



VALIDATION REPORT CEMENTHAI ENERGY CONSERVATION CO.,LTD

VALIDATION OF THE SIAM CEMENT (THUNG SONG) WASTE HEAT POWER GENERATION PROJECT (TS46 PROJECT)

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BUREAU VERITAS CERTIFICATION

VALIDATION REPORT

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Client: Cementhai Energy Conservation Co.,Ltd.	Client ref.: Dr. Kriengkrai Suksankraisorn

Summary:
Bureau Veritas Certification has made the validation of the Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) project of Cementhai Energy Conservation Co.,Ltd. located in Tambon Teewang, Thung Song District, Nakhon Si Thammarat 80110, THAILAND on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the validation process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification's opinion that the project correctly applies the baseline and monitoring methodology AM0024 Version 02.1 and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

Report No.: Thailand-val/0001/2009	Subject Group: CDM
Project title: Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project)	
Work carried out by: Mr.Ashok MAMMEN Team Leader Mr.Pasuta TONTISIRIN-Team member Mr.Nattapat TEERANANTANID-Team member Ms.Wiriya RATTANASUWAN-Team member Mr. Lucas DOU-Team member Mr. Udomsak SUWANSARANYU-Financial expert	
Work verified by: Mr.Robin Wang Jing	
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Indexing terms

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Abbreviations change / add to the list as necessary

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CL	Clarification Request
CO ₂	Carbon Dioxide
DNA	Designated National Authority
GHG	Green House Gas(es)
I	Interview
IETA	International Emissions Trading Association
MoV	Means of Verification
NGO	Non Government Organization
PCF	Prototype Carbon Fund
PP	Project Participant
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
VVM	Validation and Verification Manual
FSR	Feasibility Study Report
IRR	Internal Rate of Return
LOA	Letter of Approval
MP	Monitoring Plan
ODA	Official Development Assistance
SCG	Siam Cement Group
TS	Thung Song Cement plant
EGAT	Electricity Generating Authority of Thailand
WHG	Waste Heat Generation
CEC	Cementhai Energy Conservation Co.,Ltd
BVC	Bureau Veritas Certification (Thailand)
SET	Stock Exchange of Thailand
CONMAT	Construction Material
TGO	Thailand Greenhouse Gas Management Organization
DEDE	Department of Alternative Energy Development and Efficiency



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1 INTRODUCTION

The Cementhai Energy Conservation Co.,Ltd. has commissioned Bureau Veritas Certification to validate its CDM project Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) (hereafter called “the project”) at Tambon Teewang, Thung Song District, Nakhon Si Thammarat, THAILAND

This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The validation serves as project design verification and is a requirement of all projects. The validation 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 UNFCCC and host country criteria are validated in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The validation 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 design.

1.3 Validation team

The validation team consists of the following personnel:

Mr. Ashok MAMMEN

Bureau Veritas Certification Team Leader, Climate Change Verifier

Mr. Pasuta TONTISIRIN

Mr. Nattapat TEERANANTANID

Ms. Wiriya RATTANASUWAN

Mr. Lucas DOU

Bureau Veritas Certification Climate Change Verifier

Mr. Udomsak SUWANSARANYU

Bureau Veritas Certification Financial expert

Mr. Robin WANG JING

Bureau Veritas Certification, Internal technical reviewer



2 METHODOLOGY

The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a validation protocol was customized for the project, according to the version 01.2 of the Clean Development Mechanism Validation and Verification Manual, issued by the Executive Board at its 55 meeting on 30/07/2010. The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Appendix A to this report.

Validation Protocol Table 1: Requirements checklist				
Checklist Question	Reference	Means of verification(MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in several sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question. (See below). Clarification Request (CL) is used when the validation team has identified a need for further clarification.



Validation Protocol Table 2: Resolution of Corrective Action and Clarification Requests				
Report clarifications and corrective action requests	Ref. to checklist question in table 1	Summary of project owner response	Comment	Validation conclusion
If the conclusions from the Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section..	Reference to the checklist question number in Table 1 where the Corrective Action Request or Clarification Request is explained..	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The responses given by the Client or other project participants during the communications with the validation team should be summarized in this section.	This section should summarize the validation team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final Conclusion".

Figure 1 Validation protocol tables

2.1 Review of Documents

The Project Design Document (PDD) submitted by Cementhai Energy Conservation Co.,Ltd. and additional background documents related to the project design and baseline, i.e. country Law, Guidelines for Completing the Project Design Document (CDM-PDD), Approved methodology, Kyoto Protocol, Clarifications on Validation Requirements to be Checked by a Designated Operational Entity were reviewed.

To address Bureau Veritas Certification corrective action and clarification requests Cementhai Energy Conservation Co.,Ltd. revised the PDD and resubmitted it on 22/09/2010.

The validation findings presented in this report relate to the project as described in the PDD version 06 /1/ .

2.2 Follow-up Interviews

On 25-26/02/2009 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Cementhai Energy Conservation Co.,Ltd. were interviewed (see References). The main topics of the interviews are summarized in Table 1.

**Table 1 Interview topics**

Interviewed organization	Interview topics
Cement Thai Energy Conservation Co., Ltd.	<ul style="list-style-type: none"> ➤ Project background information. ➤ Project technology, operation, maintenance and monitoring capability. ➤ Project monitoring and management plan. ➤ Stakeholder consultation process. ➤ Project approval status (incl. EIA approval, CDM project approval status) ➤ Waste Heat Power development in the area ➤ Policies related to Waste Heat Power projects
LOCAL Stakeholder	<ul style="list-style-type: none"> ➤ Social and economical benefits due to Project ➤ Local stakeholder consultation process
ERM-Siam, Co Ltd	<ul style="list-style-type: none"> ➤ Project Category, design ➤ Base line & Additionality – Justification and Application

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the project design.

Corrective Action Requests (CAR) is issued, where:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

The validation team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.



3 VALIDATION CONCLUSIONS

In the following sections, the findings of the validation are stated.

The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are described in the Validation Protocol Appendix A. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in **Appendix A**. The validation of the Project resulted in 8 Corrective Action Requests and 21 Clarification Requests.

The number between brackets at the end of each section corresponds to the VVM paragraph. Finally, there have been 9 requests for review raised by EB on 06/09/2010. The responses of PP and BVC included in the end of each relevant topics in the validation report.

3.1 Approval

The Thailand's DNA has issued the Letter of Approval (TGO No.02/140) on 23/04/2009/2/, authorizing Cementhai Energy Conservation Co.,Ltd as the Project Participant and confirmed that the Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) contributes to Thailand's Sustainable development.

Bureau Veritas Certification received the above letters from the Cementhai Energy Conservation Co.,Ltd (PPs) and does not doubt its authenticity by checking the relevant official information.

The letters of approval do not contain a specific version of both the PDD and the validation report.

Complying with **para.45-48/VVM**, Bureau Veritas Certification hereby confirms that by referring to the information on Thailand's DNA website:

http://www.tgo.or.th/english/index.php?option=com_content&task=view&id=17&Itemid=28

There is also evident in various approvals issued by the government of host country Thailand. There are as below,

Environment Impact Assessment (EIA) approved by Office of Natural Resource and Environmental Policy and Planning on 16/09/2008 (Code: TAU-SAU 1009.3/7213) /3/

3.2 Participation

The participation for project participant has been approved by a Party of the Kyoto Protocol.

Complying with **para.54/VVM**, Bureau Veritas Certification hereby confirms that by referring to the information on UNFCCC website: <http://maindb.unfccc.int/public/country.pl?country=TH>

The validation team concluded this by validation of Letter of approval from the Board of Greenhouse Gas Management Organization (Thai DNA)



3.3 Project design document

Complying with para.57/VVM, Bureau Veritas Certification hereby confirms that the PDD complies with the latest Project Design Document Form (CDM-PDD) version 03.2 and guidance documents for completion of PDD version 07

3.4 Project description

The Project is sited in Thung Song District, Nakhon Si Thammarat province, THAILAND which has geographical coordinates with 8° 6' 1.20" N 99° 41' 2.50" E

The total installed capacity of the Project is 20.50 MW of electricity (gross) supplied by Sinoma Energy Conservation Limited, China . The gross annual power generation amounts to 107,184 MWh which will be used in the power generation unit and supplied to the cement plant, displacing parts of electricity currently supplied from national grid. the establishment of the Project is expected total estimated emission reduction of 542,029 t CO₂e during the Fixed ten years of crediting period. The process undertaken to validate the accuracy and completeness of the project description was including the document review and cross-check with the relevant approvals issued by local government by the validation team.

Complying with **para.64/VVM**, Bureau Veritas Certification hereby confirms that the project description in PDD /1/ is accurate and complete in all respects.

3.5 Baseline and monitoring methodology

3.5.1 Baseline and monitoring methodology

The Project uses the approved baseline and monitoring methodology and tools as below
Version 02.1 of AM0024 Baseline methodology for greenhouse gas reductions through waste heat recovery and utilisation for power generation at cement plants
Version 01.1 of Tool to calculate the emission factor for an electricity system
Version 05.2 of Tool for the demonstration and assessment of additionality.

The assessment of the relevant information contained in the PDD against each applicability condition is described below:

Applicability conditions	Means of validation
1) The electricity produced is used within the cement works where the proposed project activity is located and excess electricity is supplied to the grid; it is assumed that there is no electricity export to the grid in the baseline scenario (in case of existing captive power plant);	During site visit : Validation teams found Waste heat gas from project activity to produce electricity which is supplied only in TS cement work plant.

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2) Electricity generated under the project activity displaces either grid electricity or from an identified specific generation source. Identified specific generation source could be either an existing captive power generation source or new generation source;	During site visit : Validation team did not find captive power plant . All electricity is supplied to TS plant by national grid (EGAT). Therefore Electricity generated from WHG project will displace electricity from grid
3) The grid or identified specific generation source option is clearly identifiable;	The single national grid has been identified to be the Thai National Grid which is clearly physical identify during on site visit
4) Waste heat is only to be used in the project activity;	Verified during the on-site visit audit. Waste heat from both kiln_only be used in generating electricity for the project activity
5) In the baseline scenario, the recycling of waste heat is possible only within the boundary of the clinker making process (eg clinker production lines in baseline scenario could include some heat recovery systems to capture a portion of the waste heat from the cooler end of the clinker kiln and use this to heat up the incoming raw materials and fuel - so called Type 1 Waste Heat Utilisation as described in explanatory note);	During on site visit validation teams found Some part of waste heat is used in the pre-heat of raw material process and Most of the waste heat is currently vented to the Atmosphere. All of recycling of waste heat is only within the boundary of the project
6) This methodology is NOT applicable to project activities where the current use of waste heat or the identified alternative business as usual use of waste heat is located outside of the clinker making process (so called Type 2 Waste heat utilisation as described in explanatory note below);	During site visit validation teams did not find waste heat is used outside of the clinker making process or project is not Type 2 Waste heat Utilization
7) This methodology is NOT applicable to project activities that affect process emissions from cement plants.	During on site visit , validation teams found the project activity dose not affect the process an related emissions

Bureau Veritas Certification hereby confirms that the selected baseline and monitoring methodology is previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

Based on the on-site assessment, BVC hereby confirms that, as a result of the implementation of the proposed CDM project activity, there are no greenhouse gas emissions occurring within the proposed project boundary, which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology.



3.5.2 Project boundary

The TS 46 project boundary was assessed by observations of physical site, interviews and based on the evidence received on the design of the project.

The physical boundary consisted of the equipment and facilities used in the process including the control room, the suspension pre-heater boilers, the air quenching cooler boiler and steam turbine connected to the clinker production line 4 and 6. It also includes the Electricity Generating Authority of Thailand (EGAT) to which the project is connected.

The project boundary includes project CO₂ emissions due to on-site fossil fuel consumption and baseline CO₂ emissions due to on-site fossil fuel consumption as well as emissions from the displaced EGAT grid. The most relevant documentation assessed in order to confirm the project boundary are following:

Supply and Engineering Service Contract /Supply Machinery and Equipment Contract on 21 May 2008/ Waste heat recovery and power generation flow diagram of Kiln 4 and 6

The physical boundary of TS46 is defined as the facilities constructed/erected on account of the project activities and the local power grid system (meaning the national grid supplied by EGAT). There is no captive power plant within the project boundary, which denotes that no captive power plant exists for clinker production line 4 and 6. For the whole TS plant there is a captive power plant at the clinker production line 5, but the clinker production line 5 is separate from the clinker production line 4 and 6. TS5 WHG is excluded from the project boundary and Kiln 5 (TS5) and the electricity generated from its WHG system are clearly distinct from the project boundary of TS46..

The plant layout for the clinker production line TS4, TS5 and TS6 were verified. Each line has on its own complete stand-alone production facilities from raw mill and fuel mill until the clinker silo so that each production line can be in operation independently of the other line. The plant layout also shows that the existing TS5 WHG is located outside the physical boundary of the project.

During site observation, validation teams have carefully checked project boundary with plant layout and single line diagram and found that TS5 WHG is excluded from TS46 project boundary and confirm that TS5 WHG is not captive power plant within project boundary. In addition, TS5 could not export electricity from clinker production line 5 because its electricity generation is lower than clinker production line electricity requirement. Without operation of clinker production line 5, the TS5 WHG could not generate electricity. Therefore TS5 is not internal grid for the project activity.

Complying with **para.57/VVM**, Bureau Veritas Certification hereby confirms that the identification of Project boundary is in line with the delineation of grid boundaries



3.5.3 Baseline identification

In the TS46 Project, two of the production lines (Kilns No.4 and 6) are to be modified by installing waste heat recovery and power generator, according to methodology AM0024, the baseline scenario is determined properly as:

The physical boundary of TS46 Project includes the facilities constructed/erected on account of the project activity at the cement plant and the local power grid system, which supplied from EGAT (Electricity Generating Authority of Thailand), connected to the project activity. There is no captive power plant; hence, neither export nor import of electricity from the project boundary

In addition, the information presented in the PDD has been validated by a first document review of all the data, further confirmation based on the on-site visit and a final step by cross checking the information with similar relevant projects and/or technologies. The sources referenced in the PDD have been quoted correctly. The information was cross-checked based on verifiable and credible sources and sources prescribed by the methodology AM0024 in section “Identification of the Baseline Scenario”

Steps 1-3, such as:

- 1) Work Journals 2005-2007 giving historical data for Thung Song Plant Kilns No. 4& 6 on fuel consumption, kiln running factor, production rate, calorific value and heat consumption.
- 2) Historical electricity consumption records.
- 3) Letter from Thai Cement Manufacturer’s Association confirming that waste heat power generation is a non common practice in Thailand

It may be noted that although the *ex-ante* projection of annual electricity consumption (in MWh) is expected to increase, the capacity addition (in MW) is not required because the increase in consumption is the result of an increase in running hours, not the result of production capacity expansion. Based on the past record and future production plan, it shows that the electricity demand (in MW) of the cement works will not increase beyond 65 MW, which is the highest historical demand amongst the past 3 years before the project implementation at TS plant. In such case, the plant can continue to meet its electricity demand by the national grid without having to consider the construction of a captive power plant with different fuel options.

The validation team has checked the historical data of kiln utilization of 4 and 6 and found that the average utilisation factor of kilns 4 and 6 is only around 70 % and future plan utilisation factor of both kilns maximum is 86 % which substantiate the unlikelihood of not increasing kilns capacity. Therefore the option requested by the applied methodology in case of *ex-ante* projected increase in electricity consumption (Step 1.B, second bullet (iii), page 4), which is installation of captive power with different fuel options is unnecessary.

Complying with **para.80 and 81/VVM**, Bureau Veritas Certification hereby confirms that:

- (a) All the assumptions and data used by the project participants are listed in the PDD,



including their references and sources;

(b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;

(c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;

(d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;

(e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

3.5.4 Algorithms and/or formulae used to determine emission reductions

The steps taken and equations of the TS46 Project in PDD version 6 / 1/ applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring methodology (AM0024) .

To ensure the conservativeness of project emission, however, the project participant has revised the calculation of $COEF_{fuel,y}$ based on only one fuel type that has the highest carbon coefficient in the concerning year. For instance, from the 12 fuel types used in 2007, charcoal has the highest emission coefficient of 112 t CO₂/TJ and has been used in both kilns, so that $COEF_{fuel,y}$ for that year will be 112 t CO₂/TJ for both kilns, as compared to 89.94 t CO₂/TJ for Kiln 4 and 82.90 t CO₂/TJ for Kiln 6 from previous calculation (weighted average). This approach is considered conservative.

Further, 0085864_SCG-TS46_calculation_ver06 .xls /A-21/ has been checked and found calculation is reasonable.

TS5 is not consider a captive power plant for the project boundary (please refer to plant layout /A-16,17/ , single line diagram /A-18/) . Also it is not internal grid because electricity generation capacity is less than all energy requested from production kiln line 5

The project activity applies the grid emission factor for the year 2007 as an estimate of grid EF ($EF_{grid,y}$) which was calculated in the latest technical paper issued in 2009 by the Ministry of Energy* using the ***Tool to calculate the emission factor for an electricity system version 01.1***. The Grid Emission factor data taken from the Thailand Ministry of Energy which are publicly available on its website. The grid EF of the project has been validated based on an official source: Electric Power in Thailand (DEDE). The annual reports are published by the Department of Alternative Energy Development and an official source : Thailand Greenhouse Gas Management Organization (TGO) the Summary Report The Study of emission factor for an electricity system in Thailand 2009 on

(1)* Hinchiranan, S., The Estimation of Emission Factor for an Electricity System in Thailand 2007, Ministry of Energy, 2009, http://www2.dede.go.th/cdm/520126_GridEmission2007.pdf



http://www.tgo.or.th/download/publication/GEFReport_EN.pdf Thailand has single grid (national grid or EGAT 's grid). The result of calculation by Tool to calculate the emission factor for an electricity system version 01.1 which updated to version 2.0 but the change does not have any impact on the method that the grid emission factor is calculated . Grid EF of *ex-ante* parameter will be monitored on implementation and hence become available only after validation of the project activity. When compared with other projects which use same grid with the project activity it can be found that the value is conservative. BVC confirms that the estimates of grid EF and information provided in the PDD and calculation sheet are accepted.

