



**Verification and certification report form for
CDM project activities
(Version 02.1)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System UN reference number: 10006
Version number of the verification and certification report	1.0
Completion date of the verification and certification report	20/02/2018
Monitoring period number and duration of this monitoring period	Second monitoring period 01/10/2015 to 30/09/2017 (including both days)
Version number of the monitoring report to which this report applies	Version 3.1
Crediting period of the project activity corresponding to this monitoring period	01/10/2014 – 30/09/2024, Fixed, 10 years
Project participants	Al Jubail Fertilizer Company (Al Bayroni) Saudi Basic Industries Corporation (SABIC)
Host Party	Kingdom of Saudi Arabia
Applied methodologies and standardized baselines	Methodology: AM0056 - Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems Version 1.0
Mandatory sectoral scopes linked to the applied methodologies	Sectoral Scope(s); 1 - Energy industries (renewable - / non-renewable sources)
Conditional sectoral scope(s) linked to the applied methodologies	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	132,196 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	48,224 tCO ₂ e
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited E-0066

Name, position and signature of the
approver of the verification and
certification report



Abhishek Mahawar
Quality Manager

SECTION A. Executive summary

Brief summary of the project activity

The project participant, AL Jubail Fertilizer Company (Al Bayroni), manufactures ammonia, urea, 2 Ethyl Hexanol and DOP in collaboration with Taiwan Fertilizer Company (TFC). Al Bayroni is affiliated with Saudi Basic Industries Corporation (SABIC) which is the second project participant.

Al Bayroni currently operates three packaged boilers supplied by Mitsubishi Heavy Industries (MHI). Steam from the boilers is utilized exclusively within Al Bayroni at the process plants.

The registered project activity reduced GHG emission through energy efficiency measure, thereby reducing the fuel consumption of two out of the three boilers. In this whole process, steam quality and production rates are maintained as per the pre-project scenario.

The project activity includes implementation of three things, viz; a new economizer, new modified super heater and by doing associated modifications in convection ducts.

The project activity applies methodology AM0056 - Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems Version 1.0. The assessment team confirms that the total emission reductions achieved under this monitoring period 01/10/2015 to 30/09/2017 (including both days) are 48,224tCO₂e.

The basic details of the project activity are mentioned below:

Project title	Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System
UNFCCC registration number	10006
Date of registration	17/07/2014
Sectoral scope	1- Energy industries (renewable - / non-renewable sources)
Methodology/ies applied	AM0056 - Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems Version 1.0
Project participant	Al Jubail Fertilizer Company (Al Bayroni) Saudi Basic Industries Corporation (SABIC)
Location of Project Activity	Kingdom of Saudi Arabia
Geographical coordinates	49° 33' 27.98" E and 27° 3' 54.64" N

Scope of verification

The scope of the verification was limited to the monitoring period covered under the current monitoring period 01/10/2015 to 30/09/2017 of the registered CDM PA "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" to determine whether;

- 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;
- The monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of CERs, verifiable, and in accordance with applicable CDM requirements;
- The actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, any revised approved monitoring plan, the approved methodology including applicable tool(s) and/or, where applicable, the approved standardized baseline;
- The data recorded and stored as per the monitoring methodology including applicable tool(s) and, where applicable, the standardized baseline.

Verification process

The verification process involved following;

- Contract with Saudi Basic Industries Corporation for the scope of verification;
- Publication of monitoring report
- Desk review
- Physical on-site inspection
- Issuance of verification findings

- Reporting, calculation checks, QA/QC and resolution of findings
- Issuance of draft verification report
- Independent technical review of the project documentation
- Issuance of the final verification report
- Submission of the request for issuance, as appropriate

Conclusion

ESPL has performed the verification of the CDM PA “Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System” having UNFCCC Ref. Number 10006 for the monitoring period 01/10/2015 to 30/09/2017. The verified emission reductions amount to 48,224 tCO₂e in the aforesaid monitoring period.

The verification concluded that the registered CDM PA complies with all relevant CDM procedures/standards/guidance and therefore request for issuance is being submitted in accordance with the CDM procedures.

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	IR	Kumar	Sanjeev	Central Office	Y	Y	Y	Y
2.	Observer	IR	Singh	Kaviraj	Central Office	N	Y	N	N
3.	Technical Expert	IR	Kumar	Sanjeev	Central Office	Y	Y	Y	Y
4.	Methodological Expert	IR	Kumar	Sanjeev	Central Office	Y	Y	Y	Y
5.	Verifier	IR	Mahala	Deepika	Central Office	Y	N	N	Y
6.	Trainee	IR	Agarwal	Spars	Central Office	Y	N	N	N
7.	Local Expert	IR	Ahmed	Pervaiz	Central Office	Y	N	N	N

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	IR	Gautam	Ashok	Central Office
2.	TE to TR	IR	Gautam	Ashok	Central Office
3.	Approver	IR	Mahawar	Abhishek	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.	Human error in recording the readings	Low	Recording of readings for most of the parameters is automated and electronic and there is limited human	Electronic records used for ER calculation to be checked with the source data available as plant records.

			intervention. Therefore, chances of possible human errors, in recording and archiving, are minimised.	
2.	Error in transferring the data to ER sheet	High	Transfer of data from source to ER calculation involve human intervention and might lead to some readings being copy and pasted inconsistently in the ER sheet from the source data.	The values reported in ER sheet to be checked with their respective source data. The first value, last value and the total of the columns for all parameters reported at the interval of 15 minutes was verified from the source data.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM VVS for PA Version 1.0 para 329 the prescribed thresholds for materiality for CDM PAs are as under;

Emission Reductions (tCO ₂ e)/year	500,000 or more	300,000 to 500,000	300,000 or less	Small Scale CDM PAs	Micro Scale CDM Pas
Materiality Threshold (para 329)	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 2% as project activity.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO ₂ e) in this monitoring period	102,928 tCO ₂ e	48,224 tCO ₂ e**
Applicable Threshold (%) as per para 329 of CDM VVS for PA Version 1.0	2%	2%

The verification team has identified the impact of errors observed and those were corrected by PP during verification for all monitoring parameter at individual level. The extrapolated impact on ERs is also provided for parameters individually and in aggregated manner in the end.

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total) RRR (100%)	Sample selected for verification XX(YY%)	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)
PPJ _{k,y} (System)	Every 15 minutes	70,176 (95 readings per day)	Please read the comment below*.	No error identified	No impact	No impact
PRESS _{PJ,MAX}	Every 15 minutes	70,176 (95 readings per day)	Please read the comment below*.	No error identified	No impact	No impact
TEMP _{PJ}	Every 15 minutes	70,176 (95 readings per day)	Please read the comment below*.	No error identified	No impact	No impact
FC _{i,j,y}	Every 15 minutes	70,176 (95 readings per day)	Please read the comment below*.	No error identified	No impact	No impact
NCV _{i,y}	Monthly	24	24	No error identified	No impact	No impact

EFCO2 _{i, y}	-	1	1	No error identified	No impact	No impact
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*These values are recorded automatically in the especially designed software at the interval of 15 minutes and copied and pasted in the ER sheet. The first and last values reported in the column of related ER sheet were cross checked from the originally recorded values. The total of all these values reported in that column was also cross verified from source values. This ensures that no error was made while the values were transferred from source to ER sheet.

