

Verification and certification report form for CDM project activities
(Version 01.0)

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System
Reference number of the project activity	10006
Version number of the verification and certification report	2
Completion date of the verification and certification report	05/01/2017
Monitoring period number and duration of this monitoring period	First monitoring period, 01/10/2014 to 30/09/2015
Version number of monitoring report to which this report applies	05
Crediting period of the project activity corresponding to this monitoring period	01/10/2014, fixed, 10 years
Project participant(s)	Al Jubail Fertilizer Company (Al Bayroni) Saudi Basic Industries Corporation (SABIC)
Host Party	Kingdom of Saudi Arabia
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope(s); 1 - Energy industries (renewable - / non-renewable sources) AM0056 - Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems Version 1.0
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	66,098 tCO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	53,860 tCO ₂ e
Name of DOE	Earthood Services Private Limited
Name, position and signature of the approver of the verification and certification report	 Dr. Kaviraj Singh Managing Director

SECTION A. Executive summary

Brief summary of the project activity

The project participant, AL Jubail Fertilizer Company (Al Bayroni), manufactures ammonia in collaboration with Taiwan Fertilizer Company (TFC). Al Bayroni is affiliated with Saudi Basic Industries Corporation (SABIC) which is the second project participant. In the process of ammonia manufacture, three boilers are used which are procured from Mitsubishi Heavy Industries (MHI). The registered project activity reduced GHG emission through energy efficiency measure, thereby reducing the fuel consumption of two out of the three boilers. In this whole process, steam quality and production rates are maintained as per the pre-project scenario.

The project activity includes implementation of three changes, 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 verification team confirms that the total emission reductions achieved under this monitoring period 01/10/2014 to 30/09/2015 (including both days) are 53,860 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 01/10/2014 to 30/09/2015 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 Al-Jubail Fertilizer Company for the scope of verification;
- Publication of monitoring report
- Desk review
- Physical on-site inspection
- Issuance of verification findings
- Reporting, calculation checks, QA/QC and resolution of findings

- Issuance of draft verification report
- Independent technical review of the project documentation
- Issuance of the final verification report
- Submission of the request for issuance, as appropriate

Conclusion

ESPL has performed the verification of the CDM PA “Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System” having UNFCCC Ref. Number 10006 for the monitoring period 01/10/2014 to 30/09/2015. The verified emission reductions amount to 53,860 tCO₂e in the aforesaid monitoring period.

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

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Gautam	Ashok Kumar	Central Office	Y	Y	Y	Y
2.	Verifier	IR	Gupta	Anshika	Central Office	Y	N	N	Y
3.	Technical Expert TA1.1	IR	Gautam	Ashok Kumar	Central Office	Y	Y	Y	Y
4.	Methodological expert	IR	Gautam	Ashok Kumar	Central Office	Y	Y	Y	Y
5.	Local expert	ER	Kumar	Rajendra	Central Office	Y	N	N	Y

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	Mahawar	Abhishek	Central Office
2.	Expert to TR	IR	Deka	Nayan Jyoti	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in recording the readings	Low	Recording of readings for most of the parameters is automated and electronic and there is limited human	Electronic records used for ER calculation to be checked with the source data available as plant records.

			intervention. Therefore, chances of possible human errors, in recording and archiving, are minimised.	
2.	Error in transferring the data to ER sheet	High	Transfer of data from source to ER calculation involve human intervention and might lead to some readings being copy and pasted inconsistently in the ER sheet from the source data.	The values reported in ER sheet to be checked with their respective source data. The first value, last value and the total of the columns for all parameters reported at the interval of 10 minutes was verified from the source data.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM VVS Version 9 para 361 the prescribed thresholds for materiality for CDM PAs (materiality is not applicable for CDM PoAs as per 359 (a) of CDM VVS Version 9) are as 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 361)	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 2% as project activity.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO₂e) in this monitoring period	15,651 tCO ₂ e	53,860 tCO ₂ e
Applicable Threshold (%) as per para 361 of CDM VVS Version 9	2%	2%

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

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total)	Sample selected for verification	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)
PPJ _{k,y}	Every 15 minutes	34,675 (95 readings per day*365 days)	Please read the comment below*.	No error identified	No impact	No impact
PRESS _{PJ,MAX}	Every 15 minutes	34,675 (95 readings per day*365 days)	Please read the comment below*.	No error identified	No impact	No impact
TEMP _{PJ}	Every 15 minutes	34,675 (95 readings per day*365 days)	Please read the comment below*.	No error identified	No impact	No impact
FC _{i,j,y}	Continuously	34,675 (95 readings per day*365 days)	Please read the comment below*.	No error identified	No impact	No impact
NCV _{i,y}	Monthly	12	12	No error identified	No impact	No impact
EFCO _{2 i,y}	-	1	1	No error identified	No impact	No impact

**These values are recorded automatically in the especially designed software at the interval of 15 minutes and copied and pasted in the ER sheet.*

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

SECTION D. Means of verification

D.1. Desk review

A desk review was conducted by the verification team, which 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

Duration of on-site inspection: 28/10/2015				
No.	Activity performed on-site	Site location	Date	Team member
1	An assessment of the implementation and operation of the registered CDM project activity as per the registered PDD or any approved revised PDD;	Kingdom of Saudi Arabia	28/10/2015	Ashok Kumar Gautam
2	A review of information flows for generating, aggregating and reporting the monitoring parameters;			
3	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the registered monitoring plan;			
4	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;			
5	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;			
6	A review of calculations and assumptions made in determining the GHG data and emission reductions;			
7	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters;			

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1)	Israfilof	Zaour	SABIC (CDM specialist)	28/10/2015	ER calculation, implementation of PA, operation and maintenance, QA/QC procedures, monitoring of parameters	Ashok K. Gautam
2)	M Shaffeullah	Azeez	Al-Jubail Fertilizer Company (EHSS)	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
3)	Al-Fageeh	Abdullatif	Al-Jubail Fertilizer Company (EHSS)	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
4)	Jacob	Abraham	Al-Jubail Fertilizer Company (ECB)	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
5)	Shahzad	Rizwan	Al-Jubail Fertilizer Company (process engineer)	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
6)	Pandya	L.S.	Al-Jubail Fertilizer Company (process manager)	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
7)	Takroumi	Omar.M.	Al-Jubail Fertilizer Company	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
8)	Hsu Sulg	Chyuan	Al-Jubail Fertilizer Company	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
9)	A.M.	Shamran	Al-Jubail Fertilizer Company	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam
10)	Al-Mafki	Badr	Al-Jubail Fertilizer Company	28/10/2015	operation and maintenance, QA/QC procedures	Ashok K. Gautam