The PP has provided the calculation spreadsheet in the file Thailand_GridEmissionFactor2007_DEDE2009.xls . /A-22/. Validation teams have checked it with *Tool to calculate the emission factor for an electricity system version 01.1* and the estimation of emission factor for an electricity system in Thailand 2007 published by Department of Alternative Energy Development and Efficiency , Ministry of Energy , on http://www2.dede.go.th/cdm/520126_GridEmission2007.pdf that are reasonable.

Complying with para.88/VVM, Bureau Veritas Certification hereby confirms that:

- (a) All assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (b) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- (c) All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- (d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- (e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

3.6 Additionality of a project activity

“Tool for Demonstration and Assessment of Additionality” version 5.2. has been employed for demonstrating and assessing the additionality of the Project. The additionality of the project has been carefully checked, in doing so the validation team has put the main focus on the following issues

3.6.1 Prior consideration of the clean development mechanism

It has been demonstrated by the timeline of events of the Project that the CDM revenues was seriously considered in the decision to proceed with the project activity prior to start of the Project and the continuing and real action were taken to secure CDM status for the project in parallel with its implementation:

1. Incident	2. Date	3. Mean of validation
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1. Incident	2. Date	3. Mean of validation
Consideration of CDM benefits	05/10/2007	Verified :Internal memo: Approval of the benefits of GHG emission reductions resulting from installation of WHG projects/6/. Energy expert, Technical & Engineering department raised the internal memo to Managing Director of Cementthai Energy Conservation Co.,Ltd on 5/10/07 for serious considering of CDM benefits prior to the decision to proceed with the project.
Approval of project investment by the Board of directors, showing consideration of carbon credit benefits from the project implementation	24/10/2007	Verified : The Minutes of the 137 th (6/2007) board of directors meeting /14/ and FSR
Commitment to an implementation of the project activity (starting date of project activity as stated in C.1.1)	21/05/2008	Verified : Supply and engineering contract on 21 May 2008 /5/
Starting CDM PDD preparation / hiring CDM consultant	03/06/2008	Verified : Aauthorization ERM-Siam as a CDM consultant
Public participation event	30/07/2008	Verified : A invitation letter and Summary of event
Approval of EIA ¹ report by ONEP ²	16/09/2008	Verified: EIA approval letter from Government Bureau
Commencement of the construction of the project	01/09/2008	Verified : Construction plan
Engagement of DOE for validation	21/11/2008	Verified : Signed acceptance of quotation
Open for global stakeholder comments for a period of 30 days on UNFCCC website	19/12/2008	Uploaded and Verified :UNFCCC website (http://cdm.unfccc.int/Projects/Validation/index.html)
Starting the 2-day site visit with assigned validation team	23/02/2009	On site audit
Approved of LoA from Thai DNA	23/04/2009	Verified : The LoA issued by Thai DNA (TGO)

Notes:

1 EIA = Environmental Impact Assessment

2 ONEP = Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment

From above table, validation team was able to verify that the start date of the project activity determined as 21/05/2008 is appropriate (the signed date of Supply and engineering contract), which is the earliest of the dates at which the implementation or construction or real action of the project activity began(1/09/2008). This is in accordance with the latest CDM glossary. The Project with a start date before 02/08/2008 and prior to the date of publication of the PDD for Global stakeholder consultation, and PP demonstrated that the CDM was seriously considered in the decision to implement the project activity.

The validation team has checked all physical documents mentioned above and is able to verify that all documents are substantial and reasonable at that situation in the host country. Validation team was therefore able to verify that the incentives of CDM were seriously considered prior to the start of the project activity and



continuing and real action were taken to secure CDM status for the project in parallel with its implementation, which are evident accordance with the “*Guidance on the Demonstration and Assessment of Prior Consideration of the CDM*” (EB49, Annex 22).

Complying with **Para. 103/VVM**, Bureau Veritas Certification verified this issue which was considered much related to the additionality of the Project and can conclude that the serious consideration under the context of the Project has been addressed appropriately in accordance with the above guidance, consequently, the chronological events described with the relevant documented evidences can form the objective basis of the validation opinions of Bureau Veritas Certification.

As stated in methodology AM0024, the latest “Tool for Demonstration and Assessment of Additionality” version 5.2 is used to demonstrate the additionality of the Project in the PDD.

3.6.2 Identification of alternatives

Plausible and credible baseline scenarios available to the Project that provide outputs or services comparable to the proposed CDM project activity include:

Alternative I: Continuation of the current situation, ie continue venting waste heat and purchase electricity from the grid;

Alternative II: The proposed project activity (venting of waste heat to utilize it for power) undertaken without being registered as a CDM project activity;

Both alternatives are in full compliance with current laws and regulations

Complying with **Para. 106/VVM**, Bureau Veritas Certification was able to verify that the Project scenario and the baseline scenario defined to the Project are credible.

3.6.3 Investment analysis

The benchmark analysis is applied for conducting the investment analysis. The equity IRR 11.28 % was employed for the project, this benchmark derived from the government bond rates on Oct 10, 2007 (risk free rate), the country risk premium from Moody's and the beta coefficient of the construction material group in the SET during 16 Oct 2006-15 Oct 2007 and the date of approval of investment on WHG projects is 24 Oct 2007 therefore, the validation team concludes that the benchmark is suitable for the project.

Based on the data from the Feasibility Study Report, the equity IRR of the Project without CERs revenue is 7.0 %, much lower than the benchmark, which shows that the project is not financially attractive compared to the benchmark in the



absence of CDM benefits.

The validation team has verified that the IRR calculation is correct and the data input are relied on values from the approved FSR which was carried out by Cementhai Energy Conservation Co.,Ltd. Especially, for PLF (Plant Load Factor), the validation team has checked against the documentation from the manufacturer for the maintenance period. In terms of tariff and taxes as Thai law was checked, the corporate tax rate is approximately 30% for the company of this side. Therefore, the validation team confirms that the input values from FSR were valid and applicable at the time of the investment decision.

Furthermore, the validation team has reviewed the IRR calculation sheet and confirmed that:

The **operating period** of 20 years were selected reasonably following the requirements of “Guidance on the Assessment of Investment Analysis” ver. 3.1, i.e.” a minimum period of 10 years and a maximum of 20 years will be appropriate”.

Besides, the input values from the FSR have been crosschecked with validation team as follows:

The main part of **total static investment** in the FSR had been crosschecked with the already signed Supply and engineering contracts /5/ of key equipments by the validation team, and found that the total contract value is close to the one estimated in the FSR, therefore, the assumptions for the total investment is reasonable;

The **annual net power generating electricity** of the Project was crosschecked with the design parameters of Machines manufactured by Sinoma Energy Conservation Limited, China to generate 20.50 MW of electricity (gross), of which 1.23 MW will be used in the power general unit and 19.27 MW will be supplied to the cement plant, displacing parts of electricity currently supplied from national grid.

The validation team has confirmed that the **annual O&M cost** is the sum of salary and welfare of employees, materials fee, maintenance fee and Miscellaneous account, which was studied based on the *Tool for Demonstration and Assessment of Additionality version 5.2*” The original figure for calculating annual O&M expense has been crosschecked with relevant criteria for Engineering supply contract and found reasonable. The validation team has reviewed the IRR calculation /4/ and confirmed that the IRR processing is consistent with the “*Guidance on the assessment of investment analysis*” (Annex of “*Tool for Demonstration and Assessment of Additionality version 5.2*”) and the data sources as well as the analysis approach are reliable and based on the FSR linking directive to the actual situation of the host country. As it shows, without CDM income, the equity IRR of the Project is 7.0%, which is lower than the benchmark (11.28%). Four financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

- Electricity unit price
- Kiln Utilization factor



- WHG Utilization factor
- Machinery cost

According to “Annex: Guidance on the assessment of investment analysis version 3.1, Electricity unit price, Kiln Utilization factor, WHG Utilization factor and Machinery cost should be taken as uncertainty factors to do sensitivity analysis, and $\pm 10\%$

variation of above factors shall be considered in the sensitivity analysis. Therefore validation team has ensured that the variables and variations $\pm 10\%$ performed for sensitivity analysis is deemed to be reasonable in Thailand .

The sensitivity analysis showed that:

With an increase in **Electricity price with included electricity tariff** by 10% of price the equity IRR will reach 10.8%. However, the equity IRR is still lower than the benchmark of 11.28 % The project could be financially feasible if the the electricity price is higher than the base price 11% that mean the Ft must be changed up to + 37% which is more than the nearly highest value of Ft at the time of high oil prices crisis therefore, it is unlikely that this case will occur

With an increase in **Kiln Utilization factor** by 77.6%, the equity IRR will reach 8.6%. However, the equity IRR is still lower than the benchmark of 11.28 %. The project could be financially feasible if the kiln must be continually utilised at 90 % over the project lifetime which is unlikely because the average utilisation factor of kin 4 and 6 from historical record over the last three year prior the project implementation (2005-2007) is only around 70 %

With an increase in **WHG Utilization factor** by 99.%, the equity IRR will reach 8.6%. However, the equity IRR is still lower than the benchmark of 11.28 %. The project will be reached the benchmark (11.28%) if the WHG utilisation is 115 % which is absolutely not unlikely.

With a decrease in **Machinery cost** by 10%, the equity IRR may reach 8.0 %. However, the equity IRR is still lower than the benchmark of 11.28 %. The project could be financially feasible if the machinery cost is 39 % lower than the cost estimated at the decision was made. The validation team is confident that the total investment won't decrease by 39% because the already signed contract value is almost close to the one estimated in FSR and price of imported machines are depended on an exchanged rate. When the lowest rate ever since was early 2008 the machineries cost would still not reach the the optimistic case. Therefore it is unlikely that the equity IRR would reach to the benchmark

Considering of the CERs sales revenues, the equity IRR of the Project can reach the benchmark by 12.8%.

According to the Investment Analysis above, it is convincingly proved that without CDM incentive , the Project faced is insurmountable.

Considering of the CERs sales revenues the equity IRR of total investment of the Project will be significantly improved.

(A) The beta coefficient for benchmark IRR calculation

Siam Cement Group (SCG) is a parent company of Cementhai Energy Conservation Co.Ltd (CEC). It is a listed company trading in Stock Exchange of Thailand (SET) in the building sector (CONMAT). The fund raised for this project comes from 100% equity of CEC. It is therefore reasonable to apply the cost of capital of SCG as a cost of capital of CEC. The cost of capital is



comprised of both cost of debt and cost of equity. In order to derive the cost of equity, the beta coefficient of CONMAT group which is the group that SCG belongs to in SET has therefore been used. The beta coefficient figure is obtained from the official website of SET (www.setsmart.com/ism/ism_sectorquotation_historical.jsp). It is based on the timing (2007) that SCG has considered the feasibility of the project. Moreover, the beta coefficient of the energy sector (ENERG) of the stock market of Thailand during the period Oct 2006 to Oct 2007 is 1.151372 (www.setsmart.com/ism/ism_sectorquotation_historical.jsp) which is higher than the beta value used in the PDD (0.944) and hence can be considered more conservative.

(B) Total static investment

The Total static cost has been determined in FSR as shown in the following table.

Details	Cost (Million Baht)	Cost (US Dollar)
M/C	471.2	1,372,6626
Engineering Fee	31.3	911,807
Supervision Fee	23.7	690,410
Import Duties	13.4	390,358
Local Pur.(ME)	48.2	1,404,124
Local Pur.(EE)	20.1	585,537
Erection	143.5	4,180,329
Civil Work	5.9	171,874
Project Admin.	8.4	244,702
Contingency	15.2	442,794
IDC	59	1,718,741
TOTAL	840	24,470,216

Note that the investment cost is converted using 1-full year average exchange rate for 2009, in which 1 USD = 34.327445 THB

Validation team has validated these estimated figures against the actual contracts obtained after the start of the project. They are reasonably in line with the actual figures. Please keep in mind that the FSR was conducted before the start of the project in this case. The figures therefore are not necessary to be exactly the same as that of the actual figures. We have validated to ensure that they all have solid underlying assumptions. We have even asked for the actual figures to see the differences between the two. The differences are within an acceptable range of 5%.

(C) PLF (Kiln utilisation factor)



PLF depends pretty much on the level of utilization of the kiln. In other words, the more the kiln utilization rate, the more the Waste Heat Power Generation utilization rate. This is totally different from dam or windmill or solar cell power plant project where their PLF depends pretty much on the mother nature. It is therefore reasonable for us to use the historical information (This data has been certified by authorized directors of CEC). This information has already reflected the maintenance period and the demand of the cement market. In fact, the older the kiln is, the lower the utilization rate is. The PLF (63%) applied therefore seems to be on the conservative side.

The WHG running factor, we have checked a performance guarantee document issued by Sinoma Energy Conservation Ltd (manufacture) and certified by SCG Engineering Co., Ltd, a third party engineering company. All of those substantiate in line with the requirements of VVM/ver.1.2. para.110 & 111

(D) Electricity tariff

The electricity tariff used in the PDD of 2.36 THB/kWh is based on the average actual electricity cost that TS cement plant paid to the electricity utility (EGAT) during Jan-Sep 2007 before the investment decision is made in October 2007, as substantiated by the electricity bills of TS plant from EGAT (Jan-Sep 2007) /8/ [contained in folder 'EGAT 2007'] and the average electricity cost before VAT for TS plant during Jan-Sep 2007 is calculated in the excel file provided [TS_ElectricityCost_Jan-Sep2007.xls] /A-9/. The reference electricity tariff rate is specified in Annex 1 to the Power Purchase Agreement between TS plant and EGAT. [PPA STS EGAT.pdf]. /A-10/ and its English translation [PPA STS EGAT_translation.pdf] /A-10/. Since the total electricity charge constitutes a number of components, some of which depends on how the plant manages its electrical load and some of which is beyond the control of the plant, eg Ft charge, the average electricity cost will vary from month to month.

Up to May 2008 when the agreements with the WHG supplier were signed and which marked the project start date, the average electricity cost for TS plant actually fell further. The average electricity cost during Oct 2007 – May 2008 was 2.32 THB/kWh, as shown in the spreadsheet provided [TS_ElectricityCost_Oct2007-May2008.xls] /A-25/ and substantiated by the electricity bills from EGAT [contained in folder 'EGAT Oct07-May08'] /A-26/. As such, the electricity tariff used in the financial analysis (2.36 THB/kWh) is already conservative.

With regard to VAT, even though when the TS plant pays for electricity bill, VAT will be added to the electricity price, VAT is still excluded from the calculation because VAT will have to be passed on to the government directly. As such, it will not be counted towards the company profits.

We have already verified this actual data. All electricity produced from the WHG project will be used internally within Siam Cement ThungSong plant (TS Plant). The electricity tariff used in the financial analysis (2.36 THB/kWh) is higher than the average electricity cost during Oct 2007 – May 2008 (2.32 THB/kWh) when the agreements with the WHG supplier were signed and which marked the project start date so that conservative values can be justified. It is therefore



reasonable to apply the historical tariff rate paid by TS Plant. As the Power Purchase Agreement , the average electricity cost will vary from month to month depend on Quality of Electricity ,Ft charge and time which complied with PPA contract , therefore PPA value is accepted .

(E) Annual O&M costs and its component

We have verified all the above referred documents and confirm the annual O&M cost.

Cost	Value (million THB)	Means of validation
Electricity Cost	12.66	We have validated the official electricity generation contract between CEC and STS plant [TS46_O&M EE 5% from EGAT.pdf] /A-11/ and found that details and payment information between CEC and STS complied with electricity cost. Therefore electricity cost is accepted.
Water Cost	62.71	We have checked 0.550 B/kWh-Gross as per recommendation from supplier provided in [TS46_O&M MOM.pdf] /A-12/ and found that water cost is reasonable when compared with water cost unit price of provincial waterworks authority and water usage during running machines.
Chemicals Cost	29.65	We have checked 0.260 B/kWh-Gross as per recommendation from supplier [TS46_O&M MOM.pdf] /A-12/ and found that chemical cost is acceptable when compared with chemical price in general chemical markets and chemical quantity usage during running machines.
Contractor Cost	4.17	We confirmed the number of workers required is suitable in the type of work because number of workers are complied with full job functions in process , Wage is acceptable when compared with wage in general labour work market of Thailand. Therefore the details of contractor cost provided in [TS46_contractor.pdf] /A-13/ are accepted.
Maintenance Cost	19.95	We have checked 0.175 B/kWh-Gross as per recommendation from supplier [TS46_O&M MOM.pdf] /A-12/ and found that it is reasonable when compared with maintenance plan and maintenance cost provided from supplier.
Employee Salary	10.68	The employee salary in [CEC salary.pdf]/A-14/ is



Cost	Value (million THB)	Means of validation
		reasonable when compared with wage and salary in general labour market therefore calculation could be accepted for using in O&M cost.
Administration Cost of CEC	8.51	The administration cost of CEC is accepted when we have checked with official contact between CEC and STS effective on 30/6/2009 /A-23/ and the actual payment occurred in CEC WHG Phase I complied with Engineering and Account Management fee estimated . Electricity cost is 1 % of gross power during WHG is not in operation which is conservative. Therefore the total administration of CEC provided in [TS46_Admin details.pdf] /A-15/ is accepted

From the calculation sheet submitted by Siam Cement Thungsong [FS_TS46_r16.xls] /A-3/ and validated by us, shows that the cost of debt (Long term loan) has been taken out from the project cash outflow to be an Equity cash flow and the IRR calculation is calculated from Equity cash flow, therefore it is in line with the EB 51, Annex 58, para.10. "In the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow, the portion of the investment costs which is financed by debt should not be considered a cash outflow."

Hence we confirm that the equity IRR calculation used in the IRR analysis of the project activity is in accordance with the EB51, Annex 58, para 10.

In the excel sheet, the forecast of clinker production of 89% has been a mistake. The excel file has been revised accordingly. This correction does not have any impact on the financial analysis because the financial analysis is based on the historical performance specific to only 2 clinker production lines TS46 and not the forecast of clinker production for the whole TS plant.

As explained above, due to their relatively low efficiency, the kiln utilisation factor of TS46 combined will be lowered than that of TS5 and that of the whole TS plant. Even in an extreme case that the average kiln utilisation factor for TS46 reaches 89% every year over the crediting period, the sensitivity analysis shows that the equity IRR (11.1%) would be still below the benchmark of 11.28%.

There has been a mistake in the forecast of clinker production between PDD and excel sheet. The PP has revised the excel sheet accordingly. However, the sensitivity analysis in PDD confirms that at 90% Klin utilization factor the benchmark is reached. When comparing the historical record over the last three years prior implementation (2005-2007), the average utilisation factor of kilns 4 and 6 is only around 70 % which substantiate the unlikelihood of not reaching this higher kiln utilization factor.



