




Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh
Reference number of the project activity	2698
Version number of the verification and certification report	01
Completion date of the verification and certification report	05/08/2016
Monitoring period number and duration of this monitoring period	01 Duration – (from 12/02/2010 to 31/12/2015)
Version number of monitoring report to which this report applies	03
Crediting period of the project activity corresponding to this monitoring period	12/02/2010 to 11/02/2020
Project participant(s)	Sri Sai Krishna Hydro Energies (P) Limited
Host Party	India
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope: 01- Energy Industries (renewable - / non-renewable sources) Methodology: "Grid connected electricity generation from renewable sources" AMS-I.D, version 13
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	192,279 tCO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	219,103 tCO ₂ e
Name of DOE	EPIC Sustainability Services Private Limited (EPIC)
Name, position and signature of the approver of the verification and certification report	 Mr. K. Sudheendra (Head-Operations)

SECTION A. Executive summary

EPIC Sustainability Services Private Limited (EPIC) has been contracted by Sri Sai Krishna Hydro Energies (P) Limited to undertake the second periodic independent verification of the registered CDM project activity titled "10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh" (UNFCCC reference number: 2698). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 12/02/2010 to 31/12/2015 (first and last day included); and to verify that the data reported are complete and transparent.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

The verification team has, based on the recommendations in the Validation and Verification Standard/1/, and employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generations of CERs. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

The scope of the verification is the independent and objective review and ex-post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated project design document (version 06, dated 28/12/2009) /2/ (hereinafter validated PDD), corresponding validation report /2/ and its corresponding verification reports /2/. These documents were reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

The project Luni - III & Luni -II are run-off river bundled small hydroelectric projects across Luni Khad, a tributary of river Binwa in Baijnath Tehsil, Kangra District of Himachal Pradesh. exporting the generated electricity to Himachal Pradesh State Electricity Board (HPSEB).The total installed capacity is 10MW with 5MW each at Luni - III & Luni -II. It involves installation of four Pelton Wheel two each at Luni - III & Luni -II turbine with generation capacity of each generator being 2.5 MW with net rated head of 441.11m and 292.75m respectively./2/.

The power is generated at 3.3 kV which is stepped up and transmitted to 132/11 kV HPSEB substation at Dehan for export to HPSEB. The verification team has reviewed the commissioning certificates/3/ and purchase agreements/4/ for confirmation of the same

The verification team determines the conformity of the actual project activity and its operation with the validated project design document /2/. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the monitoring plan and registered PDD are in place, and that the project participants have operated the CDM project activity as per the monitoring plan in the registered PDD /2/. Thus the verification team has concluded that the project activity was implemented and operated as per the monitoring plan in the registered PDD and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated registered PDD /2/. This the first verification and the start date of this monitoring period is 12/02/2010 which is the start date of the fixed crediting period (12/02/2010 to 11/02/2020) and in line with the UNFCCC project webpage of the project activity .

The monitoring report for this monitoring period is in compliance with the monitoring plan of the validated PDD. The project activity was registered by applying the small scale methodology /6/ AMS-I.D, version 13 and the verification was carried out in accordance with the applied methodology.

It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG

emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring report.

EPIC's 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. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

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/ Technical Expert	IR	Anbazagan	Prabu Das	EPIC Sustainability (Central office, Bangalore)	X	X	X	X
2.	Verifier/ Technical Expert	ER	Seshan	Ranganathan	EPIC Sustainability (Central office, Bangalore)	X	X	X	X

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	R	Vijayaraghavan	EPIC Sustainability (Central office, Bangalore)

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.	No risk	Nil	Not applicable	Complete verification of all the values indicated in the emission reduction spread sheet in documents such as JMR, invoices/log sheets.

C.2. Consideration of materiality in conducting the verification

In line with Guidelines for Application of materiality in verifications /7/, a reasonable level of assurance is defined for the verification of the project by complete verification of all the values indicated in the emission

reduction spread sheet in documents such as JMR, invoices/generation data sheets, Plant log records at the document review stage and onsite. There are no material errors, omissions or misstatements.

SECTION D. Means of verification

D.1. Desk review

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reduction.

The first MR/ /8/ version 02 submitted by the project participant and additional background documents related to the emission reductions are reviewed as an initial step of the verification process. The subsequent step involved the identification of corrective action requests and clarification requests (CAR and CL) which are presented in Appendix 4 of this report. A complete list of all documents and records reviewed is as attached in Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 25/05/2016 to 26/05/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	<ul style="list-style-type: none"> Physical visit of water intake, turbine & generator and governor & Excitation control panel Checked installation status of the project equipments Verified the name plate details of turbine & generator Interview with the operation in-charge regarding operational procedure, any change in the project equipments, major incidents during the monitoring period etc. 	Water intake, Turbine & generator of Luni-III & Luni-II	25/05/2016 26/05/2016	Full team
2	<p>The following has been checked in the control room:</p> <ul style="list-style-type: none"> Line diagram Plant operational control procedures Gross energy meter & auxiliary meter details Log recording procedures 	Control room of Luni-III & Luni-II	25/05/2016 26/05/2016	Full team
3	<p>DG set</p> <ul style="list-style-type: none"> DG set operation, diesel consumption & receipts 	DG bay of Luni-III & Luni-II	25/05/2016 26/05/2016	Full team
4	<p>The following activities are performed:</p> <ul style="list-style-type: none"> Verification plant log records, JMR, invoices/ obligation sheets, calibration records, plant shutdown details etc. Interview with the plant personnel regarding monitoring, maintenance, QA/QC procedures, data consistency etc. 	Site Office	25/05/2016	Full team
5	Checked details of the main meter, check meter & standby meter, data recording frequency, calibration frequency etc.	132/11kV sub station	25/05/2016	Full team

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kumar	Surender	Sri Sai Krishna Hydro Energies (P) Limited	25/05/2016 26/05/2016	As above	All team members
2.	Thakur	Sandeep			As above	All team members
3.	Rana	Vijay			As above	All team members
4.	Kumar	Ashok			As above	All team members
5.	Sood	Nishant			As above	All team members
6.	Raj	Tilak			As above	All team members

D.4. Sampling approach

No sampling is used as the verification team has visited all the site where all the turbine and generators are installed along with the substations. The verification team has reviewed all the documents like invoices/generation data sheets, JMRs etc.

