Voluntary Carbon Standard Version 2007.1 Verification Report

30 June 2009

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Verification Report:

Name of Verification company:	Date of the issue:
TÜV NORD CERT GmbH	2009-06-30
Report Title:	Approved by:
13.25 MW Wind Power Generation by RMTL, in Kutch, Gujarat	K. Beyer
Client:	Project Title:
Ratnamani Metals and Tubes Ltd (RMTL)	13.25 MW Wind Power Generation by RMTL, in Kutch, Gujarat
Summary:	

Ratnamani Metals and Tubes Ltd (RMTL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project - "13.25 MW Wind Power Generation by RMTL, in Kutch, Gujarat", with regard to the relevant requirements of VCS 2007.1 Standard.

The project activity involves setting up eight (8 X 1.5 MW) and one (1X 1.25 MW) wind turbine generators supplied by Suzlon with an aggregated installed capacity of 13.25 MW. The generated electricity will be sold to the grid of Gujarat Urja Vikas Nigam Limited (interconnected with western regional grid of India) under power purchase agreement and also used for captive consumption for which the project proponent has entered in to agreement with Gujarat Energy Transmission Corporation Limited and Paschim Gujarat Vij Company Limited under wheeling agreement. The project activity was commissioned in a phased manner starting from 31/03/2006.

A risk based approach has been followed to perform this verification. In the course of the verification 08 Corrective Action Requests (CARs) were raised.

The verification is based on the registered Project Design Document (PDD), monitoring report and other supporting documents made available to the verifiers by project proponent.

This verification is also carried out along with supplementary validation on VCS-PD in accordance with VCS policy dated 19th March 2008 and 10th September 2008 of VCS 2007.1.

Taking into account 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 (2006.03.31 to 2009.03.24) is: 39541 t CO_{2e}.

Work carried out by:	Number of pages:
Mr. Pankaj Patel (Off Site) Mr. Hemang Shah Mr. Saroj Sahoo	21

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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, 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 VCS project description /PD/, the monitoring report/MR01/MR02/, CDM PDD/PDD/and supporting documents made available to the verifier and information collected through performing interviews/IM01/IM02/ 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.

As per the VCS policy Announcement on 19th March 2008, "the start date of the crediting period should be from 28th March 2006 or two years prior to the completion of the project validation whichever is later" and subsequent policy announcement on 10th September 2008, "VCS 2007 validations shall be completed within two years of the project start date, or shall be completed or contracted before 19 November 2008. In relation to contracts entered into before 19 November 2008, validation shall be completed by 19 November 2009 and proof of contracting prior to 19 November 2008 shall be provided." The supplementary validation report for the project is dated 30/06/2009 and the start date of the monitoring period is

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

31st March 2006 thus the project complies with the VCS rule for start date of monitoring period.

1.3 VCS project Description

The objective of the 13.25 MW wind power project is to reduce GHG emission by replacing electricity of the western region grid of India which predominantly uses fossil fuel. The project introduces installation of nine nos. of wind turbine generators (WTG), eight among which are of 1.50 MW and one is of 1.25 MW aggregating total capacity of the project to 13.25 MW. Project is implemented in the state of Gujarat, India. The generated electricity is supplied to the western region grid of India. All WTG are supplied by M/s Suzlon and operation and maintenance of the project activity is also undertaken by same entity. The project design has taken care of the current good practices and indigenously designed safety and environmental features. The project is currently operational, the WTG were commissioned starting from 31/03/2006.

The technical specification of 1.50 MW WTGs is as follows.

Items	Specifications
Manufacturer / Model	Suzlon / S-82
Nominal electrical output	1.5 MW
Rotor diameter	82 Meters
No. of rotor blade	3
Blade material	Glass Reinforced Plastic (GRP)
Generator	Asynchronous generator 4 pole
Braking system	Aerodynamic brakes and Mechanical brakes
Tower	79 Meters

The technical specification of 1.25 MW WTGs is as follows.

Items	Specifications
Manufacturer / Model	Suzlon / S-64
Nominal electrical output	1.25 MW
Rotor diameter	64 Meters
No. of rotor blade	3
Blade material	GRP
Generator	Asynchronous generator 4 pole
Braking system	Aerodynamic brakes and Mechanical brakes

Items	Specifications
Tower	79 Meters

1.4 Level of assurance

The verification report is based on VCS PD/PD/, Monitoring report/MR01/MR02/, CDM PDD/PDD/, emission reduction calculation/XLS1/XLS2/ supporting documents made available to the verifier and information collected through performing interviews/IM01/IM02/ 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 from April 2009 to June 2009.

