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ArcelorMittal Coke Oven Clean Gas and Water Project: External Environmental Performance Assessment

Audit Report

Version - FINAL
26 September 2018

ArcelorMittal South Africa Limited
GCS Project Number: - 18-0608
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EXECUTIVE SUMMARY

ArcelorMittal South Africa (ArcelorMittal) Vanderbijlpark Works was established in 1942 and commenced production in 1952. ArcelorMittal South Africa Vanderbijlpark Works (Vanderbijlpark Works) is one of the largest steel producers in South Africa. The Vanderbijlpark Works manufacture steel products by charging raw materials such as iron ore, coke and dolomite into blast furnaces to produce liquid iron. The liquid iron is refined in basic oxygen furnaces to produce liquid steel. The liquid steel is further processed into various rolled and coated steel products.

ArcelorMittal operates five coke batteries to produce metallurgical coke for the Blast Furnaces on site. Coke is an important input material into the iron making process. During the coke making process, gas and other by-products are formed. The Coke Batteries were built between 1945 and 1985 and the gas and water cleaning technologies were considered out dated and could not deliver clean gas, which resulted in various maintenance issues and other implications. ArcelorMittal commenced with the Coke Oven Clean Gas and Water (COCGW) Project in the early 2000s in order to install new technology that would enable them to clean the coke oven gas for re-use in the works as fuel gas and also to comply with Environmental Best Practice Standards internationally.

The construction of the plant commenced in 2005 and was commissioned in 2010 at the cost of more than R 330 million. The project faced numerous delays and challenges. In 2010 the plant ran successfully and proved significant sulphur reduction in terms of emissions. Unfortunately, the plant was shut down at the end of 2010 due to technical and mechanical difficulties. From 2011, ArcelorMittal repaired the identified faults in the process and then attempted to re-commission the facility on a few occasions. The plant has not run for more than a few days at end without interruption. Currently the gas is only partially cleaned but no sulphur removal is taking place. The major concern is that the plant is not fully operational and ArcelorMittal is not removing sulphur from the coke oven gas which leads to the release of emissions (particularly Sulphur Dioxide (SO₂)) from the facility to the environment.

A Record of Decision (RoD) was issued to ArcelorMittal for the COCGW Project (RoD number: GAUT 002/02-03/138) in terms of Regulations 1182 and 1183 and promulgated under Sections 21, 22, 26 and 28 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA). The RoD was issued by the Gauteng Department of Agriculture, Conservation and Environmental (GDACE), now Gauteng Department of Agriculture and Rural Development (GDARD) in 2004. In order to remain compliant with the conditions of the RoD, ArcelorMittal is required to appoint an external auditor to conduct bi-annual external Environmental Performance Assessment (EPA) Audits for the Vanderbijlpark Works.

GCS Water and Environment (Pty) Ltd. (GCS) was contracted by ArcelorMittal to conduct the second 2018 annual external EPA audit carried out against all conditions included in the RoD.

Accordingly, the following activities were undertaken as part of the EPA Audit:

- Assessment and comparison of the current site activities with those described in the approved RoD;
- Comparison of environmental mitigation measures implemented on site to those required and committed to in terms of the approved RoD in order to assess whether these comply with the management objectives committed to in the RoD;
- Assessment of monitoring requirements to current monitoring practices;
- Assessment of relevant documentation pertaining to various compliance aspects; and
- Identification of current activities and facilities at the Vanderbijlpark Works, which are not specifically included in the approved RoD.

The audit findings, detailed in the report, include practical recommendations whereby the various non-compliance issues can be corrected. All findings were ranked according to the following criteria:

- Compliant;
- Minor non-compliance;
- Moderate non-compliance; and
- Major non-compliance.

Currently the overall compliance with the Record of Decision (RoD) (GAUT 002/02-03/138) is noteworthy. Overall there was one (1) incident of minor non-compliance, three (3) incidents of moderate non-compliance, and zero (0) incidents of major non-compliance observed for the audit period. The instances of non-compliance weren't considered to be directly associated with significant environmental degradation, and as such the auditor believes that current environmental practices implemented on site are adequately mitigating environmental impacts.

H₂S Content in Gas

Condition 3.2(g)(i) states that "The concentrations of the various constituents of the cleaned Coke Oven Gas must be monitored before and after combustion in the coke ovens. The results are to be graphically represented and included in the bi-annual audit report. The H₂S content of the gas must be between 0.8 and 1.5 g/Nm³."

Observation:

The latest monitoring results indicate the H₂S content of the gas exceeded the maximum limit of 1.5 mg/Nm³. The current reading is 5.5 mg/Nm³. The non-compliance is linked to the Sulphur plant not being operational resulting in partially cleaned gas being flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. ArcelorMittal has prioritised this problem and the tender for the construction and installation component for the refurbishment of the Sulphur Plant was released at the beginning of August 2018.

Recommendation:

ArcelorMittal should continue with the prioritisation of the refurbishment of the gas plant in order to recommission the sulphur plant.

Plan for Achieving Reduced Fugitive Emissions

Condition 3.2(g)(iii) states that "A plan for door maintenance/replacement of all the coke batteries (No.) and progress in achieving reduced fugitive emissions has to be developed. The plan must be supported by the results of personal monitors, and actual measurements at representative areas of the coke ovens."

Observation:

Battery doors are inspected on a daily basis and a maintenance schedule has been created. Repairs are done continuously. The fugitive emissions are monitored according to the internationally accepted standards and recorded. It was observed during the site visit that the occasional door is still burning and smoking. The commitment from the facility was however also observed to repair and maintain the equipment as far as possible. Exposure monitoring at the batteries indicates that additional fugitive emission mitigation measures are required, above that already implemented. This can however not be attributed only towards doors but rather the fugitive battery emissions as a cumulative source. ArcelorMittal has however implemented management and mitigation measures such as specialised face masks and other measures to protect employees and reduce exposure. Other measures include battery tightening, end-flue repairs and charge emission reduction projects. The effectiveness of these measures should be assessed to determine whether it is sufficient to mitigate fugitive emissions.

Recommendation:

It is recommended that the effectiveness of these measures should continuously be assessed to determine whether it is sufficient to mitigate fugitive emissions.

Plan for Achieving Reduced Fugitive Emissions

Condition 3.2(h) states that “The flaring of uncleaned gas at the relevant flares is only permissible during upset conditions when the Claus Reactor is shut down for inspection/maintenance for 3 weeks every three years, and must be undertaken at temperatures and atmospheric mixing conditions conducive to maximum dispersion of pollutants.”

Observation:

The sulphur plant is not operational and therefore partially cleaned gas is flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. Flaring of uncleaned gas is taking place on a more regular basis than 3 weeks every 3 years. However, this issue has been reported on and ArcelorMittal is continuously aware that urgent intervention is needed.

Recommendation:

ArcelorMittal must continue monitoring air quality within the Works to maintain a baseline of emission results. The design, construction and operation of the sulphur plant should be prioritised as it is only through this plants operation that the flaring of uncleaned gas can be controlled.

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1 INTRODUCTION

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ArcelorMittal operates five coke batteries to produce metallurgical coke for the Blast Furnaces on site. Coke is an important input material into the iron making process. During the coke making process, gas and other by-products are formed. The Coke Batteries were built between 1945 and 1985 and the gas and water cleaning technologies were considered out dated and could not deliver clean gas, which resulted in various maintenance issues and other implications. ArcelorMittal commenced with the Coke Oven Clean Gas and Water (COCGW) Project in the early 2000s in order to install new technology that would enable them to clean the coke oven gas for re-use in the works as fuel gas and also to comply with Environmental Best Practice Standards internationally.

The project scope is technical and complex and included various improvements and changes to the existing plant as well as the installation of new infrastructure. The project aimed to improve the current controls at the batteries, improve the gas collecting mains, upgrade of the primary cooling to improve naphthalene removal, installation of a new chiller plant, installation of a distillation plant and a sulphur removal plant. The water portion included the installation of new tar decanters, a gravel filter plant and scrubbers.

