
VALIDATION REPORT

Bhushan Power and Steel Limited

**Bhushan Power and Steel Limited -
Waste Heat Recovery based
Captive Power Project**

SGS Climate Change Programme
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Summary:				
<p>Bhushan Power and Steel Limited has commissioned SGS to perform the validation of the project: Bhushan Power and Steel Limited- Waste Heat Recovery based Captive Power Project.</p> <p>Methodology used: ACM0012</p> <p>Version and Date: 02, 02/11/2007</p> <p>The scope of the validation 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. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.</p> <p>The report is based on the findings of document reviews, the stakeholder consultation process and responses from the project participants to the findings raised in this report.</p> <p>The report and the annexed validation describes a total of 21 findings which include:</p> <ul style="list-style-type: none"> • 16 Corrective Action Requests; • 05 New Information Requests; and <p>All findings have been closed out satisfactorily and the project</p> <p style="padding-left: 40px;">– Will be recommended to the CDM Executive Board with a request for registration.</p>				
Subject:				
CDM Validation				
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Abbreviations

AFBC	Atmospheric Fluidised Bed Combustion
BPSL	Bhushan Power and steel Limited
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO ₂	Carbon Dioxide
CER	Certified Emission Reductions
DR	Document Review
DNA	Designated National Authority
DOE	Designated Operational Entity
DRI	Direct Reduced Iron
DPR	Detailed Project Report
EIA	Environment Impact Assessment
GHG	Green House Gas
GRIDCO	Grid Corporation of Orissa
OERC	Orissa Electricity Regulatory Commission
I	Interviewed
KwH	Kilowatt Hour
PDD	Project Design Document
PP	Project Proponent
MOC	Modalities Of Communication
MW	Mega watt
MP	Monitoring Plan
MoV	Means of verification
NIR	New Information Request
NCV	Net Calorific Value
NOC	No Objection Certificate
RETL	Reliance Energy Trading Limited
SPCB	State Pollution Control Board
UNFCCC	United Nation Framework Convention for Climatic Change
WHRB	Waste Heat Recovery Boiler

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1. Validation Opinion

SGS United Kingdom Ltd has been contracted by Bhushan Power and Steel Limited to perform a validation of the project: Bhushan Power and Steel Limited -Waste Heat Recovery based Captive Power Project. in India.

The Validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism (CDM) and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

SGS reviewed of the project design documentation, using a risk based approach and conducted follow-up interviews.

By installation of 4 waste heat recovery boilers (WHRB) which uses the flue gases generated from the rotary Kilns to generate steam which is used in turbines for generation of electricity, the project activity will result in reductions of greenhouse gas emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project correctly applies methodology ACM0012 version 02. It is demonstrated that the project 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.

The total emission reductions from the project are estimated to be 3,334,800 t of CO₂e over a 10 year crediting period, averaging 333,480 t of CO₂e annually. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given the underlying assumptions do not change.

The project will hence be recommended by SGS for registration with the UNFCCC.

Signed on Behalf of the Validation Body by Authorized Signatory

Signature:



Name: Siddharth Yadav

Date: 15-04-2009

2. Introduction

2.1 Objective

Bhushan Power and Steel Limited has commissioned SGS to perform the validation of the project: Bhushan Power and Steel Limited -Waste Heat Recovery based Captive Power Project. with regard to the relevant requirements for CDM project activities. 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 seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

2.2 Scope

The scope of the validation 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. SGS has 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.

2.3 GHG Project Description

The proposed CDM project activity is a captive power project which generates the electricity from the waste flue gases generating from the rotary kilns and thereby reduces the GHG emissions. The project activity is located at Sambalpur district, Orissa. The project activity was already commissioned and working in satisfactory condition.

2.4 The Names and Roles of the Validation Team Members

Name	Role	Affiliate
Pankaj Mohan	Lead Assessor	India
Kamesh Iyer	Assessor	India
Nayan Jyoti Deka	Local Assessor	India

3. Methodology

3.1 Review of CDM-PDD and Additional Documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline.

A site visit was performed on 18-07-2007 & 19-07-2007 by the Local Assessor and the results will be summarized in the Local Assessment Checklist

3.2 Use of the Validation Protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	Ref ID	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements are linked to checklist questions the project should meet.	Lists any references and sources used in the validation process. Full details are provided in the table at the bottom of the checklist.	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 (Y), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification.

The completed validation protocol for this project is attached as Annex A.1 to this report

3.3 Findings

As an outcome of the validation process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR)**. A CAR is issued, where:

- mistakes have been made with a direct influence on project results;
- validation protocol requirements have not been met; or
- there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex A.2). In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

3.4 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

4. Validation Findings

4.1 Participation Requirements

The host Party for this project is India. India has ratified the Kyoto protocol on 26th Aug 2002 which can be cross check from the web link <http://maindb.unfccc.int/public/country.pl?country=IN>. CAR 1 was raised asking the PP for LOA from the DNA of the host country (India). Project Proponent has received the Letter of Approval for the present project activity on 18th June 2007 issued by Indian DNA (reference no. F.No.4/8/2007-CCC). This letter was checked by the assessor on-site and the copy of this was desk reviewed by the lead assessor and the project activity name indicated in the HCA (**Ref.no./4/**) and in section A.1 of the PDD was found same. Also, the letter confirms that the party is a party to the Kyoto Protocol, participation is voluntary and the proposed CDM project activity contributes to the sustainable development of the country and thus, CAR (1) was closed.

No Annex-I Party has been identified in the PDD as CDM EB has agreed that the registration of a CDM project activity can take place without an Annex I Party being involved at the stage of registration with a note that before CER can be transferred to an Annex 1 Party, a Letter of Approval from Annex 1 Party will be needed.

Modalities of communication (MOC was not provided so CAR21 was raised asking the PP for Modalities of Communication. PP has provided the MOC, dated 26-08-2008 which is enclosed as **Enclosure K (Ref.no. /5/)** and the title of the project and the authorised person for acting as a nodal point to UNFCCC and EB have been crossed checked with the PDD, Annex - 1 by the assessor and desk reviewed by the lead assessor. This was found to be matching. Hence, CAR 21 was closed.

4.2 Project Design

The title of the project is "Bhushan Power and Steel Limited–Waste Heat Recovery based Captive Power Project " which is unique as there are no other projects with the same title. This has been conformed from the weblink <http://cdm.unfccc.int/Projects/Validation>. The revised PDD provides the information on purpose of the project activity, type of the technology used and the contribution of the project activity to sustainable development. The BPSL Sponge Iron unit consists of four Rotary kilns. The generation of flue gas from the kiln is at the flow rate of 120,000 Nm³/hr at 9500°C. The rotary kiln is directly connected to the 4 Waste Heat Recovery Boilers (WHRBs) which forms the project activity with a steam generation capacity of 51 Tons Per Hour (TPH) each.

The total waste flue gas generated is ducted to the WHRBs to generate steam at 88 Kg/Cm² and 5200°C. The maximum pressure for which the WHRB is designed is 101 kg/cm². Flue gas with high heat content is generated in the Rotary kiln in the Sponge Iron plant during Sponge Iron conversion from iron ore.

The gas coming out from After Burning Chamber (ABC) of the Direct Reduced Iron (DRI) plant at about 1000 DegC is passed through the WHRB. BPSL has implemented the project activity ('waste heat recovery based captive power project') in two Phases. BPSL first set up a 40 MW plant in Phase – I and subsequently a 60 MW plant in Phase-II. The Phase I of 40 MW capacity comprises the Atmospheric Fluidised Bed Combustion (AFBC) 1 and WHRB 1 & 2 and the Phase II of 60 MW comprise the AFBC 2 and WHRB 3 & 4. The contribution of the WHRBs towards total power generation has been estimated at 45 MW that reduce GHG emission which has been environmentally safe technology. This was judged on the basis of specifications and experience of lead assessor on such kind of projects.

The project activity is located in India / Orissa at Thelkoli village having Latitude: 21-45'-42" N and Longitude : 84-01'-20" E which has been cross check from <http://www.gorissen.info/Pierre/maps/googleMapLocation.php?lat=19.394341&lon=74.816360&setLatLon=Set> and found to be correct.

The ownership / licence (Land ownership documents) was not provided hence CAR 12 was raised asking PP to provide ownership or licenses which will allow the implementation of the project activity. PP has provided the ownership documents (land Ownership documents) were provided by the PP .Thus, CAR 12 was closed as ownership documents (Land ownership documents) (**Ref. no./13/**) provided were checked for

the name of the owner by the assessor at site with the original document and desk reviewed by the lead assessor and found to be satisfactory. The category of the project activity is correctly identified in the PDD. The project applied the methodology ACM0012, version 2, under sectoral scope 01, & 04. The project activity is a large scale CDM project related to energy generation from waste flue gases. PDD mentioned that no ODA/ Public funding was involved in the project activity which has been conformed during the site visit and found to be correct.

The project boundary in the PDD was not defined appropriately. Thus, CAR 2 was raised. PP has revised the PDD, version 3 (**Ref.no./4/**) and has mentioned the project boundary in accordance to methodology ACM0012 version 2, dated – 2nd November 2007 which was checked by the assessor during site visit, when the project activity was on ACM0004 version 2. The project boundary was also desk reviewed by the lead assessor and found to be in accordance with ACM0012 version 2. The project boundary will also be checked during verification hence this was accepted and Thus, CAR 2 was closed.

The project boundary includes DRI Kiln however the project emissions due to the coal used in DRI kiln was not included in the PDD and CAR16 was raised. PP responded that as per the requirement under the methodology ACM0012, version 02, 'the geographical extent of the project boundary shall include the following: 'The industrial facility where the waste gas/ heat/ pressure is generated (generation of waste energy)'. In the project activity, the industrial facility where the waste gas/ heat is generated is BPSL's sponge iron plant/ DRI kiln and the source of waste heat is the After Burning Chamber (ABC) where the waste gas from the DRI kiln of BPSL facility is combusted. The DRI Kiln and the ABC are therefore included in the project boundary as per the requirement of ACM0012. However, as per ACM0012 (ver 2) it is not required to account for project emissions from coal combustion in the DRI Kiln as the DRI kiln produces sponge iron and in the process of production waste gas/ heat is also generated.

This waste gas/ heat generated during the production of sponge iron is used by the project activity for power generation and in the absence of the project, the waste gas would have been released into the atmosphere. Coal would anyway have been used in the sponge iron kiln for the production of sponge iron. The project activity did not result in the implementation/ setting up of the sponge iron kiln and therefore the use of coal. Therefore the combustion of coal in the DRI kiln need not be accounted for in the project emissions as it is not directly related to the project activity. Thus, CAR16 closed as the revised PDD (**Ref.no./4/**) is mentioning the Project boundary and project emissions transparently as desk review by the lead assessor and project boundary has been checked during the site visit by the assessor. These are found to be in accordance with methodology ACM0012 version 02.

4.3 Eligibility as a Small Scale Project

The project activity is power generation by using waste heat recovery based captive power project and is following ACM0012, version 2 dated - 02, November 2007 which has been checked from the web site <http://cdm.unfccc.int/methodologies/view?ref=ACM0012>. The total capacity of the project is 100 MW (40 MW from Phase 1 and 60 MW from phase 2) that has been checked during the site visit, which is more than the 15 MW limit for the small scale project activity, hence the project is not a small scale project activity.

4.4 Baseline Selection and Additionality

The baseline methodology earlier used in the project activity was based on ACM0004 version 2 but later on changes to ACM0012 and hence PP has applied the ACM0012, version 2 as the baseline methodology. The replacement of ACM0004 methodology by ACM0012 methodology (in June 2007) and due to the monitoring methodology requirements under ACM0004, BPSL decided to go ahead with ACM0012 methodology later, when the clarification was not answered till 5th March 2008. However, BPSL having responded to the validation findings request of DOE went ahead and requested clarification to the UNFCCC regarding applicability of the ACM0004 methodology to the project in light of the monitoring requirements / methodology and as the ACM0004 methodology was valid until March 5, 2008, BPSL waited a response from UNFCCC until then. Though the PDD as per ACM0012 methodology was already completed by project proponent, the same could be web-hosted for public comments only during March 2008 considering that ACM0004 was applicable up to 5 March 2008 and BPSL was still awaiting the feedback from UNFCCC on the clarification request until this date. However it may be noted that subsequently the clarification was responded to by the Meth Panel of the UNFCCC in April 2008 (Meth Panel meeting date 7 – 11 April 08) for the request made by BPSL (Reference: F-CDM-AM-Clar_Resp_ver 01.1 - AM_CLA_0067) and clarifying

that the procedure proposed by BPSL could be used as a modification of ACM0004. However the clarification by Meth Panel was provided only after March 5, 2008 which was the last date for submitting the project for registration under the methodology ACM0004 version 2 and therefore BPSL could not go ahead with ACM0004 methodology for the project but had to re-webhost the PDD based on ACM0012, version 2. Hence, the approved baseline and monitoring methodology applied to the project activity is based on ACM0012, version 2 "Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system". The applicability criteria of applied methodology ACM0012, version 2 has been correctly justified in the PDD which has been verified during the site visit and found to be acceptable.

The baseline scenario is identified as the most plausible baseline scenario among all realistic and credible alternative(s) as per the applied methodology ACM 0012 version 2. The realistic and credible alternatives are determined for:

- Waste gas/ heat/ pressure use in the absence of the project activity; and
- Power generation in the absence of the project activity; and
- Steam/ heat generation in the absence of the project activity

Baseline steam / heat generation options in the absence of the project activity are not discussed further as it is not relevant to the project activity.

The most plausible baseline scenario for the generation of heat and electricity using the following baseline options and combinations are as follows –

W1 : Waste gas is directly vented to atmosphere without incineration

W2 : Waste gas is released to the atmosphere after incineration or waste heat is released to the atmosphere (waste pressure energy is not utilized);

W3 : Waste gas/heat is sold as an energy source;

W4 : Waste gas/heat/pressure is used for meeting energy demand.

As the project activity was applied to the new facility so there was no prior release of waste heat/ gas in the baseline scenario. Since there is practically no other use of waste gases from the kiln of the steel plant, in absence of the proposed project the waste gas thus generated would have been quenched, cleaned and released into the atmosphere and the heat content would have been wasted. Therefore the option W2 i.e. 'Waste heat is released to the atmosphere' is more relevant baseline scenario for the project activity.

Alternative P1: Proposed project activity not undertaken as a CDM project Activity: - This alternative is in compliance with all applicable legal and regulatory requirements. In order to implement this project activity BPSL had to face number of technological barriers, which makes this alternative financially less attractive for the project activity with out CDM benefits. Hence this option was eliminated for consideration as a baseline scenario.

Alternative P2: On-site or off-site existing/new fossil fuel fired cogeneration plant: - The project activity is not a cogeneration plant. PP does not require steam in the processes involved in the sponge iron kiln. Hence this baseline alternative is not a realistic alternative to the project, though it is in compliance with the legal and regulatory requirements.

Alternative P3: On-site or off-site existing/new renewable energy based cogeneration plant: - The project activity is not a cogeneration plant based on renewable energy hence this baseline alternative is not a realistic alternative to the project, though it is in compliance with the legal and regulatory requirements.

Alternative P4: On-site or off-site existing/new fossil fuel based existing captive or identified plant

Option 4a: Coal, coal washery rejects, coal char based captive power generation

Option 4b: Diesel based captive power generation

Option 4c: Gas based captive power generation

The above alternative is in compliance with legal and regulatory requirements and considered as possible baseline alternative. This alternative was considered for further evaluation. During further evaluation it was found that option 4a is economically more feasible than option 4b. Option 4c was eliminated based on non-availability of natural gas. Hence option 4a was the only baseline alternative for this project activity.

Alternative P5: On-site or off-site existing/new renewable energy based existing captive or identified plant; :- There is no existing renewable energy based captive power plant at the sponge iron facility of PP. Renewable energy is generated from sources such as biomass, hydro, wind etc. This alternative is in compliance with the legal and regulatory requirements, and was considered as a possible baseline alternative. This alternative is considered for further evaluation. During further evaluation it was found that there is no availability of renewable energy sources in the vicinity of project site and also considering that the extent of power required by PP is quite large to be met by the renewable energy sources, hence this alternative was eliminated..

Alternative P6: Sourced Grid-connected power plants :- In the absence of CDM project activity, PP had the option of importing electricity from the Eastern regional grid, which will further lead to GHG emissions from fossil fuel based thermal power plants that form the grid. This alternative is in compliance with all applicable legal and regulatory requirements and was considered as a possible baseline. This alternative was considered for further evaluation.

Alternative P7: Captive Electricity generation from waste gas (if project activity is captive generation with waste gas, this scenario represents captive generation with lower efficiency than the project activity):- The project activity involves electricity generation from waste gas. This alternative scenario on the captive electricity generation from Waste Heat Recovery (WHR) project with lower efficiency than the proposed project activity could be a possible baseline alternative. This baseline alternative is considered for further evaluation. This was eliminated based on high cost of generation and also based on implementation of project activity in new facility.

Alternative P8: Cogeneration from waste gas (if project activity is cogeneration with waste gas, this scenario represents cogeneration with lower efficiency than the project activity :- The project activity does not involve cogeneration with waste gas and therefore this alternative was not considered as a baseline scenario.

Based on above discussion it was concluded that the possible baseline scenarios for the project activity is W2 and P4a, P4b and P6. Evaluating further for options P4a, P4b and P6 it was found that the cost of generation for P4a is Rs. 1.56 / kWh as per CEA report of Feb 2004 (Ref /80/) and Rs. 1.13/kWh as per Cost accountants certificate (ref /8/). The cost of generation for P4b is Rs. 5.96 /kWh as per CEA report of Feb 2004 (Ref /80/). The cost of grid is Rs. 4.00/kWh. This was checked from electricity bill. Hence the baseline scenario selected was W2 and P4a.

