



**Verification and certification report form for
CDM project activities
(Version 03)**

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Title: Use of waste gas at Namakwa Sands in South Africa UNFCCC Ref. No: 5884
Scale of the project activity	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
Version number of the verification and certification report	02
Completion date of the verification and certification report	20/02/2020
Monitoring period number and duration of this monitoring period	Monitoring period number: 02 Duration: 01/06/2018 – 31/05/2019
Version number of the monitoring report to which this report applies	02.1
Crediting period of the project activity corresponding to this monitoring period	31/12/2013 – 30/12/2023
Project participants	Tronox Mineral Sands (Pty) Ltd. (Republic of South Africa) WeAct Pty Ltd (Australia)
Host Party	Republic of South Africa
Applied methodologies and standardized baselines	Methodology: ACM0012 (version 04.0.0), "Consolidated base line Methodology for GHG emission reductions from waste energy recovery projects" Standard Baseline: Not Applicable
Mandatory sectoral scopes	Sectoral Scope 01: Energy industries (renewable / non-renewable);
Conditional sectoral scope(s), if applicable	Sectoral Scope 08: Mining/Mineral production
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	84,432 tCO ₂ /annum
Certified amount of GHG emission reductions or GHG removals for this monitoring period	62,704 tCO ₂ /annum
Name and UNFCCC reference number of the DOE	Name: KBS Certification Services Pvt. Ltd. UNFCCC reference number: E-0051
Name, position and signature of the approver of the verification and certification report	

	 <p>Kaushal Goyal Managing Director KBS Certification Services Pvt. Ltd.</p>
--	---

SECTION A. Executive summary

>>

KBS has been commissioned by “Tronox Mineral Sands (Pty) Ltd” to perform an independent verification of its registered CDM project “Use of waste gas at Namakwa Sands in South Africa”, UNFCCC Ref No: 5884 for the reported GHG emission reductions for the given monitoring period 01/06/2018 – 31/05/2019 (both dates included). The CDM projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

Purpose:

The purpose of this verification exercise is, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

Scope:

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

- (a) The registered PDD, including the monitoring plan and the corresponding validation opinion(s);
- (b) Previous verification reports, deviation requests, requests for revision of monitoring plan;
- (c) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- (d) The applied monitoring methodology;
- (e) The applied standardized baseline (if applicable);
- (f) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- (g) All information and references relevant to the project activity's resulting in emission reductions

The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

KBS has, based on the recommendations in the latest version of CDM Validation and Verification Standard, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Description of project:

The purpose of project activity is to utilize waste gas generated from smelter operation for the generation of electricity. The electricity is generated using 8 internal combustion gas engines having electrical output of 1698 kW each. The generated electricity by the project activity is consumed by Tronox Mineral Sands (Pty) Ltd. furnace operations and thereby reducing its electricity consumption from the national grid. Thus, utilization of the furnace off-gas for electricity generation replaces the grid electricity utilization; which is predominantly based on fossil fuel.

The project activity consists of two closed DC-arc furnaces:

- i) Furnace 1 is having an electrical capacity of 25 MW and a tapping capacity of 20 tonnes of slag every 2 hours and 30 tonnes of metal every 4 hours and;
- ii) Furnace 2 is having an electrical capacity of 35 MW and a tapping capacity of 25 tonnes of slag every 1.5 hours, and 30 tonnes of metal every 2.5 hours.

Prior to project activity the furnace off-gas (comprising of CO and H₂ gas) was cleaned and then flared. The flaring of the cleaned gas is a safety measure because it reduces the particulate emissions from the flares, as carbon monoxide is extremely poisonous. However, the flaring of the off-gas means that the energy

inherent in the gas is not utilised. The project activity uses this cleaned furnace off-gas (which was previously flared) to generate electricity using internal combustion engines. Thus, utilization of the amount of furnace off-gas for generation of electricity directly helps reducing the GHG gases emission by replacing an equivalent amount of electricity at grid.

The project activity is located at Namakwa Sands in South Africa, which is owned by Tronox Mineral Sands (Pty) Ltd. Tronox is having heavy minerals mining, and beneficiation business located in South Africa and is the project participant to the project activity. The Commissioning date of the project activity is 01/01/2014 as verified from the commissioning certificate/06/. The same was also confirmed through the interviews conducted during the site visit. The total emission reduction claimed under this monitoring period "01/06/2018 – 31/05/2019" is 62,704 tCO_{2e}.

Methodology:

KBS follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available at UNFCCC website as per CDM procedures. A desk review of the project documentation is undertaken, which is followed by an onsite visit by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and version 02 of CDM VVS, to capture the assessment of applicable CDM requirements viz., version 02 of CDM Project Standard, registered PDD, applied methodology/ies, applied standardized baseline and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team members and the nonconformities, if any. The verification protocol is an internal document, and is available on request. Following are the major milestones for the verification under consideration.

Verification contract	28/11/2019
Publication of MR	20/12/2019
On site verification	28/01/2020
Draft Verification Report	17/02/2020
Final Verification Report	20/02/2020

Conclusion:

From the verification assessment, it is confirmed that the project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place. All the monitoring systems & procedures and monitoring report confirms the requirements of the approved monitoring plan and the approved monitoring methodology. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 62,704 tCO_{2e} emission reductions during period from 01/06/2018 to 31/05/2019.

