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Validation Report

SKS Ispat Limited

**Validation of the “Waste Heat Recovery based
captive power generation by SKS Ispat Ltd”
project in India**

Report No. 812604, Revision 01

12 September 2006

TÜV SÜD Industrie Service GmbH
Carbon Management Service
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Report No.	Date of first issue	Revision No.	Date of this revision	Certificate No.
812604	01 September 2006	01	12 September 2006	-
Subject:		Validation of a CDM Project		
Executing Operational Unit:		TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199 - 80686 Munich Federal Republic of Germany		
Client:		SKS Ispat Limited Siltara Industrial Growth Centre, Phase II, 18 Mile Stone Bilaspur Road, Raipur - 493111, India		
Contract approved by:		Michael Rumberg		
Report Title:		Validation of the "Waste Heat Recovery based captive power generation by SKS Ispat Ltd" project in India		
Number of pages		18 (excluding cover page and annexes)		
Summary: <p>The Certification Body "Climate and Energy" has been ordered by SKS Ispat Limited to perform a validation of the above mentioned project. The project is a unilateral CDM project. Project participant is SKS Ispat Limited, India.</p> <p>Using a risk based approach, the validation of this project has been performed by document reviews and on-site inspection, audits at the locations of the project and interviews at the offices of the project developer and the project owner.</p> <p>As the result of this procedure, it can be confirmed that the submitted project documentation is in line with all requirements set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board.</p> <p>Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reduction of 1,167,730 tonnes CO2e over a crediting period of ten years, resulting in a calculated annual average of 116,773 tonnes CO2e, represents a reasonable estimation using the assumptions given by the project documents.</p>				
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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CR	Clarification Request
CSEB	Chattisgarh State Electricity Board
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
GHG	Greenhouse gas(es)
GM	General Manager
KP	Kyoto Protocol
MP	Monitoring Plan
ODA	Official Development Assistance
PDD	Project Design Document
SKSIL	SKS Ispat Limited
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual
WHR	Waste Heat Recovery
WR	Western Region

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1 INTRODUCTION

1.1 Objective

SKS Ispat Limited has commissioned TÜV SÜD Industrie Service GmbH (TÜV SÜD) to validate the “Waste Heat Recovery based captive power generation by SKS Ispat Ltd” project in India. The validation serves as a design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess 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 the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

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. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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.

The audit team has been provided with a draft PDD in April 2006. Based on this documentation, a document review and a fact finding mission in form of an on-site audit has taken place. The revised final PDD version, in response to the CARs and CRs indicated in the audit process, was submitted in September 2006. This PDD and the results from the on-site audit serve as the basis for the assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the validation team has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Technical aspects of sponge iron manufacturing
- Technical aspects of waste heat recovery and power production plants
- Monitoring concepts
- Political, economical and technical framework conditions in host country

According to these requirements, TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body “climate and energy”:

Javier Castro is an energy expert for CDM and JI projects at TÜV SÜD Industrie Service GmbH. He has an academic background in chemical engineering and energy systems. In his position he participates as an expert and project manager in energy related projects during the validation, verification and certifications processes for GHG mitigation projects. He has received extensive training in the CDM and JI validation processes.

Sunil Kathuria is a lead auditor for CDM projects and a lead auditor for quality and environmental management systems (according to ISO 9001 and ISO 14001) at TÜV South Asia, TÜV SÜD Group. He is based in New Delhi. In his position he is implementing validation, verification and certifications audits for CDM projects. He has received extensive training in the CDM validation process and has already participated in several CDM project assessments.

Dr. Ayse Frey is an auditor for CDM/JI projects as well as an energy/waste expert at TÜV SÜD Industrie Service GmbH. After her studies in civil and environmental engineering, she completed a PhD in the field of water and waste policy. She has over 2 years of experience with the CDM and JI flexible mechanisms as well as with management systems. She has received extensive training in the CDM/JI validation and verification processes and has participated in numerous CDM/JI project assessments.

The audit team covers the above mentioned requirements as follows:

- Knowledge of Kyoto Protocol and the Marrakech Accords (ALL)
- Environmental and Social Impact Assessment (ALL)
- Skills in environmental auditing (ALL)
- Quality assurance (ALL)
- Technical aspects of sponge iron manufacturing (CASTRO / KATHURIA)
- Technical aspects of waste heat recovery and power production plants as well as grid operation (ALL)
- Monitoring concepts (ALL)
- Political, economical and technical framework conditions in host country (KATHURIA)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body “climate and energy”:

- Werner Betzenbichler (head of the certification body “climate and energy”)

1.3 GHG Project Description

The project activity takes place at a sponge iron plant and involves the generation of electrical power through the installation of waste heat recovery boilers and turbine generators (total 25 MW). The electricity generated by the plant will be used for captive power as well as electricity supply to the grid.

The plant is located about 21 km from Raipur in Chhattisgarh state, India. The project is a unilateral CDM project. Project participant is SKS Ispat Limited, India.

The project starting date is May 15, 2006. The fixed crediting period of 10 years starts on January 1, 2007.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, 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 validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol is enclosed in Annex 1 to this report.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement 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 organised in seven different sections. Each section is then further sub-divided. 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 is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
If the conclusions from the draft 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 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under “Final Conclusion”.

Figure 1 Validation Protocol Tables

2.1 Review of Documents

The project design document submitted by the client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as Annex 2 to this report. The project design document underwent several revisions addressing corrective action and clarification requests issued by TÜV SÜD.

2.2 Follow-up Interviews

In the period of April 22-23, 2006, TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
SKS Ispat Limited	<ul style="list-style-type: none">➤ Project design➤ Technical equipment➤ Sustainable development issues➤ Baseline determination➤ Additionality➤ Crediting period➤ Monitoring plan➤ Management system➤ Environmental impacts➤ Stakeholder process➤ Approval by the Parties involved

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by TÜV SÜD were resolved during communications between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses given are summarised in chapter 3 below and documented in more detail in the validation protocol in Annex 1.