Preparations:	2009-04-30 to 2009-06-30
On-site Verification:	2009-05-28
(Draft) Reporting:	2009-06-01
(Final) Reporting:	2009-06-30

The verification consisted of the following steps:

- A desk review of the VCS PD/PD/,registered CDM PDD /PDD/,UNFCCC Project page documents and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007.1
- Supplementary Validation covering clauses of 1.12, 1.13, 1.14, 8.1 & 8.2 of VCS-PD/VCS-PD/
- A desk review of the Monitoring Report /MR01/MR02/, CDM PDD/PDD/, Emission reduction calculation/XLS1/XLS2/ and additional supporting documents which were submitted by the client. The relevant sections of the above mentioned customised protocol according to the VCS 2007.1 were used,
- Verification audit planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer,
- 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

The verification has been carried out based on the Project registration sheet/PDD/ from the web page of CDM-UNFCCC (Ref. no. 2247) http://cdm.unfccc.int/Projects/DB/RWTUV1222760737.24/view which is registered on 25/03/2009 under the CDM. There is no remaining issues including any material discrepancy from previous validation.

3.2 Project Implementation

The project proponent, Ratnamani Metals and Tubes Ltd (RMTL) is producing clean power from wind which is a renewable source of energy by setting up a wind power project of a capacity of 13.25 MW which includes eight (8 X 1.5 MW) and one (1X 1.25 MW) wind turbine generators supplied by Suzlon. The power produced from 8 WTGs is exported to the Western grid of India and 70% of power from one of the 1.5MW WTG is wheeled to the project proponent's manufacturing unit. The first WTG was commissioned on 31st March 2006.

During the monitoring period the project activity has delivered a total of 44032690 kWh of Energy to the grid leading to total baseline emission of 39,541 tCO_2e.

During site visit conducted by the verification team on 28/05/2009 the project implementation was verified and found that the actual project activity was implemented in accordance with the VCS PD/PD/ and CDM PDD/PDD/.

However CAR 2.1 to 2.3 were raised and closed based on the revised Monitoring report

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CAR 2.1 Unique identification for each WTG with sr no, location and latitude and longitude to be given in monitoring report.	/MR01/ Section 1.0	This is included in the revised monitoring report under section 1.0.	/MR02/ Section 1.0	Details are included in revised MR OK
CAR 2.2 Commissioning	/MR01/	The	/MR02/	Details

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
date of each WTG to be specified in MR.	Section 1.0	commissioning dates of each WTG is included under section 1.0 of the revised MR.	Section 1.0	are included in revised MR OK
CAR 2.3 Monitoring period date stated in section 2.1 of MR01 is incomplete.	/MR01/ Section 2.1	Details Completed	/MR02/ Section 2.1	Details are included in revised MR OK

3.3 Completeness of Monitoring

PP has submitted monitoring report /MR01/MR02/ describing various details of the project activity, monitored parameters and ER calculations. The reporting /MR01/MR02/ XLS1/XLS2/ is in line with the requirements of the validated monitoring plan as well as with the applied methodology AMS I .D. version 13 /AMS-ID/.

The reporting procedures reflect the requirements of the monitoring plan / PDD/. The net electricity exported is recorded once every month and stored appropriately in the spread sheets during the whole monitoring period. These data form the basis of emission reduction calculation.

As per the Registered PDD, Net electricity supplied by WTGs in the project activity is the only parameter which is to be monitored during the whole crediting period.

Share of electricity certificate issued monthly to each individual WTG/Client by the state utility (GEDA) form the basis to record net electricity supplied to the regional grid. The calibration certificates of the common meters at each sub station end were verified. It found that that the calibration of the meters was done in timely manner as per the requirement of the monitoring plan in the registered PDD. Also the accuracy of the meters was found to be in the range of specified limit in the monitoring plan. The list of the meters with their details is as follows:

Transformer yard meters:

