**MONITORING REPORT FORM (CDM-MR)***
**Version 01- in effect as of: 28/09/2010**

## CONTENTS



* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

**MONITORING REPORT**
**Version 01.1; 16/07/2011**

**24 MW Perla Mini Hydel Project, Karnataka, India**
**Reference number: 2112**
**First Monitoring Report: 12/09/2009 to 30/06/2011 (first and last days included)**

## SECTION A. General Description of the project activity

### A.1. Brief description of the project activity:

>>

The purpose of the project is to generate electricity using surplus discharges available in river Netravathi. The generated electricity will be exported to Mangalore Electricity Supply Company Limited (MESCOM), a distribution arm of Karnataka Power Transmission Corporation Limited (KPTCL), a state government owned power utility company.

The project is designed to generate electricity for grid system using available water sources. The technology of power generation using hydro resources is by converting the potential energy available in the water flow into mechanical energy using hydro turbines and then to electrical energy using alternators. The generated power would be transformed to match the nearest grid sub-station for proper interconnection and smooth evacuation of power.

The project would use the potential energy in a flowing river by diversion weir for running horizontal full Kaplan turbines to generate power. The components involved in the hydroelectric scheme consists of construction of intake cum power block, power house, tailrace pool and open tail channel discharging water back into the river, an outdoor yard. The powerhouse consists of five turbine generator sets of capacity 4.8 MW each. The electricity generated would be exported to southern regional grid of India.

Power would be generated at a lower voltage, which would be stepped up to higher voltage level within the project boundary to facilitate interconnection to the existing grid and export of power to MESCOM.

The total capacity of the turbine generators are 24 MW, which would generate electricity at 11 kV level and evacuated at 110 kV level.

24 MW Perla Mini Hydel project is envisaged across the river Netravathi. The components involved in the hydroelectric scheme consist of intake structure to regulate water into the powerhouse. Powerhouse would house 5 generating units of 4.8 MW each with service bay, control room, office, tailrace pool and open tail channel discharging water back into the river, an outdoor yard. The water intake structure would neither result in storage of water nor affect in any way the volume of water of the river.
The commercial operation of the project was started on 12/09/2009. The project promoter has installed the monitoring equipments to monitor the parameters, which were described in the registered CDM-PDD. First monitoring period would be from 12/09/2009 to 30/06/2011.

Total emission reductions for the monitoring period accounts to 63,058 $tCO_2e$

### A.2. Project Participants

>>

| Name of Party involved (*) ((host) indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| India (Host) | AMR Power Private Limited, Hyderabad | No |

## A.3. Location of the project activity:

>>

**Village** **:** Perla
**Taluk** **:** Bantwal
**District** **:** Dakshina Kannada (South Canara)
**State** **:** Karnataka
**Country** **:** India
**GPS Coordinates:** 12° 52’ 47’’N, 75° 05’ 40’’E