SECTION B. Verification team, technical reviewer and approver**B.1. Verification team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader & Technical Expert (TA 1.1)	IR	Kandari	Sanjay	Central Office	✓	✓	✓	✓
2.	Verifier	IR	Sharma	Shikha	Central Office	✓			✓
3.	Verifier	IR	Dey	Deboshmita	Central Office	✓			✓
4.	Technical Expert (TA 8.1) and Local Expert	EI	Allison	Hylton	Central Office	✓	✓	✓	✓

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer (TA 1.1)	IR	Badaya	Rohit	Central Office
2	Expert to TR (TA 8.1)	EI	Ohri	Yashpal	Central Office
3	Manager Technical & Certification	IR	Sharma	Chetan Swaroop	Central Office
3.	Authorizer	IR	Goyal	Kaushal	Central Office

SECTION C. Application of materiality**C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Wrong data collection	Low	Quantity of waste gas used for energy generation is monitored through pressure flow meters. The quantity of electricity supplied to the recipient plant is measured continuously using 4-quadrant billable bi-directional electricity meters with telemetry system. The flow meters are calibrated and of high accuracy class. Hence, the risk of getting wrong data is very low.	Verification team checked the accuracy of flow meters, energy meters and the calibration certificates.

2	Transfer of data from log sheet to excel ER spreadsheet	Low	Possible human error during transfer of data to ER spreadsheets and MR	Verification team checked all the log records during site visit and compared with ER spreadsheet to check for any material error during data transfer.
---	---	-----	--	--

C.2. Consideration of materiality in conducting the verification

>>

In order to detect errors, omissions or misstatements in emission reductions or removals being claimed by project participants in the monitoring report, the materiality have been applied by KBS as per clause 10.1.2.3 of CDM VVS for project activities, version 02.0 /17/. The project activity comprises of emission reductions less than 300,000 tCO₂e and 2 percent materiality threshold is applied.

The prescribed thresholds for materiality, as per §326 of “CDM validation and verification standard for project activities” version 02.0 /17/.

Prescribed range of ERs/annum	500,000+	300,000+ to 500,000	300,000	CDM project activity comprised only of small-scale project activities	CDM project activity comprised only of microscale project activities
Prescribed Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The identified/selected materiality threshold for the project activity under current monitoring period is 2% as the emission reductions are less than 300,000 tCO₂e.

	MR Version (Draft) /1.1/	MR Version (Final) /1.2/
Emission reductions/annum	62,704 tCO ₂	62,704 tCO ₂
Identified Threshold	2%	2%

The emission reductions for this monitoring period are same as per the webhosted MR. Refer Appendix 4 of this report for more details.

1. In planning the verification, KBS is able to understand the environment in which the project operates, the sources of project emissions within the project boundary and the leakage, the monitoring activities, the equipment used to monitor or measure activity data, the origin and application of data used to calculate or measure the emissions, data flow, the internal quality control system, and the overall organization with respect to monitoring and reporting.
2. A verification plan has been designed to minimize risks that a material discrepancy would not be detected. The data which directly affect emission reduction calculations are monitored and measured by accurate transmitters/meters, hence verifiable. The data log sheets of all the parameters used in ER calculations were verified 100%. The use of spreadsheets shows the adequate controls related to data updates, version tracking, traceability and security.

KBS confirms that the claimed emission reductions are free from material errors, omissions or misstatements, with a reasonable level of assurance, and proceeds with the verification as defined in the verification plan.

SECTION D. Means of verification

D.1. Desk/document review

>>

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section ‘Appendix 3’ of this report.

D.2. On-site inspection

Duration of on-site inspection: 28/01/2020				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	Namakwa Sands in South Africa	28/01/2020	Team Leader, Technical Expert (1.1): Sanjay Kandari Technical Expert (8.1): Hylton Allison
2.	Physical site visit	Namakwa Sands in South Africa	28/01/2020	Team Leader, Technical Expert (1.1): Sanjay Kandari Technical Expert (8.1): Hylton Allison
3.	Data & Parameters, Emission Reduction calculations	Namakwa Sands in South Africa	28/01/2020	Team Leader, Technical Expert (1.1): Sanjay Kandari Technical Expert (8.1): Hylton Allison
4.	Closing meeting	Namakwa Sands in South Africa	28/01/2020	Team Leader, Technical Expert (1.1): Sanjay Kandari Technical Expert (8.1): Hylton Allison

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Borah	Deepjyoti	Senior Advisor, WeAct Pty. Ltd	28/01/2020	<ul style="list-style-type: none"> - Project design - Technical details - Monitoring procedure - Incidents during the monitoring period. - Log records - ER calculation - Reporting 	Team Leader, Technical Expert (1.1): Sanjay Kandari Technical Expert (8.1): Hylton Allison
2.	Du toir	Jacques	Millwright, Tronox Mineral Sands (Pty) Ltd			
3.	Mostut	Willem	Mechanic, Tronox Mineral Sands (Pty) Ltd			
4.	Waet	Peter	Engineer, Tronox Mineral Sands (Pty) Ltd			
5.	Cube	Olja	Environmental practitioner, Tronox Mineral Sands (Pty) Ltd			
6.	Mould	Chris	Supervisor, Tronox Mineral Sands (Pty) Ltd			

D.4. Sampling approach

>>

No sampling approach was used.

D.5. Clarification requests (CLs), corrective action requests(CARs) and forward action requests (FARs) raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	-	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	CL 01, CL 02	CAR 01	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	02	01	00

SECTION E. Verification findings**E.1. Compliance of the monitoring report with the monitoring report form**

Means of verification	Verification team checked the monitoring report with latest version of MR available in the UNFCCC website (i.e. version 07.0)/14/ and "Instructions for filling out the monitoring report form" mentioned as attachment to Monitoring report form (version 07.0) /14/.
Findings	Nil
Conclusion	Verification team confirms that final monitoring report is completed using the latest valid version of the applicable monitoring report form /14/.