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	2	-	-
Compliance of the project implementation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	1	-
Assessment of data and calculation of emission reductions or net removals	1	2	-
Others (please specify)	-	-	-
Total	3	3	0

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

Means of verification	The verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form. The verification team has checked whether all the sections of the monitoring report follows the guidelines provided in the template itself.
Findings	One (CL 2) is raised in this section
Conclusion	PP has used the version 5.1 of the MR template /12/ which is current and active one. The monitoring report has been prepared as per the instructions provided in the template. EPIC has made the version 02 of the monitoring report /8/ covering the monitoring period from 12/02/2010 to 31/12/2015 publicly available through its dedicated interface on the UNFCCC CDM website before undertaking the site visit for the verification on 25/05/2016 & 26/05/2016. The verification team has concluded that the monitoring report was completed using the valid version of the applicable monitoring report form /12/and is followed the guidelines given in the template itself.

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

This is the first verification of the project activity, the verification team has reviewed the validation report and observed that there is no open issue i.e no FARs were found that required action. During this verification process, EPIC has not raised any Forward Action Request (FAR).

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

Means of verification	The verification team determined the conformity of the actual project activity and its operation with the validated project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD/2/ are in place, and that the project participants have operated the CDM project activity as per the validated PDD /2/ .
Findings	One CL (CL1) is raised in this section
Conclusion	The verification team has reviewed the commissioning certificates /3/ and power purchase agreements /4/. The verification team has observed at the site that all physical features of the power plant equipment's along with the substations are as per the validated PDD /2/. Thus the verification team has concluded that the project activity was implemented and operated as per the PDD. The specification of the main and check meters such as location, connectivity, substation, and accuracy are matching with that mentioned in the validated PDD.. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD /2/ and that all physical features of the project are in place.

E.4. Post-registration changes**E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline**

There is no temporary deviation identified for this monitoring period.

E.4.2. Corrections

There are no corrections in this monitoring period.

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

There were no changes made to the start date of the crediting period.

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

Not applicable, as monitoring plan was part of the PDD at the time of registration

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

The verification team did not observe any permanent changes from registered monitoring plan, monitoring methodology or standardized baseline, for this monitoring period.

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

There is no such change observed to the project design for this monitoring period of the project activity.

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

Not applicable as the project does not involve afforestation and reforestation activity

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

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology /6/ (AMS-I.D, version 13) including applicable tools.
Findings	No CARs/CLs raised in this section

Conclusion	The verification team is able to confirm that the monitoring plan contained in the validated PDD /2/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.D, version 13 /6/ and its applicable tools.
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E.6. Compliance of monitoring activities with the registered monitoring plan

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

Means of verification	The verification team has determined whether the monitoring plan in the registered PDD/2/ has been properly implemented and followed by the PP, and that the monitoring has been carried out in accordance with the registered monitoring plan and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD/2/..
Findings	One CAR (CAR 1) raised in this section
Conclusion	<p>The parameter fixed ex-ante is 'CO₂ emission factor for the regional grid system' (EF_y). This parameter is calculated based on the CEA data base which is publically available. The source data are rechecked with the CEA database. The calculation provided in the PDD is validated by the validating agency and the same is rechecked.</p> <p>EF_y is the emission factor of the regional grid system (ie, Northern grid, which was integrated and called as NEWNE. Further integration has taken place and it is now a single national grid.) to which the electricity generated from the project activity is exported, and was determined and validated ex-ante as 0.810465 tCO₂/MWh and will not be updated during the first crediting period. The value is correctly applied in the emission reduction calculation.</p> <p>COEF_i is the CO₂ emission factor of Fuel type (Diesel) which is fixed ex-ante as 74,000 Kg CO₂ /TJ as per the validated PDD. The value has been checked and the same has been applied appropriately in the emission reduction calculation.</p>

E.6.2. Data and parameters monitored

Means of verification	The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD.
Findings	One CL (CL 3) was raised in this section
Conclusion	<p>According to the monitoring plan of the registered PDD, the following parameters are to be monitored:</p> <p>1) Quantity of electricity generated by the project plant/unit in year y'(EG_{Gross y}), is monitored through energy meter installed at the generation site for Luni-II and Luni-III separately. The meter readings are noted down every month in the plant logbook /11/ and the same is verified during site visit and found that the gross energy generation values provided in the ER calculation sheet is correct. The gross generation for the monitoring period is verified to be 283,845 MWh for both Luni-II and Luni-III together with the generation for the monitoring period from Luni-II being 144,921 MWh and that from Luni-III being 138,924 MWh (rounded down)Luni . This parameter is not used for calculation of emission reduction and just used to crosscheck the EG_y value.</p> <p>2) Auxiliary electricity used for internal loads in year y (EG_{aux}) is monitored through the auxiliary energy meter installed at the site. The meter readings are noted down every month in the plant logbook /11/ and the same is verified during site visit and found that the auxiliary details provided in the ER calculation sheet /16/ is correct. The auxiliary consumption for the monitoring period is verified to be 1,077.817 MWh for both Luni-II and Luni-III together with the generation for the monitoring period from Luni-II being 411.970 MWh and that from Luni-III being 665.847 MWh. This parameter is not used for calculation of emission reduction, but just used to</p>

crosscheck the EG_y value.

3) Electricity supplied by the project plant/unit during the year y ($EG_{\text{export},y}$) to the grid is monitored through energy meter installed at the substation. Similarly the electricity imported by the project plant/unit during the year y ($EG_{\text{import},y}$) from the grid is also monitored through energy meter installed at the substation. The import and export readings are taken on monthly basis and the net electricity is calculated and provided in the Joint meter reading (JMR) statement. So, the EG_y , net electricity supplied to the grid is directly taken from the Joint Meter Reading. These readings are also the source for the billing. Verification team checked all monthly JMR statement//9/ and found that all the values considered for this parameter is correct. The details of the energy meters installed at substation and calibration details are given under Annex1 of the report. As mentioned in the PDD, the net electricity exported to the grid is the difference between the electricity exported to the grid and that imported from the grid which is based on the JMR/9/ reading taken every month. For the current monitoring period, the verification team during the site visit and from the JMR find the net electricity exported to the grid to be 270,362.9 MWh for both Luni-II and Luni-III together with the net export for the monitoring period from Luni-II being 138,161.847 MWh and that from Luni-III being 132,201.06 MWh. The details of the electricity exported and that imported from the grid for the monitoring period as verified from the records by the verification team is as follows.