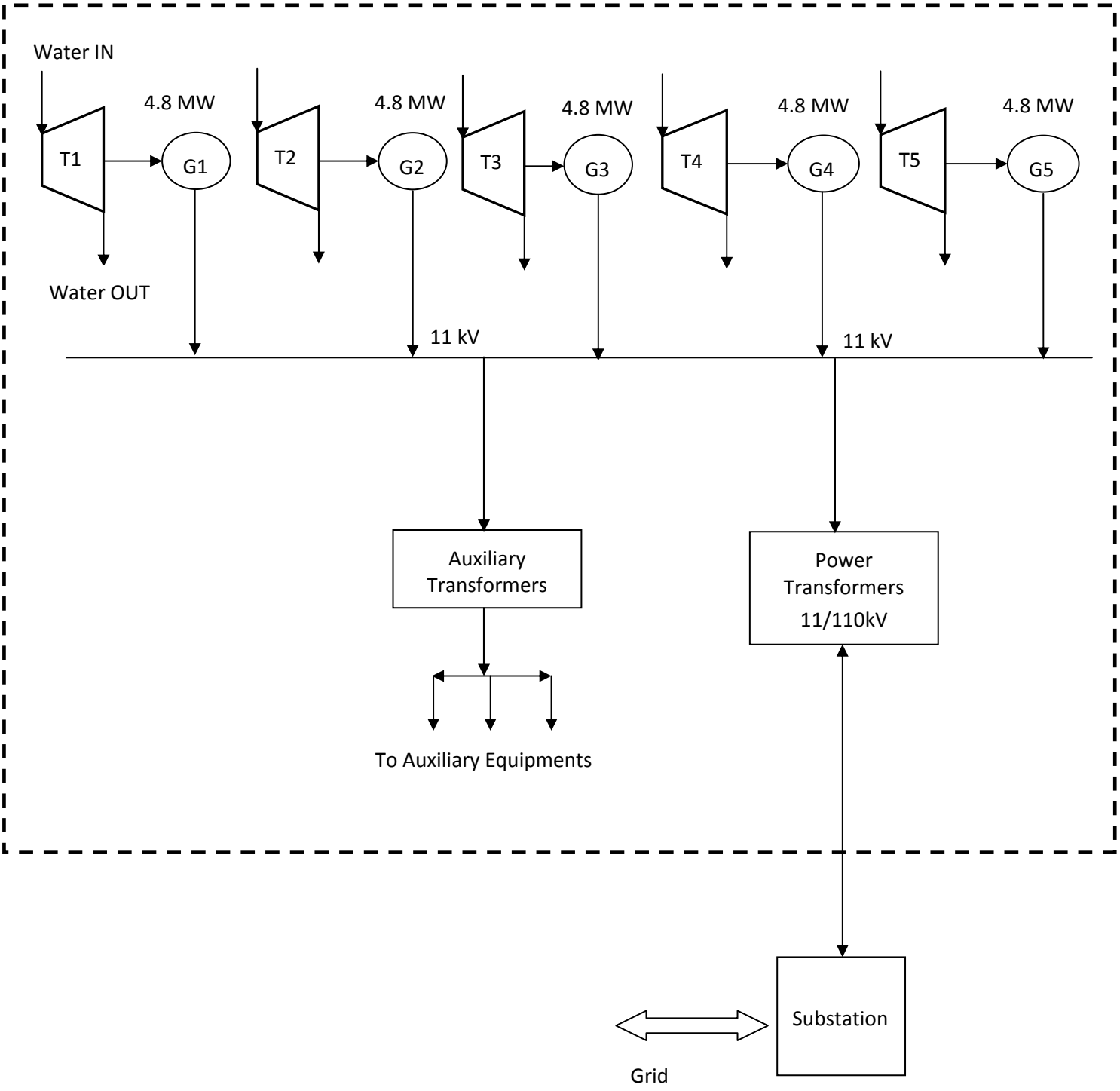
## A.4. Technical description of the project

>>

The powerhouse consists of five turbine generator sets of capacity 4.8 MW each. The Hydrology parameters and technical specifications of major equipment are detailed below.

| Parameter | Specifications |
|---|---|
| HYDROLOGY | |
| Design Discharge | 392 cumecs |
| Max Head | 8 m |
| Rated Head | 7.31 m |
| **TURBINE** | |
| Type of hydro turbine | Horizontal Full Kaplan |
| No. of generating units | 5 |
| Capacity of each generating units | 4.8 MW |
| Efficiency | 90 % |
| Rated Speed | 140 rpm |
| **GENERATOR** | |
| Type | Synchronous |
| Rated speed | 750 rpm |
| Generation voltage | 11 kV |
| Power Factor | 0.85 (lag) |
| Efficiency | 95 % |
| Frequency | 50 Htz |
| **POWER EVACUATION** | |
| Transmission Voltage | 110 kV Double Circuit ACSR Drake |
| KPTCL Substation | Netla Manur |
| Substation distance from site | 15 kms |
| Substation Voltage | 110 kV |
| **Energy (Optimum year)** | |
| Net Energy Export to KPTCL grid | 71.15GWh |
| | |

Schematic diagram of power plant is given below:



**A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:**

>>

Sectoral Scope: 1: Energy industries (renewable - / non-renewable sources)

Methodology : ACM0002, Version 06 – "Consolidated baseline methodology for grid connected electricity generation from renewable sources"

**A6. Registration date of the project activity:**

>> 12 May 2009.

**A.7. Crediting period of the project activity and related information (start date and choice of crediting period):**

>> The crediting period of the project activity is fixed. The length of crediting period is fixed as 10 years.

The start date of the crediting period was changed from 12 May 2009 to 12 Sep 2009. Hence the new crediting period is from 12 Sep 2009 to 11 Sep 2019.

**A.8. Name of responsible person(s)/entity (ies):**

>>

The entity responsible for completing the monitoring report is AMR Power Private Limited.

Details are given below:

AMR Power Private Limited.
Plot No 1071, Road No 44, Jubilee Hills, Hyderabad – 500 033, Andhra Pradesh, India.

**SECTION B. Implementation of the project activity**

**B.1. Implementation status of the project activity**

>>

The commercial operation of the project was started on 12/09/2009. The project promoter has installed the monitoring equipments to monitor the parameters, which were described in the registered CDM-PDD.

During the monitoring period i.e. from 12/09/2009 till 30/06/2011 no special events such as overhauls, equipment change, downtimes have occurred that might impact the applicability of the methodology.