E.2. Remaining forward action requests from validation and/or previous verifications

>>

This is the Second verification of this project activity. Verification team checked Verification report of the first monitoring period/04/ and found that no FAR has been raised.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	<p>The verification team determined the conformity of the actual project activity and its operation with the validated project design document. Verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD/03/ are in place, and that the project participants have operated the CDM project activity as per the validated PDD/03/.</p> <p>The verification team has checked the information in the monitoring report and compared against the registered PDD/03/.</p>
------------------------------	---

	<p>During the onsite inspection, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the approved PDD/03/. Interviews with operational personnel and households and random samplings have been carried out.</p> <p>The waste gas from smelter comprises of CO and H₂ gas, which referred as furnace off-gas. Prior to project activity the furnace off-gas was cleaned and then flared. The flaring of the cleaned gas is a safety measure, as carbon monoxide is extremely poisonous. Cleaning of the gas prior to flaring is required to reduce the particulate emissions from the flares. However, the flaring of the off-gas means that the energy inherent in the gas is not utilised. The project activity uses this cleaned furnace off-gas (which was previously flared) to generate electricity using internal combustion engines.</p> <p>Thus, utilization of the amount of furnace off-gas for generation of electricity directly helps reducing the GHG gases emission by replacing an equivalent amount of electricity at grid. The electricity is generated using 8 internal combustion gas engines having electrical output of 1698 kW each. Technical specification of each IC gas engines were verified from the name plate details during site visit.</p> <p>The installed capacity of the equipment including combustion gas equipment & furnace, specifications and locations were confirmed during site visit. The verification team has reviewed the manufacturer specification of the equipment/07/. The verification team has observed at the site that all technical details of the equipment and process and found that the details are correctly matching with the monitoring report and monitoring records maintained by PP. Thus the verification team has concluded that the project activity was implemented and operated as per registered PDD/03/. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD/03/ and that all physical features of the project are in place.</p>
Findings	Nil
Conclusion	<p>The project has been implemented according to the description presented in the registered PDD.</p> <p>According to paragraph 354-356 of CDM VVS for project activities (version 02.0), verification team confirms that:</p> <ul style="list-style-type: none"> • Implementation status and equipment installation of the project activity are consistent with the registered PDD. • The actual operation of the CDM project activity is as per the revised PDD. • Information (data and variables) provided in the monitoring report is in accordance with that stated in the registered PDD. <p>The actual emission reductions achieved during this monitoring period is much lower than the estimation anticipated in the registered CDM-PDD.</p>

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹

>>

No temporary deviation from registered monitoring plan or monitoring methodology is sought.

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied (selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

E.4.2. Corrections

>>

No corrections in the PDD applied during this monitoring period.

E.4.3. Change to the start date of the crediting period

>>

PP had requested change in the start date of crediting period.

The start date of current crediting period is 31/12/2013, changed from 01/01/2013. Thus, the current crediting period is "31/12/2013 – 30/12/2023" (Fixed).

This change is visible in the UNFCCC web-interface.

Link: <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1331554627.86/view>

E.4.4. Inclusion of a monitoring plan

>>

Not applicable as the monitoring plan is included in the registered PDD itself.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

>>

No permanent changes in the monitoring plan or monitoring methodology is sought during this monitoring period.

E.4.6. Changes to the project design

>>

No change in project design is sought during this monitoring period.

E.4.7. Changes specific to afforestation and reforestation project activities

>>

Not applicable as it is not A/R project.

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	<p>The verification team checked compliance of project monitoring plan with the applied methodology (ACM0012, version 04) /11/ and including applicable tools.</p> <p>The monitoring plan with the monitoring methodology is followed during the monitoring period. All baseline emission parameters has been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the registered PDD is in accordance with the applied methodology.</p>
Findings	Nil
Conclusion	In the opinion of the verification team the monitoring report complies with the requirement of the registered PDD/3/ and applied methodology (ACM0012, version 04)/11/ in context of the project activity. Thus, it conforms to the requirement of §357 of VVS V02/17/.

E.6. Compliance of monitoring activities with the registered monitoring plan**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

Means of verification	The verification team has checked the ex-ante parameters and data stated in Section D.1 of MR/1.2/ and compared with section B.6.2 of the registered PDD/03/ whether all parameters fixed ex-ante for the crediting period have been applied correctly.
------------------------------	---

	Ex-ante Parameter	Value	Consistent with the PDD/03/& the source mentioned in it
	EF _{Elec,gr,y}	1.036 tCO ₂ /MWh	Yes
	EF _{El,gr,y}	1.036 tCO ₂ /MWh	Yes
	Q _{BL,product}	169,242 ton slag/year	Yes
	Q _{wcm,product}	542 Nm ³ waste energy/ton slag	Yes
Findings	Nil		
Conclusion	The values of ex ante fixed parameters have been verified from the registered PDD/03/. Same has been crosschecked with the source mentioned in the PDD and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.		

E.6.2. Data and parameters monitored

Means of verification	<p>The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD/03/.</p> <p>During the verification all monitoring parameters listed in Section D.2 of MR/1.2/ were compared with section B.7.1 of the registered PDD/03/ have been verified with regard to the:</p> <ul style="list-style-type: none"> (a) appropriateness of the applied measurement / determination method, (b) the correctness of the values applied for ER calculation, (c) the accuracy, and applied QA/QC measures. <p>The monitored values are assessed as follows:</p> <p>Q_{wcm,y}: The parameter "Quantity of waste gas used for energy generation during year y" is monitored continuously through differential pressure flow meters. The flow transmitter with the accuracy class of 0.5S is installed to measure the quantity of waste gas used for the energy generation. The readings of the quantity of waste gas used are measured continuously & monthly basis. The log readings are transferred to the excel sheet for the purpose of monitoring records. Verification team checked all the waste gas values used for the energy generation provided in ER calculation excel sheet with the respective log records/05/, the value is verified as 62,940,900.40 Nm³ (The calibration of the gas flow meters were conducted in the month of February 2019 which is valid for a period of one year as per registered calibration frequency; hence delay has been considered for the period June 2018 to February 2019 by PP. Errors are considered by the PP for the delayed period and has been demonstrated in the ER sheet/02/. It was verified by the assessment team that error found during the delayed meter testing was within the permissible range). Flow meters are installed at the entry point of IC engines where the gas enters to the engines.</p> <p>PP has DCS system to monitor flow rate of waste gas, DCS is connected through online system with the flow transmitter. All values are found to be correct. Hence the total waste gas values considered for the monitoring period is accepted. Also the instantaneous meter readings were used a crosscheck of the reported value in addition to the trend of waste gas used for the energy generation. It was observed during the site visit that instantaneous readings were within the range of specifications of flow meter.</p> <p>EG_{GR,y}: The parameter "Quantity of electricity supplied to Namakwa Sands, which in the absence of the project activity would have sourced from the grid during the year y" is monitored continuously through 4-quadrant billable class meters that are bi-directional. The electricity meters are fitted with a telemetry system, and the data is fed into the plant control system on a daily basis. The main and check meters</p>
------------------------------	--