D.4. Sampling approach

There is not sampling approach defined in the PDD.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	CAR#1	-
Compliance of the project implementation with the registered PDD	-	CAR#1, CAR#2	-
Post-registration changes	-		-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	CAR#3, CAR#4	-
Compliance of monitoring activities with the registered monitoring plan	-	CAR#5	-

Compliance with the calibration frequency requirements for measuring instruments	-	CAR#6	-
Assessment of data and calculation of emission reductions or net removals	-	CAR#7, CAR#8	-
Others (explanation in ER sheet)	-	CAR#9	-
Total	0	9	0

SECTION E. Verification findings

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

Means of verification	The monitoring report form used is CDM-MR-FORM version 05.1/4/ which was the appropriate form and the latest version available at the time of verification. All the sections of the form were filled as per the guidelines and gave all the relevant details.
Findings	CAR#1 raised and resolved successfully. Refer to appendix 4 for details.
Conclusion	The final monitoring report /5/ is found to be in compliance with the applicable latest monitoring report form and the instructions therein.

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

This is the first verification of the project activity. There were no FARs in the validation report /8/ or PRC report /11/ as well which requires to be closed during this verification.

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

Means of verification	<p>This project involves the following modifications and installations to realize energy and GHG savings from the packaged boilers:</p> <ul style="list-style-type: none"> • New Economizer • New modified super-heater • Associated modifications in convection ducts <p>The project activity is located in Jubail Industrial City of Eastern Province of Saudi Arabia. The geo-coordinates of the project activity were checked with hand held mobile device using android app (Get Geo coordinates) and were found comparable to the ones given in the registered/revised PDD. The verification team visited the two boilers and monitoring locations during the on site inspection and found them operational and consistent with the registered/revised PDD. The modification done as part of the project activity were found to be complete as observed on site and the completion of implementation status (of two boilers 2008U and 2008UA) was confirmed from the mechanical completion certificate /12/ dated 31/05/2013 issued by PP to Toyo Engineering Corporation. The aforesaid certificate indicated the completion date as 16/05/2013. A third boiler 2052U was also found completely implemented on site as seen physically as well as based on mechanical completion certificate /13/ dated 28/02/2014, which was part of project description in the registered PDD /7/ but removed from later version of revised PDD /7/. A post registration change request was submitted by verification team in this regard, among other changes, which was approved by CDM EB. The aforesaid boiler was removed from the revised PDD /7/ as it failed to comply with the methodological requirements with regards to input fuel restriction for auxiliary fuel. The verification team confirms that the project activity now includes the two boilers as part of the project description viz., 2008U and 2008UA.</p> <p>In addition, the revised accepted PDD included several parameters through permanent change in monitoring plan, which were not included in the registered PDD in order to appropriately calculate ERs as per methodological requirements. The PP responded with such monitored data after the CDM approval for the said PRC request. Once the calculation procedures and entire monitoring dataset was presented the verification team identified that actual fuel savings from the project activity are significantly larger than envisaged, therefore, clearly establishing the project activity was not operated as per registered PDD. In absence of such data and calculation prior to the completion of previous PRC request, the verification team once again reviewed these changes and established that the PDD requires further changes to correct the estimated fuel savings and thus estimated ERs in</p>
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	<p>the revised PDD itself. Therefore, in this request for issuance additional PRC is submitted along with required set of documentation. The proposed revised PDD includes the revision in the value of estimated figure of fuel savings from erstwhile 9.7% to 20.18%, which is based on actual operation data (plus 10% above). The review of changes proposed in the revised PDD /7/ and as concluded in the corresponding validation opinion /11/, confirms that prior approval is not mandatory as it complies with the CDM PS Appendix 1.</p> <p>The project activity is consistent with the description given in the revised PDD/7/. Interview of the personnel on-site reveals that all the QA/QC procedures listed in the revised PDD has been applied during operation of the project activity.</p>
Findings	CAR#1, CAR#2 raised and resolved successfully. Refer to appendix 4 for details.
Conclusion	<ul style="list-style-type: none"> In view of the information verified during the site visit, the verification team is able to confirm that all physical features (technology, project equipment, and monitoring and metering equipment) of the registered CDM project activity were in place and that the project participants have operated the project activity as per the revised PDD /7/ during the concerned monitoring period. The emission reductions achieved during the current monitoring period are 53,860 tCO₂e, which is less than the estimated quantity (66,098 tCO₂e) in the revised PDD for the comparable period.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Not applicable

E.4.2. Corrections

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

1. Change in the Data Unit from "tons per hour and tons per year" to "Tonnes per year". The proposed change in Data Unit is in accordance with the applied methodology.
2. The GWP of the CH₄ was erroneously considered as 21 in the registered PDD. The revised registered PDD (version 8, dated 30/05/2016) includes GWP_{CH₄} as ex ante parameter and corrected the value under B.6.3 for ex ante estimates of leakage emissions. The said change has been proposed as per para 1 of Appendix 1 of CDM PS Version 9.
3. Minor formatting changes in the revised PDD either as a consequence of using the latest PDD template or representing the correct information at various places in the revised PDD due to other proposed changes.

The following corrections has been submitted along with this request of issuance:

1. Figure B.7.1 and B.7.2 in the PDD has been changed to give the location of steam pressure monitoring equipment for both the boilers.

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

Not applicable

E.4.4. Inclusion of a monitoring plan to a registered project activity

Not applicable

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

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

1. Change of monitoring frequency for parameters PP,J,k,y (System) and TEMPPJ in the registered monitoring plan from 'Hourly' to 'Every 15 minutes' in the revised 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 $EFCO2_{i,y}$ under section B.7.1 of the revised PDD. The inclusion is necessitated to properly determine the project emissions as prescribed in the registered PDD (page 29, 30) and "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" Version 2 /10/.
3. Additional details for measurement methods has been included with regard to some parameters that are required to be monitored as per ASME PTC 4 Standard under Note 1 in the revised PDD. The changes made has been proposed as part of para 5(f) of Appendix 1 of CDM PS Version 9.

E.4.6. Changes to the project design of a registered project activity

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

However, as part of request of issuance submitted for this PA for the monitoring period 01/10/2014 to 30/09/2015, a change to project design has been proposed by PP as follows:

The fuel saving for this project activity has been anticipated as 9.7% as per the estimates given by manufacturer. These estimates were based on highly conservative and minimum guaranteed by vendor (supplier of modification equipment - economizer) values. However, the monitoring data based on real time operational values reveals a fuel saving of 18.28%. Thus, the PP has considered a bracket of $\pm 10\%$, the upper margin (+10%) being 20.18%. Thus, the new ex-ante estimates are based on the revised fuel saving values.

