Voluntary Carbon Standard Version 2007 Verification Report Template

19 November 2007

Verification Report:

Name of Verification company:	Date of the issue:
Bureau Veritas Certification Holding SAS	5th June 2010
Report Title:	**Approved by:**
Verification Report for "Siam Cement Biomass Project"	Kusheru Wibowo
Client:	**Project Title:**
SCG Cement Co., Ltd.	Siam Cement Biomass Project

Summary:

Bureau Veritas Certification has made the verification to carry out the first periodic verification of "Siam Cement Biomass Project", Thailand, on the basis of Voluntary Carbon Standard 2007.1 and with regard to the requirements of CDM methodology ACM003/version 07.2 and related tools. The project reduces GHG emissions due to partial replacement of fossil fuels by alternative fuels or less carbon intensive fuels, including biomass, in kiln processing of cement manufacture. This verification covers the period from 01/04/2006 to 31/08/2006.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. The first output of the verification process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Annex A (Table 2 of the verification protocol). Taking into account this output, the project proponent corrected its calculation sheet and monitoring report accordingly.

In summary, Bureau Veritas Certification confirms that all operations of the project are implemented and installed correctly as described in the project description, monitoring plan, and monitoring methodology ACM0003 / version 07.2, meets the relevant VCS requirements and local legislation. Monitoring equipment essential for measuring parameters required for calculating emission reductions are appropriately calibrated. Monitoring system is in place and data are collected from each site within the grouped project, reviewed, and submitted to the authorized personnel at SCG Cement Company Limited Head Office. All related document i.e. draft monitoring report, revised monitoring reports, the validation report, monitoring plan as set out in the VCS PD, emission reduction calculation spreadsheet and supporting document are made available to DOE by the project proponent.

At the first periodic verification, the verifier finds that GHG emission reductions are calculated in conservative and appropriate manner without material misstatements. Bureau Veritas Certification Holding SAS herewith confirms that the project has achieved emission reductions.

Reporting period: From 01/04/2006 to 31/08/2006

Verified emission in the above reporting period:

Project emissions	15,996	t CO2 equivalents
Baseline emissions	304,981	t CO2 equivalents
Emission Reductions	288,985	t CO2 equivalents

Work carried out by:	Number of pages:
Ashok Mammen – Team Leader Wiriya Rattanasuwan – Team member Busarawan Jongjai – Team member	33

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1 Introduction

1.1 Objective

Verification is the periodic independent review and ex post determination by the DOE of the monitored reductions in GHG emissions during defined verification period.

The verification serves as project description verification and its requirement of all VCS projects. The verification is an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant VCS 2007.1 and host country criteria are validated in order to confirm that the project description, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of voluntary carbon units (VCUs).

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the project design document/project description document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against VCS 2007.1 requirements and associated interpretations. The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3 VCS project Description

The project is a combination of five GHG reduction projects located in five different cement manufacturing units of SCG Cement Co.,Ltd, in Thailand. All project activities in this group involve partial replacement of fossil fuels by alternative fuels or less carbon intensive fuels, including biomass, in kiln processing of cement manufacture. In order to implement the project activities a complete system for receiving, storing, and feeding alternative fuels and less carbon intensive fuels needs to be introduced.

The proposed grouped project has been implemented at The Siam Cement (Ta Luang) Co., Ltd. (Ta Luang Cement Plant and Kao wong Cement Plant), The Siam Cement (Kaeng Khoi) Co., Ltd., The Siam Cement (Thong Song) Co., Ltd., and The Siam Cement (Lampang) Co., Ltd. SCG Cement Co., Ltd. has 100% shareholding in these five companies. Although there are 5 different sites, the primary site appeared in the VCS project database is 'The Siam Cement (Kaeng khoi) Co., Ltd.' with unique coordinate at 14˚36'33.59˝ N 100˚59'46.88˝ E.

According to Voluntary Carbon Standard Program Guidelines, clause 5.2 (Group Projects), the central GHG information system and controls associated with the project and its monitoring will response by SCG Cement Co. Ltd. As per VCS program guidelines (18 November 2008), the proposed grouped project is expected to reduce anthropogenic emissions by sources within 5,000 – 1,000,000 tonnes of carbon dioxide equivalent annually. It can be categorised in sectoral scope *No.4 "Manufacturing Industries"* under UNFCCC guideline.

To implement of the project activities is able to reduce the GHG emission from fossil combustion in kiln processing with amount of VCUs expected over 10 year crediting period: 6,102,304 tCO2e.

1.4 Level of assurance

The verification report is based on VCS PD, monitoring report, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured to provide the credibility of all above.

2 Methodology

The overall validation and verification, from Contract review to Validation and Verification report & Opinion, was conducted using Bureau Veritas Certification internal procedures.
The validation and verification of the project has carried out since March 2009.

Review of the project design document:	April - May 2009
On-site Visit:	June – October 2009 (site visits were conducted for all 5locations during the validation process) 11th,12th,15th June 2009 (KaoWong, TaLuang, Kaeng Khoi) 28 Sept 2009 (TungSong) 7 October 2009 (Lampang)
Validation Reporting:	October 2009
Verification data:	January – March 2010 at SCG Cement Co,ltd. Head Office
Draft Verification Reporting:	19th March 2010.
(Final) Verification Reporting:	5th June 2010.