The construction of the plant commenced in 2005 and was commissioned in 2010 at the cost of more than R 330 million. The project faced numerous delays and challenges. In 2010 the plant ran successfully and proved significant sulphur reduction in terms of emissions. Unfortunately, the plant was shut down at the end of 2010 due to technical and mechanical difficulties. From 2011, ArcelorMittal repaired the identified faults in the process and then attempted to re-commission the facility on a few occasions. The plant has not run for more than a few days at end without interruption. Currently the gas is only partially cleaned but no sulphur removal is taking place. The major concern is that the plant is not fully operational and ArcelorMittal is not removing sulphur from the coke oven gas which leads to the release of emissions (particularly Sulphur Dioxide (SO₂)) from the facility to the environment.

A Record of Decision (RoD) was issued to ArcelorMittal for the COCGW Project (RoD number: GAUT 002/02-03/138) in terms of Regulations 1182 and 1183 and promulgated under Sections 21, 22, 26 and 28 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA). The RoD was issued by the Gauteng Department of Agriculture, Conservation and Environmental (GDACE), now Gauteng Department of Agriculture and Rural Development (GDARD) in 2004.

The following conditions are requirements of the RoD in terms of the ECA as issued by the GDACE:

- Condition 3.4 (b): A bi-annual Environmental Performance Audit conducted by an independent, accredited auditor must be submitted to the Department for review, the first audit being due 6 (six) months after commissioning of the COG and water cleaning project, and every 6 (six) months thereafter.

GCS Water and Environment (Pty) Ltd. (GCS) was contracted by ArcelorMittal to conduct an independent Environmental Performance Assessment (EPA) Audit for the Vanderbijlpark Works. The EPA audit was carried out against all conditions included in the EA and the audit assessment was undertaken by Ms. Fatima Matlou and Mrs. Riana Panaino from GCS. Both auditors have experience in mining and industrial projects.

A one (1) day site visit was undertaken at the Vanderbijlpark Works site on 22 August 2018. The site visit was initiated with a project kick-off meeting during which GCS met with Mr. Terrence Wilson, ArcelorMittal's Environmental Control Officer (ECO) for this project. Following the kick-off meeting, a comprehensive review of the RoD documentation and associated checklists was undertaken. This assessment monitored compliance in terms of document control, systems and procedures. Following the checklist audit and documentation review, the remaining time was spent on site observing and inspecting the activities being conducted.

Accordingly, the following activities were undertaken as part of the EPA Audit:

- Assessment and comparison of the current site activities with those described in the approved RoD;
- Comparison of environmental mitigation measures implemented on site to those required and committed to in terms of the approved RoD in order to assess whether these comply with the management objectives committed to in the RoD;
- Assessment of monitoring requirements to current monitoring practices;
- Assessment of relevant documentation pertaining to various compliance aspects; and

- Identification of current activities and facilities at the Vanderbijlpark Works, which are not specifically included in the approved RoD.

2 AUDIT PROCESS

The following steps formed the basis of the EPA Audit.

2.1 Step 1: What is the objective of the audit?

The objectives of any audit should be clearly defined and settled before either an internal or external audit begins. The setting of objectives is important, as it is against these objectives that ArcelorMittal will be reviewed and expected to improve.

The following objectives formed the basis for the EPA Audit:

- Ensuring legal compliance in terms of the approved RoD;
- Checking that the environmental management tools to achieve compliance are used correctly and efficiently;
- To check whether the environmental management tools are effectively fulfilling their intended purpose of environmental compliance;
- Ensuring environmental performance on a continuous basis, i.e. throughout the life cycle of the Vanderbijlpark Works site;
- Reducing environmental liability;
- To facilitate the transference of information or best practice between operating units;
- To increase environmental awareness among the employees; and
- To track the environmental accountability of managers.

2.2 Step 2: Scope of the audit

The conditions of the RoD stipulate that bi-annual performance assessments need to be undertaken to ensure compliance with the prescribed conditions as contained in the said documents.

This EPA Audit is taken to mean a regular, systematic, documented verification of whether ArcelorMittal is in compliance with the conditions of the approved RoD; the provisions of the ECA and the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), which superseded the ECA; and whether environmental performance objectives and targets are being met.

2.3 Steps 3: Information required to conduct the audit

Table 2.1 sets out the procedures that were used to obtain the audit information.

Table 2.1: Process to obtain audit information

ACTION	DESCRIPTION
Inspection	Inspection consists of examining records and documents. Inspection of records and documents provides audit evidence of varying degrees of reliability depending on their nature and source and the effectiveness of internal controls over their processing.
Observation	Observation consists of on-site observation of the activities being conducted on site.
Enquiry	Enquiry consists of seeking information of knowledgeable persons inside the organisation.
Confirmation	Confirmation consists of making enquiries to corroborate information contained in the RoD.
Computation	Computation consists of checking the accuracy of source documents and the site's records or performing independent checks of information relating to environmental aspects and impacts.

2.4 Steps 4: Conducting the audit

The audit consisted of comparing the information gathered during on-site interviews, from reports as well as assessing on-site activities with the conditions of the RoD. A checklist was developed based on the RoD conditions and used as an auditing tool to establish the audit results.

2.5 Steps 5: Evaluating the audit results

The results of the audit are presented and the auditor assesses the final compliance in relation to the realistic representation of on-site activities; taking into account South African Environmental Legislation. Through such an assessment, the auditor should determine whether the final compliance is a true representation of on-site activities and a final recommendation should be made regarding actual compliance.

2.6 Step 6: Presenting the audit results

The findings of the Audit are included in Table 5.1 of this Report. The audit findings also include practical recommendations whereby the various non-compliance issues can be corrected.

All findings were ranked according to the criteria indicated in Table 2.2. The colour coding assigned to the rankings is used to visually indicate areas of compliance, minor non-compliance, moderate non-compliance, and major non-compliance. Furthermore, to indicate which conditions are not applicable to the on-site activities and which are repeat conditions that have already been scored. Each colour coding has a value (score) attached to it.

Table 2.2: Ranking criteria and colour coding scores.

RANKING	SCORE
Compliant	2
Minor non-compliance	1
Noted/Not Applicable	0
Repeat Condition	-
Moderate non-compliance	-1
Major non-compliance	-2

All findings were ranked according to the following criteria:

Noted/Not-Applicable:

- The specific condition is not relevant to the current on-site activities.

Repeat Condition:

- The specific condition is a repeat of a previous condition.

Compliant:

- ArcelorMittal complies with the conditions as stated in the RoD.

Non-compliance:

- **Minor Non-compliance:**
 - Isolated observations demonstrating that full compliance to the environmental requirements on site have not been, or will not be, fully achieved.
- **Moderate Non-compliance:**
 - There is a substantial failure to meet the environmental requirements for the project, there is a possibility of substantial environmental degradation and/or pollution, and/or objective evidence was observed raising doubt as to the integrity of data or records inspected.
- **Major Non-compliance:**
 - There is a critical failure against legal requirements or management response that presents an immediate or significant risk that could result in prosecution and/or adverse legal findings due to failure to meet regulatory requirements; result in immediate injury or serious injury; result in prolonged business outage; and/or could result in serious damage to the project's reputation.

It must be noted that duplicate conditions are not scored due to the fact that this will negatively influence the scoring results. Duplicate conditions are marked as a Repeat Condition.

2.7 Step 7: Decision-making based on audit results

Decision-making, based on the audit results, must have the following objectives; to improve the present situation and to institute fair and reasonable corrective action. ArcelorMittal should make decisions based on the significance of the problem or non-compliance and the resources required to improve the situation.

2.8 Step 8: Instituting corrective action

It is recommended that an environmental action plan be implemented to address the Audit recommendations. The plan may include:

- Goals;
- Strategies;
- Performance indicators;
- Responsibilities; and
- A timetable for achievement.

An EPA audit is an effective management tool on condition that the recommendations, as identified in this Audit, are considered and implemented. The audit provides a basis for recommending actions to correct any deficiencies and to address any areas of environmental non-compliance recorded as part of the audit findings.