Considering the various factors available, the most likely baseline scenario would be Alternative W2 and P4a, i.e. a coal, coal washery rejects, coal char based CPP to cater to the equivalent power as that of the WHRB system. By considering the economic attractiveness of a coal, coal char and coal washery rejects based CPP. However, the baseline selection is unclear. Regarding approach towards selection of most financial attractive baseline alternative, clarification need to be provided by PP for the detail financial analysis for levelized cost per unit electricity generation with traceable sources and references. The baseline emissions calculation worksheet and justification towards determination of efficiency for coal based captive power generation facility need to be provided by PP. In house GCV calculations are typed but the Char analysis the value is written by Pen and not typed. The PP was asked to justify and provide the calibration certificate of equipment used to get the GCV value. Fcap is taken as 1 but the methodology says this needs to be calculated based on three years data. Please clarify? Thus, CAR 3 was raised due to the above issues.

The project proponent has responded by explaining the financial analysis for levelized cost per unit electricity generation as mentioned in section B.4 & B.5. of the revised PDD version 4 along with related documentary evidence. The pp has been providing the information used in baseline calculation sheet. The revised PDD version 4 is mentioning the justification for determining the efficiency of coal based captive generation in section B.6.1 and B.6.3. and also documentary evidences for efficiency calculations has been provided in

support as Enclosure B. The documentary evidence on the in house GCV calculation and calibration has been provided during the site visit Annexure-1. The PDD has been revised to change the emission factor for the baseline emission. The f cap exceed unity as it has been computed as per the sample test check report of the volume of flow gas so as per the methodology f cap has been considered as 1. The present f cap computation was ex-ante computed based upon the sample test check of the flue gas but during ex-post continuous flow meter at the relevant monitoring point will be installed. The relevant documents on flue gas and f cap calculations are provided by the PP. The documents on working cost (**Ref. no./10/**), efficiency calculation (**Ref. no./11/**), baseline calculation(**Ref no./8/**), in house GCV calculation calibration certificates & flue gas analysis report (**Ref. no./18/**) and f cap calculation (**Ref. no./9/**). are verified with the original document at site by the assessor and desk reviewed by the lead assessor and found to be satisfactory and hence CAR 3 was closed.

Additionality of the project activity is based on the following “Tool for the demonstration and assessment of additionality”, version 05.2 –

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations.

Sub- step 1a. Define alternatives to the project activity: - All the plausible and credible alternatives to the project activity has been evaluated and discussed transparently by the Project Proponent in the PDD and assessed by LA on the basis of tool and methodology..

Sub-step 1b: Consistency with mandatory applicable laws and regulations:- The alternative to the project activity are consistent with mandatory applicable laws and regulations which has been conformed during the site visit. The Step-3 i.e. barrier analysis has been opted by for the project activity to show the additionality of the proposed CDM project.

Step 3: Barrier analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity

These realistic and credible barriers include the following

> Investment Barrier: - Cost of power comparison between WHRB Boiler and AFBC Boiler to shows that the project faces investment barrier.

> Technological Barriers:- Training related problems, risk of technological failure and first of its kind in the relevant region were considered for justifying that the proposed CDM project faces technological barrier.

> Barriers due to prevailing practice

> Institutional Barrier;- The tariff regulation policy by the state electricity bodies has been considered under institutional barrier faced by the project.

Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):- The capital cost, commonly available of the technology and prevailing practice in the relevant region shows that AFBC Boiler does not faces investment barrier, technological barrier and prevailing practice barrier.

Step 4. Common practice analysis:- This has been done by considering the activities of 64 sponge iron plant in the region. This was checked from the UNFCCC website.

Sub-Step 4a was analyzed on the basis of the ‘Survey of the Indian Sponge Iron Industry’ as per the Joint Plant Committee (JPC) report for 2005-06 (survey work was up to 31.08.2005) may be referred to which indicates that the number of units with captive power generation facility is quite low. As the survey pertaining to JPC report ended on 31st August 2005, this report would be relevant to BPSL’s project. As per JPC report, as on 31.08.2005 there were 147 (Surveyed) working coal based sponge iron units and 3 (surveyed) working gas based sponge iron units in the country of which 33 (Surveyed) working coal based sponge iron units were located in the State of Orissa. Table 15 titled ‘Captive Power Generation Facility in Indian Coal Based Sponge Iron Industry’ on page 38 of the JPC report further indicates that of the total number of units (sponge iron kilns) in the State of Orissa (of about 33) only 4 of such units had a captive power generation facility. Also, the letter from the Directorate of Factories and Boilers, was checked and found that it confirms that the identified project activity is the first of its kind in the State of Orissa, with regard to the high pressure and temperature configuration. This was also checked by interviewing the person via telephone to confirm that the project is first of its kind. Thus in light of the above discussion it can be concluded that the waste heat recovery based captive power plant is not a common practice in the region.

Sub Step 4b was analyzed on the basis of 64 sponge iron plants operating in the region. The JPC report is based on 33 plants surveyed by JPC personnel. The number of sponge iron plants was also confirmed from the directorate of industries during telephonic interview. Orissa state had 4 plants which were having captive power plants. Out of these 4 plants 3 were CDM project activities namely OSIL, TSIL, OCL and 1 was captive power plant based on Coal. The three plants are also availing CDM benefits. This was checked from UNFCCC website. Hence this was accepted and concluded that the project activity is not the common practice in the region.

All the assumptions and factors for proving the additionality of the proposed CDM project had been assessed and it has been found that the discussion on additionality is not clear and due to the following mentioned issues -

- Investment Barrier is not comprehensive as it lacks detailing on project cost, capital investment details and logical view to establishing Investment Barrier. Documentary needs to be provided.
- Technological barrier needs to be substantiated with adequate proof as the issues addressed seem to be related to maintenance issues. Also, it is subject to whether the barriers mentioned are due to lack of maintaining operating parameters or proper awareness.
- documentary proof for first in the region as mentioned in the PDD
- Institutional Barrier needs to be justified with adequate evidences. Also the barrier shown is not exclusive for the WHRB project activity, this could have been the same case in the baseline scenario as well.
- Evidences for Common Practice Analysis with respect to other activities similar to the proposed project activity. The JPC report is for India and not for the state of Orissa. It is difficult to comprehend why the state of Chattisgarh is discussed when the project is in the State of Orissa.
- Explain the relevance of SL/RN technology with respect to WHRB technology

And hence, CAR 06 was raised. The Project Proponent has revised the PDD, section B.5. and detailing on project cost, capital investment details and logical view to establishing Investment Barrier with documentary evidences. The PDD has been revised to incorporate the technical barriers in detail in section B.5. Also documentary evidences are provided to support the technological barriers including third party technological barrier proof. Documentary evidence “ letter from directorates of factories and Boilers, Bhubaneswar, Orissa” (Ref /12/) dated 18th July 2008.. This was checked by telephonically interviewing the person signed the letter. This was confirmed and hence this was accepted. This has been provided in support of first of its kind in the region. The PDD has been revised to incorporate the details on institutional barriers in section B.5. along with the documents from RETL and GRIDCO which has been provided. The PDD has been revised to explain the common practice analysis under section B.5. with reference to the state of Orissa along with the source of information pertaining to common practice analysis for the state of Orissa in the foot note of the revised PDD. The SL/RN technology is the technology used in the sponge iron kiln at BPSL which generates waste gas and performance of the WHRB depends upon and is directly related to the quantity and quality of the waste gases emanating from the kiln. This SL/RN technology is imported from Germany for the project activity by the pp. Frequent variation in the type of raw material used results in fluctuation of both quantity and quality of waste gas generated and hence it leads to disruption in power generation from the WHRBs.

BPSL has adopted SL/RN technology in the kiln operation in order to ensure adequate flow of proper quality waste flue gases from the kiln. Also, documentary evidence in support of SL/RN technology has been provided which shows that that the performance of the project activity is linked to the performance to the kiln. The revised PDD version 3 has been checked and found that all the above raised issues are incorporated transparently under section B.5. The documentary evidences provided by the PP on cost working “Investment analysis (Evidences pertaining to cost of power generation from WHRB and AFBC (coal/ coal char/ coal washery rejects) based CPP)”(Ref. no./8/), the assumptions for the levelised cost generation and the certification of the cost computation (Ref. no./21/) in support of investment barrier, letter from the “Directorate of Factories and Boilers including the covering letter to Directorate of factories” (Ref. no./12/) in support of first of its kind in the region, Training – WHRB module by Thermax Ltd to BPSL personnel (Ref. no./11/). The letter was desk reviewed by LA and the persons were interviewed on site by assessor during the site visit and it was concluded that on job / during commissioning the training was provided by supplier. Hence this was accepted. The letter addressed to Mecon on the technological risks (Ref. no./25/) and Third

party technological barrier proof (**Ref.no. /22 & /24/**) in support of technological barriers faced by PP. **RETL & GRIDCO letter (Ref. no. /23/)** in support of institutional barriers faced by the PP. PP had initially signed a power purchase agreement (PPA) to export the surplus power to Reliance Energy Trading Ltd (RETL) during 01.08.2005 to 30.9.2006 and were exporting power at a variable tariff (peak and off peak) and paying the wheeling charges to GRIDCO. As per the PPA with RETL, the Open Access for transmission of power shall be as per the relevant provisions of the Central Electricity Regulatory Commission (CERC) Regulation dated 30 January 2004 regarding 'Open Access in Inter-state Transmission'. Based on this order and PPA RETL had submitted the application for grant of open access to the concerned Regional Load Despatch Center (RLDC) however, the Orissa State Load Despatch Center (SLDC) / Orissa Power Transmission Corporation Limited (OPTCL) did not grant consent for short-term open access. Subsequently PP also applied for open access which was also rejected by SLDC. After which The PP signed a PPA with GRIDCO to sell power at lower rates than offered by RETL because of rejection of open access. This barrier was judged on the basis of RETL and GRIDCO letter. Detailed project copy (**Ref.no./26/**) in support of SL/RN technology and The document by Lurgi Metallurgie GmbH (an Outokumpu technology company) (**Ref. no./30/**) were analyzed for technological barrier. The 'Survey of the Indian Sponge Iron Industry' as per the Joint Plant Committee (JPC) report for 2005-06 (**Ref. no./27/**) was analyzed for common practice barrier. These were checked with the original document at site by the assessor and desk reviewed by the lead assessor and found to be satisfactory. All these documents were checked for the additionality of the project activity. After analysing the documentary evidences it was concluded that the project activity is facing barriers in the project activity. Hence this was accepted. Thus, CAR 06 was closed as documentary evidences provided were found to be in line with the EB requirements.

The project activity start date was not clear so CAR 15 was raised asking PP to provide documentary evidence as per EB 41 Para 67. Also, it is not clear why the proponent has taken considerable time in the preparation of the PDD (more than 4years). The PP was asked to Justify for the timeline with supportings.. Project proponent responded that Project activity start date is taken as the purchase order date for the first 2 WHRBs of the project activity which is 27 Feb 2003. Prior to the project start, BPSL was aware of the technological hurdles/ challenges pertaining to the high technical configuration WHRB system and was also aware that CDM revenues are available for waste heat recovery based power projects. This was checked on the basis of letter from VP to director dated 01-10-2002. This was also verified by interviewing the personnel during the site visit by assessor and also telephonic interview by LA. This was also checked from the feasibility report. Hence this was accepted.

After placing order on the WHRBs, BPSL had faced a number of delays for implementing/ commissioning the project considering the following:

- > Delays in design and engineering work and delays in supply of equipment by equipment supplier (Themax Ltd)
- > Delay in civil and structural drawings for the power plant by the Technical consultant (MECON Ltd)
- > Delays in supply of material (belts and conveyors) from TRF Ltd
- > Delays in erection and commissioning of 40 MW STG set
- > Delays in supply of steel products from the concerned manufacturer

Though BPSL had given commitments to the Bankers, Financial Institutions and Govt of Orissa that the operation of the plant would start in September 2004, the project got delayed due to the above mentioned reasons and eventually got commissioned only in July 2005. The documentary evidences related to the above delays are provided by pp. Further it may be noted that the Phase 1 (WHRB 1 & 2) and Phase II (WHRB 3 & 4) of the project activity were commissioned in July 2005 and May 2006 respectively. Considering the high pressure and temperature configuration of the WHRBs at BPSL, the project activity faced some operational problems post commissioning of the Phase I of the project. This was checked from commissioning certificates and letters from suppliers and pp. Based on the desk review this was accepted by LA.

Technological problems were faced by the BPSL in the operation of the WHRBs so after several deliberations between BPSL and technology provider i.e. Therman, the modifications were proposed in the WHRBs considering repeated screen tube failures (Ref/24/). Due to operational issues and delays in commissioning mentioned above, the process of CDM got delayed. This is mentioned in chronology below.

Despite this BPSL had already approached CDM consultants during early 2003 till 2006 and had received an engagement letter/ proposals from more than one CDM consultants from 2003 to 2006. However after several negotiations with a few CDM consultants, the contract was signed for CDM advisory services with Ecoinvest Carbon S.A during December 2006. The PDD was initially developed based on ACM0004 – ver 2 methodology and was web-hosted for public comments during June – July 2007. The chronology for the delay in preparation of PDD from 27th February 2003 to June 2007 with proper third party evidences has been provided. PP has provided the detail chronology (**Ref.no./33/**) on the real actions taken to avail CDM benefits which is acceptable. Also, the validator has made calls against the documents provided and contacted the persons for checking the credibility of the documents. Thus, CAR 15 was closed.

Chronology of CDM Consideration

S. NO.	Date	Activity	Document submitted
1	29/10/2002	Board resolution considering CDM revenues	Board minutes
2	27/02/2003	Start date of the project	Purchase order
3	11/3/2003	Environmental monitoring	Mecon Letter
4	27/03/2003	Application for Consent to Establish U/s.25 of Water & Air	BPSL Letter
5	26/04/2003	Application for conducting Public Hearing	BPSL Letter
6	14/06/2003	Notice for Public Hearing in News Papers	Copy of Notice in The Times of India & Orria Daily"Dharitri" Newspaper.
7	18/06/2003	Proposal from CDM consultants	SH.G.Rajendran(Consultant) introducing CDM and his services related with GHG
8	26/06/2003	Response to Consultant Letter	BPSL Letter responding their awareness and consideration of carbon credits in project
9	6/7/2003	Correspondence with the state bank for term loan indicating the availability of carbon credit revenues for the WHRB project	Letter submitted to the State Bank
10	16/07/2003	Public Hearing Organised	Proceedings of Public Hearing
11	16/07/2003	Compliance to get consent to establish	State Pollution Control Board Letter
12	21/07/2003	Bank letter asking for details on the carbon revenues from the project	SBI letter
13	25/07/2003	Letter from BPSL to SBI indicating the likely revenues from the WHRB project	BPSL Letter
14	13/08/2003	Application for Consent to Establish (Required Document Submitted)	BPSL Letter
15	13/08/2003	Member Secretary to Ministry of Env & Forest (Public Hearing)	Orissa Pollution Control Board

16	18/09/2003	Approval letter of Consent to Establish	State Pollution Control Board Letter
17	24/09/2003	Communication from CDM consultant	SH.G.Rajendran(Consultant) mentioning about the similar (WHRB) type of methodology submitted to UNFCCC.
18	29/09/2003	Response to Consultant Letter	BPSL Letter responding to consultant regarding that they will wait for WHRB methodology approval
19	1/10/2003	Application for Central Environment & Pollution clearance	BPSL Letter
20	1/10/2003	Application in response to Consent to establish Letter	BPSL Letter
21	18/12/2003	Consent to Establish (Revised)	State Pollution Control Board Letter
22	17/03/2004	Communication from CDM consultancy firm	Sri Sai Renewable Energy
23	15/04/2004	Communication from CDM consultant	SH.G.Rajendran(Consultant) regarding non approval of the methodology.
24	30/04/2004	Reply Letter to Consultant in letter serial number 23 dated 15/04/2004.	BPSL Letter mentioning that they will take decision on coming board meeting
25	12/5/2004	Clearance from Central Environment & Forest Deptt.- EIA Clearance	Govt. of India, Ministry of Environment & Forest letter
26	18/08/2004	Project Management Committee Minutes	Minutes of Project management Committee on discussion of CDM
27	5/11/2004	Revised Consent to Establish for additional capacity	State Pollution Control Board Letter
28	15/12/2004	Project Management Committee Minutes	Minutes of Project management Committee meeting discussing about the CDM
29	30/12/2004	Decision taken by Board to initiate the CDM process subsequent to commissioning	BPSL Board resolution
30	22/03/2005	Proposal from CDM consultants	Mecon Letter
31	25/03/2005	BPSL indicating to MECON on taking the CDM advisory services subsequent to commissioning of the plant	BPSL Letter
32	2/7/2005	Phase 1 Commissioned	
33	8/7/2005	ACM0004 Methodology got approved	
34	26/09/2005	Discussions with CDM consultants	Total solutions letter

35	24/03/2006	Communication from CDM consultant on CDM advisory services	E & Y Consultants letter
36	8/5/2006	Phase 2 commissioned	
37	28/07/2006	Letter from Consultants	ICICI bank letter
38	18/08/2006	Letter from consultants	ICICI bank letter
39	23/08/2006	Consultancy letter	Indus tech
40	7/9/2006	Letter from consultants	ICICI bank letter
41	7/11/2006	Site visit by CDM consultants by total solutions	Email communications
42	16/12/2006	Agreement with CDM consultants	Agreement copy
43	28/03/2007	Submitted documents to MOEF for HCA	Letter submitted to HCA
44	17/04/2007	Signed contract with DOE	Agreement copy
45	17/04/2007	Proposal for Trading of Verified Emission Reductions	Global Energy Solutions
46	18/06/2007	Host country Approval received	Govt. of India, Ministry of Environment & Forest

In the baseline comparison the 2004 report is used and it is not clear why? So CAR 17 was raised. The PDD mentions document provided to DOE but the PDD no where mentions this was earlier on ACM0004 and now on ACM0012. PP responded that in the baseline comparison the Feb 2004 report of Central Electricity Authority (CEA) has been used as it is available on cost of power generation prior to project commissioning in July 2005.