**The value of all the parameters were found to be correct when checked with their evidences. However, incorrect formulas and factors applied in ER sheet lead to high value of achieved emission reductions. After DoE identified these error and calibration delay, CAR 05 and CAR 06 were raised. Response to these CAR with revised calculation has reduced the emission significantly than the public monitoring report.

Based on the above table it can be confirmed that the materiality threshold is not breached applicable for the registered PA as per CDM VVS for PA version 1.0.

SECTION D. Means of verification

D.1. Desk/document review

A desk review was conducted by the verification team that included

- A review of the data and information presented to verify its completeness;
- A review of the registered monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, 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;

A complete list of documents/evidences reviewed is included as Appendix 3.

D.2. On-site inspection

Duration of on-site inspection: 26/12/2017 to 27/12/2017				
No.	Activity performed on-site	Site location	Date	Team member
1	An assessment of the implementation and operation of the registered CDM project activity as per the registered PDD or any approved revised PDD;	Kingdom of Saudi Arabia	26/12/2017 to 27/12/2017	Sanjeev Kumar, Kaviraj Singh
2	A review of information flows for generating, aggregating and reporting the monitoring parameters;			Sanjeev Kumar, Kaviraj Singh
3	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the registered monitoring plan;			Sanjeev Kumar, Kaviraj Singh
4	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;			Sanjeev Kumar, Kaviraj Singh
5	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;			Sanjeev Kumar, Kaviraj Singh
6	A review of calculations and assumptions made in determining the GHG data and			Sanjeev Kumar, Kaviraj Singh

	emission reductions;			
7	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters;			Sanjeev Kumar, Kaviraj Singh

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Israfilof	Zaour	SABIC	26/12/2017 27/12/2017	ER calculation, implementation of PA, operation and maintenance, QA/QC procedures, monitoring of parameters	Sanjeev Kumar, Kaviraj Singh
2.	Shaffeulah	Azeem	Albayroni	26/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh
3.	Pandeya	Lokesh	Albayroni	27/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh
4.	Shahzad	Rizwan	Albayroni	26/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh
5.	Al-Abdulgada	Mohammad	SABIC	27/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh
6.	Abufayyah	Sami	Albayroni	26/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh
7.	Alnazi	Ali	Albayroni	27/12/2017	Operation and maintenance, QA/QC procedures	Sanjeev Kumar, Kaviraj Singh

D.4. Sampling approach

There is no sampling approach defined in the registered PDD.

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	-	CAR#04	-
Post-registration changes	-	CAR#04	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	CAR#01, CAR#02	-
Compliance of monitoring activities with the registered	-	-	-

monitoring plan			
Compliance with the calibration frequency requirements for measuring instruments	-	CAR#03, CAR#06	-
Assessment of data and calculation of emission reductions or net removals	CL#07	CAR#05, CAR#08	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	1	7	0

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The monitoring report form used is CDM-MR-FORM version 06/4/ which was the appropriate form and the latest version available at the time of verification. All the sections of the form were filled as per the guidelines and gave all the relevant details.
Findings	No findings.
Conclusion	The final monitoring report /5/ is found to be in compliance with the applicable latest monitoring report form and the instructions therein.

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

There is no FAR from validation or previous verification.

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

Means of verification	<p>This project involves the following modifications and installations to realize energy and GHG savings from the packaged boilers:</p> <ul style="list-style-type: none"> • New Economizer • New modified super-heater • Associated modifications in convection ducts. <p>The project activity is located in Jubail Industrial City of Eastern Province of Saudi Arabia. The geo-coordinates of the project activity were checked with hand held mobile device using android app (Get Geo coordinates) and were found comparable to the ones given in the registered PDD/7/.</p> <p>The verification team visited the two boilers and monitoring locations during the on-site inspection and found them operational and consistent with the registered PDD. The modification done as part of the project activity were found to be complete as observed on site and the completion of implementation status (of two boilers 2008U and 2008UA) was confirmed from the mechanical completion certificate /12/ dated 31/05/2013 issued by PP to Toyo Engineering Corporation. The aforesaid certificate indicated the completion date as 16/05/2013.</p> <p>A post registration change request was approved under PRC 10006-001 to remove the boiler 2052U from the registered PDD /7/ as it failed to comply with the methodological requirements with regards to input fuel restriction for auxiliary fuel. The verification team confirms that the project activity now includes the two boilers as part of the project description viz., 2008U and 2008UA.</p> <p>The shutdown schedules/13/ in the monitoring report were also checked with the plan log at the site to confirm the days when the plan has stayed non-operation (planned or unplanned).</p> <p>The verification team confirmed through interviews that the fuel used for the steam generation is 100% natural gas and does not contain any other constituent.</p> <p>The project activity is consistent with the description given in the registered PDD/7/. Interview of the personnel on-site reveals that all the QA/QC procedures listed in</p>
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	the registered PDD has been applied during operation of the project activity.
Findings	CAR#04 was raised and resolved.
Conclusion	<ul style="list-style-type: none"> In view of the information verified during the site visit, the verification team is able to confirm that all physical features (technology, project equipment, and monitoring and metering equipment) of the registered CDM project activity were in place and that the project participants have operated the project activity as per the registered PDD during the concerned monitoring period. The emission reductions achieved during the current monitoring period are 48,224 tCO₂e, which is less than the estimated quantity (132,196 tCO₂e) in the registered PDD for the comparable period.

E.4. Post-registration changes

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

Not applicable

E.4.2. Corrections

The following corrections/11/ were accepted by UNFCCC as a part of PRC with reference number 10006-001 on 05/07/2016:

1. Change in the Data Unit from "tons per hour and tons per year" to "Tonnes per year". The proposed change in Data Unit is in accordance with the applied methodology.
2. The GWP of the CH₄ was erroneously considered as 21 in the registered PDD. The PDD (version 8, dated 30/05/2016) includes GWP_{CH₄} as ex ante parameter and corrected the value under B.6.3 for ex ante estimates of leakage emissions.
3. Minor formatting changes were made in the registered PDD as a consequence of using the latest PDD template.

The following corrections/11/ were approved by UN under PRC-1006-002 on 09/03/2017:

1. Figure B.7.1 and B.7.2 in the PDD was changed to give the location of steam pressure monitoring equipment for both the boilers
2. Template was upgraded from version 6.0 to 8.0.

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

Not applicable

E.4.4. Inclusion of a monitoring plan

Not applicable

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

The following changes/11/ were accepted by UNFCCC as a part of PRC with reference number 10006-001 on 05/07/2016:

1. Change of monitoring frequency for parameters PP,J,k,y (System) and TEMPPJ in the registered monitoring plan from 'Hourly' to 'Every 15 minutes' in the PDD. The change is necessitated in order to ensure compliance with the prescribed monitoring frequency in the applied methodology.
2. Inclusion of additional monitoring parameters viz., NCV_{i,y}, FCI_{i,j,y} and EFCO_{2 i,y} under section B.7.1 of the PDD. The inclusion is necessitated to properly determine the project emissions as prescribed in the registered PDD (page 29, 30) and "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" Version 2 /10/.
3. Additional details for measurement methods has been included with regard to some parameters that are required to be monitored as per ASME PTC 4 Standard under Note 1 in the PDD. The changes made has been proposed as part of para 5(f) of Appendix 1 of CDM PS Version 9.0.

E.4.6. Changes to the project design

- Initially, modifications for energy efficiency improvement were applied on all the three boilers. However, for fulfilment of methodological requirements, one of the three boilers (2052-U) was removed from scope of project activity. It has been accepted by UNFCCC under PRC number PRC-10006-001 on 05/07/2016/11/.
- The estimated fuel savings from 9.7% to 20.18% based on data derived from real life operations was changed. The change has been approved by UNFCCC under PRC 10006-002 on 09/03/2017/11/.