3 DETAILS OF THE AUDITOR

GCS, appointed by ArcelorMittal to conduct an external EPA audit, has more than 30 years of experience and expertise in undertaking and compiling compliance audits.

3.1 Project Team

The EPA Audit was undertaken by the GCS team presented in **Table 3.1**.

Table 3.1: GCS Team

NAME	DESIGNATION	RESPONSIBILITY
Riana Panaino <ul style="list-style-type: none"> • BSc. Honours Biodiversity and Conservation • Pr. Sci. Nat. Reg No. 117170/17) • IAIA 	Senior Environmental Consultant	<ul style="list-style-type: none"> • Overall Legal Compliance • Site visits • Liaison with Client and Project Management • Environmental Legal Assessment • Compilation of Audit Report
Fatima Matlou <ul style="list-style-type: none"> • National Diploma Environmental Management • ELA (Reg. No. 2017/235/GP) 	Senior Environmental Consultant	<ul style="list-style-type: none"> • Overall Legal Compliance • Site visits • Liaison with Client and Project Management • Environmental Legal Assessment • Compilation of Audit Report
Renee Janse van Rensburg <ul style="list-style-type: none"> • MSc Environmental Management • Pr. Sci. Nat. Reg No: 400099/06 • ELA (Reg. No. 216/141/GP) • IAIA • SSAG • IOCSA (Reg No. 166) 	Manager: Environmental Authorisation and Assessment Unit	<ul style="list-style-type: none"> • Overall assistance • Report review • Technical and quality control

3.2 Assumptions and Limitations

The findings, results, observations, conclusions and recommendations given in this audit are based on the Auditor's best legal and professional knowledge as well as available information.

Although GCS exercises due care and diligence in rendering services and preparing documents, GCS accepts no liability, and the client by receiving this document, indemnifies GCS and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by GCS and by the use of the information contained in this document.

This audit report must not be altered or added to without the prior written consent of the auditor. This also refers to electronic copies of this Audit which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this audit must make reference to this EPA Audit. If these form part of a main audit relating to this investigation or report, this audit must be included in its entirety as an annexure or separate section to the main audit.

Refer to Appendix A for the Declaration of Independence of the Auditor.

4 AUDIT SCORING RESULTS: 2018 ROD EPA AUDIT

Figure 4-1 presents the percentage compliance of ArcelorMittal for the second 2018 external EPA audit for the COCGW Project in tabular and graphic format.

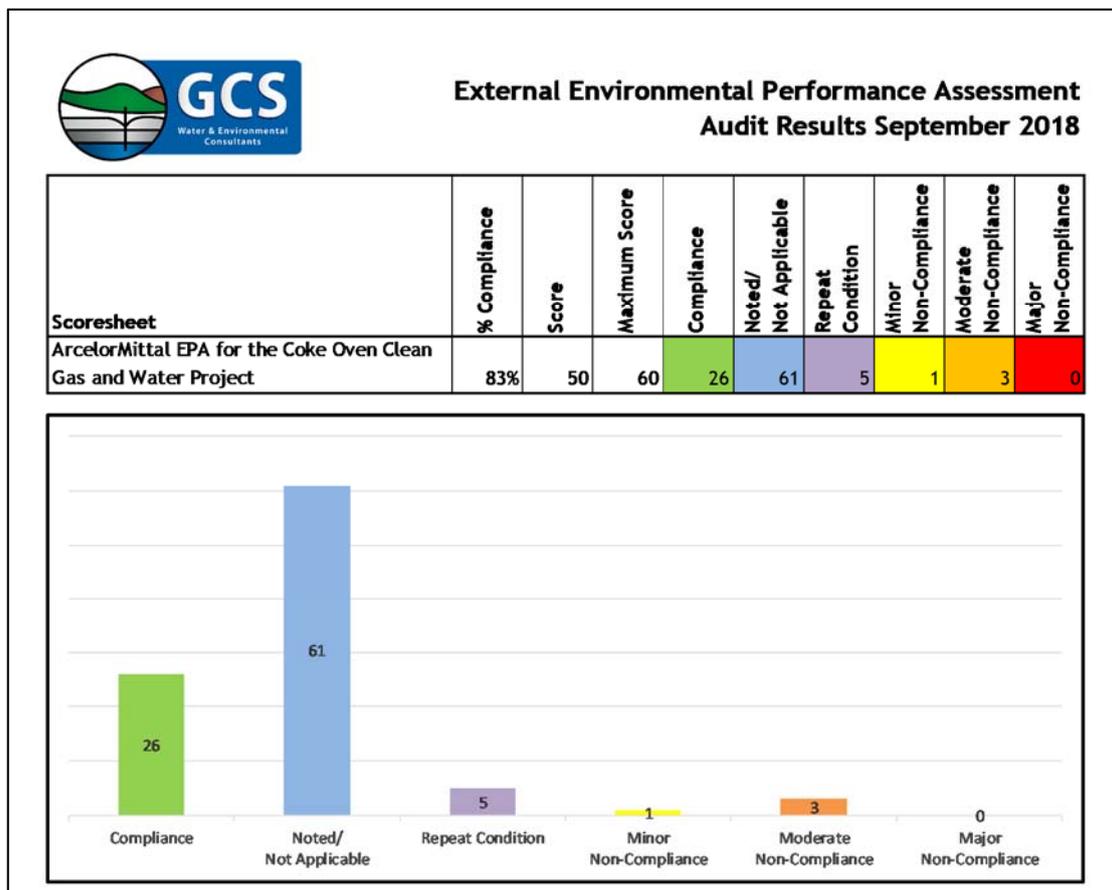


Figure 4-1: 2018 External EPA Audit Results for the COCGW Project.

The graph within the table shows the number of non-compliances observed as well as the number of conditions repeated, noted or not applicable. It can be seen from the graph that ArcelorMittal is compliant with the majority of the RoD conditions. Most of the conditions were observed to be not applicable or noted due to the fact that various changes were made regarding the facility construction and operation, which have been approved by GDARD. During the previous audit it was reported that the last outstanding items to be constructed is towards improving the works water balance and does not influence the plant’s operability. This finding is still valid.

5 AUDIT FINDINGS - 2018 ROD EPA AUDIT

Table 5.1 overleaf represents the conditions, observations and recommendations, found at the ArcelorMittal COCGW Project, second 2018 audit.

Table 5.1: Scoring Results of the EPA Audit in respect of conditions of the COCGW RoD (audit undertaken in August 2018).

No	Conditions	Status	Score	Observations	Recommendations
3.1	Description and extent of the activity				
1.1	The authorisation applies in respect of the upgrading and operation of the coke oven gas (COG) and water cleaning systems at the existing coke ovens, as detailed in Sections 10-12 (p. 77-94) of the Process Review specialist study conducted by EBS cc., and in Section 4.12.9 p.39-44) of the Scoping Report by SEF (Pty) Ltd. The activity falls within the ambit of sub regulations 1 c(ii), 8 and 9 of Government Notice R.1182 (as amended), promulgated under section 21 of the Act. The extent of the project is summarised as follows:	Noted/Not Applicable	0	This condition is noted. The authorisation pertains to the Coke Oven and Clean Gas and Water (COCGW) Project.	No applicable recommendations.
3.1.1	PROJECT SCOPE				
(a)	Proposed changes to coke ovens by-products plant Upgrade and re-use of existing Gas Cleaning Plants, combining gas lines, and the upgrading of the coke oven gas (COG) collecting mains.	Compliant	2	Upgrades have been made to the Gas Cleaning Plant, as authorised by GDARD. The plant was upgraded in 2005 and is currently operational.	No applicable recommendations.
(b)	Proposed changes to gas cleaning line The 3 basic mechanisms of cleaning COG - condensation by cooling, separation by gravity, and absorption of components onto absorption media will remain the same.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving naphthalene removal and scrubbing conditions by reducing gas temperature.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Conversion and installation of equipment to function as final coolers and provide chilled water.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving NH ₃ removal/absorption by upgrading existing scrubbers converting benzole scrubbers to NH ₃ scrubbers, and converting circulation to closed loop systems.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Installing two new distillation columns treatment of ammonia scrubbing water and one as de-acidifier to generate the required scrubbing media for H ₂ S removal, and treatment of NH ₃ , H ₂ S, HCN and CO ₂ vapour in the ammonia and H ₂ S plant.	Noted/Not Applicable	0	This condition is noted. Infrastructure construction and installation has not yet been completed. Once the final infrastructure has been completed the water will tie in with the overall water balance for the Works resulting in cleaner water being used for quenching. Funds have been approved for the construction and installation required for the remaining upgrade of the project. The design has been finalised and will include the refurbishment of the sulphur plant and the installation of other infrastructure such as the ammonia stripper.	No applicable recommendations.
Discontinuing ammonium sulphate manufacture and installation of a new plant to convert H ₂ S to elementary sulphur.	Noted/Not Applicable	0	This condition is noted. Refer to the observations made in condition 3.1.1(b), point 5.	No applicable recommendations.	