Item	Electricity exported to grid kWh	Electricity imported from grid kWh	Net Electricity exported to grid kWh
Luni II	138,184,247	22,400	138,161,847
Luni III	132,220,160	19,100	132,201,060
Total	270,404,407	41,500	270,362,907

Say 270,362.9 MWh

4) Quantity of fossil fuel (diesel) combusted in the project activity during year y (F_{iy}) is monitored as and when Diesel generator is used based on the level difference in measured using ruler gauge. The operating hours of the DG set is also noted in the log book. The same is reported monthly in the plant log book/11/. The diesel generator log book is verified during site visit and found that the value of diesel consumption and operation hours considered for this parameter is correct. Since the diesel consumption is monitored in volume basis, the same is converted to mass unit by considering the density of fuel. The diesel consumption during the monitoring period is found to be 5.828 MT for both Luni-II and Luni-III together with the consumption for the monitoring period from Luni-II being 1.6415 MT and that from Luni-III being 4.187 MT. The total operating hours of the diesel generation set during the monitoring period is found to be 944.2 for both Luni-II and Luni-III together with that for the monitoring period for Luni-II being 267.2 hours and that from Luni-III being 677 hours. The density of diesel used in the calculation is that provided by the supplier and the verification team confirms the value of 0.86 kg/litre is in order. Average net calorific value of diesel in year y (NCV_{iy}) is taken from the IPCC Guidelines on National GHG Inventories, 2006//13/ which is verified and found that the value of 43.3 TJ/Gg adopted for conversion of the mass unit of diesel consumed to energy considered is appropriate and correct.

4) CO_2 emission factor for diesel ($EF_{CO_2,y}$) is sourced from the IPCC Guidelines on National GHG Inventories, 2006 /13/ which in the validated PDD is taken as 74,000 $kgCO_2/TJ$. The verification team verified and confirms that the value of 74.0 tCO_2/TJ considered is correct and appropriate.

E.6.3. Implementation of sampling plan

Means of verification	No sampling involved in monitoring of any parameter.
Findings	-
Conclusion	-

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

Means of verification	The verification team determined whether the calibration of the measuring equipment that has an impact on the claimed emission reductions is conducted by the PP at a frequency specified in the registered monitoring plan. The calibration records were verified to check the frequency of calibration of the measuring instruments.
Findings	CAR-01 is raised in this section.
Conclusion	<p>The monitoring plan is as per the approved methodology AMS-I.D, version 13 /6/ and as in the validated PDD . As required by the monitoring methodology and the monitoring plan in the PDD, parameters monitored using instruments have been listed in Annex 1: Ex-post parameters monitored. The details of date of calibration, its validity, accuracy of the instrument applicable for each data/parameter, wherever it is applicable is detailed in Annex 1: Ex-post parameters monitored.</p> <p>The verification team has verified the calibration / testing certificates/10/ for all the monitoring instruments, and gained conformation that the instruments were functioning within the acceptable accuracy limits for the entire monitoring period. During this period no events of instruments fault or replacement were observed. On-site visit and interview with site personnel also conforms the same.</p> <p>The energy meter was checked during site visit. All the calibration details were verified from calibration certificate /10/. The verification team confirmed that the calibration of the project energy meters which meter readings are used for emission reduction calculation are done within one year which is in line with the frequency requirement as per the updated revised registered PDD /2/.The meter readings used for emission reduction calculation are EG_y(net electricity supplied to grid), EG_{imp}(electricity imported from grid) and EG_{exp}(electricity supplied to grid).The verification team noticed delay in the calibration of the meters EG_{gross} and EG_{aux} which readings are not used in the emission reduction calculations but only used as backup data. The verification team confirms that the subsequent calibration indicate that the meters are working within the specified accuracy levels. Further the team finds that during the delayed period the plant was shut down and so the delay has no impact and so there is no need to apply corrections in the readings for the delay in calibration. The details of the delay in calibration are mentioned in Annex -1 of the report.</p>

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	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	One CL(CL-1) is raised in this section
Conclusion	<p>Baseline emissions is the product of the baseline emission factor (EF_y) times the net electricity supplied by the project activity to the grid ($EG_{facility,y}$).</p> $BE_y = EG_y \times EF_y$ <p>where</p> <p>EF_y is emission factor of the grid to which electricity is exported, which was calculated ex-ante and will not be updated during the first crediting period. EF_y of the proposed project activity in the registered PDD is 0.810465 tCO₂/MWh, which has been verified to be correct based on the availability of grid data. EG_y is the net electricity supplied to the grid, which is measured at the tri-vector meter installed at the substation for each unit separately. The EG_y readings mentioned in the ER sheet is cross-checked through the JMR readings/9/ by the verification team.</p> <p>$EG_y = 270,362.9$ MWh for both units together with Luni II export being 138,161.847</p>