WTG ID number	Meter Serial no	Date of Installation	Date of Calibration	Accuracy class
SEL/1500/06-07/0358	GJU03910	3/22/2007	6/13/2006	0.5s
SEL/1500/06-07/0359	GJU03878	3/22/2007	6/13/2006	0.5s
SEL/1500/06-07/0360	GJU03908	3/21/2007	6/13/2006	0.5s
SEL/1500/06-07/0361	GJU03886	3/31/2007	6/13/2006	0.5s
SEL/1500/06-07/0382	GJU04435	3/22/2007	3/9/2007	0.5s
SEL/1500/06-07/0383	GJU04457	3/30/2007	3/9/2007	0.5s
SEL/1500/06-07/0384	GJU04460	6/30/2007	3/11/2007	0.5s
SEL/1500/06-07/0362	GJU04465	3/29/2007	3/11/2007	0.5s
SEL/1250/05-06/0139	GJU03425	3/31/2006	5/13/2008	0.5s

Common Meters:

Meter location	Serial No	Date of Calibration	Accuracy class
Suthri substation – Line 1	MSE64370	10/7/2006	0.2s
Suthri substation – Line 2	GJB00669	24/9/2006	0.2s
Vanku substation - Line 1	GJB00591	20/9/2006	0.2s
Vanku substation - Line 2	GJB00592	20/9/2006	0.2s

Moreover during site visit it was verified that all the meters for monitoring the net electricity supplied by WTG are installed as per the monitoring plan and the monitoring procedure followed is same as it is described both in the CDM PDD/PDD/ and the monitoring report/MR01/MR02/.

However CAR 3.1 and CAR 3.2 were raised and closed based on the revised Monitoring report.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 3.1 The monitoring parameters described in the section 3.1 of the Monitoring report should be as per registered PDD section B.7.1 and values applied for this crediting period, description of measurement, source of data, QA/QC applied should be included for each parameter monitored.	/MR01/ Section 3.1	The monitoring parameter has been revised as per section B.7.1 of the registered PDD.	/MR02/ Section 3.1	OK
CAR 3.2 Details of meters used for the measurement of electricity generation should be given in MR 1 with its sr no, installation date, accuracy class .	/MR01/	All meter details and calibration records are given in Annexure 2.	/MR02/ Annexure 2	Details are included. OK

3.4 Accuracy of Emission Reduction Calculations

For the calculation of baseline emissions the ex-post determined value of baseline parameters, i.e. Grid Emission Factor for current generation mix is taken into account which is a validated value. This Grid emission factor has been taken from the "CO2Basline Database for Indian Power Sector" published by Central Electricity Authority, Ministry of Power, Government of India, version 3.0.

Baseline Emissions:

The formula used for the determination of baseline emissions which is consistent with the PDD:

BE = GEN X CM /1000

Where;

BE **=** Baseline emission in tCO2/MWh

GEN **=** Net electricity supplied by WTGs per annum in the project activity in kWh

CM **=** Combined margin of WR grid in tCO2/MWh

BE = 44032690 kWh x (0.898 tCO2/MWh) / 1000

= 39,541 tCO2e

The baseline emissions (BE) during the monitoring period are **39,541** tCO_2e

End date of the Crediting period is 24/03/2009. Hence Electricity generation for the Month of March-2009 (25/02/2009 to 24/03/2009) is calculated conservatively by PP based on the actual monitored data at WTG end and Substation meter (GEDA report).

Due to this, DOE has verified a conservative approach for estimating the net power export attributable to WTGs of PP in the project activity.

In the calculation approach as described in annex-1 of the MR, transmission losses for the whole month of March-09 (25/02/2009 to 31/03/2009) is calculated by subtracting GEDA share of electricity readings from WTG reading for the period 25/02/2009 to 31/03/2009. The time period of 25/02/2009 to 31/03/2009 period is selected as the period in GEDA share of electricity certificate also corresponds to this value.

For arriving at the generation for the period 25/02/2009 to 24/03/2009, transmission losses (for the period 25/02/2009 to 31/03/2009) as calculated above is deducted from the actual monitored generation readings from WTG meter from 25/02/2009 to 24/03/2009. Thus in this case

the line loss for the whole period (35 days) is deducted from the WTG generation for 28 days to arrive at the net electricity export for the period of 25/02/2009 to 24/03/2009. This approach is considered as conservative and convincing. Accordingly emission reduction occurred for the period 25/02/2009 to 24/03/2009 due to project activity is 960 t CO2e.

Verification team has also used alternate method to calculate the net electricity exported for 25.02.2009 to 24/03/2009. This approach is based on calculating the average net daily electricity export based on GEDA certificate (i.e. 14453369/35=41524.6) and than multiplying this value with 28 days i.e. (41524.6 X 28= 1162690). The value of 1069522 kWh calculated by PP and used for emission reduction is conservative than the alternative approach used by verification team.