The verification consisted of the following steps:

- A Desk review of the VCS PD and supporting documents with the use of the requirements of CDM methodology ACM003/version 07.2 and related tools, in accordance with VCS 2007.1
- A desk review of monitoring report and supporting documents submitted by the project proponent.
- On-site inspections, review of performance records, interviews with project proponents and on-site operators, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment
- Review of monitoring results and verification of the correct application of monitoring methodologies
- Follow-up responses to Clarification and Corrective Action Requests
- Verify calculation formula and results and crosscheck data from original sources as appropriate
- Determination of the reductions in GHG emissions

3 Verification Findings

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

There were two pending issues raised during the validation process. The first Forwards Action Request (FAR-01) was raised for verifying the expected VCUs per annum in each site with their actual operation log sheets, in order to monitor all their data and parameters as stated in VCS PD for project emission. Current observation was made to biomass consumption data that were taken from Work Journal. To follow up this issue, verifier has reviewed and verified data used in calculation of both project emissions and baseline emissions by sampling a set of data in a specific period and verify it with the actual operation log sheets from each site. In addition, verifier crosschecked it with the actual data kept in the computer system database. The results have proved that data were correctly taken from the actual operation. FAR-01 is resolved with no material discrepancy.

Another issue, FAR-02 was raised to follow up the implementation of written procedure for data control and other related documents. Verifier has reviewed the use of common format file that is established to collect ex-ante data and found that all sites have implemented this common format on the record of data related to project activities starting from 01/01/2008 onwards. Verifier has made a sampling set of data in a specific period to crosscheck such data set with the actual data kept in the computer system database. The results have proved that data were correctly taken from the actual operation. Therefore, FAR-02 is also resolved with no material discrepancy.

3.2 Project Implementation

The proposed project activities involve the installation of storage and handling system for alternative fuels and less carbon intensive fuels, including biomass and other alternative fuels. In order to implement the project activities, the installation of a complete system for receiving, storing, processing, preparing and feeding of biomass were implemented. However, there were slightly different in each site on biomass processing and preparation depending on type of the main biomass residue used in the site. During site visits, it was noticed by the verifier team that each site use slightly different types of biomass due to the different geological location and agricultural activities in that area. However, the grouped project has clearly demonstrated that all types of biomass that fed into kiln are automatically weighted and data are retained in computer system database. Operators at the control room are acknowledged their responsibilities for daily operating, tracking data, and reporting the amount of daily fuels used, production clinker, and biomass (each type) used. All data required in calculation of Project Emissions, Baseline Emissions, and GHGs Emission Reduction are submitted to be centralised at the SCG Cement Co.,Ltd. Head Office in Bangkok, Thailand, and available for the verifier team in verification process.

The verifier team, therefore, confirmed that the actual implementation of each site conforms to the registered project design document.

3.3 Completeness of Monitoring

The project activity has applied the CDM approved methodology ACM003 version 07.2, and the monitoring plan is in accordance with this approved methodology. As required under the methodology the monitoring included quantity of biomass residue of each type and fossil fuel of each type in project activity year, weighted average net calorific value of the alternative or less carbon intensive fuel of each type and fossil fuel each type in project activity year, project emissions from additional fossil fuel combustion as a result of the project activity, project emissions from additional electricity consumption as a result of the project activity, annual production of clinker, and so on. The control room operators at each site are responsible for monitoring above parameters as described in the VCS PD as well as in the monitoring plan and monitoring report. The monitoring mechanism is effective and reliable as the monitoring equipments are calibrated according to the manufacturer's guidelines and the records are kept according to ISO9001 management system.

Verifiers hereby confirm that monitoring plan of the project activity is in accordance with the relevant approved methodology and the registered project design document.

3.4 Accuracy of Emission Reduction Calculations

GHGs Emission Reduction is calculated as baseline emissions minus project emissions minus leakage emissions. For this grouped project, leakage was ruled out from the calculation. According to the applied methodology (ACM003 version 07.2), reason and supporting evidences for exception of leakage clearly illustrated in the Project Design document, and it has been validated and accepted by DOE in the validation process. Baseline emissions and Project emissions calculation spreadsheets, therefore, were reviewed for accuracy, as well as its application of conservative assumptions.

It was found that the spreadsheet formulae were correctly applied, but some errors were noticed between datasets used in baseline emissions calculation, as well as project emissions. Corrective Action request (CAR-01) was raised for the inaccuracy of the average CO2 emission factor for the trucks measured during the year y (EFkm,CO2,y(tCO2/km)). Calculation spreadsheet, version 01(24/09/09), adopted the value of 0.001917 tCO2/km, while the IPCC1996, table 1-32, shows estimated emission factors for US heavy duty diesel vehicles is 1097 g/Km (0.001097 tCO2/km). In response to CAR-01, the project proponent has corrected such value in calculation spreadsheet version 02 (27/01/10) and resubmitted to the verifier. Hence, CAR-01 was closed. CAR-02 was raised for revision of the monitoring report and Emission reductions calculation in the first verification period from 1/04/2006 to 31/12/2007 as a result of inaccuracy application of value in CAR-01. CAR-03 and CAR-04 were raised for errors found in datasets of some project sites. As project emissions and baseline emissions data from that sites were taken from annual work journal report instead of actual operation log sheets, and that was where datasets were incorrectly applied. The project proponent has rechecked all datasets from 1/04/2006 to 31/12/2007 to ensure that all data from every project site were correctly taken from the actual log sheets as stated in the monitoring plan. Therefore, emission reductions calculation in the first verification period from 1/04/2006 to 31/12/2007 was recalculated accordingly, presenting in the calculation spreadsheet version 02