3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the project design documents and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in annex 1.
- 2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Annex 1. The validation of the project resulted in one Corrective Action Request and ten Clarification Requests.
- 3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the client and TÜV SÜD to resolve these Clarification or Corrective Action Requests is summarised.
- 4) The conclusions for validation subject are presented.

The validation findings relate to the project design as documented and described in the final project design documentation.

3.1 Project Design

3.1.1 Discussion

The project involves the implementation of waste heat recovery boilers and turbine generators for captive electricity generation as well as electricity supply to the grid at the premises of a sponge iron plant in Siltara village, Raipur district, Chhattisgarh state.

The project is a unilateral CDM project. Project participant is SKS Ispat Limited, India. The involved Party, India, as the host Party meets all relevant participation requirements. The project has received a Letter of Approval from the Indian government in June 2006. The project does confirm with the project category Scope 1. “Energy industries (renewable/non-renewable sources”. The objective is to reduce GHG emissions by the utilisation of waste heat for power production.

The project design engineering does reflect current good practices. The project is professionally managed and the applied technology represents state-of-the-art technique. The project equipment can be expected to run for the whole project period and it is not expected that it will be replaced by more efficient technologies. The project makes use of existing domestic boiler and turbine technologies. In accordance with the latest environmental regulations an electrostatic precipitator has been installed in order to remove particles from the exhaust gas.

Initial training is required because of the core business area being different than generation of power. According to information obtained by the validator on-site, the same is met by recruiting trained staff and also the companies supplying equipments are training local staff as part of their contract.

The project will create employment both during project commissioning stage and then during the operations stage. A total of around 50 persons shall be employed in operations.

The project is expected to be in line with sustainable development policies of the country. The Government of India assesses this question before approving the project. As a Letter of Approval has been issued for this specific project, the project must be seen as being in line with sustainable development policies of the country.

The project has to obtain different permissions and licences for erection and operation of the plant. The relevant documentation has been verified. Moreover it has been assessed the necessity for an environmental clearance of the project. Such an environmental clearance is not necessary for this type of project. The applying requirements for plant operation are hence fulfilled.

The funding for the project does not lead to a diversion of official development assistance as according to the information obtained by the audit team. Official Development Assistance (ODA) does not contribute to the financing of the project.

The project starting date is May 15, 2006. The fixed crediting period of 10 years starts on January 1, 2007.

3.1.2 Findings

Corrective Action Request No. 1

The project boundary as shown on page 14 of PDD needs to be corrected as it is showing 30MW AFBC turbine.

Response:

The project boundary has been modified (PDD Section B.4).

Clarification Request No 1:

A Letter of Approval from the host country i.e. the government of India needs to be submitted to the DOE.

Response:

Host country approval letter has been submitted to DOE.

3.1.3 Conclusion

The project complies with the requirements.

3.2 Baseline and Additionality

3.2.1 Discussion

The project applies the baseline methodology ACM0004 “Consolidated baseline methodology for waste gas and/or heat for power generation”, version 02, 03 March 2006, which is deemed

to be the one most applicable for this project. The PDD responds convincingly to each of the applicability criteria which are outlined in the baseline methodology.

The application of the baseline methodology is transparent. Two likely baseline scenarios are identified: import of electricity from the grid and coal-based captive power plant. To be conservative, import of electricity from the grid has been used as the baseline scenario in the estimation of emission reductions since grid-based power has a lower emission factor compared to coal-based power. The baseline emission factor has been calculated as a combined margin in accordance with ACM0002.

The PDD demonstrates that the project is not a likely baseline scenario by applying the “tool for the demonstration and assessment of additionality”. The Final PDD takes into account the guidelines given by this tool and complies with each defined step. However, documentary evidence was required to support the common practice and the technology barriers. The common practice analysis needed to be more focussed on the discussion of similar activities. Moreover the investment analysis needed to demonstrate that at least one other likely alternative has a lower unit cost of service.

Documentary evidence indicating that CDM had been considered in the project planning stage was submitted to the audit team.

3.2.2 Findings

Clarification Request No.2

Documentary evidence on the starting date of the project activity (financial closure) as well as on the preliminary considerations of CDM incentive should be provided.

Response:

Purchase orders for Turbine submitted to DOE.

A board extract of board meeting in which CDM was considered while deciding on WHRB implementation submitted to DOE.

Clarification Request No.3

Regarding the common practice analysis the PDD analyses activities within the sponge iron industry instead of concentrating on similar activities as defined in the ‘Tool for the demonstration and assessment of additionality’.

Response:

DRI kiln is used extensively in Sponge Iron industry only, hence universe of Sponge iron manufacturers in the state of Chattisgarh have been taken for common practice analysis.

Common practice analysis has been elaborated in the PDD (section B.3), data used for common practice analysis has been obtained from Joint Plant Committee report on Indian Sponge Iron Industry (2005-06).

Clarification Request No. 4

Documents to confirm the statements given in the technological barrier should be submitted to the validator.

Response:

Technical barriers related documents submitted to DOE and same have been referenced in the revised PDD.

Clarification Request No. 5

It should be clearly demonstrated that the cost per kWh for at least one alternative is less than the cost per kWh produced from the project.

Response:

As per the information provided in Section B.2 of the PDD, a coal-based power plant is a feasible alternative due to low capital cost and cost of power generation and this makes it the best option available to SKSIL for obtaining power requirement in its industrial complex. In the absence of the project activity, project promoter would have setup a large coal/char-based power plant to meet power demand in the plant and would have discontinued power purchase from grid (a higher cost option).

Hence in the additionality analysis cost of power generation from the project activity without CDM benefits (Rs 1.62/KWh) and coal/char based power generation (Rs 1.36/KWh) have been compared. Also, the sensitivity analysis done on cost/kWh demonstrates that waste heat-based power generation is not the most economical choice of power generation for project promoter. With CDM benefits, cost of power generation using waste gases from kiln improves to Rs 1.25/KWh making it the cheapest cost option. CDM benefits are sought to remove main barrier against implementation of the project activity.

However, as grid-based power has a lower emission factor as compared to coal-based power generation, to be conservative “Import of electricity from the grid” has been considered as the baseline scenario in this project activity.

