Voluntary Carbon Standard Version 2007.1 Verification Report

28 May 2009

53607308-08/643

Verification Report:

Name of Verification company:	Date of the issue:
TÜV NORD CERT GmbH	2009-03-23
Report Title:	Approved by:
9 MW Neria Hydroelectric Project, Karnataka, India	Rainer Winter
Client:	Project Title:
M/s.Bhoruka Power Corporation Limited.	9 MW Neria Hydroelectric Project, Karnataka, India
Summary:	

Bhoruka Power Corporation Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project “9 MW Neria Hydroelectric Project, Karnataka, India”, with regard to the relevant requirements of VCS 2007.1 Standard.

The project activity is generation of electricity by installation of renewable hydropower project to displace electricity generated by fossil fuel based thermal power plants in Southern Grid, thus achieving GHG emission reduction.

A risk based approach has been followed to perform this verification. In the course of the verification one (01) Corrective Action Requests (CAR) and six (06) Clarification Request (CR) were raised and successfully closed out.

The verification is based on documents registered by CDM EB (UNFCCC ref project number 1549), monitoring report and other supporting documents made available to the verifiers by project proponent. The project was registered on 09 October 2008 as a CDM project activity with UNFCCC, Ref. No. 1549.

This verification is also carried out along with supplementary validation on VCS-PD in accordance with the Policy Announcement from VCS Association on 19 March 2008.

Taking into account of the validation of the VCS PD and CDM-PDD and subsequent verification, the verifiers confirm that:

The GHG emission reduction in the reported monitoring period (27/07/2006 to 30/09/2008) is: 45,321 tCO2e.

Work carried out by:	Number of pages:
Mr. Ma. Paa.Puratchikkanal Mr. K.V.Sudarshan Ms. Manjari Chandra Mr. R.Murali	17

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1 Introduction

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the Project Design Document;
- to confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs[1])without any double counting during the monitoring period from 27/07/2006 to 30/09/2008, and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification of this VCS project is based on the CDM project design document/PDD/, the VCS PD, the monitoring reports/MR1/, /MR2/, and supporting documents made available to the verifier and information collected through performing interviews during the on-site assessment. Furthermore publicly available information was considered as far as available and required.
The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3 VCS project Description

The purpose of the project activity is to generate electricity by using the renewable energy sources (hydro) for a grid system in the state of Karnataka, India, the project activity displaces fossil fuels and green house gases (GHG) emissions, currently produced by thermal fossil fuel-burning facilities. The generated electricity by the project activity is being exported to the Southern regional grid in India.

The project is located at downstream of a bridge across the Neria River, in Dharmastala village in Dakshina Karnataka district of Karnataka around 50 Km from Mangalore. The Project site Coordinates are uniquely identified as:
Latitude - 12 degrees 56 minutes and 7.2 seconds north; Longitude - 75 degrees 22 minutes and 53.87 seconds east. The project site is accessible by road (National Highway 48) from Bangalore, which is about 295 Km from Bangalore.

The electricity generation facility is installed on Neria, a tributary of Netravathi River. The project activity is a Run-of-the-river scheme located on Nidle Bridge across the Neria River. The project activity entails installation of two turbines of capacity 4.5 MW each is in operation since commissioning period and is located at village Dharmastala Village, Dakshina Karnataka District, Karnataka.

[1] As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry

The emission reduction is based on net electricity exported to KPTCL in the southern regional grid from the project activity. The validated ex-ante emission factor (857tCO_{2e}/GWh) is in accordance with ACM0002/ACM0002/ which refers carbon dioxide database version 2(CEA Version 2). The net electricity exported from the plant is calculated based on the difference between the total electricity exported to the grid from project activity and the total electricity imported from the grid to the project activity.

1.4 Level of assurance

The verification report is based on CDM PDD/PDD/, Monitoring report/MR1/, /MR2/ and supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured provided the credibility of all above.

2 Methodology

The verification of the project was carried out in January 2009.
Preparations: 02/01/2009 to 23/03/2009
On-site verification: 05/01/2009 to 06/01/2009
Draft) Reporting: 08/02/2009
Final) Reporting: 23/03/2009

The verification consisted of the following steps:

- A desk review of the VCS PD /VCS-PD/,UNFCCC Project page documents[2] and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007.1;
- A desk review of the Monitoring Report /MR1/, /MR2/ and additional supporting documents submitted by the client. The relevant sections of the above mentioned customised protocol according to the VCS 2007.1 were used;
- Supplementary validation report covering clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD;
- Verification audit planning;
- On-Site assessment;
- Background investigation and follow-up interviews with personnel of the project developer; and
- Verification reporting (Draft Verification Report and Final Verification Report).