3.6.4 Barrier analysis

No barrier analysis had been applied.

3.6.5 Common practice analysis

The geographical scope of the common practice is limited to Thailand. Validation team agrees with this because the regulatory and laws are different from other countries.

The validation team has verified sources as a publicly available presentation by Thai Cement Manufacturers Association (TCMC) * found that venting of waste heat has always been the common practice of the industry with only one waste heat recovery for power generation installed at one clinker production line in 1989. This installation is considered as a pilot plant. No other cement plants have installed waste heat recovery power generation since then, which clearly proves that this type of project is not a common practice in the cement industry in Thailand. Other similar projects are being developed in Thailand, all as a CDM project. After considering the statement issued by the Thai Cement Manufacturer's Association, it can be confirmed that the proposed CDM activity is not a common practice in the defined region.

Complying with **Para. 120/VVM**, based on above demonstration, it is the opinion of Bureau Veritas Certification that the proposed CDM project activity is not common practice.

3.7 Monitoring plan

The Project uses the approved baseline monitoring methodology AM0024 version 02.1 for greenhouse gas reductions through waste heat recovery and utilisation for power generation at cement plants

Applicability of this methodology is justified in PDD as it involves waste heat recovery and utilisation for power generation at cement plants. Refer discussions on the validity of the methodology at Section 3.5.1 above.

Operational management for the project activity is comprehensively detailed in PDD and this includes description of the responsibility, monitoring procedure reference, needs are clearly mentioned. Archiving of the records is indicated and DOE is of the opinion that the retrievability of relevant CDM project activity records is pro-actively considered satisfactorily.

By reviewing the provided the monitoring procedure /7/ and on-site interview with the PP,

* http://www.siamcitycement.com/downloads/corporate_briefing/Corporate%20briefing%20Presentation%20-%20Challenge%20Ahead.ppt#365,4,Slide 4



validation team confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by the proposed CDM project activity can be reported ex post and verified.

The methodology AM0024 (version 02.1) describes that the annual production of clinker after implementation of project ($O_{clinker,y}$) shall be measured continuously during the crediting period. The project participant proposes in the PDD the measurement of clinker production from the raw material input, which is considered an industry norm amongst cement producers [http://www2.cemsuisse.ch/file/B3- HARP-Berechnungen_von_Klinker_2b_Zement - MIM - 20090430.doc]. As already explained in Section B.7.1 of the PDD, the clinker production process is generally not weighed directly due to its high temperature.

This method of measurement is analogous with, for example, the measurement of heat, in which no direct measurement of amount of heat generated in a boiler is available. As such, it has to be derived from the amount of fuel being combusted and the energy content of such fuel. This method should be considered as a measurement, not a calculation. Likewise, the NCV cannot be measured directly but through measuring of gross calorific value, and then converted from our scientific knowledge in to net calorific value. As such, the project participant still considers that the proposed method of measuring $O_{clinker,y}$ is still in line with the methodology.

We confirm that the annual production of clinker after implementation of project ($O_{clinker,y}$) shall be measured continuously during the crediting period by the production department. The data of clinker output must be continuously measured in a daily report will be manually/electronically during, and 2 year beyond, the crediting period. It is practically difficult to measure $O_{clinker,y}$ directly because of its high temperature. The measurement of clinker production from the raw material input which is justifiable to measure $O_{clinker,y}$ based on raw material input values (data unit : tonnes)

The PP has applied the corresponded Approved Monitoring Methodology AM0024 and the relevant monitored parameters are summarised in the below table.

Parameter	Data Description	Unit	Measurement method
$F_{P,y}$	Energy of the fuel used in clinker making process in year y	TJ	On-site measurement
$O_{clinker,y}$	Annual production of clinker after implementation of project	tonnes	On-site measurement
$NCV_{fuel,y}$	Net calorific value (energy content) per mass or volume unit of a fuel used in clinker making process in year y	TJ/unit mass or volume	On-site measurement
$EF_{CO2,fuel,y}$	Emission factor of fuel used in clinker production	tCO ₂ / unit mass or volume of fuel	On-site measurement



$EG_{CP,y}$	Electricity supplied from the project activity to the cement plant	MWh	On-site measurement
$EG_{Grid,y}$	Electricity supplied from the project activity to the grid	MWh	On-site measurement
$EF_{Elec,y}^*$	Emissions factor of the electricity grid	tCO ₂ /MWh	Obtained from local reliable source or calculated using publicly available information

BVC has validated each of the parameters, descriptions, and measurement methods presented in the monitoring plan of PDD and confirmed that all parameters presented in the monitoring plan meets the requirements of the methodology AM0024 version 2.1 and that no deviations were observed. The monitoring parameters were reviewed by the validation team through desk document review and discussion with the relevant staff and personnel during site observation which allow the validation team to confirm that the processed monitoring plan is tangible within project activity. The key parameters were discussed with the project owner especially regarding the location of the meters which are shown in single line diagram, the information management and QA/QC procedures to implement the project activity. The energy of fuel consumed in the clinker making process can be checked by the amount of fuel multiplied by its net calorific value (NCV) which are recorded by production department which we validated for parameter energy of the fuel used in clinker making process. Annual production of clinker after implementation of project can be checked by the measurement of clinker production from the raw material input, which is considered an industry norm amongst cement producers (http://www2.cemsuisse.ch/file/B3-HARP-Berechnungen_von_Klinker_2b_Zement_MIM_20090430.doc). We have checked the location of electricity meter that recorded electricity supplied from the project activity to the cement plant. Emission factor of fuel used in clinker production can be checked by the results from the laboratory measurement of % carbon in type of fuel which might be provided with fuel upon purchase or measured on site a monthly and IPCC default values have been used for cross-checking purpose.

The Electricity supplied from the project activity to the grid could be cross checked with EGAT electricity payment records. The Emissions factor of the electricity grid will be calculated on a yearly basis using the latest publically available information from Ministry of Energy and Thailand Greenhouse Gas Management Organization (TGO). To monitor the project emissions, net calorific value of fuels used in clinker making process & the amount of fuel consumed will be measured on-site and recorded on a continuous daily basis. The amount of fuel consumed will be measured using a weigh feeder with less than 3% error. Hence it is expected that the Project owner will be able to implement the monitoring plan and the emission reductions achieved can be reported ex-post and verified.

All parameters in monitoring plan of the PDD are in line with AM0024 Version 2.1

Complying with **para.123/VVM**, Bureau Veritas Certification hereby confirms that the project participants are able to implement the monitoring plan.



3.8 Sustainable development

Project participant has identified and analyzed the impact of the project activity during the construction phase and the O&M phase. Typically, the impacts related to air pollution, Waste water, waste and noise impacts are analyzed.

The Thailand's DNA has issued the Letter of Approval (TGO No.02/140) /2/ on 23/04/2009, authorizing Cementhai Energy Conservation Co.,Ltd as the Project Participant and confirmed that the Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) contributes to Thailand's Sustainable development. Validation team is of the opinion that the impact assessment conducted by project participant is correct and the adequate enough.

Complying with **para.126/VVM**, Bureau Veritas Certification hereby confirms that the contribution of the project to the sustainable development of the host party (Thailand).

3.9 Local stakeholder consultation

Local stakeholder construction meeting to discuss stakeholder concerns on the proposed Clean Development Mechanism (CDM) project- The Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) was held on 30/07/2008 at six different organizations (Nakhon Si Thammarat Provincial Industry Office, Thung Song District Office, Teewang Sub-district Administration Organisation, Teewang District Municipal Office, Baan Kang Pla Health Centre, Teewang community leaders). These organizations are in an around the area of Waste heat project by Cementhai Energy Conservation Co.,Ltd and hence relevant for the stakeholder consultation.

The records related to the stakeholder consultation namely list of participants, invitation letters, photographic record of the stakeholder meeting proceedings and stakeholder consultation report is maintained by the project participants /10/

Project participant has provided sufficient and transparent information on the process of local stakeholder consultation in the PDD. The information indicates that project participant provided sufficient time to stakeholders for providing comments.

The stakeholders viewed The Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) in Thailand project as contributing to local environmental benefits. Overall, there was agreement that the project activity was a beneficial project from the local sustainable development. The local stakeholders interviewed during the site visit of the validation activity endorsed these views. The stakeholders also confirmed the process of invitation as described in the PDD.

Complying with **para.129/VVM**, Bureau Veritas Certification hereby confirms that the local stakeholder consultation was performed, the Project will benefit to the local sustainable development without positively affect to the local stakeholders.



3.10 Environmental impacts

The validation team has ensured that the Environmental Impact Assessment was carried out by Consultant of Technology, and approved by the office of Natural Resources and Environmental Policy and Planning on 16/09/2008. (Code No. TAU SAU 1009.3/7213)./3/

The environmental impact results from the Project have been identified and analyzed in the PDD. By checking the EIA report the validation team is able to ensure that the environment impacts occurs mainly in the construction period due to Wastewater, Air pollution, Noise and Waste. All above impacts would be within an acceptable limit by carrying out corresponding mitigation measures as per the statement of the EIA.

Complying with **para.132/VVM**, Bureau Veritas Certification hereby confirms that the Project will not have any significant impacts on the environment by means of measures of pollution avoidance and control as well as ecological recovery.



4 VALIDATION OPINION

Bureau Veritas Certification has performed a validation of the Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project) /1/ Project in Thailand. The validation was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Project participant/s used the latest *Tool for demonstration and assessment of additionality* (version 05.2), to demonstrate the additionality of the Project. In line with this tool, the PDD provides analysis of investment barriers to determine that the project activity itself is not the baseline scenario. The Tool to calculate the emission factor for an electricity system (version 1.1) is also applied to determine the emission factor of EGAT Grid /9/.

By synthetic description of the project, the project is likely to result in reductions of GHG emissions partially. An analysis of the investment and technological barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented and maintained as designed, the project is likely to achieve the annual average over the crediting period of emission reductions of **54,202 t CO₂e**. The review of the project design documentation (version 6) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

The validation is based on the information made available to us and the engagement conditions detailed in this report.



5 REFERENCES

Category 1 Documents:

Documents provided by Type the name of the company that relate directly to the GHG components of the project.

/1/ The Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project)
PDD Version 05 dated 26/02/2010

/2/ The Thailand's DNA has issued the Letter of Approval (TGO No.02/140) on 23/04/2009

/3/ Environment Impact Assessment (EIA) approved by Office of Natural Resource and Environmental Policy and Planning on 16/09/2008 (Code: TAU-SAU 1009.3/7213

/4/ Feasibility Study Report finished by Cementhai Energy Conservation Co.,Ltd.

/5/ Contract for Supply and Engineering services on 21/05/2008

/6/ Internal memo: Approval of the benefit of GHG emission reduction resulting from installation of WHG project on 5/10/2007.

/7/ Monitoring procedure on 25/05/2009

/8/ Emission Reduction Calculation (0085864_SCG-TS46_calculation_ver 6.xls)

/9/ The estimation of emission factor for an electricity in Thailand : Bureau of Energy Research Department of Alternative Energy Development and Efficiency Ministry of Energy

/10/ List of participants, invitation letters, photographic record of the stakeholder meeting proceedings and stakeholder consultation report is maintained by the project participants

/11/ Training program from Sinoma Energy Conservation Limited

/12/The boiler controller training course and Basic knowledge of power plant course requested memo

/13/ letter to confirm that waste heat power generation is a non common practice in the cement industry in Thailand

/14/ The Minutes of the 137th (6/2007) board of directors meeting

/15/ Sinoma-EC document (TS46,LP project lifetime)



Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents.

/16/ Version 02.1 of AM0024 Baseline methodology for greenhouse gas reductions through waste heat recovery and utilisation for power generation at cement plants

/17/ Version 1.1 of Tool to calculate the emission factor for an electricity system

/18/ Version 05.2 of Tool for the demonstration and assessment of additionality

/19/ Version 03 of Guidance on the Demonstration and Assessment of Prior Consideration of the CDM

/20/ Version 01.1 of The Clean Development Mechanism Validation and Verification Manual

/21/ Version 03.1 Guideline on the assessment of investment analysis

Additional supporting document accroding to request for review from EB

/A-1/ 0085864_CEC II_benchmark.xls

/A-2/ TS46 WHG Phase II - August 2010.pdf

/A-3/ FS_TS46_r16.xls

/A-4/ TS46_compareInvestment.xls

/A-5/ The work journal

/A-6/ TS46_MOM.pdf

/A-7/ Plant_load_factor_WHG.pdf

/A-8/ The electricity bills of TS plant from EGAT (Jan-Sep 2007)

/A-9 / TS_ElectricityCost_Jan-Sep2007.xls

/A-10/ PPA STS EGAT.pdf

/A-11/ TS46_O&M EE 5% from EGAT.pdf

/A-12 / TS46_O&M MOM.pdf



/A-13/ TS46_contractor.pdf

/A-14/ CEC salary.pdf

/A-15/ TS46_Admin details.pdf

/A-16/ Plant layout TS5.pdf

/A-17/ Plant layout TS46 v1.pdf

/A-18/ STS EE diagram TS4 5 6.pdf

/A-19/ TS5_demand.xls

/A-20/ Contract prices STS.pdf

/A-21/ 0085864_SCG-TS46_calculation_ver06 .xls

/A-22/ Thailand_GridEmissionFactor2007_DEDE2009.xls

/A-23/ TS46_OperationFee.pdf

/A-24/ TS46_MOM_BudgetStatus.pdf

/A-25/ TS_ElectricityCost_Oct2007-May2008.xls

/A-26/ The electricity bills from EGAT (Oct07-May08).

/A-27/ Beta_Energy_Oct06-Oct07.xls

Persons interviewed:

List persons interviewed during the validation or persons that contributed with other information that are not included in the documents listed above.

- /1/ Dr. Kriengkrai Suksankraisorn, Cementhai Energy Conservation Co.,Ltd
- /2/ Ms. Nontaya Krairiksh, ERM-Siam Co.Ltd
- /3/ Mr.Kan Intanu (clerk of a municipality Tambol Teewang)
- /4/ Mr.Pratheep Srikaew (vice mayor of Tambol Teewang),
- /5/ Mrs.Plienrat Permpun (Health Center Head of Ban Kang Plan, Tambol Teewang)
- /6/ Mr.Sopa Kerdkhumthong (municipality member)
- /7/ Mr.Jarae Kwankird (Deputy Nai Amphur).



6. CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS

Dr. Ashok Mammen - PhD (Oils & Lubricants)

Bureau Veritas Certification – Lead verifier and team leader

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.

Mr. Pasuta Tontisirin

Bureau Veritas Certification, Team member

The Bachelor and Master degree in Environmental Engineering. He has 8 years of environmental engineering experience. He has received the training and obtained the certificates of EMS ISO14000 lead auditor and CDM lead verifier.

Ms. Wiriya Rattanasuwan

Bureau Veritas Certification, Team member

The Bachelor degree in Environmental Engineering and Master degree in Chemical engineering. She has 10 years of environmental engineering, consultant and trainer. He has received the training and obtained the certificates of EMS ISO14000 lead auditor and CDM lead verifier.

Mr. Nattapat Teeranantani

Bureau Veritas Certification, Team member

The Bachelor degree in Environmental Engineering (Honor and rank 1st in the class). He has 7 years of environmental engineering experience. He has received the training and obtained the certificates of EMS ISO14000 lead auditor, Energy Management System and CDM lead verifier.

Mr. Lucas Dou

Bureau Veritas Certification, Team member

He holds a Master Degree in Material Science. He has 2 years of CDM technical experience in energy and manufacturing sector in P.R China. He obtained the certificate of CDM Lead Verifier and Lead Auditor for EMS ISO14064.

Mr. Udomsak Suwansaranyu

Bureau Veritas Certification, Financial expert

The Bachelor degree in Bachelor of Business Administration (Accounting), Master of Business Administration (Finance), Doctor of Engineering (Industrial Engineering). He has 14 year of financial. Now, he work as the financial controller at BVC.

Mr. Robin Wang Jing

Bureau Veritas Certification, Technical Reviewer

He holds a Bachelor Degree in Gas & Heating Engineering and has total experience of twelve years and has worked in energy sector in oil or gas companies in P.R China. He obtained the certificate of CDM Lead Verifier and Lead Auditor for EMS ISO14001,14064.