The planned and unplanned shut down periods during the current monitoring period are as follows:

| | Unit I | Unit II | Unit III | Unit IV | Unit V |
|---|---|---|---|---|---|
| Total available hours (Hr:Min:Sec) | 15541:30:00 | 15613:45:00 | 15503:25:00 | 15429:55:00 | 14927:30:00 |
| Non-running hours (Hr:Min:Sec) | 10634:28:00 | 5262:55:00 | 11026:05:00 | 11728:44:00 | 11267:45:00 |
| Running hours (Hr:Min:Sec) | 4907:02:00 | 10350:50:00 | 4477:20:00 | 3701:11:00 | 3659:45:00 |

Due to less water in the river, most of the time the project has been operated effectively by interchanging Units. For major plant outages and reasons for the reported period is furnished in Appendix 1.

**B.2. Revision of the monitoring plan**

>>

Not Applicable.

**B.3 Request for deviation applied to this monitoring period**

>>

Not Applicable

## B.4 Notification or request of approval of changes

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The Project has been implemented as mentioned in the registered CDM-PDD. Hence, no notification or request of approval of changes has been made for the project.

## SECTION C. Description of the monitoring system

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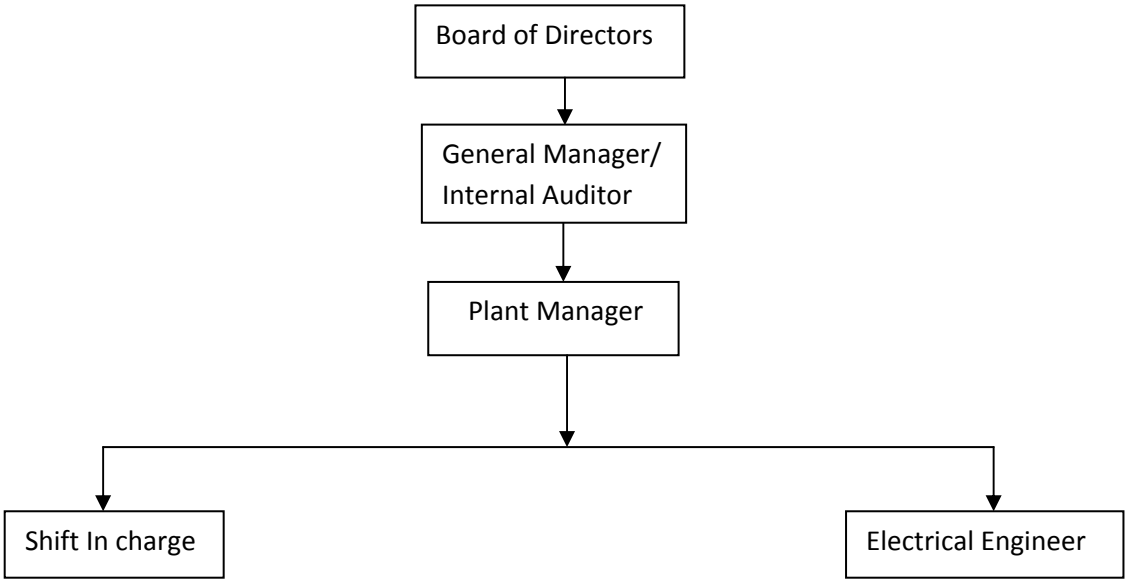
A CDM team has been formed in AMR Power Private Limited (AMRPPL) for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management. Qualified and trained people monitor the parameters and emission reduction calculations. AMRPPL is the sole agency responsible for implementation and monitoring of the project activity. The monitoring organization structure is shown below:




Roles and Responsibilities:

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data would rest with the Board of Directors who might delegate the same to the General Manager or an internal auditor.

The primary responsibility for the data measurement as per the monitoring plan would be carried out by the General Manager and necessary reports would be generated for the management i.e., Board of Directors or its committee for review.

The management would review the data collected with reference to the criteria determined in the Monitoring Plan and also suggest corrective actions wherever required. Management would also examine the internal audit reports independent of the Plant Manager's report. Management would in particular take note of deviations in data over the norms and monitor that the corrective actions have resulted in adherence to the standards. It would also be the responsibility of General Manager to report to the management about the compliance of management's instructions on corrective actions.

The company would introduce an internal audit system for the GHG compliance. The internal auditor appointed for the purpose would be an individual already working in the hydro power plant and would be imparted with necessary expertise for conducting GHG audits.
The person so appointed as an internal auditor would be given clear instructions about his scope of work and reporting requirements. He would carry out the GHG audit on quarterly basis or as required

by the monitoring plan. His report would indicate the compliance requirements and achievements. He would work directly under the control of the Board of Directors and all his reports would be addressed to the Board directly. The internal auditor in particular would report any non-compliance of corrective actions by the operating staff to the management.