The reasons why these changes could not be proposed along with earlier PRC are discussed in PRC validation opinion /11/.

E.4.7. Types of changes specific to afforestation and reforestation project activities

Not applicable

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The monitoring plan as contained in the revised PDD /7/ was reviewed against the monitoring requirements of the applied methodology AM0056 version 1.0. Based on this review it was found the monitoring plan contained in the revised PDD includes all the required parameters to be monitored in the context of project design and description and allows proper determination of emission reductions in accordance with the revised PDD /7/ and applied methodology AM0056 version 1.0/9/.
Findings	CAR#3, CAR#4 raised and resolved successfully. Refer to appendix 4 for details.
Conclusion	The monitoring plan outlined in the revised PDD is in accordance with the applied methodology /9/ and correctly applied by the registered CDM project activity.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	The values considered ex-ante for this monitoring period were cross-checked with revised PDD 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 revised PDD /07/. It has been consistently reported and used in ER sheet /06/ as well.
	Boiler load class, i and j	Given in appendix 5	The values were found to be consistent with revised PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	System Load Class "K"	Given in appendix 5	The values were found to be consistent with revised PDD /07/. It

			has been consistently reported and used in ER sheet/06/ as well.
	FC _{BLi}	Given in appendix 5	The values were found to be consistent with revised PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	PB _{Li}	Given in appendix 5	The values were found to be consistent with revised PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	NCV _{FF, BL}	Given in appendix 5	The values were found to be consistent with revised PDD /07/. It has been consistently reported and used in ER sheet/06/ as well.
	EFC,FF,BL	0.056tCO ₂ e/GJ	The uses value was found to be consistent with the source according to revised PDD i.e. IPCC National Greenhouse Gas Inventory/34/. It has been consistently reported and used in ER sheet/06/ as well.
	OXIDFF,BL	1	The uses value was found to be consistent with the source according to registered PDD i.e. IPCC National Greenhouse Gas Inventory/25/. It has been consistently reported and used in ER sheet/06/ as well.
	PRESS _{BL,MIN}	3.1 bar	The values used was found to be consistent with the tests results for pressure of the generated steam/34/. It has been consistently reported and used in ER sheet/06/ as well.
	PRESS _{BL,MAX}	38.3 bar	The values used was found to be consistent with the tests results for pressure of the generated steam/35/. It has been consistently reported and used in ER sheet/06/ as well.
	TEMP _{BLMIN}	571.1 K	The values used was found to be consistent with the tests results for temperature of the generated steam /29/. It has been consistently reported and used in ER sheet/06/ as well.
	TEMP _{BLMAX}	671.9 K	The values used was found to be consistent with the tests results for temperature of the generated steam /29/. It has been consistently reported and used in ER sheet/06/ as well.
	GWP _{CH4}	25	It was found to be consistent with the IPCC values used for second commitment period. It has been consistently reported and used in ER sheet/06/ as well.
Findings	None		
Conclusion	The value in the monitoring report /05/ and corresponding emission reduction calculations spreadsheet /06/ are consistent with the revised PDD /7/. The applied value is correct and justified.		

E.6.2. Data and parameters monitored

E.6.2.1. Generated steam in the year 'y' 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 year 'y' subdivided into load classes in the case of multi boiler installations, PPJ,k,y, t/yr

Means verification	of							
	Criteria/Requirements	Assessment/Observation						
	Measuring /Reading /Recording frequency	The parameter is recorded every 15 minutes in an online PIMS server.						
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes						
	Monitoring equipment	<div>The parameter is monitored using a D/P Transmitter of Rosemount make with the following tag numbers:<table><tr><td>Boiler ID</td><td>Tag # of equipment</td></tr><tr><td>2008 U</td><td>FT 2506</td></tr><tr><td>2008 UA</td><td>FT 2606</td></tr></table>The accuracy class of both the equipment is ±1% of Full Scale as verified from calibration certificate/14, 17/.</div>	Boiler ID	Tag # of equipment	2008 U	FT 2506	2008 UA	FT 2606
	Boiler ID	Tag # of equipment						
	2008 U	FT 2506						
	2008 UA	FT 2606						
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes							
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range							
Calibration frequency /interval:	Calibration frequency is every 3 years which has been verified using calibration certificates/14, 17/.							
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes							

	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/14, 17/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.								
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is valid for entire monitoring period. Refer to section E.7 for details.								
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes								
	How were the values in the monitoring report verified?	<p>The reported values inline to monitoring frequency as reported in MR and ER sheet has been verified with the plant records maintained onsite/29/. Values were found to be consistent and has been consistently used for calculation as well.</p> <p>The total sum for steam generation within load classes for both the boilers is as follows:</p> <table><tr><th>Boiler number</th><th>Steam generation (tons/annum)</th></tr><tr><td>2008U</td><td>701,116</td></tr><tr><td>2008 UA</td><td>747,859</td></tr><tr><td>Total</td><td>1,448,976</td></tr></table>	Boiler number	Steam generation (tons/annum)	2008U	701,116	2008 UA	747,859	Total	1,448,976
	Boiler number	Steam generation (tons/annum)								
	2008U	701,116								
	2008 UA	747,859								
Total	1,448,976									
If applicable, has the reported data been cross-checked with other available data?	Not applicable									
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.									
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.									
Findings	CAR#5 was raised and resolved. Refer to appendix 4 for details.									
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none">Monitoring results are consistently recorded as per approved frequencyQA/QC procedures have been applied in accordance with the registered monitoring plan.No sampling approach has been followed by PP for monitoring which is appropriate for the project activity. <p>This is in compliance with para 390 of VVS Version 09.</p>									

E.6.2.3. Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system, in t CH₄ per GJ fuel supplied to final consumers, $EF_{PJ,upstream,CH_4}$, t CH₄/GJ Fuel

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

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

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

E.6.2.5. 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_{CO₂,upstream,LNG} , t CO₂/GJ Fuel

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

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

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Every 15 minutes using an online PIMS server data
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	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 ±1% as verified by their calibration certificates /18, 30/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	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	Yes

	accordance with the local/national standards, or as per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/18, 30/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is valid for entire monitoring period. Refer to section E.7 for details.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	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.
Findings	None	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures has been applied in accordance with the registered monitoring plan. No sampling approach has been followed by PP for monitoring which is appropriate for the project activity. <p>This complies with para 390 of VVS Version 09.</p>	