No	Conditions	Status	Score	Observations	Recommendations
	Cleaning of excess process water The basic mechanisms of cleaning coke oven process water are separation by gravity, mechanical sludge removal, filtration and distillation. Ammonia, H ₂ S and HCN removed from water will be cracked to H ₂ , N ₂ and CO ₂ and elementary sulphur formed.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving the handling of various condensate streams by the handling of high and low tar containing streams.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving the operation of tar decanting systems, mainly through continuous discharge of crude tar together with constant water content.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving the efficiency of operation of the gravel filters, and replacing filters with a single unit of equal capacity.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Improving H ₂ S and NH ₃ scrubbing efficiency, mainly through supporting desulphurisation with a quantity of de-acidified water, reducing ammonia content by means of stripped water, maintaining optimum scrubbing temperature, and integrating the two scrubbing systems.	Noted/Not Applicable	0	This condition is noted. Refer to the observations made in condition 3.1.1(b), point 5.	No applicable recommendations.
	Improving in H ₂ S and NH ₃ stripping efficiency by modifying existing equipment to handle flows from all gas cleaning plants by the coal water stripper for free and fixed ammonia, free ammonia stripper (NH ₃ scrubbing liquor), and de-acidifier (de-acidified water for H ₂ S removal. Equipment will be designed to treat all excess coal water and scrubbing liquor streams.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a) and condition 3.1.1(b), point 5.	No applicable recommendations.
3.1.2	CONSTRUCTION/ UPGRADE/ DECOMMISSIONING ACTIVITIES				
	Modification of Gas Line 1 Connection of excess coal water to primary cooler.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(a)	Modification of the tar discharge and re-collection system.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Separating scrubbing liquor from coal water stream.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(b)	Primary Coolers - Gas Lines 3&4, and Gas Lines 6-9 Gas Lines 3&4: Installation of a new primary cooler, and new chilled water station including cooling tower upgrade, improvements to the tar separation area (removal of the existing gas tar tank from line 4), and modifications to two existing primary coolers, and decommissioning of the primary coolers for gas line 3.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Gas Lines 6-9: installation of 2 new primary coolers, followed by the modification of 3 existing coolers, and Improvements to the condensation plant.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
(c)	Chilled Water Station/Cooling Water Supply Facilities Installation of a new chilled water station and chilled water plant. Removal of old wash-oil tanks.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(d)	Installation of a New Pre-Decanter/Modification of Tar Decanters Upgrading tar separation facilities (lines 8&9), and removal of existing tar collecting tank.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Installation of a new pre-decanter, followed by the modification of tar decanters.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(e)	Installation of a Gravel Filter Unit Re-use of two tanks as coal water tanks, and Installation of a new gravel filter.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(f)	Upgrading of the Existing Ammonia Stills Integrating 3 of the 4 distillation columns, and modifying the existing acid storage tank into a caustic soda tank, including unloading and feeder pumps.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(g)	Installation of the New Stripper/ De-acidifier System Installation of new distillation columns with corrosion resistant materials, and pipes and heat exchangers to tie-in the new stripping columns.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Integration of existing tanks, and installation of one new tank for de-acidified water.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(h)	Scrubbing Facilities - Gas Lines 3&4 Modification of 2 existing ammonia scrubbers, and installation of a new H ₂ S scrubber, including a final cooling stage.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Conversion of existing naphthalene scrubber to a final cooler together with installation of new heat exchangers.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(i)	Scrubbing Facilities - Gas Lines 6-9 Demolition of the existing and Installation of a new H ₂ S scrubber, and upgrading one existing ammonia scrubber.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
	Installation of heat exchangers and a new gas line.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(j)	Elementary Sulphur Plant combined with NH₃ Cracking Installation of a combined plant for the production of elementary sulphur and cracking of nitrogen components,	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
(k)	Control System The installation of a new system to control scrubbing and conversion units.	Noted/Not Applicable	0	Refer to the observations made in condition 3.1.1(a).	No applicable recommendations.
3.2	Specific Conditions				