Monitoring Team:

| S No | Name | Responsibility |
|---|---|---|
| 1. | Mr. Tirumala Raju | Overall project Implementation |
| 2. | Mr. T Premnadh | Technical Audit, daily monitoring parameters |
| 3. | Mr Venkata Srinivas P | Monitoring Report preparation / CDM Documentation |
| 4. | Mr. Krishna Chaitanya P | MIS Executive |

Calibration and Emergency Procedures:

As per the Power Purchase Agreement (PPA), the energy exported to the Mangalore Electricity Supply Company Ltd is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for Billing.

Calibration of all the meters is carried out at least once in a year to make sure the accurateness of readings.

The plant maintains all the data in both hard and soft copy formats.

## SECTION D. Data and parameters

### D.1 Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

| | |
|---|---|
| **Data / Parameter:** | Baseline Emission Factor |
| Data unit: | tCO2/GWh |
| Description: | $CO_2$ Emission factor for the grid system |
| Source of data used: | $CO_2$ Baseline Database for the Indian Power Sector Version 3.0 data published by Central Electricity Authority published (CEA) for the year 2006 – 2007.<br><br>http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver3.pdf |
| Value(s) : | 854.7 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline Emissions |
| Additional comment: | The value is fixed ex-ante for the entire crediting period. |

| **Data / Parameter:** | $EF_{CO2,d}$ |
|---|---|
| Data unit: | $tCO_2/TJ$ |
| Description: | Emission factor of diesel |
| Source of data used: | IPCC Default Value, Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value (s): | 74.8 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The data is used to calculate the Project emissions |
| Additional comment: | The data is considered from the available authentic data source due to absence of the authentic measurement procedures by PP. IPCC default values at the upper limit of the uncertainty at a 95% confidence interval are considered. |

| **Data / Parameter:** | OXIDi |
|---|---|
| Data unit: | NA (Constant) |
| Description: | Oxidation factor of diesel consumed in the power plant |
| Source of data used: | IPCC Default Value, http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf |
| Value(s): | 1 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The data is used to calculate the Project emissions |
| Additional comment: | NA |

| **Data / Parameter:** | Calorific Value of Diesel |
|---|---|
| Data unit: | kCal/kg |
| Description: | Calorific value of the diesel used in the project plant. |
| Source of data used: | IPCC default value is being used.<br><br>http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html |
| Value (s): | 43.3TJ/Gg |

| | |
|---|---|
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The data is used to calculate the Project emissions |
| Additional comment: | NA |

| | |
|---|---|
| **Data / Parameter:** | $\rho_d$ |
| Data unit: | kg/Lit |
| Description: | Density of the fossil fuel used for the project site (Diesel) |
| Source of data used: | Indian Oil Corporation limited (IOCL)<br><br>http://www.iocl.com/Products/DieselSpecifications.pdf |
| Value(s) : | 0.86 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The IOCL value is considered as it is publicly available and can be referred as authentic source. |
| Additional comment: | NA |

## D.2 Data and parameters monitored

| | |
|---|---|
| **Data / Parameter:** | $EG_y$ |
| Data unit: | GWh |
| Description: | Electricity supplied to the grid by the project during the year, y |
| Measured /Calculated /Default: | Measured |
| Source of data: | Readings of the Meters installed at the plant site, which are recorded in the logbook. Sales records to the grid and other records are used to ensure consistency. |
| Value(s) of monitored parameter: | 74.3241 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The data is used in Baseline Emission calculations. |

<table>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>Details are given below.<br><table>
<tr><th>Parameter</th><th>Main Meter</th><th>Check Meter</th></tr>
<tr><td>Accuracy class</td><td>± 0.2%</td><td>± 0.2%</td></tr>
<tr><td>S No</td><td>07361110</td><td>07361408</td></tr>
<tr><td>Calibration Frequency</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Calibrating Agency</td><td>KPTCL</td><td>KPTCL</td></tr>
<tr><td>Calibration Dates</td><td>06/07/2009,<br>2/02/2010,<br>5/06/2010,<br>19/11/2010,<br>20/05/2011.</td><td>06/07/2009,<br>2/02/2010,<br>5/06/2010,<br>19/11/2010,<br>20/05/2011.</td></tr>
<tr><td>Validity</td><td>19/05/2012</td><td>19/05/2012</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Hourly</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Measured continuously and MESCOM issues Joint meter reading statements on monthly basis.</td></tr>
<tr><td>QA/QC procedures applied:</td><td>The meters are calibrated according to the relevant national standard on annual basis.<br>Same meter is used to calculate the electricity imported by the power plant. During the current monitoring period, the power plant has imported 0.5313 GWh.</td></tr>
</table>

| **Data / Parameter:** | $EG_{gross}$ |
|---|---|
| Data unit: | GWh |
| Description: | Total quantity of Electricity generated from the project activity during the year y |
| Measured /Calculated /Default: | Measured |
| Source of data: | Readings of the Meters installed at the plant site, which are recorded in the logbook. |
| Value(s) of monitored parameter: | 75.3862 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | NA |