Also the Orissa Electricity Regulatory Commission (OERC) Order dated 28 Jan 2002 can be referred which is based on the Order that provides information on the cost of electricity available from the grid is Rs.2.83/ unit at 80% Load Factor (L.F) as compared to the cost of electricity at more than Rs 4.00 / unit if generated through the D.G sets and therefore the power supply from the grid being more economical than the power to be available from the D.G sets. From the information available it can be inferred that power generation from coal, coal char and coal washery rejects based power plant would be the cheapest (in the range of 1.13 INR/kWH as computed by BPSL at the time of CDM consideration) when compared with grid power and diesel based power. This was checked from the spreadsheet and cost accountants certificate (Ref/8/).The revised PDD provides in Section B.5 the details of cost computation of coal, coal char and coal washery rejects based power plant. The version history has been provided in Section A.1 of the revised PDD (ver 3) indicating the use of ACM0004 methodology in Version 01 and use of ACM0012 methodology in Version 02 of the PDD. Thus, CAR 17 was closed as the revised PDD (Section A.1, B.5) (**Ref.no./4/**) along with the FEB 2004 and OERC document (**Ref.no./79/**) dated 28th Jan 2002 was verified by the assessor and desk reviewed by the lead assessor and found to be in order.

As per EB 44 Annex 3, para 96 "If the project activity start date is prior to the date of publication of the PDD for stakeholder comments it shall be demonstrated that the CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity". However, after desk reviewing of the PDD it was found that the serious CDM consideration was not mentioned in section B.5 of PDD so CAR 18 was raised along with documentary evidence need to be provided to DOE and include that reference in PDD. Credible third party evidence for the serious CDM consideration has to be provided. The serious CDM consideration as per EB41 Annex 46 in the chronological order should be provided by PP.

Also, technological barriers mentioned were also not clear, so the PP was asked to provide documentary evidence for training related barrier, risk of technological barrier, Waste gas quality, temperature control related, boiler operations problem, and other equipments. PP had replied that evidences for serious CDM consideration has been provided and also explained in the PDD (ver 3) under Section B.5. The evidences include the Board note on CDM consideration dated 29 October 2002 also indicating that BPSL was aware of the technological hurdles and challenges due to high pressure and temperature configuration of the waste heat recovery boiler which was prior to project decision. The reference to the same has been indicated in Section B.5 of the PDD. BPSL had initiated the dialogue with various institutions for the financing of the project in which CDM revenues was also considered. The application to financial institution highlighting the CDM revenues from the proposed project and the communications thereof are enclosed as Annexure-9. The detailed chronology on serious CDM consideration in accordance with EB 41 Annex 46 is attached. Technological barriers section clearly indicates that there were training related barriers, risk of technological failures, quality of waste gas, temperature control related, boiler operational problem and due to failure of other equipments. The documentary evidences of training related barriers, risk of technological failures, boiler operational problems are already provided by pp. Regarding waste gas quality aspects, it may be noted that WHRB's are designed based on flue gas emanating from the DRI Kiln having definite parameters. A copy of the basis of design provided by BPSL is enclosed. Any change in the parameters would have adverse impact on performance of the boiler. For example, the flue gas inlet temperature is 1000°C and in case temperature goes beyond 1000°C, it would have adverse impact on boiler tubes and there may be premature failure due to excessive heat. Further, coal is a vital raw material used in the DRI Kiln to produce DRI/ sponge iron. Better coal quality is related directly with the productivity of DRI and quality of flue gas which has a direct impact on steam generation. On the other hand inferior coal quality (having high ash content) will generate flue gas with high ash content and this has got impact on wear and tears on the boiler tubes. Evidence from BPSL on desired ash content in coal was also provided by PP which indicated that the ash content desired is about 27.5%. Further other equipments such as electrostatic precipitator (ESP) is an integral part of the boiler which is placed between boiler and the stack. Any breakdown in ESP would paralyse the performance of WHRB. The gas coming out from the kiln contains moisture and un-burnt coal which could stick to the wall of the electrodes and adversely affect the performance of the ESP connected to the WHRB. The functioning of the ESP is dependent on the quality of the waste gas from the kiln as against that of the AFBC. The PDD has been accordingly revised. PP was told to provide the serious CDM consideration as per EB41 Annex 46 in the chronological order. PP responded that the detailed chronology on serious CDM consideration in accordance with EB 41 Annex 46 is attached as **(Ref. no./33/)** is already explained in CAR15. PP has provided the detail chronology for the project activity that has been checked by the assessor with the original copy and desk reviewed by the lead assessor and also relevant people have been interviewed / telephoned by lead assessor to assess the credibility of the documents provided against the detailed chronology of the project activity as mentioned in CAR15 was checked, which is found to be as per the EB41, Annex 46 and EB44, Annex 3 and hence, the CAR 18 was closed.

4.5 Application of Baseline Methodology and Calculation of Emission Factors

The proposed CDM project activity is the power generation using waste gases and uses baseline methodology as described under Type ACM0012 version 02 dated 2/11/2007 for "Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system" as per large scale CDM project activities. The project activity has determine the baseline emission as per the Scenario 1 of ACM0012 version 2 which is the Baseline emissions from electricity ($BE_{\text{electricity},y}$) that is displaced by the project activity as the project activity involves only generation of electricity. The Estimation of CO2 emission factor ($EF_{\text{Elec},i,j,y}$) for the captive power plant at BPSL was determined as per the applied methodology which has been found to inline. However, as per the methodology to calculate f_{cap} but the PDD does not mentions that so CAR 19 was raised. PP responded that as per the requirement of the ACM0012 (ver 2), the baseline emissions calculation needs to include the ' f_{cap} '. In case of the project activity f_{cap} is derived based on 'Method 2' i.e. the 'The manufacturer's data for the industrial facility shall be used to estimate the amount of waste gas/heat/pressure the industrial facility generates per unit of product generated by the process that generates waste gas/heat/pressure'. The manufacturers specifications has been used for

maximum potential sponge iron production output of the kilns as per the rated capacity of the kiln which relates to waste gas generation in the baseline.. This is evidenced is sourced from the document submitted

to BPSL by Lurgi Metallurgie GmbH (an Outokumpu technology company) for the SL/RN Direct Reduction Plant $q_{wg, product}$ is the waste gas/ heat generation per unit of sponge iron which is calculated by BPSL from the manufacturers specifications. As per the design basis provided by Thermax Ltd provided by pp the waste gas generation rate is the sponge iron kiln and the capacity of the kiln the quantity of waste gas used for energy generation during a year is not available ,this was not measured previously however as indicated under Section B.7.1 of the PDD (ver 2), it is proposed to be directly measured through appropriate metering device (this is proposed to be installed shortly at BPSL) during the crediting period towards estimating f_{cap} . However in the ex-ante emission reduction calculations as detailed under Section B.6.3 of the PDD, f_{cap} has been assumed as 1. This has been clearly mentioned under Section B.6.3 of the revised PDD (ver 3) under 'Computation of f_{cap} '. The document is enclosed by PP. The document by Lurgi Metallurgie GmbH (an Outokumpu technology company) is clear and verified the data. Thus, CAR 19 was closed as the documents **(Ref. no./30/)** **(Ref. no./16/)** **(Ref. no./17/)**are provided in support of assumption taken for f_{cap} calculation and the same has been verified by the validator with original copy and found to be correct. The PDD has been revised which elaborate the discussion on estimation of baseline cap(f_{cap}) for the project activity and is found to be inline.

The project emission has been calculated as per the methodology-ACM0012 (ver 2) which includes emissions due to combustion of auxiliary fuels used to supplement the waste gas and electricity emission due to consumption of electricity for cleaning the gas before being used for generation of heat/ energy/ electricity. In the PDD regarding the fossil fuel consumption during power plant start up, maintenance or in case of exigencies with in the project boundary which can contribute towards the project emissions is not clear so NIR 04 was raised. PP response was that the section B.6.3 of the PDD (ver 2 as per ACM0012) under 'Project emissions', details the power consumption during power plant start up, maintenance or in case of exigencies. The section B.7.1 of the PDD has been revised further (PDD (ver 3)) to include the parameter 'Power DRI kiln' that would be monitored during the crediting period to estimate project emissions. However, the revised PDD is not mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies and to that PP again responded that the project emissions have been calculated considering that there would be power used from the AFBC boiler which is operated on coal and coal char. An estimate of the likely power utilized for the start up and exigencies has been calculated and accordingly the project emissions have been estimated. However, in case of utilization of the DG sets, the likely consumption of HSD is about 25 KL. The PDD has been revised accordingly. Thus, NIR04 was closed as revised PDD **(Ref.no./4/)** is mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies which has been checked by the local assessor and desk reviewed by the lead assessor.

Details of equation used for ex-ante emission reductions along with detail calculation worksheet were not provided so NIR 05 was raised. The PDD does not detail the emission reduction calculation in a transparent manner. It is not possible to reproduce the calculation from the PDD. It seems a high PLF is applied. Please clarify. In response to this PP has provided the details of equation used for ex-ante emission reductions which has been clearly depicted in Section B.6.3 of the PDD (ver 2) that is based on ACM0012 (ver 2) methodology. The source of information used in the calculations have also been clearly mentioned in the section B.6.3 of the PDD (ver 2) and documentary evidences of information used is also provided as Appendix 1 during February 2008. As apparent from the PDD the annual power generation and steam generation data assumed for ex-ante emission reduction calculation pertain to the actual data at BPSL for the year 2006-07. The document on capacity utilisation of WHRB and AFBC boilers at BPSL during 2006-07 is evidenced and provided by PP, which indicates that during 2006-07 the average capacity utilisation of the 4 WHRBs (involved in the project activity) was about 58.9% (all the four WHRBs taken together) whereas the average capacity utilisation of the 2 AFBC boilers was about 80.5%. It is apparent from the above that the plant load factor (PLF) or capacity utilisation factor (CUF) of the project activity (power from WHRBs) is not high. Though it may be expected that a WHRB could operate at about 65-70% capacity utilisation when compared with the AFBC boilers with 90-95% capacity utilisation, this is not the case that has been experienced during 2006-07 at BPSL. Therefore the above justifies that the ex-ante emission reduction calculations that use 2006-07 data do not have high PLFs. PP has provided the spreadsheet for capacity utilization **(Ref. no./19/)**. Thus, NIR 05 was closed as Spreadsheet for capacity utilization is checked by the assessor as well as desk reviewed by the lead assessor and found to be satisfactory.

The emission reductions mentioned in the PDD are not clear and how it has increased from previous PDD on ACM0004. It is not clear. PP was asked to clarify. Also provide the emission reduction calculation spreadsheet. Thus, CAR 20 was raised. Project proponent responded that previously the ER calculations

was based on ACM0004, the efficiency used to compute the baseline emission factor has been derived based on potential power generation and steam generation (based on 2006 – 2007 data at BPSL) and the corresponding heat equivalent per unit of power as well as enthalpy of steam at turbine inlet (from steam tables based on steam pressure and temperature). As per the PDD based on ACM0004 to arrive at the efficiency of the captive power plant the following method has been adopted: Efficiency (This is the turbine efficiency - since boiler efficiency has been assumed at 100% turbine efficiency will represent the overall power plant efficiency) = Thermal equivalence of power generated from the Captive Power Plant / Energy input to the turbine. However, later on the PDD has been re web hosted in methodology ACM0012, version 2 and so the for determining the efficiency of the captive power plant (based on coal, coal char and coal washery rejects) at BPSL which would have supplied power to the facility in the absence of the project, option (ii) i.e. "Highest of the efficiency values provided by two or more manufacturers for power plants with specifications similar to that that would have been required to supply the recipient with electricity that it receives from the project activity" mentioned in ACM0012 methodology has been used. As per this option (ii), the efficiency of the captive power plant at BPSL has been estimated/ derived to be 23.89% considering the following values i.e. 84% boiler efficiency (Manufacturers specification Ref/10/), NCV 2500 kcal/kg, and Turbine heat rate as 3022.715 kcal/kWh. (Documentary evidences are provided Ref/10/). Justification of increase in emission reductions in current PDD based on ACM0012: The input parameters used to compute the efficiency of the captive power plant (CPP) are different in the calculations used for ACM0004 and ACM0012. The computation of efficiency for ACM0012 is as per the requirement of the methodology and as per manufacturer's specification (based on Option (ii) indicated in ACM0012). Whereas the input parameters used in efficiency calculations for ACM0004 are based on actual power and steam generation data at BPSL in 2006 - 07 and also considering the corresponding heat equivalent / enthalpy of steam. This is the reason for different emission factors used in computing the emission reductions for both ACM0004 and ACM0012. The emission factor used in previous PDD (1.19 and 1.25 tCO₂e/MWh) based on ACM0004 was lower than the emission factor used in the current PDD (1.44 tCO₂e/MWh) based on ACM0012 and therefore the emission reductions in the current PDD based on ACM0012 is higher than the previous PDD based on ACM0004 methodology. It may be noted that the ER calculation spreadsheet has been corrected and forwarded to DOE using ACM0012 methodology. The turbine heat rate provided is not accepted as this is on plain paper and not an authenticated document. In-house Coal GCV calculation sheet is also not accepted as this mentions some GCV value by some other ink pen while rest of the sheet is typed. PP responded that the documents authenticated by the technical consultant- BHEL are enclosed again for reference in Annexure-11. The original document (**Ref. no./31/**) has been sent to the DOE for verification which has been checked by the assessor with the original copy and desk reviewed by the lead assessor and found to be OK. The emission factor is fixed ex-ante and the value used is 1.44 tCO₂e/MWh. Thus, CAR 20 was closed.

4.6 Application of Monitoring Methodology and Monitoring Plan

The present CDM project activity uses monitoring methodology as described in ACM0012 version 02 dated 2nd November 2007 for "Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system "as per CDM project activities. The description towards the data and parameters to be monitored under monitoring plan is not clear. The methodology requires monitoring of the net electricity produced by the project activity and if part of the electricity is produced from other fuels, the monitoring of the amount of waste gas recovered and NCV of waste gas has to be monitored, which are not clearly described. The project seems to be focussing on the monitoring of steam parameters however it is not clear why this replaces monitoring of the waste gas or where these monitored parameters will be used as no formula which is actually applying the monitored parameters for the steam is absent. Clarification for the parameters to be monitored for estimation of net electricity generation need to be provided. Thus, NIR 7 was raised. PP responded by telling that the description of the data and the parameters to be monitored under the monitoring plan is detailed in section B.7.1 of the revised PDD (based on ACM0012). The project (PDD ver 1) was web-hosted using ACM0004 (ver 2) methodology as per which it was required to monitor the amount of waste gas recovered and the NCV of waste gas. However now in PDD (ver2), the ACM0012 (ver 2) methodology has been applied to the project activity. The ACM0012 (ver 2) methodology has an option under 'Calculation of the energy generated (electricity and/or steam) in units supplied by waste gas/heat and other fuels' called Situation (2) which states that 'An alternative method that could be used when it is not possible to measure the net calorific value of the waste gas/heat, and steam generated with different fuels in dedicated boilers are fed to turbine/s through common steam header takes into account that the relative share of the total generation from waste gas is calculated by considering the

total steam produced and the amount of steam generated from each boiler'. This approach has been used as clearly defined in Section B.6.1 of the revised PDD based on ACM0012 methodology. Therefore, the parameters monitored (available under Section B.7.1) are as per the requirement of ACM0012 (ver 2) methodology. Further the equation used to 'calculate electricity generated using waste gas' is also in line with the methodology ACM0012 (ver 2) and are detailed in Section B.6.1 and B.6.3 of the PDD (ver 2). Thus NIR 07 was closed as revised PDD (**Ref.no./4/**) provided is transparent for monitoring of parameters which has been verified by the local assessor and desk reviewed by the lead assessor.

The description of QA/QC for the data and parameters to be monitored as required under monitoring methodology is inadequate thus, NIR 08 was raised. The QA/ QC procedures are clearly defined in the section B.7.1 of the PDD (as per ACM0012)(**Ref.no./4/**) which has been desk reviewed by the local assessor as well as by the lead assessor and found to be inline and thus, NIR 08 was closed.

The Management structure toward the monitoring plan is not well explained in the PDD so CAR 09 was raised. The issue was also raised asking PP to provide documentary evidence of modalities and procedures towards periodic training for the monitoring personnel, procedures for emergency preparedness due to emergencies, documentary evidences for calibration procedure for monitoring equipments, description towards maintenance of monitoring equipment and installations, explanation regarding procedures for monitoring, measurements and reporting of the data and parameters required under monitoring methodology and detail procedure and plan for internal CDM audit team. PP responded that the management structure is clearly depicted as "Organisation structure and Procedure for Monitoring and Reporting of data" in Section B.7.2 of the PDD based on ACM0012. BPSL maintains a training calendar for Controls and Instrumentation system every year and the training is imparted on the various aspects such as preventive maintenance, man and machine safety, PLC programming, operation of turbine, DCS system, environment and pollution control, steps for trouble shooting etc. Enclosure 6 provides the training calendar for the year 2007. The details related to periodic training of the monitoring personnel are also provided in B.7.2 and Annex 4 of the revised PDD as per ACM0012 methodology. A well laid out emergency preparedness plan exists at BPSL. The monitoring procedure of the parameters during emergency situations is detailed in section B.7.2 and Annex 4 of the PDD as per ACM0012. A yearly calibration schedule is maintained at BPSL for the monitoring equipments. Documentary evidence for calibration procedure of monitoring equipments is provided by PP. Further the frequency of calibration of monitoring equipments is provided in Section B.7.1 of the revised PDD (ver 2) based on ACM0012. The calibration procedure duly authenticated by BPSL has been submitted by PP. A detailed laid out maintenance plan is followed at BPSL for the monitoring equipments. the PP also provided the annual maintenance plan for instruments at BPSL. The maintenance plan duly authenticated by BPSL has been submitted by PP. The procedures for monitoring, measurements and reporting of data and parameters required under the monitoring methodology are detailed in Section B.7.1 and B.7.2 of the revised PDD (ver 2) as per ACM0012. A structured internal CDM audit team exist at BPSL. A brief description on the internal CDM audit team is provided in section B.7.2 and Annex 4 of the revised PDD (ver 4) as per ACM0012 methodology. Thus, CAR09 closed as the revised PDD (**Ref.no./4/**) was checked and found that Section B.7.1, B.7.2 and Annex 4 have been revised and mentions the details transparently. The training calendar and training records provided were also verified during site visit. The calibration procedure and maintenance plan provided was also checked and found to be in order as checked during site visit and also the scan copies of the same are desk reviewed by the lead assessor.

