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Prepared By	Dr. D. Siddaramu / Mr. R. Madhukar
Contact	No.1, Persiaran Dato' Menteri, Section 2, 40700 Shah Alam, Selangor Darul Ehsan, Malaysia Tel.: 603-55446479 Fax: 603-55446787 www.sirim-sqas.com.my
Approved By	Mr. Parama Iswara Subramaniam
Work Carried Out By	Dr. D. Siddaramu Mr. R. Madhukar Mr. Sai Prasad (Technical Expert)

Summary:

GVK Gautami Power Limited has appointed SIRIM QAS International Sdn Bhd to perform a periodic verification and certification of the emission reductions of 'Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited' (VCS Project ID - VCSR465) for the period from 05th June 2009 to 08th September 2011. The project activity was registered by the VCS on 07th March 2001. The verification was based on VCS Standard Version 3.3 criteria^{/1/}, the validated project description (PD)^{/2/} version 02 dated 15/05/2010, corresponding validation report^{/3/}, monitoring reports^{/4/,5/} and other supporting documents made available to the verification team by client.

The project activity involved the commissioning and operation of a new, Greenfield 469 MW natural gas fired combined cycle power plant. The proposed project activity is owned by GVK Gautami Power Ltd. (GGPL) and is located at Industrial Development Area, Peddapuram, near Samalkot in East Godavari district, Andhra Pradesh, India. The project activity was commissioned on 05th June 2009. The project activity uses relatively cleaner fuel (natural gas) instead of most common fuel in the grid i.e., coal, for power generation. The generated electricity is sold to the state electricity utility Andhra Pradesh Transmission Corporation of India Ltd, (APTRANSCO).

The generated electricity is sold to grid, as per power purchase agreement^{/6/}. The project activity results in the reduction of GHG emission by displacing the grid electricity from the Southern Grid, a fossil fuel dominated grid.

As a result of the verification, SIRIM QAS Intl. verification team confirms that the project has achieved emission reductions for the monitoring period as below:

Parameter	Description	Year 2009 (5 th June, 2009 to 31 st Dec, 2009)	Year 2010 (1 st Jan, 2010 to 31 st Dec, 2010)	Year 2011 (1 st Jan, 2011 to 8 th September, 2011)	Total Monitoring Period
BE _v (tCO ₂ e)	Emissions in the Baseline Scenario	1,514,299	2,673,290	1,677,106	5,864,695
PE _v (tCO ₂ e)	Emissions in the Project Scenario	784,709	1,378,893	884,766	3,048,368
LE _v (tCO ₂ e)	Leakages	55,388	96,982	63,018	215,344
ER _v (tCO ₂ e)	Emission Reductions	674,253	1,197,415	729,322	2,600,983

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Appendix A: Verification Protocol

1 INTRODUCTION

1.1 Objective

The objectives of this verification were:

- To verify that the project was being implemented as described in the registered PD;
- To confirm that the monitoring system was being implemented and fully functional to generate verified carbon units (VCUs) without any double counting, and
- To establish that the data reported were accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation; and
- To verify and certify GHG emission reduction reported for 'Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited' project for the period from 05th June 2009 to 08th September 2011.

1.2 Scope and Criteria

The scope of the verification is the independent and objective review and *ex-post* determination of the monitored reductions in GHG emissions from 'Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited' project.

The verification of this VCS project was based on registered VCS Project Document (PD), registered validation report (VCS 2007.1), monitoring report and supporting documents including the monitored data made available to the verification team. These documents were reviewed against the requirements of VCS Standard Version 3.3 criteria^{1/} and latest policy announcements, from VSC Board, presently applicable to the verification of project activity.

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.

1.3 Level of assurance

In line with VCS Standard Version 3.3 and as per ISO 14064-3:2006 para A.2.3.2, a reasonable level of assurance has been followed for the verification of the project. Based on the desired level of accuracy, SIRIM QAS Intl. has established an internal quality control process and assures that the information given in the monitoring report is materially correct and is a fair representation of GHG data and information which has been prepared in accordance with the VCS Standard 3.3 criteria and latest policy announcements, from VSC Board, presently applicable to the verification of project activity for the current verification period.

The verification report is prepared as per this requirement and details are presented in the verification statement in section 2 below:

1.4 Summary Description of the Project

The project activity is a Greenfield 469 MW natural gas combined cycle power plant which generates and supplies electricity to the Andhra Pradesh state electricity grid which is part of the Southern Grid. The supply and sale of the electricity to the grid is governed by a Power Purchase Agreement with Andhra Pradesh Transmission Corporation of India Ltd, (APTRANSCO)

The project activity consisted of two gas turbine generators (GTG), two heat recovery steam generators (HRSG) and one steam turbine generator (STG). The combustion turbine module consists of a 21-stage compressor and 5-stage turbine. The turbine unit has annular type combustors. The combustion of air fuel mixture takes place in the combustors. The accessory module is mounted on a separate base frame and houses the mechanical and the control elements required for the combustion turbine operation. The major components located in the auxiliary block are lubricating oil system with lube oil reservoirs and lube oil coolers. The variable frequency power required for this purpose is generated by the static frequency converter system from station auxiliary power systems (only during start up). This electricity usage is accounted in the total auxiliary consumption for calculation of net export. The combustion turbine is a single shaft machine with the compressor and turbine installed in a single casing.

The heat recovery steam generator (HRSG) is a triple pressure, unfired, horizontal gas flow type with internal thermal insulation, platforms and ladders. Feed water and steam sampling arrangements are provided as required. The water circulation through the evaporator is by means of natural circulation set up by thermo syphonic action. Steam from HRSG is supplied to a condensing type non-reheat steam turbine through steam piping.

The steam turbine generator (STG) is triple pressure condensing type. The steam entry to the turbine is through the emergency stop and control valves, which govern the speed/ load on the machine. The turbine control system is electro-hydraulic type. The STG is complete with lube oil and control oil system, governing system, protection system and gland sealing steam system. The turbine is provided with low speed barring gear, which rotates the coupled shaft. The turbine is also provided with a rotor jacking oil system. The steam turbine has a condenser for condensing the exhaust steam from the steam turbine.

The generators (210 MVA) are coupled to gas turbines and steam turbine. They deliver the power at 15.75 kV with 0.8 PF; 3 phase; 50 Hz at site ambient conditions of 29°C and a relative humidity of 70%.