reconciled daily to check if their readings are within a pre-defined accuracy band. If case of discrepancies, notification is sent to the control room to advise the operator to attend to a problem with the meters. The electricity readings are measured continuously & aggregated on monthly basis. The value of this parameter is verified as 62,824.17 MWh. Instantaneous readings of electricity production is also checked by the verification team during site visit. Also the electricity bills of ESCOM were sought to crosscheck the total contract demand of the plant. It was observed by reviewing the electricity bills that the demand of power is significantly high and electricity generated by the project activity partially fulfilled the demand.

EC_{PJ,gr,y}: "Quantity of electricity consumed by the project from the grid in year y" is monitored continuously through 4-quadrant billable class meters that are bi-directional. The electricity meters are fitted with a telemetry system, and the data is fed into the plant control system on a daily basis. The main and check meters reconciled daily to check if their readings are within a pre-defined accuracy band. If case of discrepancies, notification is sent to the control room to advise the operator to attend to a problem with the meters. The electricity readings are measured continuously & aggregated on monthly basis. The baseline scenario as per the registered PDD dated 13/11/2012 (version 9.0)/03/ and found correct. However, the verification team found that the value of electricity imported for the month of August 2018 was significantly higher than the other months of the monitoring period. A clarification was raised in this regard. Refer to Appendix 4 of this report for further details.

The value of this parameter is verified as 2,118.87 MWh. Instantaneous readings of electricity production is also checked by the verification team during site visit. It was observed that project electricity consumption was higher whenever there was shutdown. Energy meters are installed after the IC engines and depicted in the lay out diagram shown in the monitoring report.

TDL_{gr,y}: "Average technical transmission and distribution losses for providing electricity to the grid in year y" is a default value applied for PEy calculation for each year respective to the year count "April (Year 1) to March (Year 2)" as prescribed in the Eskom's report/20/. However, for the FY 2019-20 where two monitoring months are included, there is only target value available. The target value has been verified from the report /20/ and the verification team confirms that the applied value is found to be correct. Values verified as:

2018 -19	8.47%
2019 -20	8.00%

Abnormal operation of the project facility including emergencies and shut down: The parameter "Abnormal operation of the project facility including emergencies and shut down" is monitored on daily basis. The abnormal operations are recorded in the daily log sheets/19/ and aggregated on yearly basis. The value for this parameter for the monitoring period is verified as 3,469.20 hours.

The verification team crosschecked all the records/19//24/ and found to be consistent.

Findings	CL 01, CL 02 & CAR 01 is raised and successfully closed. The resolution of the CAR/CL is detailed in Appendix 4 of this report.
Conclusion	Corresponding to the §360 of VVS, version 02.0/17/, the team confirm that the monitoring has been carried out in accordance with the approved registered PDD/03/. The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in approved PDD/03/. The monitored data for the parameters has been verified by checking the procedure for information flow and found to be complete and consistent.

E.6.3. Implementation of sampling plan

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	<p>The verification team determined whether the calibration of the measuring equipment that has an impact on the claimed emission reductions is conducted by the PP at a frequency specified in the registered monitoring plan/03/. The calibration records/09/ were verified to check the frequency of calibration of the measuring instruments.</p> <p>Verification team reviewed calibration certificates and traceability of calibration in accordance with the procedures and concluded that calibrations were conducted by the competent calibration agencies/09/. Detailed methodology, details of master meters used, its calibration etc. verified by the assessment team and concluded that it meets the requirements.</p> <p>Refer Annexure 1 for the details of calibration of energy meters and gas flow meters. The validity or the prescribed frequency of calibration is once in 5 years for the energy meters and annually for the gas flow meters as per the supporting documents/09/ and the registered PDD/03/. The calibrations of energy meters were carried out as per the frequency mentioned in registered monitoring plan. However flow meter calibrations were delayed and PP has applied errors for the delayed period for flow. Refer Annexure 1 for the detailed calibration dates. The errors found in the calibrations were within the permissible errors of meters. It can be concluded by the assessment team that the calibration requirements have been met.</p>
Findings	Nil.
Conclusion	The verification team confirms that calibration of energy meters and gas flow meters were carried out in accordance with the registered PDD and national standards.

E.8. Assessment of data and calculation of emission reductions or net removals**E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks**

Means of verification	<p>The verification team has checked whether calculations of baseline GHG emissions calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan.</p> <p>In detail the following has been verified:</p> <p><u>Transparency</u>: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae.</p> <p><u>Parameter consistency</u>: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet.</p> <p><u>Correctness</u>: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology.</p> <p><u>Completeness</u>: It has been checked whether all calculations are complete and without omissions</p> <p>The baseline emission is calculated as below:</p> $BE_{Elec,y} = f_{cap} \times f_{wcm} \times \sum_j \sum_i (EG_{gr,y} \times EF_{Elec,gr,y})$ <p>Where:</p>
------------------------------	---