The description of the sources and gases included in the project boundary for the purpose of calculating project emissions and baseline emissions under Section B.3 of PDD was not provided with proper justification, proper explanation of methodological choices and project specific assumptions and explanations under section B.6.1 of PDD version 1 and proper and complete description towards data and parameters that are available at validation under section B.6.2 of PDD and hence CAR 14 was raised asking the PP to provide the same. The Project description of the sources and gases included in the project boundary for the purpose of calculating the project emissions and baseline emissions has been presented appropriately as apparent in Section B.3 of the revised PDD as per ACM0012, explanation of methodological choices and project specific assumptions and explanations under section B.6.1 is provided in the PDD as per ACM0012 and proper and complete description towards data and parameters that are available at validation has been provided in section B.6.2 of the revised PDD as per ACM0012. Thus, CAR 14 was closed as the Revised PDD (**Ref.no./4/**) submitted by PP was checked by the local assessor and desk reviewed by the lead assessor and found that the sections B.6.3, B.6.1, B.6.2 are mentioning the description of monitoring transparently and according to ACM0012 version 02.

4.7 Choice of the Crediting Period

The PDD version 1 had mentioned the start date of project activity as 27/02/2003. This was checked based on purchase order of Waste Heat Recovery Boilers (1&2). The expected operational lifetime of the project activity is 25 years as mentioned in the PDD. PP has chosen a fixed crediting period of 10 years, and the starting date of fixed crediting period is 01/07/2009 or subsequent to the date of registration of the project which ever is later as per the PDD version 04.

4.8 Environmental Impacts

The analysis of the environmental aspects and impacts due to the project activity as documented under EIA report and detailed EIA report and relevant environmental clearances from state Pollution Control Board and Ministry of Environment and Forests; Government of India are need to be provided by the PP in support of environmental impact and so CAR10 was raised asking PP to provide those documents. The analysis of environmental aspects and impacts due to the project activity are detailed in Section D.1 of the revised PDD (ver 2). EIA report was enclosed in Enclosure 9 provided to SGS during October 2007. All relevant clearances from the State Pollution Control Board and Ministry of Environment and Forests, GoI were provided to the DOE during the validation site visit in July 2007. Thus, CAR 10 was closed as Revised PDD (**Ref.no./4/**) section D.1 is mentioning the environmental aspects clearly. EIA report and SPCB clearances were also provided and found to be in order which has been checked by the local assessor at site with the original copy and desk reviewed by the lead assessor.

Consent to Establish and the Consent to Operate for the project activity from the State Pollution Control Board which is necessary to rule out any possible environmental impact so CAR 11 was raised asking PP to provide the same. The Consent to Establish and Consent to operate the project under the Air Act and Water acts; received from the State Pollution Control Board (SPCB) (**Ref.no./49/**) has been provided during the validation site visit held in July 2007. Thus, CAR 11 was closed as Consent to establish and operate was checked by the local assessor and desk reviewed by the lead assessor and found to be OK.

4.9 Local Stakeholder Comments

The local stakeholder's consultation process was carried out by publishing a notice in English (Times of India) and local (Dharitri) news daily, inviting views, comments, objections and suggestions from the stakeholders about the proposed project activity. CAR 13 was raised asking PP to provide documentary evidence towards invitations for local stakeholder comments and the procedure of compilation of the comments received during local stakeholder consultation process, detail documentary evidence towards public hearing process and NOC from Village Panchayat and the summary of comments received during local stakeholder consultation process and relevant actions taken in this regard with supporting. The invitations for local stakeholder comments were through the public hearing process which was available in the local (in both English and Vernacular language) news papers. The proceedings of public hearing process conducted on 16/07/2003 at the Tahsil office, Rengali which also details the recommendations of the public hearing panel are documented and the same has been provided. The documentary evidence towards the public hearing process is available in the 'Proceedings of the public hearing on M/s Bhushan Limited (an integrated steel plant), Rengali, Sambalpur held on 16/07/2003 at the Tahsil office, Rengali'. This document has been provided during the validation visit. The NOC from the village panchayat has also been provided during the validation site visit. The comments received during the stakeholder consultation process and relevant actions taken in this regard are detailed in Section E.2 and E.3 of the PDD respectively. The documentary evidences / supporting of the same are provided during the validation site visit. Thus, CAR 13 was closed as Revised PDD (**Ref.no./4/**) was checked along with all the documentary evidences (**Ref.no/39/**, **/43/**) by the assessor at site with the original and desk reviewed by the lead assessor and found to be satisfactory.

5. Comments by Parties, Stakeholders and NGOs

In accordance with sub-paragraphs 40 (b) and (c) of the CDM modalities and procedures, the project design document of a proposed CDM project activity shall be made publicly available and the DOE shall invite comments on the validation requirements from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. This chapter describes this process for this project.

5.1 Description of How and When the PDD was Made Publicly Available

The Project Design Document for this project was made available on the SGS website <http://cdm.unfccc.int/Projects/Validation/DB/ZVWIGL64C7SV9UZECVMZHY3AUUTOLU/view.html> and was open for comments from 20/06/2007 to 19/07/2007 which was based on methodology ACM0004, but the PDD was re-web hosted on the SGS website <http://cdm.unfccc.int/Projects/Validation/DB/E5JJVBZALS4DVDDVTJ6N5VP9BFO0BM/view.html> and was open for comments from 11/03/2008 until 09/04/2008 based on the methodology ACM0012, version 2. Comments were invited through the UNFCCC CDM homepage

5.2 Compilation of all Comments Received

Comment Number	Date Received	Submitter	Comment
1	09-04-2008	Naveen Sharma	<p>Additionality 1.a.Investment Barrier</p> <p>The common practice for any investment in power sector worldwide is to look at the levelised cost of generation of the alternatives available. On one hand BPSL had the alternative of putting up a coal fired captive power plant instead of going for the waste recovery based power plant, on the other hand waste heat based power plants use the recovered waste heat to generate electricity and thus do away with the requirement of fuel consumption and associated costs involved in electricity generation. The PDD mentions that the difference in capital cost between the alternatives is marginal. No matter how cheap coal is or no matter how conveniently it is available the levelised cost in case of WHRB power would be significantly lower than that incase of coal based power since coal based power involves fuel cost and WHRBs don't. For someone who is involved in putting up a 100 MW power plant, I am sure these common aspects of financial analysis would be in their knowledge. What surprises me is the approach to conveniently ignore the facts and fabricate the additionality arguments by making a very cleverly engineered disclosure of information and concealing the relevant facts. My sincere request to the DOE is to please review of the levelised cost workings for waste heat recovery based power and make it public so that people like us who have some sense of these projects can review and give inputs. My</p>

Comment Number	Date Received	Submitter	Comment
			<p>request to the CDM EB is, please....please ensure that the PP is required to share the levelised cost workings with the DOE, the RIT team and the international stakeholders for review.</p> <p>1.b.BPSL had the option of generating power only through AFBC boilers which would have been possible with a marginal increase in the project cost when compared to the project cost of establishing the four WHRBs and the accompanying auxiliaries and steam piping arrangements.</p> <p>Comment - The PDD has evaded all discussions on the financial benefits obtained by way of avoided fuel cost (which is linked to the previous question) and expected revenue from sale of surplus power.</p> <p>2.Technological barriers 2.a.Training related Please understand that barriers have to be such that they are (i) prohibitive in nature and (ii) should get alleviated due to CDM revenues. Please also read the definition provided in the additionality tool, it states that : only if 'Skilled and/or properly trained labour to operate and maintain the technology is not available, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance', can it be considered as barrier . The WHRB's are manufactured in India by Thermax and Thermax boiler installations are widely prevalent in India. Please see what is written above, how can you possibly argue that trained manpower to operate the plant are not available. Therefore to argue that there is a serious dearth of trained and skilled manpower in this area is completely frivolous, more so when Thermax has provided the training to BPSL staff. It is common practice, world wide, for any technology supplier to train the manpower at the receiving firm on the operations, handling and safety procedures of the installed equipment. Seriously do you expect us to believe that you undertook the investment in a 100 MW power plant even though you knew that technical people to run the plant are not available; was it reported in the board meetings and the management of your company decided to go ahead with risk involved?</p> <p>In case if the PP submits any such false claims,</p>

Comment Number	Date Received	Submitter	Comment
			<p>the DOE should exercise their rights to even check the minute book of BPSL and can even approach registrar of companies to check what was submitted to them.</p> <p>2.b. Boiler operation problems and installation of additional equipment Barriers are something that prevents you from doing a project and not something that happens after you have already implemented the project. The problems you have written here are what has happened after the project was completed, how can you argue that these were barriers at the time of inception of the project.</p> <p>2.c. Low capacity utilization of boiler PDD provides with capacity utilization data for the year 2006-2007. Again, please refer to comments above, you obviously planned a 4 x 51 TPH boiler capacity because you thought that these waste gases would be sufficient to generate that much steam. What happened in 2006-07, is after project implementation, this is an irrelevant argument. Please get your thoughts clear on what barriers mean, rather than resorting to baseless innuendoes.</p> <p>2.d. Institutional barrier I like what you have written here, excellent strategy of beating around the bush rather than focusing on the key issues. First of all, when you decided to invest in the project, you did so on the basis of the variable tariff based PPA with RETL. Anybody with a basic understanding of the power sector can tell you that a variable tariff PPA is significantly more rewarding as compared to a fixed rate PPA. Surely, you are not going to say that a variable tariff PPA was a barrier for you in setting up the project.</p> <p>What happened in 2006 and 2007 was post implementation of the project, how do you expect us to believe that an event that took place two years after the commissioning of your project, could have acted as a barrier during its inception. People in power sector have tried to figure out for years, how tariffs are going to behave and to my knowledge none have been successful so far. Did you have some fortune teller who told you this was going to happen.....if so...then..the same fortune teller would have told you that you would be getting these comments in the stakeholder consultation process...there you go.</p> <p>Besides, revenue from sale of surplus power i.e. an additional source of income obtained from the project activity and only strengthens</p>

Comment Number	Date Received	Submitter	Comment
			<p>the financial viability of the project. To describe at length about how this 'additional' stream of revenue would have been even greater had the AFBC boiler been installed (assuming a larger quantum of surplus power available to the PP for sale due to higher boiler efficiency), or unfavorable tariff regime is by no means a barrier to the project. Moreover in case of an AFBC boiler project you would have faced similar issues as well and also have had to bear the additional fuel cost.</p> <p>Comment – The PDD speaks at length about the changing tariff regime for sale of surplus to GRIDCO and the financial losses thus incurred by the PP. This argument is unfounded as it was certainly not known to the PP how tariffs would change and vary over time leading to monetary losses, at the time of project conception.</p>

5.3 Explanation of How Comments Have Been Taken into Account

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	1.a.		
ISHC Comment		Date: 09-04-2008	
<p>Additionality</p> <p>1.Investment</p> <p style="text-align: right;">Barrier</p> <p>The common practice for any investment in power sector worldwide is to look at the levelised cost of generation of the alternatives available. On one hand BPSL had the alternative of putting up a coal fired captive power plant instead of going for the waste recovery based power plant, on the other hand waste heat based power plants use the recovered waste heat to generate electricity and thus do away with the requirement of fuel consumption and associated costs involved in electricity generation. The PDD mentions that the difference in capital cost between the alternatives is marginal. No matter how cheap coal is or no matter how conveniently it is available the levelised cost in case of WHRB power would be significantly lower than that incase of coal based power since coal based power involves fuel cost and WHRBs don't. For someone who is involved in putting up a 100 MW power plant, I am sure these common aspects of financial analysis would be in their knowledge. What surprises me is the approach to conveniently ignore the facts and fabricate the additionality arguments by making a very cleverly engineered disclosure of information and concealing the relevant facts. My sincere request to the DOE is to please review of the levelised cost workings for waste heat recovery based power and make it public so that people like us who have some sense of these projects can review and give inputs. My request to the CDM EB is, please....please ensure that the PP is required to share the levelised cost workings with the DOE, the RIT team and the international stakeholders for review.</p>			
Project Participant Response:			

The levelised cost of power generation from coal, coal char and coal washery rejects based AFBC system; and power generation from WHRB system have been calculated and have been provided to the DOE. The cost of power generation from coal, coal char and coal washery rejects is about 1.13 INR/kWh which is less when compared to the cost of power generation from waste heat recovery system which is 1.45 INR/kWh.

From the cost workings it is apparent that the cost of WHR based power is relatively higher than that of the coal, coal char and coal washery rejects based power because of the following reasons:

Higher cost of WHR system (INR 501.2 Million for 204 TPH (51TPH x 4) steam generation capacity) as compared to AFBC system (INR 486.6 Million for 225 TPH steam generation capacity) results in higher depreciation cost, interest cost and return on equity.

Capacity Utilization of a WHR boiler of 204 TPH capacity, is about 60% as compared to the capacity utilization of about 90% of AFBC boiler using coal/ coal char/ coal washery rejects. This would result in generation of lesser quantity of steam from the WHRB.

While it may be accepted that there is no fuel cost involved in a WHRB system, the cost of fuel for AFBC system is also not very high due to adequate availability of coal char, and coal washery rejects from the coal washery plant of BPSL. Therefore though there is no fuel cost associated with the WHR power project, the raw material cost (for AFBC system) is also not very significant.

DOE Comment:

PP has provided sufficient explanation for the investment barrier in comparing WHRB and AFBC with documentary evidences of PO,(Ref/35/), cost of power generation for WHRB, AFBC, Grid (Ref/9/), cost accountant letter (**Ref.no./8/**) . As per methodology ACM0012 version 2 "if there is any market value then the methodology is not applicable" hence no cost of WHRB is OK. As the raw material for the AFBC is mostly generated due to Kiln so the cost of coal is only considered hence this was also accepted. This was checked and as the cost of WHRB is more than the AFBC hence the depreciation cost is high but the % of depreciation is same. This had been verified by the DOE and found to be correct. Thus the comment was closed out.

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	1.b		
ISH Comment		Date: 09-04-2008	
BPSL had the option of generating power only through AFBC boilers which would have been possible with a marginal increase in the project cost when compared to the project cost of establishing the four WHRBs and the accompanying auxiliaries and steam piping arrangements.			
Comment - The PDD has evaded all discussions on the financial benefits obtained by way of avoided fuel cost (which is linked to the previous question) and expected revenue from sale of surplus power.			
Project Participant Response:			

Response 1 (b) from BPSL: The statement “BPSL had the option of generating power only through AFBC boilers which would have been possible with a marginal increase in the project cost when compared to the project cost of establishing the four WHRBs and the accompanying auxiliaries and steam piping arrangements” has been replaced in the revised PDD (ver 3) with the following statement “BPSL had the option of generating power only through AFBC boilers which would have been relatively less costly when compared to the project cost of establishing the four WHRBs and the accompanying auxiliaries and steam piping arrangements”.

Regarding the comment that ‘the PDD has evaded all discussions on the financial benefits by way of avoided fuel cost and the expected revenue from the sale of surplus power’, it may be noted that the revised PDD (ver 3) under Section B.5 and under sub-section ‘Investment Barriers’, details the cost of power generation from WHRB and coal/ coal char/ coal washery rejects based AFBC system and provides/ details the information and assumptions used in the cost workings. The cost workings documentary evidences pertaining to the cost calculations have also been provided to the DOE. It may be noted that the cost of power generation from WHRB system is higher (INR 1.45 / kWh) than the cost of power generation from the coal, coal char and coal washery rejects based AFBC system (INR 1.13 / kWh) and the reasons for the same has been clearly provided in the previous Response 1(a) above.

It may also been noted that had an equivalent capacity AFBC boiler been implemented in place of the WHRB system, there would be greater surplus availability of power for sale to grid due to the higher capacity utilization of the AFBC boiler. This would have ensured more revenues from sale of surplus power when compared to the WHRB system.

DOE Comment:

PP has revised the PDD (**Ref.no./4/**) which has been checked by the DOE and found that PDD is incorporating the change for the statement for which the comment has been raised with a correct and clear statement. Also, the revised PDD has mentioned all the details related to the cost of power generation. Also PP has provided the cost calculation documentary evidences (**Ref.no./8/**) which has been verified by the DOE and found to be correct. The surplus availability of power would have been there in case only AFBC would have implemented as the PLF of AFBC is 90 % which is more than the WHRB. This was verified based on cost accountant letter (Ref/8/) and also on the basis of prior experience on similar kind of projects by the lead assessor. Hence this was accepted and thus the comment was closed out.

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	2.a.		
ISH Comment			Date: 09-04-2008

2. Technological barriers

2a. Training related

Please understand that barriers have to be such that they are (i) prohibitive in nature and (ii) should get alleviated due to CDM revenues. Please also read the definition provided in the additionality tool, it states that :

only if 'Skilled and/or properly trained labour to operate and maintain the technology is not available, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance', can it be considered as barrier .

The WHRB's are manufactured in India by Thermax and Thermax boiler installations are widely prevalent in India. Please see what is written above, how can you possibly argue that trained manpower to operate the plant are not available. Therefore to argue that there is a serious dearth of trained and skilled manpower in this area is completely frivolous, more so when Thermax has provided the training to BPSL staff. It is common practice, world wide, for any technology supplier to train the manpower at the receiving firm on the operations, handling and safety procedures of the installed equipment. Seriously do you expect us to believe that you undertook the investment in a 100 MW power plant even though you knew that technical people to run the plant are not available; was it reported in the board meetings and the management of your company decided to go ahead with risk involved?

In case if the PP submits any such false claims, the DOE should exercise their rights to even check the minute book of BPSL and can even approach registrar of companies to check what was submitted to them.

Project Participant Response:

The project activity at BPSL i.e. the WHR boilers were the first of its kind in the state of Orissa with respect to the high pressure and temperature configuration for a 500 TPD kiln. This is evidenced from the Letter from the 'Directorate of Factories and Boilers, Bhubhaneshwar, Orissa' which states that BPSL was the first in the state of Orissa to install WHRBs with the high pressure (maximum of 101 kg / cm²) and high temperature (520 deg C) configuration used with 500 TPD kiln. It needs to be noted that for the technology provider Thermax Ltd, this was the first time they were designing such a high pressure and temperature configuration waste heat recovery boiler for a sponge iron kiln of 500 TPD capacity and therefore there was a lot of uncertainty related to the operation of such a WHRB system which BPSL was also aware of. BPSL, prior to the commissioning of the plant, had envisaged the risks/ uncertainties related to the high pressure and temperature configuration WHRB system, which is evidenced from the document "Extract of the Minutes of the Meeting of the Board of Directors dated 29 October 2002" provided to the DOE and also through its communication from its technical consultants.