The main purpose of the project activity is to generate electricity through less GHG intensive fuel, such as natural gas (NG), that displaces electricity from an electricity distribution system (Southern Grid) dominated by fossil fuel fired generating units. The

project is a registered VCS project that applies CDM methodology AM0029, version 3.0^{/6/} under the sectoral scope no. 1 (Energy industries – renewable/non-renewable sources). The project was registered on VCS registry on 07th March 2011.

This is the first VCS verification of the project activity for the monitoring period from 05th June 2009 to 08th September 2011. In the current monitoring period, the project activity had displaced 7682.3355 GWh of electricity which would have been otherwise generated through fossil fuel sources connected to Southern Grid.

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

Not applicable as the project activity had been validated by SIRIM QAS International Sdn. Bhd. as per the VCS 2007.1 Standard. Please refer to the VCS Validation Report dated 07th March 2011 submitted to VCS Registry.

2.2 Validation Findings

2.2.1 Gap Validation

Not applicable.

2.2.2 Methodology Deviations

Not applicable as no methodology deviations have been sought during the validation of this project activity. The project activity has applied Methodology AM0029, Version 03^{/7/}.

2.2.3 Project Description Deviations

The project activity is not a grouped project.

2.2.4 New Project Activity Instances

Not Applicable.

2.3 Validation Conclusion

As per the registered Final Validation Report of the project activity issued on 07th March 2011, project activity has correctly applied the baseline and monitoring methodology AM0029, Version 03 and meets the relevant VCS 2007.1 requirements.

3 VERIFICATION PROCESS

3.1 Method and Criteria

The SIRIM QAS Intl.'s verification process consisted of the following phases:

- i) document review of the VCS registered PD, the Monitoring Report and the emission reductions calculation spreadsheets submitted by the client;
- ii) verification audit planning;
- iii) on-site visit to the project activity which included interviews with the project owner/client, review of various monitoring records and records of calibration of the monitoring equipment, and verification of measurement procedures;
- iv) preparation of draft verification report (issuance of verification audit findings);
- v) resolution of outstanding issues and the issuance of final verification report and opinion.

3.2 Document Review

The following documentation was reviewed and verified:

- Registered PD, version 02 dated 15th May 2010^{/1/}
- Validation report, version 01 dated 07th March 2011^{/2/}
- Monitoring report version 1, version 2^{/3/}
- Emission reduction spread sheet^{/8/}
- Certificate of commissioning^{/9/}
- Calibration Certificates of energy meters^{/10/}
- Calibration Certificate of gas flow meter^{/11/}
- JMR's for the entire monitoring period^{/12/}
- Joint calibration report of Gas Chromatograph^{/13/}

A complete list of all documents reviewed is as listed in section 6 (References) of this report.

3.3 Interviews

The personnel interviewed and the coverage of interviews is summarized below:

Persons interviewed	Coverage
<u>GVK Gautami Power Ltd Representatives</u> Mr. T.R.S. Soma Sekar, AGM (C & E) Mr. Raja Roy, AGM (EMD) Mr. B.S.Rao, AGM (MMD) Mr.R. Vijaya Kumar, Deputy Manager	Project implementation, Management system, Management procedures like management reviews and procedures in place especially with respect to calibration, data transfer and reporting.

Mr. Pravin Jadhav, CDM Consultant General Carbon	Detailed checking of the monitoring records and spreadsheets, as per monitoring plan and report. Confirming the correctness of the emission reduction calculations by cross verifying with the JMR readings. Assessment of calibration records of all the instruments used for monitoring.
<u>GVK Gautami Power Ltd O & M Personals</u> Mr. Y. Satya Sai Babu, AGM (C & I) Mr. K. Ramakrishna Prasad, Sr.Engineer Mr.K.V.V. Kishore, Engineer (Operations)	Monitoring system, Assessment of calibration records of all the instruments used for monitoring, JMR readings.

3.4 Site Inspections

An on-site verification to the project site was carried out from 16th to 17th January 2013.

The project assessment was based on the methodology and VCS Standard 3.3. In order to ensure transparency, a verification protocol was customized for the project, according to VCS Standard 3.3. The protocol shows, in a transparent manner, requirements, means of verification and the results. The verification protocol serves the following purpose;

- it organizes, provides details and clarifies the requirements of verification of a VCS project is expected to meet;
- it ensures a transparent verification process where the verifier will document how a particular requirement has been proved, and the results of the verification.

The completed protocol is enclosed in Annex I to this report.

The on-site audit consisted of visit to the site, metering room present in the switch yard and Central Monitoring system (CMS), to verify project implementation, the location of the monitoring equipment, and the review of documents and data in the office. Interviews with relevant personnel were also carried out to confirm the method of recording the GHG data.

3.5 Resolution of Any Material Discrepancy

The objective of this phase of the verification is to resolve the request for corrective actions and clarification and any other outstanding issues which needed to be clarified prior to SIRIM QAS Intl.'s conclusion on the monitoring report based on the site inspection and review of documents, such that the project activity meets the VCS version 3.3 criteria and latest policy announcements. Two (2) Corrective Action Requests (CAR) and four (4) Clarification Requests (CL) raised by the verification team were resolved during communication between the client and the verification team. In

order to ensure the transparency of the verification process, completed protocol is enclosed in Appendix A to this report.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The on-site verification at the project site confirmed that the project was implemented in line with the registered PD. The project activity involved commissioning and operation of a new, Greenfield 469 MW natural gas fired combined cycle power plant at Industrial Development Area, Peddapuram, near Samalkot in East Godavari district, Andhra Pradesh, India by GVK Gautami Power Ltd. (GGPL). It consists of two gas turbine generators (GTG), two heat recovery steam generators (HRSG) and one steam turbine generator (STG). It was confirmed that the project uses natural gas for power generation. The generated electricity is sold to grid, as per power purchase agreement^{/5/} with the state electricity utility Andhra Pradesh Transmission Corporation of India Ltd, (APTRANSCO). The project activity is a single site i.e., there is no phase wise implementation of the project.