(27/01/10). Hence, CAR-02, 03, and 04 were satisfactorily closed. The verifier also raised Clarification Requests which referred in Annex A (Table 2 of the verification protocol). Responses to all clarification were accepted.
During verification, the project proponent has amended new verification periods that split into 8 terms covering period from 1/04/2006 to 30/09/2009. Monitoring reports version 03 (10/03/10) were submitted to verifier along with calculation spreadsheet version 03 (10/03/10). CAR-05 was raised for the differentiation of value appeared in monitoring reports, i.e. AVD_y (Km) and $EF_{km,CO2,y}$ (tCO2/Km), to the value required by ACM003 v.07.2. However, this differentiation did not affect the calculation as verifier has rechecked data and calculation in the new spread sheet (v.03) for period of 1/04/2006-31/12/2007 and confirmed that all data remained correct. In addition to the new period adding, from 1/01/2008 to 30/09/2009, verifier raised CL-4 in order to acquire original data from each site using random technique. Verifier has carefully cross-checked data and calculation with original log sheets submitted by project proponent in response to CL-4 and, therefore, confirmed that data used in calculation spreadsheet were accurate. The revised 8 monitoring reports version 04 (18/03/10) and a calculation spreadsheet version 04 (18/03/10) were submitted to verification team, so CAR-05 was accepted and closed.

Therefore, it is verified in the course of this verification that the applied methodology ACM003 version 07.2 has been correctly and accurately applied in calculating the total emission reductions and the emission reduction calculation is accurate and conservative.

3.5 Quality of Evidence to Determine Emission Reductions

The project proponent submitted several documents as evidence to determinate Emission Reductions. The evidences were assessed as of sufficient quantity and appropriate quality. The critical parameter used for the determination of the Emission Reductions are the Quantity of biomass used in projects, Quantity of fossil fuel used in the projects, Production of clinker, Electricity consumptions in the projects, Quantity of fossil fuel used in transportation of biomass, Net Calorific Value of fossil fuel (measured from each site within the grouped project). The data pertaining to above parameters are maintained in the identified records. All data are in compliance with the figures stated in the revised monitoring report. Monitoring instruments have been calibrated according to the manufacturers' guidelines and recorded are available for verification. The verifier team checked calibration records and related certificates and found them update with no failure noticed.

3.6 Management and Operational System

The management and operational system of the project is suitable. An operational structure was established at all sites with responsibilities identified, documented, and communicated to relevant personnel according to the ISO 9001 management system. Staff training plan was clearly identified and training records were available. Necessary operational procedures were established with operational staff acknowledged their duties.

4 Verification conclusion

Bureau Veritas Certification has performed a verification of Siam Cement Biomass project of SCG Cement Co.,Ltd, Thailand. The verification was performed on the basis of VCS criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The management of SCG Cement Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the project on the basis set out within the project Monitoring and Verification Plan indicated in the ACM003 version 07.2. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification verified the contents of the Project Monitoring Report (Version 04, 18/03/10) for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented and described in validated and registered project design documents. Installed equipment being essential for clinker production and biomass consumption runs reliably and the meters deployed for the measurement of generations is calibrated appropriately. The monitoring system is in place and the project is ready to generate and generating GHG emission reductions.

Bureau Veritas Certification can confirm that the GHG emission reduction is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01-04-2006 to 31-08-2006

Verified emission in the above reporting period:

Project emissions	15,996	t CO2 equivalents
Baseline emissions	304,981	t CO2 equivalents
Emission reductions	288,985	t CO2 equivalents

Annex A – Verification Protocol

Project: Siam Cement Biomass project

First Verification Period: 01/04/2006 – 31/08/2006 (From Total Verification Period 01/04/2006 – 30/09/2009)

TABLE 1 VERIFICATION REQUIREMENTS BASED ON THE VALIDATION AND VERIFICATION MANUAL (EB44 ANNEX 3)

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
1 Project implementation in accordance with the project description document					
It is assessed if the project activity has been implemented and operated as per the PD[1]	**VVM**	**187**			
a Are all physical features of the project activity, proposed in the PD, in place?	VVM	188	Yes. All physical features of all sites have not been changed. Present project activities conform to what is written in the PD version 2, dated 24 September 2009.	OK	OK
b Have the project proponents operated the project activity as per the PD?	VVM	188	Yes.	OK	OK
c Is the project implemented against the description in the PD?	VVM	188	The project has been implemented in accordance with the description the PD.	OK	OK
d Was an on-site visit conducted?	VVM	188	Yes, site visits were conducted for all 5 locations during the validation process. (11,12,15 June 2009, 28 Sept 2009, 7 October 2009) The review of monitoring data, and verification of ER calculation in the verification period 1/04/2006 – 31/12/2007 has been performed afterwards at the Head Office of Siam Cement Group on Jan. 26, 2010.	OK	OK
e If not, justify the rationale of the decision.	VVM	188	-	-	-

[1] This Q is 'Requirement to be verified in VVM.