	<p>$BE_{Elec,y}$ = Baseline emissions due to displacement of electricity during the year y (tCO₂)</p> <p>$EG_{Gr,y}$ = The quantity of electricity supplied to Namakwa Sands, which in the absence of the project activity would have been sourced from the grid during the year y in MWh</p> <p>$EF_{Elec,gr,y}$ = The CO₂ emission factor for the grid electricity displaced due to the project activity, during the year y (tCO₂/MWh).</p> <p>f_{wcm} = Fraction of total electricity generated by the project activity using waste energy. This fraction is 1 if the electricity generation is purely from use of waste energy, as in the case of this project activity.</p> <p>f_{cap} = Factor that determines the energy that would have been produced in project year y using waste energy generated at a historical level, expressed as a fraction of the total energy produced using waste source in year y. The ratio is 1 if the waste energy generated in project year y is same or less than that generated at a historical level.</p> <p>However, f_{cap} is calculated as below:</p> $f_{cap} = \frac{Q_{WCM,BL}}{Q_{WCM,y}}$ <p>Where,</p> <p>$Q_{WCM,BL}$ = Quantity of waste energy generated prior to the start of the project activity (Nm³)</p> <p>$Q_{WCM,y}$ = Quantity of WECM used for energy generation during year y (Nm³)</p> <p>As verified from the ER sheet/02/, the waste energy generated in project year y i.e. 6,29,40,900.40 Nm³ is less than that generated at the historical level i.e. 9,16,88,950.73 Nm³. Therefore, f_{cap} ratio is equal to 1.</p> <p>Also, f_{wcm} ratio is equal to 1. Since, the electricity generation is purely from use of waste energy, as verified by the verification team.</p> <p>Hence,</p> $BE_{elec,y} = (1 \times 1 \times 62,824.17 \times 1.036) \text{ tCO}_2\text{e}$ $= 65,085 \text{ tCO}_2\text{e}$ <p>PP has submitted the calculation in the ERs excel sheet/02/. The baseline calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the approved PDD/03/ and the selected methodology /11/.</p>
Findings	Nil
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> • The calculation of baseline GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. • The emission factor applied is an ex-ante value valid for the fixed crediting period. • Any assumptions used in emission or removal calculations have been justified. • Appropriate emission factor and other reference values have been correctly

	<p>applied. It can be confirmed that the baseline calculation is overall correct.</p> <ul style="list-style-type: none"> The ER calculation sheet provided is clear, transparent and the calculations provided in the sheet are reproducible. Hence, the baseline emission reported in the monitoring report for the monitoring period (i.e 65,085 tCO₂e) is verified to be correct.
--	---

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	<p>The verification team has checked whether calculations of project GHG emissions calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan/03/.</p> <p>In detail the following has been verified:</p> <p><u>Transparency</u>: It has been checked whether the calculation of project emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae.</p> <p><u>Parameter consistency</u>: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet.</p> <p><u>Correctness</u>: It has been checked whether the applied formulae and methods for calculating project emissions are in accordance with the monitoring plan and the approved methodology.</p> <p><u>Completeness</u>: It has been checked whether all calculations are complete and without omissions</p> <p>The project emissions are calculated as below: $PE_y = PE_{AF,y} + PE_{EL,y}$</p> <p>The project electricity consumption is 2,118.87 MWh as confirmed through the review of documents/05/ and calculations presented in the ERs sheet (Emission Reductions tab)/02/. There is no leakage emissions involved as per the registered PDD/03/ and the applied methodology/11/. The electricity consumption by all project and leakage electricity consumption sources is 2,118.87 MWh. The total electricity which is generated is consumed in the Namakwa Sands smelting operations, thus resulting in a reduction of electricity purchased. The same amount of electricity would have been imported from Eskom (South Africa's national electricity provider). The electricity generation/consumption has been provided in the ERs sheet (Emission Reductions tab)/02/. Hence the electricity consumption by all project and leakage electricity consumption sources is smaller than the electricity consumption of all baseline electricity consumption sources.</p> $PE_y = PE_{EL,y} = EC_{PJ,gr,y} \times EF_{EL,gr,y} \times (1 + TDL_{gr,y})$ $= 2,118.87 \times 1.036 \times (1 + TDL_{gr,y})$ $= 2,381 \text{ tCO}_2\text{e}$ <p>PP has submitted the calculation in the ERs excel sheet/02/. The project emission calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the registered PDD/03/ and the selected methodology/11/.</p>
Findings	Nil.
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> The calculations of project GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. The emission factor applied is an ex-ante value valid for the fixed crediting period. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factor and other reference values have been correctly applied. It can be confirmed that the project emission calculation is overall correct. The ER calculation sheet provided is clear, transparent and the calculations provided in the sheet are reproducible.

	<ul style="list-style-type: none"> Hence, the project emissions reported in the monitoring report for the monitoring period (i.e, 2,381 tCO₂e) is verified to be correct
--	--

E.8.3. Calculation of leakage GHG emissions

Means of verification	As mentioned in the registered PDD, the leakage is zero in line with the registered PDD and the applied methodology.
Findings	Nil
Conclusion	Leakage is zero in line with the registered PDD and the applied methodology.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>The section E.4 of the MR demonstrates the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodology as follows:</p> $ER_y = BE_y - PE_y - L_y$ $= 65,085 - 2,381 - 0 = 62,704 \text{ tCO}_2\text{e}$ <p>The ER calculation sheet and monitoring report is verified to check the calculations.</p>
Findings	Nil
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> The emission reductions value reported (i.e. 62,704 tCO₂e) is verified to be correct. The summary table in the MR has been filled correctly and the values are in line with the related emissions reduction spreadsheet. <p>Since the monitoring period starts after the 31st December 2012, the emission reductions up to 31/12/2012 is 0 tCO₂e and from 01/01/2013 is 62,704 tCO₂e and these are correctly reported under the respective columns in the MR.</p>