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

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Every 15 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	The parameter has been monitored using thermocouple (K-type) with tag numbers

		8100 for boiler 2008 U. For boiler 2008 UA monitoring has been done by equipment with tag numbers TI 8103. Accuracy class for both the equipment is $\pm 1.2^{\circ}\text{C}$ as verified by calibration certificates/15, 19/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes
	Calibration frequency /interval:	Annually
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/15, 19/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is not valid for entire monitoring period. Refer to section E.7 for details.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	The values for this parameter was verified using the plant records/29/. Owing to the monitoring frequency of 15 minutes, this parameter has multiple values, thus it has not been reported in verification report. The values reported in ER sheet has been checked for consistency as mentioned above.
	If applicable, has the reported data been cross-checked with other available data?	-

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	
Findings	CAR#5 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 395 of VVS Version 09. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 390 of VVS Version 09.</p>	

E.6.2.8. Quantity of natural gas combusted in one year, $FC_{i,j,y}$, m3/yr

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuously on hourly basis
	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	Yes

	per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration is carried out by Al-Jubail Fertilizer Company/16, 20/. The calibration certificates mentioned the details of equipment used for calibration which were found to be appropriate and had a valid calibration dates for itself.
	Is(are) calibration(s) valid for the whole reporting period?	Calibration is valid for entire monitoring period. Refer to section E.7 for details.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	A value of 112,027,321.80 m ³ /yr has been verified using plant log data and supplier invoices/21/. 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?	-
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	CAR#5 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 390 of VVS Version 09.</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
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the	Not applicable

	monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	Calibration frequency /interval:	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	The value of 0.04 GJ/m ³ was verified from the monthly invoices issued by natural gas supplier (Saudi ARAMCO). The value is reported and used for ER calculation consistently.
	If applicable, has the reported data been cross-checked with other available data?	-
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	CAR#5 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 390 of VVS Version 09.</p>	

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

Means verification of	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
	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?	Not applicable
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	Calibration frequency /interval:	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Value of 0.056 tCO ₂ /GJ has been verified from the source of information, i.e. IPCC Guidelines on National GHG Inventories/25/. Values was found to be consistently reported and used for ER calculation.
	If applicable, has the reported data been cross-checked with other available data?	-

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and accurate.
Findings	CAR#5 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and registered monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. <p>This complies with para 390 of VVS Version 09.</p>	

E.6.3. Implementation of sampling plan

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

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

Means of verification	Calibration of equipment for boiler 2008 U according to the parameters monitored by them is as given below:				
	Parameter	Equipment Tag #	Calibration date	Validity	Monitoring period covered?
	FC i,j,y	FT 2509 A	24.04.2013 06.04.2015	3 years	Y
	PPJ,k,y	FT 2506	26.11.2010 02.04.2013	3 years	Y
	TEMP _{PJ}	TI 8100	13.04.2013 03.11.2015	1 year	N
	PRESS _{PJ}	PT 2513	01.07.2014 30.06.2015	1 year	Y
	<p>As evident above, calibration for equipment monitoring parameters FC i,j,y, PPJ,k,y and PRESS_{PJ} are under compliance of the required frequency. Equipment TI8100 monitoring parameter TEMP_{PJ} is out of calibration for the whole monitoring period. Thus, an error factor of +1.2 degree Celsius has been applied in ER sheet to conservatively calculate the emission reduction. The error factor applied was crosschecked from calibration certificates and found to be consistent.</p> <p>Calibration of equipment for boiler 2008 UA according to the parameters monitored by them is as given below:</p>				
	Parameter	Equipment Tag #	Calibration date	Validity	Monitoring period covered?
	FC i,j,y	FT 2609 A	24.04.2013, 06.04.2015	3 years	Y
	PPJ,k,y	FT 2606	02.04.2013 18.04.2013	3 years	Y
	TEMP _{PJ}	TI 8103	13.04.2013 29.10.2015	1 year	N
	PRESS _{PJ}	PT-2613	09.07.2014	1 year	Y

	06.07.2015
	As evident above, calibration for equipment monitoring parameters FC _{i,j,y} , PPJ _{k,y} and PRESS _{PJ} are under compliance of the required frequency. Equipment TI8103 monitoring parameter TEMP _{PJ} is out of calibration for the whole monitoring period. Thus, an error factor of +1.2 degree Celsius has been applied in ER sheet to conservatively calculate the emission reduction. The error factor applied was crosschecked from calibration certificates and found to be consistent.
Findings	CAR#6 was raised and resolved. Refer to appendix 4 for details.
Conclusion	The verification team confirms that the calibration is conducted at the frequency as specified by the methodology and/or the registered monitoring plan except mentioned otherwise, above. Appropriate corrections were applied conservatively.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>Baseline emission estimation has been done in accordance with registered monitoring plan/07/ and applied methodology/09/. The equation used is as follows:</p> $BE_y = 44/12 * EF_{C,FF,BL} * OXID_{FF,BL} * SEC_{syst}$ <p>Where:</p> <p>BE_y Baseline emissions resulting from steam generation within the capacity of the baseline equipment in the monitoring period (tCO₂/yr)</p> <p>SEC_{syst} Specific energy consumption (GJ/t) of the multi boiler steam generation system</p> <p>$EF_{C,FF,BL}$ Carbon emission factor of baseline fossil fuel (tC/GJ)</p> <p>$OXID_{FF,BL}$ Oxidation factor of baseline fossil fuel</p> <p>$44/12$ Ratio of the molecular weight of CO₂ to the molecular weight of carbon</p> <p>Equation was found to be correctly applied in the ER sheet/4/.</p>
Findings	None
Conclusion	<p>Calculation of baseline GHG emissions was found to be satisfactory. The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the revised PDD, with the relevant supportings and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>

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

Means of verification	<p>Project emission estimation has been done in accordance with registered monitoring plan/01/, applied methodology/05/ and tool/06, 09/. The equation used is as follows:</p> $PE_{FC,JY} = \sum FC_{i,J} \times COEF_{i,Y}$ <p>Where:</p> <p>$PE_{FC,JY}$ = Are the CO₂ emissions from fossil fuel combustion in process j during the year 'y' (tCO₂/year)</p> <p>$\sum FC_{i,J}$ = Is the quantity of fuel type 'i' combusted in process 'j' during the year y (Mass or Volume Unit/year)</p>
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	<p>$COEF_{i,y}$ = Is the CO2 emission coefficient of fuel type 'i' in year 'y' (tCO2/mass or volume unit)</p> <p>i = are the fuel types</p> <p>Equations were found to be correctly applied in the ER sheet/6/.</p>
Findings	None
Conclusion	<p>Calculation of project GHG emissions was found to be satisfactory.</p> <p>The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the revised PDD, with the relevant supportings and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>