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
2 Compliance of the monitoring plan with the monitoring methodology					
It Is assessed if the monitoring plan of the project activity is in accordance with the applied methodology	**VVM**	**190**			
a Is the validated monitoring plan in accordance with the approved methodology applied by the project activity?	VVM	191	According to the PD version 2, date 24 September 2009, the following parameters are checked against monitoring plan; 1. FCPJ,k,y and FCPJ,i,y (ton) : Quantity of biomass residue of type k (FCPJ,k,y) and fossil fuel of type i (FCPJ,i,y) used in the project plant in year y. <u>Source</u>: data log sheet and monthly operation report DOE validated the authentic evidences from log sheets and these data parameters are available on each site. 2. $EF_{CO2,k,y}$ (tCO2/GJ) : Weighted average CO2 emission factor for biomass residue of type k (EFCO2,k,y) and for fossil fuel of type i (EFCO2,FF,i) in year y. This data is adopted from IPCC2006, according to ACM0003 v.7.2. DOE validated and accepted.	1.OK 2.OK	OK OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			3. NCVk,y and NCVi,y (GJ/ton) : Weighted average net calorific value of the alternative or less carbon intensive fuel type k (NCVk,y) and fossil fuel types i (NCVi,y) in year y. <u>Source</u>: the measured values by the project participants. NCV is measured on a monthly basis according to the national or international approved standards and procedures through a qualified laboratory. DOE have not seen the evidences from laboratory report, but the data were used in calculation sheet. (Refer to Question 4.a)	~~3.Refer to CL 2~~	OK
			4. AVD_y (km) : Average round trip distance (from and to) between the alternative fuel supply sites and the site of the project plant during the year y. <u>Source</u>: Adopt maximum distance of 400 Km for a round trip. DOE validated and accepted.	4.OK	OK
			5. $EF_{km,CO2,y}$ (tCO2/km) : Average CO2 emission factor for the trucks measured during the year y. <u>Source</u>: Adopted value of 0.001917 tCO2/km [Revised 1996 IPCC Guidelines for National		

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Greenhouse Gas Inventories: Reference Manual, Table 1-32 (for US heavy duty diesel vehicles, uncontrolled – this is the most conservative) DOE found that the IPCC1996, table 1-32 shows estimated emission factors for US heavy duty diesel vehicles is 1097 g/Km that is different from what was used in the PDD version 02 (24/09/09) and therefore the value of $EF_{km,CO2,y}$ in previous ER calculation (version 01) need to correct.	~~5.CAR 1~~	OK
			6. $AF_{T,k,y}$ (ton) : Quantity of biomass residue type k that has been transported to the project site during the year y. <u>Source</u> : On-site measurements. DOE validated reports on log sheet of the year 2006-2007. There were data available according to monitoring plan.	6.OK	OK
			7. $P_{clinker,y}$ (ton) : Production of clinker in year y Source: Production data logsheet at the project site DOE verified data logsheets from each site. There were available data according to monitoring plan.	7.OK	OK
			8. TL_y (ton) :Average truck load of the trucks used during the year y.	8.OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Source: a conservative calculation, the default value 15 tonnes/trip is used, since the on-site data is not available. [Reference to transportation regulation of Thailand] DOE validated and accepted.		
			9. $AF_{T,k,y}$ (litre/day) : Quantity of alternative fuel type k for biomass handling Source: To be conservative, the maximum number of fossil fuel used in biomass handling systems, (130 litre/day) is used. DOE validated this figure and found conservative.	9.OK	OK
			10. $FC_{BL,i,y}$ (ton) : Quantity of fossil fuel type i displaced in the project plant as a result of the project activity in year y. Source: determined as consistent with the guidance above on the determination of the baseline CO_2 emission factor ($EF_{CO2,BL,y}$) every verification period. DOE validated and found these parameters are available at all site during verification period 2006-2007, except the quantity of Diesel used for on-site transportation of biomass that is available only at Thung Song site. In the absence of Diesel consumption data from other sites, DOE accepted the most conservative data in year 2006 to be used and applied to ER calculation of every site.	10.OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			DOE found the rest of parameters in monitoring plan were available at each site and assumptions were validated base on conservative data.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b If no, was a request for revision of the monitoring plan was done? (The DOE may request for revision of the monitoring plan covering the monitoring period under verification)	VVM	192	The validated monitoring plan is in accordance with the approved methodology applied by the project activity, however some parameter are not correctly applied. Referred to comment in Question 2.a.5 above. Therefore, to revise on Monitoring report and ER calculation is required for the verification period 1/04/2006 – 31/12/2007.	~~CAR 2~~	OK
c Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	VVM	193	No. All aspects are covered in monitoring plan.	OK	OK
3 Compliance of monitoring with the monitoring plan					
It is assessed if monitoring of reductions in GHG emissions to result from the project activity is implemented in accordance with the monitoring plan contained in the PD or the accepted revised monitoring plan[1].	**VVM**	**195**			
a Have the monitoring plan and the applied methodology been properly implemented and followed by the project proponents?	VVM	196	Yes. Moinitoring plan as stated in PD version 2 date 24 September 2009 and the ACM0003 version 7.2 have been properly implemented and followed.	OK	OK
b Have all parameters stated in the monitoring plan	VVM	196	-		

