




**Verification and certification report form for
CDM project activities
(Version 03.0)**

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 UNFCCC Reference Number: 10006
Scale of the project activity	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
Version number of the verification and certification report	2.0
Completion date of the verification and certification report	10/04/2020
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 3 rd Monitoring Period Duration: 01/10/2017 to 30/09/2019
Version number of the monitoring report to which this report applies	1.3
Crediting period of the project activity corresponding to this monitoring period	01/10/2014 – 30/09/2024
Project participants	Al Jubail Fertilizer Company (Al Bayroni) Saudi Basic Industries Corporation (SABIC)
Host Party	Kingdom of Saudi Arabia
Applied methodologies and standardized baselines	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	1: Energy industries (renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	132,196 tCO _{2e}
Certified amount of GHG emission reductions or GHG removals for this monitoring period	83,815 tCO _{2e}
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	 Ashok Kumar Gautam Director

SECTION A. Executive summary

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 utilised exclusively within Al Bayroni at the process plants.

The registered project activity includes implementation of three components/modifications, 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 reduction during the current monitoring period 01/10/2017 to 30/09/2019 (including both days) are 83,815 tCO₂e.

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 01/10/2017 to 30/09/2019 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 or any approved revised 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

Earthood has performed the verification of the CDM project “Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System” having UNFCCC Ref. Number 10006. The verification includes confirming the implementation of the project as per description in the PDD, the monitoring plan of the PDD and the application of the monitoring methodology as per AM0056 - Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems Version 1.0. Earthood confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. The emission reductions from the CDM project activity 10006 “Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System” during the period 01/10/2017 to 30/09/2019 (first and last days included) amount to **83,815 tCO₂e**.

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	Singh	Kaviraj	Central Office	Y	N	Y	Y
2.	Verifier	IR	Mahala	Deepika	Central Office	Y	N	N	Y
3.	Verifier	IR	Vatsa	Vaishali	Central Office	Y	N	Y	Y
4.	Methodology Expert	IR	Kumar	Sanjeev	Central Office	Y	N	N	N
5.	Local Expert	ER	Ahmad	Parvaiz	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 Kumar	Central Office
2.	TA Expert to TR	IR	Gautam	Ashok Kumar	Central Office
3.	Approver	IR	Gautam	Ashok Kumar	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 are maintained with the help of SCADA which are transferred for ER

			intervention. Therefore, chances of possible human errors, in recording and archiving, are minimised.	calculations. The assessment team checked with the source sheets available.
2.	Error in transferring the data to ER sheet	High	Transfer of data from source to ER calculation involves human intervention and might lead to some readings being copied and pasted inconsistently in the ER sheet from the source data.	The values reported in ER sheet were checked with their respective source data. The first value, last value and the total of the columns for all parameters reported was verified from the source data.

C.2. Consideration of materiality in conducting the verification

In accordance with the CDM VVS Version 02 para 326 the thresholds for materiality for CDM PAs are under:

Emission Reductions (tCO₂e)/year	500,000 or more	300,001 to 499,999	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 2.0% because the project activity (PA) under verification is a large scale CDM PA.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO₂e) in this monitoring period	102,084 tCO ₂	83,815 tCO ₂ *
Applicable Threshold (%) as per para 326 of CDM VVS Version 2	2.0%	2.0%

*The decrease in the ER's of the final monitoring report/03/ is due to typographical errors identified in transferring the data from the ER sheet and for other minor calculations errors. The assessment team has raised CAR#01 & CL#02 in this regard and were resolved satisfactorily leading to lesser emission reduction than reported in the MR made public for the commencement of verification. Appendix 4 of this verification report may be referred for more information on the raised findings.

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total) Total (100%)	Sample selected for verification Sample (%)	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)
PPJ,k,y** (System)	Every 15 minutes	70,080 (96 readings per day)	Please read the comment below*	No error identified	No impact	No impact
PRESS _{P,J,MA} x**	Every 15 minutes	70,080 (96 readings per day)	Please read the comment below*	No error identified	No impact	No impact
TEMP _{PJ} **	Every 15 minutes	70,080 (96 readings per day)	Please read the comment below*	No error identified	No impact	No impact
FC _{i,j,y} **	Every 15 minutes	70,080 (96 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
EF _{CO2i,y}	Yearly	1	1	No error identified	No Impact	No Impact

* These values are recorded automatically in the especially designed software (SCADA) 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.

**Complete dataset for all the parameters was made available by the PP for verification, the data was made available at an interval of 15 minutes for the parameters recorded through SCADA. It has also been included in the emission reduction calculation sheet. However, incorrect correction factors applied in ER sheet led to low value of achieved emission reductions. After DOE identified this error and erroneous application of correction factor CL#01 was raised. Response to this CL has resulted in the increase of the emission significantly than the public monitoring report.

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

SECTION D. Means of verification

D.1. Desk/document review

A desk review was conducted by the verification team that included

- a) A review of the data and information presented to verify its completeness;
- b) 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;
- c) 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

No physical site visit audit was conducted for this verification. Following para 339 of VVS for PA ver.2.0/27/, the verification team concluded that an on-site inspection is not mandatory in this case because the following conditions are met by this monitoring period (01/10/2017 to 30/09/2019):

1. It is the third verification for the DOE (ESPL) doing this verification of the project activity. ESPL has conducted the verification for MP#1 (01/10/2014-30/09/2015) and MP#2 (01/10/2015 to 30/09/2016) /6/ and conducted the physical on-site audit in last two verifications/6/.
2. The physical site visit for last assessment (MP#2) was conducted by ESPL team on 26/12/2017. Only two years and three months had elapsed at the time of finalizing this verification assessment and report, since the last on-site inspection conducted for verification for the project activity by the assessment team.
3. The total ERs claimed since the last verification are 83,815 tCO₂e. The project activity has not achieved more than 300,000 tCO₂e GHG emission reductions or net anthropogenic GHG removals since the last verification when the site visit was conducted/6/.

However, in order to comply with para 340 of VVS for PA Ver 2.0/27/, ESPL assessment team has applied various alternative means like a video conference call, telephonic interview and additional document review etc., A video conference call with the plant personnel and other people involved in project, was organised by the DOE (Involving the Team leader and Verifier) on 13/02/2020. The details of the people involved is given in table D.3 below. The team leader had asked questions related to the implementation of the project activity and further project related inquiries were made. The information gathered during the call was compared with the documentation and records received from PP and found satisfactory. The assessment team has also requested PP to present the photos/screen shots of name plates of technologies installed, snapshots of energy meters, calibration certificates etc. and these were submitted. The assessment team basis on the interview of plant personnel and document review confirm that the project activity is implemented and operated inline to the registered PDD and no changes has been made since the last verification. The further details of the used alternative means have been discussed in various chapters of this report.