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

Not Applicable

E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines

Means of verification	The monitoring plan as contained in the registered PDD /7/ was reviewed against the monitoring requirements of the applied methodology AM0056 version 1.0. Based on this review it was found the monitoring plan contained in the registered PDD includes all the required parameters to be monitored in the context of project design and description and allows proper determination of emission reductions in accordance with the registered PDD /7/ and applied methodology AM0056 version 1.0/9/.
Findings	No findings.
Conclusion	The monitoring plan outlined in the registered PDD/7/ is in accordance with the applied methodology /9/ and correctly applied by the registered CDM project activity.

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 values considered ex-ante for this monitoring period were cross-checked with registered PDD/7/ and their respective sources. The summary of all the ex-ante parameters has been given below:		
	Parameter	Value applied	MoV
	CAP	100-120 Tons/Hour for each boiler	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	Boiler load class, i and j	See appendix 5	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	System Load Class "K"	See appendix 5	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	FC _{BLi}	See appendix 5	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	PB _{Li}	See appendix 5	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	NCV _{FF, BL}	See appendix 5	The values were found to be consistent with registered PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	EF _{C,FF,BL}	0.056tCO ₂ e/GJ	The value is actually for

			CO ₂ (EF _{CO2,FF,BL}). Therefore, the factor-44/12 in section E.8.1 baseline emission calculation is not required. The uses value was found to be consistent with the source according to registered PDD i.e. IPCC National Greenhouse Gas Inventory/25/. It has been consistently reported and used in ER sheet/06/ as well.
	OXID _{FF,BL}	1	The uses value was found to be consistent with the source according to registered PDD i.e. IPCC National Greenhouse Gas Inventory/25/. It has been consistently reported and used in ER sheet/06/ as well.
	PRESS _{BL,MIN}	3.1 bar	The values used was found to be consistent with the tests results for pressure of the generated steam/28/. It has been consistently reported and used in ER sheet/06/ as well.
	PRESS _{BL,MAX}	38.3 bar	The values used was found to be consistent with the tests results for pressure of the generated steam/28/. It has been consistently reported and used in ER sheet/06/ as well.
	TEMP _{BLMIN}	571.1 K	The values used was found to be consistent with the tests results for temperature of the generated steam /30/. It has been consistently reported and used in ER sheet/06/ as well.
	TEMP _{BLMAX}	671.9 K	The values used was found to be consistent with the tests results for temperature of the generated steam /30/. It has been consistently reported and used in ER sheet/06/ as well.
	GWP _{CH4}	25	It was found to be consistent with the IPCC values used for second commitment period. It has been consistently reported and used in ER sheet/06/ as well.
Findings	CAR#01 was raised and resolved.		
Conclusion	The value in the monitoring report /05/ and corresponding emission reduction calculations spreadsheet /06/ are consistent with the registered PDD /7/. The applied value is correct and justified.		

E.6.2. Data and parameters monitored

E.6.2.1. Generated steam in the monitoring period (01/10/2015 to 30/09/2017) subdivided into load classes in the case of single boiler installations, P_{PJ,i,y}, t/yr

Means of verification	The project activity has two boilers. Therefore, this parameter is not applicable.
Findings	None
Conclusion	Not applicable

E.6.2.2. Generated steam in the monitoring period (01/10/2015 to 30/09/2017) subdivided into load classes in the case of multi boiler installations, PPJ,k,y, t/yr

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is measured continuously and recorded every 15 minutes in an online PIMS (Process Integrated Management System) server data stamping.

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The registered monitoring plan /7/ required this parameter to be monitored every 15 minutes. This measuring and recording frequency is in line with the registered monitoring plan/7/ and applied methodology/9/.						
	Monitoring equipment	<p>The parameter is monitored using a D/P Transmitter of Rosemount make with the following tag numbers:</p> <table border="1"> <thead> <tr> <th>Boiler ID</th><th>Tag # of equipment</th></tr> </thead> <tbody> <tr> <td>2008 U</td><td>FT 2506</td></tr> <tr> <td>2008 UA</td><td>FT 2606</td></tr> </tbody> </table> <p>The accuracy class of both the equipment is $\pm 1\%$ of Full Scale as verified from calibration certificate/14,17/.</p>	Boiler ID	Tag # of equipment	2008 U	FT 2506	2008 UA	FT 2606
	Boiler ID	Tag # of equipment						
	2008 U	FT 2506						
	2008 UA	FT 2606						
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes						
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range						
Calibration frequency /interval:	Calibration frequency is every years which has been verified using calibration certificates/14,17/. Delay in calibration was observed. The Assessment of delay has been reported under section E.7							
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes							
Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/14,17/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.							

	Is(are) calibration(s) valid for the whole reporting period?	Delay in calibration was observed. The Assessment of delay has been reported under section E.7								
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes								
	How were the values in the monitoring report verified?	<p>The applied values inline to monitoring frequency as reported in MR and ER sheet has been verified with the plant records maintained onsite/27/. Values were found to be consistent and has been consistently used for calculation as well.</p> <p>The total sum for steam generation within load classes for both the boilers is as follows:</p> <table border="1"> <thead> <tr> <th>Boiler number</th> <th>Steam generation (tons)</th> </tr> </thead> <tbody> <tr> <td>2008U</td> <td>848,029.86 tons</td> </tr> <tr> <td>2008 UA</td> <td>550,072.48 tons</td> </tr> <tr> <td>Total</td> <td>1,398,102.33 tons</td> </tr> </tbody> </table>	Boiler number	Steam generation (tons)	2008U	848,029.86 tons	2008 UA	550,072.48 tons	Total	1,398,102.33 tons
	Boiler number	Steam generation (tons)								
	2008U	848,029.86 tons								
	2008 UA	550,072.48 tons								
Total	1,398,102.33 tons									
If applicable, has the reported data been cross-checked with other available data?	Not applicable									
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.									
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.									
Findings	CAR#02 was raised and resolved.									
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:</p> <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed by PP for monitoring which is appropriate for the project activity. <p>This is in compliance with para 364 of VVS for PA Version 1.0.</p>									

E.6.2.3. Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system, in t CH₄ per GJ fuel supplied to final consumers, EF_{PJ,upstream,CH₄} , t CH₄/GJ Fuel

Means of verification	It is out of scope for this project activity as per registered monitoring plan/07/. Therefore, this parameter is not applicable.
Findings	None
Conclusion	Not applicable

E.6.2.4. Emission factor for upstream fugitive methane emissions of fossil fuel used in the baseline equipment from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system, in t CH₄ per GJ fuel supplied to final consumers, $EF_{BL,upstream,CH_4}$, t CH₄/GJ Fuel

Means of verification	It is out of scope for this project activity as per registered monitoring plan/07/. Therefore, this parameter is not applicable.
Findings	None
Conclusion	Not applicable

E.6.2.5. Emission factor for upstream CO₂ emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, regasification and compression of LNG into a natural gas transmission or distribution system, $EF_{CO_2,upstream,LNG}$, tCO₂/GJ Fuel

Means of verification	It is out of scope for this project activity as per registered monitoring plan/07/. Therefore, this parameter is not applicable.
Findings	None
Conclusion	Not applicable