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
and the applied methodology been sufficiently monitored and updated as applicable, including:					
i Project emission parameters?	VVM	196	Follow up FAR – 01 and FAR - 02 from validation report. ***FAR-01:*** *The expected VCUs per annum in each site should be verified with their operation log sheet to monitor all their data and parameters as stated in VCS PD for project emission. Current observation was made to biomass consumption data that were taken from Work Journal.* ***FAR-02:*** *The actual implementation of the written procedure for data control and other related documents should be verified.* It was found during verification that all data in year 2006 – 2009 (Oct) are available in both monthly logsheet and work journal with apparently different value between these two sources. In addition, the ex-ante data are not yet recorded in a new common format. The Project Emission parameters used in ER calculation could not easily be traced and checked for correctness. It effects level of confidence on Emission Reduction. At least monitorong data in verificatiod period 2008 – 2009 of each site are required to fill up in the new common format. DOE check project emission parameters and found some differences between ER calculation sheet and log sheet as the followings; - At Ta Luang site, it was found that data in log	~~CL 1~~ ~~CAR 3~~	OK OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			sheets year 2006 – 2007 did not conform to data summarized in Work Journal. - At Thung Song site, data of fuel consumption type coal and lignite in year 2006-2007 are incorrectly taken from logsheet. At Lampang site, data monitored at year 2006-2007 are correctly taken from logsheet. (Kiln production, fuel consumption). At, KhangKoi site, the data at year 2006-2007 are correct. At Khaowong site, the data at year 2006-2007 are correct. Refer to above comments, Project Emissions from each site need to be corrected and recaluclated.		

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii Baseline emission parameters?	VVM	196	Baseline data calculation from fuel consumptions at Lampang(2000-2002),Ta Lung (2000-2002), Thung Song site (2000), Khangkoi site (2000-2002) were found incorrectly taken from data Logsheet. Refer to above comments, Baseline Emissions from each site need to be corrected and recaluclated.	~~CAR 4~~	OK
iii Leakage parameters?	VVM	196	N/A Leakage was ruled out and illustration was stated in the PD version 2 (24 sept 09).	OK	OK
iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	VVM	196	Yes.	OK	OK
c Are equipments used for monitoring controlled and calibrated in accordance with the monitoring plan?	VVM	196	Yes.	OK	OK
i Are monitoring results consistently reccorded as per approved frequency?	VVM	196	Yes.	OK	OK
ii Have quality assurance and quality control procedures been applied in accordance with the monitoring plan?	VVM	196	Yes.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
4 Assessment of data and calculation of greenhouse gas emission reductions					
It is assessed if GHG emission reductions achieved by / resulting from the project activity are calculated applying the selected methodology	VVM	198			
a Is a complete set of data for the specified monitoring period is available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation if appropriate).	VVM	199	ER Calculation sheet, date 24 Sept 2009, uses NCV data from SCG laboratory in baseline years (2000-2002) and project activity years (2006-2009) that are passed quality assurance under ISO9001 certify system. These data are stated in the monitoring plan. Require NCV data taken from each site at base line years (2000-2002) and project activity years (2006 – 2009.	~~CL2~~	OK
b Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	VVM	199	Yes. Plant log sheets and annual work journal during year 2006 – 2007 have been cross-checked 100% for correctness. However, the verification period has been adjusted according to ADDENDUM2 (amended on 12/02/2010) to the validation and verification proposal#THAILAND/0003/2008 Rev.3, November 18, 2008. Therefore, the new monitoring reports are required to submit to DOE accordingly. On March 13th, 2010, the new revised monitoring	~~CL3~~	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			reports (version 03, dated 10/03/10) that were split into 8 periods as below, were submitted along with ER calculation sheet version 10/03/10. Monitoring periods are: 01/04/2006 – 31/08/2006, 01/09/2006 – 31/12/2006, 01/01/2007 – 30/06/2007, 01/07/2007 – 31/12/2007, 01/01/2008 – 30/06/2008, 01/07/2008 – 31/12/2008, 01/01/2009 – 30/06/2009, 01/07/2009 – 30/09/2009. DOE has reviewed the data and calculation on the period of 01/04/2006 – 31/08/2006, 01/09/2006 – 31/12/2006, 01/01/2007 – 30/06/2007, 01/07/2007 – 31/12/2007, and also cross-checked with plant log sheets and annual work journal. The data and calculation during those periods remain correct. However, as the monitoring periods of 01/01/2008 – 30/06/2008, 01/07/2008 – 31/12/2008, 01/01/2009 – 30/06/2009, 01/07/2009 – 30/09/2009 were added according to the ADDENDUM2 (amended on 12/02/2010) to the validation and verification proposal#THAILAND/0003/2008 Rev.3, November 18, 2008, therefore DOE has requested original data from log sheets of each project site to be cross-checked with information and data values	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			present in ER calculation sheet during those periods. Data sets were randomly selected from the 'summary of monitoring data recorded during 01/01/2008 - 30/09/2009' which cover every period and every site. Authentic information to prove the value in data sets shown in summary of monitoring data recorded during 01/01/2008 - 30/09/2009 are: - Amount of Fuel used (ton) (each type) - Lab result of the NCV calculation of each fuel type - Amount of biomass fed in the system to replace fuel (t) (each type) - Lab result of the NCV calculation of each biomass type - Amount of clinker production (ton) Sampling dates of each projects site are: 1. Site TS 2008: 12-16 May 2008, 29 Sep-3 Oct 2008 2009: 9-13 Mar 2009, 5-9 July 2009 2. Site TL 2008: 7-11 Jan 2008, 6-10 July 2008 2009: 7-11 Jan 2009, 6-10 July 2009 3. Site LP 2008: 1-5 Mar 2008, 3-7 Nov 2008 2009: 12-16 Jan 2009, 1-5 Sep 2009 4. Site KK 2008: 13-17 Apr 2008, 22-26 Dec 2008	~~CL 4~~	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			2009: 2-6 Feb 2009, 17-21 Aug 2009 5. site KW 2008: 23-27 Feb 2008, 21-25 Sep 2008 2009: 23-27 Feb 2009, 21-25 Sep 2009		
c Have calculations of baseline emissions, project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	VVM	199	Formulae in ACM0003 v.7.2 are correctly applied in the ER calculation sheet.	OK	OK
d Have any assumptions used in emission calculations been justified?	VVM	199	Yes.	OK	OK
e Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVM	199	The 2006 IPCC values (lower limit and upper limit) for Emission Factors have been correctly applied in the ER calculation, except the value of $EF_{km,CO2,y}$ as mentioned in CAR 1. Refer to CAR 1, Question 2 a.) above.	OK	OK