VALIDATION PROTOCOL

Table 1 **Validation requirements based on the Validation and Verification Manual (EB44 Annex 3)**

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
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CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
1. Approval			COUNTRY A <i>(insert the country name)</i>	COUNTRY B <i>(insert the country name)</i>		
a. Have all Parties involved approved the project activity?	VVM	44	Thailand	-	OK	OK
b. Has the DNA of each Party indicated as being involved in the proposed CDM project activity in section A.3 of the PDD provided a written letter of approval? (If yes, provide the reference of the letter of approval, any supporting documentation, and specify if the letter was received from the project participatn or directly from the DNA)	VVM	45	Please provide LoA of Thailand	-	GL-4	OK
c. Does the letter of approval from DNA of each Party involved:	VVM	45	-	-	-	
i. confirm that the Party is a Party of the Kyoto Protocol?	VVM	45.a	Same as CL1	-	GL-4	OK
ii. confirm that participation is voluntary?	VVM	45.b	Same as CL1	-	GL-4	OK
iii. confirm that, in the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country?	VVM	45.c	Same as CL1	-	GL-4	OK
iv. Refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	VVM	45.d	Same as CL1	-	GL-4	OK
d. Is(are) the letter(s) of approval unconditional with respect to (i) to (iv) above?	VVM	46	Same as CL1	-	GL-4	OK
e. Has(ve) the letter(s) of approval been issued by	VVM	47	Same as CL1	-	GL-4	OK


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CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
the respective Party's designated national authority (DNA)?						
f. If there is doubt with respect to (e) above, was verified with the DNA that the letter of approval is valid for the proposed CDM project activity under validation?	VVM	47	Same as CL1	-	GL-4	OK
g. Is there doubt with respect to the authenticity of the letter of approval?	VVM	48	Same as CL1	-	GL-4	OK
h. If yes, was verified with the DNA that the letter of approval is authentic?	VVM	48	NA	-	-	-
2. Participation			<i>PP1 (insert PP1 name)</i>	<i>PP2 (insert PP2 name)</i>		
a. Have all project participants been listed in a consistent manner in the project documentation?	VVM	51	Cement Thai Energy Conservation Co., Ltd.	-	OK	OK
b. Has the participation of the project participants in the project activity been approved by a Party to the Kyoto Protocol?	VVM	51	Yes, refer to 1.b	-	GL-4	OK
c. Are the project participants listed in tabular form in section A.3 of the PDD?	VVM	52	Yes, refer to 2.a (Cement Thai Energy Conservation Co., Ltd.)	-	OK	OK
d. Is the information in section A.3 consistent with the contact details provided in annex 1 of the PDD?	VVM	52	Yes, refer to 2.a	-	OK	OK
e. Has the participation of each of the project participants been approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation? (Provide reference of the approval document for each of the project participants)	VVM	52	Yes, refer to 1.b	-	GL-4	OK
f. Are any entities other than those approved as	VVM	52	No	-	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
project participants included in these sections of the PDD?						
g. Has the approval of participation issued from the relevant DNA?	VVM	53	Yes	-	OK	OK
h. Is there doubt with respect to (g) above? I	VVM	53	No	-	OK	OK
i. If yes, was verified with the DNA that the approval of participation is valid for the proposed project participant?	VVM	53	No	-	OK	OK
3. Project desing document						
a. Is the PDD used as a basis for validation prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website?	VVM	55	Yes, CDM-PDD is Version 03-ineffect as of : 28 July 2006		OK	OK
b. Is the PDD in accordance with the applicable CDM requirements for completing the PDD?	VVM	56	Yes		OK	OK
c. In CDM-PDD section A.1 are the following provided?	EB 41	Ann 12	-		-	-
i. Title of project	EB 41	Ann 12	Siam Cement (Thung Song) Waste Heat Power Generation Project (TS46 Project)		OK	OK
ii. Current version number and date of document	EB 41	Ann 12	Version 06, 22 September 2010		OK	OK
d. In CDM-PDD section A.2 are following provided (max. one page)?	EB 41	Ann 12	-		-	-
i. A brief description of the project activity covering purpose which includes the scenario existing prior to the start or project, present scenario and baseline scenario	EB 41	Ann 12	The project activities involve waste heat recovery and utilization for power generation at Siam Cement Thung Song (STS) in Nakhon Si Thammarat province of Thailand. The		OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			baseline scenario is the continuation of the current activities, ie the waste heat from the clinker production process would continue to be vented and the electricity would continue to be supplied from the national grid. The project activity will reduce anthropogenic greenhouse gas by displacing electricity generated from fossil fuel supplied by other grid-connected power plants.		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Explanation on how the GHG emission reductions are effected	EB 41	Ann 12	Two of the production lines (Kilns No.4 and 6) are to be modified by installing waste heat recovery and power generator. These hot gases from the pre-heater and clinker cooler will be collected and passed through suspension pre-heater boilers (SP boiler) and air quenching cooler boilers (AQC boiler) with total capacity to produce steam. The steam will be sent to a steam turbine to generate electricity (gross). The gross annual power generated will be used in the power generation unit and supplied to the cement plant, displacing parts of electricity currently supplied from national grid. After the project activity is implemented, the exhaust of the heat recovery boilers fitted as part of the project activity will still be used to dry the raw materials as before. The proposed project activity will alter neither the plant's production process nor its production capacity.	OK	OK
iii. The PP's view on the contribution of project activity to sustainable development	EB 41	Ann 12	Environmental, social and economical benefits contributing to the sustainable development in Thailand has been discussed and approved from DNA	OK	OK
e. In CDM-PDD section A.3 are following provided in the tabular format?	EB 41	Ann 12	-	-	-
i. List of project participants and parties	EB 41	Ann 12	Cementhai Energy Conservation Co., Ltd	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Identification of Host Party			Thailand	OK	OK
iii. Indication whether the Party wishes to be considered as project participant	EB 41	Ann 12	NO	OK	OK
f. In CDM-PDD section A.4.1 are following provided?	EB 41	Ann 12	-	-	-
i. Technical description, location, host party(ies) and address as required	EB 41	Ann 12	Tambon Teewang, Thung Song District, Nakhon Si Thammarat Province, The Kingdom of Thailand	OK	OK
ii. Detailed physical location with unique identification of the project activity (eg. Longitude/latitude) – not to exceed one page	EB 41	Ann 12	Nakhon Si Thammarat province, approximately 835 km to the south of Bangkok., Street address: 52 Moo 6, Thung Song-Huai Yat Road, Tambon Teewang, Thung Song District, Nakhon Si Thammarat 80110, THAILAND Geographical coordinates: 8° 6' 1.20" N 99° 41' 2.50" E	OK	OK
g. In CDM-PDD section A.4.2 is the list of categories of project activities provided?	EB 41	Ann 12	Sectoral scope 4 – Manufacturing industries Sectoral scope 1 – Energy industries (renewable / non-renewable sources)	OK	OK
h. In CDM-PDD section A.4.3 are following provided?	EB 41	Ann 12	-	-	-
i. A description of how environmentally safe and sound technology, and know-how, is transferred to the Host Party(ies)	EB 41	Ann 12	Please provide a description of transfer of know-how to Thailand (Host country)	CL-2	OK
ii. Explanation of purpose of project activity with scenario existing prior to the start of project, scope or present activities and the baseline scenario	EB 41	Ann 12	Yes, described	OK	OK
iii. List and arrangement of the main	EB 41	Ann	Yes, described	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
manufacturing/production technologies, systems and equipments involved		12			
iv. The emissions sources and GHGs involved	EB 41	Ann 12	In the cement production process, there are two main sources that generate significant amount of waste heat, which are hot gas leaving the rotary kiln and hot air leaving the clinker cooler.	OK	OK
i. In CDM-PDD section A.4.4 is the estimation of emission reductions provided as requested in a tabular format?	EB 41	Ann 12	Yes, it is provided in CDM-PDD section A.4.4	OK	OK
j. In CDM-PDD section A.4.5 is Information regarding Public funding provided?	EB 41	Ann 12	No Annex-I country financial support for this project has been received	OK	OK
k. In CDM-PDD section B.1 are following provided?	EB 41	Ann 12	-	-	-
i. The approved methodology and version number	EB 41	Ann 12	AM0024 version 02 "Baseline methodology for greenhouse gas reductions through waste heat recovery and utilisation for power generation at cement plants". The latest version is 02.1	CL-3	OK
ii. Any methodologies or tools which the above approved methodology draws upon and their version number	EB 41	Ann 12	Version 1.1 of Tool to calculate the emission factor for an electricity system ; and Version 05.2 of Tool for the demonstration and assessment of additionality.	OK	OK
l. In CDM-PDD section B.2 are following provided?	EB 41	Ann 12	-	-	-
i. Justification of the choice of methodology that the project activity meets each of the applicability conditions	EB 41	Ann 12	The proposed project activity meets each of the applicability conditions of the methodology AM0024, as justified in the following.	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>Applicability conditions 1) The electricity produced is used within the cement works where the proposed project activity is located and excess electricity is supplied to the grid; it is assumed that there is no electricity export to the grid in the baseline scenario (in case of existing captive power plant);</p> <p><i>Mean of validation:</i> During site visit : Validation team found Waste heat gas from project activity to produce electricity which is supplied only in TS cement work plant.</p> <p>Applicability is met.</p> <p>Applicability conditions 2) Electricity generated under the project activity displaces either grid electricity or from an identified specific generation source. Identified specific generation source could be either an existing captive power generation source or new generation source;</p> <p><i>Mean of validation :</i> During site visit : Validation team did not find captive power plant . All electricity is supplied to TS plant by national grid (EGAT). Therefore Electricity generated from WHG project will displace electricity from grid</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>Applicability is met.</p> <p>Applicability conditions 3) The grid or identified specific generation source option is clearly identifiable</p> <p><i>Mean of validation:</i> The single national grid has been identified to be the Thai National Grid which is clearly physical identify during on site visit</p> <p>Applicability is met.</p> <p>Applicability conditions 4) Waste heat is only to be used in the project activity;</p> <p><i>Mean of validation:</i> Verified during the on-site visit audit. Waste heat from both kilns only be used in generating electricity for the project activity</p> <p>Applicability is met.</p> <p>Applicability conditions 5) In the baseline scenario, the recycling of waste heat is possible only within the boundary of the</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>clinker making process (eg clinker production lines in baseline scenario could include some heat recovery systems to capture a portion of the waste heat from the cooler end of the clinker kiln and use this to heat up the incoming raw materials and fuel - so called Type 1 Waste Heat Utilisation as described in explanatory note);</p> <p><i>Mean of validation: During on site visit validation team found Some part of waste heat is used in the pre-heat of raw material process and Most of the waste heat is currently vented to the Atmosphere. All of recycling of waste heat is only within the boundary of the project</i></p> <p>Applicability is met.</p> <p>Applicability conditions</p> <p>6) This methodology is NOT applicable to project activities where the current use of waste heat or the identified alternative business as usual use of waste heat is located outside of the clinker making process (so called Type 2 Waste heat utilisation as described in explanatory note below);</p> <p><i>Mean of validation: During site visit validation team did not find waste heat is used outside of the clinker making process or project is not Type 2 Waste heat Utilization:</i></p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>Applicability is met.</p> <p>Applicability conditions 7) This methodology is NOT applicable to project activities that affect process emissions from cement plants.</p> <p><i>Mean of validation: During on site visit , validation team found the project activity dose not affect the process an related emissions</i></p> <p>Applicability is met.</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Documentations with references that had been used. This can be provided in Annex 3 instead	EB 41	Ann 12	Yes	OK	OK
m. In CDM-PDD section B.3 are following provided?	EB 41	Ann 12	-	-	-
i. Description of all sources and gases included in the project boundary in the table	EB 41	Ann 12	Yes, they are included in the CDM-PDD section B.3	OK	OK
ii. A flow diagram of the project boundary physically delineating the project activity	EB 41	Ann 12	Flow diagram of the project boundary physically delineating the project activity is not provided	CAR-1	OK
iii. The flow diagram with all equipments, systems and flows of mass and energy etc	EB 41	Ann 12	Same as CAR 1	CAR-1	OK
n. In CDM-PDD section B.4 are following provided?	EB 41	Ann 12	-	-	-
i. Explanation how the most plausible baseline scenario is identified in accordance with the selected baseline methodology	EB 41	Ann 12	The baseline scenario for the project activity was identified through the following steps as per methodology: Step 1: Determination of technically feasible alternatives to the project activity: It has been explained and justified that the only most likely option for electricity supply is the continuation of the current situation, ie grid electricity. Step 2: Compliance with regulatory requirements: Both the options, the venting of the waste heat with possible re-circulating some portion for drying raw materials, versus recovery and utilisation of waste heat for power generation and the purchase of grid electricity are all in full compliance of existing regulatory requirements.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Step 3: Undertake economic analysis of all options that meets the regulatory requirements: Not done since there is only one alternative to the project activity, which is the continuation of the current situation, which is the baseline		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Justification provided	OK	OK
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources, etc.)	EB 41	Ann 12	All data is provided in CDM-PDD section B.4	OK	OK
iv. A transparent and detailed description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed project activity	EB 41	Ann 12	All data is provided in CDM-PDD section B.4	OK	OK
o. In CDM-PDD section B.5 are following provided?	EB 41	Ann 12	-	-	-
i. Explanation of how and why this project activity is additional and therefore not the baseline scenario in accordance with the selected baseline methodology	EB 41	Ann 12	Version 05.2 of the “Tool for the demonstration and assessment of additionality is used. Investment analysis method had been followed. Calculations to be verified.	OK	OK
ii. Justification of key assumptions and rationales	EB 41	Ann 12	It is stated that “The benchmark for investment in the cement business within SCG is minimum EBITDA/Investment or EBITDA/OA (Earnings Before Interest, Taxes, Depreciation and Amortization per Operating Asset) of 15%.” Is there any sector specific benchmark available for the country? Needs proof for the selection of benchmark of 15%. Investment analysis assumptions and evidences can not show that it shall be derived from sources specified in the Guidance on the Assessment of Investment	CAR-2	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Analysis (version 3.1), attached to the Additionality Tool version 05.2		


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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources etc)	EB 41	Ann 12	Same as CAR2	CAR 2	OK
iv. Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity, if the starting date of the project activity is before the date of validation	EB 41	Ann 12	Evidence of serious consideration of CDM not provided.	CAR 3	OK
p. In CDM-PDD section B.6.1 are following provided?	EB 41	Ann 12	-	-	-
i. Explanation as to how the procedures, in the approved methodology to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity	EB 41	Ann 12	The emission reduction spread sheet is not provided.	GL 4	OK
ii. Equations used in calculating emission reductions	EB 41	Ann 12	OK	OK	OK
iii. Explanation and justification for all relevant methodological choices, including different scenarios or cases, options and default values	EB 41	Ann 12	Yes, there are explanations and justifications for all relevant methodological choices	OK	OK
q. In CDM-PDD section B.6.2 are following provided?	EB 41	Ann 12	-	-	-
i. A compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period AND that are available when validation is undertaken	EB 41	Ann 12	OK	OK	OK


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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. The actual value period	EB 41	Ann 12	OK	OK	OK
iii. Explanation and justification for the choice of the source of data	EB 41	Ann 12	OK	OK	OK
iv. Clear and transparent references or additional documentation in Annex 3	EB 41	Ann 12	OK	OK	OK
v. Where values have been measured, a description of the measurement methods and procedures (e.g. which standards have been used), indicated the responsible person/entity having undertaken the measurement, the date of measurement(s) and the measurement results	EB 41	Ann 12	OK	OK	OK
r. In CDM-PDD section B.6.3 are following provided?	EB 41	Ann 12	-	-	-
i. A transparent <i>ex ante</i> calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant equations provided in the approved methodology	EB 41	Ann 12	Same as CL 3 Site visit: Need to correct the calculation by Following the AM0024 version 02.1. Leakage should be explained as well	CL-4	OK
ii. Documentation how each equation is applied, in a manner that enables the reader to reproduce the calculation	EB 41	Ann 12	OK	OK	OK
iii. Additional background information and or data in Annex 3, including relevant electronic files (i.e. spreadsheets)	EB 41	Ann 12	Should specify the source of website of Table A3-6 (CO2 emissions and OM emission factor of grid electricity generation, 2006).	CL-5	OK

VALIDATION REPORT



CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
s. In CDM-PDD section B.6.4 are the results of the <i>ex ante</i> estimation of emission reductions for all years of the crediting period, provided in a tabular format?	EB 41	Ann 12	Current demand of electricity consumption for cement work (Ecement) is calculated from overall production data that included production load from kiln No.5 that is not considered within project boundary.	CAR-4	OK
t. In CDM-PDD section B.7.1 are following provided?	EB 41	Ann 12	-		
i. Specific information on how the data and parameters that need to be monitored would actually be collected during monitoring for the project activity	EB 41	Ann 12	OK	OK	OK
ii. For each parameter the following below information, using the table provided:	EB 41	Ann 12	-		
a. The source(s) of data that will be actually used for the proposed project activity (e.g. which exact national statistics). Where several sources may be used, explain and justify which data sources should be preferred.	EB 41	Ann 12	OK	OK	OK
b. Where data or parameters are supposed to be measured, specify the measurement methods and procedures, including a specification which accepted industry standards or national or international standards will be applied, which measurement equipment is used, how the measurement is undertaken, which calibration procedures are applied, what is	EB 41	Ann 12	Operation manual providing greater details of roles and responsibility of each staff, reporting format, QA/QC procedure, etc. shall be provided. Please note that data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. This needs to be documented.	GL-6	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
the accuracy of the measurement method, who is the responsible person/entity that should undertake the measurements and what is the measurement interval; (i) A description of the QA/QC procedures (if any) that should be applied; (ii) Where relevant: any further comment. Provide any relevant further background documentation in Annex 4.					
u. In CDM-PDD section B.7.2 are following provided?	EB 41	Ann 12	-		
i. A detailed description of the monitoring plan	EB 41	Ann 12	OK	OK	OK
ii. The operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity	EB 41	Ann 12	OK	OK	OK
iii. The responsibilities for and institutional arrangements for data collection and archiving	EB 41	Ann 12	OK	OK	OK
iv. Indication that the monitoring plan reflect good monitoring practice appropriate to the type of project activity	EB 41	Ann 12	OK	OK	OK
v. Relevant further background information in Annex 4	EB 41	Ann 12	In PDD Annex 4 should be elaborated the background information used in the application of the monitoring methodology such as operation procedure, QC/QA procedure, calibration procedure, data management procedure and maintenance procedure.	CL-7	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
v. In CDM-PDD section B.8 are following provided?	EB 41	Ann 12	-		
i. Date of completion of the application of the methodology to the project activity study in DD/MM/YYYY	EB 41	Ann 12	Yes , Date is 22/09/2010	OK	OK
ii. Contact information of the person(s)/entity(ies) responsible for the application of the baseline and monitoring methodology to the project activity	EB 41	Ann 12	OK	OK	OK
iii. Indication if the person/entity is also a project participant listed in Annex 1	EB 41	Ann 12	OK	OK	OK
w. In CDM-PDD section C.1.1 are following provided?	EB 41	Ann 12	-	-	-
i. The starting date of a CDM project activity, which is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun (EB33, Para 76/CDM Glossary of terms/EB41, Para 67)	EB 41	Ann 12	Starting date is The supply and engineering contract between the project proponent and the technology provider was signed on 21/05/2008	OK	OK
ii. A description of how this start date has been determined, and a description of the evidence available to support this start date	EB 41	Ann 12	Signing of Memorandum of Understanding among the project proponent and the technology providers was not provided.	CAR-5	OK