The GPS co-ordinates (i.e., Latitude – Longitude) mentioned in the registered PD and monitoring report were confirmed through Google Earth Map. The verification team was able to confirm that the physical features of the project site such as the technology and project equipment of the project activity are in place and the project is being implemented and operated as per the registered PD.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

According to the methodology the following parameters should be monitored

- Metering of the electricity exported by power plant to the Southern Grid
- Total volume of natural gas combusted in the project plant in year 'y'
- The net calorific value (energy content) per volume unit of natural gas in year 'y'
- Quantity of LNG or NG consumed in the project activity (for leakage, if any)
- The BM emission factor in accordance with tools to calculate emission factor for electricity system

The verification of the above parameters is as shown below:

No.	Parameter	Value applied during the monitoring period	Source of data used and measurement frequency	Means of verification
1.	Electricity exported by	7,682,335,592 kWh	Source: Common Trivector energy meter at	In accordance with the monitoring plan of the

	the project plant (EG _{PJ,y})		the plant site present in the switch yard. The meter is a 3 phase 4 wire meter of accuracy 0.2 class. The digital readings will be monitored each hour and data will be recorded monthly. The data represents the electricity measured by the Cumulative Energy Meter. This represents the summation of the readings measured by the energy meter line-1 and energy meter line-2. The readings are taken manually every day at 00 hrs. The readings are stored in the power plant electricity generation log book. The readings are taken by the shift engineers and are cross checked by the site main controller and are recorded in the log book. Measured - Monthly, monitored – continuously	registered PD, this parameter value is taken from the JMR invoice (invoices raised by PP to Andhra Pradesh Power Coordination Committee a wing of APTRANSCO). During the site visit, the verification team visited the switch yard and verified the power plant log book and JMR invoices. The team found that value used is as per the JMR reading. Hence value and source is authentic and appropriate. As described in the registered PD, the meter is a 3 phase 4 wire meter of accuracy 0.2 class. The digital readings are monitored each hour and data is recorded monthly. The data represents the electricity measured by the Cumulative Energy Meter representing the summation of the readings measured by the energy meter line-1 and energy meter line-2.
2.	Quantity of NG consumed in the project activity (Q _{NG})	1,519,541,371 SCM	Source: The quantity of Natural Gas was measured by the gas flow meter which is installed by GAIL at their terminal (which is inside the project boundary). The readings were recorded manually at 00 hrs. The quantity of	The readings are recorded manually at 00 hrs and are stored in the power plant log book. During the site visit, the verification team checked the daily quantity of natural gas consumed by the project activity with the invoices raised by fuel supplier (GAIL) and found correct. Further in

			natural gas was cross checked with the invoices that were obtained from the GAIL. Measured - Monthly, monitored – continuously	calculating project and leakage emission, PP has considered this additional value of natural gas (i.e., Q_{NG}) consumed in the project activity.
3.	Net Calorific Value of Natural Gas (NCV_{NG})	8541.36 kcal/SCM	Source: Invoice from the supplier. NCV is measured by the Gas calorimeter installed by GAIL at their terminal (which is inside the project boundary). Measured - Monthly, monitored – continuously	In accordance with the monitoring plan, the NCV is taken from the supplier provided data as described in the registered PD and in line with applied methodology. During the site visit, the verification team checked the invoices raised by fuel supplier (GAIL) and found that this NCV value of natural gas supplied in the invoice is used for emission reduction calculations. Hence value and source is authentic and appropriate.
4.	Calculation of CO_2 Emission Co-efficient of natural gas ($COEF_{f,y}$)	0.0020 tCO_2/SCM	Calculated with formula given in applicable methodology AM0029 $COEF_{f,y} = \sum NCV_{f,y} * EF_{CO_2,f,y} * OXID_f$	In accordance with the monitoring plan of the registered PD, this is calculated value. The values of $EF_{CO_2,f,y}$ and $OXID_f$ is taken as per IPCC Guidelines and NCV as monitored in the monitoring plan as actual 8570 kcal/SCM * 4.186 * 10⁻⁹ * 56.1 t CO_2 / TJ * 1 = 0.0020 tCO_2/ m^3 Hence verification team considers the value and source as authentic and appropriate.
5.	The Build Margin emission factor of	763.4 tCO_2/GWh	Source: CEA CO_2 Baseline Database, version 06; March 2011	Calculated as per the monitoring methodology AM0029, Version 03,

	Southern grid ($EF_{BM,y}$)			$EF_{BM,y}$ is used for ex-ante estimation and as per methodology requirement; this is monitored ex-post for emission reduction calculation in the monitoring period (latest available database, most recent year Build Margin emission factor is used). Hence appropriate.
6.	Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity ($EF_{BL,upstream,CH_4}$)	15.94 tCO ₂ /MU	Calculated	Calculated as per the monitoring methodology AM0029, Version 03. In line with the baseline emission factor selection. $EF_{BL,upstream,CH_4}$ is calculated for power plants included in the Build Margin. This data will be computed consistent with the Build Margin emission factor based on latest available information from CEA and applied methodology. The verification team considers data as authentic and appropriate.
7.	Quantity of LNG consumed in the project activity (Q_{LNG})	963,543	Source of data: Fuel flow meter at GAIL terminal (which is inside the project boundary). Measured: Daily, monitored continuously	In accordance with the monitoring plan of the registered PD, this parameter value is taken from the GAIL invoice. During site visit, the verification team found that LNG was consumed only during 1 st January to 8 th September 2011. This was confirmed from O & M team and the invoice raised by the fuel supplier (GAIL).

For the default/fixed values, the values determined during the validation were used and it was fixed for the entire crediting period of the project. Following are the default values that were used in the calculation of the emission reductions:

No.	Parameter	Value (Unit)	Reference	Justification
1.	Fugitive methane upstream emissions ($EF_{NG,upstream,CH_4}$)	296 (tCH ₄ /PJ)	Table- 2 of AM0029 Version 03	Default value as provided in applied methodology AM0029, version 03 is used for fugitive methane upstream emissions calculations. As data is taken from the applied methodology, value used is most appropriate.
2.	Oxidation Factor of NG ($OXID_{NG}$)	1 (Unit less factor)	Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories	For oxidation factor of natural gas, default value published by IPCC (Chapter 1, Volume 2, 2006) is used. As data is taken from IPCC, data source is found authentic and appropriate.
3.	Emission factor for fuel "f" in tonnes of carbon dioxide per Giga Joule. ($EF_{CO_2,f,y}$)	0.0561 (tCO ₂ /GJ)	Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories	As emission factor for fuel ($EF_{CO_2,f,y}$) is taken from IPCC (Chapter 1, Volume 2, 2006), the data source is found authentic and appropriate.

The verification team confirms that values of parameters monitored ex-ante is as per registered PD. The values of parameters monitored ex-post are in line with approved methodology.