E.6.2.6. Pressure of the generated steam, $PRESS_{PJ}$, bar

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is measured cautiously and recorded every 15 minutes in an online PIMS (Process Integrated Management System) server data stamping.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Pressure of the generated steam, following registered PDD/7/, shall be monitored and recorded every 15 minutes. During onsite verification it was verified that the pressure is being monitored and recorded every 15 minutes.
	Monitoring equipment	The parameter is monitored using D/P transmitter of FOXBRO make with tag number PT-2513 for boiler 2008 U and Rosemont make PT-2613 for boiler 2008 UA. The accuracy for both is $\pm 1\%$ as verified by their calibration certificates /18, 30/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy class of the pressure monitoring device is $\pm 1\%$ which was verified from the calibration certificate and found correct. There is no accuracy class defined in the registered PDD so $\pm 1\%$ was found acceptable as a general industrial norm for best practices.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The reported accuracy class was found applicable to the entire monitoring range.
	Calibration frequency /interval:	Annually. Delay in calibration was observed. The Assessment of delay has been reported under section E.7.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the	Yes.

	frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/18, 30/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Delay in calibration was observed. The Assessment of delay has been reported under section E.7.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	Values in the monitoring report were verified using the test result records on site/28/. The information was found to be consistently reported and used in ER sheet. Since the verified values are multiple in number owing to the monitoring frequency, they have not been reported in VCR and MR. However, values reported in ER sheet stands verified.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	CAR#02 was raised and resolved.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:.</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures has been applied in accordance with the registered monitoring plan. No sampling approach has been followed by PP for monitoring which is appropriate for the project activity. <p>This complies with para 364 of VVS for PA Version 1.0.</p>	

E.6.2.7 Temperature of the generated steam, TEMP_{PJ}, K

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Every 15 minutes.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes /	Temperature of the generated steam, following registered PDD/7/, shall be monitored and recorded every 15 minutes. During onsite verification it was verified that

	No)	the pressure is being monitored and recorded every 15 minutes.
	Monitoring equipment	The parameter has been monitored using thermocouple (K-type) with tag numbers TI 2520-1 for boiler 2008 U. For boiler 2008 UA monitoring has been done by equipment with tag numbers TI 2620-1. Accuracy class for both the equipment is $\pm 1.2^{\circ}\text{C}$ as verified by calibration certificates/15, 19/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes
	Calibration frequency /interval:	Annually. Delay in calibration was observed. The Assessment of delay has been reported under section E.7.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/15, 19/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is not valid for entire monitoring period. Refer to section E.7 for details.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	The values for this parameter was verified using the plant records/29/. Owing to the monitoring frequency of 15 minutes, this parameter has multiple values, thus it has not been reported in verification report. The values reported in ER sheet has been checked for consistency as mentioned

		above.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	CAR#02 was raised and resolved.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 369 of VVS for PA Version 1.0. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 364 of VVS for PA Version 1.0.</p>	

E.6.2.8. Quantity of natural gas combusted in two years, FC_{i,j,y} , m3/yr

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuously on hourly basis as per the registered PDD/7/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	The parameter is monitored using Coriolis Mass Flow Meter of Emerson make with a tag number FT 2509A for boiler 2008 U and tag number FT 2609A for boiler 2008 UA. The accuracy class for both the equipment is $\pm 1\%$.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes
	Calibration frequency /interval:	Annually. Delay in calibration was observed. The Assessment of delay has been reported under section E.7.

	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/15, 19/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is not valid for entire monitoring period. Refer to section E.7 for details.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	A value of 111,759,215.95 Nm ³ has been verified using plant log. The value was found to be consistently reported and used in calculation of emission reduction.
	If applicable, has the reported data been cross-checked with other available data?	The value has been cross checked and compared with the invoices/21/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	No findings.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 364 of VVS for PA Version 1.0.</p>	

E.6.2.9. Weighted Average Net Calorific Value of Fossil Fuel Used, NCV_{i,y}, GJ/m³

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Monthly as per the registered PDD/7/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

	Monitoring equipment	Not applicable
	How were the values in the monitoring report verified?	The value of 0.039112904 GJ/m ³ was verified from the monthly invoices issued by natural gas supplier (Saudi ARAMCO)/21/. The value is reported and used for ER calculation consistently.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	No findings	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 364 of VVS for PA Version 1.0.</p>	

E.6.2.10 Weighted average CO₂ emission factor of natural gas in year y, EFCO₂ _{i, y}, tCO₂/GJ

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Annually as per the registered PDD/7/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	Not applicable.
	How were the values in the monitoring report verified?	Value of 0.056 tCO ₂ /GJ has been verified from the source of information, i.e. IPCC Guidelines on National GHG Inventories/25/. Values was found to be consistently reported and used for ER calculation.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	No findings	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that:</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. 	

	<ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 364 of VVS for PA Version 1.0.</p>
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E.6.3. Implementation of sampling plan

Means of verification	No sampling plan has been applied by PP.
Findings	None
Conclusion	Not applicable

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

Means of verification	Calibration of equipment for boiler 2008 U according to the parameters monitored by them is as given below:					
	Parameter	Equipment Tag #	Calibration date	Accuracy	Validity	Monitoring period covered?
	FC i,j,y	FT 2509 A	06/04/2015 31/03/2016 28/12/2017	±1% of full scale	1 years	N
	PPJ,k,y	FT 2506	02/04/2013 24/02/2016 28/12/2017	±1% of full scale	1 years	N
	TEMPPJ	TI 2520-1	01/11/2015 26/10/2017	±1.2°C	1 year	N
	PRESSPJ	PT 2513	01/07/2014 30/06/2015 04/07/2017	±1%	1 year	N
	Calibration of equipment for boiler 2008 UA according to the parameters monitored by them is as given below:					
	Parameter	Equipment Tag #	Calibration date	Accuracy	Validity	Monitoring period covered?
	FC i,j,y	FT 2609 A	06/04/2015 31/03/2016 28/12/2017	±1% of full scale	1 years	N
	PPJ,k,y	FT 2606	02/04/2013 25/02/2016 28/12/2017	±1% of full scale	1 years	N
	TEMPPJ	TE 2620-1	21/10/2015 08/10/2017	±1.2°C	1 year	N
	PRESSPJ	PT 2613	09/07/2014 06/07/2015 13/07/2017	±1%	1 year	N
	All the dates and accuracy class stated were checked with the calibration certificates/14-20/ of the respective equipment. Delay in calibration was observed for all the equipment listed above. Error factor equal to the accuracy class has been applied to all the values which were obtained during the period when calibration was missed. The approach was found to be in line with the project standard. Thus, the verification team accepted the final values of ERs obtained after applying error factors.					
Findings	CAR#03 and CAR#06 was raised and resolved.					
Conclusion	The verification identified delay in calibration for all the equipment. The correction factors have been applied conservatively.					