	<p>MWh & LunIII being 132,201.060MWh $EF_y = 0.810465 \text{ tCO}_2/\text{MWh}$ $BE_y = 219,119$ (rounded down) tCO_2e</p> <p>The verification team has crosschecked the ER calculation sheet/16/ and found that the baseline emission calculation is correct and in accordance with the formulas & equations provided in the updated revised validated PDD /2/. Hence the baseline emission value calculated in ER sheet /16/ and reported in the monitoring report is correct.</p>
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E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of project GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Findings	One CAR (CAR-2) is raised in this section.
Conclusion	<p>Project emissions are calculated from diesel consumption ($FC_{i,y}$), net calorific value of Diesel (NCV_i) and CO_2 emission factor of Diesel ($EF_{\text{CO}_2,i}$) as follows:</p> $PE_{FC,i,y} = FC_{i,y} * COEF_i,$ <p>$FC_{i,y}$ is the diesel consumed in the DG set as described in above sections and the NCV_i & $EF_{\text{CO}_2,i}$ values are taken from IPCC, 2006. The plant diesel consumption, running hours of the DG set were verified from log records, purchase records and stock /11/ are verified to confirm the value of diesel consumption and IPCC is verified to confirm the value of NCV_i & emission factor of diesel. The density of diesel is considered as 0.86 kg/l as per the supplier Indian Oil Corporation Limited (IOCL)/15/ which is used for conversion of the diesel consumed in litres to mass quantity kilogram. The oxidation factor of 1 has been considered as per IPCC /13/. The density of fuel and oxidation factor have been used in the calculation to bring consistency in the units used for emission reduction calculation</p> <p>$FC_{\text{diesel}, y} = 0.204 \text{ kl}$ Density = 0.86 kg/l $NCV_i = 43.3 \text{ TJ/Gg}$ $EF_{\text{CO}_2,d} = 74 \text{ tCO}_2/\text{TJ}$ $PE_y = 18.68 \text{ tCO}_2\text{e}$</p> <p>The verification team further notes that the total diesel consumption during the monitoring period based on the running hours of the DG set and the diesel consumption indicated by supplier works out to 5.665 MT against the measured value of 5.8285 MT. The PP has adopted a conservative approach and has calculated diesel consumption based on the measured value which is higher.</p> <p>The verification team has crosschecked the ER calculation sheet/16/ and found that the project emission calculation and the values adopted is correct and conservative and is in accordance with the formulas & equations provided in the registered PDD. Hence the project emission value calculated in ER sheet /16/ and reported in the monitoring report is correct.</p> <p>The verification team notes that the project emission is 187 tCO_2e which is insignificant compared to the total emission of 219,000 tCO_2e for the monitoring period.</p>

E.8.3. Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No CARs/CLs raised in this section
Conclusion	The leakage emissions are regarded as zero according to the applied

methodology/6/ and updated revised validated PDD /2/.

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

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No CARs/CLs raised in this section
Conclusion	Emission reductions in this monitoring period are: $ER_y = BE_y - PE_y - L_y$ $= 219,119 - 18.68 - 0 = \text{rounded down to } 219,100 \text{ tCO}_2\text{e}$ The verification team has crosschecked the ER calculation sheet /16/ and found that the emission reduction calculation is correct and in accordance with the formulas & equations provided in the registered PDD. Hence the emission reduction value calculated in ER sheet /16/ and reported in the monitoring report is correct.

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 verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	One CL (CL 1) was raised in this section
Conclusion	The verification team analysed the emission reductions reported during the subject monitoring period in comparison with the estimate in the updated revised registered PDD. For the current monitoring period, the emission reductions are achieved are 14.2% higher than that estimated in the PPD for the corresponding period. The emission reductions achieved during the monitoring period is 219,103 tCO ₂ e against 192279 tCO ₂ e. The verification team checked the generation data month wise and find that the average generation during the period October to December for the years 2001 to 2014 was 1,086 MWh whereas the generation was 1284MWh during October to December 2015 which was higher by 18.2% due to higher than normal rainfall. This is corroborated from the records of rainfall data which shows higher rainfall in 2015 /17/. The verification team finds from the excel sheet submitted at the time of registration that the IRR reaches the benchmark when the revenue increases by 23.4%. The tariff is fixed and so revenue increase can only be due to increased power generation. The power generation for the monitoring period is 14.2% higher than that estimated in the PDD, but this is well below 23.4% required to reach the benchmark. Based on the above, the verification team confirms that the higher emission reduction achieved is not a normal feature and that the project activity continues to be additional.

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

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	No CARs/CLs raised in this section
Conclusion	The actual CER achieved is higher than that estimated in the registered PDD /2/ which is because of increased availability of water during the monitoring period as explained in 8.5 above.

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

Means of verification	The verification team has determined the CER achieved during first commitment period and second commitment period
Findings	No CARs/CLs raised in this section
Conclusion	ER achieved up to 31st Dec 2012 = 102,174 tCO ₂ e ER achieved from 1st Jan 2013 = 116,929 tCO ₂ e.

SECTION F. Internal quality control

After the completion of assessment by the verification team all the relevant documentation is submitted to a qualified, Independent Technical Reviewer as part of EPIC's Internal quality Control system. A Technical Reviewer team is appointed to review the draft final validation report (Draft FVR). The comments made by the Technical Reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the validation team with appropriate justification. The technical review process can also raise issues in this regard which is resolved further by the validation team to the satisfaction of the Technical Reviewer. The Technical Reviewer either accepts or rejects made by the validation team. The final report (after resolutions of all findings) is then submitted to the Head – Operations for review and approval.

SECTION G. Verification opinion

EPIC Sustainability Services Private Limited (EPIC) has been contracted by Sri Sai Krishna Hydro Energies (P) Limited to undertake the first periodic independent verification of the registered CDM project activity titled "10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh" (UNFCCC reference number: 2698). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 12/02/2010 to 31/12/2015 (first and last day included); and to verify that the data reported are complete and transparent.

The verification team determines the conformity of the actual project activity and its operation with the approved revised project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the approved PDD are in place, and that the project participants have operated the CDM project activity as per the same. Thus the verification team has concluded that the project activity was implemented and operated as per approved PDD, and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the approved PDD. The start date of this monitoring period is 12/02/2010 which is in line with the UNFCCC project webpage considering the start date of the crediting period.

The monitoring report for this monitoring period is in compliance with the approved monitoring plan and PDD. The verification team was able to confirm that the monitoring plan by the project activity is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.D, version 13 and its applicable tools. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

The management of project participants is responsible for the preparation and reporting of GHG emissions data, and the reported GHG emission reduction on the basis set out within the project monitoring plan. The development and maintenance of records and reporting procedures in accordance with the monitoring plan and PDD, including the calculation and determination of GHG emission reduction from the project is the responsibility of the management of the project. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring report.

EPIC's 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. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions

data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated. The verification team has verified that the information included in the revised monitoring report is correct and that the emission reduction achieved has been determined correctly. Based on the information seen and evaluated, the verification team confirms the following:

Project title:	10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh
UNFCCC ref no:	2698
Crediting period:	12/02/2010 to 11/02/2020
PDD	Version 06, dated 28/12/2009
Monitoring report	Version 03, dated 13/07/2016
Methodology used for verification:	AMS-I.D, version 13
Applicable monitoring period:	12/02/2010 to 31/12/2015
Emissions reductions verified:	219,103 tCO ₂

SECTION H. Certification statement

EPIC Sustainability Services Private Limited (EPIC) has carried out the first verification of the emission reductions that have been reported for the CDM project activity 2698 "10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh" in India for the period 12/02/2010 to 31/12/2015.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

EPIC takes responsibility for issuance of an independent verification statement on the reported GHG emission reductions from the project activity.