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	<p>The verification team has checked whether the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD/03/. The section E.5 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD/03/.</p> <table border="1"> <tr> <td>Emission reduction estimated as per the registered PDD /03/</td><td>Actual emission reduction achieved as per Monitoring report /01.2/</td></tr> <tr> <td>84,432 tCO₂e</td><td>62,704 tCO₂e</td></tr> </table> <p>Hence, the actual emission reduction achieved during the monitoring period is 25.7% lesser than the estimation in the PDD.</p>	Emission reduction estimated as per the registered PDD /03/	Actual emission reduction achieved as per Monitoring report /01.2/	84,432 tCO ₂ e	62,704 tCO ₂ e
Emission reduction estimated as per the registered PDD /03/	Actual emission reduction achieved as per Monitoring report /01.2/				
84,432 tCO ₂ e	62,704 tCO ₂ e				
Findings	Nil				
Conclusion	<p>The estimated emission reduction as per registered PDD and the actual emission reduction achieved for the monitoring period are correctly reported in the section E.5 of MR.</p> <p>The actual achieved emission reduction is 25.7% lesser than the estimation in the PDD. The justification for the same is provided in the MR and found reasonable based on the site visit.</p>				

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The verification team has determined the ERs achieved during this monitoring period and compared with the estimated value and provided reason for the decrease in ERs.
Findings	Nil
Conclusion	The actual achieved emission reduction is 25.7% lesser than the estimation in the PDD which is due to the low production requirement at plant as there was low market demand. Hence, the justification has been included for the decrease in the emission reductions which is found appropriate.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has determined the ERs achieved during first commitment period and second commitment period.
Findings	Nil
Conclusion	The emission reduction achieved up to 31/12/2012 is 0 tCO ₂ e and from 01/01/2013 onwards is 62,704 tCO ₂ e and the same is verified from the ERs calculation sheet.

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not Applicable
Findings	Not Applicable
Conclusion	Not Applicable

E.10. Global stakeholder consultation

Means of verification	Not applicable since it is the second verification period of this project activity.
Findings	Not Applicable
Conclusion	Not applicable since it is the second verification period of this project activity.

SECTION F. Internal quality control

>>

The draft verification report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by KBS are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Manager Technical and Certification. The technical Reviewer and Manager (Technical & Certification) can be the same person.

The final decision is authorized by Managing Director, KBS once the report is approved by the Manager (Technical & Certification).

SECTION G. Verification opinion

>>

The verification team confirms that the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification and on site visit, the data submitted by PP was cross verified with the values mentioned in the emission reduction sheet/02/ and monitoring report/01/. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the approved revised PDD/03/.

Evidences (documents/interview/site visit) referred for verification of individual monitoring parameter and fixed parameters are defined in section E.6 above. It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in Appendix 3 of this report.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 62,704 tCO₂e emission reductions during period 01/06/2018 to 31/05/2019.

SECTION H. Certification statement

>>

KBS Certification Services Pvt. Ltd. has been contracted by 'Tronox Mineral Sands (Pty) Ltd' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the CDM Project activity "Use of waste gas at Namakwa Sands in South Africa" and UNFCCC Reference Number 5884 for the monitoring period 01/06/2018 to 31/05/2019 (including both dates) in the Monitoring Report Version 01.0 (initial) dated 20/12/2019.

The verification is based on the approved PDD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.

The management of the 'Tronox Mineral Sands (Pty) Ltd' is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project final Monitoring Report version 02.1 dated 19/02/2020. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'Tronox Mineral Sands (Pty) Ltd'. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report version 02.1 dated 19/02/2020.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 01/06/2018 to 31/05/2019 (including both dates) based on the reported emission reductions in the final Monitoring Report version 02.1 dated 19/02/2020 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

KBS confirms the following;

Reporting period: 01/06/2018 to 31/05/2019 (including both dates)

Verified and certified emission in the above reporting period:

Emissions	Up to 31/12/2012	From 01/01/2013	Total	Unit
Baseline Emissions (BE)	0	65,085	65,085	tCO ₂ e
Project Emissions (PE)	0	2,381	2,381	tCO ₂ e
Leakage Emissions (LE)	0	0	0	tCO ₂ e

Certified Emission Reductions (CERs)	0	62,704	62,704	tCO ₂ e
--------------------------------------	---	--------	--------	--------------------

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CEA	Central Electricity Authority
CERs	Certified Emission Reductions
CH ₄	Methane
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
COP	Conference of Parties
CMP	Conference of the Parties serving as the meeting of Parties to Kyoto Protocol
DCS	Distributed Control System
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
GHGs	Greenhouse Gas(es)
GWP	Global Warming Potential
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KBS	KBS Certification Services Pvt. Ltd.
KP	Kyoto Protocol
LE	Leakage Emissions
MR	Monitoring Report
MP	Monitoring Plan
MTPA	Million Tonnes Per Annum
PE	Project Emissions
PDD	Project Design Document
PS	Project Standard for project activities
PCP	Project Cycle Procedure for project activities
PPA	Power Purchase Agreement
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation & Verification Standard for project activities

Appendix 2. Competence of team members and technical reviewers

Personnel Name:		Sanjay Kandari	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope		Technical Area	
Energy Industries (renewable/non-renewable)		TA 1.1: Thermal energy generation from fossil fuels and	

CDM-VCR-FORM

sources)	biomass including thermal electricity from solar
Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
Energy demand	TA 3.1. Energy Demand
Waste Handling and Disposal	TA 13.1 Waste Handling and Disposal TA 13.2 Manure
Approved by (Manager C & T)	Akhilesh Joshi
Approval date:	11/12/2015

Personnel Name:		Rohit Badaya	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		
Energy demand	TA 3.1. Energy Demand		
Waste Handling and Disposal	TA 13.1 Solid waste and wastewater TA 13.2 Manure		
Approved By	Manager Competency & Training		
Approval date:	16/10/2017		

Personnel Name:		Mr. Hylton Allison	
Qualified to work as:			
Team Leader	<input type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (South Africa)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Mining/mineral production	TA 8.1: Mining/mineral production		
Approved by (Manager C & T)	Sanjay Kandari		
Approval date:	22/01/2020		