The verification team verified the values of monitored parameters used in the calculation of emission reduction with the relevant records during on-site and as well as off-site assessment of data and documents, all the parameters monitored were are in accordance with the registered VCS PD. The values of various parameters such as fuel consumed, electricity generated, etc. are correct and free of any material misstatement.

The verification team reviewed the Monitoring Report and found that in Section 4.2 the formulae for calculation of baseline emission, project emission and leakage were clearly described as per the registered PD in line with the applied methodology.

Based on the review of the emission reduction calculation spread sheet verification team

confirms that the emission reductions are correct and conservative as the data that directly affect the emission reduction are from official, credible and appropriate sources, PP has included the correct value of electricity generated and the fuel consumed for calculating emission reduction.

Further, PP explained that there were three scheduled shut down during the monitoring period (05-06-2009 to 08-09-2011). The verification team confirmed the three shut down from the daily electricity generation log book and actual electricity generated and fed to the grid from the JMR. The JMR readings for net electricity generated were cross checked with the invoice raised by the PP to the Andhra Pradesh Power Coordination Committee (a wing of APTRANSCO).

Emission reductions calculation:

In accordance with baseline methodology (AM0029 version 03), the emission reductions are to be calculated using the following equations:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y : = Emissions reductions in year y (t CO_{2e})

BE_y : = Emissions in the baseline scenario in year y (t CO_{2e})

PE_y : = Emissions in the project scenario in year y (t CO_{2e})

LE_y : = Leakage in year y (t CO_{2e})

Calculated as difference between the baseline emissions, minus the project emissions and leakage, the emission reductions for the entire monitoring period are 2,600,983 tCO_{2e}.

Baseline Emissions:

Baseline emissions are calculated by multiplying the electricity generated in the project plant ($EG_{PJ,y}$) with a baseline CO₂ emission factor ($EF_{BL,CO2,y}$), as follows:

$$BE_y = EG_{PJ,y} * EF_{BL,CO2,y}$$

During the monitoring period, the total net electricity supplied by the project activity is 7,682,335,592 kWh. The baseline emission factor (Build Margin) has to be ex-post and the values during the validation are based on CEA version 5 and hence the Build Margin is updated based on the version 6 of CEA. Based on the net electricity supplied and the emission factor, the baseline emissions are 5,864,695 tCO_{2e}.

Project Emissions:

The project activity is on-site combustion of natural gas to generate electricity. The CO₂ emissions from electricity generation (PE_y) are calculated as follows:

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

Where:

FC_{f,y}: = Is the total volume of natural gas or other fuel 'f' combusted in the project plant or other start-up fuel (m³ or similar) in year(s) y

COEF_{f,y}: = Is the CO₂ emission coefficient (tCO₂/m³ or similar) in year(s) for each fuel and is obtained as:

$$COEF_{f,y} = \sum NCV_y * EFCO_{2f,y} * OXID_f$$

Where:

NCV_{f,y}: = Is the net calorific value (energy content) per volume unit of natural gas in year y (GJ/m³) as determined from the fuel supplier, wherever possible, otherwise from local or national data

EFCO_{2f,y}: = Is the CO₂ emission factor per unit of energy of natural gas in year y (tCO₂/GJ) as determined from the fuel supplier, wherever possible, otherwise from local or national data

OXID_f: = Is the oxidation factor of natural gas

For start-up fuels, IPCC default calorific values and CO₂ emission factors are acceptable, if local or national estimates are unavailable.

Is result from the on-site combustion of natural gas to generate electricity, The project emissions are estimated by multiplying volume of natural gas combusted (15205049143 SCM) by the project activity during the monitoring period and CO₂ emission coefficient (0.0561 tCO_{2e} /GJ). Based on the natural gas combusted and the CO₂ emission coefficient, the project emissions are 3,048,368 tCO_{2e}.

Leakage:

Leakage may result from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary. This includes mainly fugitive CH₄ emissions and CO₂ emissions from associated fuel combustion and flaring. In this methodology, the following leakage emission sources shall be considered:

- Fugitive CH₄ emissions associated with fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas used in the project plant and fossil fuels used in the grid in the absence of the project activity;
- In the case LNG is used in the project plant: CO₂ emissions from fuel

combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

Thus, leakage emissions are calculated as follows:

$$LE_y = LE_{CH_4, y} + LE_{LNG\ CO_2, y}$$

Where:

LE_y : = Leakage emissions during the year y in tCO_{2e}

$LE_{CH_4, y}$: = Leakage emissions due to fugitive upstream CH₄ emissions in the year y in t CO_{2e}

$LE_{LNG, CO_2, y}$: = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_{2e}

Emission factor for upstream fugitive methane emissions ($EF_{BL, upstream, CH_4}$) is calculated in a conservative manner in accordance with the methodology and the leakage emission for the monitoring period is 215,344 tCO_{2e}. CO₂ emissions from LNG were also considered, as LNG was used in the project activity.

As the estimates of emissions reductions are derived from accepted national sources, it is reasonable to assume that they are accurate. The baseline methodology (AM0029 version 03) has been applied correctly to calculate the project emissions, baseline emissions, leakage emissions and emission reductions. The verification team has verified the information in the registered PD, monitoring report and the emission reduction calculation sheet and found that the formulae used in the monitoring report were correctly applied in line with the applied methodology and tool to calculate the emission factor for an electricity system (version 02).

The verification team verified the values of monitored parameters used in the calculation of emission reduction with the relevant records during on-site and as well as off-site assessment of data and documents. All the parameters monitored were in accordance with the registered VCS PD.

The values of various parameters such as fuel consumed, electricity generated, etc. are correct and free of any material misstatement.

Based on the review of the emission reduction calculation spread sheet, the verification team confirms that the emission reductions are correct and conservative as the data that directly affect the emission reduction are from official, credible and appropriate sources; PP has included the correct value of electricity generated and the fuel consumed for calculating emission reduction.

Further, PP explained that there were scheduled shut down during the monitoring period (05-06-2009 to 08-09-2011) on following dates

No.	Plant shut down period
1	29/09/2009
2	28/02/2010 to 02/03/2010
3	24/07/2011 to 26/07/2011

Hence, there was no generation of electricity and no emission reduction are claimed during this period and whenever electricity was imported from the grid during plant maintenance and shut down period, this is subtracted from the total electricity supplied to the grid.

PP has used appropriate methods and formulae for calculating baseline emissions, project emissions and leakage emissions are in line with applied baseline and monitoring methodology.