<table>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>
<table>
<tr><th>Parameter</th><th>GEN-1</th><th>GEN-2</th><th>GEN-3</th><th>GEN-4</th><th>GEN-5</th></tr>
<tr><td>Accuracy class (± %)</td><td>0.5</td><td>0.5</td><td>0.5</td><td>0.5</td><td>0.5</td></tr>
<tr><td>S No</td><td>B3270623</td><td>B3271102</td><td>B3271101</td><td>B3270624</td><td>B3281352</td></tr>
<tr><td>Calibration Frequency</td><td>Annually</td><td>Annually</td><td>Annually</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Calibrating Agency</td><td>Shaan Energy</td><td>Shaan Energy</td><td>Shaan Energy</td><td>Shaan Energy</td><td>Shaan Energy</td></tr>
<tr><td>Calibration Dates</td><td>28/08/2009<br>25/05/2010<br>23/05/2011</td><td>28/08/2009<br>25/05/2010<br>23/05/2011</td><td>28/08/2009<br>25/05/2010<br>23/05/2011</td><td>28/08/2009<br>25/05/2010<br>23/05/2011</td><td>28/08/2009<br>25/05/2010<br>23/05/2011</td></tr>
<tr><td>Validity</td><td>22/05/2012</td><td>22/05/2012</td><td>22/05/2012</td><td>22/05/2012</td><td>22/05/2012</td></tr>
</table>
</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Monitored continuously and recorded hourly to aggregate for Monthly.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>NA</td></tr>
<tr><td>QA/QC procedures applied:</td><td>The Meters used for reading the Gross electricity generation will be calibrated as per industry standards of host country (India) on annual basis.</td></tr>
</table>

| **Data / Parameter:** | $FF_{i,y}$ |
|---|---|
| Data unit: | Liters per year |
| Description: | Quantity of fossil fuel type i combusted in the project plant during year y. (Diesel combusted in power plant) |
| Measured /Calculated /Default: | Measured |
| Source of data: | Fuel issuance log books. |
| Value(s) of monitored parameter: | 4546 |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | The data is used to calculate Project emissions. |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | NA |
| Measuring/ Reading/ Recording frequency: | Daily |
| Calculation method (if applicable): | NA |

| | |
|---|---|
| QA/QC procedures applied: | The quantity of diesel used is directly measured and monitored on a daily basis at the project site using level gauge measurement. The total quantity of HSD consumed will be measured on regular basis using dip stick/ level gauge or store issues. Hence, the total quantity of HSD procured and quantity of HSD consumed is considered for estimation of project emissions. The data recorded can be cross checked against the fuel purchase receipts. |

## SECTION E. Emission reductions calculation

### E.1 Baseline emissions calculation

>>

Baseline Emissions are calculated as follows.

$$BE_y = EG_y * EF_y$$

Where, EGy is the electricity exported to grid in GWh
EFy is the baseline emission factor for a given year ($tCO_2$/GWh)

The electricity export from the project activity during the year y is 74.3241 GWh, multiplied with CEA published emission factor (Combined Margin) for southern region grid 854.7 $tCO_2$/GWh. The resultant baseline emissions are estimated as below.

$BE_y$ = 74.3241 GWh * 854.7 $tCO_2$/GWh
= 63525 $tCO_2$

### E.2 Project emissions calculation

>>

Total Project Emissions

$PE_y$ = $PE_{FF,y} + PE_{EC,y}$

$PE_{FF,y}$ = Project emission due to the combustion of fossil fuels in DG set during the year y

$PE_{EC,y}$ = Project emissions due to import of electricity from grid system during the year y

Project Emissions due to the combustion of fossil fuels (DG set)

$$PE_{FF,y} = FF_{i,y} * COEF_i$$

Where, **$PE_{FF,y}$** is the Project emissions from combustion of fossil fuel (DG set) in the project activity during the year y

**$FF_{i,y}$** is the Quantity of fossil fuel type i combusted (DG set) during the year y

**COEFi** is the Carbon dioxide emission factor of the fuel type i

$PE_{FF,y}$ = 4546 lts * 74.8 $tCO_2$/TJ * 0.86 kg/ltr * 1 * 43.3 TJ/Gg
= 12.66 $tCO_2$