E.8.3. Calculation of leakage GHG emissions

Means of verification	<p>Leakage emission estimation has been done in accordance with registered monitoring plan/01/, applied methodology/05/ and tool/06, 09/. The equation used is as follows:</p> $LE_{CH_4,Y} = (FC_{PJ,Y} * NCV_{PJ,Y} * EF_{PJ,upstream,CH_4} - FC_{BL,Y} * EF_{BL,upstream,CH_4}) * GWP_{CH_4}$ <p>Where:</p> <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>$EF_{PJ,upstream,CH_4}$ = Emission factor for upstream fugitive methane emissions of fossil fuel used in the project activity from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system</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_{CH_4} = 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/6/.</p>
Findings	None
Conclusion	<p>Calculation of project GHG emissions was found to be satisfactory.</p> <p>The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the revised PDD, with the relevant supportings and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>

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

Means verification	of	As elaborated above, the emission reductions from the project activity were based on baseline, project and leakage emissions only. The calculations presented in this regard in the final monitoring report and corresponding ER calculation sheet were found appropriate and complying with the provisions prescribed in the registered monitoring plan of revised PDD and applied methodology. The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.
Findings		CAR#7 was raised and resolved. Refer to appendix 4 for details.
Conclusion		The verification team confirms that appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project GHG emissions or actual net GHG removals and leakage GHG emissions have been followed; The assumptions, emission factors and default values that were applied in the calculations have been justified.

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

Means verification	of	Actual emission reduction is lower than the revised ex ante emission reductions for the considered monitoring period as per estimates in the revised PDD /7/. The actual emission reductions claimed to be achieved in the MR i.e., 53,860 tCO ₂ e is whereas, estimated ERs in the revised PDD is 66,098 tCO ₂ e. lower emission reduction has been achieved due to lower fuel efficiency achieved by the system.
Findings		None
Conclusion		Justification of lower emission reductions has been included in the section E.6 of the revised MR. The explanation included in the revised MR/5/ was found acceptable. Thus, comparison of actual GHG emission reduction with estimates in revised PDD/7/ was found OK.

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

Means verification	of	Post PRC, the ex-ante estimates are greater than the achieved emission reductions, thus no further scrutiny has been done.
Findings		CAR#8
Conclusion		Achieved ERs are within the ex-ante estimates as per revised PDD/7/.

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

Means verification	of	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 01/10/2014 to 30/09/2015 (including both days) amount to 53,860 tCO ₂ e.						
		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>53,860 tCO₂e</td></tr></table>	Commitment period	Amount	Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e	From 01/01/2013	53,860 tCO ₂ e
	Commitment period	Amount						
Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e							
From 01/01/2013	53,860 tCO ₂ e							
Findings		None						
Conclusion		Actual GHG emission reductions in the commitment period (01/01/2013 onwards) were found to be 53.860 tCO ₂ e						

SECTION F. Internal quality control

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

possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

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

SECTION G. Verification opinion

Earthood Services Private Limited (Earthood), contracted by Al-Jubail Fertilizer Company, has performed the independent verification of the emission reductions for the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in Kingdom of Saudi Arabia for the monitoring period 01/10/2014 to 30/09/2015 (including both days) as reported in the Monitoring Report (public) Version 1 dated 04/10/2015. The Al Jubail Fertilizer Company (Al Bayroni) is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology AM0056 Version 1.0, the monitoring plan contained in the registered PDD, Monitoring Report (public) Version 1 dated 04/10/2015.

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

The verification team confirms that:

- The project activity was found completely implemented as per the description given in the revised PDD.
- The actual operation conforms to the description in the revised PDD

SECTION H. Certification statement

Earthood Services Private Limited (Earthood), contracted by Al-Jubail Fertilizer Company, has performed the independent verification of the emission reductions for the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in Kingdom of Saudi Arabia for the monitoring period 01/10/2014 to 30/09/2015 (including both days) as reported in the Monitoring Report (Final) Version 5 dated 08/11/2016. The Al Jubail Fertilizer Company (Al Bayroni) is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology AM0056 Version 1.0, the monitoring plan contained in the registered PDD, Monitoring Report (public) Version 1 dated 04/10/2015 as per the methodology described under Section D of this report.

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

In our opinion the GHG emissions reductions reported for the project activity for the period 01/10/2014 to 30/09/2015 (including both days) are fairly stated in the Monitoring Report (final) Version 5 dated 08/11/2016. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AM0056 Version 1.0 and the monitoring plan contained in the PDD Version 8 dated 30/05/2016.

Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 10006 "Efficiency Improvement by Boiler Rehabilitation in fossil fuel-fired (Natural Gas) Steam Boiler System" in India during the period 01/10/2014 to 30/09/2015 (including both days) amount to 53,860 tCO₂e.

Verified and certified emission reductions as per commitment period:

Commitment period	Amount
Upto 31/12/2012 (1 st commitment period)	Not Applicable/Nil
From 01/01/2013 onwards	53,860 tCO ₂ e

Appendix 1. Abbreviations

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

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	14 Years +		
Field	Energy, Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C. AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Z., AMS-III.AV., AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0006		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (1.1)	YES		
TA Expert (1.2)	YES		
TA Expert (3.1)	YES		
TA Expert (13.1)	YES		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Kaviraj Singh	Date	08/09/2016

Competence Statement			
Name	Rajendra Kumar		
Country	Saudi Arabia		
Education	MBA (Finance)		
Experience	8 Yrs		
Field	Finance		
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		
Reviewed by	Abhishek Mahawar	Date	13/09/2016
Approved by	Ashok Kumar Gautam	Date	13/09/2016

Competence Statement			
Name	Anshika Gupta		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	2 Year +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (1.2, 3.1)	NO		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Ashok Kumar Gautam	Date	08/09/2016

Competence Statement			
Name	Abhishek Mahawar		
Country	India		
Education	B. Tech. (Chemical Engineering) MBA (Finance)		
Experience	7 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS.I.F. and ACM0002		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert (1.2)	YES		
Reviewed by	Ashok Gautam	Date	07/09/2016
Approved by	Kaviraj Singh	Date	07/09/2016

Competence Statement	
Name	Nayan Jyoti Deka
Country	India

Education	M.Tech. (Energy Technology), Tezpur University		
Experience	8 Years +		
Field	Climate Change & Energy Management		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-III.H., AMS-I.C., ACM0006, ACM0002		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (1.1, 1.2, 3.1, 13.1)	YES		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Ashok Kumar Gautam	Date	08/09/2016

