandie
Last Name	Binneman
Job Title	General Manager/ ACO
Responsibility	Emission inventory primary
Email	jolandie@cpmct.co.za
Phone Number	021 551 2066
After hours contact number	082 444 8820
Fax	021 552 7792
Address	CPM Building, 13 Link Close, Montague Gardens
Province	Western Cape
District Municipality	City of Cape Town Metropolitan Municipality
Local Municipality	City of Cape Town Metropolitan Municipality
Postal Code	7441

**C.1. Raw Material Used**

Raw Material Type	Maximum Permitted Consumption Rate (Quantity)	Design Consumption Rate (Quantity)	Actual Consumption Rate (Quantity)	Units (Quantity/Period)
Borax (Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> )	N/A	525	525	g/45mins
Nitric Acid (HNO <sub>3</sub> )	N/A	4	4	l/30mins
Hydrochloric Acid (HCl)	N/A	1	1	l/20mins

### C.2. Production Rates

Production Name	Maximum Production Capacity Permitted (Quantity)	Design Production Capacity (Quantity)	Actual Production Capacity (Quantity)	Units (Quantity/Period)
Gold	N/A	150	150	Kg/Month
Silver	N/A	600	600	Kg/Month

### C.3. By Product Rates

By Product Name	Sodium Hydroxide
Design Production Capacity	2L
Actual Production Capacity	
Unit	2

### C. 4. Material used in Energy Production

Energy Production Material	Electricity
Design Production Capacity	182000
Actual Production Capacity	182000
Unit	Kwh/Month
Sulphur (%)	0
Ash (%)	0
Energy Production Material	Gas
Design Production Capacity	58
Actual Production Capacity	58
Unit	GJ/Month
Sulphur (%)	0

Ash (%)	0
<b>CONTROL DEVICE</b>	
<b>Control Device Detail Information</b>	
Device Type	Wet Scrubber
Control Unit ID	
Control Unit Name	
Description	Wet scrubber fitted to laboratory stack (fume extraction scrubber)
Model Number	61
Date Manufactured	Unknown
Commission Date	Unknown
Date of Significant Modification or Upgrade	Unknown
Control Eff Design Capacity C (%)	
Overall Min. Control Efficiency (%)	
Overall Min. Utilisation (%)	
<b>Disposal of Waste and Effluents Arising from Control Device</b>	
Waste/Effluent Type	Spent Sodium Hydroxide Solution
Hazardous Compounds Present	HCl and HNO <sub>3</sub> neutralised by Sodium Hydroxide
Method of Disposal	Solutions are collected and disposed of by Enviro Serve
Description	Minimal amounts of Sodium hydroxide is produced. This is collected and disposed of by Enviro Serve.
<b>Controlled Pollutant List</b>	
Ammonia (NH <sub>3</sub> )	Wet Scrubber
Chlorine	Wet Scrubber
HCL	Wet Scrubber
HF	Wet Scrubber
Oxides of Nitrogen (NO <sub>x</sub> )	Wet Scrubber
PM	Wet Scrubber
SO <sub>2</sub>	Wet Scrubber
Control Efficiency (%)	95%







<b>STACK</b>	
<b>SVIS (Induction Stack)</b>	
Stack Orientation	Vertical
Stack ID	SV0001
Stack Name	SVIS
Decommission Date	NA
Stack Height (m)	10.5
Stack Diameter (m)	0.5
Height above nearby building (m)	0
Building Height (m)	
Building Length (m)	
Building Width (m)	
Exit Gas Temperature (C)	33
Exit Gas Flow Rate (cu.m/s)	1.48861
Exit Gas Velocity (m/s)	7.58143
By-Pass Stack	Yes/ <b>No</b>
Latitude Measure	-33.8589
Longitude Measure	18.5178
Stack Description	Induction furnace stack. Melting and casting of metal into ingots (bars) occurs here.
<b>SVGS (Gas Stack)</b>	
Stack Orientation	Vertical
Stack ID	SV0002
Stack Name	SVGS
Decommission Date	NA
Stack Height (m)	9
Stack Diameter (m)	0.5
Height above nearby building (m)	0
Building Height (m)	
Building Length (m)	