The criteria of this verification include the relevant rules and steps as set out in the VCS 2007.1.

3 Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous validation

[2] http://cdm.unfccc.int/Projects/DB/DNV-CUK1200571481.71

All raised CARs and CRs were successfully closed during the validation of the project design. There are no remaining issues. The verification has been carried out based on the final registered PDD and CDM-UNFCCC Project registration sheet.

3.2 Project Implementation

The project activity involves generation of electricity using hydro potential from 2 nos. of turbines which is exported to the southern regional grid. The hydro turbines of 2 x 4500 kW capacities are horizontal Full Kaplan type leading to a total installed capacity of 9.0 MW.

During the monitoring period (27/07/2006 to 30/09/2008) the project activity has exported a total net electricity of 53099750 kWh and thus the total baseline emission comes to 45,321 tCO_{2e}.

It was verified in the course of this verification that the actual project activity was implemented in accordance with the CDM-PDD.

3.3 Completeness of Monitoring

The reporting /MR2/ /XLS2/ is in line with the requirements of the validated monitoring plan as well as with the applied methodology AMS ID version 10/AMS ID/.

The reporting procedures reflect the requirements of the monitoring plan /PDD/. The monitoring parameters are recorded as per the monitoring plan.

The energy meters are installed at the Pilakala substation located 15 kms from the project site. These meters are of 0.2 class accuracy, of L&T make and have been tested by KPTCL officials before commissioning. At the time of commissioning the meter was sealed by the KPTCL officials.

Every month KPTCL officials visit the Pilakala substation in the presence of O&M team of the Neria hydropower plant of Bhoruka Power Corporation Limited (BPCL) and the meter reading is taken jointly and recorded by KPTCL. The said meter readings are then used to prepare the joint meter readings or Form B issued by KPTCL every month based on which credit is given for the energy generated by hydro power plant. Thus the net energy exported every month is the basis for the Form B supplied to BPCL.

This data then forms the basis of emission reduction calculation for the project activity.

Calibration of Main Meter carried out by KPTCL covering the reported monitoring period were verified for their frequency and traceability to industry standards/CAL/. Calibration records(pre-installation and most recent) of all installed meter were checked and found OK, the calibration is carried out by the State electricity board as per the electricity standards for each of the equipment and are described in the PPA signed for the project. The details regarding the calibration of the meter are provided as follows:

Meter	Main meter serial No.	Check meter serial No.	Calibration Dates
Line I	05341379	05341375	20/07/2007 & 13/08/2008
Line II	05341378	05271163	20/07/2007 & 13/08/2008

Nevertheless, CR 3.1 and 3.2 have been raised and closed successfully based on the revised Monitoring report.

CAR/CR/FAR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CR 3.1 Calibration reports dated 20/07/07 and 13/08/08 have been verified. However, according to article 7 of PPA, testing of energy meters is to be carried out every quarter. Please clarify.	/CAL/ /PPA/	Generally, calibration of energy meters is performed annually. The results of the calibration reports (20/07/07 and 13/08/08) indicate that the errors of the energy meters are within the permissible limit. Hence the condition for meter testing as stipulated in the PPA is satisfied.	-	The calibration reports have been verified, and errors are within the limit. CR 3.1 is closed.
CR 3.2 The MR mentions electricity export and import readings are being recorded daily. Is it done automatically or manually? Please provide relevant daily generation data.	/MR/	The electricity export and import readings are recorded manually by the operator at the Pilikala substation. These readings are taken at 00.00 hrs daily. The records are then sent to the Control Room. Samples of the data have been submitted for	-	OK CR 3.2 is closed.

CAR/CR/FAR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
		verification		

3.4 Accuracy of Emission Reduction Calculations

The value of the emission reductions depends on the net electricity exported by the project activity.

The baseline emissions reductions are based on the net electricity supplied by the project, which is the difference between the electricity exported and the amount of electricity imported due to the project activity. The project emissions are zero as there is no use of any fossil fuel. Therefore the baseline emissions are equal to the Emission Reductions.

The total net electricity supplied by the hydropower plant during the monitoring period is 530,997,750 kWh. The baseline emission factor has been fixed ex-ante as 0.857 (tCO_2/MWh) based on the CEA data for Sothern Regional Grid/CEA/. Based on the net electricity supplied and the emission factor the baseline emissions are 45,321 tCO_{2e}.