The GHG emission reductions for the monitoring period (05-06-2009 to 08-09-2011) are calculated based on Baseline Emission, Project Emission, Leakage and Emission Reduction

The emission reduction is calculated on the basis of the net electricity exported by the project activity and the Natural gas consumption. The calculation is in accordance with the applied methodology (i.e., AM0029, version 03) and registered VCS PD.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

The equipment used to monitor and measure the parameters in the monitoring plan had been calibrated accordingly. The calibration of the monitoring equipment was conducted at the frequency as specified PPA, registered PD and monitoring report. The details of the calibration are tabulated below:

Monitoring Instrument	Serial number	Frequency of calibration	Calibration information			Remarks
Electricity meters in the switch yard at the plant site						
Electricity meter Line-1	07615227	Once in six months	Calibration	Validity till	Meter kept in service Date	The electricity meters are calibrated at “Electrical Research and Development Association” (ERDA) and
			17/04/2009	16/04/2010	26/06/2009	
			24/06/2010	23/06/2011	16/07/2010	
			08/04/2011	07/04/2012	05/07/2011	
Electricity meter Line-2	09451715		Calibration	Validity till	Meter kept in service Date	

			06/11/2009	05/11/2010	20/01/2010	“Electronics Test and Development Center” (ETDC) (Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Government of India).
			08/04/2011	07/04/2012	05/07/2011	
Rolling stock meters (Stand by meters)	07615234		Calibration	Validity till	Meter kept in service Date	
			17/04/2009	16/04/2010	26/06/2009	
			24/06/2010	23/06/2011	16/07/2010	
	09451716		18/10/2011	17/10/2012	06/01/2012	
			Calibration	Validity till	Meter kept in service Date	
			06/11/2009	05/11/2010	20/01/2010	
	011961773		12/11/2010	11/11/2011	10/01/2011	
			Calibration	Validity till	Meter kept in service Date	
			12/11/2010	11/11/2011	10/01/2011	
Check Meters	08/06/2012		07/06/2013	-		
	25/10/2010		25/11/2011			
	7659724	25/10/2010		25/11/2011		
	7659726	25/10/2010		25/11/2011		

Gas flow meter at GAIL					
Line A	FB-S600/1741 8241	Yearly	28/04/2009 25/01/2010 26/10/2010 27/04/2011	27/04/2010 24/01/2011 25/10/2011 26/04/2012	The Gas flow meters are calibrated by GAIL (India) Ltd. Kakinada, Andhra Pradesh
Line B	FB-S600/1741 8252		28/04/2009 25/01/2010 26/10/2010 27/04/2011	27/04/2010 24/01/2011 25/10/2011 26/04/2012	

Gas Chromatograph at GAIL					
	9007289	Yearly	27/06/2009 30/01/2010 28/08/2010 19/05/2011	26/06/2010 29/01/2011 27/08/2011 19/05/2012	The Gas chromatograph meters are calibrated GAIL (India) Ltd. Kakinada, Andhra Pradesh
	709668		27/05/2011	26/05/2012	

As described in the monitoring plan of the approved PD, and as per PPA condition, the meters are installed by the APTRANSCO and Eastern Power Distribution Company of Andhra Pradesh Limited (APEPDCL). The PP has no control on it. The meters are

calibrated at “Electrical Research and Development Association” (ERDA) and “Electronics Test and Development Center” (ETDC) (Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Government of India). During on-site visit, the verification team noticed that as per PPA, calibration frequency of six monthly is followed. The individual calibrated meters, are replaced within six months by pre-calibrated rolling meters (stand-by meters) and the serial number of respective number will be applicable from that date as meter in use.

The verification team confirms that the calibrated electricity meters were used during the monitoring period (05/06/2009 to 08/09/2011). The calibration results are within specified limits; hence, measurements carried out through these meters are correct.

The quantity of natural gas was measured by the gas flow meter which is installed by GAIL at their terminal. The quantity of natural gas was cross checked with the invoices that were obtained from GAIL. The meter installed by GAIL was calibrated according to the standard procedures.

The invoices given to project proponent were used to monitor the NCV.

Based on the calibration certificates of all the monitoring instruments submitted by the project participant and having reviewed all the calibration certificates, the verification team confirms that the calibration details of all the instruments as provided above are correct and are in line with the PPA, registered PD and validation report. The errors identified are within acceptable limits for the instruments/ measuring equipment by the calibration/ testing process. Hence, the measurements performed by this equipment can be confirmed as correct and the calibrations were conducted at the frequencies as specified by the methodology, PPA, registered PD and validation report.

The verification team also confirms that the monitoring was carried out in accordance with the monitoring methodology and is in accordance with section 4.8 of the VCS Standard Version 3.3.

4.4 Management and Operational System

The project activity is operated and managed by the project proponent through GVK Gautami Power Limited. The individual plants record data related to their respective project activity. The natural gas based power project abides by all regulatory and statutory requirements as prescribed under the state and central laws and regulations. A monitoring team has been established at the plant site. The project team is entrusted with the responsibility of storing, recording the data related to the project activity. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner. Installed meters are calibrated according to the maintenance schedule programmed at the start of the operation and recalibrated according to the plant's performance requirement.

The Director of GGPL has authorised the G. M (Engineering & Power Plant) to develop the PD and the Monitoring Plan. The responsibilities of GGPL personnel involved in the project are as below:

Designation	Responsibilities
Vice-President (Engineering & Power Plant)	Registration and Project Execution
G. M. – Power Plant	Operation, Verification of data, Inspection of data whenever necessary to independently check the authenticity of data and take corrective actions wherever required. Storage of data
Sr. Manager – Power Plant	Operation, Monitoring and Verification of Data Data Recording, Storage of data
Shift Engineers and Operators (Operation and Maintenance)	Operation and Maintenance Storage of data, Data Recording, Data Collection, Archiving of data, Observation, Monitoring.

5 VERIFICATION CONCLUSION

The scope of this verification covers the determination of verified greenhouse gas emissions reductions generated by the VCS registered project activity, “Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited” for the period from 05th June 2009 to 08th September 2011. The crediting period for this project is 05th June 2009 to 04th June 2018.

The management of GVK Gautami Power Limited was responsible for the preparation and reporting of GHG emissions data, and the reported GHG emissions reduction on the basis set out within the project monitoring plan.

It is the responsibility of SIRIM QAS Intl. verification team to express an independent GHG verification opinion on the GHG emissions from the project for the monitoring period starting from 05th June 2009 to 08th September 2011 and on the calculation of GHG emission reductions from the project based on the verified emissions for the same period.