Table 2 **Resolution of Corrective Action / Forward Action / Clarification Requests.**

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR 1 - DOE found that the IPCC1996, table 1-32 shows estimated emission factors for US heavy duty diesel vehicles is 1097 g/Km that is different from what was used in the PDD version 02 (24/09/09), and therefore the value of EFkm,CO2,y in previous ER calculation (version 01) need to correct.	2 a.	The Emission reductions are revised as per the IPCC 1996, Table 1-32, which describes the typical emissions diesel trucks. In absence of any local data availability, the same is used for conservative estimation.	DOE received the revise ER calculation sheet version 27/01/2010 together with revised Monitoring Report version02 dated 27/01/2010. The average CO2 emission factor for the trucks measured during the year y (EFkm,CO2,y) was changed to 1097 g/km that is now in conformance to the value showed in the IPCC1996, table 1-32. **Hence, CAR 1 is closed.**
CAR 2 - Revise on Monitoring report and ER calculation is required for the verification period 1/04/2006 – 31/12/2007. Please submit monitoring reports and ER calculation for the adding period 1/01/2008 – 30/09/2009. (Refer to CL 3)	2 b.	The Monitoring Report and Emission reductions are revised for the extended monitoring period.	DOE received the revised ER calculation sheet version 27/01/2010 together with revised Monitoring Report version02 dated 27/01/2010. All data and calculation formula for the period of 1/04/2006 – 31/12/2007 were crosschecked with data Log Sheets. DOE verified and confirmed the result of ER calculation during this period. In addition, monitoring reports and ER calculation for the adding period

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
			1/01/2008 – 30/09/2009 were submitted and crosschecked with original data log sheets, therefore, DOE verified and confirmed the result of ER calculation during the adding period 1/01/2008 – 30/09/2009. **Hence, CAR 2 is closed.**
CAR 3 - DOE check project emission parameters and found some differences between ER calculation sheet and log sheet as the followings; - At Ta Luang site, it was found that data in log sheets year 2006 – 2007 did not conform to data summarized in Work Journal. - At Thung Song site, data of fuel consumption type coal and lignite in year 2006-2007 are incorrectly taken from log sheet. Refer to above comments, Project Emissions from above sites need to be corrected and recaluclated.	3 b. i	The revised version of ER calculation sheet version 21/01/2010 had been send to DOE. The project emissions have been corrected accordingly.	DOE received the revised ER calculation sheet version 27/01/2010 together with revised Monitoring Report version02 dated 27/01/2010. Data related to project activities in year 2006-2007 of all sites were corrected. Project Emissions in year 2006 – 2007 were recalculated accordingly. DOE confirmed correctness of such data according to data Log sheets, and has verified the calculation of Project Emissions. **Hence, CAR 3 is closed.**

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR 4 - Baseline data calculation from fuel consumptions at Lampang(2000-2002),Ta Lung (2000-2002), Thung Song site (2000), Khangkoi site (2000-2002) were found incorrectly taken from data Logsheet. Refer to above comments, Baseline Emissions from above sites need to be corrected and recaluclated.	3 b. ii	The data for the following sites has been corrected to match the log sheet send to DOE. Then baseline emissions have been recalculated in accordance to the corrected data.	DOE received the revised ER calculation sheet version 27/01/2010 together with revised Monitoring Report version.02 dated 27/01/2010. Baseline data of all sites were corrected. Baseline emissions were recalculated accordingly. DOE confirmed correctness of Baseline data according to data Log sheets, and has verified the calculation of Baseline Emissions. **Hence, CAR 4 is closed.**
CAR 5 – Refer to verification team conclusion in response to CL 3. DOE has rechecked details, data and calculation in monitoring reports, version.3 dated 10/03/10, and found that parameters being monitored i.e. AVD_y (Km) and $EF_{km,CO2,y}$ (tCO2/Km) as stated in item 3 of the monitoring reports are wrongly quoted. In addition, the table titled *"CO2 emission factor for alternative and less carbon intensive fuels of type k ($EF_{CO2,k,y}$) and for fossil fuel of type i ($EF_{CO2,k,y}$) between 2006 (1 st April) and 2009"*	Refer to verification team conclusion in CL 3	The Monitoring report is revised for the parameters as mentioned in the findings. The value of AVD y and EF km, CO2, y is revised as per the IPCC 1996, Table 1-32. The emission factor for the alternative fuel is revised in item 5	DOE has reviewed all the revised monitoring reports and accepted. Parameters mentioned in CAR 5 were corrected accordingly. **Hence, CAR 5 is closed.**