VALIDATION REPORT



CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iii. If this starting date is earlier than the date of publication of the CDM-PDD for global stakeholder consultation by a DOE, description in Section B.5 contain a of how the benefits of the CDM were seriously considered prior to the starting date (EB41, Para 68).	EB 41	Ann 12	Do not provide the approval of investment on CDM project evidence.	CAR-6	OK
x. In CDM-PDD section C.1.2 is the expected operational lifetime of the project activity in years and months provided?	EB 41	Ann 12	20 years 00 month	OK	OK
y. In CDM-PDD section C.2 is it stated whether the project activity will use a renewable or a fixed crediting period and is C.2.1 or C.2.2 completed accordingly?	EB 41	Ann 12	Fixed 10 years	OK	OK
z. In CDM-PDD section C.2.1 is it indicated that each crediting period shall be at most 7 years and may be renewed at most two times, provided that, for each renewal, a designated operational entity determines and informs the Executive Board that the original project baseline is still valid or has been updated taking account of new data where applicable?	EB 41	Ann 12	NA	-	-
aa. In CDM-PDD section C.2.1.1 are dates in the following format: (DD/MM/YYYY) provided?	EB 41	Ann 12	NA	-	-
bb. In CDM-PDD section C.2.1.2 is the length of the first crediting period in years and months provided?	EB 41	Ann 12	NA	-	-
cc. In CDM-PDD section C.2.2 is the fixed crediting period at most ten (10) years provided?	EB 41	Ann 12	10 years	OK	OK
dd. In CDM-PDD section C.2.2.1 are the dates	EB 41	Ann	01/06/2010 or the date of registration by the CDM	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
provided in the following format: (DD/MM/YYYY)?		12	EB, whichever is later		
ee. In CDM-PDD section C.2.2.2 is the length of the crediting period in years and months Provided?	EB 41	Ann 12	10 years 0 month	OK	OK
ff. In CDM-PDD section D.2 are the conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the Host Party, if environmental impacts are considered significant by the project participants or the Host, provided?	EB 41	Ann 12	The EIA report was completed in August 2008 and has been approved by the Office of Natural Resources and Environmental Policy and Planning (ONEP), Ministry of Natural Resources and Environment, on 20 th August 2008. Provided environmental impacts assessment	OK	OK
gg. In CDM-PDD section E.1 are the following provided?	EB 41	Ann 12	-		
i. The process by which comments by local stakeholders have been invited and compiled. An invitation for comments by local stakeholders shall be made in an open and transparent manner, in a way that facilitates comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.	EB 41	Ann 12	Dr.Kriengkrai Suksankraisorn,CEC presented the invitation letter issued on 24/6/2008 and attendance sheet as the evidences.	OK	OK
ii. The project activity is described in a manner, which allows the local stakeholders to understand the project activity, taking into account confidentiality provisions of the CDM modalities and procedures.	EB 41	Ann 12	Yes, During on site validation, arrangement an interaction of representatives of the local stakeholders with DOE are done. No further complaints are made.	OK	OK
iii. The local stakeholder process has been completed before submitting the proposed project activity to the DOE for validation.	EB 41	Ann 12	Yes, the local stakeholder process had been completed on 30 July 2008, the validation process had been completed on 25-26 February 2009	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
hh. In CDM-PDD section E.2 are following provided?	EB 41	Ann 12	-		
i. Identification of local stakeholders that have made comments	EB 41	Ann 12	Yes	OK	OK
ii. A summary of this comments.	EB 41	Ann 12	Summary of comments are provided	OK	OK
ii. In CDM-PDD section E.3 is the explanation of how due account have been taken of comments received from local stakeholders provided?	EB 41	Ann 12	Yes, in CDM-PDD section E.3 provided activities from comments received from local stakeholder.	OK	OK
jj. In CDM-PDD Annex 1 are the following provided?	EB 41	Ann 12	-		
i. Contact information of project participants	EB 41	Ann 12	Cementhai Energy Conservation Co., Ltd.	OK	OK
ii. For each organisation listed in section A.3 the following mandatory fields: Organization, Name of contact person, Street, City, Postfix/ZIP, Country, Telephone and Fax or e-mail	EB 41	Ann 12	Yes, all details are completed	OK	OK
kk. In CDM-PDD Annex 2 is information from Parties included in Annex I on sources of public funding for the project activity which shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties provided?	EB 41	Ann 12	OK	OK	OK
ll. In CDM-PDD Annex 3 is the background information used in the application of the baseline methodology provided?	EB 41	Ann 12	OK	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
mm. In CDM-PDD Annex 4 is the background information used in the application of the monitoring methodology provided?	EB 41	Ann 12	Same as CL 7 In PDD Annex 4 should elaborate the background information used in the application of the monitoring methodology such as operation procedure, QC/QA procedure, calibration procedure, data management procedure and maintenance procedure.	CL 7	OK
4. Project description					
a. Does the PDD contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	VVM	58	Yes	OK	OK
b. Is the description of the proposed CDM project activity as contained in the PDD:	VVM	59	-	-	-
i. sufficiently covering all relevant elements?	VVM	59	Yes	OK	OK
ii. accurate?	VVM	59	Check specification of SP boiler and AQC of Kilns No.4 and No.6, it is found that the actual data of electricity generated by steam turbine is 19,270 KW <i>net power generation</i> (with 20,500 KW gross). The proposed PDD wrongly quote gross data. Gross annual power generation amount of 100,644 MWh is incorrect.	GAR 7	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iii. providing the reader with a clear understanding of the nature of the proposed CDM project activity?	VVM	59	Technology employed in WHG needs to be identified.	CL-8	OK
c. Is the proposed CDM project activity in existing facilities or or utilizing existing equipments?	VVM	60	The proposed CDM project is within the existing facilities. Two Waste Heat Generators will be installed and modified in the clinker production lines (Kilns No.4 and 6) to recover and utilize waste heat to generate electricity supplied to the plant itself.	OK	OK
d. Is the CDM project activity one of the following types:	VVM	60	-	-	-
i. Large scale?	VVM	60	Yes, Large scale	OK	OK
ii. Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year?	VVM	60	NA	-	-
iii. Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes?	VVM	60	NA	-	-
e. If yes to (c) and (d) above, was a physical site inspection conducted to confirm that the description in the PDD reflects the proposed CDM project activity, unless other means are specified in the methodology?	VVM	60	Yes	OK	OK
f. If yes to (d.iii) above, was the number of physical site visits base on samping?	VVM	60	NA	-	-


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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
g. If yes is the sampling size appropriately justified through statistical analysis?	VVM	60	NA	-	-
h. For all other proposed CDM project activities not referred to in paragraphs 59 – 60, and for other individual proposed small scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, was a physical site inspection conducted?	VVM	62	NA	-	-
i. If no:	VVM	62	-	-	-
i. Was the validation undertaken by reviewing available designs and feasibility studies, conducting comparison analysis to equivalent projects, as appropriate?	VVM	62	NA.	-	-
ii. Was it appropriately justified?	VVM	62	NA.	-	-
j. Does the proposed CDM project activity involve the alteration of an existing installation or process?	VVM	63	Yes. See Engineering design plan of SP and AQC boiler at kiln No.4 and 6	OK	OK
k. If yes, does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	VVM	63	Yes.	OK	OK
5. Baseline and monitoring methodology					
a. General requirement					
a. Do the the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board?	VVM	65	Same as CL 3	CL-3	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b. Is the selected methodology applicable to the project activity?	VVM	66	Refer to (5.b.a) below	-	-
c. Had the selected methodology been correctly applied?	VVM	66	Refer to (5.b.c) below	-	-
d. Had the selected methodology been correctly applied with respect to project boundary?	VVM	67	Refer to (5.c) below	-	-
e. Had the selected methodology been correctly applied with respect to baseline identification?	VVM	67	Refer to (5.d) below	-	-
f. Had the selected methodology been correctly applied with respect to Algorithms and/or formulae used to determine emission reductions?	VVM	67	Refer to (5.e) below	-	-
g. Had the selected methodology been correctly applied with respect to additionality?	VVM	67	Yes. Version 05.2 of Tool for the demonstration and assessment of additionality (EB 39).	OK	OK
i. Specific questions per methodology regarding application of the methodology with respect to additionality.			Refer to checklist questions number 6.c.1	OK	OK
h. Had the selected methodology been correctly applied with respect to monitoring methodology?	VVM	67	Same as CL 3	CL-3	OK
i. Specific questions per methodology regarding application of the methodology with respect to monitoring methodology.					
To be verified whether the monitoring methodology in proposed CDM project monitor the following					



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
parameters during project operation?					
<i>For baseline monitoring:</i>				GL-9	OK
• 1. Electricity demand of cement works and other local loads within the complex of cement works prior to start of the project;			1. Electricity demand of cement works is not separated from locals load as well as the specific demand of production cement line No.4 and 6 of the project boundary. Need clarification.	OK	OK
• 2. Electricity generation of existing captive power generation, if any;			2. None.	OK	OK
• 3. Waste heat use within the cement works and normal uses of waste heat in cement production commonly practiced in the region or Host country;			3. Yes.	OK	OK
• 4. Regulations and/or policy that could influence the use of waste heat and generation of power in the region;			4. SCG internal policy and commitment to the WBCSD (world business council on sustainable development). The company pledges voluntary commitment in the WBCSD-CSI to reduce carbon dioxide emission to no more than 670 kg CO ₂ /ton cement by 2010. Refer to SD report 2006-2007.	OK	OK
• 5. Project electricity generation;			5. Yes.	OK	OK
• 6. If the baseline is supply of electricity from the grid:			6. Yes	OK	OK
• 7. Electricity generation, fuel consumption, and fuel specific energy content and emission factor of power			7. Only electricity generation. No other fuel		



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
generation sources connected to the grid to estimate operating margin and build margin;			consumption concerned to the proposed CDM activity (WHG). There is evidence of determination of fuel specific energy content and emission factor of power generation sources connected to the grid.	OK	OK
• 8. Electricity imports and exports;			8. Electricity is only imported from the grid.	GL-10	OK
• 9. Electricity generation from the proposed project activity;			9. The net power generation (MW) presented in table 4 (page 16) of the proposed PDD project need further clarification as the source of 'Self-power consumption (MW)' is not clearly identified....(6% as stated by specification, but this figure is not used in calculation of self power generation)	OK	OK
• 10. Annual determination of the emission factor of the grid (weighted average excluding zero and low cost sources) to recalculate the operating margin with monitored data;			10. Yes.	OK	OK
• 11. Annual determination of the emission factor of the grid (weighted average of recently built plants - represented by the 5 most recent plants or the most 20% of the generating units built) to recalculate the build margin with monitored data;			11. Yes.	OK	OK
• 12. Annual determination of the combined margin;			12. Yes.	OK	OK
• 13. Confirmation to meet applicability;			13. Yes.	GL-14	OK
• 14. If the baseline is an identified generation source and in particular existing captive power plant:			14. There is only electrical generation source from		



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
- Fuel consumption and electricity generation.			the grid. None existing captive power source is used. However, it is not clearly stated in the proposed PDD.		
<u>Project Emissions</u>				OK	OK
• 15. Fuel consumption, emission factor and energy content used in operation of clinker making process post project implementation;			15. Yes. (Not used in calculation as no fuel consumption concerned to the proposed CDM project)	OK	OK
• 16. Fuel consumption in clinker making process prior to project implementation;			16. Yes. (Not used in calculation as no fuel consumption concerned to the proposed CDM project)	CL-12	OK
• 17. Electricity generated by the project			17. Yes. However, net power (MW) 17.73 is required to check for correctness and source.		



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<i>b. Applicability of the selected methodology to the project activity</i>					
a. Is the selected baseline and monitoring methodology, previously approved by the CDM Executive Board, applicable to the project activity?	VVM	68	Same as CL 3	CL-3	OK
i. Specific questions per methodology regarding applicability.					
<u>Check conditions for applicability:</u>					
1. Is electricity production used within project boundary?			1 Yes.	OK	OK
2. Any electricity export to the grid in the baseline scenario?			2 No.	OK	OK
3. Does electricity generated under PDD displace either grid or other identified source (if any)?			3. Yes, Electricity generated under PDD displace electricity from the grid.	OK	OK
4. Is the grid and/or other identified generation source identifiable?			4. The grid is identified in electrical purchased agreement as "EGAT". However it is not identified in section B.2 of the proposed PDD.	CL-13	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
5. Waste heat is to be used in the project activity?			5. Yes.	OK	OK
6. Check baseline scenario if the recycling of waste heat is possible only within the boundary of the clinker making process? Is the proposed CDM project categorized type I or type II?			6. Yes, Type I.	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b. Is the methodology correctly quoted?	VVM	69	Same as CL 3	CL-3	OK
c. Are the applicability conditions of the methodology met?	VVM	70	Yes	OK	OK
i. Specific questions per methodology regarding applicability conditions. Check on site to confirm that the proposed CDM project is type I and the electricity is only from the grid.			Refer checklist question number 5.b.a. i	OK	OK
d. Is the proeject activity expected to result in emissions other than those allowed by the methodology?	VVM	70	No	OK	OK
e. Is the choice of the methodology justified?	VVM	70	Yes	OK	OK
f. Have the project participants shown that the project activity meets each of the applicability conditions or the approved methodology?	VVM	70	Refer to (5.b.c) above	OK	OK
g. Have the project participants shown that the project activity meets each of the applicability conditions of any tool or other methodology component referred to the methodology?	VVM	70	Yes	OK	OK
ii. Specific questions per methodology regarding applicability conditions of any tool or other methodology component referred to the methodology.			Refer checklist question number 5.b.a. i	OK	OK
h. Is the DOE, based on local and sectoral knowledge, aware that comparable information is available from sources other than that used in the PDD?	VVM	70	Yes	OK	OK
i. If yes, was the PDD cross checked against the other sources to confirm that the project activity	VVM	70	Yes, Checked in case of same project which on register process Siam Cement (Thung Song)	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
meets the applicability conditions of the methodology? (provide the reference to these choices)			Waste Heat Power Generation Project, Thailand (TS5 Project) http://cdm.unfccc.int/Projects/projsearch.html		
j. Can a determination regarding the applicability of the selected methodology to the proposed CDM project activity be made?	VVM	71	Yes, refer to the section B.2	OK	OK
k. If no, clarification of the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	71	NA	-	-
l. If answer to (5.b.c) above is "no", revision or deviation from the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	72	NA	-	-
m. If yes to (5.b.k) and (5.b.l) above, a request for registration was submitted before the CDM Executive Board has approved the proposed deviation or revision?	VVM	73	NA	-	-
c. Project boundary					
a. Does the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity?	VVM	77	Project boundary stated in Section B.3 is not clear that the proposed activity use electricity from either the grid or other identifiable captive power generation.	CL-14	OK
			Project participant should state more clearly of the exclusion of Kiln no.5 from the proposed project boundary to be transparent in order to justify other related data presented in the proposed	CL-15	OK


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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
i. Specific questions per methodology regarding application of the methodology with respect to project boundary. Is there captive power in the proposed activity?			None of captive power is used in the proposed activity	OK	OK
b. Is the delineation in the PDD of the project boundary correct?	VVM	78	Yes	OK	OK
c. Does the delineation in the PDD of the project boundary meet the requirements of the selected baseline?	VVM	78	Yes	OK	OK
d. Have all sources and GHGs required by the methodology been included within the project boundary?	VVM	78	Yes	OK	OK
e. Does the methodology allow project participant to choose whether a source or gas is to be included within the project boundary?	VVM	78	Yes. The methodology allows to include CO2 emissions from on-site fuel consumption of fossil fuels.	OK	OK
f. If yes, have the project participants justified that choice?	VVM	78	The methodology allows including CO2 emissions from on-site fuel consumption of fossil fuels but the project participants did not justify that choice	CL-16	FAR1
g. If yes, is the justification provided reasonable? (provide reference to the supporting documented evidence provided by the project participants)	VVM	78	The methodology allows including CO2 emissions from on-site fuel consumption of fossil fuels but no justification provided reasonable (should provide reference to the supporting documented evidence provided by the project participants).	CL-17	OK
d. Baseline identification					
a. Does the PDD identify the baseline for the	VVM	80	Yes, refer to Section B.4	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
proposed CDM project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity?					
b. Has any procedure contained in the methodology to identify the most reasonable baseline scenario, been correctly applied?	VVM	81	Yes	OK	OK
i. Specific questions per methodology regarding application of any procedure contained in the methodology to identify the most reasonable baseline scenario. Check PDD if there is clear identification of the following points; 1.A - 1.1 is there any current use of waste heat from the kiln? Which would be replaced by PDD? - 1.2 are there other demands for any additional waste heat use at the baseline scenario? - 1.3 evidence is used to demonstrate that waste heat is within the energy balance boundary of the clinker making process? 1.B - 1.1 Does PDD list all the identifiable sources of electric energy supply for the cement plants, including;	AM000 24 versio n 02.1		1A 1.1 Yes, waste heat is re-circulated to pre-heating process. 1.2 No demand for additional waste heat at the base line scenario. 1.3 Yes. Refer to Engineering design plan. 1B 1.1 Yes. Same as CAR 4, Current demand of electricity consumption for cement work (E_{cement}) is	OK OK OK CAR-4	OK OK OK OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<ul style="list-style-type: none"> Current demand(in the last 2 years) Future demand and supply throughout the crediting period <p>(verify meter records, production plan, load design, works data)</p> <p>-1.2 Check production data 2 years prior to the PDD (must be included in PDD)</p> <p>-1.3 Production capacity for the crediting period (based on data from production records and plan)</p> <p>-1.4 Are these data included in the monitoring programme since the starting of the crediting period?</p> <p>-1.5 Analysis should show any increase of energy demand expected and explain how this demand could be met (as alternative such as from the grid or other power sources)</p> <p>-1.6 Check if other categories of options analyzed in identify baseline electricity options;</p> <p>a. Supply from the grid</p> <p>b. Supply from existing capacity, or, in case of increasing demand, expansion of captive power generation source.</p>			<p>calculated from overall production data that included production load from kiln No.5 that is not considered within project boundary.</p> <p>1.2 Yes.</p> <p>1.3 Yes.</p> <p>1.4 Yes.</p> <p>1.5 Yes.</p> <p>1.6 Optional scenario is to continue using power from the grid.</p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<p>c. Construction of a captive plant with different fuel options if electricity demand is increasing.</p> <p>Step 2: Check compliance with regulatory requirements if the PDD cut off any options that do not meet the regulatory requirement? Law and regulation to be considered;</p> <ul style="list-style-type: none"> - Energy efficiency/ conservation laws - Cleaner production - Environmental protection <p>Step 3: 3.1 Does PDD undertake economic analysis of those options that meet regulatory requirements? 3.2 Is IRR based on waste heat recovery and electricity supply scenario only?</p>			<p>Step 2: Yes the other option from proposed PDD project complies with the law.</p> <p>Step3: 3.1 Yes. 3.2 Yes.</p>	<p>OK</p> <p>OK OK</p>	<p>OK</p> <p>OK OK</p>