Further Thermax, who are the pioneers in the boiler installations in India, faced lot of operational problems, pre and post commissioning of the WHRB due to the lack of experience of the implementation and operation of such a WHRB system with high technical configuration. Evidences of the technical problems faced by BPSL prior to the commissioning and operation of the plant has already been provided to the DOE. It is apparent from the documents provided in Enclosure F that there were significant delays in design and engineering work and supply of equipment by Themax Ltd.

Further it may be noted that the Phase 1 (WHRB 1&2) and Phase II (WHRB 3&4) of the project activity were commissioned in July 2005 and May 2006 respectively after significant delays in commissioning the project. Considering the high pressure and temperature configuration of the WHRBs at BPSL, the project activity faced continuous operational problems post-commissioning of the Phase I of the project (Refer Enclosure 4b and Appendix 3). Thermax, who designed the WHRBs in the project activity, could not identify an immediate solution to the various technological problems as the operating parameters of the boilers were the first of the kind to be used with a 500 TPD kiln. The screen tube failure during Phase I occurred for several months and during each time, a short term action was taken but that was not sufficient to prevent the recurrence of the problem as boiler tube leakage problems were encountered in the Phase II as well. Therefore technology supplier Thermax Ltd themselves were finding it challenging to resolve some operational issues post the commissioning of the boilers which is apparent from the evidences provided to the DOE.

It is quite evident from the facts stated above, that despite the continuous interaction with the technology provider and with adequate training program provided to BPSL's personnel by Thermax Ltd, the project faced several operational issues pre and post commissioning of the plant. Since this was relatively first of its kind for the technology provider themselves with respect to the relatively higher technical configuration of the WHRBs, the risk / uncertainty related to the proper functioning of the WHRB system was perceived by BPSL prior to project start. Though, thermax had provided training to the BPSL staff, the risks associated with the operation of the high pressure boiler could not be mitigated as apparent from the documents provided to the DOE which lists the boiler tube leakages / failure records of WHRBs involved in the project activity since commissioning.

DOE Comment:

PP has provided documentary evidences (**Ref.no./12/**) for "First of its kind " by Directorate of Factories and Boilers. This was verified telephonically by Lead assessor. The technology is very new (SL/RN Technology is new) and imported from Germany on which the WHRB is depending for power generation.) This is new to the region (state of Orissa) and it faces the problem of unskilled labour and for that they had to provide training. This has been interviewed during site visit with plant people and also training documents (**Ref.no./11/**) has been checked and found to be OK. Also relevant people like Thermax commissioning engineers and concerned person of Directorate of factories and boilers has been interviewed in this regard. Thus the comment was closed out.

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	2.b.		
ISHC Comment			Date: 09-04-2008

2b. Boiler operation problems and installation of additional equipment

Barriers are something that prevents you from doing a project and not something that happens after you have already implemented the project. The problems you have written here are what has happened after the project was completed, how can you argue that these were barriers at the time of inception of the project.

Project Participant Response:

Response 2(b) from BPSL:

As apparent from the documentary evidences provided to the DOE, BPSL had envisaged technological barriers/ risks/ uncertainties considering the high technical configuration of the WHRB's prior to the decision of implementing the project activity

(Refer Extract of the Minutes of the Meeting of the Board of Directors on 29 October 2002 and P.O dated – 27 Feb 2003 provided in Enclosure 3 and the letter from its technical consultant). In this context it is also to be noted that BPSL's project (WHRB) was the first of its kind with respect to the high pressure and temperature configuration for a 500 TPD kiln in the State of Orissa (Refer Enclosure 5 provided to SGS in October 07 and also Enclosure D provided in June 08). Apart from the above evidences, BPSL had perceived technological barriers based on the following:

1. Regarding waste gas quality aspects, it may be noted that WHRB's are designed based on flue gas emanating from the DRI Kiln having definite parameters. A copy of the basis of design by Thermax Ltd is enclosed as Enclosure G provided to SGS. Any change in the parameters would have adverse impact on performance of the boiler. For example, the flue gas inlet temperature is 1000oC and in case temperature goes beyond 1000oC, it would have adverse impact on boiler tubes and there may be premature failure due to excessive heat. Quality of raw materials such as iron ore, physical and chemical properties of coal influence the waste gas generation inside the kiln. Poor quality of coal with high ash content results in accumulation of deposits inside the kiln and hence reduces the active kiln volume. BPSL in October 2002 appointed Outokumpu Lurgi Metallurgie for the preparation of the feasibility report. BPSL was made aware of the fact in the feasibility report that the existing quality of the Iron ore and Coal available in the region could lead to few operational problems such as the reduction in the performance of the rotary kiln which in turn would affect the waste gas quality from the kiln. The report also indicated that the coal quality available locally is much inferior as it has high ash content which could lead to a decrease in the plants capacity and also increases the accretion activities in the rotary kiln.
2. Further, coal is a vital raw material used in the DRI Kiln to produce DRI/ sponge iron. Better coal quality is related directly with the productivity of DRI and quality of flue gas, which subsequently has a direct impact on steam generation. On the other hand inferior coal quality (having high ash content) will generate flue gas with high ash content and this has got impact on wear and tears on the boiler tubes. Evidence from BPSL on desired ash content in coal is enclosed in Enclosure G provided to SGS which indicates that the ash content desired is about 27.5%.
3. Regarding other equipments, it may be noted that electrostatic precipitator (ESP) is an integral part of the boiler which is placed between boiler and the stack. The gas coming out from the kiln contains moisture and un-burnt coal which could stick to the wall of the electrodes and adversely affect the performance of the ESP connected to the WHRB. The functioning of the ESP is dependent on the quality of the waste gas from the kiln as against that of the AFBC.

Despite BPSL being aware of the above challenges of a WHRB system as informed to them by their technical consultant / technology provider it has been emphasized in the PDD that these barriers that were envisaged prior to the project start, were actually faced during the operation of the project activity.

DOE Comment:

The above issues on the barrier for the project activity were verified with documentary evidences (**Ref.no./21/ & /22/**) which has been checked by the DOE and found to be OK. The documentary evidences were checked through original documents for SL/RN technology as well as boiler tube leakage documents of Thermax i.e. boiler supplier. Thus PP's response was accepted and the comment was closed out.

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	2c		
ISH Comment		Date: 09-04-2008	
<p>2c. Low capacity utilization of boiler</p> <p>PDD provides with capacity utilization data for the year 2006-2007. Again, please refer to comments above; you obviously planned a 4 x 51 TPH boiler capacity because you thought that these waste gases would be sufficient to generate that much steam. What happened in 2006-07, is after project implementation, this is an irrelevant argument. Please get your thoughts clear on what barriers mean, rather than resorting to baseless innuendoes.</p>			
Project Participant Response:			
<p>It is apparent that before BPSL went ahead with the decision to implement the project activity, they had appointed technical consultants to work on the project feasibility. They were informed by their technical consultant that capacity utilization of a waste heat recovery system is much lesser when compared to that of a coal based AFBC system considering the dependence of the WHRB system on the kiln operation where as the AFBC depends only on coal / coal char/ coal washery rejects which are abundantly available.</p> <p>It is a known fact that the capacity utilisation of WHRB is lower than the capacity utilisation of the AFBC boilers considering the operational problems of WHRB as compared to the AFBC boiler as well as due to the dependence of the WHRB on the kiln operation and other downstream equipments (as apparent from the above discussions). BPSL were aware of the fact that the quality of raw materials such as Iron ore and coal, available in the region, could hamper the performance of the kiln which in turn would affect the performance of the WHRB and result in the lower capacity utilization than the AFBC boiler.</p> <p>The capacity utilisation of the WHRB is primarily dependent upon the quality and quantity of waste gas generation inside the DRI kiln. The generation of waste gas in the DRI kiln is influenced by the quality of two prime reactants viz. iron ore and coal that take part in the reduction process. Poor quality of iron ore consequence to development of accretion inside the DRI kiln which in turn impacts the general reduction performance inside the kiln and hence generation of waste gas as well.</p> <p>Likewise iron ore, physical and chemical properties of coal also influence the waste gas generation inside the kiln. Poor quality of coal with high ash content results in accumulation of deposits inside the kiln and hence reduces the active kiln volume. It is quite apparent that generation of waste gas inside the DRI kiln might reduce due to poor quality of iron ore and coal. In such circumstances it would have a cascading effect upon the performance of the WHRB whose capacity utilisation factor would come down due to reduced availability of waste gas from the DRI kiln.</p> <p>In the context of the present project activity, BPSL was aware of the risk factors pertaining to the low capacity unfavorable of the WHRB even prior to the investment decision making. The operating manual as provided by Outokumpu , the technology provider of the DRI kiln, quite evidently enunciates the causal effect of raw material quality (like iron ore & coal) with adequate generation of waste gas inside the DRI kiln. In addition to this the technical consultant of the WHRB has also informed BPSL about the possibility of poor capacity unfavorable of WHRB since up-grade quality iron ore and coal were not available during that point in time.Necessary evidences of the same have already been provided to the DOE.</p> <p>The information on capacity utilization during 2006 – 07 at BPSL's plant justifies the relatively lower capacity utilization of WHRBs as against AFBC. Though this information is post – commissioning of the project, it's clear evidence indicating that this is an operational barrier faced by BPSL as envisaged previously.</p>			

DOE Comment:

The response for 1st paragraph was verified on the basis of Board note(Ref /34/), Cost accountants letter (Ref/8/), and Spreadsheet. PP has clearly explained that they face the operational barrier due to low capacity utilization of WHRB as envisaged previously with proper documentary evidence (**Ref.no. /7/, /8/, /19/, /34/**) and the same was verified during the site visit by DOE and found to be acceptable. Thus, the comment was closed out.

Date:	09-04-2008	Raised by:	Naveen Sharma
No.:	2d		
ISH Comment		Date: 09-04-2008	
<p>2d. Institutional barrier</p> <p>I like what you have written here, excellent strategy of beating around the bush rather than focusing on the key issues. First of all, when you decided to invest in the project, you did so on the basis of the variable tariff based PPA with RETL. Anybody with a basic understanding of the power sector can tell you that a variable tariff PPA is significantly more rewarding as compared to a fixed rate PPA. Surely, you are not going to say that a variable tariff PPA was a barrier for you in setting up the project.</p> <p>What happened in 2006 and 2007 was post implementation of the project, how do you expect us to believe that an event that took place two years after the commissioning of your project, could have acted as a barrier during its inception. People in power sector have tried to figure out for years, how tariffs are going to behave and to my knowledge none have been successful so far. Did you have some fortune teller who told you this was going to happen.....if so...then..the same fortune teller would have told you that you would be getting these comments in the stakeholder consultation process...there you go.</p> <p>Besides, revenue from sale of surplus power i.e. an additional source of income obtained from the project activity and only strengthens the financial viability of the project. To describe at length about how this 'additional' stream of revenue would have been even greater had the AFBC boiler been installed (assuming a larger quantum of surplus power available to the PP for sale due to higher boiler efficiency), or unfavourable tariff regime is by no means a barrier to the project. Moreover in case of an AFBC boiler project you would have faced similar issues as well and also have had to bear the additional fuel cost.</p> <p>Comment – The PDD speaks at length about the changing tariff regime for sale of surplus to GRIDCO and the financial losses thus incurred by the PP. This argument is unfounded as it was certainly not known to the PP how tariffs would change and vary over time leading to monetary losses, at the time of project conception.</p>			
Project Participant Response:			
<p>Response 2(d) from BPSL:</p> <p>The institutional barrier mentioned in the PDD was faced by BPSL even,post the commissioning of the project activity as well. The documents for the same has also provided to DOE</p>			

DOE Comment:

PP had initially signed a power purchase agreement (PPA) to export the surplus power to Reliance Energy Trading Ltd (RETL) during 01.08.2005 to 30.9.2006 and were exporting power at a variable tariff (peak and off peak) and paying the wheeling charges to GRIDCO. As per the PPA with RETL, the Open Access for transmission of power shall be as per the relevant provisions of the Central Electricity Regulatory Commission (CERC) Regulation dated 30 January 2004 regarding 'Open Access in Inter-state Transmission'. Based on this order and PPA RETL had submitted the application for grant of open access to the concerned Regional Load Despatch Center (RLDC) however, the Orissa State Load Despatch Center (SLDC) / Orissa Power Transmission Corporation Limited (OPTCL) did not grant consent for short-term open access. Subsequently PP also applied for open access which was also rejected by SLDC. After which The PP signed a PPA with GRIDCO (Ref/23/) and the amount on which it is signed is very low as compared to the cost at which it is procured by end users from Grid and also proposed by RETL. Hence the financial losses were also proven. Hence the institutional barrier was envisaged by PP before the commissioning of the project. The documents on chronology of event /delay (Ref.no./33/) the project activity reveals that the institutional barrier mentioned in the PDD was faced by BPSL post the commissioning of the project activity as well, this was checked from the documents provided and it is acceptable , Thus the comment was closed out.

As per EB 43, Annex 12, Para 11, the authenticity of the person who raised the ISH comments was not found. However, all the comments have been responded by the PP and the same has been validated and closed out by the DOE.

6. List of Persons Interviewed

Date	Name	Position	Short Description of Subject Discussed
18-07-2007	Neraj Arora	Vice President	Project proponents view on project activity and CDM funds. Technical description of project activity and baseline and data monitoring for project activity
18-07-2007	Chitra Ravi	Manager(FSG)	Technical description of project activity and baseline and data monitoring for project activity.
18-07-2007	S.K.Panigrahi	Vice President, power plant	O/M Contract and Monitoring Procedure, Training.
18-07-2007	Navin	consultant	Additionality, Baseline and Monitoring procedure

7. Document References

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

- /1/ PDD, version 01, (submitted for international stakeholders comments with methodology ACM0004)
- /2/ PDD version 02, dated – 05/03/2008 (submitted for international stakeholder's comments with methodology ACM0012)
- /3/ PDD version 03, Dated – 12/01/2009
- /4/ PDD version 04 Dated – 18-03-2009
- /5/ HCA letter dated 18th June 2007 having reference number F.No. 4/8/2007-CCC
- /6/ MOC letter dated 26-08-2008
- /7/ CER calculation spreadsheet

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

- /8/ Cost accountant certificate
- /9/ Evidences pertaining to cost of power generation from WHRB & AFBC based CCP(Enclosure A)
- /10/ Evidences regarding efficiency calculations:
 - Calorific value of coal, coal char and coal washery rejects
 - Boiler efficiency of 75 TPH AFBC boiler as per manufacturer's specifications (Thermax Babcock and Wilcox Ltd)
 - Turbine heat rate for 40 MW and 60 MW turbo-generator (TG) sets
 (Enclosure B)
- /11/ Training – WHRB module by Thermax Ltd to BPSL personnel(Enclosure – C,)
- /12/ Scanned copy of original letter from 'Directorate of Factories and Boilers'(Enclosure-D, Annex-3 & Enclosure 5)
- /13/ Land ownership documents(Enclosure E)
- /14/ Evidences pertaining to delays in the CDM process initiation(Enclosure F & Enclosure 10)
- /15/
 - Basis of design of WHRB boiler
 - Preferred ash contents in coal
 (Enclosure G)
- /16/ The maximum potential sponge iron production output of 500 TPD kiln as per the rated capacity of the kiln as per manufacturer's specification(Enclosure H)
- /17/ Design basis provided by Thermax Ltd indicating that the waste gas generation rate is 1,20,000 m³/hr from the sponge iron kiln and the capacity of the kiln being 500 TPD (Enclosure I)

- /18/ The in house GCV calculations and the calibration certificate & the flue gas analysis(Annex- 1, Enclosure 7, &Appendix 5)
- /19/ The Capacity utilization factor(Appendix 2)
- /20/ Fcap calculation (Annexure 2)
- /21/ The evidence for the assumptions for the levelized cost generation and the certification of the cost computation(Enclosure 11 & Annex 4)
- /22/ The evidence on technological risks involved due to the high operating parameters and low capacity utilization(Annex 5)
- /23/ GRIDCO – RETL letter
- /24/ Boiler tube leakage record(Enclosure 4 & Appendix 3)
- /25/ The letter address to Mecon on the technological risk(Annex-4)
- /26/ Detailed Project copy of June 2005(Enclouser 12)
- /27/ The 'Survey of the Indian Sponge Iron Industry' as per the Joint Plant Committee (JPC) report for 2005-06(Annex 7)
- /28/ The application to financial institution highlighting the CDM revenues from the proposed project and the communications(Annex 9)
- /29/ Discussion with consultant prior to 2006, Mecon letter 22/03/05 (Annexure 8)
- /30/ The document by Lurgi Metallurgie GmbH (an Outokumpu technology company(Annex 10)
- /31/ The documents authenticated by the technical consultant- BHEL
- /32/ EIA report (Enclosure 9)
- /33/ Detailed Chronology of event on serious CDM consideration (Annexure 6)
- /34/ Board minutes, dated – 29/10/2002, Board resolution considering CDM revenues
- /35/ Purchase Order, dated – 27/02/2003, Start date of the project
- /36/ Mecon Letter, dated - 11/3/2003, Environmental monitoring
- /37/ BPSL Letter, dated - 27/03/2003, Application for Consent to Establish U/s.25 of Water & Air
- /38/ BPSL Letter, dated - 26/04/2003, Application for conducting Public Hearing
- /39/ Copy of Notice in The Times of India & Orria Daily"Dharitri" Newspaper, dated – 14/06/2003, Notice for Public hearing
- /40/ SH.G.Rajendran(Consultant) introducing CDM and his services related with GHG, dated – 18/06/2003, Proposal from CDM consultants
- /41/ BPSL Letter responding their awareness and consideration of carbon credits in project, dated - 26/06/2003, Response to Consultant Letter
- /42/ Letter submitted to the bank, dated – 6/7/2003, Correspondence with the bank for term loan indicating the availability of carbon credit revenues for the WHRB project
- /43/ Proceedings of Public Hearing, dated - 16/07/2003, Public Hearing Organized
- /44/ State Pollution Control Board Letter, dated - 16/07/2003, Compliance to get consent to establish
- /45/ SBI letter, dated - 21/07/2003, Bank letter asking for details on the carbon revenues from the project
- /46/ BPSL Letter, dated - 25/07/2003, Letter from BPSL to SBI indicating the likely revenues from the WHRB project
- /47/ BPSL Letter, dated - 13/08/2003, Application for Consent to Establish (Required Document Submitted)
- /48/ Orissa Pollution Control Board, dated - 13/08/2003, Member Secretary to Ministry of Env & Forest (Public Hearing)
- /49/ State Pollution Control Board Letter, dated - 18/09/2003, Approval letter of Consent to Establish
- /50/ SH.G.Rajendran(Consultant) mentioning about the similar type of methodology submitted to UNFCCC, dated - 24/09/2003, Communication from CDM consultant
- /51/ BPSL Letter responding to consultant regarding that they will wait for methodology approval, dated – 29/09/2003, Response to Consultant Letter
- /52/ BPSL Letter, dated - 1/10/2003, Application for Central Environment & Pollution clearance

