VERIFICATION / CERTIFICATION REPORT

"Optimal utilisation of clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan" in India

(CDM Registration Reference No. 0183)

MONITORING AND REPORTING PERIOD:

01/10/2005 to 31/12/2006

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VERIFICATION / CERTIFICATION REPORT

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Client: Shree Cement Limited	Client ref.: Rakesh Bhargava

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

DNV Certification AS (DNV) has been contracted by Shree Cement Ltd. (SCL) to carry out verification and certification of emission reductions generated by the "optimal utilisation of clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan" in India, for the period 1 October 2005 to 31 December 2006.

In our opinion, the GHG emissions reductions reported for the project is as reported in the revised CDM monitoring report dated 11 May 2007 for the project submitted to DNV are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0005 version-01, the revised monitoring report, the validated Project Design Document, version 01, dated 20 September. 2005 and the review decisions as documented in CDM-EB26. As a consequence, DNV Certification AS is able to certify that the emission reductions from the project for the period 1 October 2005 to 31 December 2006 amount to 124 479 tonnes of CO_2 equivalent.

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Report title: "Optimal utilisation of clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan" in India	
Work carried out by: Kumaraswamy Chandrashekara, Ramesh Ramachandran, Soumik Biswas, Santhosh Jayaram and Subhendu Biswas	
Work verified by: Einar Telnes	

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Abbreviations

BC	Blended Cement
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NATCOM	National Communication (Indian)
NCV	Net Calorific Value
PDD	Project Design Document
PPC	Portland Pozzolanic Cement
SCL	Shree Cement Limited
UNFCCC	United Nations Framework Convention for Climate Change

1 INTRODUCTION

Shree Cement Limited (SCL) has commissioned DNV Certification AS (DNV) to carry out the verification of emission reductions generated by the "Optimal utilisation of clinker project at Shree Cement Limited (SCL), Beawar Rajasthan in India", for the period 1 October 2005 to 31 December 2006.

The verification team consisted of the following personnel:

Ramesh Ramachandran	DNV, India	Team Leader and CDM Verifier
Subhendu Biswas	DNV, India	CDM Validator
Soumik Biswas	DNV,India	CDM Validator
Chandrashekara Kumaraswamy	DNV, India	CDM Verifier
Einar Telnes	DNV, Norway	Technical reviewer
Santhosh Jayaram	DNV, Colombo	Sector expert

1.1 Objective

Verification is the periodic independent review and *ex-post* determination by the Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined verification period.

Certification is the written assurance by the DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

1.2 Scope

The verification scope is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan for the project activity,
- To evaluate the GHG emission reduction data and express a conclusion with a high level of assurance about whether the reported GHG emission reduction data is free from material misstatement,
- To verify that the reported GHG emission data is sufficiently supported by evidence

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

The verification team has, based on the recommendations in the Validation and Verification Manual /5/, employed a risk based approach, focussing on the identification of significant reporting risks and verifying the mitigation measures for these.

1.3 CDM Project Description

Project Parties	*The Republic of India.*
Title of the project activity	*Optimal utilization of clinker project at Shree Cement Limited (SCL), Beawar Rajasthan.*
Registration Reference No	*UNFCCC registration No. 0183*
Project Participants	*Shree Cement Limited.*
Location of the project activity	*The project is located at the site of Shree Cement Limited, Bangur Nagar, Beawar, Rajasthan-305901, Republic of India.*

Baseline and monitoring methodology: *ACM 0005, version 1*

Project's crediting period	*1 August 2000 to 31 July 2010 (fixed).*
Verification period	*1 October 2005 to 31 December 2006.*

The project activity entails the reduction of clinker content of Portland Pozzolanic Cement (PPC) produced by increasing the fly ash additive percent (%) and thereby replacing an equivalent amount of clinker at SCL's cement manufacturing unit at Beawar, Rajasthan.

Reduction in percentage of clinker used in cement manufacturing would eventually reduce GHGs emissions associated with clinker manufacturing. The project activity would therefore reduce direct onsite emissions from clinkerisation and direct off-site emissions due to power generation at the thermal power plants used for grinding of blended cement, kiln operations and processing of additives per unit of cement produced.