D.3. Interviews

The following persons were interviewed, by video conferencing, by the assessment team.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Mehmood	Faizan	Albayroni	13/02/2020 & 09/03/2020	Project Implementation, Monitoring Plan, ER calculation	Dr. Kaviraj Singh, Vaishali Vatsa
2.	Zaour Yasar	Israfilof	Albayroni	13/02/2020 & 09/03/2020	ER Calculation, MR and data collection	Dr. Kaviraj Singh, Vaishali Vatsa
3.	Pandeya	Lokesh	Albayroni	13/02/2020	Project operation and maintenance	Dr. Kaviraj Singh, Vaishali Vatsa

D.4. Sampling approach

There is no sampling approach 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	CL#01	-	-
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	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	CL#02		
Assessment of data and calculation of emission reductions or net removals	-	CAR#01	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	02	01	-

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 07.0/5/ which is an appropriate form and the latest version available at the time of verification/submission for request for issuance. All the sections of the aforesaid form were duly filled as per the guidelines and provided all the relevant details.
Findings	CL#01 was raised and resolved
Conclusion	The final monitoring report /3/ is found to be in-line with the latest CDM-MR-form/5/ available and the instructions therein.

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

There was no FAR raised during the previous verification as checked from the verification report for the second monitoring period/6/

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

Means of verification	The alternative means of site visit that were adopted by the DOE to confirm the implementation and operation of the project activity are as follows:
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1. The implementation and operation of technology was verified during the last verification by ESPL assessment team /6/
2. Confirmation was obtained, during the video call conferencing with senior management involved in plant operation that no changes in the project design has been made since the last verification when the site visit was conducted.
3. In order to confirm the reliability of emission reduction data presented to the assessment team plant personnel responsible for the collection, recording and processing of data was interviewed for quality control procedures implemented during the process.
4. Photos/ screenshots of the technologies installed were also obtained by the assessment team to confirm the compliance with the registered PDD
5. Photos of name plates of the plant records and metering systems were also obtained on sample and random basis to cross verify the information presented in the MR about the project implementation and monitoring.
6. The copy of records like scan copies of all calibration certificates were obtained by the assessment team.
7. The information about the model and positioning of meters was verified during the last verification by the ESPL assessment team and the same has been considered credible for this monitoring period as well.

Basis on the review of information gathered by applying the alternative means, as explained above, the verification team confirms, that installation and operation of the project activity is in-line to the details given in registered PDD /1/. The following component which are part of the modifications made in the boiler as energy efficiency measures in this project activity were found to be installed and operated in-line with the registered PDD/1/;

- New economizer
- New modified super heater
- Associated modifications in convection ducts

The verification team also confirms, by relaying on the verification of the information applying alternative means of the site visit, as detailed above in point 1 & 2, that project activity includes two boilers (2008 U & 2008 UA) which are still installed and in operation during the current monitoring period and no change in the project design has been made. It may also be important to note that third boiler 2052U, which was part of the project activity at the time of registration was removed later via post-registration change request PRC 10006-001 because it failed to comply with the methodological requirements with regards to input fuel restriction for auxiliary fuel/6/.

The modification made in these boilers as energy efficiency measures which are part of project activity are still intact and inline to the registered PDD/1/. The details of the boiler rehabilitation was checked from the mechanical completion certificate/7/ dated 31/05/2013 issued by PP by Toyo Engineering Corporation and found correct. The aforesaid certificate indicated the completion date as 16/05/2013 which is consistent with the other project related documents. The original copy of this certificate was verified by the assessment team during last verification and therefore this information was found credible and reliable in the current verification/6/.

The shutdown records/8/ shared by PP were checked to confirm the plant's non-operational days (planned or unplanned). The reason reported for the shutdown were also discussed with the plant personnel and response were found satisfactory.

The project activity is located in Jubail Industrial City of Eastern Province of Saudi Arabia. The geo-coordinates and location of the project activity were cross checked using the google maps and were found consistent with the information given in the registered PDD/1/. ESPL assessment team has visited the plant during the last verification and therefore the reported location is MR was found correct /6/.

The assessment team has also confirmed by reviewing the copy of invoices raised to client by the supplier of the gas fuel and found consistent with the information

	<p>verified and reported by the ESPL assessment team during the last verification and therefore it is confirmed that the fuel used for steam generation was 100% natural gas and doesn't contain any other fuel type/6,23/.</p> <p>The project activity was found to be implemented as described in the registered PDD/1/ and the QA/QC procedures mentioned under each of the parameters in the registered PDD/1/were found to be followed on-site.</p>
Findings	No Findings were raised
Conclusion	<ul style="list-style-type: none"> In view of the information's verified, 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/1/ during the concerned monitoring period. The emission reductions achieved during the current monitoring period are 83,815 tCO₂e which is less than the estimated quantity (132,196 tCO₂e) in the registered PDD/1/ for the comparable period.

E.4. Post-registration changes

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

Not Applicable

E.4.2. Corrections

The following correction proposed by PP were approved by UN under PRC request reference no. 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 parameters and corrected the value under B.6.3 for ex-ante estimates of leakage emissions.
3. Minor editorial changes were made in the registered PDD as a consequence of using the latest PDD template

In another request, following correction were approved by CDM EB under PRC request reference no. 10006-002 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 version 8.0

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

Not Applicable

E.4.4. Inclusion of a monitoring plan

Not Applicable

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

The following changes were approved by the UNFCCC as part of the PRC 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_{j,y} and EFCO_{2 i,y} under section B.7.1 of the PDD. The inclusion was necessary so as 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 2.0
3. Additional details for measurement methods that 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 /28/

E.4.6. Changes to the project design

1. Initially, modification for energy efficiency was applied in all the three boilers. However, for fulfilment of methodological requirements, one of the three-boilers (2052U) was removed from scope of project activity. It has been accepted under PRC request reference number 10006-001 by the UNFCCC on 05/07/2016 /9/
2. 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 /9/