No	Conditions	Status	Score	Observations	Recommendations
a)	An updated project schedule with time-frames must be submitted to the Department 30 (thirty) calendar days prior to the commencement of construction activities. The schedule must clearly indicate the different phases of construction and commissioning and decommissioning (i.e. expected dates of commissioning of specific completed parts of the COG and water treatment systems).	Noted/Not Applicable	0	This condition was adhered to in 2004 and is not applicable until additional construction activities are initiated.	ArcelorMittal must ensure that the GDARD is informed of the proposed commencement of construction activities thirty (30) days prior to such commencement.
b)	The Department must be informed of both the start of construction and the start of commissioning at least 30 (thirty) calendar days prior to the commencement thereof.	Noted/Not Applicable	0	This condition was adhered to in 2004 (construction) and 2010 (commissioning) and is not applicable until additional construction/commissioning activities are initiated.	ArcelorMittal must ensure that the GDARD is informed of the proposed commencement of construction activities thirty (30) days prior to such commencement.
c)	A detailed Environmental Management Plan (EMP) for the implementation of the project must be submitted to the Department for approval 30 (thirty) calendar days prior to the commencement of construction activities. The EMP must specifically include, inter alia:	Noted/Not Applicable	0	This condition was adhered to in 2008 (construction EMP) and in 2012 (operational EMP). The construction EMP was approved by the GDARD. ArcelorMittal have not received approval of the operational EMP from the GDARD, although the GDARD has acknowledged receipt of the operational EMP.	No applicable recommendations.
i.	An auditable plan for monitoring all facets of the COG and water cleaning project implementation and operation, including decommissioning of all underground sumps, piping (underground and overhead), obsolete machinery, plants e.g. the benzol plant ammonium sulphate plant, tar separators etc., as well as taking of soil samples to indicate the levels of remediation required, and any remedial measures to be implemented.	Compliant	2	The operational EMP contains auditable elements relating to the COCGW Project.	No applicable recommendations.
ii.	A proposed surface and groundwater monitoring regime, which will be in line with the DWAF Water License. The graphically represented results of this monitoring are to be included in a bi-annual audit, which must be submitted to this Department for review to determine if the remedial measures have been successful or if further remediation is required.	Compliant	2	Surface water monitoring is being undertaken in line with the requirements of the Water Use License (WUL) issued to ArcelorMittal Vanderbijlpark Works.	No applicable recommendations.
iii.	Proposed methods of reducing spillages at the quench tower.	Compliant	2	The operational EMP addresses the spillages at the quench towers. ArcelorMittal reportedly installed an alarm system at all the quench towers to warn operators of high sump levels.	No applicable recommendations.
iv.	The EMP must include an air quality monitoring program based on the requirements of Condition 3.2(g).	Compliant	2	An air quality monitoring programme, which meets the requirements set out by the condition 3.2 (g), was submitted together with the operational EMP.	No applicable recommendations.
v.	A diagram indicating all unpaved surface areas, including bunds and storm-water channels, and any areas identified for storm-water and surface water management. Plans must be developed to ensure that all surface areas are protected from spillage and erosion, and that dust in the area of the coke ovens is reduced.	Noted/Not Applicable	0	This condition was adhered to in 2010 as the diagram was submitted together with the first bi-annual Environmental Performance Audit (June 2010) to the GDARD.	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
vi.	A proposal to address significant pollution from cooling tower sumps.	Compliant	2	General operating procedures are covered in the operational EMP. Further, the whole area is bunded and sumps are placed strategically within these bunded areas. A bio-dosing program is also in place to reduce potential microbial health risks.	No applicable recommendations.
vii.	Handling procedures of sulphur and other by-products produced.	Compliant	2	Kindly note that currently no sulphur is generated. Further, the EMP was updated to include the handling of all by-products, including coke breeze.	No applicable recommendations.
viii.	A waste management plan pertaining to any waste from the treatment process not reused or sold as by-products, including expected volumes and classification, the disposal thereof, and waste manifest system.	Compliant	2	The operational EMP addresses waste management. In addition, ArcelorMittal also has a site wide Waste Management Procedure.	No applicable recommendations.
d)	A copy of the detailed HAZOP study to be conducted during the detail design phase of the project must be submitted to the Department 30 (thirty) calendar days before commissioning commences. The HAZOP must specifically include risks related to commissioning or decommissioning of any equipment, failure of treatment systems due to inefficient operation etc., emergencies and shutdowns, incidents such as spills, and potential discharges to the environment (air, water and land), and must propose operational and emergency procedures accordingly.	Noted/Not Applicable	0	This condition was adhered to in 2003 and again in 2004.	No applicable recommendations.
e)	An auditable Preventative Maintenance Plan must be developed to ensure that all water systems and environmentally critical equipment such as exhausters, ESP's, scrubbers and strippers are maintained as required. This plan must be auditable and must be externally verified on commissioning of the new plant. The management of IVS are to commit to the budget to undertake the required preventative maintenance. A discussion on the implementation of and compliance with the maintenance plan must be included in the bi-annual audit reports.	Compliant	2	An amendment application for the external verification of the Preventative Maintenance Plan (PMP), dated 29 July 2009, was submitted on 7 August 2009. Amendment to this condition was granted in November 2009.	No applicable recommendations.
f)	Final design plans for new and upgraded containment areas (sumps, tar decanters etc.), buffer tanks and chemical storage tanks, as well as proof of the Department of Water Affairs and Forestry's (DWAF) approval thereof as applicable, must be provided 30 (thirty) calendar days prior to the commencement of construction thereof. The above design plans must include information on specific pollution prevention measures (e.g. bunding & liners), compliance with relevant SABS standards (specifically tanks), the sourcing of particular materials as	Noted/Not Applicable	0	This condition was adhered to in 2014. ArcelorMittal has, on many occasions, resubmitted the plans to the Department of Water and Sanitation (DWS) for approval which is, to date, outstanding. Updated designs will be submitted to DWS again in order to obtain the Departments written approval thereof.	ArcelorMittal must ensure that updated designs are submitted to the DWS as and when required.

No	Conditions	Status	Score	Observations	Recommendations
	required (e.g. clay for liners), time-frames for construction, and exact location on site.				
g)	The following air quality management, monitoring and reporting regime must be implemented and reported on in the bi-annual environmental performance audits as applicable. Note that emission sampling (as applicable) is not required for each of the seven coke oven stacks, but may be conducted on a single stack representative of the whole plant (a short motivation for using a particular stack in terms of physical and gas flow characteristics, similarity to other stacks, differences between stacks etc. must however be provided). Note that conditions relevant to the coke ovens themselves are applicable to all the coke oven batteries on site (i.e. no. 1, 3, 41 6, 7, 8, 9):	Compliant	2	The facility has chosen representative stacks for some sampling based on the age and performance of the battery. Battery 4, 8 and 9 was chosen as the current Coke Strategy for the Works indicates that these 3 batteries will most likely be in operation for longer opposed to the other batteries with a shorter remaining life span. The facility argued that they wish to collect data on the remaining batteries which will remain in operation in order to have a long term trend for these batteries, both approaches are reasonable.	No applicable recommendations.
i.	The concentrations of the various constituents of the cleaned Coke Oven Gas must be monitored before and after combustion in the coke ovens. The results are to be graphically represented and included in the bi-annual audit report. The H ₂ S content of the gas must be between 0.8 and 1.5 g/Nm ³	Moderate compliance non-	-1	The latest monitoring results indicate the H ₂ S content of the gas exceeded the maximum limit of 1.5 mg/Nm ³ . The current reading is 5.5 mg/Nm ³ (refer to Appendix B). The non-compliance is linked to the Sulphur plant not being operational resulting in only partially cleaned gas being flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. ArcelorMittal has prioritised this problem and the tender for the construction and installation for the refurbishment of the Sulphur Plant was released at the beginning of August 2018.	ArcelorMittal should continue with the prioritisation of the refurbishment in order to recommission the sulphur plant.
ii.	The emissions from the stacks of the coke ovens must be analysed for dioxin and furan emissions within 6 months of decommissioning of the benzole plant. The results of this monitoring must be reported in the bi-annual audit.	Noted/Not Applicable	0	This condition was adhered to in 2006 and is no longer applicable.	No applicable recommendations.
iii.	A plan for door maintenance/replacement of all the coke batteries (No.) and progress in achieving reduced fugitive emissions has to be developed. The plan must be supported by the results of personal monitors, and actual measurements at representative areas of the coke ovens.	Moderate compliance non-	-1	Battery doors are inspected on a daily basis and a maintenance schedule has been created. Repairs are done continuously. The fugitive emissions are monitored according to the internationally accepted standards and recorded. It was observed during the site visit that the occasional door is still burning and smoking. The commitment from the facility was however also observed to repair and maintain the equipment as far as possible. Exposure monitoring at the batteries indicates that additional fugitive emission mitigation measures are required, above that already implemented. This can however not be attributed only towards doors but rather the	It is recommended that the effectiveness of these measures should continuously be assessed to determine whether it is sufficient to mitigate fugitive emissions.