CAR 3.1 and CRs 3.3, and 3.4 were raised and closed successfully.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CAR 3.1 Hourly generation cumulated to daily generation data to be provided for the period between 27/07/06 to 31/07/06.	/MR1/ /XCS1/	Documents provided: a) Initial reading b) Daily generation readings between 27/07/06 to 31/07/06 submitted to DOE. Thus the reading incorporated in the	-	The evidence submitted for electricity export for the period 27/07/06 to 30/07/06 is satisfactory. CAR 3.1 is closed.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
		MR are correct and it is acceptable		
CR 3.3 There are minor computation errors in the outage/shutdown values computed in Table 2.1 and 2.2 of the MR. Please clarify.	/MR1/	The readings mentioned in the monitoring report are in Hours and minutes. The values computed in table 2.1 and 2.2 are therefore correct.	-	The values have been verified as per the project owner's response and found to be OK. CR 3.3 is closed.
CR 3.4 The emission reduction calculation spreadsheet values have to be rounded down to the lower value (and not rounded up) for conservativeness. Therefore the amount of tCO_2 e has to be rectified accordingly.	/MR/ /XLS1/	The same has been incorporated in the revised Monitoring report	/MR2/ /XLS2/	The MR and spreadsheet has been modified accordingly. OK CR 3.4 is closed.

All the figures as per the monitoring plan were cross-checked by the verification team against basic monitored data and the calculations were found to be correct.

The closure of all the CARs and CRs issued above resulted in change of net ER 45,321 tCO_{2e}.

3.5 Quality of Evidence to Determine Emission Reductions

Proper data management inclusive of data acquisition, aggregation and data management system is being followed for the project activity.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan /PDD/. No significant, lack of evidence and missing data were detected during on-site verification.

It is evident from the monitoring data that the monitoring system ensures for continuous operation, no major break down has been found during the monitoring period.

The monitoring personnel at site are well trained and follow reproducible routines as was evident during the site visit. Members of monitoring team were interviewed.

Thus, they are competent to carry out the relevant tasks with sufficient accuracy. All necessary monitored and measured raw data were checked during on-site verification.

Nevertheless, CR 3.5 was raised and closed.

CAR/CR/FAR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CR 3.5 The form B for energy readings for the period 01.05.2006 to 01.06.2006 has been overwritten as 27.07.2006 to 01.08.2006. Please clarify, and submit relevant document as evidence of electricity exported for the period in question	/LOG/	By oversight the dates were wrongly written on the B form. As the Tri Vector meters are at Pilikala station where computer & printer are not available, the corrections were hand written on the Form B However our machines were commissioned on 27/07/2006. The corresponding invoice raised by the State Power Procurement Co-ordination Centre for the month of July 2006 is submitted to DOE	-	The invoice for the month of July 2006 (27.07.2006 to 01.08.2006) has been verified. The export and import readings tally with that of the B Form. Thus the error is one of oversight. OK CR 3.5 is closed.

3.6 Management and Operational System

The allocation of responsibilities is documented in a written form and is followed as described in the PDD. Routines for the archiving of data are defined and documented. Calculations are laid down in the monitoring report is in line with PDD[/PDD/].

The authority of the project site is given to Mr.Ramu. The main meter readings are noted in presence of officials from both BPCL and KPTCL. The project activity has got dedicated metering system and thus the value reflected in the ER sheet is purely for the project activity.

All internal data are subjected to QA/QC measures. All monitored data are archived in Physical and Electronic form. It was verified during the site visit that all internal data

goes through a process of review starting from the shift in charge to the Manager of the plant. It was evident from the data checks conducted that the QA/QC procedure is satisfactory. .

All meters undergo calibration regularly by KPTCL officials. The calibration reports were verified and found to be in accordance with the PPA between BPCL and KPTCL. The MR mentions in detail the calibration procedures adopted and meter details including calibration dates. The monitoring report, therefore satisfies the calibration procedure followed and the calibration frequency for the Main Meter. However, CR 3.6 was raised and closed.

CAR/CR/FAR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CR 3.6 Section 11 of the MR makes a mention of internal audit report of GHG emissions reductions prepared by BPCL which has to be submitted for verification.	/MR/ /PDD/	The internal audit report of GHG emissions reductions is submitted to DOE. It has been verified and found to be satisfactory.	-	OK CR 3.6 is closed.