The verification was done on the basis of the baseline and monitoring methodology AMS-I.D, version 13, the monitoring plan of the registered PDD and the monitoring report (version 03) dated 13/07/2016. The verification included checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and the collection of evidence supporting the reported data.

The emission reductions are calculated correctly and EPIC could certify that the emission reductions from the CDM project activity 2698 "10 MW bundled Luni-III & Luni-II hydroelectric projects for a grid system at Sri Sai Krishna Hydro Energies Private Limited in Kangra District, Himachal Pradesh" in India during the period 12/02/2010 to 31/12/2015 is 219,103 tCO₂ equivalent.

Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	CDM Validation and Verification Standard
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Commitment Period
DOE	Designated Operational Entity EB Executive Board
EF	Emission factor
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
HEPP	Hydro Electric Power Plant
HPSEB	Himachal Pradesh State Electricity Board
IOCL	Indian Oil Corporation Limited
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
JMR	Joint Meter Reading
MP	Monitoring Plan
MR	Monitoring Report
MW	Mega Watt
MWh	Mega Watt hour
NCV	Net Calorific Value
NEWNE	Integrated Northern, Eastern, Western and North Eastern Grid
PDD	Project Design Document
PP	Project Participant
PPA	Power Purchase Agreement
SSKHE	Sri Sai Krishna Hydro Energies (P) Limited
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification standard

Appendix 1. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the verification of the project

Name	Mr. A. Prabu Das	Mr. R. Seshan	Mr. R. Vijayaraghavan
Role	Lead Auditor	Team member & Technical Expert	Technical reviewer
Competence in relevant Technical Area	1.2	1.2	1.2
Responsibility	Doc review, onsite, DVR preparation, DVR resolution, FVR preparation	Doc review, onsite, DVR preparation, DVR resolution, FVR preparation	Technical Review

Mr. A Prabu Das, holds a M.Tech Degree in Energy Conservation and Management and B. Tech Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 8 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last six years have been in CDM consultancy and validation services. He has undergone extensive training on CDM validation and verification and is a qualified lead auditor for Sectoral Scope 1 under Technical Area “TA 1.2 Renewables” in accordance with procedures of EPIC Sustainability Services Pvt. Ltd. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Mr. Seshan Ranganathan, holds a Bachelor’s Degree in Chemical Engineering and has done diploma course in Management and completed the graduate ship course in Industrial Engineering and has an overall working experience of around thirty two years with twenty four years’ experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat -recovery, efficiency studies of boilers ,power plants, safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry. He is qualified validator, verifier and technical reviewer and has eight years’ experience working with leading certification bodies. He is involved in the validation/verification of over 100 projects in various roles. He is a qualified expert for Sectoral Scope 1 under Technical Area “TA 1.2 renewables” in accordance with procedures of EPIC sustainability services Pvt. Ltd.

Mr. R. Vijayaraghavan, holds BE in Mechanical Engineering, M.Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 10 years of working experience in energy sector including validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as Lead Auditor with Sectoral Scope 1 and 13. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Appendix 2. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	UNFCCC	Validation and verification standard version 9.0 https://cdm.unfccc.int/Projects/DB/SGS-UKL1245152884.07/view	/1/	Publically available
/2/	UNFCCC	Approved PDD, validation report, https://cdm.unfccc.int/Projects/DB/SGS-UKL1245152884.07/view	/2/	Publically available
/3/	PP	Commissioning certificates of the project activity Luni II-HPSEB/PHE/LUNI-II/2009 2642-47 dt 18/11/09 commissioned on 12/11/09. Luni III-HPSEB/PHE/LUNI-III/2009 660-05 dated 3/06/09 commissioned on 31/05/09	/3/	PP
/4/	PP	Power Purchase agreements dated 12/07/2006 separately for LUNI II and LUNI III	/4/	PP
/5/	PP	UNFCCC webpage –indicating start date of the crediting period	/5/	Publically available
/6/	UNFCCC	AMS-I.D, version 13	/6/	Publically available
/7/	UNFCCC	Guidelines for Application of materiality in verifications version 2.0	/7/	Publically available
/8/	UNFCCC PP	Webhosted monitoring report version 2.0 Revised monitoring report, version 3.0	/8/	PP
/9/	PP	Monthly Joint metering reading & Energy bill for each month of the current monitoring period	/9/	PP
/10/	PP	Calibration certificates covering the current monitoring period	/10/	PP
/11/	PP	Plant records: -Auxiliary consumption -Diesel consumption -Major Incidents -Plant outages -Log sheets for power generated for the monitoring period	/11/	PP
/12/	UNFCCC	Template: Monitoring Report Form, version 05.1	/12/	Publically available
/13/	IPCC	IPCC Guidelines on National GHG Inventories, 2006	/13/	Publically available
/14/	PP	Electricity sale invoices/Daily generation data	/14/	PP
/15/	IOCL	Supplier of diesel http://www.iocl.com/Products/DieselSpecifications.pdf	/15/	Publically available
/16/	PP	Emission reduction calculation sheet	/16/	PP
/17/	DOE	Rainfall in the district http://www.himvani.com/news/2015/10/23/meteorological-office-forecasts-rain-and-snowfall-in-himachal-pradesh/	/17/	Publically available

Appendix 3. 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: 30/06/2016
Description of FAR				
This is first verification and there was no pending FAR from validation that required action				
Project participant response				Date:
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date:
NA				

Table 2. CL from this verification

CL ID	01	Section no.	B.1	Date: 30/05/2016
Description of CL				
PP to confirm the dates of commercial operation and provide supporting documents				
Project participant response				Date: 13/07/2016
Commercial operation of Luni II unit-1 was on 11.11.2009 whereas unit-2 was on 12.11.2009 .So the commercial operation of total 5Mw as per HPSEB certificate dated 18.11.2009 its 12.11.2009 & Commercial operation of Luni III as per HPSEB certificate dated 03.06.2009 its 31.05.2009				
Documentation provided by project participant				
Commissioning certificates for both Luni II & Luni III from HPSEB were provided as an evidence				
DOE assessment				Date: 20/07/2016
The verification team verified the commissioning certificates and confirms that the details are in order and the emission reductions are claimed only from the date of registration of the project activity that is 12/02/2010. CL-1 is closed				