Building Width (m)	
Exit Gas Temperature (C)	98
Exit Gas Flow Rate (cu.m/s)	2.55361
Exit Gas Velocity (m/s)	13.0054
By-Pass Stack	Yes/ <b>No</b>
Latitude Measure	-33.8589
Longitude Measure	18.5178
Stack Description	Gas furnace stack or Gas Stack.
<b>SVES (Electric Stack)</b>	
Stack Orientation	Vertical
Stack ID	SV0003
Stack Name	SVES
Decommission Date	NA
Stack Height (m)	9
Stack Diameter (m)	0.6
Height above nearby building (m)	0
Building Height (m)	
Building Length (m)	
Building Width (m)	
Exit Gas Temperature (C)	35
Exit Gas Flow Rate (cu.m/s)	3.48944
Exit Gas Velocity (m/s)	12.3414
By-Pass Stack	No
Latitude Measure	-33.8589
Longitude Measure	18.5178
Stack Description	Electric furnace stack
<b>SVLS (Lab Stack)</b>	
Stack Orientation	Vertical
Stack ID	SV0004



Stack Name	SVLS
Decommission Date	NA
Stack Height (m)	10
Stack Diameter (m)	0.4
Height above nearby building (m)	0
Building Height (m)	
Building Length (m)	
Building Width (m)	
Exit Gas Temperature (C)	26
Exit Gas Flow Rate (cu.m/s)	0.983611
Exit Gas Velocity (m/s)	7.82733
By-Pass Stack	No
Latitude Measure	-33.8608
Longitude Measure	18.5267
Stack Description	Laboratory stack (also referred to as the scrubber stack in the attached specialist report)
<b>GV (Granulation room vent)</b> - It should be noted that the granulation room vent is not fitted with a stack but a vent, which allows fresh air from outside to enter the room.	
Stack Orientation	Vertical
Stack ID	SV0005
Stack Name	GV
Decommission Date	NA
Stack Height (m)	2.00
Stack Diameter (m)	0.30
Height above nearby building (m)	0
Building Height (m)	
Building Length (m)	
Building Width (m)	
Exit Gas Temperature (C)	Not tested due to low emissions rating confirmed by an independent specialist, however the ambient temperature in the room is on average ~18-20°
Exit Gas Flow Rate (cu.m/s)	Not tested due to no emissions being confirmed by an independent specialist

Exit Gas Velocity (m/s)	Not tested due to no emissions being confirmed by an independent specialist
By-Pass Stack	No
Latitude Measure	-33.86079°
Longitude Measure	18.52687°
Stack Description	It should be noted that the granulation room vent is not fitted with a stack but a vent, which allows fresh air from outside to enter the room. Approximately 600 grams of ingots are melted in a small heating appliance in the room, with absolutely no emissions.
<b>EMISSION UNIT</b>	
<b>EUSmelting - Furnace</b>	<b>Metal smelting and melting and casting of metal into inglots (bars) occurs here.</b>
Is this an Area/Line source	No
Emission Unit Type	Furnace
Emission Unit Name	EUSmelting
Installation Date	01/03/2000
Appliance/Process Equipment Number	HP01
Appliance Serial Number	HP01
Appliance type/ Description	
Description	Metal smelting and melting and casting of metal into inglots (bars) occurs here
Batch/ Continuous Specification	
What Control Devices are associated with this unit?	None
What stacks are associated with this unit?	Electric Stack Gas Stack Induction Stack Granulation Room Vent
<b>EULab – Other evaporative sources</b>	<b>Dissolving of metallic granules in nitric acid and aqua regia occurs in batches in the Laboratory. this occurs over a number (maximum of 11) bunsen burners.</b>
Is this an Area/Line source	No
Emission Unit Type	Other Evaporative Sources
Emission Unit Name	EULab