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UNFCCC	Standard: CDM PS	Ver. 9	Others
2.	UNFCCC	Standard: CDM PCP	Ver. 9	Others
3.	UNFCCC	Standard: CDM VVS	Ver. 9	Others
4.	UNFCCC	Form: CDM-MR-FORM	Ver. 5.1	Others
5.	PP	Monitoring Report (Publication) Monitoring Report (Final)	Ver 1, 04/10/2015 Ver 5, 08/11/2016	PP
6.	PP	ER Spreadsheet (final)	Corresponding to final MR	PP
7.	PP	Registered PDD (approved) Revised PDD (as part of this RFI)	Ver 08, 30/05/2016 Ver 10.1, 08/11/2016	Others PP
8.	SGS UK Ltd.	Validation Report	Ver 03, 14/07/2014	Others
9.	UNFCCC	Methodology: AM0056, Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems	Ver. 1.0	Others
10.	UNFCCC	Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion	Version 02	Others
11.	ESPL	PRC Validation Opinion -approved by CDM EB -submitted with this request	Ver 3.0, 31/05/2016 Ver 4.0, 08/12/2016	Others
12.	PP	Plant mechanical completion certificate for boiler Ammonia Plant & Boilers 2008 U/UA	31/05/2013	PP
13.	PP	Plant mechanical completion certificate for Boiler 2052U of ABEOP	28/02/2014	PP
14.	Al-Jubail Fertilizer Company	Flow meter transmitter calibration report for FT-2506	26/11/2010, 02/04/2013	PP
15.	SABIC	Loop test report for Thermocouple 8100	13/04/2013, 03/11/2015	PP

16.	Various	Test reports for FT-2509A: Calibration and testing report	24/04/2013, 06/04/2015	PP
17.	Al-Jubail Fertilizer Company	Transmitter calibration report for flow meter FT-2606	02/04/2013, 18/04/2013	PP
18.	Al-Jubail Fertilizer Company	Transmitter calibration report for PT-2613	09/07/2014, 06/07/2015	PP
19.	Al-Jubail Fertilizer Company	Calibration report for Thermocouple 8103	13/04/2013, 29/10/2015	PP
20.	Emerson process management	Calibration certificate for transmitter FT-2609A	24/04/2013, 06/04/2015	PP
21.	Saudi Aramco	Invoice issued for supply of fuel gas	-	
22.	DNV Business Assurance	ISO 14001:2008 and ISO 14001:2004 certificate issued to SABIC	14/02/2012	PP
23.	BSI	Certificate of registration for ISO 9001:2008	01/05/2015	PP
24.	UNFCCC	Webpage for project activity. http://cdm.unfccc.int/Projects/DB/SGS-UKL1405604803.71/view	Last access date 26/07/2016	Others
25.	IPCC	National Greenhouse Gas Inventory	2006	PP
26.	UNFCCC	CDM-MR-FORM	Version 5.1	Others
27.	UNFCCC	CDM-VCR-FORM	Version 1.0	Others
28.	Al-Jubail Fertilizer Company	Calibration certificates for FT 2606	15/12/2010, 02/04/2013, 18/04/2013	PP
29.	PP	Plant records for the monitoring parameters	electronically retrieved	PP
30.	Al-Jubail Fertilizer Company	Calibration certificate for PT-2513	01/07/2014, 30/06/2015	

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

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

There were no FAR observed in the validation report dated – 14/07/2014.

Table 2. CL from this verification

No CL as on date.

Table 3. CAR from this verification

CAR ID	01	Section no.	Section A	Date	11/11/2015
Description of CAR					

a) PP is requested to kindly include the complete location of the PA as per the registered PDD detailing the	
Host Party; Region/state/province, etc.; City/town/community, etc.; Physical/geographical location.	
b) PP is requested to kindly provide the contact information of responsible person under section A.6 even if the person is same as mentioned in Appendix 1 as per MR completion guidelines.	
c) PP is requested to provide the QA/QC documents in order to check the compliance of the monitoring programme.	
d) Please correct the heading as per the MR template, since as per MR template Section E.4. includes the "Summary of calculation of emission reductions or net GHG removals by sinks"	
Project participant response	Date : 11/07/2016
a) The complete location of the PA as per the registered PDD is outlined in MR as required.	
b) The contact information of responsible person under section is provided.	
c) The requested QA/QC documents are provided with this response as attachments.	
d) The heading is corrected as required.	
Documentation provided by project participant	
a) Please see section A.2 of the revised Monitoring Report.	
b) Please see section A. 6 of the revised Monitoring Report.	
c) The following QA/QC documents have been attached: DNV Business Assurance, ISO 9001, OSHAS, Quality Management System, RC 14001.	
d) Please see section E. 4 of the revised Monitoring Report.	
DOE assessment	Date: 26/07/2016
a) Revised MR contains appropriate and correct information. Thus this CAR is closed .	
b) Contact information is now included in revised MR. Thus this CAR is closed .	
c) Appropriate QA/QC documents has been submitted along with the response. Verification team after reviewing them can conclude that they are legit and appropriate. Thus this CAR stands closed .	
d) The heading in revised document is consistent with the CDM-MR-FORM version 5.1. Thus this CAR stands closed .	

CAR ID	02	Section no.	Section B.1 of MR	Date : 11/11/2015
Description of CAR				
a) The date of completion mentioned in the MR is inconsistent with the records provided during site visit.				
b) One of the boilers i.e., 2052-U was seen firing the other fuels (waste liquid fuels) in excess of 1% of the total fuel. Therefore, PP are requested to demonstrate how the project activity has is complying or operating in accordance with the description given in the registered PDD, in particular when there is no mention of waste liquid fuel in PDD and also the applicability condition of applied methodology requiring other fuels to be less than 1%.				
Project participant response				Date : 11/07/2016
a) The date of completion stated in the MR have been corrected and now consistent with Plant Mechanical Completion Certificates provided to the auditors.				
b) The PP operates three boilers within this project: the first two (identified as 2008-U and 2008-UA) are designed to use only natural gas as a fuel. The third one (identified as 2052-U) was designed to use primarily natural gas. It can also use waste liquid fuels as additional source of fuel. At the time of writing PDD, it was envisaged that boiler 2052-U would use waste liquid fuel in the quantities not exceeding 1% of all the fuel used in this project which is in accordance with methodology requirement. Due to operational necessity during the monitoring period, the boiler 2052-U has exceeded the use of waste liquid fuel by more than 1%.				
In order to comply with methodology requirements the Project Proponent has excluded the boiler 2052-U from the revised PDD in post registration changes which were subsequently approved by the UNFCCC on 05/07/2016.				
Documentation provided by project participant				
a) Mechanical Completion Certificates provided to the auditors during the site visit.				
DOE assessment				Date: 26/07/2016