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

Not Applicable

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

Means of verification	The monitoring plan as mentioned in the registered PDD/1/ was reviewed against the monitoring requirements of the applied methodology AM0056 version 1.0 /10/. Based on this review It was found the monitoring plan contained in the registered PDD/1/ includes all the parameters required to be monitored in context of project design and description and allows proper determination of emission reductions in accordance with the registered PDD /1/ and applied methodology AM0056 version 1.0 /10/.
Findings	No findings were raised
Conclusion	The monitoring plan outlined in the registered PDD /1/ is in accordance with the applied methodology /10/ 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/1/ 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 of the three boilers	The values were found to be consistent with the PDD/01/. It has been consistently reported and used in ER sheet /02/ as

			well.
	Boiler load class, i and j	See appendix 5	The values were found to be consistent with PDD /01/. It has been consistently reported and used in ER sheet/02/ as well.
	System Load Class "K"	See appendix 6	The values were found to be consistent with PDD /01/. It has been consistently reported and used in ER sheet/02/ as well.
	FC _{BLi}	See appendix 7	The values were found to be consistent with PDD /01/. It has been consistently reported and used in ER sheet/02/ as well.
	PB _{Li}	See appendix 7	The values were found to be consistent with PDD /01/. It has been consistently reported and used in ER sheet/02/ as well.
	NCV _{FF, BL}	See appendix 7	The values were found to be consistent with PDD /01/. It has been consistently reported and used in ER sheet/02/ as well.
	EF _{C,FF,BL}	0.056tC/GJ	The value applied was found to be consistent with the source according to PDD i.e. IPCC National Greenhouse Gas Inventory/04/. It has been consistently reported and used in ER sheet/02/ as well.
	OXIDFF,BL	1	The applied value was found to be consistent with the source according to PDD i.e. IPCC National Greenhouse Gas Inventory/4/. It has been consistently reported and used in ER sheet/02/ 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/12/. It has been consistently reported and used in ER sheet/02/as well.
	PRESS _{BL,MAX}	38.3 bar	The values applied was found to be consistent with the tests results for

			pressure of the generated steam/12/. It has been consistently reported and used in ER sheet/02/ 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 /13/. It has been consistently reported and used in ER sheet/02/ 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 /13/. It has been consistently reported and used in ER sheet/02/ as well.
	GWP _{CH4}	25	The value used was found to be consistent with the IPCC default value from where it has been derived /04/. It has been consistently reported and used in ER sheet/2/ and MR/3/.
Findings	No Findings were raised		
Conclusion	The value in the monitoring report /03/ and corresponding emission reduction calculations spreadsheet /02/ are consistent with the registered PDD /01/. The applied values are correct and justified.		

E.6.2. Data and parameters monitored

E.6.2.1. Generated steam in the monitoring period (01/10/2017 to 30/09/2019) subdivided into load classes in the case of single boiler installations, PPJ,i,y, t/yr

Means of verification	Single boiler installation has not been done in the project activity. Therefore, this parameter is not applicable.
Findings	None
Conclusion	Not applicable

E.6.2.2. Generated steam in the monitoring period (01/10/2017 to 30/09/2019) 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 recorded every 15 minutes in an online PIMS (Process Integrated Management System) server data sampling.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The registered monitoring plan /1/ required this parameter to be monitored every 15 minutes using an online PIMS (Process Integrated Management System) and recorded on server. The monitoring frequency of the parameter is in line with the registered monitoring plan /1/ and applied methodology. The compliance of the monitoring plan for this parameter was also verified by the ESPL assessment team during last verification and was found

		consistent/6/.						
	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 U-A</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, 15/.</p>	Boiler ID	Tag # of equipment	2008 U	FT 2506	2008 U-A	FT 2606
Boiler ID	Tag # of equipment							
2008 U	FT 2506							
2008 U-A	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 year which has been verified using calibration certificates/14, 15/.						
	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, 15/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and the calibration was valid for current monitoring period.						
	Is(are) calibration(s) valid for the whole reporting period?	There was a delay in meter calibration from the defined frequency has been observed in meter tag number FT2606. This meter FT2606 was supposed to be calibrated by 28/12/2018 but was indeed calibrated on 28/01/2019. Therefore, by following the para 366 of VVS for PA, PP has applied an maximum permissible error percentage of the equipment (-1%), for the period whilst this meter was not in calibration (from 28/12/2018 to 27/01/2019). The assessment team in-line to para 366(a) of VVS for PA has confirmed that the maximum permissible error percentage has been applied						

		appropriately as the results of the delayed calibration do not show error beyond maximum permissible limit in the monitoring equipment. The calibration details of the meters are given in detail, in section E.7 of the report.								
	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 reported values inline to monitoring frequency as reported in MR/3/ and ER sheet /2/ has been verified with the plant records maintained shared by the PP/11/. The interviews with the monitoring personnel confirmed that the frequency for recording the parameter was in-line to the frequency stated in the MR /3/. The implementation of the monitoring of this parameter, inline to the registered PDD, was also verified by the assessment team during last verification and therefore, the provided information, after verifying as explained above, was found to be consistent and appropriately used for ER 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/annum)</th> </tr> </thead> <tbody> <tr> <td>2008U</td> <td>1,357,452.65</td> </tr> <tr> <td>2008 UA</td> <td>1,267,050.10</td> </tr> <tr> <td>Total</td> <td>2,624,502.75</td> </tr> </tbody> </table>	Boiler number	Steam generation (tons/annum)	2008U	1,357,452.65	2008 UA	1,267,050.10	Total	2,624,502.75
	Boiler number	Steam generation (tons/annum)								
	2008U	1,357,452.65								
	2008 UA	1,267,050.10								
	Total	2,624,502.75								
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. The monitoring equipment was found to be regularly maintained and tested for its functioning inline to the ASME PTC 4-1998 as checked from the maintenance record shared by PP and cross-checked from the monitoring personnel during the e-interview.									
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	CL#02 was raised and resolved.									
Conclusion	<p>The verification team confirms that:</p> <p>a) The registered monitoring plan has been properly implemented and followed by the project participants</p>									

	<p>b) Monitoring of parameter is implemented in accordance with registered monitoring plan. /01/</p> <p>c) The equipment used for monitoring the parameter showed delay calibration. Thus, in-line to para 366 of VVS for PA error factor was applied to the values of the parameter for which the calibration of the monitoring equipment was found to be delayed. For the remaining period the calibration of the monitoring equipment was found to be in-line with the applied methodology and registered monitoring plan.</p> <p>d) Monitoring results are consistently recorded as per approved frequency</p> <p>e) Quality assurance and quality control procedures have been applied in accordance with the registered monitoring plan.</p>
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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, $EF_{PJ,upstream,CH_4}$, t CH₄/GJ Fuel

Means of verification	This parameter is not applicable as it is out of the scope of the project activity hence, the parameter is not monitored
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, $EF_{PJ,upstream,CH_4}$, t CH₄/GJ Fuel

Means of verification	This parameter is not applicable as it is out of the scope of the project activity hence, the parameter is not monitored
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, $EF_{CO_2,upstream,LNG}$, t CO₂/GJ Fuel

Means of verification	This parameter is not applicable as it is out of the scope of the project activity hence, the parameter is not monitored
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 monitored in every 15 minutes using an online PIMS (Process Integrated Management System) and recorded on server
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Monitoring of the pressure of the generated steam, follows the monitoring frequency stated in the registered monitoring plan /01/. The parameter was found to be monitored and recorded every 15 minutes as verified from the data logs shared by the PP in the ER sheet/2/.