The major components/equipment of the fly ash blending system at SCL are:

- Reinforced Cement Concrete (RCC) silo of 2000 T capacity installed at SCL, Beawar.
- Steel silo of 200 T capacity installed at Suratgarh Thermal Power Plant, Suratgarh.
- Mechanised bucket elevators.
- Intermediate storage bin of 35 m^3 capacity.
- Sophisticated & high accuracy solid flow meters.
- Environmentally benign bag dust collectors & silo blowers.

The actual starting date of the project and the crediting period is 1 August 2000.

The emission reductions reported and claimed from the project for the period from 1 October 2005 to 31 December 2006, equate to 124 479 tonnes of CO_2 equivalent.

2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. As the CDM Executive Board has not yet

formally endorsed the application of any materiality principle for verification of emission reductions from CDM projects - implying that emphasis should be on the significant contributors to emission reductions - the DNV team has for this assignment decided to check all factors and issues with the same emphasis. The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project.

Duration of verification

Preparations: *7 March 2007 to 8 March 2007*

Verification: *9 March 2007 to 9 March 2007*

Reporting*:* *11 March 2007 to 11 May 2007*

2.1 Review of Documentation

The basis for the verification has been the revised monitoring report of the project, dated 11 May 2007 for the period 1 October 2005 to 31 December 2006, the latest version of the project design document (PDD), and the approved baseline and monitoring methodology for the project, ACM 0005, version 1. The project operator has in addition supplied the verification team with emission reduction calculations provided in the form of spreadsheets.

2.2 Site Visits

Detailed verification of all data contained in the monitoring report was performed during a site visit at Shree Cement Limited on 9 March 2007. During the site visit, the following personnel were interviewed or assisted the verification team:

Name	Organisation	Position
H.C.Kabra	Shree Power	Senior Vice President
S.M Khira	Shree Cement Ltd	Sr. Advisor – Technical
P.K.Tripathy	Shree Cement Ltd	Vice President – Technical.
Rakesh Bhargava	Shree Cement Ltd	General Manager, Environment.
C.K Khatri	Shree Cement Ltd	General Manager, Quality Control

3 VERIFICATION FINDINGS

3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

An assessment on CARs raised during the verification of the project, carried out by DNV on 9 March 2007 is described in the following table:

CAR	Description of the CAR	Comments	Conclusions
CAR1	Certificate of surplus fly-ash availability as per QA/QC procedures is not available	Documents substantiating surplus availability of fly ash have been provided .	OK (formally concluded)
CAR2	During verification data mismatch in diesel consumption of DG set was found.	Necessary corrections have been made in the revised monitoring report and emission reduction calculation sheet.	OK (formally concluded)
CAR3	Substantiation on Export data and Leakage Factor α figures have not been included in the monitoring report,	Necessary corrections have been made in the revised monitoring report.	OK (formally concluded)

3.2 Assessment

The data presented in the revised monitoring report were assessed by reviewing in detail project documentation, production records, interviews with personnel at Shree Cement Ltd., collection of measurement data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results and verify the correct application of the approved monitoring methodology. Data from other sources, such as annual excise data from site and reports of analysis done by independent labs like NCCBM which are used for determining the emission factor for self generated electricity have also been assessed.

3.2.1 Factors used for project emission reduction calculations.

"$BE_{clinker}$", baseline emissions of Co2 per tonne of clinker in the project activity:
The validated baseline emission factor of 0.881098 t CO_2/tonne of clinker, which is documented in the registered PDD, has been used for estimating the emission reductions.

"$BE_{ele\_ADD\_BC}$ ", baseline electricity emissions for BC grinding and additive preparation:
The validated baseline emission factor of 0.0231692 t CO_2/tonne of blended cement, which is documented in the registered PDD, has been used for estimating the emission reductions.