Project Emissions due to import of electricity from the grid system

$PE_{EC,y}$ = $EG_{import} * EF_y$

$EG_{import}$ = Onsite electricity consumption of the project activity imported from the grid system during the year y

$EF_y$ = $CO_2$ Emission factor for the grid system during the year y

$PE_{EC,y}$ = 0.5313 GWh * 854.7 $tCO_2$/GWh
= 454.1 $tCO_2$

Total Project Emissions

$PE_y$ = $PE_{FF,y} + PE_{EC,y}$
= 12.6 $tCO_2$ + 454.1 $tCO_2$
= 466.7 $tCO_2$

## E.3. Leakage calculation

>>

The project has considered zero leakages.

## E.4. Emission reductions calculation / table

>>

The following formula is adopted for calculating emission reductions generated by the project activity:

$ER_y = BE_y - PE_y - L_y$

Where, $ER_y$ is emission reductions in a given year
$BE_y$ is baseline emissions in a given year
$PE_y$ is project emissions in a given year
$L_y$ is leakage in a given year

| Month | Baseline Emissions tCO2e | Project Emissions, tCO2e | | | Nett Emission Reductions tCO2e |
|---|---|---|---|---|---|
| | | Import | Diesel | Total | |
| September (12/09/09 to 31/09/09) | 1193.2 | 5.1 | 0.0 | 5.1 | 1188.0 |
| October (1/10/09 to 31/10/09) | 2483.8 | 1.7 | 1.1 | 2.8 | 2480.9 |
| November (1/11/09 to 30/11/09) | 3111.1 | 1.7 | 1.1 | 2.8 | 3108.3 |
| December (1/12/09 to 31/12/09) | 553.8 | 37.6 | 0.8 | 38.4 | 515.4 |
| January (1/01/10 to 31/01/10) | 794.9 | 41.0 | 0.7 | 41.7 | 753.2 |
| February (1/02/10 to 28/02/10) | 0.0 | 38.5 | 0.5 | 39.1 | -39.1 |
| March (1/03/10 to 31/03/10) | 0.0 | 30.8 | 0.5 | 31.3 | -31.3 |
| April (1/04/10 to 30/04/10) | 0.0 | 30.8 | 0.9 | 31.6 | -31.6 |
| May (1/05/10 to 31/05/10) | 0.0 | 53.0 | 0.6 | 53.6 | -53.6 |
| June (1/06/10 to 30/03/10) | 2530.3 | 30.1 | 0.7 | 30.7 | 2499.5 |
| July (1/07/10 to 31/07/10) | 6646.1 | 0.0 | 0.6 | 0.6 | 6645.5 |

| | | | | | |
|---|---|---|---|---|---|
| August (1/08/10 to 30/08/10) | 9639.3 | 0.0 | 0.0 | 0.0 | 9639.3 |
| September (1/09/10 to 31/09/10) | 10239.3 | 0.0 | 0.5 | 0.5 | 10238.8 |
| October (1/10/10 to 31/10/10) | 9721.4 | 0.0 | 0.5 | 0.5 | 9720.8 |
| November (1/11/10 to 30/11/10) | 8844.4 | 0.0 | 0.0 | 0.0 | 8844.4 |
| December (1/12/10 to 31/12/10) | 2560.7 | 1.7 | 0.0 | 1.7 | 2559.0 |
| January (1/01/11 to 31/01/11) | 294.0 | 1.7 | 0.0 | 1.7 | 292.3 |
| February (1/02/11 to 28/02/11) | 292.3 | 15.4 | 0.0 | 15.4 | 276.9 |
| March (1/03/11 to 31/03/11) | 0.0 | 51.3 | 0.3 | 51.5 | -51.5 |
| April (1/04/11 to 30/04/11) | 0.0 | 51.3 | 0.3 | 51.6 | -51.6 |
| May (1/05/11 to 31/05/11) | -0.2 | 48.7 | 2.6 | 51.3 | -51.3 |
| June (1/06/11 to 31/06/11) | 4620.5 | 13.7 | 0.6 | 14.2 | 4606.3 |
| **Total** | **63524.8** | **454.1** | **12.57** | **466.7** | **63058** |

Note: We have conservatively rounded down the emission value.

**E.5. Comparison of actual emission reductions with estimates in the CDM-PDD**

>>

| Item | Values applied in ex-ante calculation of the registered CDM-PDD | Actual values reached during the monitoring period |
|---|---|---|
| **Emission reductions ($tCO_2e$)** | 111496 (For 22 Months) | 63058 |

**E.6. Remarks on difference from estimated value in the PDD**

>>

The emission reductions achieved during the monitoring period were marginally lower than the emission reductions estimated in the PDD for the equivalent period because the actual plant availability was marginally lower than estimated in the PDD.