	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 /17,18/.
	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 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?	Accuracy is valid for the entire measuring range
	Calibration frequency /interval:	Annually
	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/17,18/. The calibration of the monitoring equipment was checked against these certificates and was found to be delayed.
	Is(are) calibration(s) valid for the whole reporting period?	There was a delay in meter calibration, from the defined frequency, has been observed in both the meters (PT-2513 & PT2613) which are being used to monitor this parameter. This meter tag number PT 2513 was supposed to be calibrated on 03/07/2018 and again by 08/07/2019 but was indeed calibrated on 09/07/2018 and 03/09/2019. Therefore, following para 366 of VVS for PA, PP has applied the maximum permissible error percentage (-1%) of the equipment specified by supplier, for the period whilst this meter was not in calibration (from 04/07/2018 to 09/07/2018 & also from 09/07/2019 to 03/09/2019). The assessment team in-line to para 366(a) of VVS for PA has confirmed that the maximum permissible error percentage has been applied appropriately as the results of the delayed calibration do not show error beyond maximum permissible limit in the monitoring equipment.

		<p>Meter tag number PT-2613 was required to be calibrated on 13/07/2018 but was calibrated on 17/07/2018 and again by 17/07/2019 but was indeed calibrated on 03/09/2019. therefore, PP has applied maximum permissible error percentage of -1%, for the period whilst this meter was not in calibration (from 13/07/2018 to 17/07/2018 & also from 17/07/2019 to 03/09/2019). The assessment team in-line to the para 366(a) of VVS for PA, has confirmed that the maximum permissible error percentage specified by the supplier, has been applied appropriately as the results of the delayed calibration do not show error beyond maximum permissible limit in the monitoring equipment. Please refer section E.7 for further details of calibration.</p> <p>.</p>
	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. 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. 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. The monitoring equipment was found to be regularly maintained and tested for its functioning in-line to the ASME PTC 4-1998 as checked from the maintenance record shared by PP and cross-checked from the monitoring personnel during the e-interview.
Findings	No findings were raised	
Conclusion	<p>Through 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 methodology and registered monitoring plan. • Monitoring results are recorded as per the approved frequency • QA/QC procedure has been applied in accordance with the registered monitoring plan except the calibration of the monitoring equipment which was found to be delayed during the current monitoring period. The error factor has been applied to the values of the parameter for the period during which a delay in the calibration was observed in-line to para 366 of VVS for PA. • No Sampling approach has been followed for the project activity which was found to be appropriate <p>This complies with para 364 of VVS for PA version 2.0</p>	

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 / No)	Temperature of the generated steam following registered PDD /1/ , is monitored and recorded every 15 minutes. It is verified that the pressure is being monitored and recorded every 15 minutes.
	Monitoring equipment	The parameter has been monitored using equipment thermocouple (K-type) with tag numbers TI 2520 for boiler 2008 U and with tag number TI 2620-1 for boiler 2008 UA. Accuracy class for both the equipment is $\pm 1.2^{\circ}\text{C}$ as verified from the calibration certificates /19,20/.
	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
	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/19, 20/. The calibration details were checked from the calibration certificates. It was confirmed that the monitoring equipment is calibrated during the current monitoring period as per the calibration requirement.
	Is(are) calibration(s) valid for the whole reporting period?	There was a delay in calibration from the defined frequency has been observed in monitoring equipment tag number TI-2620-1. The monitoring equipment tag number TI 2620-1 was supposed to be calibrated by 07/10/2018 but was indeed calibrated on 08/10/2018. Therefore, following para 366 of VVS for PA has applied the maximum

		<p>permissible error (+1.2 degree C) of the monitoring equipment specified by supplier, for the period whilst this meter was not in calibration. The assessment team in-line to para 366(a) of VVS for PA has confirmed that the maximum error percentage specified by the supplier has been applied appropriately as the results of the delayed calibration do not show error beyond maximum permissible limit in the monitoring equipment.</p> <p>The calibration details of the meters are given in detail, in section E.7 of the report.</p>
	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/16/. 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 accurate and reliable. The monitoring equipment was found to be regularly maintained and tested for its functioning in-line to the ASME PTC 4-1998 as checked from the maintenance record shared by the PP and cross-checked from the monitoring personnel during the e-interview.
Findings	No findings were raised	
Conclusion	<p>Through 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 methodology and registered monitoring plan. Monitoring results are recorded as per the approved frequency QA/QC procedure has been applied in accordance with the registered monitoring plan except the calibration of the monitoring equipment which was found to be delayed during the current monitoring period. The error factor has been applied to the values of the parameter for the period during which a delay in the calibration was observed in-line to para 366 of VVS for PA. No Sampling approach has been followed for the project activity which was found to be appropriate <p>This complies with para 364 of VVS for PA version 2.0</p>	

Quantity of natural gas combusted in one year, FC_{i,j,y}, m3/yr

Means of verification	Criteria/Requirements	Assessment/Observation
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	Measuring /Reading /Recording frequency	Continuously on hourly basis as per the PDD/1/
	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
	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/21, 22/. The calibration details were checked from the corresponding calibration certificates and the calibration was found to be in line with the frequency prescribed in the registered monitoring plan.
	Is(are) calibration(s) valid for the whole reporting period?	The monitoring devices were found to be in claibration for the complete monitoring period. The calibration details are given in section E.7 of this report. .
	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	A value of 217,570,008.87 m ³ /yr has been verified using plant log data and supplier

	monitoring report verified?	invoices/23/. 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 consistency of metered fuel consumption quantities is cross-checked with monthly energy balance based on purchased quantities
	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 were raised	
Conclusion	<p>Through 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 methodology and registered monitoring plan. Monitoring results are recorded as per the approved frequency QA/QC procedure has been applied in accordance with the registered monitoring plan. No Sampling approach has been followed for the project activity which was found to be appropriate <p>This complies with para 364 of VVS for PA version 2.0</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
	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 applied is 0.038534415 GJ/m ³ was verified from the monthly invoices issued by the natural gas supplier (Saudi ARAMCO)/23/. The value is used consistently in the ER calculation.
	If applicable, has the reported data been cross-checked with other available data?	The reported value has been cross-checked from the "Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion" (version 02), which states that the value (50.2 TJ/Gg) needs to be within the uncertainty range of the IPCC default values (lower value 46.5 TJ/Gg and upper value 50.4 TJ/Gg) . The applied value was found to be acceptable as it was found to be equivalent to the value stated 0.04 GJ/m ³ which is within the uncertainty range of the IPCC default values/4/.