a) Revised MR reflects correct information. Thus this CAR is closed . b) PP had considered PRC and removed the third boiler to be in compliance with methodology. It was approved by UNFCCC on 05/07/2016 as verified through the project activity's webpage. However, section B.2.2 and B.2.5 of MR says not applicable, when, PRC validation opinion talks about correction, permanent changes to registered and monitoring plan and changes to project design of registered project activity as well. Thus this CAR is open .	
Project participant response	Date : 31/07/2016
b)section B.2.2 and B.2.5 of MR has been updated to reflect corrections and permanent changes to the registered PDD.	
Documentation provided by project participant	
Sections B.2.2 and B.2.5 of revised MR	
DOE assessment	Date: 20/09/2016
The sections of MR has been revised to reflect correct and consistent information. Thus this CAR is closed .	

CAR ID	03	Section no.	Section D.1 and D.2	Date : 11/11/2015
Description of CAR				
Please demonstrate how the monitoring plan included in the registered PDD and therefore the monitoring activities are complying with the applied methodology in particular when				
a) There is no mention as how the ASME PTC 4-1998 version is was applied on the monitoring results b) There are several other parameters referred in the applied Tool, are not included in the registered monitoring plan (please refer the methodological choices as which parameters are used in PA) c) Other key details e.g. calibration frequency, accuracy of meters etc. are not specified.				
Project participant response				Date : 11/07/2016
a) The application of ASME PTC 4-1998 and compliance against its particular codes are outlined in revised Monitoring Report. b) All parameters in applied tool as per methodology are now included in monitoring plan of the revised PDD (post registration changes) and duly reported in Monitoring Report. c) All key details (tag number, make, type, model, accuracy, initial test date, methodology, calibration date, next calibration date, accuracy of meters etc.) are specified as required for individual boilers in appendix 5 of revised Monitoring Report. Also please refer to "Instrument equipment monitoring plan" excel document.				
Documentation provided by project participant				
a) Section D.2 in the revised Monitoring Report b) Sections D.1 and D.2 in the revised Monitoring Report c) Appendix 5 Monitoring Equipment of revised Monitoring Report. Also "Instrument equipment monitoring plan" excel document.				
DOE assessment				Date: 26/07/2016
a) Application of ASME PTC 4-1998 has been incorporated in revised MR. Thus this CAR is closed . b) All the parameters from tool has been added to revised PDD and MR as well. Thus this CAR is closed . c) The table used for reporting of monitoring parameters in section D.2 of MR is not in compliance with the used form (CDM-MR-FORM). Thus this CAR is open .				
Project participant response				Date : 31/07/2016
Tables in section D.2 have been changed to be in compliance.				
Documentation provided by project participant				
Section D.2 of revised MR				
DOE assessment				Date:20/09/2016
Revised table reflects consistent and correct information. Thus this CAR is closed .				

CAR ID	04	Section no.	D.1 & D.2	Date : 11/11/2015
Description of CAR				

- a) PP is requested to kindly keep the notation of the ex-ante parameters as well as monitored parameters inline to the regd. PDD & applied methodology in the MR.
- b) As per the registered PDD, the value for the ex-ante parameter NCVFF, BL has been shown as 0.04GJ/NM3, however, in the MR, under this parameter, it has refer to Appendix 3 for the values and the Appendix 3 shows that the values varies from 0.039 to 0.042 GJ/Nm3, thus PP is requested to clarify this anomaly?
- c) Please correct unit of the parameter PPJ,K,y (system) inline with the registered PDD since regd. PDD also mention units as Tons/hours and thus ER sheet should also include tons/hours values

Project participant response	Date : 11/07/2016
<p>a) The notation of ex-ante and monitored parameters were realigned to match that of applied methodology and registered PDD.</p> <p>b) NCVFF,BL calorific value in baseline is taken from supplier's invoice and it is showing 0.04 due to less decimal values. NCVFF,MR: Similarly in MR the calorific value is also taken from supplier's invoice. Due to conversion of invoice calorific value from BTU to GJ (for unified units) the difference is insignificant to reflect in term of numbers.</p> <p>c) According to the methodology AMS 0056 (version 01) for the parameter PPJ,K,y (system) the unit must be "t/yr". In the registered PDD the parameter unit stipulated is also the same i.e. "t/yr". Therefore this parameter and the value used in Monitoring Report is in accordance with methodology and registered PDD. However, the registered PDD erroneously included the unit "tons/hour" along with "t/yr". This was rectified in revised PDD.</p>	
Documentation provided by project participant	
<p>a) Please refer to sections D 1 and D 2 of revised Monitoring Report.</p> <p>b) NA</p> <p>c) Please refer to parameter PPJ,K,y in table on page 20 of the methodology AMS 0056 (version 01).</p>	
DOE assessment	Date: 26/07/2016
<p>a) The notation of parameter is in consistency with registered PDD and methodology. Thus this CAR is closed.</p> <p>b) The explanation provided by PP seems to be legit thus accepted by verification team. Thus this CAR is closed.</p> <p>c) The unit of parameter is consistent within all the documents and methodology. Thus this CAR is closed.</p>	

CAR ID	05	Section no.	D.2	Date : 11/11/2015
Description of CAR				
Monitoring Frequency of monitored parameters -				
<p>a) As per the applied methodology. The monitoring frequency of the parameter PPJ,k,y (System) is "Every 15 minutes, allocated and aggregated into load classes", so PP is requested to clarify ,how the monitoring plan is in line with the applied methodology???</p> <p>b) As per the applied methodology. The monitoring frequency of the parameter TEMP_{PJ} is "Every 15 minutes, allocated and aggregated into load classes", so PP is requested to clarify, how the monitoring plan is in line with the applied methodology?</p>				
Project participant response				Date : 11/07/2016
The monitoring frequency for these parameters has been changed to every 15 minutes in the revised PDD. The same frequency is used in MR.				
Documentation provided by project participant				
Revised PDD (post registration changes approved by the UNFCCC on 05/07/2016)				
DOE assessment				Date: 26/07/2016
The monitoring frequency is now consistent with the applied methodology. Thus this CAR is closed .				