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>Baseline emission estimation has been done in accordance with registered monitoring plan/07/ and applied methodology/09/. The equation used is as follows:</p> $BE_y = 44/12 * EF_{C,FF,BL} * OXID_{FF,BL} * SEC_{syst}$ <p>Where:</p> <table border="1"> <tr> <td>BE_y</td><td>Baseline emissions resulting from steam generation within the capacity of the baseline equipment in the monitoring period (tCO₂/yr)</td></tr> <tr> <td>SEC_{syst}</td><td>Specific energy consumption (GJ/t) of the multi boiler steam generation system</td></tr> <tr> <td>$EF_{C,FF,BL}$</td><td>Carbon emission factor of baseline fossil fuel (tC/GJ)</td></tr> <tr> <td>$OXID_{FF,BL}$</td><td>Oxidation factor of baseline fossil fuel</td></tr> <tr> <td>44/12</td><td>Ratio of the molecular weight of CO₂ to the molecular weight of carbon</td></tr> </table> <p>The value of the parameters listed above have been verified under section E.6.1. and E.6.2. Equation was found to be correctly applied in the ER sheet/6/. The final calculated value of baseline emission is 293,013 tCO₂e.</p>	BE_y	Baseline emissions resulting from steam generation within the capacity of the baseline equipment in the monitoring period (tCO ₂ /yr)	SEC_{syst}	Specific energy consumption (GJ/t) of the multi boiler steam generation system	$EF_{C,FF,BL}$	Carbon emission factor of baseline fossil fuel (tC/GJ)	$OXID_{FF,BL}$	Oxidation factor of baseline fossil fuel	44/12	Ratio of the molecular weight of CO ₂ to the molecular weight of carbon
BE_y	Baseline emissions resulting from steam generation within the capacity of the baseline equipment in the monitoring period (tCO ₂ /yr)										
SEC_{syst}	Specific energy consumption (GJ/t) of the multi boiler steam generation system										
$EF_{C,FF,BL}$	Carbon emission factor of baseline fossil fuel (tC/GJ)										
$OXID_{FF,BL}$	Oxidation factor of baseline fossil fuel										
44/12	Ratio of the molecular weight of CO ₂ to the molecular weight of carbon										
Findings	CAR#05 and CAR#08 were raised and resolved.										
Conclusion	<p>Calculation of baseline GHG emissions was found to be satisfactory. The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the registered PDD, with the relevant supportings and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>										

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

Means of verification	<p>Project emission estimation has been done in accordance with registered monitoring plan/01/, applied methodology/05/ and tool/06, 09/. The equation used is as follows:</p> $PE_{FC,JY} = \sum FC_{i,J} \times COEF_{i,Y}$ <p>Where:</p> <table border="1"> <tr> <td>$PE_{FC,JY}$</td><td>Are the CO₂ emissions from fossil fuel combustion in process j during the year 'y' (tCO₂/year)</td></tr> <tr> <td>$\sum FC_{i,J}$</td><td>Is the quantity of fuel type 'i' combusted in process 'j' during the year y (Mass or Volume Unit/year)</td></tr> <tr> <td>$COEF_{i,Y}$</td><td>Is the CO₂ emission coefficient of fuel type 'i' in year 'y' (tCO₂/mass or volume unit)</td></tr> <tr> <td>I</td><td>All the fuel types</td></tr> </table> <p>The value of the parameters listed above have been verified under section E.6.1. and E.6.2. Equations were found to be correctly applied in the ER sheet/6/. The final calculated value of project emission is 244,789 tCO₂e.</p>	$PE_{FC,JY}$	Are the CO ₂ emissions from fossil fuel combustion in process j during the year 'y' (tCO ₂ /year)	$\sum FC_{i,J}$	Is the quantity of fuel type 'i' combusted in process 'j' during the year y (Mass or Volume Unit/year)	$COEF_{i,Y}$	Is the CO ₂ emission coefficient of fuel type 'i' in year 'y' (tCO ₂ /mass or volume unit)	I	All the fuel types
$PE_{FC,JY}$	Are the CO ₂ emissions from fossil fuel combustion in process j during the year 'y' (tCO ₂ /year)								
$\sum FC_{i,J}$	Is the quantity of fuel type 'i' combusted in process 'j' during the year y (Mass or Volume Unit/year)								
$COEF_{i,Y}$	Is the CO ₂ emission coefficient of fuel type 'i' in year 'y' (tCO ₂ /mass or volume unit)								
I	All the fuel types								
Findings	No findings.								
Conclusion	<p>Calculation of project GHG emissions was found to be satisfactory. The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the registered</p>								

	<p>PDD, with the relevant supporting and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>
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E.8.3. Calculation of leakage GHG emissions

Means of verification	<p>Leakage emission estimation has been done in accordance with registered monitoring plan/01/, applied methodology/05/ and tool/06, 09/. The equation used is as follows:</p> $LE_{CH_4,Y} = (FC_{PJ,Y} * NCV_{PJ,Y} * EF_{PJ,upstream,CH_4} - FC_{BL,Y} * EF_{BL,upstream,CH_4}) * GWP_{CH_4}$ <p>Where:</p> <table border="1"> <tr> <td>$FC_{PJ,Y}$</td><td>Quantity of fossil fuel combusted in the project plant during the monitoring period</td></tr> <tr> <td>$NCV_{PJ,Y}$</td><td>Average net calorific value of the fossil fuel combusted during the monitoring period</td></tr> <tr> <td>$EF_{PJ,upstream,CH_4}$</td><td>Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system</td></tr> <tr> <td>$FC_{BL,Y}$</td><td>Fossil fuel that would have been combusted in the absence of the project activity during the monitoring period</td></tr> <tr> <td>GWP_{CH_4}</td><td>Global warming potential of methane valid for the relevant commitment period.</td></tr> </table> <p>The value of the parameters listed above have been verified under section E.6.1. and E.6.2. No potential new sources of leakage were identified onsite. Equations were found to be correctly applied in the ER sheet/6/. The final calculated value of leakage emission is -6373 tCO₂e. As per the applied methodology/9/, If $LE_y < 0$, then the value can be considered as 0.</p>	$FC_{PJ,Y}$	Quantity of fossil fuel combusted in the project plant during the monitoring period	$NCV_{PJ,Y}$	Average net calorific value of the fossil fuel combusted during the monitoring period	$EF_{PJ,upstream,CH_4}$	Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system	$FC_{BL,Y}$	Fossil fuel that would have been combusted in the absence of the project activity during the monitoring period	GWP_{CH_4}	Global warming potential of methane valid for the relevant commitment period.
$FC_{PJ,Y}$	Quantity of fossil fuel combusted in the project plant during the monitoring period										
$NCV_{PJ,Y}$	Average net calorific value of the fossil fuel combusted during the monitoring period										
$EF_{PJ,upstream,CH_4}$	Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system										
$FC_{BL,Y}$	Fossil fuel that would have been combusted in the absence of the project activity during the monitoring period										
GWP_{CH_4}	Global warming potential of methane valid for the relevant commitment period.										
Findings	CL#07 was raised and resolved.										
Conclusion	<p>Calculation of project GHG emissions was found to be satisfactory.</p> <p>The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the registered PDD, with the relevant supportings and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>										

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

Means of verification	<p>As elaborated above, the emission reductions from the project activity were based on baseline, project and leakage emissions only. The calculations presented in this regard in the final monitoring report and corresponding ER calculation sheet were found appropriate and complying with the provisions prescribed in the registered monitoring plan of registered PDD/7/ and applied methodology.</p> <p>The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.</p>
Findings	No findings.
Conclusion	The verification team confirms that appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project GHG

	emissions or actual net GHG removals and leakage GHG emissions have been followed; The assumptions, emission factors and default values that were applied in the calculations have been justified
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E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	Actual emission reduction is lower than the emission reductions for the considered monitoring period as per estimates in the registered PDD/7/. The actual emission reductions claimed to be achieved in the MR i.e., 48,224 tCO ₂ e is whereas, estimated ERs in the registered PDD is 132,196 tCO ₂ e. Lower emission reduction has been achieved because the project activity did not operate in specific system load range many of the times and calorific value of fuel is lesser than that of baseline fuel.
Findings	No findings
Conclusion	There is no increase in emission reductions during this monitoring period.

