21 June 2018

Samancor Manganese (Pty) Ltd
39 Melrose Boulevard
Melrose Arch
Johannesburg, 2076
South Africa
P O Box 61820
Marshalltown, 2107
South Africa
T +27 11 376 2000
south32.net

The Director General: Department of Environmental Affairs
Private Bag X 447
Pretoria
0001

Dear Dineo Ngobeni

SUBMISSION OF POLLUTION PREVENTION PLAN AS PER THE NATIONAL POLLUTION PREVENTION PLANS REGULATIONS, 2017 GNR 712/2017: Samancor Manganese (Pty) Ltd (Metalloys)

Metalloys hereby submits the pollution prevention plan as per the National Pollution Prevention Plans Regulations, 2017 GNR 712/2017. Metalloys has subjected the Green House Gas emission data for calendar year 2016 to a third party verification. The verification revealed that Metalloys must embark on a program to upgrade their GHG reporting methodology from Tier 1 to Tier 2 as per Table 5.2., page 18 of Technical guidelines. The guideline does make provision for a transitional arrangement, resulting in leniency period of 5 year to transition.

Metalloys will be embarking on a project to move to Tier 2 reporting as per the Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry, April 2007 and incorporate findings made by the third party. Tier 2 reporting data will be made available to you by the 21 December 2018.

Yours sincerely

Metalloys

Date: 

POLLUTION PREVENTION PLAN

METALLOYS

November 2017

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CONTACT DETAILS	
Name	*HANNELIE JORDAAN*
Contact Number	
Email Address	
Company Name	*Samancor Manganese (Pty) Ltd*
Registration Number	**2003/020080/07**
Physical Address	**FARM KOOKFONTEIN, MEYERTON**
Postal Address	**PO BOX 66, MEYERTON 1960**

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DECLARATION

DECLARATION OF ACCURACY OF INFORMATION

Name of Company: Samancor Manganese (PTY) Ltd (Metalloys, Meyerton) **(Please see cover letter)**

Declaration of accuracy of information provided:

I declare that the information provided in this report is in all respects factually true and correct to the best of my knowledge and as at the date of signature.

Signed at Meyerton on this 21 day of June 2018

On behalf of

Metalloys

DESCRIPTION OF THE OPERATION

RAW MATERIAL HANDLING

Raw materials dispatched to the Metalloys site are delivered using either road and/or rail transport systems and are off-loaded at stockpiles. The raw materials are reclaimed when required and directed to various metallurgical plants, via conveyer belts.

FURNACES – WEST (M12 & M14 FURNACES AND M19/OBC) AND NORTH PLANT (M10 & M11)

Metalloys produces high carbon ferromanganese (HCFeMn) using the submerged arc furnaces, M10, M11, M12 and M14. The North Plant furnaces (M10 and M11) and the West Plant M12 furnace are currently in care and maintenance (not operational) due to poor market conditions. Medium carbon ferromanganese (MCFeMn) is produced at the Oxygen Blown Converter (OBC/M19). The OBC is currently operated on a campaign basis when there is a demand for MCFeMn.

The submerged arc furnaces consist of a water-cooled steel shell lined with a freeze lining. Raw materials are loaded to the furnace to produce two molten phases, HCFeMn alloy and slag, and off-gas comprising mainly of carbon monoxide (CO), carbon dioxide (CO_2) and hydrogen (H_2).

At North Plant the alloy is cast into a casting machine (alternately into casting bays) from where it is crushed, screened and sold as the final product.

At West Plant the alloy is cast into casting bays from where it is crushed, screened and sold as the final product. Optionally, the molten metal is poured into ladles and transported to the Oxygen Blown Converter (OBC) to reduce the carbon content in HCFeMn by blowing it with O_2 to produce MCFeMn.

The off-gas from the furnaces contains particulate matter and tars, which are removed from the gas by primary gas cleaning plants. The cleaned gas is sent to the Electricity Generation Plant (Elgen) where it is used to generate electricity. Alternatively, in the event that Elgen is out of service, the clean gas is flared at the respective Clean Gas Stack.

Sludge forms as an underflow of the scrubbers and cyclones. At North Plant it is pumped to the Agglomeration Plant and in case of emergency to the New North Plant Sludge Dam (NNPSD). West Plant sludge is pumped to the New West Plant Sludge Dam (NWPSD). In all cases sludge and water separates through gravity for reuse of the water in the gas cleaning process.

The furnace operation, tapping, conveying of molten metal and slag, casting of metal and charging of furnaces generates fugitive emissions. At each of the plants (north & West) there are hoods connected to extraction ducts to capture the fugitive emissions. The bag filter dust is collected and despatched to the Agglomeration Plant.

Both North and West Plants store and are supplied with N_2 and O_2 from gas farms. N_2 gas is used for purging the primary gas cleaning plants. O_2 is used for lancing the slag and metal tap holes.

At OBC (M19) gases, fumes and off-gas are extracted from the convertor hood. Heavier manganese oxide particles in the off-gas drop out in the spray tower and are collected in a bag or bin. The off-gas containing the smaller manganese oxide particles passes to the bag filters, these particles are then collected in the bag filters while the clean off-gas is vented to atmosphere. The manganese oxide particles constitute the product Admox (Advalloy Manganese Oxide) and is sold to international markets or used in the agglomeration process.