	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	CL#02 was raised and resolved	
Conclusion	<p>Through 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 methodology and registered monitoring plan. Monitoring results are recorded as per the approved frequency QA/QC procedure has been applied in accordance with the registered monitoring plan No Sampling approach has been followed for the project activity which was found to be appropriate <p>This complies with para 364 of VVS for PA version 2.0</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
	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/04/. 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 were raised	
Conclusion	<p>Through 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 methodology and registered monitoring plan. Monitoring results are recorded as per the approved frequency QA/QC procedure has been applied in accordance with the registered monitoring plan No Sampling approach has been followed for the project activity which was found to be appropriate 	

This complies with para 364 of VVS for PA version 2.0

E.6.3. Implementation of sampling plan

Means of verification	No Sampling Plan has been applied by PP
Findings	No findings were raised
Conclusion	Not applicable

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

Means of verification	Calibration details of the monitoring equipment installed for boiler 2008 U and parameters monitored by these equipment are listed below:				
	Parameter	Equipment Tag #	Calibration date	Accuracy	Validity
	FC i,j,y	FT 2509 A	28/12/2017 23/10/2018	±1% of full scale	1 year
	PPJ,k,y	FT 2506	28/12/2017 13/12/2018	±1% of full scale	1 year
	TEMP _{PJ}	TI 2520	26/10/2016 26/10/2017 17/10/2018	±1.2°C	1 year
	PRESS _{PJ}	PT 2513	04/07/2017 09/07/2018 03/09/2019	±1%	1 year
	It is evident from the above table that all the monitoring equipments were calibrated as per the calibration frequency stated in the monitoring plan and thus, the calibration for all the equipment was valid for the current monitoring period. However, for the period the monitoring devices were not in calibration, maximum permissible error percentage defined for the equipment by the supplier has been applied inline to para 366 of VVS for PA. In all the delayed calibration results the observed error were not beyond the maximum permissible limit for the instrument.				
	Calibration details of the monitoring equipment installed for boiler 2008 U-A and the parameters monitored by them is listed below:				
	Parameter	Equipment Tag #	Calibration date	Accuracy	Validity
	FC i,j,y	FT 2609 A	28/12/2017 22/03/2018 17/03/2019	±1% of full scale	1year
	PPJ,k,y	FT 2606	28/12/2017 28/01/2019 14/04/2019	±1% of full scale	1year
	TEMP _{PJ}	TI 2620	08/10/2017 08/10/2018 07/10/2019	±1.2°C	1 year
	PRESS _{PJ}	PT-2613	13/07/2017 17/07/2018 03/09/2019	±1%	1 year
	All the details of the monitoring equipment were checked against the calibration certificates and was found to be correct and appropriate /14,15,17-22/ The calibration date of the monitoring equipment for the previous monitoring period				

	was also checked from the verification report /6/ to confirm that the initial calibration date for this monitoring period was well within one-year from the previous calibration.
Findings	CL#01 and CL#02 was raised and resolved.
Conclusion	The verification team checked the calibration details which was found to be delayed for many monitoring equipment as listed above. In-line to the para 366 of VVS for PA/27/ error factors were applied to the value of the parameter for which the delay in the monitoring equipment was observed whereas for other monitoring equipment the calibration was found to be in-accordance with the registered monitoring plan.

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 emissions have been calculated in-line with the methodology/10/ which 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 parameter 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 /2/.</p> <p>So, BE_y = 553,316 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	No findings were raised										
Conclusion	<p>The verification team confirms that</p> <ol style="list-style-type: none"> The complete data was available and is duly reported; As indicated above, the description with regard to cross-check of reported data is included under respective parameter above; Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed; Appropriate emission factors, IPCC default factors and other reference values were correctly applied. There is no pro-rata approach applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol. 										

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

Means of verification	<p>Project emissions for the project activity was found to be calculated in-line with the applied methodology /10/ and tool 03 /24/ which was as follows:</p> $PE_{FC,JY} = \sum FCI_{I,J} \times COEF_{I,Y}$ <p>Where,</p>
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	PEFC,JY	the CO2 emissions from fossil fuel combustion in process j during the year 'y' (tCO2/year)
	$\sum FC_{i,j}$	the quantity of fuel type 'i' combusted in process 'j' during the year y (Mass or Volume Unit/year)
	COEF _{i,Y}	the CO2 emission coefficient of fuel type 'i' in year 'y' (tCO2/mass or volume unit)
	i	fuel types
<p>The value of the parameter 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 /2/.</p> <p>The final value of project emissions is 469,501 tCO2e</p>		
Findings	No findings were raised	
Conclusion	<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 revised approved PDD/01/, with the relevant supporting and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating project 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.8.3. Calculation of leakage GHG emissions