## APPENDIX 1
## MAJOR PLANT OUTAGES AND REASONS

| Unit - I | | | | | |
|---|---|---|---|---|---|
| S.No. | Period | Shut down in Hrs:Min:Sec | | | Major Reasons |
| | | Planned | Forced | Others | |
| 1 | Sep-09 | | | | Low water level and grid failure. |
| 2 | Oct-09 | | 620:20:00 | | Low water level and grid failure. |
| 3 | Nov-09 | | | 528:05:00 | Low water level. |
| 4 | Dec-09 | | | 744:00:00 | Low water level. |
| 5 | Jan-10 | | | 658:25:00 | Low water level. |
| 6 | Feb-10 | | | 672:00:00 | Low water level. |
| 7 | Mar-10 | | | 744:00:00 | Low water level. |
| 8 | Apr-10 | | | 720:00:00 | Low water level. |
| 9 | May-10 | | | 744:00:00 | Low water level. |
| 10 | Jun-10 | | | 412:53:00 | Low water level. |
| 11 | Jul-10 | | 22:15:00 | | Grid failure |
| 12 | Aug-10 | | 27:45:00 | | Grid failure |
| 13 | Sep-10 | | 24:20:00 | | Grid failure |
| 14 | Oct-10 | | 35:35:00 | | Grid failure |
| 15 | Nov-10 | | 34:55:00 | | Grid failure |
| 16 | Dec-10 | | | 744:00:00 | Low water level. |
| 17 | Jan-11 | | | 744:00:00 | Low water level. |
| 18 | Feb-11 | | | 672:00:00 | Low water level. |
| 19 | Mar-11 | | | 744:00:00 | Low water level. |
| 20 | Apr-11 | | | 720:00:00 | Low water level. |
| 21 | May-11 | | | 744:00:00 | Low water level. |
| 22 | Jun-11 | | 277:55:00 | | Grid Failed, Low Water Level |

| Unit - II | | | | | |
|---|---|---|---|---|---|
| S No. | Period | Shut down in Hrs:Min:Sec | | | Major Reasons |
| | | Planned | Forced | Others | |
| 1 | Oct-09 | | | 456:25:00 | Low water level and grid failure. |
| 2 | Nov-09 | | 59:30:00 | | Low water level. |
| 3 | Dec-09 | | | 490:30:00 | Low water level. |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Jan-10 | | | 606:25:00 | Low water level. |
| 5 | Feb-10 | | | 672:00:00 | Low water level. |
| 6 | Mar-10 | | | 744:00:00 | Low water level. |
| 7 | Apr-10 | | | 720:00:00 | Low water level. |
| 8 | May-10 | | | 744:00:00 | Low water level. |
| 9 | Jun-10 | | | 414:54:00 | Low water level. |
| 10 | Jul-10 | | 22:30:00 | | Grid failure |
| 11 | Aug-10 | | 14:45:00 | | Grid failure |
| 12 | Sep-10 | | 54:35:00 | | Grid failure |
| 13 | Oct-10 | | 47:30:00 | | Grid failure |
| 14 | Nov-10 | | | 116:15:00 | Low water level. |
| 15 | Dec-10 | | | 744:00:00 | Low water level. |
| 16 | Jan-11 | | | 744:00:00 | Low water level. |
| 17 | Feb-11 | | | 672:00:00 | Low water level. |
| 18 | Mar-11 | | | 744:00:00 | Low water level. |
| 19 | Apr-11 | | | 720:00:00 | Low water level. |
| 20 | May-11 | | | 744:00:00 | Low water level. |
| 21 | Jun-11 | | 579:50:00 | | Grid Failed, Low Water Level |

| **Unit - III** | | | | | |
|---|---|---|---|---|---|
| **S.No.** | **Period** | **Shut down in Hrs:Min:Sec** | | | **Major Reasons** |
| | | **Planned** | **Forced** | **Others** | |
| 1 | Oct-09 | | 173:20:00 | | Low water level and grid failure. |
| 2 | Nov-09 | | | 234:45:00 | Low water level. |
| 3 | Dec-09 | | | 682:05:00 | Low water level. |
| 4 | Jan-10 | | | 744:00:00 | Low water level. |
| 5 | Feb-10 | | | 672:00:00 | Low water level. |
| 6 | Mar-10 | | | 744:00:00 | Low water level. |
| 7 | Apr-10 | | | 720:00:00 | Low water level. |
| 8 | May-10 | | | 744:00:00 | Low water level. |
| 9 | Jun-10 | | | 720:00:00 | Low water level. |