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
as shown in item 5 of the monitoring reports shows *default value* that is different from what is required in the monitoring methodology of ACM0003 V.07.2.		of the revised monitoring report.	
FAR – 1 This is raised for next verification period, after 1/10/2009 onward, to ensure no inconsistency for complete year 2009. Data for complete year 2009 is to be checked in next verification.		During the next verification, it must be ensured that the data for complete year is in line with the formulae in applied methodology, to ensure consistency.	-

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL 1 - Follow up FAR – 01 and FAR - 02 from validation report. ***FAR-01:*** *The expected VCUs per annum in each site should be verified with their operation log sheet to monitor all their data and parameters as stated in VCS PD for project emission. Current observation was made to biomass consumption data that were taken from Work Journal.* ***FAR-02:*** *The actual implementation of the written procedure for data control and other related documents should be verified.* It was found during verification that all data in year 2006 – 2009 (Oct) are available in both monthly logsheet and work journal with apparently different value between these two sources. In addition, the ex-ante data are not yet recorded in a new common format. The Project Emission parameters used in ER calculation could not easily be traced and checked for correctness. It effects level of confidence on Emission Reduction. At least monitorong data in verificatiod period 2008 – 2009 of each site are required to fill up in the newcommon format.	3 b. i	The evidence had been send to DOE on 16/02/2010. The new format is used for the period of 2008-2007 while the data for 2006-2007 had been verified by DOE. The 2006-2007 data come from actual operation logsheet discarding data reported from the work journals	DOE received evidences on 16/02/2010. The new common format is now used for collecting monitoring data from 1/01/2008 onward. For data in year 2006 – 2007, all data were verified with the actual operation log sheet discarding data reported from the work journals. DOE has rechecked for correctness and accepted. Hence, **CL 1 is closed, FAR-01 and FAR-02 from validation report is also closed.**

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL 2 – Require NCV data taken from each site at base line years (2000-2002) and project activity years (2006 – 2009).	4 a.	The evidence of NCV for each site have been provided on 16/02/2010.	DOE received evidences on 16/02/2010. Hence, **CL 2 is closed.**
CL 3 - The verification period has been adjusted according to ADDENDUM2 (amended on 12/02/2010) to the validation and verification proposal#THAILAND/0003/2008 Rev.3, November 18, 2008. Therefore, the new monitoring reports are required to submit to DOE accordingly.	4 b.	The monitoring report is revised as per the addendum to the verification proposal and distributed into 8 verification periods. The revised reports are submitted on 13/03/2010	DOE has received the revised monitoring reports, version.3 dated 10/03/10, that were split into 8 verification periods as below; 01/04/2006 – 31/08/2006, 01/09/2006 – 31/12/2006, 01/01/2007 – 31/06/2007, 01/07/2007 – 31/12/2007, 01/01/2008 – 31/06/2008, 01/07/2008 – 31/12/2008, 01/01/2009 – 30/06/2009, 01/07/2009 – 30/09/2009. ER calculation sheet, dated 10/03/10, was revised accordingly and submitted together with the above monitoring reports. **Hence, CL 3 is closed.** *However, DOE has rechecked details, data and calculation in monitoring*

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
			reports, version.3 dated 10/03/10, and found that parameters being monitored i.e. AVD_y (Km) and $EF_{km,CO2,y}$ (tCO2/Km) as stated in item 3 of the monitoring reports are wrongly quoted. In addition, the table titled "CO2 emission factor for alternative and less carbon intensive fuels of type k ($EF_{CO2,k,y}$) and for fossil fuel of type i ($EF_{CO2,k,y}$) between 2006 (1st April) and 2009" as shown in item 5 on the monitoring reports shows default value that is different from what is required in monitoring methodology of ACM0003 V.07.2. Therefore, ***CAR 5 is raised.***
CL 4 - Authentic information to prove the value in data sets shown in summary of monitoring data recorded during 01/01/2008 - 30/09/2009 are: - Amount of Fuel used (ton) (each type) - Lab result of the NCV calculation of each fuel type - Amount of biomass fed in the system to replace fuel (t) (each type) - Lab result of the NCV calculation of each	4 b.	- Fuel consumption from log records provided. - NCV measurement records are provided - Biomass consumption from log records is provided - The NCV measurement	DOE has cross-checked data and calculation based on sampling dates covering 1/01/2008 – 30/09/09 and found all data were correct and traceable to original source. **Hence CL-4 is closed.**

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
biomass type - Amount of clinker production (ton) Sampling dates of each projects site are: 1. Site TS 2008: 12-16 May 2008, 29 Sep-3 Oct 2008 2009: 9-13 Mar 2009, 5-9 July 2009 2. Site TL 2008: 7-11 Jan 2008, 6-10 July 2008 2009: 7-11 Jan 2009, 6-10 July 2009 3. Site LP 2008: 1-5 Mar 2008, 3-7 Nov 2008 2009: 12-16 Jan 2009, 1-5 Sep 2009 4. Site KK 2008: 13-17 Apr 2008, 22-26 Dec 2008 2009: 2-6 Feb 2009, 17-21 Aug 2009 5. site KW 2008: 23-27 Feb 2008, 21-25 Sep 2008 2009: 23-27 Feb 2009, 21-25 Sep 2009		records for biomass are provided. - Clinker production measurements are provided from log records. All the log record requested had been send to DOE on 17/03/10.	