CL ID	02	Section no.	B.1	Date: 30/05/2016
Description of CL				
The operating hours, shutdown duration and maintenance work carried out during this monitoring period are not seen reported in the MR				
Project participant response				Date: 13/07/2016
Operating hours, shut down and details of Major maintenance during MR period are included in MR under section B1 in revised MR version No:2 dated 13/07/2016.				
Documentation provided by project participant				
Revised MR version 03 dated 13/07/2016				
DOE assessment				Date: 20/07/2016

The verification team verified the shut down and major maintenance details that are provided in the revised MR with the log books and confirms that the same is in order.
CL-02 is closed

CL ID	03	Section no.	D.2	Date: 30/05/2016
Description of CL				
Transcription error noticed in the net energy export between the excel sheet and the Joint meter reading reports				
Project participant response				Date: 13/07/2016
The transcription error noticed in the excel sheet has been corrected.				
Documentation provided by project participant				
Revised MR version 03 dated 13/07/2016 and JMR				
DOE assessment				Date: 20/07/2016
The verification team confirms that the transcription errors have been corrected and there is no inconsistency between the revised MR and CER calculation sheet. The emission reduction achieved during the monitoring period is 219,103 tCO ₂ e .				
CL-03 is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	D.1	Date: 30/05/2016
Description of CAR				
All the ex ante parameters as per registered PDD are not included in the MR				
Project participant response				Date: 13/07/2016
Deisel Ex ante parameres are included in MR under section D1& D2				
Documentation provided by project participant				
Revised MR version 03 dated 13/07/2016				
DOE assessment				Date: 20/07/2016
The verification team confirms that in the revised MR version 03 dated 13/07/2016 all ex ante parameters as per the registered PDD are included and the values are correct.				
CAR 1 is closed.				

CAR ID	02	Section no.	D2	Date: 13/05/2016
Description of CAR				
The calibration détails of the meters provided does not cover the full monitoring period.				
Project participant response				Date: 13/07/2016
MR updated with calibration details for all meters (Gross, auxillary) covering total monitoring period in MR version No :03 dated 13/07/2016				
Documentation provided by project participant				
Revised MR version 03 dated 13/07/2016.				
DOE assessment				Date: 20/07/2016
The verification team confirms that the calibration details included in the revised MR version 03 covers the current monitoring period 12/02/2010 to 31/12/2015.				
CAR-02 is closed.				

CAR ID	3	Section no.	D2	Date: 30/05/2016
Description of CAR				
The project émissions are not accounted for the monitoring period				
Project participant response				Date : 13/07/2016
Project Emissions are accounted in revised MR & CER sheet version No :3 dated 13/07/2016				
Documentation provided by project participant				
Revised MR version 03 dated 13/07/2016 & diesel consumption log book and purchase records				
DOE assessment				Date : 20/07/2016
The vérification team has cross checked the ER calculation sheet/16/ and found that the project emission calculation and the values adopted is correct and conservative and is in accordance with the formulas & equations provided in the registered PDD. Hence the project emission value calculated in ER sheet /16/ and reported in the monitoring report is correct. The verification team further notes that the total diesel consumption during the monitoring period based on the running hours of the DG set and the diesel consumption indicated by supplier works out to 5.665 MT against the measured value of 5.8285 MT. The PP has adopted a conservative approach and has calculated the diesel consumption based on the measured				

value which is higher.

The vérification team notes that the project emission is 18.68 tCO₂e which is insignificant compared to the total emission of 219,101 tCO₂e for the monitoring period which is far less than 1% of the emission reduction.

Table 4. FAR from this verification

FAR ID	xx	Section No.	NA	Date: 13/05/2016
Description of FAR				
No FAR is identified in this verification				
Project participant response				Date: NA
Documentation provided by project participant				
NA				
DOE assessment				Date: NA
NA				