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

Means of verification	Post PRC, the ex-ante estimates are greater than the achieved emission reductions, thus no further scrutiny has been done.
Findings	No findings
Conclusion	Achieved ERs are lesser than ex-ante estimates as per registered PDD/7/.

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	<p>Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in Kingdom of Saudi Arabia for the monitoring period 01/10/2015 to 30/09/2017 (including both days) amount to 48,224 tCO₂e.</p> <p>Verified and certified emission reductions as per commitment period:</p> <table> <tr> <th>Commitment period</th><th>Amount</th></tr> <tr> <td>Upto 31/12/2012 (1st commitment period)</td><td>0 tCO₂e</td></tr> <tr> <td>From 01/01/2013</td><td>48,224 tCO₂e</td></tr> </table>	Commitment period	Amount	Upto 31/12/2012 (1st commitment period)	0 tCO ₂ e	From 01/01/2013	48,224 tCO ₂ e
Commitment period	Amount						
Upto 31/12/2012 (1st commitment period)	0 tCO ₂ e						
From 01/01/2013	48,224 tCO ₂ e						
Findings	No findings.						
Conclusion	Actual GHG emission reductions in the commitment period (01/01/2013 onwards) were found to be 48,224 tCO ₂ e						

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

Means of verification	The PP has not monitored any sustainable co-benefits.
Findings	Not applicable.
Conclusion	Not applicable.

E.10. Global stakeholder consultation

Means of verification	This is not the first monitoring period.
Findings	Not applicable.
Conclusion	Not Applicable.

SECTION F. Internal quality control

The draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized on behalf of Earthood Services Private Limited

SECTION G. Verification opinion

Earthood Services Private Limited (Earthood), contracted by Saudi Basic Industries Corporation (SABIC), has performed the independent verification of the emission reductions for the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in Kingdom of Saudi Arabia for the monitoring period 01/10/2015 to 30/09/2017 (including both days) as reported in the Monitoring Report (public) Version 1 dated 20/11/2017. The Al Jubail Fertilizer Company (Al Bayroni) is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology AM0056 Version 1.0, the monitoring plan contained in the PDD Version 10.1 dated 08/11/2016, Monitoring Report (public) Version 1 dated 20/11/2017.

Earthood's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

The verification team confirms that the project activity was found completely implemented as per the description given in the registered PDD and the actual operation conforms to the description in the registered PDD.

SECTION H. Certification statement

Earthood Services Private Limited (Earthood), contracted by Saudi Basic Industries Corporation (SABIC), has performed the independent verification of the emission reductions for the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in Kingdom of Saudi Arabia for the monitoring period 01/10/2015 to 30/09/2017 (including both days) as reported in the Monitoring Report (Final) Version 3.1, dated 19/02/2018. The Al Jubail Fertilizer Company (Al Bayroni) is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology AM0056 Version 1.0, the monitoring plan contained in the PDD Version 10.1 dated 08/11/2016, Monitoring Report (public) Version 1 dated 20/11/2017 as per the methodology described under Section D of this report.

Earthood's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 01/10/2015 to 30/09/2017 (including both days) are fairly stated in the Monitoring Report (final) 3.1, dated 19/02/2018. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AM0056 Version 1.0 and the monitoring plan contained in the PDD Version 10.1 dated 08/11/2016.

Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in India during the period 01/10/2015 to 30/09/2017 (including both days) amount to 48,224 tCO₂e.

Verified and certified emission reductions as per commitment period:

Commitment period	Amount
Upto 31/12/2012 (1 st commitment period)	Not Applicable/Nil
From 01/01/2013 onwards	48,224 tCO ₂ e

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
AM	Approved Methodology
AMS	Approved Methodology for SSC Projects
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CH ₄	Methane
CL	Clarification Request
CM	Combined Margin
CME	Coordinating/Managing Entity
CO ₂	Carbon di oxide
CP	Crediting Period
CPA DD	Component Project Activity Design Document
DNA	Designated National Authority
DR	Desk Review
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact Assessment
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Green House Gas
GSC/GSP	Global Stakeholder Consultation Process
GW	Giga Watt
GWh	Giga Watt hour
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
kW	kilo Watt
kWh	kilo Watt hour
LoA	Letter of Approval/Authorization
LSC	Local Stakeholder Consultation Process
MoC	Modalities of Communication
MoV	Means of Validation
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
N ₂ O	Nitrous Oxide
OM	Operating Margin
PCP	Project Cycle Procedure
PDD	Project Design Document
PE	Project Emission
PLF	Plant Load Factor
PoA DD	Programme of Activities Design Document
PP	Project Participant
PS	Project Standard
RFR	Request for Registration
SABIC	Saudi Basic Industries Corporation
tCO ₂ e	Tonnes of Carbon di oxide equivalent
TPH	Tonnes Per Hour

UNFCCC	United Nations Framework Convention on Climate Change
V	Version
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Sanjeev Kumar		
Country	India		
Education	B. Tech. (Chemical Engineering) M.Tech. (Energy Management)		
Experience	13 years		
Field	Climate Change, Environment, Energy		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	YES (AMD ID, ACM0002, ACM0006, AMS.ID, AMS.IF, AMS.IC, AMS.IA, ACM004, AM0009, AMS.IID, AMS.IIE, ACM0004, ACM0009, ACM0012, AM0008, ACM0001, AM0013, AM0025, AMS.IIIH, AM0056)		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	Date	03/02/2018
Approved by	Ashok Kumar Gautam	Date	03/02/2018

Competence Statement			
Name	Deepika Mahala		
Country	India		
Education	M. Sc. (Environmental Mgmt), GGSIP University B.Sc. Honour (Chemistry), Sri Venkateshwar College, DU		
Experience	1.5 Years		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	ACM0002, AMS.I.D., AMS.I.A, AMS.III.AV, AMS.II.G		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Abhishek Mahawar	Date	20/07/2017
Approved by	Ashok Kumar Gautam	Date	20/07/2017

Competence Statement			
Name	Kaviraj Singh		
Country	India		
Education	Ph.D. (Environmental Engineering), IIT Delhi Masters (Energy & Environmental), DAVV Indore		
Experience	8 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-II.D., ACM0006, AMS-I.A., AMS-I.C., AMS-II.B., AMS-III.H, ACM0002, ACM0001		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 13.1, TA 13.2)		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Ashok Gautam	Date	08/09/2016

Competence Statement			
Name	Parvaiz Ahmad		
Country	Saudi Arabia		
Education	M.Sc Environmental Botany		
Experience	1 Year		
Field	Environment		
Approved Roles			
Team Leader	No		
Validator	No		
Verifier	No		
Methodology Expert	No		
Local expert	Saudi Arabia		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	No		
Reviewed by	Abhishek Mahawar	Date	17/01/2018
Approved by	Ashok Kumar Gautam	Date	17/01/2018

Competence Statement	
Name	Ashok Gautam
Country	India
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)
Experience	15 Years +
Field	Energy, Climate Change & Environment
Approved Roles	

Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C. AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.AV., ACM0002, ACM0004, ACM0006, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Kaviraj Singh	Date	08/09/2016