"PE_{calcin}", emissions from the calcinations of the limestone (t Co2/tonne clinker):
The emission factor is calculated based on the recorded value of CaO and MgO of the raw mix and clinker as analysed in the in-plant laboratory. The verification team has assessed these data and found these to be correct. The instruments used for analysis were found to have been calibrated as per the established calibration schedule.

"$PE_{fossil\_fuel,y}$", emissions per tonne of clinker due to combustion of fossil fuels for clinker production:
In line with the registered PDD, the emission factors for fossil fuels used such as pet coke, low LCV coal, Indian coal and imported coal have been calculated based on IPCC default factors which have been used in the emission reduction calculations. The calculations have been verified by DNV and found to be accurate.

"$PE_{ele\_grid\_CLNK}$", grid electricity emissions for clinker production:
The amount of grid electricity consumed for clinker production is calculated based on the total amount of "metered" electricity consumed for clinkerisation. The amount of electricity consumed from the grid has been estimated based on the proportion of grid power to the total power consumed for clinker production. The total amount of grid electricity consumed was verified from the power purchase documents and confirmed to be correct. The different meters at the consumption end have been calibrated by external agencies and were found to be in line with the calibration plan. The accuracy level of the meters as assessed during the calibration by external agencies was found to be within the specification limit of the meters.

"$PE_{ele\_sg\_CLNK}$" emissions from self generated electricity for clinker production:
The emission factor for self generation (EF_{sg_Y}) has been calculated based on annually depending on the amount of fossil fuels consumed for self generation. The actual amount of fossil fuels consumed are assessed against the plant excise records and consumption records and confirmed to be in line with the data provided in the monitoring report. The net electricity consumption has been used in the calculations in line with the review decisions documented in CDM-EB-26. The data and calculations provided in the revised monitoring report have been verified by DNV and found to be accurate.

"$PE_{ele\_grid\_BC,y}$" grid electricity emissions for BC grinding:
The final validated PDD details the calculation as per the approved baseline methodology ACM-0005 version-01 for estimation of emission due to grid electricity consumption for BC grinding. DNV has assessed the calculation to be correct and in line with the equations detailed in ACM-0005 version-01.

"$PE_{ele\_sg\_BC,y}$" Self electricity emissions for BC grinding:
The final validated PDD details the calculation as per the approved baseline methodology ACM-0005 version-01 for estimation of emission due to self generated electricity consumption for BC grinding. DNV has assessed the calculation to be correct and in line with the equations detailed in ACM-0005 version-01. This was also checked against the daily and monthly consumption figures and found to be correct.

"α_y" tonnes of additive in year y/total additional additives used in year y:

The verification team assessed the proof of excess availability of fly ash during the period under verification and found the documents to be in order. It was evidenced that the additional amount of fly ash consumed over the years are available in excess and is not a diversion of additives from any existing users. Hence, no discounting of emission reductions due to the project activity was required for the period under verification.

"L_y" Leakage emissions for transport of additives:
The verification team assessed the calculation details for leakage determination and found the same to be in order. The amount of fly ash consumed in the project activity was cross-checked with the plant records and excise related records and found to be correct.

"$P_{blend, y}$" Share of clinker per tonne of blended cement in year y.:
The verification team assessed the calculation details for determining the amount of clinker consumed in PPC production and found the same to be in order. The amount of fly ash and gypsum consumed in the project activity was cross-checked with the plant records and excise related records and found to be correct. The clinker is measured using weigh feeders and totalized reading is obtained from plant DCS system which is integrated with the MIS system of the plant.

3.2.1.1 Monitored data for project emissions within the project boundary.

The following data were monitored for determining the project emissions: "$CLNK_y$" quantity of clinker produced in the year y, quantity of raw mix, "MgO Out & CaO Out" MgO and CaO content for the clinker produced, "$PE_{fossil\_fuel,y}$" quantity of fossil fuel consumed for clinkerisation in the year y, "$f_{i,j,y}$" quantity of fuel consumed for self generation, "$PELE_{grid\_clink,y}$" grid electricity consumption, "$PELE_{sg\_clink,y}$" captive power generation, "BC_y" amount of blended cement production in the year y, and "ADD_y" amount of additive procured in the year y.