ELGEN PLANT (ELECTRICITY GENERATION)

The Elgen Plant takes off gas from the North and West Plants, and burns it in a boiler to generate steam. The steam then is used to run a Turbine, which turns an alternator generating, electricity which is fed into the Grid and in that way supplements the consumption of electricity by the Metalloys site. The Elgen Plant is designed to generate 50MW.

METAL RECOVERY PLANT (METREC)

Slag collected from North and West Plant furnaces is crushed and screened to make it suitable for further processing at the Metal Recovery Plant (Metrec). The Metrec process is responsible for the recovery of metal from the slag and producing a mineral aggregate. The fine metal fraction is stockpiled and recirculated to the on-site furnaces after mixing and agglomeration. The course metal fraction is transferred to final products for sale.

AGGLOMERATION PLANT

The Agglomeration Plant makes use of a dry agglomeration technology that doesn't use heat. Majority of the raw materials used in the Agglomeration process is Manganese or Reductants containing material, with the exception of binders and additives that are inert. The final product for this plant is fed back to the on-site furnaces and access product sold to the market.

FINAL PRODUCTS HANDLING

This process consist of a serious of hoppers, crushers, screens and conveyors that are operated to generate product to customer specifications. The different consignment products are then either loaded onto trains via a load out station or stored in bunkers, loaded by front end loader into a hopper and then transferred to trucks.

ANNUAL GREENHOUSE EMISSIONS

BASELINE EMISSIONS – YEAR PRECEDING IMPLEMENTATION OF THE REGULATION

Activity (IPCC Source Category)[1]	Year (insert calendar years for which data is provided)[2]	GHG1 (CO_2)	GHG2 (CH_4)	GHG3 (N_2O)	GHG4 (HFCs)	GHG5 (PFCs)	GHG6 (SF_6)	Methodology and GHG emission factors used to estimate baseline emissions[3]	Total GHG emissions in CO_2 equivalents (Tonnes)
Ferro Alloy Production	2016	158675.24	13.974	0.580	N/A	N/A	N/A	Tier 1	158689.80
Total by gas									

[1] Activities for which GHG data will be required for PPP reporting (activities are presented in the National GHG Reporting Regulations, 2017)
[2] Provide a baseline of the GHGs emissions for the year preceding the implementation of the Regulations, that is: from Jan 2016 to Dec 2016
[3] As per the National Greenhouse Gas Emission Reporting Regulations, 2017

MITIGATION PLAN

DETAIL OF PLANNED MITIGATION MEASURES

Mitigation measure	Description of mitigation measure	Anticipated implementation date	Assumptions used to estimate anticipated GHG emission reduction	Affected GHG	Anticipated emission reduction (tonnes CO_2e)					
					Y1	Y2	Y3	Y4	Y5	Total over 5 years
Energy reduction at M14 closed circuit water cooling	Installation of variable speed drives (VSD) on larger motors and fans in the M14 closed circuit water cooling	01/12/2018	A 40% saving in electricity estimated. Current consumption: 6 x 30kW motors currently running at full load for 24h/day. The calculation is based on a 40% saving in energy. 6*30*24*365=1576800KWh 1576800*0.6=946080 40% saving is 630720KWh (630720 /1000)*0.99Kg CO2eq = 624.41	CO_2						
Elgen Optimization	Control system optimization which entailed the following optimisation processes: • Gas flow	01/12/2017	Improvement in MW/kg gas efficiency. Potential to improve ratio from 1.1 to 1.4 MW/kg gas. (0.3 MWh improvement when Elgen is running) 0.3MWh*24*365 = 2628 MWh /Year	CO_2	2341.548					

	• Air fuel ratio • Maintenance of valves	Assume 90% availability 2628*0.9 = 2365.2 MWh /Year 0.99Kg CO2eq = 2365200 * 0.99 = 2341.548 Kg CO2eq
Total tonnes (CO2eq)		**2965.958**

SUMMARY AND CONCLUSION

Provide a brief summary concluding the commitment to implementation of GHG abatement projects over the next five year period. Ensure that any foreseeable challenges are noted and flagged for commentary in the annual progress update.

1. **Energy reduction at M14 closed circuit water cooling**

Commitment to implementation: The M14 closed circuit water cooling system does not have variable speed drives installed. This means that the motors and fans operate at maximum irrespective of the associated load. Metalloys is committed to ensuring reduction of energy consumption through the installation of the VSD's. A projected 40% saving of electrical consumption is expected from this installation. The project commenced in 2017 with the installation of the VSD's, the expectation is that the VSD'S will be commissioned in 2017.

2. **Elgen Optimization**

Commitment to implementation: The Elgen Plant is designed to generate electricity from the off gas. This project is aimed at control system optimization by ensuring gas flow optimisation, controlling the air fuel ratio and maintenance of valves. There is a potential to improve the ratio from 1.1 to 1.4 MW/kg gas.