- /53/ BPSL Letter, dated - 1/10/2003, Application in response to Consent to establish Letter
- /54/ State Pollution Control Board Letter, dated - 18/12/2003, Consent to Establish (Revised)
- /55/ Sri Sai Renewable Energy, dated - 17/03/2004, Communication from CDM consultant
- /56/ SH.G.Rajendran(Consultant) regarding non approval of the methodology, dated - 15/04/2004, Communication from CDM consultant
- /57/ BPSL Letter mentioning that they will take decision on coming board meeting, dated - 30/04/2004, Reply Letter to Consultant
- /58/ Govt. of India, Ministry of Environment & Forest letter, dated - 12/5/2004, Clearance from Central Environment & Forest Deptt.
- /59/ Minutes of Project management Committee, dated – 18/08/2004, Project Management Committee Minutes
- /60/ State Pollution Control Board Letter, dated - 5/11/2004, Revised Consent to Establish for additional capacity
- /61/ Minutes of Project management Committee meeting discussing about the CDM,dated - 15/12/2004, Project Management Committee Minutes
- /62/ BPSL Board resolution, dated - 30/12/2004, Decision taken by Board to initiate the CDM process subsequent to commissioning
- /63/ Mecon Letter, dated - 22/03/2005, Proposal from CDM consultants
- /64/ BPSL Letter, dated - 25/03/2005, BPSL indicating to MECON on taking the CDM advisory services subsequent to commissioning of the plant
- /65/ Phase 1 Commissioned, dated - 2/7/2005
- /66/ ACM0004 Methodology got approved, dated - 8/7/2005
- /67/ Total solutions letter, dated - 26/09/2005, Discussions with CDM consultants
- /68/ E & Y Consultants letter, dated - 24/03/2006, Communication from CDM consultant on CDM advisory services
- /69/ Phase 2 commissioned, dated - 8/5/2006
- /70/ ICICI bank letter, dated - 28/07/2006, Letter from Consultants
- /71/ ICICI bank letter, dated - 18/08/2006, Letter from consultants
- /72/ Indus tech, dated - 23/08/2006, Consultancy letter
- /73/ ICICI bank letter, dated - 7/9/2006, Letter from consultants
- /74/ Email communications, dated - 7/11/2006, Site visit by CDM consultants
- /75/ Agreement copy, dated - 16/12/2006, Agreement with CDM consultants
- 76/ Letter submitted to HCA, dated - 28/03/2007, Submitted documents to MOEF for HCA
- /77/ Agreement copy, dated - 17/04/2007, Signed contract with DOE
- /78/ Global Energy Solutions, dated - 17/04/2007, Proposal for Trading of Verified Emission Reductions
- /79/ OERC document
- /80/ CEA report February 2004
- /81/ JPC Report



A.1 Annex 1: Local Assessment

This checklist is designed to provide confirmation of in-country data and information provided in the Project Design Document for **Bhushan Power and Steel Limited–Waste Heat Recovery based Captive Power Project**

It serves as a “**reality check**” on the project that is completed by a local assessor from SGS India.

Issue	Findings	Source/Mean of Verification	Further Action / Clarification / Information Required?
No ODA involved letter	The undertaking letter for No ODA involved in the project activity has been provided.	Undertaking letter	No action
The chronology of planning and implementation of the project activity	The detailed chronology of planning and implementation of the project activity has been discussed with the PP.	Interviewed.	No action
Purchase order for the project activity	The purchase order of the project activity has been provided by the PP	Purchase order copy	No action
Technical specification for the project activity	PP has provided the technical specification of the project activity	Documentation	No action
Consent to establish and operate from PCB	PP has provide the consent to establish and operate from state pollution control board	PCB letter	No action
Ownership license	The ownership license has been checked at the site.	Documentation	No action
Proof required that the technology would not change during the crediting period.	PP has provided the undertaking letter that the technology would not change during the crediting period.	Undertaking letter	No action
Extensive initial training and maintenance efforts need to be checked during site visit	PP has provided the initial training and maintenance documents which shows that training has been provided in the initial stage of the project activity.	Training documents	No action



Issue	Findings	Source/Mean of Verification	Further Action / Clarification / Information Required?
The procedures for training of monitoring personnel need to be checked during site visit.	The training procedures for monitoring personal has been discussed with the PP.	Interviewed.	No action
MOC	Modalities of communication not provided	Pending	CAR21

A.2 Annex 2: Validation Protocol

Table 1 Participation Requirements for Clean Development Mechanism (CDM) Project Activities (Ref PDD, Letters of Approval and UNFCCC website)

Requirement	Reference	Comments	Conclusion
1. All Parties (listed in Section A3 of the PDD) have ratified the Kyoto protocol and are allowed to participate in CDM projects	Marrakech Accords, CDM Modalities §30	India has ratified the Kyoto protocol on 26 th August 2002 and is allowed to participate	Y
2. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3 and be entered into voluntarily.	Marrakech Accords, CDM Modalities §29 and §30	No Annex – I party has been selected yet.	Y
3. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof, and be entered into voluntarily	Marrakech Accords, CDM Modalities §29 and §30 Kyoto Protocol Art. 12.2, Marrakech Accords, CDM Modalities §40a	Please provide the LOA from the DNA of the non-Annex I country (India)	CAR 01 CAR01 closed Y

Requirement	Reference	Comments	Conclusion
4. 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	<p>Provide information on the global stakeholder process: website:</p> <p>http://cdm.unfccc.int/Projects/Validation/D/B/ZVWIGL64C7SV9UZECVMZHY3AUUTOLU/view.html</p> <p>Starting date: 20-06-2007 Closing date: 19-07-2007 Number of comments received: 0</p> <p>This was re-webhosted as the methodology ACM0004 version 2 expired and replaced by ACM0012.</p> <p>http://cdm.unfccc.int/Projects/Validation/D/B/E5JJVBZALS4DVDDVTJ6N5VP9BFO0BM/view.html</p> <p>Starting date: 11-03-2008 Closing date: 09-04-2008 Number of comments received: 01</p>	Y
5. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	The PP has used the current version 3 in effect as of: 28 July 2006	Y
6. The project participants shall submit a letter on the modalities of communication (MoC) before submitting a request for registration	EB-09 F_CDM_REG form	Modalities of Communication to be provided by the PP.	CAR 21 CAR21 closed Y



Requirement	Reference	Comments	Conclusion
7. For AR projects, the host country shall have issued a communication providing a single definition of minimum tree cover, minimum land area value and minimum tree height. Has such a letter been issued and are the definitions consistently applied throughout the PDD?		NA	NA

Table 2 PDD

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity					
A.1. Project Title					
A.1.1. Does the used project title clearly enable to identify the unique CDM activity?	01	DR	Bhushan Power and Steel Limited–Waste Heat Recovery based Captive Power Project and the title is unique.	Y	Y
A.1.2. Are there an indication of a revision number and the date of the revision?	01	DR	This is the version 2.0 of the PDD dated 05/03/2008. Version 03 was due to CAR's / NIR's. Version 04 was also due to CARs/ NIRs.	Y	Y
A.1.3. Is this in consistency with the time line of the project's history?	01	DR	Yes this is consistent with time line of the project activity.	Y	Y
A.2. Description of the Project Activity					
A.2.1. Is the description delivering a transparent overview of the project activities?	01	DR	The project activity is based on the WHR technology, a clean technology for power generation from waste hot flue gas, which would otherwise be quenched, cleaned and released into the atmosphere and the heat content would have been wasted. The project comprises of four boilers of 51 tons per hour (TPH) capacity and with the outlet steam parameters of 88 kg/cm2 (maximum pressure of 101 kg/cm2), and 520° C.	Y	Y
A.2.2. Is all information provided in compliance with actual situation or planning?	01	DR	The chronology of planning and implementation of the project activity will be checked during site visit.	Y	Y

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

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.2.3. Is all information provided consistent with details provided in further chapters of the PDD?	01	DR	All figures and facts provided and mentioned in PDD is consistent.	Y	Y
A.3. Project Participants					
A.3.1. Is the table required for the indication of project participants correctly applied?	01	DR	Yes, the project participant correctly applied the required table. Name of the PP is Bhushan Power & Steel Limited (BPSL)	Y	Y
A.3.2. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	01	DR	Annex 1 provides the correct information.	Y	Y
A.4. Technical Description of the Project Activity					
A.4.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)? Are the latitude and longitude of the site indicated (decimal points)	01	DR	The project activity is located in India / Orissa. Thelkoli village : Latitude: 21-45'-42" N Longitude : 84-01'-20" E.	Y	Y
A.4.2. Do the project participants possess ownership or licenses which will allow the implementation of the project at that site / those sites?	01	DR	Provide ownership or licenses which will allow the implementation of the project activity.	CAR 12	CAR12 closed Y
A.4.3. Is the category(ies) of the project activity correctly identified?	01	DR	The project applied the methodology ACM0012, version 2, under sectoral scope 01. The project activity is a large scale CDM project related to energy generation from waste flue gases.	Y	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.4.4. Does the project design engineering reflect current good practices?	01	DR	The project design engineering reflects current good practices.	Y	Y
A.4.5. Does the description of the technology to be applied provide sufficient and transparent input to evaluate its impact on the greenhouse gas balance and is the explanation how the project will reduce greenhouse gas emission transparent and suitable?	01	DR	The project activity generates the electricity from the waste flue gas and thereby reduces the GHG emissions.	Y	Y
A.4.6. Is all information provided in compliance with actual situation or planning as available by the project participants?	01	DR	To be checked during site visit.	Site visit.	Y
A.4.7. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	01	DR	The project activity involves two AFBC and four WHRB units. The WHRB are single drum water tube boilers of 51 TPH capacity each operating at 88 kg/cm ² pressure (designed for maximum pressure of 101 kg/cm ²) and at a temperature of 5200C. The Power generated from the generator at 11 kV will be connected to the Sponge Iron plant after the auxiliary power consumption of WHR power plant. The technology to be used for this project activity is based on Rankine cycle. This technology is a common technology it may result in a significantly better performance.	Y	Y
A.4.8. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	01	DR	The project technology is not likely to be substituted by the project participant by more efficient technology. To be checked during site visit.	LAC/ site visit	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.4.9. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	01	DR	Extensive initial training and maintenance efforts need to be checked during site visit.	Site visit	Y
A.4.10. Does the project make provisions for meeting training and maintenance needs?	01	DR	Pending site visit	Site visit	Y
A.4.11. Is a schedule available on the implementation of the project and are there any risks for delays?	01	DR	The schedule on the implementation of the project need to be discussed during site visit.	Site visit	Y
A.4.12. Is the table required for the indication of projected emission reductions correctly applied?	01	DR	The table for emission reduction calculations correctly applied.	Y	Y
A.5. Public Funding					
A.5.1. Does the information on public funding provided conform with the actual situation or planning as presented by the project participants?	01	DR	To be checked at site	LAC/Site visit	Y
A.5.2. Is all information provided consist with details provided by further chapters of the PDD (in particular annex 2)?	01	DR	Annex 2 in the PDD mentioned that no ODA was involved in the project .Pending site visit	Site visit	Y
A.5.3. In case of public funding from Annex I Parties is it confirmed that such funding does not result in a diversion of official development assistance	01	DR	Pending site visit.	Site visit	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B. Baseline and Monitoring Methodology					
B.1. Choice and Applicability					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	01	DR	In the baseline comparison the 2004 report is used. It is not clear why? The PDD mentions document provided to DOE but the PDD no where mentions this was earlier on ACM0004 and now on ACM0012. Please clarify.	CAR 17	CAR17 closed Y
B.1.2. Is the baseline methodology the one deemed most applicable for this project?	01	DR	Subject to closer of CAR 17	Pending	Y
B.1.3. Is the choice of the methodology correctly justified by the PDD and is the project in conformance with all applicability criteria of the applied methodology?	01	DR	Subject to closer of CAR 17	Pending CAR 17	Y
B.2. Project Boundary					
B.2.1. Are all emission sources and gasses related to the baseline scenario, project scenario and leakage clearly identified and described in a complete manner?	01	DR	The project boundary includes DRI Kiln but the Project emissions due to the coal used in DRI kiln is not included in the PDD.	CAR 16	CAR16 closed Y
B.2.2. In case of grid connected electricity projects: Is the relevant grid correctly identified in accordance with EB guidance and the underlying methodology?	01	DR	NA	NA	Y
B.2.3. Are the project's spatial boundaries (geographical) and the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	01	DR	The project boundary in the PDD is not defined appropriately.	CAR 02	CAR02 closed Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.3. Identification of the Baseline Scenario					
B.3.1. Does the PDD discuss the identification of the most likely baseline scenario? Does the PDD follow the steps to determine the baseline scenario required by the methodology and is the application of the methodology and the discussion and determination of the chosen baseline transparent?	01	DR	The baseline selection is unclear. Regarding approach towards selection of most financial attractive baseline alternative. Clarify through detail financial analysis for levelized cost per unit electricity generation with traceable sources and references. Provide baseline emissions calculation worksheet Provide justification towards determination of efficiency for coal based captive power generation facility.	CAR 03	CAR03 closed Y
B.3.2. Does the application consider all potential realistic and credible baseline scenarios in the discussion taking into account relevant national and/or sectoral policies, macro-economic trends and political aspirations??	01	DR	Subject to closer of pending CAR 03	Pending	Y
B.3.3. Is the choice of the baseline compatible with the available data?	01	DR	Subject to closer of pending CAR 03	Pending	Y
B.3.4. Is conservativeness addressed in the way of identifying the baseline?	01	DR	Subject to closer of pending CAR 03	Pending	Y
B.3.5. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	01	DR	Subject to closer of pending CAR 03	Pending	Y



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4. Additionality					

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

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.1. Does the PDD clearly demonstrate the additionality using the approach as given by the methodology and by following all the required steps?	01,02	DR	<p>The discussion on additionality is not clear.</p> <ul style="list-style-type: none"> Investment Barrier is not comprehensive as it lacks detailing on project cost, capital investment details and logical view to establishing Investment Barrier. Documentary needs to be provided. Technological barrier needs to be substantiated with adequate proof as the issues addressed seem to be related to maintenance issues. Also, it is subject to whether the barriers mentioned are due to lack of maintaining operating parameters or proper awareness. Provide documentary proof for first in the region as mentioned in the PDD Institutional Barrier needs to be justified with adequate evidences. Also the barrier shown is not exclusive for the WHRB project activity, this could have been the same case in the baseline scenario as well. <p>Provide evidences for Common Practice Analysis with respect to other activities similar to the proposed project activity. The JPC report is for India and not for the state of Orissa. It is difficult to comprehend why the state of Chattisgarh is discussed when the project is in the State of Orissa.</p> <p>Please explain the relevance of SL/RN technology with respect to WHRB technology.</p>	NIR 06	NIR06 closed Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.2. In case of using the additionality tool: Is the 'Additionality Tool' used in the PDD latest version? If an earlier version has been used, do the changes impact the discussion in the PDD? Are all steps followed in a transparent manner?	01,03	DR	Yes, additionality tool has been used in the project activity.	Y	Y
B.4.3. Is the discussion on additionality and the evidence provided consistent with the starting date of the project If the project has started before the validation is it discussed how the CDM was taken into account in the decision to go ahead with the project activity	01,02,03	DR	Provide documentary evidence for the project activity start date. Also, It is not clear why the proponent has taken considerable gap in the preparation of the PDD (more than 4years).Justify timeline with supporting.	CAR 15	CAR15 closed Y
B.4.4. Is the discussion on additionality consistent with the identification all potential realistic and credible baseline scenarios B.4.5. Do the identified alternative include technologies and practices that include outputs (e.g) cement or services comparable with the proposed CDM project activity	01	DR	Subject to closer of pending NIR 06	Pending	Y
B.4.6. If an investment analysis has been used, has it been shown that the proposed project activity is economically or financially less attractive than at least one other alternative without the revenue from the sale of CERs?	01	DR	Subject to closer of pending NIR 06	Pending	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.7. If a barrier analysis has been used, has it been shown that the proposed project activity faces barriers that prevent the implementation of this type of proposed project activity but would not have prevented the implementation of at least one of the alternatives?	01	DR	The PDD is not mentioning the serious CDM consideration in section B.5 of PDD. This mentions documentary evidence provided to DOE. Please clarify which documentary evidence and include that reference in PDD. Technological barriers mentioned are also not clear. Please provide documentary evidence for training related barrier, risk of technological barrier, Waste gas quality, temperature control related, boiler operations problem, and other equipments.	CAR 18	CAR18 closed Y
B.4.8. Has it been shown that the project is not common practice?	01	DR	Subject to closer of pending CAR 18	Pending	Y
B.4.9. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario	01	DR	Subject to closer of pending CAR 18	Pending	Y
B.5. Application of the Baseline Methodology					
B.5.1. Has the approved methodology been applied correctly for determining baseline emissions ?	01,02	DR	F _{cap} calculation in methodology says three years data is needed but the PDD does not mention that. Please clarify.	CAR 19	CAR19 closed Y
B.5.2. Has the approved methodology been applied correctly for determining project emissions ?	01,02	DR	It is not clear from the PDD regarding the fossil fuel consumption during power plant start up, maintenance or in case of exigencies with in the project boundary which can contribute towards the project emissions.	NIR 04	NIR04 closed Y
B.5.3. Has the approved methodology been applied correctly for determining leakage ?	01,02	DR	Subject to closer of pending CAR 19 and NIR 04	Pending	Y
B.5.4. Where applicable, has the approved methodology been applied correctly for the direct calculation of emission reductions	01,02	DR	Subject to closer of pending CAR 19 and NIR 04	Pending	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.5.5. Have all the methodological choices been explained, have they been properly justified and are they correct	01,02	DR	Subject to closer of pending CAR 19 and NIR 04	Pending	Y
B.5.6. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	01,02	DR	Subject to closer of pending CAR 19 and NIR 04	Pending	Y
B.6. Ex-ante Data and Parameters Used					
B.6.1. Are the data provided in compliance with the methodology?	01	DR	Provide details of equation used for ex-ante emission reductions along with detail calculation worksheet. The PDD does not detail the emission reduction calculation in a transparent manner. It is not possible to reproduce the calculation from the PDD. It seems a high PLF is applied. Please clarify.	NIR 05	NIR05 closed Y
B.6.2. Is all the data derived from official data sources or replicable records and have these been correctly quoted?	01	DR	Subject to closer of pending NIR 05	Pending	Y
B.6.3. Is the vintage of the baseline data correct?	01	DR	Subject to closer of pending NIR 05	Pending	Y
B.7. Calculation of Emissions Reductions					
B.7.1. Has the approved methodology been applied correctly for determining emission reductions ?	01	DR	The emission reductions mentioned in the PDD are not clear and how it has increased from previous PDD on ACM0004. It is not clear. Please clarify. Also provide the emission reduction calculation spreadsheet.	CAR 20	CAR20 closed Y
B.7.2. Are the emission reduction calculations documented in a complete and transparent manner?	01	DR	Subject to closer of pending CAR 20	Pending	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.7.3. Have conservative assumptions been used to calculate emission reductions?	01	DR	Subject to closer of pending CAR 20	Pending	Y
B.7.4. Is the projection based on provable input parameter?	01	DR	Subject to closer of pending CAR 20	Pending	Y
B.7.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	01	DR	Subject to closer of pending CAR 20	Pending	Y
B.7.6. Is the calculation of the emission reduction correct?	01	DR	Subject to closer of pending CAR 20	Pending	Y
B.8. Emission Reductions					
B.8.1. Will the project result in fewer GHG emissions than the baseline scenario?	01	DR	The project results in fewer GHG emissions than the baseline scenario. Subject to closer of pending CARs and NIRs.	Pending	Y
B.8.2. Is the form/table required for the indication of projected emission reductions correctly applied?	01	DR	The table required for the indication of projected emission reductions is correctly applied.	Y	Y
B.8.3. Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	01	DR	Yes, the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period. Subject to closer of pending CARs and NIRs.	Pending	Y