4 Verification conclusion

M/s Bhoruka Power Corporation Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project - “9 MW Neria Hydroelectric Project, Karnataka, India, for the monitoring period covering 27-07-2006 to 30-09-2008, with regard to the relevant requirements of VCS 2007.1 Standard as well as criteria for consistent project operations, monitoring and reporting.

The project activity generates electricity which is supplied to the Southern Grid of India. The review of the MR and additional documents related to monitoring; the subsequent background investigations and follow-up interviews have provided TÜV NORD JI/CDM CP with sufficient evidence to verify the fulfilment of the stated criteria.

A risk based approach has been followed to perform this verification. In the course of the verification 1 Corrective Action Requests (CAR) and 6 Clarification Requests (CR) were raised and successfully closed out.

The verification is based on the MR, registered CDM PDD, VCS PD, and other additional documents made available by project proponent.

As a result of the verification confirm that the project fulfils criteria of VCS 2007.1.

Verified emission in the reporting period of 2006-07-27 to 2008-09-30:

Project emissions	*0 t CO_2 equivalents*
Baseline emissions	*45,321 t CO_2 equivalents*
Emission reductions	*45,321 t CO_2 equivalents*

Annexure 1:

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
KPTCL	Karnataka Power Transmission Corporation Limited
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CR	Clarification Request
ER	Emission Reduction
GHG	Greenhouse gas(es)
kV	Kilo Volt
kWh	Kilo watt hour
MR	Monitoring Report
XLS	Spreadsheet for emission reduction calculation
MP	Monitoring Plan
MW	Megawatt
MWh	Megawatt Hours
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emission Reduction

Annexure 2:

Documents referred during the course of verification:

Reference	Documents
/CAL/	Calibration certificates dated 2007/07/20 and 2008/08/13 for all electricity meters (Sl Nos. 05341379, 05341375, 05341378 and 05271163) during the monitoring period.
/GR/	Statements for electricity generation certified by KPTCL covering the monitoring period
/MR1/	Monitoring Report version 1
/MR2/	Monitoring report version 2
/EIK/	Approval from Electrical Inspectorate
/EQPMAN/	Maintenance details of hydro turbines
/PPA/	Extract of Power Purchase Agreement between KPTCL and BPCL.
/CR/ **/CfO/**	Statutory Clearances: 1. Letter of Synchronisation to the grid dated 2006/08/01 issued by KPTCL. 2. Consent for Operation of the plant issued on 2006/06/21 by the Karnataka State Pollution Control Board valid from 2006/07/01 to 2015/12/31.
/GHG/	Internal audit report of GHG emissions reductions
/TS/	Technical specification of the turbines.
/VCS S-VAL/	Supplementary Validation report as per VCS 2007.1.
/XLS1/	Emission reduction calculation sheet corresponding to /MR1/
/XLS2/	Emission reduction calculation sheet corresponding to /MR2/

Background investigation and assessment documents

Reference	Document
/AMS I.D/	“Grid connected renewable electricity generation” Version 10,
/ACM0002/	“Consolidated methodology for grid-connected electricity generation from renewable sources” Version 6,
/IPCC-RM/	2006 IPCC Guidelines for National Greenhouse Gas Inventories
/PDD/	Final Project Design Document for CDM project: ‘9 MW Neria Hydroelectric Project, Karnataka, India." registered 09/10/2008, UNFCCC Project ref. no. 1594. http://cdm.unfccc.int/Projects/DB/DNV-CUK1200571481.71
/VAL/	Validation Report for CDM project ‘9 MW Neria Hydroelectric Project, Karnataka, India’ issued by DNV. http://cdm.unfccc.int/Projects/DB/DNV-CUK1200571481.71
/VCS/	Voluntary Carbon Standard 2007.1
/VAL-XCS/	Validated Excel Calculation sheets for baseline determination linked with the registered PDD.

Websites used

Reference	Link	Organisation
/CEA/	www.cea.nic.in	Central Electricity Authority
/UNFCCC/	http://cdm.unfccc.int	UNFCCC
/VCS/	http://www.v-c-s.org/	VCS

Interviewed Persons

Reference		Name	Organisation / Function

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	V. V. Reddy	M/s. Bhoruka Power Corporation Limited
/IM01/	☒ Mr. ☐ Ms	Ramu Joshi	M/s. Bhoruka Power Corporation Limited
/IM01/	☒ Mr. ☐ Ms	Sangamesh	M/s. Bhoruka Power Corporation Limited