CAR ID	06	Section no.	D.2	Date : 11/11/2015
Description of CAR				
The calibration details mentioned in the MR does not cover the complete monitoring period. PP is requested to kindly include the details of the previous calibration details along with the due date along with the next upcoming calibration due date in the MR for transparency of the equipment calibration. Please follow this for all the monitoring equipment in the MR. Also, PP is requested to kindly provide all the calibration certificates.				

Project participant response	Date : 11/07/2016
Full calibration details have been provided in the revised Monitoring Report and the QA/QC documents.	
Documentation provided by project participant	
Please refer to Appendix 5 Monitoring Equipment of revised Monitoring Report and the following QA/QC documents attached: DNV Business Assurance, ISO 9001, OSHAS, Quality Management System, RC 14001, "Instrument equipment monitoring plan" excel document.	
DOE assessment	Date: 26/07/2016
The calibration and monitoring equipment details has not been given in section D.2 of MR, which is mandated by the CDM-MR-FORM. Thus this CAR is open .	
Project participant response	Date : 31/07/2016
Section D.2 has been reviewed and updated as required.	
Documentation provided by project participant	
Section D.2	
DOE assessment	Date: 20/09/2016
Section had been revised to give the required information consistently. However, temperature monitoring equipment for both the boilers was found to be out of calibration for the entire monitoring period. Thus this CAR is open .	
Project participant response	Date : 08/11/2016
The error factor inline to calibration certificate has been applied to temperature data of both the boilers.	
Documentation provided by project participant	
Revised ER sheet titled "ER for Albayroni CDM."	
DOE assessment	Date: 08/11/2016
The values for temperature of generated steam has been revised inline to error factor mentioned calibration certificates. Inline to this revision, fuel efficiency has also been revised which has reduced the achieved emission reduction. Thus this CAR is also closed .	

CAR ID	07	Section no.	E.2	Date : 11/11/2015
Description of CAR				
ER calculation spread sheet – The representation of Emission reduction calculation is not clearly depicted in the ER sheet. PP need to clearly depict the baseline, project and leakage emission calculation in a clear and transparent manner in order to give the reader a clear understanding of the emission reduction calculation.				
Project participant response				Date : 11/07/2016
Emission Reduction sheet have been revised to include primary data, baseline, project and leakage calculations in clear and transparent manner. The primary data is based on 15 min frequency and excludes any manual entry.				
Documentation provided by project participant				
Revised ER sheet titled "ER for Albayroni CDM."				
DOE assessment				Date: 27/07/2016
Information now represented clearly in revised ER sheet. Thus this CAR is closed .				

CAR ID	08	Section no.	E.5	Date : 11/11/2015
Description of CAR				
a) PP is requested to kindly provide the detailed reason with explanation for the difference on the ER as compared to the values in registered PDD				
Project participant response				Date : 11/07/2016
Detailed explanation for the difference is provided in section E. 6 of the revised Monitoring Report.				
Documentation provided by project participant				
Section E.6 of the revised Monitoring Report.				
DOE assessment				Date: 26/07/2016
Section E.6 mentions the reason for achievement of increased ER than estimates to be greater fuel saving. However, PP should also address the following points;				
<ul style="list-style-type: none"> Detailed explanation comparing the numbers responsible for increased in CERs as considered at validation and actual achieved during the project operation Documentary evidences for the support of reason explained behind the increase in CERs Probability of occurrence of the increase in CERs in future 				
Open.				
Project participant response				Date : 31/07/2016
Detailed explanation has been provided in section E.6 of MR				
Documentation provided by project participant				

Section E.6 of MR.	
DOE assessment	Date: 20/09/2016
PP has sought a PRC which changes the fuel saving of system. Thus the estimated emission reductions are lower than the achieved ERs. The estimated ERs as per the registered PDD were based on an assumption of 9.7% fuel saving as per the estimates given by manufacturer (which were based on the lower value). However, the monitored data of fuel savings gave a value of approximately 18% fuel saving. Thus the new estimates are based on a more conservative value of 20.18% (which is the higher value in the range of $\pm 10\%$ since PP expects this deviation in fuel efficiency in future)	

CAR ID	09	Section no.	-	Date : 12/10/2016
Description of CAR				
1. In the excel sheet "Data Correction", the reason why Steam Flow for U2008 boiler is made 0 for the initial monitoring period from 01/10/2014 to 20/10/2014 is not discussed in the MR.				
Project participant response				Date : 12/10/2016
1. In the Data correction sheet the values of 2008U boiler are made zero based on non-availability of other tags data in PIMS for same time.				
Documentation provided by project participant				
DOE assessment				Date: 08/11/2016
1. The consideration of value for steam flow as 0 for boiler 2008U has been found to be conservative since data for the period was not available. Thus this CAR is closed .				

Table 4. FAR from this verification

There is no FAR from this verification.

Appendix 5. Values verified for ex-ante parameters

1) Boiler load class, i and j

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

2) System Load Class "K"

System Load Class	System Load	2008U	2008UA
1	21-40	OFF	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

3) FC_{BLi}

Boiler s	Loa d Clas s	Range (MT/H)	FCBL,i	PBL,i	SFCi,j	Calorific Value	SEC	SEC Sys
			Fuel (Nm3/Hour)	Steam (T/Hour)	Nm3/Tstea m	GJ/Nm3	GJ/T Steam	GJ/hr
2008- U	1	0-20	1.8	285.4	157.4	0.0384	6.0460	1725.2880
	2	21-40	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	3	41-60	53.4	3846.0	72.0	0.0384	2.7637	10629.053 1
	4	61-80	72.6	5689.9	78.4	0.0382	2.9914	17020.714 8
	5	81-100	95.0	7610.8	80.1	0.0384	3.0808	23447.047 2
	6	101- 120	105.6	7833.1	74.2	0.0390	2.8965	22688.447 3
	7	>120	121.9	9440.9	77.5	0.0380	2.9449	27801.918 9
2008- UA	1	0-20	6.4	289.6	45.4	0.0384	1.7454	505.4883
	2	21-40	39.7	1624.0	40.9	0.0384	1.5709	2551.1513
	3	41-60	53.5	4418.3	82.6	0.0384	3.1738	14022.863 4
	4	61-80	71.8	5973.2	83.2	0.0382	3.1809	18999.885 7
	5	81-100	94.5	7893.6	83.5	0.0385	3.2106	25343.309 8
	6	101- 120	105.8	8477.1	80.1	0.0390	3.1254	26494.706 7
	7	>120	123.4	10016.9	81.2	0.0380	3.0857	30909.556 3

Appendix 6. SFC estimation per load class

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

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		