Clarification Request No. 6

A clear documentation of the data sources with an unambiguous reference to each of the figures provided should be given in order to allow a verification of the same.

Additionally, the assumptions made for the calculations do not seem to be conservative, specially the working days (is contradictory to the availability risk statements).

Furthermore, why are the figures in Table A.4.4.1 and E.6. different? These should be the same.

Response:

Data have been referenced in PDD and excel sheet for calculations provided to DOE.

Support documents for information used for baseline assessment and investment analysis have also been provided to DOE.

Expected power generation figure as provided by technical consultant (based on kiln running days of 330) is being used for both CERs estimation and financial analysis as well. Availability risk factor is being accounted for in the expected plant load factor (79%) which is lower than a

normal fossil fuel based power plant (90-95%). Same PLF is being taken for financial analysis as well.

Tables A.4.4.1. and E.6. have been corrected and are now the same.

3.2.3 Conclusion

The project complies with the requirements.

3.3 Monitoring Plan

3.3.1 Discussion

The selected monitoring methodology ACM0004 is deemed to be the most applicable for this project. The application of the monitoring methodology is transparent.

A monitoring of the baseline emissions is only partly necessary as the emission factor is determined ex-ante and will not be monitored. The only indicators mandatory to be monitored are the total electricity generated and the auxiliary electricity needed, thus resulting in the net electricity supplied. The respective parameters are properly described in the monitoring plan. No emergency situation with unintended emission has to be expected.

The project boundary includes diesel generators for tertiary backup in order to rotate the kiln. The monitoring of auxiliary fuel used to run these diesel generators in the project activity has been included in the monitoring plan to account for possible project emissions. Furthermore, it has been demonstrated that power produced by diesel generators is not measured as power produced by the waste heat recovery boilers.

No leakage is to be considered according to the methodology.

Authority and responsibility for registration, monitoring, measurement and reporting were only partly described and additional information was required. The overall responsibility for reporting of emissions data is with the General Manager (GM). One person to be defined by the management will be responsible for data collection and management.

3.3.2 Findings

Clarification Request No.7

It is not clear why the monitoring of quantity and calorific value of fuel & waste gas are included in the monitoring plan when direct measurement of electricity generated is possible.

Response:

Monitoring plan has been modified (section D of PDD), and this anomaly has been corrected. There is no requirement for monitoring of CV of fuel and waste gases as direct measurement of electricity generation is possible.

Clarification Request No.8:

It should be explained how it is ensured that power produced by the diesel genset is not measured as produced by the waste heat recovery plant.

Response:

Meter used for measuring power generation from the project activity is independent of power generation using diesel genset. There is no linkage between power generation in the project activity and diesel based generation. A line diagram to confirm this has also been submitted to DOE.

Clarification Request No.9

The procedure covering roles, responsibilities and authorities for carrying out monitoring, measurement and reporting of the complete monitoring plan needs to be submitted to DOE. The procedure should also cover retention period for records and calibration of monitoring equipments, and corrective actions and internal audits should be defined. The monitoring plan should also include the uncertainty levels, methods and associated accuracy level of measurement instruments and calibration procedures to be used for various parameters. As mentioned in the EB decision (see link:

http://cdm.unfccc.int/Reference/Guidclarif/EB23_%20para%2024_guidance_monitoring.pdf).

Response:

The monitoring plan has been modified to include the missing requirements, details regarding the uncertainty levels, methods and associated accuracy levels of measurement instruments and calibration procedures to be used for various parameters. See PDD Section D and Annex 4.

3.3.3 Conclusion

The project complies with the requirements.

3.4 Calculation of GHG Emissions

3.4.1 Discussion

The project design captures all direct and indirect GHG emissions in the baseline and project scenarios. Project emissions may emerge in the case of power shortages from the operation of back-up diesel generators. These have been included in the calculation of GHG emissions, which results in a conservative estimate of GHG emission reductions, since these project emissions most likely occurred in the baseline scenario as well.

Leakage is not to be considered according to the methodology.

The calculations of the baseline emissions are documented in a complete and transparent manner. Baseline emissions are estimated based on the baseline emission factor for the Western regional grid, which is calculated as a combined margin according to ACM0002. The estimation of GHG emission reductions is based on expected power generation figures as provided by the technical consultant. To be on the conservative side, availability risk factor has been accounted for in the expected plant load factor (79%) which is lower than the normal plant load factor for fossil-fuel based power plants (90-95%). It was also demonstrated that dispatch data is not available for calculating OM, which was verified by the audit team.

3.4.2 Findings

Clarification Request No.10

It should be clearly demonstrated (with an official document) that the dispatch data is not available for a dispatch analysis.

Response:

Official document stating lack of dispatch data for grid emission factor estimation is not available. However, same could be easily verified by checking GEF estimation procedure adopted by registered CDM project activities till date in India.

CDM registered projects are also using Simple OM due to lack of availability of necessary dispatch data. Following are the projects already registered (all of these are connected to Western Region Grid and hence have similar baseline grid emission level):

- VGL - Waste Heat based 4 MW Captive Power Project at Raipur
- JBSL–Waste Heat Recovery Based Captive Power Project
- Waste heat recovery based captive power project at Monnet
- 8MW Waste Heat Recovery based Captive Power Project at OCL
- Power generation from waste heat of non-recovery type coke ovens at JSPL
- Process Waste Heat utilization for power generation at Phillips Carbon Black Limited, Gujarat

3.4.3 Conclusion

The project complies with the requirements.

3.5 Environmental Impacts

3.5.1 Discussion

An Environmental Impact Assessment of the project is not required according to Indian legislation. However, a Rapid Environment Impact Assessment study was carried out on voluntary basis. The environmental aspects of the project have been addressed in the PDD. It is not expected that the project will cause adverse environmental effects. Transboundary impacts are not considered to be of relevance.

The project complies with Indian environmental legislation and has obtained the necessary consents from the State Pollution Control Board, which were verified by the audit team on-site.

3.5.2 Findings

None.