Competence Statement			
Name	Sparsh Agarwal		
Country	India		
Education	M.Tech (Environmental Engineering and Management), IIT Delhi		
Experience	3 months		
Field	Environmental Engineering & Climate Change		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	NO		
Trainee	YES (Validator/ Verifier)		
Reviewed by	Abhishek Mahawar	Date	04/12/2017
Approved by	Ashok Kumar Gautam	Date	04/12/2017

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UNFCCC	Standard: CDM PS for PA	Ver. 1.0	Others
2.	UNFCCC	Standard: CDM PCP for PA	Ver. 1.0	Others
3.	UNFCCC	Standard: CDM VVS for PA	Ver. 1.0	Others
4.	UNFCCC	Form: CDM-MR-FORM	Ver. 06	Others
5.	PP	Monitoring Report (Publication) Monitoring Report (Final)	Ver 01, 20/11/2017 Version 3.1 dated 19/02/2018	PP
6.	PP	ER Spreadsheet (final)	Corresponding to final MR	PP
7.	PP	Registered PDD	Version 10.1, 08/11/2016	Others
8.	SGS UK Ltd.	Validation Report	Version 03, 14/07/2014	Others

9.	UNFCCC	Methodology: AM0056, Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems	Ver. 1.0	Others
10.	UNFCCC	Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion	Version 02	Others
11.	Earthood Services Private Limited	PRC Validation Opinion (PRC10006-001) PRC validation opinion(PRC10006-002)	Version 3.0 dated 31/05/2016 Version 4.0, dated 08/12/2016	Others
12.	PP	Plant mechanical completion certificate for boiler Ammonia Plant & Boilers 2008 U/UA	Version 0, dated 31/05/2013	PP
13.	PP	Shutdown schedules.	01/10/2015-30/09/2017	PP
14.	Al-Jubail Fertilizer Company	Flow meter transmitter calibration report for FT-2506	02/04/2013 24/02/2016 28/12/2017	PP
15.	SABIC	Loop test report for Thermocouple TI 2520-1	01/11/2015 26/10/2017	PP
16.	Various	Test reports for FT-2509A: Calibration and testing report	06/04/2015 31/03/2016 28/12/2017	PP
17.	Al-Jubail Fertilizer Company	Transmitter calibration report for flow meter FT-2606	02/04/2013 25/02/2016 28/12/2017	PP
18.	Al-Jubail Fertilizer Company	Transmitter Calibration certificate for PT-2513 Transmitter calibration report for PT-2613	01/07/2014 30/06/2015 04/07/2017 09/07/2014 06/07/2015 13/07/2017	PP
19.	Al-Jubail Fertilizer Company	Calibration report for Thermocouple TI 2620-1	21/10/2015 08/10/2017	PP
20.	Emerson process management	Calibration certificate for transmitter FT-2609A	06/04/2015 31/03/2016 28/12/2017	PP
21.	Saudi Aramco	Invoice issued for supply of fuel gas	-	
22.	DNV Business Assurance	ISO 14001:2008 and ISO 14001:2004 certificate issued to SABIC	Start date 14/02/2012	PP
23.	BSI	Certificate of registration for ISO 9001:2008	Effective start date 01/05/2015	PP
24.	UNFCCC	Webpage for project activity. http://cdm.unfccc.int/Projects/DB/SGS-UKL1405604803.71/view	Last access date 22/01/2018	Others
25.	IPCC	National Greenhouse Gas Inventory	2006	PP
26.	UNFCCC	CDM-MR-FORM	Version 06	Others
27.	PP	Plant records for the monitoring parameters	-	PP
28.	PP	Test results for Pressure of the steam	-	PP
29.	PP	Plant records for the monitoring parameters	-	PP
30.	PP	Test results for Pressure of the steam	-	PP

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

Table 1.

There is no FAR from the previous validation or verification.

Table2. There is no CL from this verification.

CL ID	7	Section No.	E.8.3.	Date : 29/01/2018
Description of CL				
In the ER sheet it was found that the final value of leakage emissions obtained after applying the exact formula from methodology has been multiplied by '-1'. PP is requested to explain why it has been multiplied and how the same is in line with the applied methodology.				
Project participant response				Date : 30/01/2018
Due to misunderstanding of the methodology the PP assumed that carbon leakages have to be positive and subtracted from overall GHG savings. The methodology AM056 (page 11) states that where net leakage effects are negative, PP should assume them to be "= 0". The PP therefore corrected this in the new MR and ER.				
Documentation provided by project participant				
MR v3 and ER v3				
DOE assessment				Date: 31/01/2018
The final value of leakage emissions obtained from the ER calculation sheet is a negative value. The PP has considered is 0. The approach was found to be in line with the applied methodology page 11.				
Thus, the CAR stands closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.6.1.	Date : 29/12/2017
Description of CAR				
Monitoring report version 01 doesn't provide the following required information;				
<ol style="list-style-type: none"> 1. The reported ex-ante and exposed parameters in section D.1 and D.2 respectively, are not in line with the PDD since some of the parameters are missing. 2. The value of parameter TEMP_{BLMIN} reported in MR (571.7K) is inconsistent with the PDD V10.1. 				
Project participant response				Date : 31/12/2017
Parameters and value have been corrected and reported in Monitoring report version 02				
Documentation provided by project participant				
Monitoring report version 2				
DOE assessment				Date: 19/01/2018
<ol style="list-style-type: none"> 1. Parameter GWP has been added to Ex-ante parameters list and Parameter FC_{ij,y}, EF_{PJ,upstream,CH4} and EF_{BL,upstream,CH4} have been added to the revised monitoring report. The ex-ante parameter value was found to be inline to the registered PDD and the ex-post monitored parameters added were found to be monitored as the registered monitoring plan. (Closed). 2. The values of all parameters have been corrected and made in line with the registered PDD. 				
Thus, the CAR stands closed.				

CAR ID	02	Section no.	E.6.2.	Date : 29/12/2017
Description of CAR				
Monitored parameter MR version 1, section D.2 is not consistent with the registered PDD for the monitoring frequencies of the parameters (PPJ,k,y (System), PRESS _{PJ} and TEMPP _J)				
Monitored parameter MR version 1, section D.2 is not consistent with the ER sheet for the values of the parameters (P _{PJ,k,y} (System), PRESS _{PJ} and TEMPP _J).				
Project participant response				Date : 31/12/2017
Parameters and value have been corrected and reported in Monitoring report version 02				
Documentation provided by project participant				
Monitoring report version 2				
DOE assessment				Date: 19/01/2018
The monitoring frequencies have been stated as every 15 min which is in line with the registered monitoring plan.				
The ER sheet has also been revised and values applied in the sheet were found to be consistent with the monitoring report and actual monitored data.				
Thus, the CAR stands closed.				