The verification team has cross-checked these annual production, consumption and procurement figures from the organisations' excise records and daily production records and found them to be correct.

3.3 Project Implementation

The project has been implemented in August 2000. The project boundaries and key equipment for the project activity are in line with the PDD. The process flow diagram has been updated to include the steel silo constructed at Suratgarh Thermal power plant.

3.4 Project Baseline

The PDD and the monitoring report documents the baseline period to be from 01/08/1999 to 31/07/2000.

3.5 Accuracy of emission reduction calculations

DNV has assessed the calculations to be accurate.

3.6 Quality of evidence to determine emission reductions

The emission reductions reported during the period 01 October 2005 to 31 December 2006 is verified to be 124 479 t CO_2e.

SCL's established Quality and Environment Management Systems has enabled sufficient evidence to be presented for the reported net emission reductions. Internal calibrations and external calibration are carried out as per the calibration plan. The calibration certificates of the instruments used for data monitoring and recording were also verified during the site visit.

4 CERTIFICATION STATEMENT

Introduction

DNV Certification AS. (DNV) has performed a verification of the emission reductions reported for the "Optimal utilisation of clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan" in India (CDM Registration Reference No. 0183), for the period 1 October 2005 to 31 December 2006.

The project has applied the approved baseline and monitoring methodologies ACM0005, version 01 and emissions reductions reported in the revised monitoring report received on 11 May 2007 are in line with review decisions documented in EB-26. DNV has assessed the revised calculations and found them to be correct.

Responsibilities of Shree Cement Limited (SCL) and DNV Certification AS

The management of Shree Cement Limited (SCL) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project for the period 1 October 2005 to 31 December 2006.

Basis of GHG verification opinion

Our verification approach draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for the period 1 October 2005 to 31 December 2006.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the period 1 October 2005 to 31 December 2006 are fairly stated.

We conducted our verification on the basis of the monitoring methodology ACM0005, version 01, and the monitoring plan included in the PDD of the project. The verification included:

- *collection of evidence supporting the reported data,*
- *checking whether the provisions of the monitoring methodology ACM0005, version 01, and the monitoring plan in the PDD were consistently and appropriately applied.*

We have verified whether the information included in the revised monitoring report of 11 May 2007 is correct and that the emissions reductions achieved have been determined correctly.

Certification Statement

In our opinion the GHG emissions reductions reported for the project in the revised monitoring report of 11 May 2007 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0005 Version.01 and the monitoring plan and formulae provided in the registered PDD of September 2005.

DNV Certification AS is able to certify that the emission reductions from the "Optimal Utilisation of Clinker project at Shree Cement Limited (SCL), Beawar Rajasthan in India" project" for the period 1 October 2005 to 31 December 2006 amount to 124 479 ton CO_2 equivalent.

Bangalore and Oslo, 14 May 2007

Manager (South Asia)	*Director*
Climate Change Services	International Climate Change Services
Det Norske Veritas Certification Ltd.	Det Norske Veritas Certification Ltd.

5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the initial verification conclusions, and are usually further checked through interviews with key personnel.

/1/ SCL - Optimal Utilisation of Clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan Monitoring Report 1 October 2005 to 31 December 2006. dated 07 March 2007, 13 March 2007 and 11 May 2007..

/2/ SCL - Project design Document of Optimal Utilisation of Clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan September 2005

/3/ SGS – Validation Findings - Optimal Utilisation of Clinker project at Shree Cement Ltd (SCL) Beawar, Rajasthan

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.

/4/ Approved baseline and monitoring methodology ACM0005: Consolidated Baseline and monitoring methodology for increasing blend in cement production. Version 01.

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/6/ CDM Manual

/7/ Excise data for Shree Cement Ltd. Year 2005 & 2006 .

/8/ Plant record for Shree Cement Ltd. Year 2005 & 2006.

/9/ Power Generation records of Shree Power Ltd.

/10/ Letters of correspondence from Thermal power plants.

/11/ Test certificates From National Council for Cement and Building Materials.

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