Personnel Name:		Ms. Shikha Sharma	
Qualified to work as:			
Team Leader	<input type="checkbox"/>	Technical Expert	<input type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert	<input type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
-	-		
Approved by (Manager C & T)	Sanjay Kandari		

Approval date:	26/11/2019
----------------	------------

Personnel Name:		Ms. Deboshmita Dey	
Qualified to work as:			
Team Leader	<input type="checkbox"/>	Technical Expert	<input type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert	<input type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope		Technical Area	
-		-	
Approved by (Manager C & T)		Sanjay Kandari	
Approval date:		26/11/2019	

Personnel Name:		Mr. Yashpal Ohri	
Qualified to work as:			
Team Leader	<input type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert	<input type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope		Technical Area	
Mining/mineral production		TA 8.1: Mining/mineral production	
Approved by (Manager C & T)		Sanjay Kandari	
Approval date:		10/12/2018	

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	/1.1/ Monitoring Report (initial) /1.2/ Monitoring Report (final)	Version 01.0, dated 20/12/2019 Version 02.1, dated 19/02/2020	PP
2	PP	/2.1/ ERs Calculation Sheet corresponding to the initial version of the Monitoring Report /2.2/ ERs Calculation Sheet corresponding to the final version of the Monitoring Report	Version 01.0, dated 20/12/2019 Version 01.1, dated 19/02/2020	PP
3	PP	Registered PDD	Version 9.0, dated 13/11/2012	Publically available
4	Carbon check India	Verification Report of 1 st Monitoring period	Version 03.0, dated 30/05/2019	Publically available
5	PP	Plant measurement/operational records	-	PP
6	PP	Commissioning certificate	Dated 01/01/2014	PP
7	PP	Technical specifications of gas flow meters and energy meters	-	PP
8	PP	QA/QC Manual and maintenance manual, Monitoring manual	-	PP
9	PP	/9.1/ Calibration records of Gas flow meters and Energy Meters /9.2/ Email communication for energy meters' calibration frequency	-	PP
10	UNFCCC	Project page in UNFCCC website	https://cdm.unfccc.int/Projects/DB/TUEV-SUED1331554627.86/view	Publically available
11	UNFCCC	ACM0012 - Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects	<u>Version 04</u>	Publically available
12	IPCC	12.1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 12.2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	<u>Web link</u>	Publically available
13	UNFCCC	Kyoto Protocol (1997)	<u>Web link</u>	Publically available
14	UNFCCC	Monitoring Report Form (CDM-MR-FORM), Version 07	Version 07.0	Publically available
15	UNFCCC	CDM Project Standard for project activities	Version 02.0	Publically available
16	UNFCCC	CDM Project Cycle Procedure for project activities	Version 02.0	Publically available

17	UNFCCC	CDM Validation and Verification Standard for project activities	Version 02.0	Publically available
18	UNFCCC	Glossary "CDM terms"	Version 10	Publically available
19	PP	Abnormal Operation Register-01 June 2018-31 May 2019	-	PP
20	Eskom	Eskom Integrated Report	31 March 2019	PP
21	PP	Samples copies of electricity bills	--	PP
22	PP	Statuary clearances for environment related to the project and plant	--	PP
23	PP	Declaration for high Import during August, 2018	--	PP
24	PP	2018-2019 Daily Summary (data from DCS)	--	PP

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verifications

FAR ID	xx	Section no.	Date: DD/MM/YYYY
Description of FAR			
Project participant response			Date: DD/MM/YYYY
Documentation provided by project participant			
DOE assessment			Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	E.6.2	Date: 03/02/2020
Description of CL				
The following documents are to be furnished by PP for the verification purpose:				
<ol style="list-style-type: none"> 1. Details of the plant shutdown records 2. Eskom's annual report 3. Monitoring manual 4. QA/QC Manual and maintenance manual 5. Electricity bill to verify total electricity demand of the plant 6. Statuary clearances for environment 				
Project participant response				Date: 12/02/2020
PP would like to confirm that all required documents are being submitted to DOE. The details of the submitted documents are as follows:				
<ol style="list-style-type: none"> 1) Details of plan shutdown records – provided in excel file, extracted from the DCS. The DCS records were made available to DOE during the site visit. 2) Eskom's annual report – pertaining to the current monitoring period. This is also publically available; weblink is now included in the ER sheet (version 1.1) for easy reference. 3) Monitoring Manual – it's a detailed document combined at plant level. Same was made available to DOE during site visit. 4) QA/QC Manual and maintenance manual - it's a detailed document combined at plant level. Same was made available to DOE during site visit. 5) Electricity bills – samples copies of electricity bills are provided to DOE. 6) Statuary Clearances for environment – all relevant environmental clearances are submitted to DOE. 				

Documentation provided by project participant	
<ol style="list-style-type: none"> 1) Details of the plant shutdown records. 2) Eskom's annual report (Eskom Integrated Report, 31 March 2019) 3) Sample copies of electricity bills. 4) Environmental Clearances related to the project and plant. 	
DOE assessment	Date: 13/02/2020
The documents furnished by PP was verified and found to be consistent. Hence, CL 01 is closed.	