CAR ID	03	Section no.	E.6.2. and E.7.	Date : 29/12/2017
Description of CAR				
<ol style="list-style-type: none"> The information provided in monitoring report version 01 for the monitoring equipment (Quantity of natural gas combusted, Generated steam, Temperature and Pressure of Steam) of all the monitoring parameters for both the boilers (tag numbers; 2008U & 2008UA) is inconsistent with the original records verified on site; <ol style="list-style-type: none"> Tag number Serial number Make Model Accuracy class Range In MR version 1.0, also doesn't provide the following information about calibrations; <ol style="list-style-type: none"> Calibration dates Validity Calibration Frequency 				
Project participant response				Date : 31/12/2017
<ol style="list-style-type: none"> The information for monitoring equipment in MR version 2 is now consistent with original records verified on site. Information about calibration is now provided in MR version 2 (section D.2. and appendixes) 				
Documentation provided by project participant				
Monitoring report version 2 and its appendixes.				
DOE assessment				Date: 19/01/2018
<ol style="list-style-type: none"> Information related to monitoring equipment have been added to the revised monitoring report, appendix 4. All the information related to calibration details of 2008 U and 2008 UA have added under section appendix 4 of the revised monitoring report. Delay was observed for all equipment. However, error factor has been applied to the period when delay in calibration has happened. Thus, the delay has been corrected in line with the project standard. <p>Thus, the CAR stands closed</p>				

Table 1. CAR from this verification

CAR ID	04	Section no.	E.3. and E.4.	Date : 29/12/2017
Description of CAR				
In MR version 1.0, doesn't provide the following information, as required by MR completion guidance,				
<ol style="list-style-type: none"> Section B.2: Corrections that have been approved by the Board as applicable from the period prior to this monitoring period shall be listed(brief summary) provide the UN approval dates and reference numbers of the post-registration changes. Also, MR mentions detailed diagram about boiler 3 which has been removed before the conclusion of last verification. 				
Project participant response				Date : 31/12/2017
Corrections, UNFCCC Executive Board approval dates and ref numbers are now provide in sections B.2.2 to B.2.6. Boiler 3 has been removed from MR.				
Documentation provided by project participant				
Monitoring report version 2				
DOE assessment UN appr				Date: 19/01/2018
<ol style="list-style-type: none"> Correction approved by board have been added to section B.2. of the revised monitoring report. UN approval dates and reference numbers have also been added to the revised report. Diagram of Boiler 3 has been removed. 				
Thus, the CAR stands closed.				

CAR ID	05	Section no.	E.8.1	Date : 29/12/2017
Description of CAR				
<ol style="list-style-type: none"> The formula applied for the calculation of baseline emissions in ER sheet titled "<i>Emission Calculations Final-1</i>" was found inconsistent with the applied methodology AM0056 version 1.0, page 8, equation (7). In ER sheet titled "<i>System Load Classes and emissions</i>" Boiler 2008UA has been kept off. However, values for this boiler has been used to calculate steam flow for system load class 21-40. The value of steam generated (ER sheet titled 'emission calculation final-1, cell C8) and the fuel consumed calculated in cell C10 in the same sheet represent the entire monitoring period (01/10/2015-30/09/2017). however the emission reduction has been multiplied for the year factor (2). Please clarify. 				
Project participant response				Date : 31/12/2017
<ol style="list-style-type: none"> The formulas has been corrected and is now consistent with applied methodology The issue has been rectified The values have been corrected 				
Documentation provided by project participant				
ER Sheet version 2.				
DOE assessment				Date: 19/01/2018
<ol style="list-style-type: none"> The formula has been corrected and applied as per the underlying methodology now. The value has been corrected in cell has been corrected. The factor has been removed. The steam generation is for entire monitoring period. The correction has impacted the ER significantly and the ERs have reduced because of the change. 				
Thus, the CAR stands closed.				

CAR ID	06	Section no.	E.7.	Date : 29/12/2017
Description of CAR				

The calibration for the two meters for monitoring of a) quantity of natural gas combusted (FC,i,j,y) and b) steam generated (PPJ,k,y) was found conducted once in three years whereas the PDD requires these meters to be calibrated once in every year. Following are the calibration dates and validity of certificates verified on site for the above referred meters;

Parameter		Equipment Tag #	Calibration date
2008U (Boiler 1)			
FC i,j,y	Natural Gas	FT 2509 A	21/04/2013 & 31/03/2016
PPJ,k,y	Steam Flow	FT 2506	02/04/2013 & 25/02/2016

2008UA (Boiler 2)

FC i,j,y	Natural gas	FT 2609 A	21/04/2013 & 31/03/2016
PPJ,k,y		FT 2606	02/04/2013 & 25/02/2016

The calibration frequency was not found in line with the registered PDD.

Project participant response **Date : 31/12/2017**

Calibration data has been updated. Calibration from now on will be performed on annual basis in accordance with PDD. Necessary procedural changes have been performed.

Documentation provided by project participant

Monitoring Report version 2, appendix 4.

DOE assessment **Date: 19/01/2018**

Calibration data has been updated under appendix 4 of the revised monitoring report. Delay was observed for all equipment. However, error factor has been applied to the period when delay in calibration has happened. Thus, the delay has been corrected in line with the project standard.

s
Thus, the CAR stands closed.

CAR ID	08	Section no.	E.8.	Date : 10/02/2018
Description of CAR				
Inconsistency in reporting of various values in the monitoring report and the ER sheet were observed.				
Project participant response				Date : 19/02/2018
Reporting values in MR have been corrected to match ER up to 2 decimal points				
Documentation provided by project participant				
MR v3.1				
DOE assessment				Date: 20/02/2018
The inconsistent values in the MR(sectionE) have been corrected and the revised monitoring report has been submitted to the DoE. Thus, the CAR stands closed.				

Table 2. FAR from this verification
There is no FAR from this verification.

Appendix 5:

The Selected Boiler Load Classes:

Boiler Load Class (Tons/hr)	2008-U Load Classes	2008-UA Load Classes
0-20	1	1
21-40	2	2
41-60	3	3
61-80	4	4
81-100	5	5
101-120	6	6
>120	7	7

System Generation Load Class

System Load Class	System Load	2008U	2008UA
1	21-40	ON	OFF
		OFF	ON
		ON	ON
2	41-60	ON	OFF
		ON	ON
		OFF	ON
3	61-80	ON	OFF
		OFF	ON
4	81-100	ON	OFF
		OFF	ON
		ON	ON
5	101-120	ON	OFF
		OFF	ON
		ON	ON
6	121-140	ON	OFF
		OFF	ON
		ON	ON
7	141-160	ON	ON
8	161-180	ON	ON
9	181-200	ON	ON
10	201-220	ON	ON
11	221-240	ON	ON
12	241-260	ON	ON

SFC Estimation Per Load Class (Baseline data):

Boiler s	Load Class s	Range (MT/H)	PBL _i	FCBL _i	SFC _{i,j}	Calorific Value
			Steam(Tons/hr)	Fuel (Nm3/Hour)	Nm3/Tsteam	GJ/Nm3

CDM-VCR-FORM

Boiler s	Load Class	Range (MT/H)	PBL _i	FCBL _i	SFC _{i,j}	Calorific Value
			Steam(Tons/hr)	Fuel (Nm3/Hour)	Nm3/Tsteam	GJ/Nm3
2008-U	1	0-20	10.8	334.6	31.0	0.039851562
	2	21-40	25.5	4164.9	163.3	0.039851562
	3	41-60	53.4	4767.0	89.3	0.039851562
	4	61-80	75.2	7012.6	93.3	0.039851562
	5	81-100	91.3	7988.2	87.4	0.039851562
	6	101-120	112.6	10285.5	91.4	0.039888941
	7	>120	128.0	11125.3	86.9	0.039888704
2008-UA	1	0-20	7.3	687.2	94.2	0.039851562
	2	21-40	39.5	3292.2	83.4	0.039851562
	3	41-60	49.8	3872.4	77.8	0.039851562
	4	61-80	69.6	7350.9	105.7	0.039851562
	5	81-100	90.8	8559.3	94.2	0.039851562
	6	101-120	113.1	11041.1	97.7	0.039871233
	7	>120	130.1	8473.3	65.2	0.039976849

Document information

Version	Date	Description
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