No	Conditions	Status	Score	Observations	Recommendations
				fugitive battery emissions as a cumulative source. ArcelorMittal has however implemented management and mitigation measures such as specialised face masks and other measures to protect employees and reduce exposure. Other measures include battery tightening, end-flue repairs and charge emission reduction projects. The effectiveness of these measures should be assessed to determine whether it is sufficient to mitigate fugitive emissions. Refer to Appendix C for the Door Inspection and Maintenance Plan.	
iv.	The assumptions regarding improved air quality made with respect to this project must be confirmed by actual ambient air quality monitoring. The improvements achieved must be discussed in the bi-annual environmental performance audit reports. Attention must be paid to the recommendation contained in the air quality report to install additional PM ₁₀ and gaseous samplers within the zone of impact directly south of the IVS site.	Noted/Not Applicable	0	Ambient air quality monitoring is conducted however, since the plant is not fully operational as yet, actual ambient air quality information for the completed project are still unattainable. ArcelorMittal is aware of the requirement for actual ambient air quality information.	No applicable recommendations.
v.	The following monitoring must be undertaken within 6 months of the commissioning of the various treatment plants. Results must be included in the first bi-annual environmental audit report, together with a plan for remediation should these emissions be significant. - Monitoring for ammonia and hydrogen sulphide fumes from the tar decanters and liquid sumps and storage tanks. - Monitoring for benzene must be undertaken at the flushing liquor storage tanks. - Sampling frequency and parameters for sampling of the cooling tower water is to be determined. Based on the understanding obtained from this sampling, emissions in the steam must be anticipated and sampling of steam must be undertaken to determine the impact on the environment of the present cooling process, determine if mitigation measures are required, and to develop reduction plans accordingly.	Noted/Not Applicable	0	This condition was adhered to previously and is not applicable to this audit period.	No applicable recommendations.
vi.	The composition of the approximately 15% of treated COG that would be flared, as well as the gas flare temperature, must be determined and reported on in the first bi-annual environmental audit. A discussion on the effective treatment of gas through flaring, and a plan to reduce the need for flaring the remaining 15% of COG must also be provided in the first audit.	Noted/Not Applicable	0	This condition was adhered to previously with the gas quality being reported on in the first bi-annual audit report. As such this condition is not applicable at this stage.	No applicable recommendations.
vii.	Based on the assumptions made in the air quality report, and the results of actual isokinetic sampling and personal monitoring, a	Noted/Not Applicable	0	Airshed Planning Professionals was commissioned in 2011 to conduct the required assessment and develop the air quality	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
	plan must be developed with proposals on future emission sampling, including the frequency thereof and the constituents to be sampled for. This work must be undertaken by an external expert and a report with recommendations must be submitted with the first bi-annual audit. In order to ensure early detection of issues to be addressed and ensure the efficiency of treatment equipment, relevant air quality monitoring of COG must be undertaken after each step of commissioning a specific treatment technology.			monitoring plan for the Coke Ovens. The report was submitted as required, as such this condition is noted as not applicable at this stage.	
viii.	Based on emission results further emission reduction programs may have to be developed. These plans must consider international standards and best practice, such as the US EPA's <i>Final rule to reduce toxic emissions from coke ovens</i> (February, 2003), and <i>NESHAP for Coke Ovens: Pushing, Quenching and Battery Stacks - Background information for proposed standards</i> (February 2001).	Compliant	2	ArcelorMittal has developed a Coke Strategy for the short, medium and long term. The facility also implements additional Emission Reduction Plans in line with the various site-specific Atmospheric Emissions Licenses (AEL). Further strategies for emission reductions are continuously investigated. The implementation of the plans, including the establishment of the Ammonia stripping plant, reportedly depends on resource availability. Funds have now been approved for the refurbishment and installation of the Sulphur plant and ammonia stripper, and a tender for new designs has been sent out at the beginning of August 2018. Refer to Appendix D for the Cumulative Particulate Matter Report.	No applicable recommendations.
h)	The flaring of uncleaned gas at the relevant flares is only permissible during upset conditions when the Claus Reactor is shut down for inspection/maintenance for 3 weeks every three years, and must be undertaken at temperatures and atmospheric mixing conditions conducive to maximum dispersion of pollutants.	Moderate compliance non-	-1	The Sulphur plant is not operational and therefore only partially cleaned gas is flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. Flaring is taking place on a more regular basis than just 3 weeks every 3 years. However, this issue has been reported on and ArcelorMittal is continuously aware that urgent intervention is needed.	ArcelorMittal must continue monitoring air quality within the Works to maintain a baseline of emission results. The design, construction and operation of the sulphur plant should be prioritised as it is only through this plant's operation that the flaring of uncleaned gas can be controlled.
i)	Detailed and up to date records must be kept of all incidents and complaints pertaining to the COG and water cleaning project, how these were managed, and the recurrence thereof prevented. These records must be made available to the Department within 14 (fourteen) calendar days upon written request by the Department.	Compliant	2	Incident and complaints registers are available at the main gate. Incidents are also recorded and saved on the internal reporting system and/or noted in ECO reports/incident register. The facility has an electronic incident management system (PIVOT) which manages the incidents. The system facilitates the investigation and mitigation measures between different responsible parties. No incidents related to the project were recorded during the audit period.	No applicable recommendations.
j)	This Department and the Department of Water Affairs and Forestry must be informed of any major environmental and pollution	Noted/Not Applicable	0	No major or emergency incidents were reported in the reporting period and as such this condition is not applicable.	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
	incidents relating to the COG and water cleaning project within 24 (twenty four) hours of such incidents occurring.				
k)	The use of the existing Maturation Dams for the storage or disposal of any effluent/sludge/waste is prohibited as from 6 months after commissioning of the completed coke oven by-products plant. An application for authorisation and draft plan for decommissioning and rehabilitation of the existing Maturation Dams must be submitted to the Department within 120 (one hundred and twenty) calendar days of commissioning of the COG and water cleaning project.	Noted/Not Applicable	0	The Department of Environmental Affairs (DEA) issued a Waste Management License (WML) for the decommissioning of the maturation ponds in February 2012. As such the facility implemented various process changes in order to cease the use of the dams. The dams were taken out of operation in 2008, two years before the COCGW project was commissioned. The remediation of the maturation ponds are progressing very well. The dam consisted out of 3 dams of which the remediation of Dams 2 and 3 is 100% complete and Dam 1 about 60% complete. Soil is being remediated in-situ. This condition is therefore noted as not applicable to the audit period.	No applicable recommendations.
l)	Planning with respect to addressing existing groundwater contamination identified in the Coke Plant area must continue. Confirmation of, or plans for the abstraction and/or treatment of contaminated groundwater or specific pollutants, including the feasibility of abstracting contaminated groundwater from the aquifer underlying the site as a source of water supply to the process, needs to be considered. Progress with respect to this matter must be reported on in the quarterly progress reports and bi-annual environmental performance audits thereafter.	Compliant	2	A contaminated land assessment in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) (Part 8), which encompassed the entire Works, was recently finalised. The contaminated land assessment report, including groundwater assessment, and associated remediation plan was submitted to the Department of Environmental Affairs (DEA) on 7 June 2018. The auditor was informed that the content of these documents would be presented to the Department on 27 August 2018, after the audit site visit. The auditor has been informed that such a meeting took place and that ArcelorMittal Vanderbijlpark Works is awaiting a response from the DEA on the suggested way forward.	No applicable recommendations.
m)	The recommendations contained in the specialist studies submitted in support of the application for authorisation of the COG and water cleaning project are regarded as an extension of the conditions of this authorisation. Implementation of or compliance with these recommendations must be discussed as part of the quarterly progress reports and bi-annual environmental performance audits thereafter.	Compliant	2	These recommendations have been included in the EMP and are also assessed as part of the internal audits. Refer to Appendix E for the most recent quarterly report.	No applicable recommendations.
n)	An Independent Environmental Control Officer (ECO) with an understanding of the coke oven operational and treatment processes must be appointment for the duration of construction and commissioning, to monitor and report on compliance with the conditions of this authorisation.	Compliant	2	Mr Terrence Wilson was appointed as the ECO for the ArcelorMittal site on 27 January 2010.	No applicable recommendations.
3.3	General Conditions				