Annex 1: Ex-post parameters monitored

Parameters	Description	Value	Means of verification																																												
EG _{grossy}	Electricity generated by the project during the year y	Luni II 144,921 MWh Luni III 138,924 MWh	Source of data: Measured using Energy meters																																												
			Measuring/reading/recording frequency: Continuously measured and recorded and reported monthly.																																												
			Monitoring equipment:																																												
			Energy meters details																																												
			<table><tr><td>Location</td><td>Unit-I</td><td>Unit-II</td></tr><tr><td>Luni II</td><td>HAJ213545</td><td>HAJ213546</td></tr><tr><td>Luni III</td><td>8311PH1008 & KBA243426</td><td>8312PH1008</td></tr></table>	Location	Unit-I	Unit-II	Luni II	HAJ213545	HAJ213546	Luni III	8311PH1008 & KBA243426	8312PH1008																																			
			Location	Unit-I	Unit-II																																										
			Luni II	HAJ213545	HAJ213546																																										
			Luni III	8311PH1008 & KBA243426	8312PH1008																																										
			Accuracy class: Acceptable accuracy of the meter is 0.5%																																												
			Calibration frequency : Annual																																												
Calibration information: Luni II																																															
<table><tr><th>Meter No</th><th>Date of calibration</th><th>Valid till</th><th>Delay in calibration</th></tr><tr><td rowspan="14">HAJ213545 & HAJ213546</td><td>16/11/2009</td><td>15/11/2010</td><td>-</td></tr><tr><td>29/11/2010</td><td>10</td><td>-</td></tr><tr><td>06/11/2011</td><td>28/11/2011</td><td>14 days</td></tr><tr><td>02/11/2012</td><td>11</td><td>-</td></tr><tr><td>07/11/2013</td><td>05/11/2014</td><td>6 days</td></tr><tr><td>29/11/2014</td><td>12</td><td>23 days</td></tr><tr><td>23/11/2015</td><td>01/11/2016</td><td>-</td></tr><tr><td></td><td>13</td><td></td></tr><tr><td></td><td>06/11/2014</td><td></td></tr><tr><td></td><td>14</td><td></td></tr><tr><td></td><td>28/11/2014</td><td></td></tr><tr><td></td><td>15</td><td></td></tr><tr><td></td><td>22/11/2014</td><td></td></tr><tr><td></td><td>16</td><td></td></tr></table>	Meter No	Date of calibration	Valid till	Delay in calibration	HAJ213545 & HAJ213546	16/11/2009	15/11/2010	-	29/11/2010	10	-	06/11/2011	28/11/2011	14 days	02/11/2012	11	-	07/11/2013	05/11/2014	6 days	29/11/2014	12	23 days	23/11/2015	01/11/2016	-		13			06/11/2014			14			28/11/2014			15			22/11/2014			16	
Meter No	Date of calibration	Valid till	Delay in calibration																																												
HAJ213545 & HAJ213546	16/11/2009	15/11/2010	-																																												
	29/11/2010	10	-																																												
	06/11/2011	28/11/2011	14 days																																												
	02/11/2012	11	-																																												
	07/11/2013	05/11/2014	6 days																																												
	29/11/2014	12	23 days																																												
	23/11/2015	01/11/2016	-																																												
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		14																																													
		28/11/2014																																													
		15																																													
		22/11/2014																																													
		16																																													
Calibration information: Luni III																																															
<table><tr><th>Meter No</th><th>Date of calibration</th><th>Valid till</th><th>Delay in calibration</th></tr><tr><td rowspan="4">8311PH1008 & KBA243426</td><td>13/11/2009</td><td>12/11/2010</td><td>-</td></tr><tr><td>26/11/2010</td><td>10</td><td>14 days</td></tr><tr><td>09/11/2011</td><td>25/11/2011</td><td>-</td></tr><tr><td>28/10/2012</td><td>11</td><td>-</td></tr><tr><td>8312PH100</td><td>03/11/2013</td><td>08/11/2013</td><td>6 days</td></tr></table>	Meter No	Date of calibration	Valid till	Delay in calibration	8311PH1008 & KBA243426	13/11/2009	12/11/2010	-	26/11/2010	10	14 days	09/11/2011	25/11/2011	-	28/10/2012	11	-	8312PH100	03/11/2013	08/11/2013	6 days																										
Meter No	Date of calibration	Valid till	Delay in calibration																																												
8311PH1008 & KBA243426	13/11/2009	12/11/2010	-																																												
	26/11/2010	10	14 days																																												
	09/11/2011	25/11/2011	-																																												
	28/10/2012	11	-																																												
8312PH100	03/11/2013	08/11/2013	6 days																																												

			8	25/11/2014 27/11/2015	12 27/10/20 13 02/11/20 14 24/11/20 15 26/11/20 16	23 days 3 days	
<p>The calibration certificate issued by RELTECH Engineers, the agency which did the calibration of the meter indicates that the meters are functioning within the specified accuracy. However it is seen that the in certain occasions the calibration has been done beyond the due date of calibration as noted in the table above. The verification team confirms the calibration certificate of the calibration done beyond the due date shows that the meter is functioning within the specified accuracy limits. The meter readings are not used for emission reduction calculations but only used as backup data. Further there was no power generation during the period as the plant was shut down due to non-availability of water as could be verified from the plant logs. Hence the verification team concludes that the delay in calibration does not have any impact on the emission reductions achieved.</p> <p>The verification team finds that the total gross electricity generation from both units together for the verification period is 283,846 MWh. The total auxiliary consumption for both units together is 1,007.82. The net export as per these meters at generation site is 282,838 MWh whereas the net export of electricity as per JMR based on meter readings in the substation is 270,362.9 MWh. The emission reduction calculation is based on the JMR reading and is conservative and comparable.</p>							

EG _{Auxiliary,y}	Auxiliary electricity consumption of the project	Luni II 354.979 MWh Luni III 585.117 MWh	<p>Source of data: Measured using Energy meters</p> <p>Measuring/reading/recording frequency: Continuously measured and recorded and reported monthly.</p> <p>Monitoring equipment: Energy meters details</p> <table border="1"><tr><td>Location</td><td>S.NO</td></tr><tr><td>Luni II</td><td>TM7400</td></tr><tr><td>Luni III</td><td>8313PH1008</td></tr></table> <p>Accuracy class: Acceptable accuracy of the meter is 0.5%</p> <p>Calibration information: Calibration information: Luni II</p> <table border="1"><tr><th>Meter No</th><th>Date of calibration</th><th>Valid till</th><th>Delay in calibration</th></tr><tr><td rowspan="8">TM7400</td><td>16/11/2009</td><td>15/11/2010</td><td>-</td></tr><tr><td>29/11/2010</td><td>28/11/2011</td><td>14 days</td></tr><tr><td>06/11/2011</td><td>05/11/2012</td><td>-</td></tr><tr><td>02/11/2012</td><td>01/11/2013</td><td>-</td></tr><tr><td>07/11/2013</td><td>06/11/2014</td><td>6 days</td></tr><tr><td>29/11/2014</td><td>28/11/2015</td><td>23 days</td></tr><tr><td>23/11/2015</td><td>22/11/2016</td><td>-</td></tr><tr><td></td><td></td><td></td></tr></table> <p>Calibration information: Luni III</p> <table border="1"><tr><th>Meter No</th><th>Date of calibration</th><th>Valid till</th><th>Delay in calibration</th></tr><tr><td rowspan="8">8313PH1008</td><td>13/11/2009</td><td>12/11/2010</td><td>-</td></tr><tr><td>26/11/2010</td><td>25/11/2011</td><td>14 days</td></tr><tr><td>09/11/2011</td><td>08/11/2012</td><td>-</td></tr><tr><td>28/10/2012</td><td>27/10/2013</td><td>-</td></tr><tr><td>03/11/2013</td><td>02/11/2014</td><td>6 days</td></tr><tr><td>25/11/2014</td><td>24/11/2015</td><td>23 days</td></tr><tr><td>27/11/2015</td><td>26/11/2016</td><td>-</td></tr><tr><td></td><td></td><td></td></tr></table> <p>The calibration certificate issued by RELTECH Engineers, the agency which did the calibration of the meter indicates that the meters are functioning within the specified accuracy. However it is seen that the in certain occasions the calibration has been done beyond the due date of calibration as noted in the table above. The verification team confirms the calibration certifications of the calibration done beyond the due date shows that the meter is functioning within the specified accuracy limits. The meter readings are not used for emission reduction calculations but only used as backup data. Further there was no power generation during the period as the plant was shut down due to non-availability of water as could be verified from the plant logs. Hence the verification team concludes that the delay in calibration does not have any impact on the emission reductions achieved</p>	Location	S.NO	Luni II	TM7400	Luni III	8313PH1008	Meter No	Date of calibration	Valid till	Delay in calibration	TM7400	16/11/2009	15/11/2010	-	29/11/2010	28/11/2011	14 days	06/11/2011	05/11/2012	-	02/11/2012	01/11/2013	-	07/11/2013	06/11/2014	6 days	29/11/2014	28/11/2015	23 days	23/11/2015	22/11/2016	-				Meter No	Date of calibration	Valid till	Delay in calibration	8313PH1008	13/11/2009	12/11/2010	-	26/11/2010	25/11/2011	14 days	09/11/2011	08/11/2012	-	28/10/2012	27/10/2013	-	03/11/2013	02/11/2014	6 days	25/11/2014	24/11/2015	23 days	27/11/2015	26/11/2016	-			
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EG _y EG _{export y}	Net electricity supplied to the grid Electricity supplied to the grid	Luni II 138,161.847 MWh Luni III 132,201.06 MWh Luni II	<p>Source of data: Measured using Energy meters</p> <p>Measuring/reading/recording frequency: Continuously measured and recorded and reported monthly.</p> <p>Monitoring equipment: Bi-directional electronic tri-vector located at sub station</p> <p>Energy meters details</p>																																																																