3.5.3 Conclusion

The project complies with the requirements.

3.6 Comments by Local Stakeholders

3.6.1 Discussion

Stakeholders have been directly asked to comment on the project. No stakeholder process is required according to national legislation.

The Chattisgarh Environment Conservation Board conducted a public hearing on 03 October 2005 on the premises of collectorate Raipur district. Stakeholders were invited to this public hearing via notices in the newspapers (Navbharat Times and Dainik Bhaskar) as well as directly through the gram-panchayat (local village representatives). No negative comments have been received.

3.6.2 Findings

None.

3.6.3 Conclusion

The project complies with the requirements.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on its website and invited comments from Parties, stakeholders and non-governmental organizations during a period of 30 days, from April 13 to May 12, 2006.

Published on:

http://www.netinform.net/KE/Wegweiser/Guide2.aspx?ID=1659&Ebene1_ID=26&Ebene2_ID=463&mode=1

During the commenting period one comment was received. The comment was been submitted on May 12, 2006 by Ms. Anamika Chatterjee. Ms. Anamika Chatterjee is not an accredited observer organisation to the United Nations Framework Convention on Climate Change Conference of the Parties. The comment has subsequently not been considered as per the regulations, but relevant points have been taken into account during the validation process.

VALIDATION OPINION

TÜV SÜD has performed a validation of the “Waste Heat Recovery based captive power generation by SKS Ispat Ltd” project in India. The project is a unilateral CDM project. Project participant is SKS Ispat Limited, India. The Party involved is India as the host country. The validation was performed on the basis of UNFCCC criteria and host country criteria, 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 modalities and procedures and subsequent decisions by the CDM Executive Board.

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project does meet all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by TÜV SÜD for registration with the UNFCCC under the CDM.

By displacing fossil fuel-based electricity with electricity generated from waste heat, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the 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 as designed, the project is likely to achieve the estimated amount of emission reductions.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reduction of 1,167,730 tonnes CO₂e over a crediting period of ten years, resulting in a calculated annual average of 116,773 tonnes CO₂e, represents a reasonable estimation using the assumptions given by the project documents.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2006-09-12

Munich, 2006-09-12



Werner Betzenbichler

**Head of certification body “climate
and energy”**



Javier Castro

Project Manager

Annex 1: Validation Protocol

**Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities**

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	☑	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Marrakesh Accords, CDM Modalities §40a	☑	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	☑	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Marrakesh Accords, CDM Modalities §40a	☑	A Letter of Approval from the Indian government needs to be submitted to DOE See A 3.2 below.
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	☑	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, Marrakesh Accords, CDM Modalities §43	☑	Table 2, Section B.2
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords	☑	The project did not receive public funding.



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REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	☑	India has established a designated national authority.
9. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	☑	India is a Party to the Kyoto Protocol and has accessed the Protocol at August 26, 2002.
10. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	Marrakech Accords, CDM Modalities §37b	☑	Table 2, Section G
11. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	Marrakech Accords, CDM Modalities §37c	☑	Table 2, Section F
12. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel	Marrakech Accords, CDM Modalities §37e	☑	Table 2, Section B.1.1 and D.1.1
13. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	Marrakech Accords, CDM Modalities §37f	☑	Table 2, Section D
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Marrakech Accords, CDM Modalities, §40	☑	A global public stakeholder process on the UNFCCC website has taken place from April 13, 2006 to May 12, 2006. See link (http://www.netinform.net/KE/Wegweiser/Guide2.aspx?ID=1659&Ebene1_ID=26&Ebene2_ID=463&m)



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REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
			ode=1) and one comment has been received.
15. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	Marrakech Accords, CDM Modalities, §45c,d	☑	Table 2, Section B.2
16. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, CDM Modalities, §47	☑	Table 2, Section B.2
17. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	☑	The project design document does conform with the CDM Project Design Document format (version 02, from 1 July 2004) valid by the time of PDD submission.



Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	1, 2, 3, 4, 6, 11, 13, 20, 23	DR I	<p>The project spatial boundaries are clearly described in chapter A.2 and B.4 of the PDD. The description is in line with the applied methodology. In addition, the location of the site is exactly defined.</p> <p>The project involves the implementation of waste heat recovery boilers and turbine generators for captive electricity generation as well as electricity supply to the grid at the premises of a sponge iron plant in Siltara village, Raipur district, Chhattisgarh state. Auxiliary heat to the waste heat recovery process is not provided. The projects spatial boundary includes the project site as well as all power plants connected to the Western grid.</p>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries	1, 2, 3, 4,	DR I	The PDD does define the project system boundaries. The project involves 2 x 12	CAR1	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
clearly defined?	6, 11, 13, 20,2 3		<p>TPH and 2 x 38 TPH waste heat recovery boilers and a turbine generator set of 25MW.</p> <p>The back-up diesel generators are only acting as the backup when grid cannot be provide for the auxiliaries during shut down period & they are expected to have limited influence.</p> <p><u>Corrective Action request No.1</u></p> <p>The project boundary as shown on page 14 of PDD needs to be corrected as it is showing 30MW AFBC turbine.</p>		
A.2. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	1, 2, 3, 4, 6, 11, 13, 14,	DR I	Yes, the project design engineering does reflect current good practices. During project studies carried out in advance to the project implementation, consulting and engineering companies confirmed the appropriateness of the employed technology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.2. Does the project use state of the art technology or would the technology result in a significantly	1, 2, 3, 4,	DR I	The project makes use of existing domestic boiler and turbine technologies. In	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
better performance than any commonly used technologies in the host country?	6, 11, 13, 14, 19, 20, 25		accordance with the latest environmental regulations an electrostatic precipitator has been installed in order to remove particles from the exhaust gas.		
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1, 2, 3, 4, 6, 11, 13, 14, 19, 20, 25	DR I	It is not likely that the key technology applied will be substituted by other or more efficient technologies.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	1, 2, 3, 4, 6,9 14, 20	DR I	Initial training is required because of the core business area being different than generation of power. According to information obtained by the validator on site the same is met by recruiting trained staff and also the companies supplying equipments are training local staff as part of their contract.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.5. Does the project make provisions for meeting training and maintenance needs?	1, 2, 3, 4, 6,9 14, 20	DR I	Yes the plant has evolved their maintenance checklists which are used by the operations staff.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	1,2,3, 4,6,8, 11,13, 14,15, 17	DR I	Yes, according to the information given in the PDD the project is in line with relevant legislation in India. During the visit on site it could be evidenced that the relevant licences and permits are in place.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.2. Is the project in line with host-country specific CDM requirements?	1,2,3, 4,6,8, 11,13, 14,15, 17	DR I	<u>Clarification request no. 1</u> A Letter of Approval from the host country i.e. the government of India needs to be submitted to the DOE.	CR1	<input checked="" type="checkbox"/>
A.3.3. Is the project in line with sustainable development policies of the host country?	1,2,3, 4,6,8, 11,13, 14,15, 17	DR I	See above in A.3.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	1,2,3, 7,9	DR I	Yes, the project will create employment, during project commissioning stage and then during the operations stage. A total of around 50 persons shall be employed in operations. In addition the availability of power shall reduce burden on the western grid thus improving availability of power	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	1,2,3,4,5,6	DR I	Yes, the baseline methodology applied has been approved by the CDM Executive Board and is published as under the name ACM0004, version 02: "Consolidated baseline methodology for waste gas and/or heat for power generation".	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	1,2,3,4,5,6,25	DR I	<p>The baseline methodology is deemed to be one, out of the existing approved baseline methodologies, most applicable for this project.</p> <p>The PDD responds convincingly to each of the applicability criteria which are outlined in the baseline methodology.</p>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2. Baseline Determination <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	1,2, 3, 4,5,6 ,25	DR I	The application of the methodology and the discussion and determination of the chosen baseline is mainly clear.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.2. Has the baseline been determined using conservative assumptions where possible?	1,2, 3, 4,5,6 ,25	DR	Baseline determination has been carried out in line with ACM002	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.3. Has the baseline been established on a project-specific basis?	1,2, 3, 4,5,6 ,25	DR I	Yes, the baseline has been based on project specific data.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	1,2, 3, 4,5,6 ,25	DR I	Yes the scenario has been based on the western grid.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.5. Is the baseline determination compatible with the available data?	1,2, 3, 4,5,6 ,25	DR I	The baseline emission factor is calculated using the combined margin approach. The data for operating margin is based on the average of the last three years (2002/03, 2003/04 and 2004/05) considering the Western regional grid. The built margin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			calculation includes data available until March 05.		
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	1,2,3,4,5,6,25	DR I	Yes, the most likely baseline scenario is the purchase of electricity from the grid in combination with backup diesel generators in case of power cut.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?	1,2,3,10,4,5,6,16,25	DR I	<p>The baseline methodology asks for the application of the "tool for the demonstration and assessment of additionality". The PDD takes into account the guidelines given by this tool and complies mainly with each defined step.</p> <p>However the discussion of additionality needs to be supported by respective documentation.</p> <p><u>Clarification Request No.2</u></p> <p>Documentary evidence on the starting date of the project activity (financial closure) as well as on the preliminary considerations of CDM incentive should be provided.</p> <p><u>Clarification Request No.3</u></p> <p>Regarding the common practice analysis the PDD analyses activities within the sponge iron industry instead of concentrating on similar activities as defined in the 'Tool for the demonstration and assessment of additionality'.</p>	CR 2 CR 3 CR 4 CR 5	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<p>Please discuss in more detail the driver for each <u>similar</u> project activity in India. The PDD should demonstrate that the activity is the first of this kind under the given circumstances.</p> <p><u>Clarification request No.4</u></p> <p>Documents to confirm the statements give in the technological barrier should be submitted to the validator.</p> <p><u>Clarification request No.5</u></p> <p>It should be clearly demonstrated that the cost per kWh for at least one alternative is less than the cost per kWh produced from the project.</p>		
B.2.8. Have the major risks to the baseline been identified?	1,2,3,4,5,6,25	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.2.9. Is all literature and sources clearly referenced?	1,2,3,4,5,6,25	DR I	<p>References for literature and data sources are provided in general.</p> <p><u>Clarification Request No. 6</u></p> <p>A clear documentation of the data sources with an unambiguous reference to each of the figures provided should be given in order to allow a verification of the same.</p> <p>Additionally, the assumptions made for the</p>	CR 6	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			calculations do not seem to be conservative, specially the working days (is contradictory to the availability risk statements). Furthermore, why are the figures in Table A.4.4.1 and E.6. different? These should be the same.		
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	1,2,3,4,5,6,19,20	DR I	The starting date of the project is defined as the commissioning date of the plant 15.05.2006 and operational lifetime are clearly defined for 30 year which is reasonable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max. two x 7 years or fixed crediting period of max. 10 years)?	1,2,3,4,5,6,19,20	DR I	Yes, the crediting period is fixed for 10 year & the starting date is planned at 01/11/2006.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.1.3. Is it assured that in case the start of the crediting period is before the registration of the project that the project activities starting date falls in the period between 1 January 2000 and the registration of the first clean development mechanism project?	1,2,3,4,5,6,19,20	DR, I	According to the information in the PDD the start of project activities has been after the registration date of the first clean development mechanism project. This statement could be verified during the visit on site and the review of respective documents.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	1,2,3, 4, 6,18 24	DR I	Yes, it refers to ACM0004, version 02 that has been approved by the CDM Executive Board.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	1,2,3, 4,6,18 ,24	DR I	<p>The monitoring methodology is deemed to be one out of the existing approved monitoring methodologies most applicable for this project. The PDD responds convincingly to each of the applicability criteria which are outlined in the monitoring methodology.</p> <p><u>Clarification Request No.7</u></p> <p>It is not clear why the monitoring of quantity and calorific value of fuel & waste gas are included in the monitoring plan when direct measurement of electricity generated is</p>	CR 7	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			possible.		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	1,2,3, 4,6,18, 24	DR I	Yes, see D.1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	1,2,3, 4,6,,18, 24	DR I	Yes, the selection of the monitoring methodology is transparent.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	1,2,3, 4,6, 18,24	DR I	<p>The project boundary includes diesel generators and the measurement of GHG emissions from DG sets have been explained in the section E .1 of PDD but the monitoring plan does not include it's measurements</p> <p><u>Clarification Request No.8:</u></p> <p>It should be explained how it is ensured that power produced by the diesel genset is not measured as produced by the waste heat recovery plant.</p>	CR 8	<input checked="" type="checkbox"/>
D.2.2. Are the choices of project GHG indicators reasonable?	1,2,3, 4,6,18, 24	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2.3. Will it be possible to monitor / measure the	1,2,3,	DR	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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specified project GHG indicators?	4,6,18 ,24	I			
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	1,2,3, 4,6,18 ,24	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.2.5. Will the indicators enable comparison of project data and performance over time?	1,2,3, 4,6,18 ,24	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	1,2,3, 4	DR I	No leakage is evident in the project according to the methodology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.2. Have relevant indicators for GHG leakage been included?	1,2,3, 4	DR I	See above in D.3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	1,2,3, 4	DR I	See above in D3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?	1,2,3, 4	DR I	See above in D3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	1,2,3, 4, 16,25	DR I	Yes, the monitoring plan has been provided according to the requirements of ACM0004. Recalculation of the emission factor for the grid electricity replaced by the project activity is not required as it is based on an ex-ante approach.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	1,2,3, 4, 16,25	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.4.3. Will it be possible to monitor the specified baseline indicators?	1,2,3, 4,16, 25	DR I	Yes, as the electricity produced and the auxiliary electricity needed is key parameters for daily operations it will be possible to monitor this indicator.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	1,2,3, 4	DR I	The methodology does not require the monitoring of such data.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.2. Is the choice of indicators for sustainability	1,2,3,	DR	No, according to the methodology there is	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
development (social, environmental, economic) reasonable?	4	I	no need to define specific indicators.		
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	1,2,3, 4	DR I	See above D.5.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	1,2,3, 4	DR I	See above D.5.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	1,2,3, 7,8,9, 20	DR I	Yes, the general manager has the overall responsibility for reporting of emissions data. One person to be defined by the management will be responsible for data collection and management.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	1,2,3, 7,8,9, 20,24, 26	DR I	<p>The respective procedures are only partly defined.</p> <p><u>Clarification Request No.9</u></p> <p>The procedure covering roles, responsibilities and authorities for carrying out monitoring, measurement and reporting of the complete monitoring plan needs to be submitted to DOE. The procedure should also cover retention period for records and calibration of monitoring equipments, and corrective actions and internal audits should</p>	CR 9	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			be defined. The monitoring plan should also include the uncertainty levels, methods and associated accuracy level of measurement instruments and calibration procedures to be used for various parameters. As mentioned in the EB decision (see link: http://cdm.unfccc.int/Reference/Guidclarif/E/B23_%20para%2024_guidance_monitoring.pdf).		
D.6.3. Are procedures identified for training of monitoring personnel?	1,2,3, 7,8,9, 20,24, 26	DR I	Since the plant is under commissioning and the trainings of the manpower has been found to be part of commissioning.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	1,2,3, 7,8,9, 20,24, 26,27	DR I	No emergency situation with unintended emission has to be expected.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.5. Are procedures identified for calibration of monitoring equipment?	1,2,3, 7,8,9, 20,24, 26,27	DR I	See above in D 6.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	1,2,3, 7,8,9, 20,24, 26,27	DR I	The plant is under commissioning , the checklists and procedures have been defined for maintenance of equipments and installations	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.7. Are procedures identified for monitoring, measurements and reporting?	1,2,3, 7,8,9, 20,24,	DR I	See above D.6.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
	26				
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	1,2,3, 7,8,9, 20,24, 26	DR I	Samples of day to day record keeping are identified but the implementation shall be demonstrated after the plant becomes operational	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	1,2,3, 7,8,9, 20,24, 26	DR I	See above D.6.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.10. Are procedures identified for review of reported results/data?	1,2,3, 7,8,9, 20,24, 26	DR I	See above D.6.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	1,2,3, 7,8,9, 20,23, 24,26	DR I	No procedures have been defined. See above in D. 6.2	CR 9	<input checked="" type="checkbox"/>
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	1,2,3, 7,8,9, 20,23, 24,26	DR I	See above D.6.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	1,2,3, 7,8,9, 20,24, 26	DR I	See above D.6.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E. Calculation of GHG Emissions by Source <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>					
E.1. Predicted Project GHG Emissions <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	1, 2, 3	DR I	Yes direct project emissions may emerge in case of power cuts from the operation of the back-up diesel generators.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	1, 2, 3	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	1, 2, 3,	DR I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	1, 2, 3	DR I	See above E.1.1.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	1, 2, 3	DR I	The methodology only requires the evaluation of CO ₂ .	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* MoV = Means of Verification, DR= Document Review, I= Interview