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.9. Monitoring Methodology					
<p>B.9.1. Does the monitoring methodology provide a consistent approach in the context of all parameter to be monitored and further information provided by the PDD?</p> <p>Are all parameters and data that is available at validation consistent with the approved methodology</p>	01,02	DR	<p>Provide description of the sources and gases included in the project boundary for the purpose of calculating project emissions and baseline emissions under Section B.3 of PDD with proper justification.</p> <p>Provide proper explanation of methodological choices and project specific assumptions and explanations under section B.6.1 of PDD version 1.</p> <p>Provide proper and complete description towards data and parameters that are available at validation under section B.6.2 of PDD.</p>	CAR 14	<p>CAR14 closed Y</p>
B.9.2. Does the monitoring methodology apply consistently the choice of the option selected for monitoring both of project and baseline emissions?	01,02	DR	Subject to closer of pending CAR 14	Pending	Y

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

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.10. Data and Parameters Monitored					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period?	01	DR	<p>The description towards the data and parameters to be monitored under monitoring plan is not clear.</p> <p>The methodology requires monitoring of the net electricity produced by the project activity and if part of the electricity is produced from other fuels, the monitoring of the amount of waste gas recovered and NCV of waste gas has to be monitored, which are not clearly described.</p> <p>The project seems to be focussing on the monitoring of steam parameters however it is not clear why this replaces monitoring of the waste gas or where these monitored parameters will be used as no formula which is actually applying the monitored parameters for the steam is absent.</p> <p>Provide clarification for the parameters to be monitored for estimation of net electricity generation</p>	NIR 07	NIR07 closed Y
B.10.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	01	DR	Subject to closer of pending NIR 07	Pending	Y
B.10.3. Will it be possible to determine the specified project GHG indicators?	01	DR	Subject to closer of pending NIR 07	Pending	Y
B.10.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	01	DR	Subject to closer of pending NIR 07	Pending	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.10.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	01	DR	Subject to closer of pending NIR 07	Pending	Y
B.10.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	01	DR	Subject to closer of pending NIR 07	Pending	Y
B.10.7. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	01	DR	Subject to closer of pending NIR 07	Pending	Y
B.11. Quality Control (QC) and Quality Assurance (QA) Procedures					
B.11.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	01	DR	The description of QA/QC for the data and parameters to be monitored as required under monitoring methodology is inadequate.	NIR 08	NIR08 closed Y
B.11.2. Is the belonging determination of uncertainty levels done correctly for each ID in a correct and reliable manner?	01	DR	Subject to closer of pending NIR 08	Pending	Y
B.11.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	01	DR	Subject to closer of pending NIR 08	Pending	Y
B.11.4. Is it ensured that data will be bound to national or internal reference standards?	01	DR	Subject to closer of pending NIR 08	Pending	Y
B.11.5. Is it ensured that data provisions will be free of potential conflicts of interests resulting in a tendency of overestimating emission reductions?	01	DR	Subject to closer of pending NIR 08	Pending	Y



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.12. Operational and Management Structure					
B.12.1. Is the authority and responsibility of project management clearly described?	01	DR	The authority and responsibility of project management is clearly described in the PDD.	Y	Y
B.12.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	01	DR	The same has been described in section B.7.2.	Y	Y
B.12.3. Are procedures identified for training of monitoring personnel?	01	DR	The procedures for training of monitoring personnel need to be checked during site visit.	Site visit	Y

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

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.13. Monitoring Plan (Annex 4)					
B.13.1. Is the monitoring plan developed in a project specific manner clearly addressing the unique features of the CDM activity?	01	DR	<p>Management structure toward the monitoring plan is not well explained in the PDD,</p> <ul style="list-style-type: none"> Please Provide documentary evidence of modalities and procedures towards periodic training for the monitoring personnel. Please provide procedures for emergency preparedness due to emergencies. Please provide documentary evidences for calibration procedure for monitoring equipments. Please provide description towards maintenance of monitoring equipment and installations. Please provide explanation regarding procedures for monitoring, measurements and reporting of the data and parameters required under monitoring methodology. Please provide detail procedure and plan for internal CDM audit team. 	CAR 09	CAR09 closed Y
B.13.2. Does the monitoring plan completely describes all measures to be implemented for monitoring all parameter required, including measures to be implemented for ensuring data quality?	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.3. Does the monitoring plan provide information on monitoring equipment and respective positioning in order to safeguard a proper installation?	01	DR	Subject to closer of pending CAR 09	Pending	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.13.4. Are procedures identified for calibration of monitoring equipment?	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.5. Are procedures identified for maintenance of monitoring equipment and installations?	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.6. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.7. Are procedures identified for dealing with possible monitoring data adjustments and missing data allowing redundant reconstruction of data in case of monitoring problems??	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.8. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.13.9. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	01	DR	Subject to closer of pending CAR 09	Pending	Y
B.14. Baseline Details					
B.14.1. Is there any indication of a date when determine the baseline?	01	DR	The baseline determination was completed on 16/05/2007	Y	Y
B.14.2. Is this in consistency with the time line of the PDD history?	01	DR	Yes, this consistent with the time line of the PDD history.	Y	Y
B.14.3. Is all data required provided in a complete manner by annex 3 of the PDD?	01	DR	Annex 3 provides all the required data.	Y	Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
C. Duration of the Project / Crediting Period					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	01	DR	The project start date is 27/02/2003. The fixed crediting start date written in PDD as 01/01/2009 and fixed crediting period will start from date of commissioning of project activity or from date of registration which ever is later The operational life time is 25 years.	Y	Y
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?	01	DR	Fixed crediting period of 10 years is selected for the project activity and it is reasonable.	Y	Y
C.1.3. Does the project's operational lifetime exceed the crediting period	01	DR	The project's operational life time is expected to be 25 years which exceeds the crediting period of 10 years.	Y	Y
D. Environmental Impacts					
D.1.1. Does the project comply with environmental legislation in the host country?	01	DR	Provide analysis of the environmental aspects and impacts due to the project activity as documented under EIA report. Provide detailed EIA report and relevant environmental clearances from state Pollution Control Board and Ministry of Environment and Forests; Government of India.	CAR 10	CAR10 closed Y
D.1.2. Has an analysis of the environmental impacts of the project activity been sufficiently described?	01	DR	Subject to closer of pending CAR 10	Pending	Y
D.1.3. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	01	DR	Provide Consent to Establish and the Consent to Operate for the project activity from the State Pollution Control Board.	CAR 11	CAR11 closed Y

Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
D.1.4. Will the project create any adverse environmental effects?	01	DR	Subject to closer of pending CAR 11	Pending	Y
D.1.5. Are transboundary environmental impacts considered in the analysis?	01	DR	Subject to closer of pending CAR 11	Pending	Y
D.1.6. Have identified environmental impacts been addressed in the project design?	01	DR	Subject to closer of pending CAR 11	Pending	Y
E. Stakeholder Comments					
E.1.1. Have relevant stakeholders been consulted?	01	DR	Provide documentary evidence towards invitations for local stakeholder comments and the procedure of compilation of the comments received during local stakeholder consultation process. Provide detail documentary evidence towards public hearing process and NOC from Village Panchayat. Provide the summary of comments received during local stakeholder consultation process and relevant actions taken in this regard with supporting.	CAR 13	CAR13 closed Y
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	01	DR	Subject to closer of pending CAR 13	Pending	Y
E.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?	01	DR	Subject to closer of pending CAR 13	Pending	Y
E.1.4. Is the undertaken stakeholder process described in a complete and transparent manner?	01	DR	Subject to closer of pending CAR 13	Pending	Y



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
E.1.5. Is a summary of the stakeholder comments received provided?	01	DR	Subject to closer of pending CAR 13	Pending	Y
E.1.6. Has due account been taken of any stakeholder comments received?	01	DR	Subject to closer of pending CAR 13	Pending	Y

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





References

Reference ID	Title / Description	Comments
01	PDD, version 02, dated – 05/03/2008	PDD, version 02, dated – 05/03/2008
02	ACM 0012, version 2, dated 02-11-2007	ACM 0012, version 2, dated 02-11-2007
03	Tool of additionality version 5.2	Tool of additionality version 5.2

A.3 Annex 3: Overview of Findings

Findings Overview

Findings from validation of Bhushan Power and Steel Limited–Waste Heat Recovery based Captive Power Project

Each Table below represents a finding from the validation assessment. The findings are numbered consecutively, approximately in the order that they have been identified.

Description of Table:

Type	Findings are either New Information Requests (NIR) or Corrective Action Requests (CAR). CARs are items that must be addressed before a project can receive a recommendation for registration. NIRs may lead to the raising of CARs. Observations are included at the end and may or may not be addressed. They are primarily to act as signposts for the verifying DOE.
Issue	Details the content of the finding
Ref	Refers to the item number in the Validation Protocol
Response	Please insert response to finding, starting with the date of entry.

Rows for comments and further response will be appended to the table until the Findings has been addressed to the satisfaction of the Lead Assessor.

Please Note: This is an open list and more findings may be added as validation progresses.

Date:	31/03/2008			Raised by:	Pankaj Mohan			
No.:	1.	Type:	CAR	Issue:	Participation requirement for CDM		Ref.:	Table 1
Lead Assessor Comment					Date: 31/03/2008			
Please provide the LOA from the DNA of the non-Annex I country (India)								
Project Participant Response:					Date: 19/06/2008			
Scanned copy of the LOA from the DNA provided to SGS at site during validation visit								
Acceptance and Close out by Lead Assessor:					Date: 07/07/2008			
Information Provided:						Verified Document Reference: Letter of Approval dated 18 th June 2007 having reference number F.No. 4/8/2007-CCC		
LOA from the Indian DNA Provided.								
Information Verified:								
Letter of Approval dated 18 th June 2007 having reference number F.No. 4/8/2007-CCC								
Reasoning for not acceptance or acceptance and close out:								
Letter of Approval dated 18 th June 2007 having reference number F.No. 4/8/2007-CCC is checked with original copy and hence CAR01 closed.								

Date:	31/03/2008				Raised by:	Pankaj Mohan				
No.:	2.	Type:	CAR	Issue:	Project boundary				Ref.:	B.2.3
Lead Assessor Comment							Date: 31/03/2008			
The project boundary in the PDD is not defined appropriately.										
Project Participant Response:							Date: 19/06/2008			
The project boundary has been appropriately defined in the PDD – ver 2 (based on ACM0012 ver 2 methodology) that was web-hosted for public comments. The project boundary is as required under ACM0012 – ver 2.										
Acceptance and Close out by Lead Assessor:							Date: 07/07/2008			

Information Provided: Revised PDD Information Verified: Revised PDD is checked against the ACM0012 version 02 methodology.	Verified Document Reference: Revised PDD and ACM0012 version 02 methodology.
Reasoning for not acceptance or acceptance and close out: Revised PDD and ACM0012 version 02 of methodology were checked and found that the project boundary is in accordance and hence accepted so CAR02 was closed out.	

Date:	31/03/2008			Raised by: Pankaj Mohan				
No.:	3.	Type:	CAR	Issue:	Baseline		Ref.:	B.3.1
Lead Assessor Comment					Date: 31/03/2008			
<p>The baseline selection is unclear Regarding approach towards selection of most financial attractive baseline alternative. Clarify through detail financial analysis for levelized cost per unit electricity generation with traceable sources and references. Provide baseline emissions calculation worksheet Provide justification towards determination of efficiency for coal based captive power generation facility.</p>								
Project Participant Response:					Date: 19/06/2008			
<p>(a) Detail financial analysis for levelized cost per unit electricity generation with traceable sources and references: The detailed financial analysis of levelized cost per unit electricity generation for the coal, coal char and coal washery rejects based captive power plant at BPSL has been performed as apparent from section B.4 and B.5 of the revised PDD ver 3. The cost workings related to unit cost of generation from coal, coal char and coal washery rejects based CPP has been provided to SGS in enclosed mail. The related documentary evidences pertaining to the cost workings are provided to SGS in Enclosure A.</p> <p>(b) Baseline calculation worksheet: The baseline calculation sheet was already provided to Mr. Sanjeev Kumar, SGS in mail dated 5 March 2008 while submitting the PDD for web-hosting as per ACM0012 (ver 2) methodology. The information used in the baseline calculation sheet corresponding to annual power generation, annual steam generation, specific steam consumption, steam pressure and steam temperature are already evidenced and provided as Appendix 1.</p> <p>(c) Justification for determination of efficiency for coal based captive generation facility: The justification for determination of efficiency has been detailed in section B.6.1 and B.6.3 of the PDD (ver 2) based on ACM0012 (ver 2) methodology. The following information used in the efficiency calculation has been evidenced in Enclosure B:</p> <ul style="list-style-type: none">Calorific value of coal, coal char and coal washery rejects of 2500 kcal/kgBoiler efficiency of 84% as per the technology provider (Thermax Babcock and Wilcox Ltd) for the 75 TPH AFBC boiler <p>Turbine heat rate of 3022.715 kcal/kWh and 3350.85 kcal/ kWh for the 40 MW and 60 MW TG sets respectively (source of data is from manufacturer's manual). The turbine heat rate value 3022.714 kcal/kWh (pertaining to the 40 MW TG set) has been used on a conservative basis.</p>								
Acceptance and Close out by Lead Assessor:					Date: 07/07/2008			

<p>Information Provided: PO for the Costs of equipments, Spreadsheet dated 4th March 2008 for baseline calculations, Design specifications from Thermax and in house GCV calculation sheet.</p> <p>Information Verified: PO for the costs of equipments is provided but there is no document provided to verify the assumptions taken in levelized cost of generation. In the sheet of Asset value the assumptions for cost of transportation is used as 5%, cost of civil construction as 15%, Preoperative and preliminary expenses as 15% in boilers and cost of civil construction for turbine as 30%. Please provide proof for these assumptions also.</p> <p>Spreadsheet dated 4th March 2008 is using two different emission factors for the calculation of baseline emissions and project emissions. This is not acceptable. Fcap is taken as 1 but the methodology says this needs to be calculated based on three years data. Please clarify?</p> <p>Design specifications of Thermax for Boiler efficiency of AFBC boiler is accepted. In house GCV calculations are typed but the Char analysis the value is written by Pen and not typed. Please justify and Provide the calibration certificate of equipment used to get the GCV value.</p>	<p>Verified Document Reference: PO for the Costs of equipments, Spreadsheet dated 4th March 2008 for baseline calculations, Design specifications from Thermax and in house GCV calculation sheet.</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR03 is open as the documentary evidences for assumptions are missing. The spreadsheet is using two emission factors for baseline emission and project emissions. The in-house GCV calculations are not typed and the calibration certificate of Instrument used for GCV calculation is missing.</p>	
<p>Project Participant Response:</p>	<p>Date: 01/09/2008</p>
<p>The in house GCV calculations and the calibration certificate is enclosed as Annexure-1. The emission factor for the baseline emission has been calculated and the same has been used as the emission factor for the project emissions. The factors have been changed in the revised PDD.</p>	
<p>Acceptance and Close out by Lead Assessor:</p>	<p>Date: 18/09/2008</p>
<p>Information Provided: GCV calculations and calibration certificate of benzoic acid.</p> <p>Information Verified: Spreadsheet is corrected for emission factors for the calculation of baseline emissions and project emissions. This is not acceptable. In house GCV calculations and calibration certificate of equipment used to get the GCV value is provided.</p> <p>Fcap is taken as 1 but the methodology says this needs to be calculated based on three years data. Please clarify?</p> <p>Certificate from cost accountants is provided to verify the assumptions taken in levelized cost of generation. In the sheet of Asset value the assumptions for cost of transportation is used as 5%, cost of civil construction as 15%, Preoperative and preliminary expenses as 15% in boilers and cost of civil construction for turbine as 30%.</p>	<p>Verified Document Reference: GCV calculation & Calibration certificate of benzoic acid. Cost accountant certificate dated 18-07-2008.</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR03 is open as the justification for Fcap is not mentioned in the reply.</p>	
<p>Project Participant Response:</p>	<p>Date: 30/10/2008</p>

The F cap has been computed as per the sample test check report of the volume of flow gas. According to this computation the f cap exceeds unity. In such cases the methodology stipulates the f cap to be considered at unity. In the present case the f cap computation is an ex-ante approach and hence has been computed based upon the sample test check of the flue gas. During Ex-post BPSL propose to install a continuous flow meter at the relevant monitoring point. The flue gas analysis is enclosed as Annexure-1 and the fcap calculations are enclosed as Annexure-2 .	
Acceptance and Close out by Lead Assessor:	Date: 11/11/2008
Information Provided: The flue gas analysis is enclosed as Annexure-1 and the fcap calculations are enclosed as Annexure-2 . Information Verified:	Verified Document Reference: The flue gas analysis is enclosed as Annexure-1 and the fcap calculations are enclosed as Annexure-2 .
Reasoning for not acceptance or acceptance and close out: CAR03 is closed as the justification for Fcap is mentioned in the reply.	