EG _{import,y}	Electricity imported from grid	138,184.247 MWh Luni III 132,220.160 MWh Luni II 22.400 MWh Luni III 19.100 MWh	<p>There is a main meter & check meter installed for both units and details are as follows.</p> <p>Accuracy class: Acceptable accuracy of the meter is 0.2%</p> <p>Calibration information:</p> <table border="1"> <thead> <tr> <th>Meter No</th><th>Date of calibration</th><th>Valid till</th><th>Period when the meter was in use</th></tr> </thead> <tbody> <tr> <td>07033715(Main) 00733705(Check)</td><td>21-04-2009 17-02-2011 03-03-2012 08-02-2013</td><td>20-04-2010 16-02-2012 02-03-2013 07-02-2014</td><td>21/4/2009 to 20/04/2010 18/5/2011 to 15/02/2012 11/04/2013 to 09/07/2013</td></tr> <tr> <td>07360988(Main) 07360973(check)</td><td>27-04-2009 28-05-2010 14-11-2011</td><td>26-04-2010 27-05-2011 13-11-2012</td><td>22/12/2010 to 17/05/2011</td></tr> <tr> <td>07041343(Main) 07041344(check)</td><td>22-08-2012 10-07-2013 25-07-2014 25-08-2015</td><td>21-08-2013 09-07-2014 24-08-2015 24-08-2016</td><td>22/08/2012 to 10/04/2013 10/07/2013 to 31/03/2014 26/10/2014 to 06/02/2015 25/08/2015 to 14/01/2016</td></tr> <tr> <td>13191233(Main) 13191167(check)</td><td>25-11-2013 07-02-2015</td><td>24-11-2014 06-02-2016</td><td>01/04/2014 to 25/10/2014 07/02/2015 to 24/08/2015</td></tr> <tr> <td>07360973(Main) 07360988(check)</td><td>11-02-2013</td><td>10-02-2014</td><td></td></tr> </tbody> </table> <p>The calibration certificate issued by Power Grid Corporation Of India Limited, the agency which did the calibration of the meter indicates that the meters are functioning within the specified accuracy. Whenever the meters are taken for calibration, they are replaced with another set of meters which were calibrated earlier.</p> <p>Data cross check and QA/QC procedures: As could be verified during site visit the meter readings are not used for the calculation of emission reductions per se but act as a backup data, in line with the monitoring plan of the updated revised registered PDD.</p>	Meter No	Date of calibration	Valid till	Period when the meter was in use	07033715(Main) 00733705(Check)	21-04-2009 17-02-2011 03-03-2012 08-02-2013	20-04-2010 16-02-2012 02-03-2013 07-02-2014	21/4/2009 to 20/04/2010 18/5/2011 to 15/02/2012 11/04/2013 to 09/07/2013	07360988(Main) 07360973(check)	27-04-2009 28-05-2010 14-11-2011	26-04-2010 27-05-2011 13-11-2012	22/12/2010 to 17/05/2011	07041343(Main) 07041344(check)	22-08-2012 10-07-2013 25-07-2014 25-08-2015	21-08-2013 09-07-2014 24-08-2015 24-08-2016	22/08/2012 to 10/04/2013 10/07/2013 to 31/03/2014 26/10/2014 to 06/02/2015 25/08/2015 to 14/01/2016	13191233(Main) 13191167(check)	25-11-2013 07-02-2015	24-11-2014 06-02-2016	01/04/2014 to 25/10/2014 07/02/2015 to 24/08/2015	07360973(Main) 07360988(check)	11-02-2013	10-02-2014	
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FC _{i,y}	Quantity of fossil fuel i (diesel) combusted in the project plant during the present monitoring period	28,077 liters	<p>Source of data: Measured using Ruler gauge</p> <p>Measuring/reading/recording frequency: Measured daily .Recorded and reported monthly.</p> <p>Monitoring equipment:</p> <p>Ruler gauge</p> <p>Accuracy class: Acceptable accuracy of the meter is 0.4%</p> <p>Calibration information: Considering the difficulties and cost involved in calibrating the ruler gauge, the PP uses a new ruler gauge every year.The verification team from the log book and records confirms that a new ruler gauge has been used during the years 2011,2012,2013,2014 & 2015</p> <p>Data cross check and QA/QC procedures: The verification team cross checked the consumption of diesel with purchase quantity and the stock register and confirms that the PP has as a conservative approach used the total diesel consumption</p>																								

			<p>at site for calculation of emission reduction. It is seen that the DG set is not in continuous operation and is infrequently used.</p> <p>Further the consumption data is used for estimation of project emission. The project emission during the current monitoring period is 78.2 tCO₂e. which is only 0.04% of the total emission reductions for the monitoring period 12/02/2010 to 31/12/2015.</p>
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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		