The verification was carried out in accordance with the requirements of the VCS Standard Version 3.3 criteria. As a result of the verification, the verification team confirms that for the reporting period:

- all operations of the project were implemented as described in the registered PD, (VCS Project ID no.VCSR465),
- the monitoring plan is in accordance with the approved monitoring methodology, AM0029 - Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas, version 03 applied by the VCS project activity, (VCS Project

ID no.VCSR465).The monitoring system was in place and functional, with the installed equipment essential for generating emission reduction operating appropriately. Calibration of all the equipment had been carried out accordingly.

- the GHG emission reductions were calculated correctly on the basis of approved monitoring methodology AM0029 - Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas, version 03.

It has been verified that the information included in the final monitoring report (Version 2.0, dated 15th February 2013) was correct and that the emission reductions achieved had been determined correctly. In our opinion, the GHG emission reductions for the period from 05th June 2009 to 08th September 2011 stated in the latest revised monitoring report (Version 2.0, dated 13th March, 2013) for the project are fairly stated.

The verifier confirms that the GHG emission reductions were calculated without material misstatements for the whole monitoring period. Our opinion is based on the project's GHG emissions and resulting GHG emission reductions reported, and, to the valid and registered project baseline and monitoring documents. Based on the information we have seen and evaluated, we confirm the following:

Parameter	Description	Year 2009 (5 th June, 2009 to 31 st Dec, 2009)	Year 2010 (1 st Jan, 2010 to 31 st Dec, 2010)	Year 2011 (1 st Jan, 2011 to 8 th September, 2011)	Total Monitoring Period
BE _y (tCO ₂ e)	Emissions in the Baseline Scenario	1,514,299	2,673,290	1,677,106	5,864,695
PE _y (tCO ₂ e)	Emissions in the Project Scenario	784,709	1,378,893	884,766	3,048,368
LE _y (tCO ₂ e)	Leakages	55,388	96,982	63,018	215,344
ER _y (tCO ₂ e)	Emission Reductions	674,253	1,197,415	729,322	2,600,983

Prepared by:



Dr. D. Siddaramu
(Verification Team Leader)

Approved by:



Parama Iswara Subramaniam
(DOE Representative)

6 REFERENCES

Ref. No.	Document or Type of Information
/1/	VCS Standard Version 3.3 criteria
/2/	Validated project description version 02 dated 15/05/2010
/3/	Validation report
/4/	Monitoring report, version01
/5/	Revised Monitoring report, version 02 dated 15/02/2013
/6/	Power Purchase Agreement
/7/	CDM methodology AM0029, version 3.0
/8/	Emission reduction spread sheet
/9/	Certificate of commissioning
/10/	Calibration Certificates of energy meters
/11/	Calibration Certificate of gas flow meter
/12/	JMR's for the entire monitoring period
/13/	Joint calibration report of Gas Chromatograph

APPENDIX A
VERIFICATION PROTOCOL
Project No. SQAS-VCS-ES12880084

APPENDIX A: VERIFICATION PROTOCOL

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1. Compliance of the project implementation with the registered project description.					
1.1 Was an on-site visit conducted for this verification? If no, please justify the rationale of the decision.			On-site audit was carried out from 16/01/2013 to 17/01/2013	OK	OK
1.2 Are all physical features of the VCS project activity proposed in the registered PD in place?			Yes, all the physical features of the VCS project activity are as in the registered PD.	OK	OK
1.3 Have the project participants operated the proposed VCS project activity as per the registered PD?			Yes, the project participant operated the proposed VCS project activity as per the registered PD and no deviation was found during the site visit. However; We are not able to locate the project on the VCS project database with the ID (VCSR465) mentioned in the MR. To provide the VCS Project ID and link of the registered VCS project activity on VCS project database.	CAR 1	OK

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1.4 For this monitoring period, what is the status of the implementation of the project? For project activities that consist of more than one site, the DOE shall describe the status of implementation and starting date of operation for each site. For project activities with phased implementation, what is the progress of the proposed project activity achieved in each phase under verification? If the phased implementation is delayed, describe the reasons and present the expected implementation dates;			The project activity is a Greenfield 469 MW natural gas based combined cycle power plant commissioned on 05th June 2009 near Peddapuram village, in the East Godavari District of Andhra Pradesh, India for generation and supply of electricity to Andhra Pradesh state electricity grid (which is part of the Southern Grid), governed by a Power Purchase Agreement with APDISCOM (Andhra Pradesh Distribution Company). This is not a phased implementation project activity.	OK	OK
1.5 Describe the actual operation of the project activity.			The project activity involved commissioning and operation of a new, Greenfield 469 MW natural gas fired combined cycle power plant at Industrial Development Area, Peddapuram, near Samalkot in East Godavari district, Andhra Pradesh, India by GVK Gautami Power Ltd. (GGPL). It consisted of two gas turbine generators (GTG), two heat recovery steam generators (HRSG) and one steam turbine generator (STG). It was confirmed that the project uses natural gas for power generation. The generated electricity is sold to grid, as per power purchase agreement with the state electricity utility Andhra Pradesh Transmission Corporation of India Ltd, (AP-TRANSCO). The project activity is a single site i.e., there was no phase wise implementation of the project.	OK	OK

Checklist Questions	Ref.	§	Comments by verifier	Draft Concl	Final Concl
1.6 Any information (data and variables) provided in the monitoring report that is different from that stated in the registered PD? (that has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in the future monitoring)			As per the registered PD, the emission reductions estimated were 1,293,422 tCO ₂ e/ annum. During the current monitoring period (05/06/2009 to 08/09/2011) i.e., 27 months, the emission reduction estimate, as per the prorate calculations, should have been 2,910,199 tCO ₂ e whereas the actual emissions reduction achieved in this period is 2,600,983 tCO ₂ e which is lesser than the ex-ante estimation. The difference between the actual emission reductions and the ex-ante emission reduction estimations is attributed to LNG use and shut down period.	OK	OK

2. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) The monitoring plan of the proposed VCS project activity shall comply with the applied methodology.					
2.1 For monitoring aspects that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), these should be brought to the attention of the Board issues which may enhance the level of accuracy and completeness of the monitoring plan.			There are no parameters which are not specified in the methodology which are monitored in the project activity.	OK	OK
2.2 Is the monitoring plan of the VCS project activity complying with the methodology applied by the registered VCS project activity or an approved revised PD?			Yes, the monitoring plan applied by the VCS project activity is in accordance with the approved methodology.	OK	OK
3. Compliance of monitoring activities with the registered monitoring plan. Determine whether the monitoring of parameters related to the GHG emissions reductions in the project activity has been implemented in accordance with the monitoring plan contained in the registered PD.					
3.1 Has the monitoring plan been properly implemented and followed by the project participants?			Yes, the implementation of the monitoring is in line with the plan stated in registered PD, meeting the requirements of the applied methodology.	OK	OK

3.2 Have all parameters stated in the monitoring plan, and relevant VCS board decisions been sufficiently monitored and updated as applicable, including:			Yes, all parameters stated in the monitoring plan, applied methodology and relevant VCS board decisions have been sufficiently monitored and updated as applicable, including	OK	OK
i) project emission parameters			Yes, the project emission parameters stated in the monitoring plan, applied methodology and relevant VCS board decisions have been sufficiently monitored and updated as applicable in the monitoring report. The project activity is on-site combustion of natural gas to generate electricity. The CO₂ emissions from electricity generation (PE_y) are calculated as follows: $PE_y = \sum_f FC_{f,y} * COEF_{f,y}$ $COEF_{f,y} = \sum NCV_y * EFCO_{2f,y} * OXID_f$ For start-up fuels, IPCC default calorific values and CO₂ emission factors are acceptable, if local or national estimates are unavailable. Is result from the on-site combustion of natural gas to generate electricity, The project emissions are estimated by multiplying volume of natural gas combusted (15205049143 SCM) by the project activity during the monitoring period and CO₂ emission coefficient (0.0561 tCO_{2e}/GJ). Based on the natural gas combusted and the CO₂ emission coefficient the project emissions are 3,048,368 tCO_{2e}. However; Justify the appropriateness of the “Net Calorific Value (NCV)” used in calculation of project emissions.	CAR-2	OK

ii) baseline emission parameters		Yes, the baseline emission parameters stated in the monitoring plan, applied methodology and relevant VCS board decisions have been sufficiently monitored and updated as applicable in the monitoring report. Baseline emissions are calculated by multiplying the electricity generated in the project plant ($EG_{PJ,y}$) with a baseline CO₂ emission factor ($EF_{BL,CO2,y}$), as follows: $BE_y = EG_{PJ,y} * EF_{BL,CO2,y}$ During monitoring period the total net electricity supplied by the project activity is 7,682,335,592 kWh. The baseline emission factor (Build Margin) has to be ex-post and the values during the validation are based on CEA version 5 and hence the Build margin is updated based on the version 6 of CEA. Based on the net electricity supplied and the emission factor the baseline emissions are 5,864,695 tCO_{2e}. However; For the baseline emission reduction calculations in the excel sheet, indicate the assumed data source used for calculation and provide documentary evidences to substantiate the same.	CL-1	OK
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iii) leakage parameters		Yes, the baseline emission parameters stated in the monitoring plan, applied methodology and relevant VCS board decisions have been sufficiently monitored and updated as applicable in the monitoring report. Leakage emissions are calculated as follows: $LE_y = LE_{CH_4, y} + LE_{LNG\ CO_2, y}$ Where: LE_y : = Leakage emissions during the year y in tCO_{2e} $LE_{CH_4, y}$: = Leakage emissions due to fugitive upstream CH₄ emissions in the year y in t CO_{2e} $LE_{LNG, CO_2, y}$: = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_{2e} Emission factor for upstream fugitive methane emissions ($EF_{BL, upstream, CH_4}$) is calculated in a conservative manner in accordance with the methodology and the Leakage emission for the monitoring period is 215,344 tCO_{2e}. CO₂ emissions from LNG were also considered, as LNG was used in the project activity. However; In leakage calculations, for $LE_{LNG, CO_2, y}$ it is indicated as zero, whereas during on-site visit from the gas invoices it is observed that LNG is consumed. Clarify	CL-2	OK
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iv) Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?			Yes, the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan.	OK	OK
3.3 Has the equipment used for monitoring is in accordance with section 4 below and is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification?			Yes, the accuracy of equipment used for monitoring is in accordance with monitoring plan, applied methodology and local/ national standards as per the manufacturer's specification. The electricity meters are calibrated at "Electrical Research and Development Association" (Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Government of India). The Gas flow meters and Gas chromatograph meters are calibrated by GAIL (India) Ltd. Kakinada, Andhra Pradesh However, Please clarify; As per the registered PD and the monitoring report calibrations of the energy meters are done once in 6 months. Submit the calibration certificate for verification.	CL-3	OK
3.4 Are monitoring results consistently recorded as per approved frequency?			Yes, monitoring results are consistently recorded as per the approved frequency.	OK	OK
3.5 Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or revised monitoring plan?			Yes, the QA and QC procedures have been applied. The readings in these meters is taken by State Electricity Board (SEB) officials and used for billing purposes.	OK	OK

4. Compliance with the calibration frequency requirements for measuring instruments. Determine whether the calibration of those measuring equipments that have an impact on the claimed emission reductions is conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan.					
4.1 Identify if there is any monitoring equipment not calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer's specification?			No such situation found. Monitoring equipment are calibrated as per the monitoring plan in the registered PD in line with the applied methodology. However; The MR indicates shutdown periods during the current monitoring period (05.06.2009 to 08.09.2011). The following needs clarification with respect to: • Provide supporting evidences for the dates indicated in the MR and • Account this in the VER calculations Also, refer CL in section 3.3	CL-4	OK

4.2 If there is delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), has the following conservative approach adopted in the calculation of emission reductions: (a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or (b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment.			No such situation found. Monitoring results are consistently recorded as per the approved frequency.	OK	OK
4.3 Confirm that the error has been applied: (a) In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions; (b) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.			No such situation found.	OK	OK

4.4	In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, the verification team, prior to finalizing verification, shall request the project participants to conduct the required calibration and shall determine whether the project participants have calculated the emission reductions conservatively using the approach mentioned in paragraph 4.3 above.			No, there is no assumption used in the emission calculations.	OK	OK
4.5	In cases where the verification team determines that it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of project participants (For example, due to the contractual terms between the project participant and purchasing/selling entities), the verification team, shall follow the requirements for post registration changes in section of E of the VVS.			As per the registered PD the monitoring instrument are calibrated as per manufacturer's standards within the stipulated time as per PPA and applied methodology.	OK	OK
4.6	In cases where neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the verification team shall determine whether the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used.			As per the registered PD the monitoring instrument are calibrated as per manufacturer's standards within the stipulated time as per PPA and applied methodology	OK	OK