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	1, 2, 3	DR I	There are no emission sources as leakages	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.2. Have these leakage effects been properly accounted for in calculations?	1, 2, 3	DR I	See above E.2.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	1, 2, 3	DR I	See above E.2.2.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.4. Are the calculations documented in a complete and transparent manner?	1, 2, 3	DR I	See above E.2.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.5. Have conservative assumptions been used when calculating leakage?	1, 2, 3	DR I	See above E.2.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.2.6. Are uncertainties in the leakage estimates properly addressed?	1, 2, 3	DR I	See above E.2.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3. Baseline Emissions <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	1, 2, 3	DR I	Yes. The baseline emission factor is calculated using the combined margin approach. The data for operating margin is	CR 10	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<p>based on the average of the last three years considering the Western regional grid. The built margin calculation includes data available until March 05.</p> <p><u>Clarification request No.10</u></p> <p>It should be clearly demonstrated (with an official document) that the dispatch data is not available for a dispatch analysis.</p>		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	1, 2, 3	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	1, 2, 3	DR I	Yes the calculation is according to the approved methodology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	1, 2, 3	DR I	See B.2.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	1, 2, 3	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	1, 2, 3	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	1, 2, 3	DR I	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	1,2,3, 7,11, 12,15, 17	DR I	Yes. the environmental aspects have been defined with respect to air water and noise in details	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	1,2,3, 7,11, 12,15, 17	DR I	A rapid environment assessment was carried out by the party and the same has been submitted to state government for obtaining necessary clearances	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.3. Will the project create any adverse environmental effects?	1,2,3, 7, 11,12, 15,17	DR I	No, the project is not expected to create adverse environmental effects	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.4. Are transboundary environmental impacts considered in the analysis?	1,2,3, 7, 11,12, 15,17	DR I	Transboundary impacts are not considered to be of relevance.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
F.1.5. Have identified environmental impacts been addressed in the project design?	1,2,3, 7, 11,12, 15,17	DR I	Environmental impacts were not considered significant.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.6. Does the project comply with environmental legislation in the host country?	1,2,3, 11,12, 15,17	DR I	Yes the plant has necessary consents and permissions from the State Pollution Control Board.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	1,2,3, 7,11,1 2,15, 17	DR I	Yes all the necessary stakeholders have been consulted: State Pollution Control Board, public hearing of Ministry of Commerce and the concerned Municipal Body under which this notified industrial area falls.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	1,2,3, 7,11, 12,15, 17	DR I	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	1,2,3, 7,11, 12,15, 17	DR I	A stakeholder consultation process is not required according to Indian legislation.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G.1.4. Is a summary of the stakeholder comments	1,2,3,	DR	No comments have been received so far.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
received provided?	7,11, 12,15, 17	I			
G.1.5. Has due account been taken of any stakeholder comments received?	1,2,3, 7,11, 12,15, 17	DR I	See above G.1.4.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<u>Corrective Action request No.1</u> The project boundary as shown on page 14 of PDD needs to be corrected as it is showing 30MW AFBC turbine.	A.1.2	The project boundary has been modified (PDD Section B.4)	☑
<u>Clarification request no. 1</u> A Letter of Approval from the host country i.e. the government of India needs to be submitted to the DOE.	A.3.2	Host country approval letter has been submitted to DOE.	☑
<u>Clarification Request No.2</u> Documentary evidence on the starting date of the project activity (financial closure) as well as on the preliminary considerations of CDM incentive should be provided.	B.2.7	Purchase orders for Turbine submitted to DOE. A board extract of board meeting in which CDM was considered while deciding on WHRB implementation submitted to DOE.	☑
<u>Clarification Request No.3</u> Regarding the common practice analysis the PDD analyses activities within the sponge iron industry instead of concentrating on similar activities as defined in the 'Tool for the demonstration and assessment of additionality'.	B.2.7	DRI kiln is used extensively in Sponge Iron industry only, hence universe of Sponge iron manufacturers in the state of Chattisgarh have been taken for common practice analysis. Common practice analysis has been	☑