Annex B – Curricula Vitae of the Validation Team Members

Team leader and lead verifier : Ashok Mammen - PhD (Oils & Lubricants)
Bureau Veritas Certification – Lead Validator and Lead Verifier
Over 20 years of experience in chemical and petrochemical field. Dr. Mammen is a lead auditor for environment, safety and quality management systems. He is also a lead verifier and tutor for GHG projects and has been involved in the validation and verification processes of more than 75 CDM/JI/VCS and other GHG projects.

Team member and verifier : Ms. Wiriya Rattanasuwan – Chemical Engineer
Bureau Veritas Certification – Validator (Thailand based) / Lead auditor
Wiriya Rattanasuwan is an auditor for environment, safety and quality management systems. She is also validator and verifier for GHG projects. She has been involved in the validation process of 8 CDM projects.

Team member and verifier : Ms. Busarawan Jongjai – Chemical and Environmental Scientist
Bureau Veritas Certification – Validator (Thailand based) / Lead auditor
Busarawan Jongjai is a senior auditor for environment, safety and quality management systems. She is also validator for GHG projects. She has been involved in the validation process of 4 CDM projects.

Internal Technical Reviewer: Kusheru Wibowo - Chemical Engineer
Bureau Veritas Certification - Internal Technical Reviewer (South East Asia)
Over all 18 years of experience. He has worked with Standards in Bureau Verification Certification as Lead auditor for Quality Management system ISO 9001, Environmental Management System ISO 14001 for nine years. He has undergone intensive training on Clean Development Mechanism and has been involved in 8 CDM project validation/verification activities.

Abbreviation List

CAR	Corrective Actions Request
CL	Clarification
DEDE	Department of Alternative Energy Development and Efficiency, Ministry of Energy, Thailand
DOE	Designated Of Entity (Bureau Veritas Certification Holding SAS)
EIA	Environmental Impact Assessment
FAR	Forward Action Request
ONEP	Office of Natural Resources and Environmental Policy and Planning
PP	Project Proponent (SCG Cement Co.,Ltd)
SCG	Siam Cement Group (SCG Cement Co.,Ltd)
VCS PD	VCS project description

References

/1/ PDD version 2 (23/09/09)
/2/ Draft Monitoring Report version 01 (09/04/09)
/3/ Draft Monitoring Report version 02 (27/01/10)
/4/ Draft Monitoring Report version 03 (10/03/10)
Monitoring Period: 01/04/2006 – 01/08/2006
Monitoring Period: 01/09/2006 – 31/12/2006
Monitoring Period: 01/01/2007 – 30/06/2007
Monitoring Period: 01/07/2007 – 31/12/2007
Monitoring Period: 01/01/2008 – 30/06/2008
Monitoring Period: 01/07/2008 – 31/12/2008
Monitoring Period: 01/01/2009 – 30/06/2009
Monitoring Period: 01/07/2009 – 30/09/2009
/5/ Monitoring Report version 04 (18/03/10)
Monitoring Period: 01/04/2006 – 01/08/2006
Monitoring Period: 01/09/2006 – 31/12/2006
Monitoring Period: 01/01/2007 – 30/06/2007
Monitoring Period: 01/07/2007 – 31/12/2007
Monitoring Period: 01/01/2008 – 30/06/2008
Monitoring Period: 01/07/2008 – 31/12/2008
Monitoring Period: 01/01/2009 – 30/09/2009
Monitoring Period: 01/07/2009 – 30/09/2009
/6/ Draft Calculation spreadsheet, version 01(09/04/09)
/7/ Draft Calculation spreadsheet, version 02(23/09/09)
/7/ Draft Calculation spreadsheet, version 02.1(27/01/10)
/8/ Draft Calculation spreadsheet, version 03(10/03/10)
/9/ Calculation spreadsheet, version 04(18/03/10)
/10/ Summary Log sheets (for BE) year 2000–2002, Site KK, KW, TL, LP, TS
/11/ Summary Log sheets (for PE) year 2006-2007, Site KK, KW, TL, LP, TS
/12/ Summary Log sheets (for PE) year 2008-2009, Site KK, KW, TL, LP, TS
/13/ Primary data from monthly report year 2006-2007, Site KK, KW, TL, LP, TS
/14/ Primary data from monthly report year 2008-2009, Site KK, KW, TL, LP, TS
/15/ Voluntary Carbon Standard 2007.1
/16/ The approved consolidated baseline and monitoring methodology ACM0003 version 07.2 “Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture”.
/17/ List of Calibration records verified
Site LP – Weigh scale No: LWB1, LWB2, HWB1, HWB2, RWB1, RWB2
Site TL – Electronic belt weigh scale No: 904H-1, 904H-2; Truck weigh scale No:B1X03, B1X04, B1J33, B1J34; Rice husk weigh feeder scale No: W2U64, W1U64
Site KW – Automatic feeder scale No: W1A02F1, W2A02F1, W1U64F1, W2U64F1; Weigh scale No: #3 - #7 (Products), #8 (Biomass)
Site KK – Weigh scale No: KL-D10H (Belt#1), KL-D1000 (Belt# 2 - #6) TOLEDO8530 (Belt#7 -#8)
Site TS – Weigh scale No: X1X05, X1X06, B1X03, B1X04