5.0 Assessment of data and calculation of emission reductions Assess the data and calculations of GHG emission reductions achieved by/resulting from the project activity by the application of the selected approved methodology.					
5.1 Is a complete set of data for the specified monitoring period is available?			Yes, the complete set of data for the current monitoring period is made available to the verification team.	OK	OK
5.2 If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the verification team shall raise a CAR for the project participants to comply with the VCS requirements.			No, complete set of data for the current monitoring period is made available to the verification team.	OK	OK
5.3 Has information provided in the monitoring report been crosschecked with other sources such as plant log books, inventories, purchase records, laboratory analysis?			Yes, the information provided in the monitoring report has been cross checked with the JMRs, Invoices and calibration certificates	OK	OK
5.4 Have calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?			Yes, the calculations of baseline emissions, proposed VCS project activity emissions and leakage, have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology	OK	OK
5.5 Any assumptions used in emission calculations? If yes, they been justified?			No, there is no assumption used in the emission calculations	OK	OK

5.6 Have appropriate emission factors, IPCC default values and other reference values been correctly applied?		Yes, for calculation emission reductions, PP has used the values as described in the registered PD in line with applied methodology. For calculation of emission factor CEA data base, IPCC and methodology default values are used. The emission factor is applied correctly and consistent with the emission reduction calculation sheet and monitoring report.	OK	OK
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Appendix II: Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Reference to checklist question in Verification Protocol (Appendix A)	Summary of project owner response	Validation team conclusion
<u>CAR 1</u> 1. We are not able to locate the project on the VCS project database with the ID (VCSR465) mentioned in the MR and 2. Provide the VCS Project ID and link of the registered VCS project activity on VCS project database	Section 1.3	The project is registered on APX Registry and is not in public database yet. DOE was shown project registration page during site visit and a copy of the webpage showing project home is shared now. Attachment - CAR 1 – APX VCS registry home for Gautami (one page each showing following numbers) Project VCS ID: VCSR465 APX Account ID: 831	Verification team has cross verified APX VCS (ID VCSR465) Registry home page for Gautami Power Project and found correct. From the attachment, it is clear that the project is registered under APX Registry with the ID VCSR465 and APX Account ID 831. <u>Conclusion:</u> CAR 1 Closed
<u>CAR 2</u> Justify the appropriateness of the “Net Calorific Value (NCV)” used in calculation of project emissions.	Section 3.2(i)	As per the validated PD, the source of NCV is ‘Invoice from the supplier’ and the supplier GAIL provides invoice every 15 days (1-15th and 16th to month end for all months). Thus, a weighted average value is calculated for each of the three years in worksheet ‘NCV weighted avg’ in the emission reduction calculation sheet. The same is used for the annual project emission calculation in the emission reduction calculations sheet.	Verification team has verified the fuel supplier invoices. It is in line with monitoring plan of the Registered PD. Hence the NCV value used in calculation is acceptable and CAR is resolved. <u>Conclusion:</u> CAR 2 Closed

Draft report clarifications and corrective action requests by validation team	Reference to checklist question in Verification Protocol (Appendix A)	Summary of project owner response	Validation team conclusion
<u>CL 1</u> For the baseline emission reduction calculations in the excel sheet, indicate the assumed data source used for calculation and provide documentary evidences to substantiate the same.	Section 3.2(ii)	The baseline emissions are calculated in the 'Emission calculation' worksheet in the submitted excel worksheets. The baseline emission calculation is multiplication of net electricity export taken from the 'Electricity export (daily)' worksheet and the baseline emission factor from the 'Emission factor' worksheet. Appropriate linking and reference are now given in the sheets.	The baseline emission reductions calculations in the revised excel sheet was checked and found appropriate. Hence the issue is resolved. <u>Conclusion:</u> CL 1 Closed
<u>CL 2</u> In leakage calculations, for $LE_{LNG,CO_2,y}$ it is indicated as zero, whereas during on-site visit from the gas invoices it is observed that LNG is consumed. Clarify	Section 3.2(iii)	The calculation is now updated to include the leakage emission calculation from use of LNG. Please refer 'Emission calculation' worksheet, row No. 26 to 29 in the emission reduction calculations.	The LNG consumption is now included in the leakage emission calculations. Hence the issue is resolved. <u>Conclusion:</u> CL 2 Closed
<u>CL 3</u> Please clarify; As per the registered PD and the monitoring report calibrations of the energy meters are done once in 6 months. Submit the calibration certificate for verification.	Section 3.3	All the calibration reports during the monitoring period are submitted to the DOE. A summary of these dates is included as a Table in the excel sheet. Please refer DVD submitted to DOE for all the energy meter calibration certificates. Please note that as per PPA, calibration	The verification team has cross checked with calibration certificates, serial numbers and pre-calibrated rolling meters, the energy meter calibrations has been done once in six months as per registered PD in line with PPA. Hence the issue is resolved. <u>Conclusion:</u>

Draft report clarifications and corrective action requests by validation team	Reference to check-list question in Verification Protocol (Appendix A)	Summary of project owner response	Validation team conclusion
		frequency of six monthly is followed during this monitoring period. The calibration dates may not be seen within six months from the last calibration of individual meters, but it is replaced within six months by pre-calibrated rolling meter and serial number of respective number will be applicable from that date as meter in use.	CL 3 Closed

<u>CL 4</u> The MR indicates shutdown periods during the current monitoring period (05.06.2009 to 08.09.2011). The following needs clarification with respect to: • Provide supporting evidences for the dates indicated in the MR and • Account this in the VER calculations	Section 4.1	The communications of shutdown period with APTransco are submitted for period 1) 29 Sept 2009 2) 28 Feb to 2 Mar 2010 3) 24 to 26 Jul 2011 Please refer 'Electricity export (daily)' work-sheet in the emission reduction calculation and against these date, no export is shown. There was some electricity import and thus, net export is also shown negative on these dates. Please refer attached folder 'CI - 4 Plant Shutdown Communication'	Now it is clear from the communications with AP Trancsco by PP giving the shutdown details. Further, the shutdown periods has not been accounted in VER calculations. This was verified from VER calculation excel sheet and found correct. Hence the issue is resolved. <u>Conclusion:</u> CL 4 Closed
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