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
Please discuss in more detail the driver for each <u>similar</u> project activity in India. The PDD should demonstrate that the activity is the first of this kind under the given circumstances.		elaborated in the PDD (section B.3), data used for common practice analysis has been obtained from Joint Plant Committee report on Indian Sponge Iron Industry (2005-06).	
<u>Clarification Request No. 4</u> Documents to confirm the statements give in the technological barrier should be submitted to the validator.	B.2.7.	Technical barriers related documents submitted to DOE and same have been referenced in the revised PDD.	☑
<u>Clarification Request No. 5</u> It should be clearly demonstrated that the cost per kWh for at least one alternative is less than the cost per kWh produced from the project.	B.2.7.	As per the information provided in Section B.2 of the PDD, a coal-based power plant is a feasible alternative due to low capital cost and cost of power generation and this makes it the best option available to SKSIL for obtaining power requirement in its industrial complex. In the absence of the project activity, project promoter would have setup a large coal/char-based power plant to meet power demand in the plant and would have discontinued power purchase from grid (a higher cost option). Hence in the additionality analysis cost of power generation from the project	☑



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>activity without CDM benefits (Rs 1.62/KWh) and coal/char based power generation (Rs 1.36/KWh) have been compared. Also, the sensitivity analysis done on cost/kWh demonstrates that waste heat-based power generation is not the most economical choice of power generation for project promoter. With CDM benefits, cost of power generation using waste gases from kiln improves to Rs 1.25/KWh making it the cheapest cost option. CDM benefits are sought to remove main barrier against implementation of the project activity.</p> <p>However, as grid-based power has a lower emission factor as compared to coal-based power generation, to be conservative "Import of electricity from the grid" has been considered as the baseline scenario in this project activity.</p>	
<p><u>Clarification Request No. 6</u></p> <p>A clear documentation of the data sources with an unambiguous reference to each of the figures provided should be given in order to allow a verification of the same.</p> <p>Additionally, the assumptions made for the</p>	B.2.9	<p>Data have been referenced in PDD and excel sheet for calculations provided to DOE.</p> <p>Support documents for information used for baseline assessment and investment analysis have also been</p>	<p style="text-align: center;">☑</p>



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>calculations do not seem to be conservative, specially the working days (is contradictory to the availability risk statements).</p> <p>Furthermore, why are the figures in Table A.4.4.1 and E.6. different? These should be the same.</p>		<p>provided to DOE.</p> <p>Expected power generation figure as provided by technical consultant (based on kiln running days of 330) is being used for both CERs estimation and financial analysis as well. Availability risk factor is being accounted for in the expected plant load factor (79%) which is lower than a normal fossil fuel based power plant (90-95%). Same PLF is being taken for financial analysis as well.</p> <p>Tables A.4.4.1. and E.6. have been corrected and are now the same.</p>	
<p><u>Clarification Request No.7</u></p> <p>It is not clear why the monitoring of quantity and calorific value of fuel & waste gas are included in the monitoring plan when direct measurement of electricity generated is possible.</p>	D.1.2	<p>Monitoring plan has been modified (section D of PDD), and this anomaly has been corrected. There is no requirement for monitoring of CV of fuel and waste gases as direct measurement of electricity generation is possible.</p>	☑
<p><u>Clarification Request No.8:</u></p> <p>It should be explained how it is ensured that power produced by the diesel genset is not measured as produced by the waste heat</p>	D.2.1	<p>Meter used for measuring power generation from the project activity is independent of power generation using diesel genset. There is no linkage between power generation in the</p>	☑