| | | | | | |
|---|---|---|---|---|---|
| 10 | Jul-10 | | | 744:00:00 | Gear box maintenance and low water level |
| 11 | Aug-10 | | 122:15:00 | | Grid failure, Maintenance work carriedout |
| 12 | Sep-10 | | 18:55:00 | | Grid failure |
| 13 | Oct-10 | | 138:55:00 | | Low water level. |
| 14 | Nov-10 | | 21:25:00 | | Grid failure |
| 15 | Dec-10 | | | 507:50:00 | Low water level. |
| 16 | Jan-11 | | | 744:00:00 | Low water level. |
| 17 | Feb-11 | | | 672:00:00 | Low water level. |
| 18 | Mar-11 | | | 744:00:00 | Low water level. |
| 19 | Apr-11 | | | 720:00:00 | Low water level. |
| 20 | May-11 | | | 744:00:00 | Low water level. |
| 21 | Jun-11 | | 414:35:00 | | Grid Failed, Low Water Level |

| Unit - IV | | | | | |
|---|---|---|---|---|---|
| S.No. | Period | Shut down in Hrs:Min:Sec | | | Major Reasons |
| | | Planned | Forced | Others | |
| 1 | Oct-09 | | 100:15:00 | | Low water level and grid failure. |
| 2 | Nov-09 | | | 259:55:00 | Low water level. |
| 3 | Dec-09 | | | 744:00:00 | Low water level. |
| 4 | Jan-10 | | | 744:00:00 | Low water level. |
| 5 | Feb-10 | | | 672:00:00 | Low water level. |
| 6 | Mar-10 | | | 744:00:00 | Low water level. |
| 7 | Apr-10 | | | 720:00:00 | Low water level. |
| 8 | May-10 | | | 744:00:00 | Low water level. |
| 9 | Jun-10 | | | 499:00:00 | Low water level. |
| 10 | Jul-10 | | 23:25:00 | | Grid failure |
| 11 | Aug-10 | | 25:30:00 | | Grid failure |
| 12 | Sep-10 | | | 497:00:00 | Low water level. |
| 13 | Oct-10 | | | 744:00:00 | Low water level. |
| 14 | Nov-10 | | | 720:00:00 | Low water level. |
| 15 | Dec-10 | | | 744:00:00 | Low water level. |
| 16 | Jan-11 | | | 744:00:00 | Low water level. |
| 17 | Feb-11 | | | 672:00:00 | Low water level. |
| 18 | Mar-11 | | | 744:00:00 | Low water level. |
| 19 | Apr-11 | | | 720:00:00 | Low water level. |
| 20 | May-11 | | | 744:00:00 | Low water level. |
| 21 | Jun-11 | | 123:39:00 | | Grid Failed, Low Water Level |

| Unit - V | | | | | |
|---|---|---|---|---|---|
| S.No. | Period | Shut down in Hrs:Min | | | Major Reasons |
| | | Planned | Forced | Others | |
| 1 | Nov-09 | | | 719:05:00 | Low water level. |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Dec-09 | | | 744:00:00 | Low water level. |
| 3 | Jan-10 | | | 744:00:00 | Low water level. |
| 4 | Feb-10 | | | 672:00:00 | Low water level. |
| 5 | Mar-10 | | | 744:00:00 | Low water level. |
| 6 | Apr-10 | | | 720:00:00 | Low water level. |
| 7 | May-10 | | | 744:00:00 | Low water level. |
| 8 | Jun-10 | | | 720:00:00 | Low water level. |
| 9 | Jul-10 | | | 744:00:00 | Low water level. |
| 10 | Aug-10 | 636:45:00 | | | Gear box maintenance, Low Water level. |
| 11 | Sep-10 | | 11:35:00 | | Grid Failure |
| 12 | Oct-10 | | 34:10:00 | | Grid Failure |
| 13 | Nov-10 | | 11:10:00 | | Grid Failure |
| 14 | Dec-10 | | | 239:05:00 | Low water level. |
| 15 | Jan-11 | | | 531:50:00 | Low water level. |
| 16 | Feb-11 | | | 324:05:00 | Low water level. |
| 17 | Mar-11 | | | 744:00:00 | Low water level. |
| 18 | Apr-11 | | | 720:00:00 | Low water level. |
| 19 | May-11 | | | 744:00:00 | Low water level. |
| 20 | Jun-11 | | | 720:00:00 | Low water level. |

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**History of the document**

| Version | Date | Nature of revision |
|---|---|---|
| 01 | EB 54, Annex 34<br>28 May 2010 | Initial adoption. |
| **Decision Class**: Regulatory<br>**Document Type**: Guideline<br>**Business Function**: Issuance | | |