Installation Date	01/03/2000															
Appliance/Process Equipment Number	CPM01															
Appliance Serial Number	LAB01															
Appliance type/ Description																
Description	Dissolving of metallic granules in nitric acid and aqua regia occurs in batches in the Laboratory. this occurs over a number (maximum of 11) bunsen burners.															
Batch/ Continuous Specification																
What Control Devices are associated with this unit?	Wet Scrubber															
What stacks are associated with this unit?	Laboratory Stack															
<b>REPORTING GROUP</b>																
<b>RG0001</b>																
Reporting group type	Multi-Unit Reporting Group															
Reporting group Identifier	RG0001															
Description	Recovery of precious metals from jewellers waste. Inputs are melted with a blow torch and then taken to the furnace room and casted into ingots. The granulation room facilitates the slow melting of ingots to form molten droplets. The laboratory is made up of eleven Bunsen burners used when dissolving the granules and ingots in HNO3 and aqua regia to further refine the metal.															
Emissions Unit list																
<p>1 - 2 of 2 item(s)</p> <table border="1"> <thead> <tr> <th>Delete</th> <th>Emission Unit ID</th> <th>Type</th> <th>Installation Date</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>EU0001</td> <td>Furnace</td> <td>03/01/2000</td> <td>Metal smelting and melting and casting of metal into inglots (bars) occurs here.</td> </tr> <tr> <td></td> <td>EU0002</td> <td>Other evaporative sources</td> <td>03/01/2000</td> <td>Dissolving of metallic granules in nitric acid and aqua regia occurs in batches in the Laboratory. this occurs over a number (maximum of 11) bunsen burners.</td> </tr> </tbody> </table> <p><b>Associate Emission Unit</b></p>		Delete	Emission Unit ID	Type	Installation Date	Description		EU0001	Furnace	03/01/2000	Metal smelting and melting and casting of metal into inglots (bars) occurs here.		EU0002	Other evaporative sources	03/01/2000	Dissolving of metallic granules in nitric acid and aqua regia occurs in batches in the Laboratory. this occurs over a number (maximum of 11) bunsen burners.
Delete	Emission Unit ID	Type	Installation Date	Description												
	EU0001	Furnace	03/01/2000	Metal smelting and melting and casting of metal into inglots (bars) occurs here.												
	EU0002	Other evaporative sources	03/01/2000	Dissolving of metallic granules in nitric acid and aqua regia occurs in batches in the Laboratory. this occurs over a number (maximum of 11) bunsen burners.												
Applicable Rule/Category List																



1 - 2 of 2 item(s)

Delete	SEC21 Subcategory	Description
	SA0402	Combustion installations not used primarily for steam raising and electricity generation (except drying)
	SA0417	The production or processing of precious and associated base metals through chemical treatment (Excluding Inorganic Chemicals-related activities regulated under Category 7).

Associate Section 21 Subcategory

**ACTIVITY AND EMISSIONS**

RG0001	Do one per listed activity
Add Activity	Precious Metal Recovery
Section 21	SA041700201
Section 21 Category	4.17
Section 21 Subcategory	
Description	The production or processing of precious sand associated base metals through chemical treatment (excluding inorganic chemicals-related activities regulated under Category 7). SA0417002  Processing of gold through chemical treatment (SA041700201)
Application	
Add Activity	Precious Metal Recovery
Section 21	SA040200312
Section 21 Category	4.2
Section 21 Subcategory	
Description	[SA0402] Combustion installations not used primarily for steam raising and electricity generation (except drying); [SA0402003] Combustion installations in metallurgical industry not used primarily for steam raising and electricity generation (except drying); [SA040200312] Other Not Classified
Application	

**MONITORING MANAGEMENT AND MITIGATION**

**RG0001 - MONITORING**

**Not applicable**

Pollutant Name	NO
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Monitoring Method	NO
Monitoring Location	NO
Average Monitoring Duration/Location	NO
Measured Parameters	NO
Applicable regulation	SA0417 - The production or processing of precious and associated base metals through chemical treatment (Excluding Inorganic Chemicals-related activities regulated under Category 7).  SA0402 - Combustion installations not used primarily for steam raising and electricity generation (except drying)
Applicable Emissions Unit	EU0001  EU0002
Comments/Parameters Monitored/Explanation for Other	
<b>RG0001 - MITIGATION</b>	
Compliance to specific measures	NO
Area and/or Line Source Description	NO
Description of specific mitigation measures	NO
Timeframe for implementing specific measures	NO
Method of monitoring mitigation measures effectiveness	NO
Contingency Measures	NO