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
c. Does the selected methodology require use of tools (such as the “Tool for the demonstration and assessment of additionality” and the “Combined tool to identify the baseline scenario and demonstrate additionality”) to establish the baseline scenario?	VVM	81	Yes. Version 02 of Tool to calculate the emission factor for an electricity system (EB 50); and Version 05.2 of Tool for the demonstration and assessment of additionality.	OK	OK
d. If yes, was the methodology consulted on the application of these tools? (In such cases, the guidance in the methodology shall supersede the tool.)	VVM	81	Yes.	OK	OK
i. Specific questions per methodology regarding application of tools to establish the most reasonable baseline scenario.			Refer to checklist question number 5.d.b.1	OK	OK
e. Does the methodology require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario?	VVM	82	Yes. Only one scenario is identified in section B.4 as alternative: the alternative to venting of waste heat (with possible re-circulating some portion for drying raw material) is to utilize it for power generation.	OK	OK
f. If yes, are all scenarios that are considered by the project participants and are supplementary to those required by the methodology reasonable in the context of the proposed CDM project activity?	VVM	82	Yes.	OK	OK
g. Has any reasonable alternative scenario been excluded?	VVM	82	No.	OK	OK
h. Is the baseline scenario identified reasonably supported by:	VVM	83			
i. Assumptions?	VVM	83	Yes.	OK	OK
ii. Calculations?	VVM	83	Yes.	OK	OK
iii. Rationales?	VVM	83	Yes.	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
i. Are the documents and sources referred to in the PDD correctly quoted and interpreted?	VVM	83	Yes.	OK	OK
j. Was the information provided in the PDD cross checked with other verifiable and credible sources, such as local expert opinion, if available? (identify the sources)	VVM	83	Yes.	OK	OK
k. Have all applicable CDM requirements been taken into account in the identification of the baseline scenario for the proposed CDM project activity?	VVM	84	Yes.	OK	OK
l. Have all relevant policies and circumstances been identified and correctly considered in the PDD, in accordance with the guidance by the CDM Executive Board?	VVM	84	Yes.	OK	OK
m. Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	VVM	85	Yes.	OK	OK
e. Algorithms and/or formulae used to determine emission reductions					
a. Do the steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring?	VVM	88	Steps and Calculation is to be verified. (Equation 5)	CL-18	OK
b. Have the equations and parameters in the PDD been correctly applied with respect those in the	VVM	89	Same as CL 18	CL-18	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
select approved methodology? i Specific questions per methodology regarding steps taken and equations and parameters applied to calculate project emissions, baseline emissions, leakage and emission reductions.					
It is observed in the proposed PDD that emission (CO2) from on-site fossil fuel consumption within project boundary, and/or from captive power generation(if any) is not included when calculation. However such sources are not clearly identified in section B.3.			Section B.3 need further clarification.	CL-19	OK
c. Does the methodology provide for selection between different options for equations or parameters?	VVM	89	Yes. At equation 5. Local values of $NCV_{fuel,y}$ and $EF_{CO2, fuel,y}$ should be used where available. If no such values are available, country-specific values (see e.g. IPCC Good Practice Guidance for LULUCF) are preferable to IPCC world-wide default values.	OK	OK
d. If yes, has adequate justification been provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided)?	VVM	89	Yes.	OK	OK
e. If yes, have correct equations and parameters	VVM	89	Refer to (5.e.b) above	-	-



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been used, in accordance with the methodology selected?					
f. Will data and parameters be monitored throughout the crediting period of the proposed CDM project activity?	VVM	90	Yes.	OK	Ok
g. If no, and these data and parameters will remain fixed throughout the crediting period, are all data sources and assumptions:	VVM	90	-	-	-
i. Appropriate and correct?	VVM	90	Data of gross annual power generation is identified at 100,644 MWh, however when verified with data source it is found that this number is incorrect. Thus, the estimated emission reduction need to be corrected and recalculated.	CAR-8	OK
ii. Applicable to the proposed CDM project activity?	VVM	90	Yes.	OK	OK
iii. Resulting in a conservative estimate of the emission reductions?	VVM	90	Yes.	OK	OK
h. Will data and parameters be monitored on implementation and hence become available only after validation of the project activity?	VVM	90	No. The project activity started before validation (project start date: Supply and engineering contract date on 21/05/2008), therefore data have been shortly monitored.	OK	OK
i. If yes, are the estimates provided in the PDD for these data and parameters reasonable?	VVM	90	Yes.	OK	OK
6. Additionality of a project activity					
a. Does the PDD describe how a proposed CDM projet activity is additional?	VVM	93	Yes, PDD describe in Section B.5	OK	OK



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b. Does the CDM-PDD state the latest version of the additionality tool being used?	VVM	95	The additionality of the project activity is demonstrated below using version 05.2 of the "Tool for the demonstration and assessment of additionality".	OK	OK
c. Were the following steps of the tool to assess additionality used:	EB 39	Ann 10	-	-	-
i. Identification of alternatives to the project activity?	EB 39	Ann 10	<p>Yes, refer to section B.4 in step 1.A and 1.B</p> <p><i>Identify options for waste heat utilisation</i></p> <p>The general practice for the management of waste heat from clinker production process is to vent it to the atmosphere, while some more modern plant might re-circulate it to dry the raw material. Although TS plant has already recovered and utilised some of the waste heat within the energy balance boundary of the clinkering process (Type 1 waste heat utilisation), a large proportion of the waste heat is still vented to the atmosphere. There are no other industrial facilities in the vicinity of the plant that could make economic use of the waste heat. Thus, the alternative to venting of waste heat (with possible re-circulating some portion for drying raw material) is to utilise it for power generation.</p>	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>Summary ;</p> <p>Alternative I: Continuation of the current situation, ie continue venting waste heat and purchase electricity from the grid;</p> <p>Alternative II: The proposed project activity undertaken without being registered as a CDM project activity;</p> <p>Identify source of electricity supply. In 2007, TS plant purchases grid electricity from EGAT at around 437 GWh. According to the methodology, E_{cement} and E_{load}, which are the electricity demand of the cement works and other local loads, should be included in the Project Design Document for at least two years prior to the start date of the project activity. The following table shows the average electricity demand of the cement work at TS plant for 3 years prior to the start date of the project activities. There are no other local loads at TS plant.</p>		



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ii. Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible?	EB 39	Ann 10	Same as CAR 2	CAR 2	OK
iii. Barriers analysis?	EB 39	Ann 10	Yes, there are three barriers, technological barriers, financial barriers and prevailing practice barrier	OK	OK
iv. Common practice analysis?	EB 39	Ann 10	<p>Yes, they were</p> <p>The geographical scope of the common practice is limited to Thailand. Validation team agrees with this because the regulatory and laws are different from other countries.</p> <p>The validation team has verified sources as a publicly available presentation by Thai Cement Manufacturers Association (TCMC) *found that venting of waste heat has always been the common practice of the industry with only one waste heat recovery for power generation installed at one clinker production line in 1989. This installation is considered as a pilot plant of Siam city cement limited.</p> <p>No other cement plants have installed waste heat recovery power generation since then, which clearly proves that this type of project is not a common practice in the cement industry in</p>	OK	OK

* http://www.siamcitycement.com/downloads/corporate_briefing/Corporate%20briefing%20Presentation%20-%20Challenge%20Ahead.ppt#365,4,Slide 4



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			<p>Thailand. Other similar projects are being developed in Thailand, all as a CDM project.</p> <p>There are ten similar projects in Thailand refer to http://cdm.unfccc.int/Projects/Validation/index.html</p> <p>After considering the statement issued by the Thai Cement Manufacturer's Association, it can be confirmed that the proposed CDM activity is not a common practice in the defined region.</p>		


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d. In step 1 (i) have all the sub-steps as below been followed?	EB 39	Ann 10	-	-	-
i. Sub-step 1a: Define alternatives to the project activity	EB 39	Ann 10	Based on PDD B.4 Step 1A, the alternative to venting of waste heat (with possible re-circulating some portion for drying raw material) is to utilise it for power generation.	OK	OK
ii. Sub-step 1b: Consistency with mandatory laws and regulations	EB 39	Ann 10	The confirmation that both alternatives are in line with mandatory laws and regulations is in Step 1 of PDD B.5	OK	OK
e. Have the following alternatives been included while defining alternatives as per sub-step 1a?	EB 39	Ann 10	-	-	-
i. (a) The proposed project activity undertaken without being registered as a CDM project activity;	EB 39	Ann 10	Yes. Refer to 5.c.i above	OK	OK
ii. (b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services or services with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;	EB 39	Ann 10	Yes. Refer to 5.c.i above	OK	OK
iii. (c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).	EB 39	Ann 10	Yes. Refer to 5.c.i above	OK	OK
f. Has the project participant included the technologies or practices that provide outputs or services with comparable quality, properties and application areas as the proposed CDM project	EB 39	Ann 10	Yes, it has Alternative I: Continuation of the current situation, ie continue venting waste heat and purchase	OK	OK



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activity and that have been implemented previously or are currently being introduced in the relevant country/region?			electricity from the grid; Alternative II: The proposed project activity undertaken without being registered as a CDM project activity;		
g. Has the outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity done correctly? Please briefly mention the outcome.	EB 39	Ann 10	As a result, 2 alternatives are identified. These include 1. continuation of current situation 2. undertaking the project without CDM revenue.	OK	OK
h. Is the alternative(s) in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution.?	EB 39	Ann 10	The confirmation that both alternatives are in line with mandatory laws and regulations is in Step 1 of PDD B.5	OK	OK
i. If an alternative does not comply with all mandatory applicable legislation and regulations, has it been shown that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country?	EB 39	Ann 10	NA	-	-
j. Has the outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the	EB 39	Ann 10	All alternatives are in line with the laws and regulations.	OK	OK


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enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations done correctly? Please state the outcome.					
k. Has PP selected Step 2 (Investment analysis) or Step 3 (Barrier analysis) or both Steps 2 and 3?	EB 39	Ann 10	Both step 2 and 3 are selected	OK	OK
l. In step 2, have all the sub-steps as below been followed?	EB 39	Ann 10	-	-	-
i. Sub-step 2a: Determine appropriate analysis method;	EB 39	Ann 10	Option III is selected	OK	OK
ii. Sub-step 2b: Option I. Apply simple cost analysis;	EB 39	Ann 10	Not applicable	OK	OK
iii. Sub-step 2b: Option II. Apply investment comparison analysis;	EB 39	Ann 10	Not selected	OK	OK
iv. Sub-step 2b: Option III. Apply benchmark analysis;	EB 39	Ann 10	Selected	OK	OK
v. Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III);	EB 39	Ann 10	IRR has been calculated.	OK	OK
vi. Sub-step 2d: Sensitivity analysis (only applicable to Options II and III).	EB 39	Ann 10	Did	OK	OK
m. In sub-step 2a has the determination of appropriate method of analysis done as per the guidance as below?	EB 39	Ann 10	-	-	-
i. Simple cost analysis if the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income (Option I).	EB 39	Ann 10	Not applicable since the project will generate economic value.	-	-
ii. Otherwise, use the investment comparison	EB 39	Ann	This is a company policy to apply a benchmark for	OK	OK



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analysis (Option II) or the benchmark analysis (Option III). Specify option used with justification.		10	all the projects. In other words, SCG will invest only in the case that equity IRR exceeds the benchmark. As mentioned above, the company benchmark is 15%. There is a minutes of meeting of Board of directors for this particular issue and PPs provided the WACC as its benchmark in this case. The WACC calculated appears to be 11.28% which is a bit lower than the company benchmark		
n. Has the below guideline followed for sub-step 2b Option I. Apply simple cost analysis? Document the costs associated with the CDM project activity and the alternatives identified in Step1 and demonstrate that there is at least one alternative which is less costly than the project activity.	EB 39	Ann 10	Not applicable	-	-
o. Has the below guideline followed for sub-step 2b Option II. Apply investment comparison analysis? Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service most suitable for the project type and decision-making context. Please specify	EB 39	Ann 10	Not applicable, Option III is selected.	-	-
p. Has the below guideline followed for Sub-step 2b: Option III. Apply benchmark analysis?	EB 39	Ann 10	-	-	-
i. Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context.	EB 39	Ann 10	IRR is chosen as a financial indicator.	OK	OK
ii. When applying Option II or Option III, the	EB 39	Ann	Yes, the equity IRR chosen is calculated based on	OK	OK



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financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered.		10	the generally accepted standard		
iii. Discount rates and benchmarks shall be derived from: (a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data; (b) Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects; (c) A company internal benchmark (weighted average capital cost of the company), only in the particular case referred to above in 2. The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e. that	EB 39	Ann 10	The benchmark of cost of capital is applied. Validation teams have checked all the assumptions used in the calculation of the benchmark against their sources. These include government bond rate, market risk premium and company beta	OK	OK



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project activities under similar conditions developed by the same company used the same benchmark; (d) Government/official approved benchmark where such benchmarks are used for investment decisions; (e) Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified. Please specify benchmark and justify.					
q. Has the below guideline followed for Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III)?	EB 39	Ann 10	-	-	-
i. Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but possibly including inter alia subsidies/fiscal incentives, ODA, etc, where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.	EB 39	Ann 10	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
ii. Present the investment analysis in a transparent manner and provide all the relevant assumptions, preferably in the CDM-PDD, or in separate annexes to the CDM-PDD.	EB 39	Ann 10	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK



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iii. Justify and/or cite assumptions.	EB 39	Ann 10	Did	OK	OK
iv. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions.	EB 39	Ann 10	<i>Please see Step 2d in PDD B.5</i>	OK	OK
v. Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.	EB 39	Ann 10	They all seem to be consistent.	OK	OK
vi. Present in the CDM-PDD a clear comparison of the financial indicator for the proposed CDM activity. Please specify details for above.	EB 39	Ann 10	The equity IRR with and without CDM revenue are shown in Annex 5	OK	OK
r. Has the below guideline followed for Sub-step 2d: Sensitivity analysis (only applicable to Options II and III)? Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions.	EB 39	Ann 10	<i>Please see Step 2d in PDD B.5</i>	OK	OK
s. Has the outcome of Step 2 clearly mentioned with justification?	EB 39	Ann 10	<i>Yes, please see Step 2 in PDD B.5</i>	OK	OK
t. In step 3: Barrier analysis have all the sub-steps as below been followed?	EB 39	Ann 10	-	-	-
i. Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity;	EB 39	Ann 10	Yes, it includes technological barrier, financial barrier, and prevailing practice barrier.	OK	OK
ii. Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the	EB 39	Ann 10	Please see sub step 3b in PDD B.5	OK	OK



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proposed project activity).					
u. Has the below guideline followed for Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project?	EB 39	Ann 10	-	-	-
i. (a) Investment barriers: For alternatives undertaken and operated by private entities: Similar activities have only been implemented with grants or other non-commercial finance terms. No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in the country where the proposed CDM project activity is to be implemented, as demonstrated by the credit rating of the country or other country investments reports of reputed origin.	EB 39	Ann 10	<p>1) No private capital was available for this project</p> <p>The return of the project is lower than company WACC and company benchmark. It is therefore not applicable to source the fund internally.</p> <p>2) Was loan denied by banks on normal commercial terms?</p> <p>Since the rate of return is lower than company WACC and company benchmark, SCG therefore decides not to seek the loan for this particular project.</p> <p>3) Similar activities have only been implemented with grants or other non-commercial finance terms.</p> <p>there's none grants/non-commercial funds to the cement plants for developing this technology in Thailand</p> <p>From above ,This is to prove that investments in</p>	OK	OK



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			<p>similar projects have been obtained only through non-commercial terms therefore it is additonality</p> <p>However, Validation teams have opinion that investment barrier cannot be applied for this project. Only investment analysis may be used to demonstrate additionality</p>		



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ii. (b) Technological barriers: Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance; Lack of infrastructure for implementation and logistics for maintenance of the technology, Risk of technological failure: the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the proposed CDM project activity, as demonstrated by relevant scientific literature or technology manufacturer information, The particular technology used in the proposed project activity is not available in the relevant region.	EB 39	Ann 10	The necessary trained labor to operate and maintain new clean technologies does not necessarily prevent implementation of project, e.g. most suppliers of equipment are able to provide sufficient training and/or even provide themselves staff to operate the plant. Finally, Validation teams have opinion that technological barrier cannot be applied for this project.	OK	OK
iii. (c) Barriers due to prevailing practice: The project activity is the “first of its kind”.	EB 39	Ann 10	Please provide evidences to prove that the project is the first of its kind.	CL-21	OK
iv. (d) Other barriers, preferably specified in the underlying methodology as examples.	EB 39	Ann 10	Not applicable	-	-
v. Has the outcome from Step 3a clearly mentioned in PDD?	EB 39	Ann 10	Yes, please see step 3 in PDD B.5	OK	OK
w. Has the below guideline followed for Sub-step 3	EB 39	Ann	-	-	-



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b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)?		10			
i. If the identified barriers also affect other alternatives, explain how they are affected less strongly than they affect the proposed CDM project activity. In other words, demonstrate that the identified barriers do not prevent the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration.	EB 39	Ann 10	The barriers have an impact equally on the project with and without CDM revenue and it has no impact whatsoever if the continuation of the current situation is considered.	OK	OK
ii. Provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternatives are prevented by these barriers.	EB 39	Ann 10	Same as CL 21	CL-21	OK
iii. The type of evidence to be provided should include at least one of the following: (a) Relevant legislation, regulatory information or industry norms; (b) Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions, etc; (c) Relevant statistical data from national or	EB 39	Ann 10	Same as CL 21	CL-21	OK



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international statistics; (d) Documentation of relevant market data (e.g. market prices, tariffs, rules); (e) Written documentation of independent expert judgments from industry, educational institutions (e.g. universities, technical schools, training centres), industry associations and others. Please specify.					
x. Has the outcome from Step 3 clearly mentioned in PDD?	EB 39	Ann 10	Same as CL 21	CL-21	OK
y. In step 4: Common practise analysis have all the sub-steps as below followed?	EB 39	Ann 10	-	-	-
i. Sub-step 4a: Analyze other activities similar to the proposed project activity;	EB 39	Ann 10	According to an investigation by Thai Cement Manufacturers Association (TCMC), it is revealed that venting of waste heat has always been the common practice of the industry with only one waste heat recovery for power generation installed at one clinker production line in 1989. This installation is considered as a pilot plant. No other cement plants have installed waste heat recovery power generation since then, which clearly proves that this type of project is not a common practice in the cement industry in Thailand. Other similar projects are being developed in Thailand, all as a CDM project. <u>refer to letter from TCMA/13/ and Thai DNA website (http://www.tgo.or.th/)</u>	OK	OK