CL ID	02	Section no.	E.6.2	Date: 03/02/2020
Description of CL				
The value of electricity imported for the month of August 2018 is significantly higher than the other months of monitoring period. Kindly clarify.				
Project participant response				Date: 12/02/2020
<p>PP would like to clarify that there were maintenance activities related to the furnaces in the month of August 2018. During this time mainly the 2nd furnace was under rebuild hence non-operational and 1st furnace was also working intermittently. Therefore, to minimize the overall operational load in the generation plant, the generation plant was also taken out of operation during the period 31/07/2018 to 12/8/2018. Therefore, the export power from the generation plant during this period was zero, whereas import power during this month has got increased compared to regular operation in other months. This can further be referred from the DCS data which indicates that the higher consumption of import power was mainly on 12/08/2018 and 13/08/2018 when generation plant was restarted for operation and then gradually stabilized. PP is submitting the daily operational data extracted from DCS. Also, PP is submitting a declaration highlighting this reason of shutdown period during the month of August 2018. The records of DCS data were also made available to DOE during the site visit.</p>				
Documentation provided by project participant				
<p>Daily operational data extracted from DCS. Declaration from PP stating the reason higher import value during the month of August 2018.</p>				
DOE assessment				Date: 13/02/2020
The clarification provided by PP for the higher import in August, 2018 was found to be acceptable and has been verified from the declaration provided by PP. Hence, CL 02 is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.6.2	Date: 03/02/2020
Description of CAR				
<ol style="list-style-type: none"> 1. Under section D.2 of the web hosted MR, the value of monitored parameter “Abnormal operation of the project facility including emergencies and shutdown” is missing. 2. Under section D.2 of the web hosted MR, the QA/QC details of the monitored parameter “Abnormal operation of the project facility including emergencies and shutdown” is missing as per the registered PDD. 				
Project participant response				Date: 12/02/2020
<ol style="list-style-type: none"> 1) The value of the particular parameter “Abnormal operation of the project facility including emergencies and shutdown” has been included in the specific table under the section D.2. of the MR. The revised MR version (version 02) is submitted to DOE. 2) The details related to QA/QC procedure for the particular parameter “Abnormal operation of the project facility including emergencies and shutdown” has been included under the specific section of D.2 of the MR. The revised MR version (version 02) is submitted to DOE. 				
Documentation provided by project participant				
<p>Revised MR, version 02, dated 10/02/2020. Excel sheet for the parameter “Abnormal operation of the project facility including emergencies and shutdown”, which is extracted from DCS.</p>				
DOE assessment				Date: 13/02/2020

1. Under section D.2 of the web hosted MR, the value of monitored parameter “Abnormal operation of the project facility including emergencies and shutdown” has now been mentioned in the revised MR.
2. Under section D.2 of the web hosted MR, the QA/QC details of the monitored parameter “Abnormal operation of the project facility including emergencies and shutdown” has now been mentioned in the revised MR.

Hence, CAR 01 is closed.

Table 3. FAR from this verification

No FAR from this verification

FAR ID	Xx	Section No.	Date: DD/MM/YYYY
Description of FAR			
Project participant response			Date: DD/MM/YYYY
Documentation provided by project participant			
DOE assessment			Date: DD/MM/YYYY

Annexure 1: Details of Calibration of Energy Meters and Gas Flow Meters

Meter	Accuracy class	Serial No	Calibration frequency	Calibration Agency	Date of last calibrations	Validity of the recent calibration
Gas Flow meter 1	0.5 S	0053274	Annually	Emerson Process Management & Shriram Consultants	06/04/2013, 14/02/2019	13/02/2020 It was noted that the calibration for the flow meter was delayed in the current monitoring period from 01/06/2018 to 13/02/2019. PP has applied maximum permissible error while computing flow for ER calculations. It was evidenced from the recent calibration that errors were within the permissible range hence application of maximum permissible error is in compliance with CDM PS for project activities.
Gas Flow meter 2	0.5 S	0053264	Annually	Emerson Process Management & Shriram Consultants	06/04/2013, 14/02/2019	13/02/2020 It was noted that the calibration for the flow meter was delayed in the current monitoring period from 01/06/2018 to 13/02/2019. PP has applied maximum permissible error while computing flow for ER calculations. It was evidenced from the recent calibration that

CDM-VCR-FORM

						errors were within the permissible range hence application of maximum permissible error is in compliance with CDM PS for project activities.
Gas Flow meter 3	0.5 S	0053275	Annually	Emerson Process Management & Shriram Consultants	07/04/2013, 14/02/2019	13/02/2020 It was noted that the calibration for the flow meter was delayed in the current monitoring period from 01/06/2018 to 13/02/2019. PP has applied maximum permissible error while computing flow for ER calculations. It was evidenced from the recent calibration that errors were within the permissible range hence application of maximum permissible error is in compliance with CDM PS for project activities.
Gas Flow meter 4	0.5 S	D13000000384314	Annually	Siemens & Shriram Consultants	28/03/2013, 15/02/2019	14/02/2020 It was noted that the calibration for the flow meter was delayed in the current monitoring period from 01/06/2018 to 14/02/2019. PP has applied maximum permissible error while computing flow for ER calculations. It was evidenced from the recent calibration that errors were within the permissible range hence application of maximum

CDM-VCR-FORM

						permissible error is in compliance with CDM PS for project activities.
Gas Flow meter 5	0.5 S	D13000000389357	Annually	Siemens & Shriram Consultants	02/05/2013, 15/02/2019	14/02/2020 It was noted that the calibration for the flow meter was delayed in the current monitoring period from 01/06/2018 to 14/02/2019. PP has applied maximum permissible error while computing flow for ER calculations. It was evidenced from the recent calibration that errors were within the permissible range hence application of maximum permissible error is in compliance with CDM PS for project activities.
Energy meter 1 (Main)	0.2 S	81120018	Once in 5 years as per manufacturer's recommendation	Elster Kent Metering (Pty) Ltd., part of Honeywell	12/12/2013, 02/08/2018	01/08/2023
Energy meter 1 (Check)	0.2 S	81120019	Once in 5 years as per manufacturer's recommendation	Elster Kent Metering (Pty) Ltd., part of Honeywell	12/12/2013, 02/08/2018	01/08/2023
Energy meter 2 (Main)	0.2 S	81120020	Once in 5 years as per manufacturer's recommendation	Elster Kent Metering (Pty) Ltd., part of Honeywell	12/12/2013, 02/08/2018	01/08/2023
Energy meter 2 (Check)	0.2 S	81120021	Once in 5 years as per manufacturer's recommendation	Elster Kent Metering (Pty) Ltd., part of Honeywell	12/12/2013, 02/08/2018	01/08/2023

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		