The alternative method used for calculation of emission reduction in absence of monitored data exactly inline with the monitoring plan for the period 25th Feb 2009 to 24th march 2009 is in line with verification guidance as described in paragraph 109 (b) of the report of the twenty-sixth meeting of the CDM Executive Board <http://cdm.unfccc.int/EB/026/eb26rep.pdf>

Additionally verification team has also calculated PLF for 1.25MW WTG at Vanku, 10.5 MW WTGs at Suthri and 1.5 MW WTG at Suthri /XLS2/. The calculated PLF based on the generation data submitted and verified by verification team works out to 18.18%, 18.54% and 22.91% respectively. The values are less than the value of 23% based on GERC order and used in the registered PDD for estimation of Emission reduction calculation.

Project Emission & Leakage:

In accordance with AMS I.D. (Version 13, date: EB 36), the project emission and leakage were considered as zero.

Emission Reduction:

ERy = BEy - PEy - LEy

= BEy – 0 – 0

= BEy

Emission Reduction = baseline emission

Hence, total emission reductions due to project activity during crediting period are 39,541t CO_2e.

However, CAR 4.1 was raised and successfully closed.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CAR 4.1 Grid emission factor (determined ex-ante as per registered PDD) considered for the project activity should be described in MR (OM/BM/CM) and reference to the methodology and tools should be specified.	/MR01/	The Grid emission factor and the tool is included in the MR.	/MR02/ Section 3.0 and 2.0 respectively	OK

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

3.5 Quality of Evidence to Determine Emission Reductions

The only key monitoring parameter with influence on the calculation of the emission reductions is the net power exported to the Grid and the grid emission factor. The power is measured with high accuracy and duly calibrated class 0.5S power meters.

The grid emission factor is taken from "CO_2Basline Database for Indian Power Sector" published by Central Electricity Authority, Ministry of Power, Government of India, version 3.0. This is considered as highly reliable and authentic document.

All necessary monitoring instruments are installed. The measuring devices are well known and state of the art. The details of the meters are given in Annexure -2 of the monitoring report/MR02/. Calibration has been carried out as defined in the monitoring plan and the records for the same were reviewed. Based on the same it is concluded that the recorded reading from these meters are accurate enough.

The net electricity exported by the WTGs belonging to the project activity as reported in the monitoring report and the emission reduction calculation sheet/XLS1/XLS2/ were verified with the GEDA share of certificates/GEDA/. These certificates are issued by GEDA an autonomous government body. Moreover these GEDA share of certificate/GEDA/ are used for commercial billing by state electricity board. Hence this are considered as highly authentic and reliable source of information. All evidences are clearly identifiable and assessed to be correct.

The other data monitored for plausibility check were also checked. This data consists of power generation, tower shut down, grid availability and these are recorded in the daily log/LOG/ maintained by O & M team. The data were checked by the verification team. It was found that the daily log was being maintained as defined in the monitoring plan in the registered CDM PDD/PDD/.

All records including daily generation, PLF, grid availability and tower shut down needed for monitoring are archived and were found to be in line with the requirements of the monitoring plan. The monitored data have been provisioned to be kept for at least 2 years after the end the issuance of VERs as per the requirement.

However, CAR 5.1 was raised and closed successfully.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CAR 5.1 Energy supplied by Suthri 10.5 MW WTG bundle shown in section 4.0 of MR-1 under the table energy supplied by WTGs for the month of Feb-08 as 119714 kWh which does not tally with the GEDA share of electricity certificate where the	/MR01/	It is a typographical mistake. Energy supplied figure for the Month of Feb-08 and corresponding ER calculations and baseline emissions are corrected in revised MR	/MR02/ Section 4.0	Corrected figure for the month of Feb-08 is checked with GEDA certificate and found OK.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
value is given as 1199714. The same requires to be corrected.				

3.6 Management and Operational System

The roles and responsibilities of the responsible person for monitoring of emission reductions for the verification of measurement, data collection as well as the preparation of monitoring report have been implemented as it is defined in the registered PDD. This was verified during the on site assessment conducted by the verification team on 28/05/09.

All monitored data are archived partly in physical and partly in electronic form. The data will be kept for the whole crediting period and additional 2 years as given in the PDD/PDD/. The calibration status was not described in the Monitoring report. Thus CAR 6.1 was raised and was closed on the basis of revised monitoring report/MR02/ which mentions the calibration status of each equipment related to the monitored parameters. The calibration certificates were checked and found OK. During site visit on 28.05.2009, it was verified that the monthly joint meter reading was taken as defined in the section B.7.2 of the registered CDM PDD/PDD/.