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ii. Sub-step 4b: Discuss any similar Options that are occurring.	EB 39	Ann 10	Not applicable as there is no similar project activity occurring elsewhere in Thailand except the CDM project activities refer to <u>letter from TCMA/13/ and Thai DNA website</u> (http://www.tgo.or.th/)	-	-
z. Has the below guideline followed for Sub-step 4a: Analyze other activities similar to the proposed project activity? Provide an analysis of any other activities that are operational and that are similar to the proposed project activity. Other CDM project activities are not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. On the basis of that analysis, describe whether and to which extent similar activities have already diffused in the relevant region.	EB 39	Ann 10	Not applicable as there is no similar project activity occurring elsewhere in Thailand except the CDM project activities. refer to <u>letter from TCMA/13/ and Thai DNA website</u> (http://www.tgo.or.th/)	-	-
aa. Has the below guideline followed for Sub-step 4b: Discuss any similar Options that are occurring? If similar activities are identified, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain	EB 39	Ann 10	Not applicable as there is no similar project activity occurring elsewhere in Thailand except the CDM project activities.	-	-



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why the similar activities enjoyed certain benefits that rendered it financially/economically attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject. In case similar projects are not accessible, the PDD should include justification about non-accessibility of data/information.					
bb. Has the outcome from Step 4 clearly mentioned in PDD?	EB 39	Ann 10	Yes, please see Step 4 in PDD B.5	OK	OK
cc. Has it been proved that the project is additional?	EB 39	Ann 10	Yes.	OK	OK



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<i>a. Prior consideration of the clean development mechanism</i>					
a. Is the project activity start date prior to the date of publication of the PDD for stakeholder comments?	VVM	97	Yes, the real construction of modification start on 1/09/08 and the date of publication of the PDD for stakeholder comments on 19/12/08-17/1/09	OK	OK
b. If yes, were the CDM benefits considered necessary in the decision to undertake the project as a proposed CDM project activity?	VVM	97	Yes refer to Internal memo: Approval of the benefits of GHG emission reductions resulting from installation of WHG projects/6/. Energy expert, Technical & Engineering department raised the internal memo to Managing Director of Cementthai Energy Conservation Co.,ltd on 5/10/07 for serious considering of CDM benefits prior to the decision to proceed with the project.	OK	OK
c. Is the start date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms", which states that "The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins."?	VVM	98	Yes, the project activity start is date of signed supply and engineering contact : 21/5/2008	OK	OK
d. Does the project activity require construction, retrofit or other modifications?	VVM	98	Yes, it does.	OK	OK
e. If yes, is it ensured that the date of commissioning cannot be considered as the project activity start date?	VVM	98	The commissioning date did not consider as the	OK	OK



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			projects activity start date		



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f. Is it a new project activity (a project activity with a start date on or after 02 August 2008) or an existing project activity (a project activity with a start date before 02 August 2008)?	VVM	99	N/A	-	-
g. For a new project, for which PDD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, had the PP informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status? (Provide reference to such confirmation from Host Party DNA and/or UNFCCC secretariat).	VVM	100	N/A	-	-
h. For an existing project activity, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, are the following evidences provided:	VVM	101	-	-	-
i. evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project, including, inter alia:	VVM	101	-	-	-
a. minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity?			OK. Refer to minute of the 137 th (6/2007) Board of directors meeting /14/ and Internal memo: Approval of the benefit of GHG emission reduction resulting from installation of WHG project on 5 October 2007 /6/.	OK	OK



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ii. reliable evidence from project participants that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation, including, inter alia:	VVM	101	-	-	-
a. contract with consultants for CDM/PDD/methodology services?	VVM	101	Yes, PPs did the Authorization ERM-Siam as a CDM consultant on 03/06/2008	OK	OK
b. Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds)?	VVM	101	No, PPs do not decision to buy their CERs to other people	OK	OK
c. evidence of agreements or negotiations with a DOE for validation services?	VVM	101	PPs did contact with BVC for validation on 21/11/08	OK	OK
d. submission of a new methodology to the CDM Executive Board?	VVM	101	NA	-	-
e. publication in newspaper?	VVM	101	No, publication in UNFCCC website	OK	OK
f. interviews with DNA?	VVM	101	No	OK	OK
g. earlier correspondence on the project with the DNA or the UNFCCC secretariat?	VVM	101	Yes, they received LOA from DNA	OK	OK
b. Identification of alternatives					
a. Does the approved methodology that is selected by the proposed CDM project activity prescribe the baseline scenario and hence no further analysis is required?	VVM	104	No	OK	OK
b. If no, does the PDD identify credible alternatives to the project activity in order to determine the most realistic baseline scenario?	VVM	105	Yes. According to the PDD, in the baseline scenario, the recycling of waste heat is possible only within the boundary of the clinker making	OK	OK



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			process (eg clinker production lines in baseline scenario could include some heat recovery systems to capture a portion of the waste heat from the cooler end of the clinker kiln and use this to heat up the incoming raw materials and fuel - so called Type 1 Waste Heat Utilisation as described in explanatory note).		



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c. Does the list of alternatives given in the PDD ensure that:	VVM	105	-	-	
i. the list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	VVM	105	Yes, the option is continuation of the current situation, ie continue venting waste heat and purchase electricity from the grid	OK	OK
ii. the list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?	VVM	105	Yes	OK	OK
iii. the alternatives comply with all applicable and enforced legislation?	VVM	105	Yes, all alternatives comply with applicable and enforced Thai legislation	OK	OK
c. Investment analysis					
a. Has investment analysis been used to demonstrate the additionality of the proposed CDM project activity?	VVM	107	Yes, it has. The additionality of the project activity is demonstrated below using version 05.2 of the "Tool for the demonstration and assessment of additionality". Please see Step 2 of PDD B5	OK	OK
b. If yes, does the PDD provide evidence that the proposed CDM project activity would not be:	VVM	107	-	-	-
i. the most economically or financially attractive alternative?	VVM	107	NA , Project proponent chooesed to apply the benchmark analysis.	-	-
ii. economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)?	VVM	107	Same as CAR 2	CAR-2	OK
c. Was this shown by one of the following approaches, by demonstrating ?	VVM	108	-	-	-



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i. The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity.	VVM	108	NA , the proposed CDM project activity has electricity income.	-	-
ii. The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative.	VVM	108	NA , Project proponent chooesed to apply the benchmark analysis	-	-
iii. The financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	VVM	108	Same as CAR 2	CAR-2	OK
d. Is the period of assessment limited to the proposed crediting period of the CDM project activity?	EB 51	Ann 58	The period of assessment covers the fixed 10 years crediting period.	OK	OK
e. Does the project IRR and equity IRR calculations reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period?	EB 51	Ann 58	20 year for operation period per the approved FSR and refer to PDD section C.1.2	OK	OK
f. Does the IRR calculation include the cost of major maintenance and/or rehabilitation if these	EB 51	Ann 58	Please explain more details of additional capital expenses (30%of the total investment)	CL-20	OK



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are expected to be incurred during the period of assessment?					
g. Do the project participants justify the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period?	EB 51	Ann 58	Yes, they did	OK	OK
h. Does the cash flow in the final year include a fair value of the project activity assets at the end of the assessment period?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
i. Has the fair value been calculated in accordance with local accounting regulations where available, or international best practice?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
j. Does the fair value calculations include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
k. Was depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV)?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
l. Has taxation been included as an expense in the IRR/NPV calculation in cases where the benchmark or other comparator is intended for post-tax comparisons?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
m. Are the input values used in all investment analysis valid and applicable at the time of the	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK



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investment decision taken by the project participant?					
n. Is the timing of the investment decision consistent and appropriate with the input values?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
o. Are all the listed input values been consistently applied in all calculations?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
p. Does the investment analysis reflect the economic decision making context at point of the decision to recommence the project in the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
q. Have project participants supplied the spreadsheet versions of all investment analysis?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
r. Are all formulas used in this analysis readable and all relevant cells be viewable and unprotected?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
s. In cases where the project participant does not wish to make such a spreadsheet available to the public has the PP provided an exact read-only or PDF copy for general publication?	EB 51	Ann 58	Not applicable	-	-
t. In case the PP wishes to black-out certain elements of the publicly available version, is it justifiable?	EB 51	Ann 58	Not applicable	-	-
u. Was the cost of financing expenditures (i.e. loan repayments and interest) included in the calculation of project IRR?	EB 51	Ann 58	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK
v. In the calculation of equity IRR, has only the	EB 51	Ann	Yes. Pls see Annex 5 of the PDD for more details.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
portion of investment costs which is financed by equity been considered as the net cash outflow?		45			
w. Has the portion of the investment costs which is financed by debt been considered a cash outflow in the calculation of equity IRR? (this is not allowed)	EB 51	Ann 58	Pls see PDD B5 Step 2 for more details.	OK	OK
x. In cases where a benchmark approach is used is the applied benchmark appropriate to the type of IRR calculated?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK
y. Has local commercial lending rates or weighted average costs of capital (WACC) selected as appropriate benchmarks for a project IRR?	EB 51	Ann 58	Not applicable	-	-
z. Has required/expected returns on equity selected as appropriate benchmark for an equity IRR?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK
aa. In case benchmarks supplied by relevant national authorities selected is it applicable to the project activity and the type of IRR calculation presented?	EB 51	Ann 58	Not applicable	-	-
bb. In the cases of projects which could be developed by an entity other than the project participant is the benchmark applied based on publicly available data sources which can be clearly validated?	EB 51	Ann 58	Not applicable	-	-
cc. Have internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC) been applied in cases where there is only one possible project developer?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
dd. In such cases, have these values been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region?	EB 51	Ann 58	NA	-	-
ee. Has a minimum clear evidence of the resolution by the company's Board and/or shareholders been provided to the effect as above?	EB 51	Ann 58	NA	-	-
ff. Has a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behavior of the entity during at least the last 3 years in relation to similar projects been conducted?	EB 51	Ann 58	NA	-	-
gg. Does the risk premiums applied in the determination of required returns on equity reflect the risk profile of the project activity being assessed, established according to national/international accounting principles? (It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices.)	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK
hh. Has an investment comparison analysis and not a benchmark analysis used when the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services?	EB 51	Ann 58	Not applicable	-	-



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Have variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues been subjected to reasonable variation (positive and negative) and the results of this variation been presented in the PDD and be reproducible in the associated spreadsheets?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2d for more details.	OK	OK
jj. Have a corrective action been raised for a variable to be included in the sensitivity analysis which constitute less than 20% and have a material impact on the analysis ?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2d for more details.	OK	OK
kk. Is the range of variations selected is reasonable in the project context?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2d for more details.	OK	OK
ll. Dos the variations in the sensitivity analysis at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances?	EB 51	Ann 58	Yes. Pls see PDD B5 Step 2d for more details.	OK	OK
mm. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative, is an assessment done of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity?	EB 51	Ann 58	Not applicable	-	-
nn. Was a thorough assessment of all parameters and assumptions used in calculating the relevant	VVM	110	Yes. Pls see PDD B5 Step 2d for more details.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices conducted?					
oo. Were the parameters cross-checked against third-party or publicly available sources, such as invoices or price indices?	VVM	110	Yes, they were	OK	OK
pp. Were feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants reviewed?	VVM	110	Yes. Financial statements have been reviewed.	OK	OK
qq. Was the correctness of computations carried out and documented by the project participants assessed?	VVM	110	The calculation has been reviewed internally by SCG executives	OK	OK
rr. Was the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions assessed?	VVM	110	Yes, it was	OK	OK
ss. Is the type of benchmark applied is suitable for the type of financial indicator presented?	VVM	111	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK
tt. Do any risk premiums applied determining the benchmark reflect the risks associated with the project type or activity?	VVM	111	Yes. Pls see PDD B5 Step 2 for more details.	OK	OK
uu. To determine this, was it assessed whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by:				-	-
i. assessing previous investment decisions by the project participants involved?	VVM	111	NA	-	-



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. determining whether the same benchmark has been applied?	VVM	111	NA	-	-
iii. determining if there are verifiable circumstances that have led to a change in the benchmark?	VVM	111	NA	-	-
vv. Did the project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities?	VVM	112	No. there is no approval from authorities	OK	OK
tt. If yes:	VVM	112	-	-	-
i. has the FSR been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed?	VVM	112	Not applicable	-	-
ii. Are the values used in the PDD and associated annexes fully consistent with the FSR?	VVM	112	Not applicable	-	-
iii. If not, was the appropriateness of the values validated?	VVM	112	Not applicable	-	-
iv. On the basis of its specific local and sectoral expertise, is confirmation provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the	VVM	112	Not applicable	-	-



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
investment decision?					
d. Barrier analysis					
a. Has barrier analysis been used to demonstrated the additionality of the proposed CDM project activity?	VVM	114	Yes, it has. Refer to Step 3 of PDD section B.5	OK	OK
b. If yes, does the PDD demonstrate that the proposed CDM project activity faces barriers that:	VVM	114	-	-	-
i. prevent the implementation of this type of proposed CMD project activity?	VVM	114	Refer to check list question 6-u-i,ii,iii	OK	OK
ii. do not prevent the implementation of at least one of the alternatives?	VVM	114	Yes	OK	OK
c. Are there any issues that have a clear direct impact on the financial returns of the project activity, other than: risk related barriers, for example risk of technical failure, that could have negative effects on the financial performance; or barriers related to the unavailability of sources of finance for the project activity? {If yes, these issues cannot be considered barriers and shall be assessed by investment analysis. [Refer to (6.c) above]}	VVM	115	Yes. Please see Step 3 of PDD B5	OK	OK
d. Were the barriers determined as real by:	VVM	116	-	-	-
i. assssing the available evidence and/or undertaking interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) to determine whether the barriers listed in the PDD exist?	VVM	116	Same as CL 21	CL-21	OK
ii. ensuring that existence of barriers is	VVM	116	Same as CL 21	CL-21	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?					
iii. Is existence of a barrier substantiated only by the opinions of the project participants? (If yes, this barrier cannot be considered as adequately substantiated)	VVM	116	Same as CL 21	CL-21	OK
e. Were the barriers determined as preventing the implementation of the project activity but not the implementation of at least one of the possible alternatives by applying local and sectoral expertise to judge whether a barrier or set of barriers would prevent the implementation of the proposed CDM project activity and would not equally prevent implementation of <i>at least one of</i> the possible alternatives, in particular the identified baseline scenario?	VVM	116	Same as CL 21	CL-21	OK
e. Common practice analysis					
a. Is this a large-scale, or first-of-its kind small-scale project activity?	VVM	118	A large-scale	OK	OK
b. If yes, was common practice analysis carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality?	VVM	118	Yes, Please see step 4 of PDD B.5	OK	OK
c. Was it assessed whether the geographical scope (e.g. defined region) of the common practice analysis is appropriate for the assessment of common practice related to the	VVM	119	Yes. Project is located in Thailand. The geographical scope of the common practice is limited to Thailand. Validation team agrees with this because the regulatory and laws are different	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
project activity's technology or industry type? (For certain technologies the relevant region for assessment will be local and for others it may be transnational/global.			from other countries.		
d. Was a region other than the entire host country chosen?	VVM	119	No, it was not	OK	OK
e. If yes, was the explanation why this region is more appropriate assessed?	VVM	119	NA	-	-
f. Using official sources and local and industry expertise, was it determined to what extent similar and operational projects (e.g., using similar technology or practice), other than CDM project activities, have been undertaken in the defined region?	VVM	119	Yes	OK	OK
g. Are similar and operational projects, other than CDM project activities, already "widely observed and commonly carried out" in the defined region?	VVM	119	Yes	OK	OK
h. If yes, was it assessed whether there are essential distinctions between the proposed CDM project activity and the other similar activities?	VVM	119	NA	-	-
7. Monitoring plan					
a. Does the PDD include a monitoring plan?	VVM	121	Yes. Refer to PDD B.7	OK	OK
b. Is this monitoring plan based on the approved monitoring methodology applied to the proposed CDM project activity?	VVM	121	Same as CL 3	CL-3	OK
c. Were the list of parameters required by the the selected methodology identified?	VVM	122	Yes. Refer to PDD B.7.1	OK	OK
d. Does the monitoring plan contains all necessary	VVM	122	Yes. Refer to PDD B.7	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
parameters?					
e. Are the parameters clearly described?	VVM	122	Yes. Refer to PDD B.7	OK	OK
f. Does the means of monitoring described in the plan comply with the requirements of the methodology?	VVM	122	Yes. Refer to PDD B.7	OK	OK
g. Specific questions per methodology regarding parameters.					
-Are Electricity demand of cement works and other local loads within the complex of cement works prior to start of the Project described			Yes, Refer to PDD B.4.	OK	OK
-Are there Electricity generation of existing captive power generation			No, The project have no captive power plant	OK	OK
-Are Electricity generated by the project described			Yes, Refer to PDD B.7	OK	OK
-Does Annual determination of the emission factor of the grid described			Yes, Refer to Annex 3	OK	OK
h. Are the monitoring arrangements described in the monitoring plan feasible within the project design?	VVM	122	Yes. Refer to PDD B.7	OK	OK
i. Are the following means of implementation of the monitoring plan sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified:	VVM	122	-	-	-
i. data management procedures?	VVM	122	Same as CL 7	GL7	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. quality assurance procedures?	VVM	122	Same as CL 7	CL-7	OK
iii. quality control procedures?	VVM	122	Same as CL 7	CL-7	OK
8. Sustainable development					
a. Does the CDM project activity assists Parties not included in Annex I to the Convention in achieving sustainable development?	VVM	124	Same as CL 1	CL-4	OK
b. Does the letter of approval by the DNA of the host Party confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party?	VVM	125	Same as CL 1	CL-4	OK
9. Local stakeholder consultation					
a. Were local stakeholders (public, including individuals, groups or communities affected, of likely to be affected, by the proposed CDM project activity or actions leading to the implementation of such an activity) invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website?	VVM	127	<p>Yes, as defined in section E. of the PDD. Local stakeholder consultation was held by inviting local governmental sectors.</p> <p>Site visit: There were people invited including people who are involved. They were acknowledged the project characteristics, good points of project (such as capturing heat to generate the electricity, reducing to release hot air to atmosphere, job opportunity), weak point of project (only one concerned thing that was loud noise occurring during boiler start up). Emergency plan was acknowledged as well. Compliant receiving channels included direct contact to Public Relation Manager of Siam Cement Thungsong Co., Ltd., contact governmental officer. Public relation between factory and</p>	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			community was done continuously such as occupational development funding, natural water source conservation, health center development, sport activity encouragement, etc.		
b. Have comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity been invited?	VVM	128	Yes (referred to section E. of the PDD)	OK	OK
c. Is the summary of the comments received as provided in the PDD complete?	VVM	128	All comments were not the corrective action request but there was only query for information.	OK	OK
d. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM	128	NA	-	-
10. Environmental impacts					
a. Have the project participants submitted documentation on the analysis of the environmental impacts of the project activity?	VVM	130	Yes. Refer to PDD D.1 and attached files name EIA WHG STS_4_6 Complete.pdf	OK	OK
b. Have the project participants undertaken an analysis of environmental impacts?	VVM	131	Yes. Refer to PDD D.1 and attached files name EIA WHG STS_4_6 Complete.pdf	OK	OK
c. Does the host Party require an environmental impact assessment?	VVM	131	Yes. Refer to PDD D.1 and attached files name EIA WHG STS_4_6 Complete.pdf	OK	OK
d. If yes, have the project participants undertaken an environmental impact assessment?	VVM	131	Yes.	OK	OK