No	Conditions	Status	Score	Observations	Recommendations
a)	Any changes to, or deviations from, the project description set out in this letter must be approved, in writing, by the Department before such changes or deviations may be effected. In assessing whether to grant such approval or not, the Department may request such information as It deems necessary to evaluate the significance and impacts of such changes or deviations.	Noted/Not Applicable	0	This condition is noted. No changes to, or deviations from, the project description were made during the audit period.	No applicable recommendations.
b)	This Department may review the conditions contained in this letter from time to time and may, by notice in writing to the applicant, amend, add or remove a condition.	Noted/Not Applicable	0	This condition is noted.	No applicable recommendations.
c)	The applicant must notify the Department, in writing, at least 30 (thirty) days prior to the change of ownership, project developer or the alienation of any similar rights for the activity described in this letter. The applicant must furnish a copy of this document to the new owner, developer or person to whom the rights accrue and inform the new owner, developer or person to whom the rights accrue that the conditions contained herein are binding on them.	Noted/Not Applicable	0	This condition is noted.	No applicable recommendations.
d)	Where any of the applicant's contact details change, including the name of the responsible person, the physical or postal address and/ or telephonic details, the applicant must notify the Department as soon as the new details become known to the applicant.	Noted/Not Applicable	0	This condition is noted.	No applicable recommendations.
e)	Authorisation for the activity is granted in terms of the Environment Conservation Act, 1989 (Act 73 of 1989) only and does not exempt the holder from compliance with other relevant legislation.	Noted/Not Applicable	0	This condition is noted. ArcelorMittal has a legal register in place with sufficient legal advisors to ensure they are aware of their legal requirements. The register is updated as required.	No applicable recommendations.
f)	The applicant shall be responsible for ensuring compliance with the conditions contained in this letter by any person acting on his behalf, including but not limited to, an agent, servant, or employee or any person rendering a service to the applicant in respect the activity, including but not limited to, contractors and consultants.	Compliant	2	An ECO has been appointed to ensure compliance with conditions of the authorisation and ensure contractors are informed of requirements. A copy of the EMP has also been provided to contractors and an agreement signed that they must adhere to the conditions in the EMP.	No applicable recommendations.
g)	Departmental officials shall be given access to the property referred to in 1 above for the purpose of assessing and/ or monitoring compliance with the conditions contained in this document at all reasonable times.	Noted/Not Applicable	0	This condition is noted.	No applicable recommendations.
h)	The applicant must notify the Department within 24 (twenty four) hours if any condition of this authorisation cannot, or is not, adhered to. The notification must be supplemented with reasons for non-compliance.	Noted/Not Applicable	0	This condition is noted.	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
3.4	Reporting requirements				
a)	A summarised quarterly progress report on the implementation of the COG and water cleaning project must be submitted to the Department, the first report being due 90 (ninety) calendar days after construction commences, and every 90 (ninety) calendar days thereafter. These progress reports must address, inter alia, the following:	Compliant	2	ArcelorMittal compiles quarterly progress reports and is only required to submit these reports to GDARD upon request. Refer to Appendix E for the most recent quarterly report.	No applicable recommendations.
i.	Up to date scheduling of implementation and associated time-frames.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
ii.	Records of any major incidents (see 3.2(i) above).	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
iii.	Decommissioning of infrastructure.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
iv.	Rehabilitation and disposal of contaminated waste material (soil, decommissioned equipment etc.), including the quantity and classification (general/hazardous) thereof.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
v.	Commissioning of any treatment infrastructure.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
vi.	Results on the monitoring of the efficiency of commissioned treatment infrastructure.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
vii.	Monitoring of activities in terms of the environmental management plan (see 3.2 (c) above).	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
viii.	Any steps taken to rectify areas of non-compliance with environmental requirements.	Noted/Not Applicable	0	This condition is noted as a reporting requirement.	No applicable recommendations.
b)	A bi-annual Environmental Performance Audit conducted by an independent, accredited auditor must be submitted to the Department for review, the first audit being due 6 (six) months after commissioning of the COG and water cleaning project, and every 6 (six) months thereafter. The bi-annual audit must include, inter alia, the following (results in graph format as applicable):	Compliant	2	The previous external EPA was conducted by GCS in March 2018.	No applicable recommendations.
i.	Volume of water treated, volume re-used, volume discharged, and reduction in volume of fresh water intake achieved, i.e. updated water balance for the site.	Compliant	2	ArcelorMittal Vanderbijlpark Works is a zero effluent discharge facility as required in terms of the WUL. The updated water balance for the Works is attached as Appendix F , whilst the water balance for the Coke Plant is attached as Appendix G . Prior to becoming a zero discharge facility treated effluent was discharged from the Works through the Rietspruit canal into the Rietspruit River which flows into the Vaal River. Effluent discharge qualities and volumes are presented in Appendix H and freshwater abstraction volumes are presented in Appendix I . An average 65% reduction in water abstraction has been achieved since 2005.	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
ii.	Results of improvements in air and water quality achieved.	Compliant	2	ArcelorMittal is committed to improving air and water quality results for the Works. Refer to Appendix B, Appendix D, Appendix H and Appendix I.	No applicable recommendations.
iii.	Air quality monitoring and reporting as required by Condition 3.2(g).	Compliant	2	Ambient air quality and fugitive emissions monitoring, management and reporting for the Works is undertaken in accordance with the Atmospheric Emissions License (AEL) and the Air Quality Monitoring Plan produced by Airshed Planning Professionals in 2011 (refer to Appendix J). The ambient air quality around the Works is monitored by ArcelorMittal at four pre-determined locations. Fugitive emissions by nature are a difficult element to monitor. The monitoring system that has been put in place by ArcelorMittal is noteworthy and the different sources of fugitive emissions are assessed in the fugitive emissions monitoring plan which includes the doors, pipes and charging times, and smoke observed. The Coke Battery Stack dust emissions are attached as Appendix K . Occupational health monitoring, undertaken in terms of the Occupational Health and Safety Act, can also be used as a monitoring program in order to determine the effectiveness of the mitigation measures implemented at the Works. Furthermore, as noted in the quarterly progress reports (Appendix E), ambient air quality monitoring results from stations operated by the DEA, indicate that SO ₂ limits were not exceeded in the Vaal Triangle Airshed Priority Area during the first quarter of the year.	No applicable recommendations.
iv.	Discussion on groundwater treatment (volumes, pollution stabilisation etc.).	Compliant	2	ArcelorMittal have established remedial actions to avoid continued groundwater contamination. A contaminated land assessment was undertaken in 2017/2018 and the report and associated remediation plan was submitted to the DEA on 7 June 2018. This assessment and remediation plan, together with remodelled groundwater information for the Works, will be used to assess the success rate of the remedial actions implemented to date. Arcelor Mittal awaits a response from the DEA on the recommended way forward.	No applicable recommendations.
v.	Discussions on the implementation (or not) of recommendations as contained in the Scoping Report and Specialist Studies.	Compliant	2	The recommendations as contained in the scoping report and specialist reports have been included into the operational EMP and monitoring plans for the project.	No applicable recommendations.
vi.	Results of ground and surface water monitoring as provided for in the EMP.	Minor non-compliance	1	The Works are operated as a zero discharge facility, however in the event of process upset conditions, contaminated surface water can be diverted to the Coke Plant sump which is a buffer	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
				dam where water from the dam can be reclaimed for re-use as and when there is sufficient capacity in the system. The levels of the coke plant sump is managed and measured to ensure the sump does not overflow. Clean storm water is measured at the coke plant storm water drain but is combined with other areas inflows. The flow is measured continuously and the Electrical Conductivity is also monitored. Discharge into the Rietspruit has taken place a few times during the first 6 months of 2018, with no discharge during the second half as per the data at the time of conducting the audit (refer to Appendix H). Groundwater monitoring and management is conducted according to the ArcelorMittal WUL. A contaminated land assessment in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) (Part 8), which encompassed the entire Works, was recently finalised. The contaminated land assessment report, including groundwater assessment, and associated remediation plan was submitted to the Department of Environmental Affairs (DEA) on 7 June 2018. The auditor was informed that the content of these documents would be presented to the Department on 27 August 2018, after the audit site visit. The auditor has been informed that such a meeting took place and that ArcelorMittal Vanderbijlpark Works is awaiting a response from the DEA on the suggested way forward. The groundwater monitoring graphs and results are attached as Appendix L .	
vii.	Quantities and handling of all by-products produced (sulphur, tar etc.).	Compliant	2	The Coke Ovens generates coke breeze, liquid raw tar and tar sludge as by-products and waste streams. The various waste stream quantities are presented in Appendix M . Liquid tar generated by the coke ovens are pumped to the tar plant for further processing. Tar sludge is generated and mixed with coal dross at a temporary storage area from where it is collected and disposed by Enviroserv (Holfontein H:H Waste Disposal site). Safe disposal certificates are kept for the loads as removed. ArcelorMittal reported that the facility has constructed a plant to recycle and re-use the tar sludge back into the coke battery plant. The tar sludge is captured by the existing carousels system and is transported with the forklift to the new tar sludge recycling plant. The tar sludge is mixed in with the coal and used in the coke making process again. The recycling facility has been commissioned with the	No applicable recommendations.