CAR/CR	Reference	*Summary of project owner response*	*Revised sections (as applicable)*	Conclusion
CAR 6.1 The MR should provide the information on calibration status for the equipments included in the project activity.	/MR01/	This is included in Annexure 2.	MR02 Annexure 2	OK

Due to closure of CAR's issued during the verification the net resultant value of VER has been changed from 38,572tCO_{2e} to 39,541 tCO_{2e}.

4 Verification conclusion

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the registered PDD, supplementary VCS PD as annex to CDM PDD, supplementary validation report as annex to CDM validation report (Policy Announcement from VCS association on 19th March, 2008 and VCS 2007.1, monitoring report and supporting documents made available to the verifiers by the project proponent.

As a result of the verification, the verifier confirms that:

- All operations of the project are implemented and installed as planned and described in the project design document.
- The monitoring system is in place and functional.
- The installed equipment essential for generating emission reductions runs reliably.
- The GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

All the documents checked during on-site visit and verification process will be kept confidential and will not be disclosed at any time other than the Project Proponent consent as required by VCSA.

Monitoring period: 2006-03-31 to 2009-03-24 including both days.

Verified emission reduction generated in the above mentioned monitoring period:

Baseline emissions (t CO_2 eqv.)	Project emissions (t CO_2 eqv.)	Net Emission reductions (t CO_2 eqv.)
39,541	0	**39,541**

Year wise breakup of VER is as follow :

(March – December) 2006 : 1601 t CO_2 eqv.
(January – December) 2007 : 10965 t CO_2 eqv.
(January – December) 2008 : 23472 t CO_2 eqv.

(January – March) 2009	:	3503 t CO_2 eqv.
Total Monitoring period	:	39541 t CO_2 eqv.

Pankaj Patel	Rainer Winter
Verification Team Leader	Final approval
Vadodara, 2009-06-30	Essen, 2009-06-30

Annexure 1:

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CR	Clarification Request
ER	Emission Reduction
eqv	Equivalent
GHG	Greenhouse gas(es)
RMTL	Ratnamani Metals and Tubes Ltd
MR	Monitoring Report
MP	Monitoring Plan
MW	Megawatt
PD	Project Document
PLF	Plant Load Factor
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate
VER	Voluntary Emission Reduction

Annexure 2:

Table 5.1 Documents referred during the course of verification:

Reference	Documents
/CAL/	Calibration Certificate of electricity meters covering the 1st monitoring period
/GEDA/	GEDA share of certificates
/LOG/	Daily Log Book.
/MR01/	First Monitoring Report version 1 dated 30/04/2009
/MR02/	Final Monitoring Report version 2 dated 10/06/2009
/PDD/	Registered CDM Project Design Document.
/POT/	Proof of title (http://www.v-c-s.org/docs/Program%20Guidelines%202007.pdf) equivalent to LoA from Host country.
/SC/	Statutory clearances
/SD/	Shut down details of the each plant
/TS/	Technical specifications of instruments
/VAL-R/	Validation Report available.
/XLS1/	Excel calculation sheets provided by the project participant (related to MR01).
/XLS2/	Excel calculation sheets provided by the project participant (related to MR02).

Table 5.2 Background investigation and assessment documents

Reference	Document
/AMS-I.D./	Grid connected renewable electricity Generation (Version 13: EB 36)

Reference	Document
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/PD/	Final Project Document for VCS project
/VAL/	Validation Report for VCS project 13.25 MW Wind Power Generation by RMTL, in Kutch, Gujarat issued by TUV NORD.
/VCS/	Voluntary Carbon Standard 2007.1

Table 5.3 Websites used

Reference	Link	Organisation
/UNFCCC/	http://cdm.unfccc.int	UNFCCC
/VCS/	http://www.v-c-s.org	VCS
/IPCC/	www.ipcc-nggip.iges.or.jp	IPCC publications

Table 5.4 Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Aniruddh Dave	Ratnamani Metals and Tubes Limited
/IM01/	☒ Mr. ☐ Ms	Vimal Katta	Ratnamani Metals and Tubes Limited.
/IM02/	☐ Mr.	Subhuddhi	Emergent Ventures

Reference		Name	Organisation / Function
	☒ Ms		