**Table 2 Resolution of Corrective Action and Clarification Requests**

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CAR 1: Flow diagram of the project boundary physically delineating the project activity is not provided. Flow diagram with all equipments, systems etc are not provided.	Table 1 / Item 3-m-ii,iii	Provided the electronic file of presentation of project boundary and plant layout and The project flow diagram showing project boundary, equipment, system is provided in B.3 (Figure 5. p.14) of The PDD	Response to CAR-1 is satisfactory and the same is closed
CAR 2: It is stated that “The benchmark for investment in the cement business within SCG is minimum EBITDA/Investment or EBITDA/OA (Earnings Before Interest, Taxes, Depreciation and Amortization per Operating Asset) of 15%.” Is there any sector specific benchmark available for the country? Needs proof for the selection of benchmark of 15%. Investment analysis assumptions and evidences can not show that it shall be derived from sources specified in the Guidance on the Assessment of Investment Analysis (version 02, attached to the	Table 1 / Item 3-o-ii,iii	The investment analysis in Step 2 of B.5 has been revised in PDD. The latest version, it shows that PP has decided to applied benchmark analysis, using equity IRR. The benchmark rate has been derived from the government bond rates, increased by a suitable risk premium to reflect private investment so as to represent standard returns in the market.	Response to CAR-2 is satisfactory and the same is closed A benchmark of 11.28% has been applied and accepted. a beta value of project is a beta of Construction group which data used to calculate beta coefficient were the daily closing SET index and CONMAT taken from the Stock Exchange of Thailand during 16 Oct 2006-15 Oct 2007 and the approval of investment on WHG projects date is



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
Additionality Tool version 05.2)			24 Oct 2007 therefore, the validation team concludes that the benchmark is suitable for the project.
CAR 3: Evidence of serious consideration of CDM not provided.	Table 1 / Item 3-o-iv	Provided the Serious consideration of the CDM could be referred to Internal memo: Approval of the benefits of GHG emission reductions resulting from installation of WHG projects/6/. Energy expert, Technical & Engineering department raised the internal memo to Managing Director of Cementthai Energy Conservation Co., Ltd on 5/10/07 for serious considering of CDM benefits prior to the decision to proceed with the project	Response to CAR-3 is satisfactory and the same is closed



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CAR 4 : Current demand of electricity consumption for cement work (Ecement) is calculated from overall production data that included production load from kiln No.5 that is not considered as project boundary.	Table 1 / Item 5.d-b-i	<p>Section B.4. has been further substantiated, taken into account WHG TS5.</p> <p>The ER calculation sheet has been revised and complied with the work journal provided. The revised ER calculation sheet, as well as PDD and FS sheet, are provided.</p>	Response to CAR-4 is satisfactory and the same is closed.
CAR 5: Signing of Memorandum of Understanding among the project proponent and the technology providers was not provided.	Table 1 / Item 3.-w-ii	Provided the soft file of technology transfer letter from Sinoma Energy Conservation Co., Ltd. (Letter No. CEC 06/09).	Response to CAR- 5 is satisfactory and the same is closed
CAR 6: Do not provide the approval of investment on CDM project evidence.	Table 1 / Item 3-w-iii	Provided the soft file of excerpt form minute of meeting the 137 th (6/2007) board of directors meeting the Siam Cement Public Company Limited /14/.	Response to CAR-6 is satisfactory and the same is closed
CAR 7 : The description of the proposed CDM project activity as contained in the PDD is not accurate because specification of SP boiler and AQC of Kilns No.4 and No.6, it is found that the actual data of electricity generated by steam turbine is 19,270 KW <i>net power generation</i> (with 20,500 KW gross).	Table 1 / Item 4.-b.-ii	<p>Correction in ER sheet has been done and appropriate changed in the PDD.</p> <p>PDD has been revised and complied with provided documentary evidence.</p> <p>Since the project has not yet in commissioning period, proof of gross power from test-run period is not</p>	<p>Response to CAR-7 is satisfactory and the same is closed.</p> <p>The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)" has been revised in section A.2 to quote gross power generation at 19.27 MW. <i>However,</i></p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
<p>The proposed PDD wrongly quote gross data.</p> <p>Gross annual power generation amount of 100,644 MWh is incorrect.</p>		<p>available at this time. However, the supplier performance guarantee (Annex 1 to engineering contract) is provided.</p> <p>[CAR06_TS46_power gen and self power.pdf]</p> <p>In this revised PDD , correction of gross annual power generation figures has been done to ensure consistency of the context and the plant's work journal of kilns no.4 and 6 in base year 2007 is provided.</p> <p>[CAR06_TS46_WJ Kiln2007.pdf]</p> <p>Please also refer to a revised ER calculation sheet.</p> <p>[0085864_SCG-TS46_Calculation_ver03_rev00.xls]</p>	<p><i>proof of this gross power from supplier guarantee result from test-run period is required for validating this amount..</i></p> <p>On 31/08/09, Validator received Proof from supplier contract is received and it shows that Gross power generation is 20,500 kW, and net power generation is 19,270 kW.</p> <p>Validator rechecked data quoted in the PDD Section A.2 and the ER calculation sheet (version 03) and found that this data was correctly quoted in both document.</p> <p>Therefore, the response is accepted.</p> <p>Gross annual power generation is quote in the revised PDD section A.2 at amount of 112,424 MWh which will be used in the power generation unit and supplied to the cement plant, displacing parts of electricity currently supplied from national grid.</p> <p><i>As this quoted number has been changed from previous calculation,</i></p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
			<p><i>proof of running hours of generators at Kilns No.4 and No.6 in baseline year (2007) are required.</i></p> <p>On 31/08/09, The amount quoted in the PDD Section A.4.3 was adjusted to 107,184_MWh.</p> <p>Validator rechecked data quoted in the latest version of PDD Section A.2 and the ER calculation sheet and found that this data was correctly quoted in both document.</p> <p>Therefore, the response is accepted.</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CAR 8: Data of gross annual power generation is identified at 100,644 MWh, however when verified with data source it is found that this number is incorrect. Thus, the estimated emission reduction need to be corrected and recalculated.	Table 1 / Item 5-e-g-i	Refer to CAR 7	<p>Response to CAR-8 is satisfactory and the same is closed.</p> <p>(Refer to CAR 7)</p> <p>On 31/08/09 The amount quoted in the PDD (version 03) Section A.4.3 was adjusted to 107,184 MWh.</p> <p>Validator rechecked data quoted in the latest version of PDD Section A.2 and the ER calculation sheet and found that this data was correctly quoted in both document.</p> <p>Therefore, the response is accepted.</p>
CL 1: Please provide LoA of Thailand	Table 1 / Item 1 / item 2.b,e,g,h,i,	Received the letter of approval from project owner on 27/7/09 details as below letter of approval number : TGO No.02 / 140 issued by DNA, the Board of Thailand Greenhouse Gas Management Organization (Public Organization), on 23/4/2009 /2/	Response to CL- 1 is satisfactory and the same is closed.
CL 2: In PDD section A.4.3 does not have	Table 1 /	Additional description, including know-	Response to CL- 2 is satisfactory and



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
the description of know-how, is transferred to the Host Party(ies).	Item 3-h-i	how transfer, is provided in Section A.4.3 of The PDD version 05, title "Siam Cement (Thung Song) Waste Heat Power Generation Project (TS Project)" has been revised in section A.4.3 to add description of technology to be employed by the project activity as a waste heat recovery and electricity generation which is transferred from Sinoma Energy Conservation Limited, China. Proof of this statement has been received.	the same is closed
CL 3: AM0024 version 02 "Baseline methodology for greenhouse gas reductions through waste heat recovery and utilisation for power generation at cement plants". The latest version is 02.1	Table 1 / Item 3-k-i	Correction in PDD the latest version , Section B.1, has been made as suggested.	<p>Response to CL- 3 is satisfactory and the same is closed .</p> <p>The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)" has been revised in section B.1 to state the latest version of AM0024 "Baseline methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants" version 02.1.</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CL 4: The calculation sheet for emission reduction is needed be provide.	Table 1 / Item 3.-p-1	<p>The emission reduction spread sheet is provided.</p> <p>Please refer to the revised ER calculation sheet and 2007 work journal stated in CAR 7.</p> <p>Actual clinker production – Please refer to revision and documents as listed in CAR 7.</p> <p>Electricity consumption – The copy of aggregate of annual electricity consumption has been verified and provided herewith.</p> <p>[CL4_TS46_EE usage approved.pdf]</p>	Response to CL-4 is satisfactory and the same is closed.
CL 5: Need to correct the calculation by following the AM0024 version 02.1. Leakage should be explained as well. Should specify the source of website of Table A3-6 (CO2 emissions and OM emission factor of grid electricity generation, 2006).	Table 1 / Item 3-r,1,3	-Explanation of “Leakage” has been included in Section B.6.3.	<p>Response to CL- 5 is satisfactory and the same is closed</p> <p>The PDD, title “Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)” has been revised</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
		<p>- Source of website of has been added under Table A3-6. The soft copy of DEDE source is also attached herewith.</p>	<p>in section B.6.3 to add explanation of “Leakage” (i.e construction and fuel handling in the context of electric sector projects) and such leakages are considered negligible. According to on-site validation, it was found that construction period was only a short term and such activity has nearly completed, therefore this statement is acceptable.</p> <p>The PDD, title “Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)” has been revised Table A3-6 to add website of Department of Alternative Energy Development and Efficiency (DEDE), under the Ministry of Energy, Thailand, and the soft copy was received.</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CL 6: Operation manual providing greater details of roles and responsibility of each staff, reporting format, QA/QC procedure, etc. shall be provided. Please note that data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. This needs to be documented.	Table 1 / Item 3-u-5	Project proponent prepared monitoring procedure /7/ on 25 May 2009 and sent to DOE on 22 July 2009. This procedure consist of important information such as roles and responsibility of each position and ensure monitoring document will be kept at least 2 years after the end of the crediting period or the last issuance of CERs for this project activity.	Response to CL- 6 is satisfactory and the same is closed
CL 7: In PDD Annex 4 should elaborate the background information used in the application of the monitoring methodology such as operation procedure, QC/QA procedure, calibration procedure, data management procedure and maintenance procedure.	Table 1 / Item 3-t-i-b	Annex 4 of PDD has been completed, illustrating project's specific monitoring procedure apart from information provided in parameter tables in B.7.1. Please also refer to the monitoring procedure attached. [CL7_TS46_WHG-II Monitoring Precedure.pdf]	Response to CL- 7 is satisfactory and the same is closed
CL 8: Technology employed in WHG needs to be identified.	Table 1 / Item 4-b-iii	The technology to be employed has been substantiated in A.4.3.	Response to CL- 8 is satisfactory and the same is closed The PDD, title "Siam cement (Thung



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
			Song) Waste Heat Power Generation Project (T46 Project)" has been revised in section A.4.3 to details of Sinoma Energy Conservation limited, China, as a provider of waste Heat Recovery and Electricity Generation to the project. Proof of this statement has been received.
CL 9: Electricity demand of cement works is not separated from locals load as well as the specific demand of production cement line No.4 and 6 of the project boundary. Need clarification.	Table 1 / Item 5-b-i-1	Refer to CAR 8	<p>Response to CL-9 is satisfactory and the same is closed</p> <p>The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)" has been revised in section B.4 to clarify baseline scenario in which TS5 has been confirmed by the client not to be included in project boundary. As review the revised calculation sheet attached with the PDD, production data are precisely taken from TS4 and TS6 as complied with Work Journal year 2006 and 2007.</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CL 10: The net power generation (MW) presented in table 4 (page 16) of the proposed PDD project need further clarification as the source of 'Self-power consumption (MW)' is not clearly identified....(6% as stated by specification, but this figure is not used in calculation of self power generation)	Table 1 / Item 5-a-h-9	Refer to CAR 4 Please refer to the performance guarantee.	Response to CL-10 is satisfactory and the same is closed. (Refer to CAR 4)
CL 11: There is only electrical generation source from the grid. None existing captive power source is used. However, it is not clearly stated in the proposed PDD.	Table 1 / Item 5-a-h-14	Referring to revised Section B.4., it identifies that no other electricity source, other than grid, is considered the baseline scenario.	Response to CL- 11 is satisfactory and the same is closed The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)" has been revised in section B.4 to clearly state the name of EGAT (Electricity Generating Authority of Thailand) as a source of the grid.
CL 12: Project emissions- net power (MW) 17.73 is required to check for correctness and source.	Table 1 / Item 5-a-h-17	It has been corrected in the PDD.	Response to CL- 12 is satisfactory and the same is closed The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)" has been revised



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
			in section A.2, A.4.3, and B.3 to use amount of 19.27 MW for net power.
CL 13: The grid is identified in electrical purchased agreement as “EGAT (Electricity Generation Authority of Thailand)”. However it is not identified in section B.2 of the proposed PDD.	Table 1 / Item 5-b-a-i-3	It is clearly identified in B.2 (no.3 in the table).	Response to CL- 13 is satisfactory and the same is closed The PDD, title “Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)” has been revised in section B.2 to clearly identify EGAT (Electricity Generating Authority of Thailand) as a source of the grid.
CL 14: Project boundary stated in Section B.3 is not clear that the proposed activity use electricity from either the grid or other identifiable captive power generation.	Table 1 / Item 5-c-a.	No other electricity source of electricity other than grid is stated in Section B.3.	Response to CL- 14 is satisfactory and the same is closed The PDD, title “Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)”, Section B.3, has clearly identify EGAT (Electricity Generating Authority of Thailand) as a source of the grid and no captive power plant.
CL 15: Project participant should state more clearly of the exclusion of Kiln no.5 from the proposed project boundary to be transparency in order to justify other related	Table 1 / Item 5-c-a.	Refer to CL 11 The exclusion of kiln no.5 has been	Response to CL- 15 is satisfactory and the same is closed



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
data presented in the proposed PDD.		performed in B.4 of PDD.	



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
CL 16: The methodology allows including CO ₂ emissions from on-site fuel consumption of fossil fuels but the project participants did not justify that choice.	Table 1 / Item 5-c-f	According to AM0024 ver02.1, CO ₂ emission is calculated as a project emission (PE _y) which is the difference in CO ₂ emissions use of fossil fuel in the clinker making process in cement manufacturing unit, where the project is being implemented, before and after the project implementation. Since the plant has no plan to neither improve the clinker production process itself nor change in fuel consumption in the plant production process, the energy consumption per unit of output is presumed unchanged (F _{P,y} = F _B).	Response to CL- 16 is satisfactory and the same is closed Forward Action Request (FAR1). According to production forecast of TS46 in the next 10 years, there is an increasing trend in Kiln utilization factor and therefore future parameter should be closely monitored.
CL 17: The methodology allows including CO ₂ emissions from on-site fuel consumption of fossil fuels but no justification provided reasonable (should provide reference to the supporting documented evidence provided by the project participants).	Table 1 / Item 5-c-g.	Refer to CL 16 Although AM0024 includes emission from on-site fuel consumption, the project is purposely to recover the waste heat from the clinker making process without any alteration of the process itself as stated in B.2 (applicability condition no.7) of the PDD. Thus, an <i>ex-ante</i> calculation shows that EI _B equals to EI _{P,y} , or there is no difference in CO ₂ emissions from use of fossil fuel in the clinker making process before and after the project	Refer above conclusion. (CL16)



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
		implementation.	
CL 18: Steps and Calculation is to be verified. (Equation 5)	Table 1 / Item 5-e-a,b	Correction is made in equation 5 of ER calculation, as well as in the PDD.	Response to CL- 18 is satisfactory and the same is closed. The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)", Section B.3, has been revised data related to ER.
CL 19: It is observed in the proposed PDD that emission (CO ₂) from on-site fossil fuel consumption within project boundary, and/or from captive power generation(if any) is not included when calculation. However such sources are not clearly identified in section B.3.	Table 1 / Item 5-e-b-i	There is no existing captive power generation in the project boundary and it is clearly stated in B.3.	Response to CL- 19 is satisfactory and the same is closed The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (T46 Project)", Section B.3, has clearly identify EGAT (Electricity Generating Authority of Thailand) as a source of the grid and no captive power plant.
CL 20: Please explain the details of the additional capital expenses (30 % of the total investment)	Table 1 / Item 6-c-f	WHG system normally need to stop 2-3 months every 10 year for major overhaul with maintenance cost about 30% of investment cost.	Response to CL- 20 is satisfactory and the same is closed. Validation team checked the Document name Sinoma-EC page 5 /15/ (attached) from supplier and found that it is suitability.
CL 21: Please provide evidences to prove	Table 1 /	We believe that even though the TCMA letter couldn't be accepted as a support	Response to CL- 21 is satisfactory and



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. To checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
that the project is the first of its kind.	Item 6-u-iii	to prevailing practice barrier, it's still considered sufficient for common practice analysis. The TS 46 projects are apparently the first of its kind in commercial scale in the country. However if a documentary evidence is an absolute requirement, this barrier can be removed	the same is closed The barrier analysis was withdrawn from an The PDD, title "Siam cement (Thung Song) Waste Heat Power Generation Project (TS 46 Project)"