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
recovery plant.		project activity and diesel based generation. A line diagram to confirm this has also been submitted to DOE.	
<p><u>Clarification Request No.9</u></p> <p>The procedure covering roles, responsibilities and authorities for carrying out monitoring, measurement and reporting of the complete monitoring plan needs to be submitted to DOE. The procedure should also cover retention period for records and calibration of monitoring equipments, and corrective actions and internal audits should be defined. The monitoring plan should also include the uncertainty levels, methods and associated accuracy level of measurement instruments and calibration procedures to be used for various parameters. As mentioned in the EB decision (see link: http://cdm.unfccc.int/Reference/Guidclarif/EB23_%20para%2024_guidance_monitoring.pdf).</p>	D.6.2	The monitoring plan has been modified to include the missing requirements, details regarding the uncertainty levels, methods and associated accuracy levels of measurement instruments and calibration procedures to be used for various parameters. See PDD Section D and Annex 4.	☑
<p><u>Clarification Request No.10</u></p> <p>It should be clearly demonstrated (with an official document) that the dispatch data is not available for a dispatch analysis.</p>	E.3.1.	Official document stating lack of dispatch data for grid emission factor estimation is not available. However, same could be easily verified by checking GEF estimation procedure	☑




Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>adopted by registered CDM project activities till date in India.</p> <p>CDM registered projects are also using Simple OM due to lack of availability of necessary dispatch data. Following are the projects already registered (all of these are connected to Western Region Grid and hence have similar baseline grid emission level):</p> <ul style="list-style-type: none">- VGL - Waste Heat based 4 MW Captive Power Project at Raipur- JBSL–Waste Heat Recovery Based Captive Power Project- Waste heat recovery based captive power project at Monnet- 8MW Waste Heat Recovery based Captive Power Project at OCL- Power generation from waste heat of non-recovery type coke ovens at JSPL- Process Waste Heat utilization for power generation at Phillips Carbon Black Limited, Gujarat	

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Annex 2: Information Reference List

Final Report	2006-09-12	Validation of the “Waste Heat Recovery based captive power generation by SKS Ispat Ltd.” Information Reference List	Page 1 of 2	
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Reference No.	Document or Type of Information
1.	<p>On-site interviews at the project site of the “Waste Heat Recovery based captive power generation by SKS Ispat Ltd” in Raipur Chattisgarh, India by auditing team of TÜV SÜD, performed on 22nd & 23rd April 2006.</p> <p>Validation team on site: Sunil Kathuria TUV South Asia TÜV SÜD Group.</p> <p>Interviewed persons: Deepak Gupta SKS Ispat Limited-Managing Director S.K.Goel, SKS Ispat Limited-General Manager Finance B. Mehta SKS Ispat Limited-General Manager Projects</p>
2.	Draft Project Design Document, SKS Ispat Limited, dated 20.10.05, submitted April 2006
3.	Revised Final Project Design Document, SKS Ispat Limited, dated 12.09.2006
4.	Approved Consolidated Baseline Methodology ACM004, version 02, UNFCCC, 03 March 2006
5.	Tool for demonstration and assessment of additionality, version 02, UNFCCC, 28 November 2005
6.	UNFCCC homepage, http://www.unfccc.int
7.	Extract from Detailed Project Report for 25MW captive power plant, dated June 2005, submitted 22.04.2006
8.	Factory's License, dated 19.05.2005, submitted 22.04.2006
9.	Organisation Chart, SKS Spat Limited, dated nil, submitted April 2006
10.	Cost of capital for capital sector utilities ,Cresil advisory services, dated 13.04.2000, submitted 22.04.2006
11.	No Objection Certificate from Chattisgarh Environment Conservation Board, dated 10.02.2006, submitted 22.04.2006.
12.	Copy of the newspaper clipping inviting comments,dated nil, submitted 22.04.2006.
13.	Electrical Inspector's Report of the Installations, dated 01.04.2006, submitted 22.04.2006.
14.	Boilers Inspection Report, senior inspector boilers dated 25.02.2006 submitted 22.04.2006.
15.	Rapid Environmental Impact Assessment, B.S .Envi-Tech(P) Limited, dated nil, submitted 22.04.2006
16.	Grid emission factor calculations, SKS ispat Limited, dated 04.05.2006, submitted 10.05.2006
17.	Public Hearing Preceding from Chattisgarh Environment Conservation Board, dated 10.02.2006, submitted 22.04.2006
18.	Sample copy of daily reports on Generation of Power SKS ispat Limited, dated 04.05.2006, submitted 10.05.2006

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		Information Reference List		

Reference No.	Document or Type of Information
19.	Project progress assessment, SAIL consultancy division, dated 15.10.2005, submitted 10.05.2006
20.	Project profile, SKS Ispat Limited, dated 04.05.2006, submitted 10.05.2006
21.	Sources of fund, SKS Ispat Limited, dated nil, submitted 10.05.2006
22.	Financial Analysis, SKS Ispat Limited, dated nil
23.	Site visit photographs, audit team, dated 22.04.2006
24.	Samples of kiln production and downtime report ,SKS ispat Limited; dated nil, submitted 10.05.2006
25.	Heat rate calculations for the boiler, SKS Ispat Limited, dated nil, submitted 10.05.2006
26.	Sample of daily maintenance checklist, SKS Ispat Limited, dated nil, submitted 10.05.2006
27.	Confirmation of lifetime of boiler and turbine, AKB power consultants Pvt Limited, dated 12.5.06, submitted 10.06.2006
28.	Operational problems witnessed in WHRB, Research paper, VP Agarwal and KC Sood, published by TERI, submitted August 2006
29.	Coal/char based AFBC power project details, Detailed project report, submitted August 2006