No	Conditions	Status	Score	Observations	Recommendations
				anticipated outcome of a reduction/elimination of the disposal of hazardous waste. No liquid sulphur has been generated during the audit period as the plant is off line. Coke breeze is generated during the quenching process. Water is sprayed onto the hot coals when it is pushed out of the ovens. The coke breeze collects at the base of the quench tower. The majority of the coke breeze is transported by railway to the sinter plant for recycling.	
viii.	Report on the success of the carousel system being implemented for the collection of tar from tar decanters (first audit only), as well as the method used to return the tar to the coke ovens. A mechanism to collect spillages from the carousel must be discussed, as well as the implementation of an alarm to indicate when the collection vessels are full.	Noted/Not Applicable	0	This condition is not applicable for the audit period.	No applicable recommendations.
ix.	Discussion on the implementation of and compliance with the Preventative Maintenance Plan (see 3.2(e) above).	Repeat Condition	-	Critical maintenance requirements are continuously identified and are captured on the SAP system for tracking and action. A job cards is created and managed on this internal system. Refer to Appendix N for an example of a job card. This condition is scored according to condition 3.2 (e).	No applicable recommendations.
x.	Records of any major incidents (see 3.2(i) above),	Repeat Condition	-	Refer to the observations made in condition 3.2(i).	No applicable recommendations.
xi.	Quantity of waste generated, and the classification and management thereof.	Repeat Condition	-	Refer to the observations made in condition 3.2(vii).	No applicable recommendations.
xii.	Reporting on compliance with the provisions of this authorisation and the environmental management plan, and steps taken to rectify non-compliance.	Compliant	2	This report serves as the second bi-annual external EPA report for 2018.	No applicable recommendations.
xiii.	Monitoring of relevant boreholes with respect to detecting any leaks/pollution from all facets of the COG and water cleaning.	Compliant	2	A borehole improvement plan has been undertaken. Upgrade of the monitoring borehole network completed in 2010 and supplementary monitoring boreholes have been equipped with caps. New boreholes were drilled to replace the damaged boreholes. A new borehole was installed to replace the previously damaged CO-3D. Refer to the groundwater monitoring results in Appendix L .	It is recommended that the WUL be amended to include the new boreholes.
xiv.	Details of any failures in the treatment system an how these were managed.	Repeat Condition	-	Refer to the observations made in condition 3.2(i).	No applicable recommendations.
xv.	Details on the quality and quantity of any discharge (air, water and land), and reasons for discharge, how these were managed, and the recurrence thereof prevented.	Repeat Condition	-	Refer to the observations made in condition 3.4(b)(ii).	No applicable recommendations.
3.5	Duration of authorisation				

No	Conditions	Status	Score	Observations	Recommendations
	If the activity authorised by this letter does not commence within 6 (six) months from the date of signature of this letter, the authorisation will lapse and the applicant will need to re-apply for authorisation in terms of the above legislation or any amendments thereto.	Noted/Not Applicable	0	This condition is not applicable for the audit period.	No applicable recommendations.
		Total Findings	96		

6 CONCLUSION AND RECOMMENDATIONS

By conducting an EPA, ArcelorMittal recognises the importance of the importance of the authorisation in regulating processes related to the project.

Currently the overall compliance with the Record of Decision (ROD) (GAUT 002/02-03/138) is noteworthy. Overall there was one (1) incident of minor non-compliance, three (3) incidents of moderate non-compliance, and zero (0) incidents of major non-compliance observed for the audit period. ArcelorMittal is compliant with the relevant conditions of the ROD that apply to the current status of the project.

H₂S Content in Gas

Condition 3.2(g)(i) states that "The concentrations of the various constituents of the cleaned Coke Oven Gas must be monitored before and after combustion in the coke ovens. The results are to be graphically represented and included in the bi-annual audit report. The H₂S content of the gas must be between 0.8 and 1.5 g/Nm³."

Observation:

The latest monitoring results indicate the H₂S content of the gas exceeded the maximum limit of 1.5 mg/Nm³. The current reading is 5.5 mg/Nm³. The non-compliance is linked to the Sulphur plant not being operational resulting in partially cleaned gas being flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. ArcelorMittal has prioritised this problem and the tender for the construction and installation component for the refurbishment of the Sulphur Plant was released at the beginning of August 2018.

Recommendation:

ArcelorMittal should continue with the prioritisation of the refurbishment of the gas plant in order to recommission the sulphur plant.

Plan for Achieving Reduced Fugitive Emissions

Condition 3.2(g)(iii) states that "A plan for door maintenance/replacement of all the coke batteries (No.) and progress in achieving reduced fugitive emissions has to be developed. The plan must be supported by the results of personal monitors, and actual measurements at representative areas of the coke ovens."

Observation:

Battery doors are inspected on a daily basis and a maintenance schedule has been created. Repairs are done continuously. The fugitive emissions are monitored according to the internationally accepted standards and recorded. It was observed during the site visit that the occasional door is still burning and smoking. The commitment from the facility was however also observed to repair and maintain the equipment as far as possible. Exposure monitoring at the batteries indicates that additional fugitive emission mitigation measures are required, above that already implemented. This can however not be attributed only towards doors but rather the fugitive battery emissions as a cumulative source. ArcelorMittal has however implemented management and mitigation measures such as specialised face masks and other measures to protect employees and reduce exposure. Other measures include battery tightening, end-flue repairs and charge emission reduction projects. The effectiveness of these measures should be assessed to determine whether it is sufficient to mitigate fugitive emissions.

Recommendation:

It is recommended that the effectiveness of these measures should continuously be assessed to determine whether it is sufficient to mitigate fugitive emissions.

Plan for Achieving Reduced Fugitive Emissions

Condition 3.2(h) states that "The flaring of uncleaned gas at the relevant flares is only permissible during upset conditions when the Claus Reactor is shut down for inspection/maintenance for 3 weeks every three years, and must be undertaken at temperatures and atmospheric mixing conditions conducive to maximum dispersion of pollutants."

Observation:

The sulphur plant is not operational and therefore partially cleaned gas is flared when there is no use for it in the rest of the works as an energy source. The Claus reactor has been non-operational for an extended period of time due to equipment failure and significant repairs and replacements are required. Flaring of uncleaned gas is taking place on a more regular basis than 3 weeks every 3 years. However, this issue has been reported on and ArcelorMittal is continuously aware that urgent intervention is needed.

Recommendation:

ArcelorMittal must continue monitoring air quality within the Works to maintain a baseline of emission results. The design, construction and operation of the sulphur plant should be

prioritised as it is only through this plants operation that the flaring of uncleaned gas can be controlled.

The instances of non-compliance weren't considered to be directly associated with significant environmental degradation, and as such the auditor believes that current environmental practices implemented on site are adequately mitigating environmental impacts.

APPENDIX A: DECLARATION OF AUDITOR INDEPENDENCE

I, Riana Panaino, declare that:

- I act as the independent environmental auditor in this assessment;
- I will perform the work relating to the assessment in an objective manner, even if this results in views and findings that are not favourable to the authorisation holder;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental auditing, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activities;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in Regulation 34 of the Regulations when preparing this assessment and any report relating it;
- I have no, and will not engage in, conflicting interests in the undertaking of this assessment;
- I undertake to disclose to the holder and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the assessment is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the assessment;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will provide the competent authority with access to all information at my disposal regarding the assessment, whether such information is favourable to the holder or not;
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from an environmental auditor in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of Regulation 48 of the Regulations and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.



Signature of the environmental auditor

26 September 2018

APPENDIX B: H₂S IN COKE OVEN GAS DATA

APPENDIX C: DOOR INSPECTION AND MAINTENANCE PLAN

APPENDIX D: CUMULATIVE PARTICULATE MATTER EMISSION REDUCTION

APPENDIX E: QUARTERLY PROGRESS REPORT.

APPENDIX F: UPDATED WORKS WATER BALANCE

APPENDIX G: COKE PLANT WATER BALANCE

APPENDIX H: DISCHARGE VOLUMES

APPENDIX I: ABSTRACTION VOLUMES

APPENDIX J: COKE PLANT AIR QUALITY MONITORING PLAN

APPENDIX K: COKE BATTERY STACK DUST EMISSIONS

APPENDIX L: GROUNDWATER QUALITY RESULTS

APPENDIX M: WASTE STREAM QUANTITIES

APPENDIX N: EXAMPLE OF A RECENT JOB CARD