Means of verification	<p>Leakage emission estimation has been done in accordance with registered monitoring plan/01/, applied methodology/10/ and tool/24/. 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> <p>FC_{PJ,Y} = Quantity of fossil fuel combusted in the project plant during the monitoring period</p> <p>NCV_{PJ,Y} = Average net calorific value of the fossil fuel combusted during the monitoring period</p> <p>EF_{PJ,upstream,CH₄} = 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</p> <p>FC_{BL,Y} = Fossil fuel that would have been combusted in the absence of the project activity during the monitoring period</p> <p>GWP_{CH₄} = Global warming potential of methane valid for the relevant commitment period.</p> <p>No potential new sources of leakage were identified onsite. Equations were found to be correctly applied in the ER sheet/02/. The final calculated value of leakage emission is -11,075 tCO2e</p> <p>As per the applied methodology/10/, If LE<0, then the value can be considered as 0.</p>
Findings	No findings were raised
Conclusion	<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 revised approved PDD/01/, with the relevant supporting and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating project 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.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>As per applied methodology AM00056 Version 1.0 /10/ emission reductions are calculated as follows:</p> $ER_y= BE_y -PE_y -LE_y$ <p>Where:</p> <table><tr><td>ER_y</td><td>=</td><td>Emission reductions in year y (t CO₂e)</td></tr><tr><td>BE_y</td><td>=</td><td>Baseline emissions in year y (t CO₂e)</td></tr><tr><td>PE_y</td><td>=</td><td>Project emissions in year y (t CO₂e)</td></tr><tr><td>LE_y</td><td>=</td><td>Leakage emissions in year y (t CO₂e)</td></tr></table> $ER_y= 553,316 -469,501 -0$ $= \mathbf{83,815 \text{ tCO}_2\text{e}}$ <p>The final value of Emission reduction is 83,815 tCO₂e</p> <p>Emission reduction from the project activity were based on baseline, project and leakage emissions only. The calculations presented in this regard in the final monitoring report /3/ and corresponding ER calculation sheet /2/were found appropriate and complying with provisions prescribed in the registered monitoring plan /01/ and applied methodology /10/</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>	ER _y	=	Emission reductions in year y (t CO ₂ e)	BE _y	=	Baseline emissions in year y (t CO ₂ e)	PE _y	=	Project emissions in year y (t CO ₂ e)	LE _y	=	Leakage emissions in year y (t CO ₂ e)
ER _y	=	Emission reductions in year y (t CO ₂ e)											
BE _y	=	Baseline emissions in year y (t CO ₂ e)											
PE _y	=	Project emissions in year y (t CO ₂ e)											
LE _y	=	Leakage emissions in year y (t CO ₂ e)											
Findings	No findings were raised.												
Conclusion	<p>The verification team confirms that:</p> <ul style="list-style-type: none">a) The complete data was available and is duly reported;b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.3.4.2 of this report);c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed;d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied.e) There is no pro-rate approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol. <p>The total number of ERs achieved during the current monitoring period is 83,815 tCO₂e.</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	The achieved and estimated ERs are presented in the next table. The achieved ERs are lower as compared to the estimated ERs due to the amount of steam generated as stated in the PDD i.e. due to the difference in the estimated and actual monitored data over the monitoring period. Since, the achieved ERs are lower than the estimated, no further justification was sought.
Findings	CAR#01 was raised and resolved.
Conclusion	The actual ERs achieved in the PA is not higher than the estimated quantity of ERs in the PDD/01/. Accordingly, it was accepted by verification team.

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
83,815	132,196

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

Means of verification	As verified and evident from the Monitoring Report /03/ and corresponding ER calculations sheet /2/, the actual emission reductions achieved for PA under this verification in the current monitoring period were found less than the estimated quantity in the PDD/1/ for the comparable period. This is largely due to lower amount of steam generation. Considering, there is no increase in ERs no further verification effort was put in. The quantitative details of actual values of achieved ERs for the PA and value estimated in the PDD/1/ is presented in the next table.
Findings	None.
Conclusion	The actual emission reductions achieved in PA is not higher than the estimated quantity of ERs in the PDD/1/. Accordingly, it was accepted by the verification team.

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	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 01/10/2017 to 30/09/2019 (including both days) amount to 69,674 tCO ₂ . Verified and certified emission reductions as per commitment period: <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>83,815 tCO₂</td></tr> </table>	Commitment period	Amount	Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e	From 01/01/2013	83,815 tCO ₂
Commitment period	Amount						
Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e						
From 01/01/2013	83,815 tCO ₂						
Findings	None.						
Conclusion	The actual ERs achieved in the current monitoring period are not higher than the estimated quantity of ERs in the PDD. Accordingly, it was accepted by verification team.						

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

Means of verification	PP did not identify and establish the monitoring of the sustainable development benefits of the registered CDM PA/1/ and no such document was developed and published on the UNFCCC CDM website/12/. Therefore, assessment is required.
Findings	None.
Conclusion	The CME is not required to monitor the sustainable development benefits of the registered CDM PoA.

E.10. Global stakeholder consultation

Means of verification	The global stakeholder consultation was not found applicable because period under verification is 3rd monitoring period.
Findings	None.
Conclusion	The requirement is applicable for situations when global stakeholder consultation was carried out after the publication of first monitoring report. Therefore, this was not found 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 (ESPL), contracted by Al Jubail Fertilizer Company (Al Bayroni) who is the PP for the PA, to perform the first independent verification of the emission reductions for the registered CDM PA 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" for the third monitoring period 01/10/2017 to 30/09/2019 (both days included) as reported in the Monitoring Report (final) Version 1.3 dated 09/04/2020 /03/. PP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. This verification report is for the PA-10006 which was included at the UNFCCC webpage at the end of the current monitoring period.

ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. This verification report has been prepared using the latest available template/26/ specified by UNFCCC and complies with the instructions to follow of CDM VVS-PA Version 02/27/.

The verification activities were conducted in accordance with ESPL's CDM Quality Manual System as per the steps indicated under Section A of this report. The verification process has resulted in conclusion that the implemented monitoring plan confirms to the registered PDD as well as comply with applicable CDM rules and regulations and in accordance with applied monitoring methodologies, AM0056 (Version 01)/10/.

As a result, it is confirmed that the emission reductions from the CDM PA 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" are correctly reported in the Monitoring Report Version 1.3/03/ dated 09/04/2020 and corresponding ER sheet/6/ for the monitoring period 01/10/2017 to 30/09/2019 (including both days) amount as 83,815 tCO₂e. Therefore, this will be submitted as part of request for issuance as per CDM PCP Version 02 /29/.

SECTION H. Certification statement

Earthood Services Private Limited (ESPL), contracted by Al Jubail Fertilizer Company (Al Bayroni) (the PP for the PA), has performed the first independent verification of the emission reductions for the registered CDM PA 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" for the monitoring period 01/10/2017 to 30/09/2019 (including both days) as reported in the Monitoring Report (public) Version 1 dated 08/12/2019.

The verification is based on the registered 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 Al Jubail Fertilizer Company (Al Bayroni) 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 1.3 dated 09/04/2020. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Bureau of Energy Efficiency. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 1.3 dated 09/04/2020.

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 01/10/2017 to 30/09/2019

(including both dates) based on the reported emission reductions in the Final Monitoring Report Version 1.3 dated 09/04/2020 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, ESPL 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.

ESPL confirms the following;

Monitoring period: From 01/10/2017 to 30/09/2019 (including both dates)

Verified and certified emission in the above monitoring period:

	Amount	Unit
Certified emission reductions (CERs)	83,815	tCO ₂ e

Appendix 1. Abbreviations

	Full texts
ACM	Approved Consolidated Methodology
AM	Approved Methodology
ACM	Approved Consolidated Methodology
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification Request
CM	Combined Margin
CO ₂	Carbon di oxide
CP	Crediting Period
DNA	Designated National Authority
DR	Desk Review
DOE	Designated Operational Entity
EB	Executive Board
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
ODA	Official Development Assistance
OM	Operating Margin
PA	Project Activity
PCP	Project Cycle Procedure
PDD	Project Design Document
PE	Project Emission
PP	Project Participant
PS	Project Standard
RFR	Request for Registration
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	Kaviraj Singh		
Country	India		
Education	Ph.D. (Environmental Engineering), IIT Delhi Masters (Energy & Environmental), DAVV Indore		
Experience	15 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, AM0080		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1, TA 13.2)		
Reviewed by	Abhishek Mahawar	Date	26/09/2019
Approved by	Ashok Gautam	Date	26/09/2019

Competence Statement			
Name	Deepika Mahala		
Country	India		
Education	M. Sc. (Environmental Management), GGSIP University B.Sc. Hons. (Chemistry), Sri Venkateshwar College, DU		
Experience	3 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	YES		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Shreya Garg	Date	14/09/2018
Approved by	Anshika Gupta	Date	14/09/2018

Competence Statement			
Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	16 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-I.E, AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Q, AMS-III.Z., AMS-III.AV., AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0012, ACM0006, AM0018, ACM0009, AM0034, AMS.I.B, ACM0003		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Shreya Garg	Date	23/10/2019
Approved by	Anshika Gupta	Date	23/10/2019

Competence Statement			
Name	Vaishali Vatsa		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	4 months		
Field	Climate Change		
Approved Roles			
Team Leader	NO		
Validator	Yes		
Verifier	Yes		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	NO		
Reviewed by	Shreya Garg	Date	30/12/2019
Approved by	Anshika Gupta	Date	02/01/2020

Competence Statement	
Name	Parvaiz Ahmad
Country	Saudi Arabia
Education	M.Sc. Environmental Botany
Experience	+1 year

Field	Environmental Botany		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Saudi Arabia)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	NO		
Trainee	NO		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Kumar Gautam	Date	01/03/2018

Competence Statement			
Name	Sanjeev Kumar		
Country	India		
Education	B. Tech. (Chemical Engineering) M.Tech. (Energy Management)		
Experience	13.5 years +		
Field	Climate Change, Environment, Energy		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	YES (ACM0002, ACM0006, ACM0004, ACM0009, ACM0012, ACM0001, AMS I.D, AMS I.F, AMS I.C, AMS I.A, AMS II.C, AMS II.D, AMS II.E, AMS III.H, AM0009, AM0013, AM0025, AM0056, AM0028, AM0029, AM0008, AMS III.R, ACM0003)		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, 4.1, 13.1)		
Reviewed by	Shreya Garg	Date	16/01/2020
Approved by	Anshika Gupta	Date	16/01/2020

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Al Bayroni	PDD	Dated: 08/11/2016 Version: 10.1	PP
2	Al Bayroni	ER sheet	Corresponding to the monitoring period	PP
3	Al Bayroni	MR (Public) MR (Final)	Dated: 08/12/2019 Dated: 09/04/2020 V1.3	PP

4.	IPCC	IPCC Defaults	2006	
5	UNFCCC	CDM-MR-FORM	Version 07.0	Others
6	ESPL	Previous verification report (2 nd Monitoring Period) Verification report (3 rd Monitoring Period)	Dated: 20/02/2018 Version: 1.0	Others
7	Al Bayroni	Plant Mechanical completion certificate for boiler Ammonia Plant & Boilers 2008 U/UA	Dated:31/05/2013	PP
8	Al Bayroni	Shutdown Records	01/10/2017- 30/09/2019	PP
9	ESPL	PRC-Validation report (10006-001) PRC-Validation report (10006-002)	Version3.0, Dated: 31/05/2016 Version 4.0, Dated 08/12/2016	Others
10	UNFCCC	AM00056	Version 1.0	Others
11	Al Bayroni	E-meeting (Documents)	13/02/2020	
12	Al Bayroni	Test results for pressure of the generated steam	-	PP
13	Al Bayroni	Test results for temperature of the generated steam	-	PP
14	SAFCO	Calibration certificate for FT 2506 (2008 U)	28/12/2017 13/12/2018 18/11/2019	PP
15	Al Bayroni	Calibration certificate for FT 2606 (2008 U-A)	28/12/2017 28/01/2019 18/11/2019	PP
16	Al Bayroni	Plant records maintained on-site	-	PP
17	Al Bayroni	Calibration certificate for PT 2513 (2008 U)	07/04/2017 07/09/2018 09/03/2019	PP
18	Al Bayroni	Calibration certificate for PT 2613 (2008 U-A)	13/07/2018 17/07/2019 10/03/2020	PP
19	Al Bayroni	Calibration certificate for TI-2520 (2008 U)	26/10/2017 26/10/2018 17/10/2019 27/10/2020	PP
20	Al Bayroni	Calibration certificate for TI-2620 (2008 U-A)	10/09/2017 10/08/2018 10/08/2019 10/07/2020	PP
21	Al Bayroni	Calibration certificate for FT-2509 A (2008 U)	28/12/2017 23/10/2018 27/10/2019	PP
22	Al Bayroni	Calibration certificate for FT-2609 A (2008 U-A)	28/12/2017 22/03/2018 17/03/2019	PP
23	ARAMCO	Supplier Invoices for fuel	-	PP
24	UNFCCC	Tool to calculate project or leakage CO2 emissions from fossil fuel combustion'	version 2	Others
25	UNFCCC	CDM Project Page: https://cdm.unfccc.int/Projects/DB/SGS-UKL1405604803.71/view	-	Others
26	UNFCCC	CDM-VCR-FORM for Project Activity	Version 3.0	Others
27	UNFCCC	CDM VVS-PA	Version 2.0	Others
28	UNFCCC	CDM PS	Version 2.0	Others
29	UNFCCC	CDM PCP	Version 2.0	Others
30	BSI	Certificate of registration for ISO 9001:2008	Effective start date 01/05/2015	PP
31	DNV Business	ISO 14001:2008 and ISO	14/02/2012	PP

	Assurance	14001:2004 certificate issued to SABIC		
32	UNFCCC	Project Webpage: https://cdm.unfccc.int/Projects/DB/SGS-UKL1405604803.71/view	-	Others
33	UNFCCC	Tool to calculate leakage or fossil fuel combustion	Version 2.0	Others

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

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

FAR ID	NA	Section no.	NA	Date : DD/MM/YYYY
Description of FAR				
No FAR Raised from previous verification				
Project participant response				Date : DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY
NA				

Table 2. CL from this verification

CL ID	01	Section no.	E.1, E.7	Date : 16/01/2020
Description of CL				
1. As per MR template guidelines section E.5.1 of the MR states to, “explain the calculation of “amount estimated ex ante for this monitoring period in the PDD” transparently.” PP is requested to fill the section in-line to the guidelines stated.				
2. Monitoring Equipment FT2506 for boiler 2008U and FT2606 for boiler 2008UA for monitoring Steam generated (PPJ,k,y) was found to be calibrated during the current monitoring period as per the calibration frequency stated in the registered PDD. PP is requested to clarify the reason for the application of data correction factor to the steam flow value of both the boilers in the ER sheet titled: 10006 ER calculation; Tab: Data correction ; Cell: D1 and Cell: G1.				
Project participant response				Date : 22/02/2020
1. Calculation of estimated ex-ante for the current monitoring period is added under section E.5.1 of the MR. 2. The same has been corrected and updated ER sheet has been shared with the DOE				
Documentation provided by project participant				
MR Version 1.2 ER sheet version 3				
DOE assessment				Date: 24/02/2020
1. Section E.5.1 of the revised MR version 1.2 now includes the calculation of “amount estimated ex ante for this monitoring period” (Closed)				
2. PP has now removed the correction factors added to the steam flow value of both the boilers (i.e. 2008U and 2008UA) measured by the monitoring equipment FT2506. The monitoring equipment was found to be calibrated during the current monitoring period and thus, the application of correction factor was not required. PP has shared the ER sheet with the revised ERs. (Closed)				

CL ID	02	Section no.	E.7., E.6.2.9	Date : 31/03/2020
Description of CL				

<p>1. A delay in the calibration of monitoring equipment (TI 2520-1, PT-2513, FT2606, TI 2620-1, PT-2613) was observed during the current monitoring period. In-line to the para 366 of VVS for PA, which states "If during verification DOE determines delay in the calibration (and the delayed calibration results are available) then PP shall apply the maximum permissible error of the equipment. PP is requested to clarify the same.</p> <p>2. Value of the monitored parameter 'NCV i,y' listed under section D.2 of the Monitoring report (Dated:30/01/2020) was found to be average of monthly values and not weighted average as per the parameter description. PP shall provide the clarification for the inconsistency.</p>	
Project participant response	Date : 09/04/2020
<p>1. Error factor has been applied to the equipment with the delay in calibration and the ERs have been revised accordingly.</p> <p>2. The calculation of the monitored parameter 'NCV i,y' has been revised and now the ER sheet reflects the Weighted average value of the parameter.</p>	
Documentation provided by project participant	
<p>MR Version 1.3 ER sheet Version 03 revision 04</p>	
DOE assessment	Date: 10/04/2020
<p>1. PP has applied the correction factor to the parameter values for which delay in calibration was observed during the current monitoring period. (Closed)</p> <p>2. PP has revised the calculation of monitored parameter 'NCV i,y' listed under section D.2 of the Monitoring report (Dated:09/04/2020). The weighted average value has been updated in the Emission reduction sheet (Version 03 Rev 04) and monitoring report. (Closed)</p>	

Table 3. CAR from this verification

CAR ID	01	Section no.	E.8.5	Date : 16/01/2020
Description of CAR				
<p>1. Value of ERs achieved mentioned in the key project information page(page1) of the MR dated 08/12/2019 version 1.1 was found to be inconsistent with the ERs achieved mentioned in the ER sheet titled:10006 ER calculation sheet; Tab: Emission Calculations Final-1; Cell: C41 and also with section E.5.of MR.</p> <p>2. Value of the estimated ERs (i.e. 69,674 tCO₂e) mentioned in the key project information page(page1) of the MR dated 08/12/2020 version 1.1 was found to be inconsistent with the ERs achieved mentioned in the ER sheet titled:10006 ER calculation sheet; Tab: Emission Calculations Final; Cell: C41 and also with section E.5.of MR (Value mentioned is 132,196 tCO₂e).</p>				
Project participant response				Date : 22/02/2020
<p>1. Achieved ER value has been revised.</p> <p>2. Corrected</p>				
Documentation provided by project participant				
Revised ER sheet and MR				
DOE assessment				Date: 24/02/2020
<p>1. Value of ERs achieved (85,198 tCO₂e) in the current monitoring period is now consistently mentioned both in MR version 1.2 and ER sheet Version 3. (Closed)</p> <p>2. Value of the ERs estimated (132,196 tCO₂e) for the current monitoring period is now consistently mentioned both in MR version 1.2 and ER sheet Version 3. (Closed)</p>				

Table 4. FAR from this verification

FAR ID	NA	Section No.	NA	Date : DD/MM/YYYY
Description of FAR				
No FAR from this verification				
Project participant response				Date : DD/MM/YYYY
NA				

Documentation provided by project participant	
NA	
DOE assessment	Date: DD/MM/YYYY
NA	

Appendix 5. Boiler Load Class

Boiler Load Class (Tons/hr)	2008-U	2008-UA
	Load Classes	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

Appendix 6. 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

Appendix 7. Specific Fuel Consumption Estimation per load class:

Boilers	Load Class	Range	FCBL _i	PBL _i	SFC _{i,j}	Calorific Value (ARAMCO-HHV)
		MT/hr	Fuel (Nm ³ /Hour)	Steam(T/Hour)	Nm ³ /Tsteam	GJ/Nm ³
2008-U	1	0-20	2043.8	15.9	128.2	0.039200
	2	21-40	2117.7	26.5	79.84	0.038900
	3	41-60	4143.2	53.2	77.8	0.0384400
	4	61-80	5537.1	67.7	81.8	0.0385050
	5	81-100	7802.4	95.3	81.9	0.0385671
	6	101-120	8695.0	105.0	82.83	0.0385331
	7	>120	10634.9	124.0	85.7	0.0384506
2008-UA	1	0-20	819.6	5.2	156.8	0.0389257
	2	21-40	2697.5	30.1	89.5	0.0391287
	3	41-60	4816.0	56.5	85.3	0.0386420
	4	61-80	5811.1	69.2	83.9	0.0384695
	5	81-100	7908.9	95.8	82.6	0.0385328
	6	101-120	8746.7	105.4	82.98	0.0385453
	7	>120	10523.6	124.9	84.2	0.0384455

- - - - -

Document information

Version	Date	Description
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN); Make structural and editorial improvements.
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		