Date:	31/03/2008	Raised by:	Pankaj Mohan				
No.:	4.	Type:	NIR	Issue:	Fossil fuel consumption	Ref.:	B.5.2.
Lead Assessor Comment					Date: 31/03/2008		
It is not clear from the PDD regarding the fossil fuel consumption during power plant start up, maintenance or in case of exigencies with in the project boundary which can contribute towards the project emissions.							
Project Participant Response:					Date: 19/06/2008		
The section B.6.3 of the PDD (ver 2 as per ACM0012) under 'Project emissions', details the power consumption during power plant start up, maintenance or in case of exigencies. The section B.7.1 of the PDD has been revised further (PDD (ver 3)) to include the parameter 'Power DRI kiln' that would be monitored during the crediting period to estimate project emissions.							
Acceptance and Close out by Lead Assessor:					Date: 07/07/2008		
Information Provided: Revised PDD Information Verified: Revised PDD is provided which was checked and found that the revised PDD section B.6.3 is mentioning the amount of power consumption during power plant start up, maintenance and exigencies but not mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies. Revised PDD section B.7.1 is mentioning the parameter "Power DRI Kiln". This should also include the fossil fuel consumption in boilers during start up also.					Verified Document Reference: Revised PDD		
Reasoning for not acceptance or acceptance and close out: NIR04 open as revised PDD is not mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies.							
Project Participant Response:					Date: 01/09/2008		
The project emissions have been calculated considering that there would be power used from the AFBC boiler which is operated on coal and coal char. An estimate of the likely power utilized for the start up and exigencies has been calculated and accordingly the project emissions have been estimated. However, in case of utilization of the DG sets, the likely consumption of HSD is about 25 KL. The PDD has been accordingly revised.							
Acceptance and Close out by Lead Assessor:					Date: 18/09/2008		

Information Provided: Revised PDD Information Verified: Revised PDD is provided which was checked and found that the revised PDD is mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies.	Verified Document Reference: Revised PDD
Reasoning for not acceptance or acceptance and close out: NIR04 closed as revised PDD is mentioning the amount of fossil fuel used for start up of boilers, maintenance and exigencies.	

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	5.	Type:	NIR	Issue:		Ref.:	B.6.1.
Lead Assessor Comment					Date: 31/03/2008		
Provide details of equation used for ex-ante emission reductions along with detail calculation worksheet. The PDD does not detail the emission reduction calculation in a transparent manner. It is not possible to reproduce the calculation from the PDD. It seems a high PLF is applied. Please clarify.							
Project Participant Response:					Date: 19/06/2008		
<p>Details of equation used for ex-ante emission reductions has been clearly depicted in Section B.6.3 of the PDD (ver 2) that is based on ACM0012 (ver 2) methodology. The detailed calculation worksheet containing baseline emission, project emission and emission reduction calculation is provided to Mr. Sanjeev Kumar, SGS in mail dated 5 March 2008. The source of information used in the calculations have also been clearly mentioned in the section B.6.3 of the PDD (ver 2) and documentary evidences of information used is also provided to SGS (sent by courier) as Appendix 1 during February 2008.</p> <p>As apparent from the PDD the annual power generation and steam generation data assumed for ex-ante emission reduction calculation pertain to the actual data at BPSL for the year 2006-07. The same has been evidenced and provided to SGS as Appendix 1 during February 2008. The document on capacity utilisation of WHRB and AFBC boilers at BPSL during 2006-07 is evidenced and provided to SGS as Appendix 2 during February 2008, which indicates that during 2006-07 the average capacity utilisation of the 4 WHRBs (involved in the project activity) was about 58.9% (all the four WHRBs taken together) whereas the average capacity utilisation of the 2 AFBC boilers was about 80.5%. It is apparent from the above that the plant load factor (PLF) or capacity utilisation factor (CUF) of the project activity (power from WHRBs) is not high. Though it may be expected that a WHRB could operate at about 65-70% capacity utilisation when compared with the AFBC boilers with 90-95% capacity utilisation, this is not the case that has been experienced during 2006-07 at BPSL. Therefore the above justifies that the ex-ante emission reduction calculations that use 2006-07 data do not have high PLFs.</p>							
Acceptance and Close out by Lead Assessor:					Date: 07/07/2008		
Information Provided:					Verified Document Reference:		
Ex-ante emission reduction in section B.6.3 of Revised PDD and Appendix 1 and Capacity utilization as Appendix 2.					Revised PDD, Appendix 1 including total annual power generation, total annual steam consumption, specific steam consumption, steam pressure and temperature at turbine inlet, performance guarantee test. Appendix 2 for capacity utilization verified by VP power plant.		
Information Verified:							
The justification was accepted but please provides the spreadsheet for capacity utilization to check all the parameters and formulas used to calculate capacity utilization.							

Reasoning for not acceptance or acceptance and close out: NIR05 is open as Spreadsheet for capacity utilization is missing.	
Project Participant Response:	Date: 01/09/2008
The spreadsheet for capacity utilization is enclosed as Annexure-2 .	
Acceptance and Close out by Lead Assessor:	Date: 18/09/2008
Information Provided: Capacity utilization spreadsheet Information Verified: Capacity utilization spreadsheet was checked and found to be OK	Verified Document Reference: Capacity utilization spreadsheet
Reasoning for not acceptance or acceptance and close out: NIR05 is closed as Spreadsheet for capacity utilization is provided and checked. This was found to be OK.	

Date:	31/03/2008	Raised by:	Pankaj Mohan
No.:	6.	Type:	NIR
Issue:	Additionality	Ref.:	B.4.1.
Lead Assessor Comment		Date: 31/03/2008	
The discussion on additionality is not clear. <ul style="list-style-type: none"> Investment Barrier is not comprehensive as it lacks detailing on project cost, capital investment details and logical view to establishing Investment Barrier. Documentary needs to be provided. Technological barrier needs to be substantiated with adequate proof as the issues addressed seem to be related to maintenance issues. Also, it is subject to whether the barriers mentioned are due to lack of maintaining operating parameters or proper awareness. Provide documentary proof for first in the region as mentioned in the PDD Institutional Barrier needs to be justified with adequate evidences. Also the barrier shown is not exclusive for the WHRB project activity, this could have been the same case in the baseline scenario as well. Provide evidences for Common Practice Analysis with respect to other activities similar to the proposed project activity. The JPC report is for India and not for the state of Orissa. It is difficult to comprehend why the state of Chattisgarh is discussed when the project is in the State of Orissa. Please explain the relevance of SL/RN technology with respect to WHRB technology 			
Project Participant Response:		Date: 19/06/2008	

(a) Investment barrier:

The details of project cost pertaining to the WHRB as compared to AFBC of equivalent steam generation capacity has been provided under Investment barriers in Section B.5 of the revised PDD (ver 2).

As apparent from the investment barrier section of the revised PDD (ver 3), the cost of putting up the 4 X 51 TPH WHRBs (total 204 TPH capacity) was INR 501.2 Million whereas the cost of putting up a 225 TPH (1 X 75 TPH and 1 X 150 TPH capacity AFBC) capacity AFBC boiler was INR 486.6 Million. The cost of setting up a 204 TPH capacity WHRB is more than the cost of setting up a 225 TPH capacity AFBC system. Further, considering the lower capacity utilisation of WHRB (about 60%) when compared to AFBC (about 90%), the WHRB system works out to be much more expensive than an AFBC system of equivalent capacity.

Enclosure 3 (submitted to SGS during October 2007) includes the purchase orders for the 4 WHRBs, 2 AFBC boilers and turbines. Further to the above, the cost workings related to unit cost of power generation from WHRB and AFBC (coal, coal char and coal washery rejects) based CPP has been provided to SGS in the enclosed mail. The related documentary evidences pertaining to the cost workings are provided to SGS in **Enclosure A**. The cost of power generation from WHRB and AFBC indicates that the cost of generation WHR based power is much higher (1.45 INR/kWh) than the cost of generation of coal/ coal char/ coal washery rejects based power (1.13 INR/kWh). The Section B.5 of the PDD has been revised to include the comparative cost of power generation from coal, coal char, coal washery rejects as well from waste heat recovery.

(b) Technological barrier: The technological barrier section has been revised and detailed in section B.5 of the revised PDD (ver 2). Documents pertaining to the establishment of technological barriers were provided as Enclosure 4 (despatched to SGS during October 2007) and includes the following:

- Training records: Training provided by Thermax Ltd and BPSL to the employees towards the operation of the WHRBs
- Operational problems: Documentary evidence of BPSL having faced problems with the WHRB since commissioning/ starting of its operation and subsequent communication with Thermax Ltd

With respect to technological risks, evidence that BPSL had perceived technological risks/ uncertainties during project conception stage due to high pressure and temperature configuration has already been provided to the DOE. Further authenticated records of operational problems, i.e. boiler tube leakage issues and training records were enclosed as Appendix 3 and despatched to SGS during Feb 2008. It may be noted that as per the request of SGS, some authenticated training documents related to WHRB are also provided in **Enclosure C** to this response.

(c) Documentary proof of first in the region:

Evidence that this high pressure and temperature configuration WHRB was the first of its kind in the state (in Orissa) had been enclosed (Enclosure 5). This pertains to the Letter from the 'Directorate of Factories and Boilers, Bhubhaneshwar, Orissa' that BPSL was the first in the state of Orissa to install WHRBs to generate steam with the high pressure (maximum of 101 kg / cm²) and high temperature (520 deg C) configuration. The scanned copy of the original is titled as **Enclosure D** and sent to SGS in the enclosed mail.

(d) Institutional barriers: The section B.5 of the revised PDD (ver 2, as per ACM0012) addresses the relevant details pertaining to the institutional barrier. The documents of Reliance Energy Trading Limited (RETL) and Grid Corporation of Orissa (GRIDCO) have been provided to the DOE during validation site visit.

(e) Evidence of common practice analysis:

Section B.5 of the revised PDD (ver 2 as per ACM0012) explains the common practice analysis with reference to the state of Orissa. The documentary evidence or source of information pertaining to common practice analysis for the state of Orissa has been provided as a footnote in the PDD itself which is a reference to the registered PDD (Reference No 0367) mentioning the facts on no of WHR projects implemented in the State of Orissa around the time of project implementation (2004-05). It needs to be noted that Bhushan Power & Steel Ltd (BPSL)'s WHR project in Jharsuguda was also one amongst the first six such WHR projects in the state and therefore is clearly not common practice.

f) Relevance of SL/RN technology with respect to WHRB technology:

The SL/RN technology is the technology used in the sponge iron kiln at BPSL which generates waste gas. It needs to be noted that the performance of the WHRB depends upon and is directly related to the quantity and quality of the waste gases emanating from the kiln. Both quantity and quality of the waste flue gas are determined by the type of coal and iron ore used as raw material in the production process. Frequent variation in the type of raw material used results in fluctuation of both quantity and quality of waste gas generated and hence it leads to disruption in power generation from the WHRBs.

In order to overcome such operational difficulties BPSL has adopted SL/RN technology in the kiln operation in order to ensure adequate flow of proper quality waste flue gases from the kiln. Hence it should be noted that though SL/RN technology is exclusively related to DRI kilns it influences the performance of the WHRBs also since they are interconnected to each other without any isolation mechanism.

The documentary evidence regarding SL/RN technology is available in the Project Report submitted to SGS during October 2007 as Enclosure 12.

Acceptance and Close out by Lead Assessor:

Date: 07/07/2008

Information Provided:

Revised PDD, Enclosure A, Enclosure 3, PO copies, Spreadsheet, Enclosure 4, Appendix 3, Enclosure C, Enclosure 5, Enclosure D, RETL & GRIDCO letters, & Enclosure 12.

Information Verified:

The revised PDD was checked and found that section B.5 has been revised. The PO copies for cost of equipments is also verified and found to be OK. The spreadsheet for levelized cost is provided but there is no document provided to verify the assumptions taken in levelized cost of generation. In the sheet of Asset value the assumptions for cost of transportation is used as 5%, cost of civil construction as 15%, Preoperative and preliminary expenses as 15% in boilers and cost of civil construction for turbine as 30%. Please provide proof for these assumptions along with the third party evidence for levelized cost of generation.

The training records are provided and found to be OK. The boiler tube leakage records were also provided and were checked during site visit. Please provide any third party evidence for the technological barriers mentioned.

The document for first of its kind is not accepted. Please provide this on the letterhead of "Directorate of Factories and Boilers".

Common practice proof is still not clear and provide third party evidence.

RETL & GRIDCO letters were accepted along with the DPR copy.

Verified Document Reference:

Revised PDD, Training records, Boiler tube leakage records, PO copies, Spreadsheet, Directorate of Factories and Boilers letter, RETL , GRIDCO Letter and DPR copy of June 2004.

Reasoning for not acceptance or acceptance and close out:

CAR06 is open for assumption Proofs, Third party technological barrier proof, First of its kind proof needs to be provided, Common practice analysis is still not clear.

Project Participant Response:

Date: 01/09/2008

The documentary evidences for the following barriers are enclosed herewith:

The letter from the “Directorate of Factories and Boilers” is enclosed as **Annexure-3**

The evidence for the assumptions for the leveled cost generation and the certification of the cost computation is enclosed as **Annexure-4**

The evidence on technological risks involved due to the high operating parameters and low capacity utilization are enclosed as **Annexure-5**.

BPSL during October 2002 got the technical feasibility report prepared by Outokumpu Lurgi Metallurgie. Analysis of the available Iron ore during that period was carried out which indicated two weak points of the quality of the ore viz. high phosphorus and L.O.I content. It was brought to the notice of BPSL that with the existing quality of raw material there was a possibility of a general reduction in the performance of the rotary kiln which in turn would affect the waste gas quality from the kiln. Further the report also indicates that the coal quality available locally is much inferior as it has a high ash content. The technology supplier ‘Outokumpu’ has mentioned that “ash content of <25% on a consistent basis is desirable from an operational point of view. Exceeding the ash level goes along with a decrease of the plant’s capacity and possibly with increased accretion activities in the rotary kiln”. Whereas, the analysis of coal conducted indicates that the ash content is about 25-30% which is more than 25% and the desirable limit. As per Outokumpu technology, the high ash contents would not be desirable from operational point of view as increased ash level decreases the plants capacity and also increases the accretion activities in the rotary kiln. The documentary evidence of the justification is enclosed in **Annexure-6**. Besides, BPSL was also aware of the fact that due to the high operating parameters of the boiler, which was amongst the first of its kind, there could be technical risks involved. Evidence of the same is enclosed in **Annexure-5**.

The ‘Survey of the Indian Sponge Iron Industry’ as per the Joint Plant Committee (JPC) report for 2005-06 (survey work was up to 31.08.2005) may be referred to which indicates that the number of units with captive power generation facility is quite low. As the survey pertaining to JPC report ended on 31 Aug 2005, this report would be relevant to BPSL’s project (as the project activity was commissioned around *** 2005). As per JPC report, as on 31.08.2005 there were 147 working coal based sponge iron units and 3 working gas based sponge iron units in the country of which 33 working coal based sponge iron units were located in the State of Orissa. Table 15 of the report titled ‘Captive Power Generation Facility in Indian Coal Based Sponge Iron Industry’ further indicates that of the total number of units (sponge iron kilns) in the State of Orissa (of about 33) only 4 of such units had a captive power generation facility. Therefore it can be interpreted that only 4 upon 33 or 12.12% of the sponge iron kilns in Orissa had captive power generation systems (including waste heat recovery as well) around the time of project activity commissioning. Further referring to the UNFCCC registered projects with Ref No: 0274 (TSIL – Waste heat recovery based power project) and 0515 (OSIL – Waste heat recovery based captive power project), it seems apparent that they were among the 4 sponge iron units having captive power generation. Referring to the ‘Common practice analysis’ of the CDM project activity with Ref No. 0367 (8 MW Waste heat recovery based captive power project at OCL), it is apparent that the above 2 projects have been implemented taking into account potential revenues from CDM. Further it is also clearly evident from this registered PDD with Ref No: 0367 in ‘Step 5: Impact of CDM registration’ that the project activity of OCL was to start commercial production only in April 2006 which was after 31.08.2005 and therefore this was not among the 4 kilns having captive power generation facility referred to in the JPC report.

Further to the above assessment on the number of project activities in the state similar to the project activity under consideration, it can also be inferred from Table 17: ‘Nature of Constraints facing the Indian Coal Based Sponge Iron Industry’ that of the 33 units in Orissa, 14 of them faced raw material (availability/price) related constraints and 6 of them faced power related constraints clearly indicating that more than 42% of coal based sponge iron kilns in Orissa faced raw material constraints and more than 18% faced power related constraints. Kindly refer **Annexure-7** which includes relevant pages from the JPC report justifying the above information.

Acceptance and Close out by Lead Assessor:

Date: 18/09/2008

<p>Information Provided: Revised PDD, Annexure 3, 4,5,6,7</p> <p>Information Verified: Document provided to verify the assumptions taken in levelized cost of generation. In the sheet of Asset value the assumptions for cost of transportation is used as 5%, cost of civil construction as 15%, Preoperative and preliminary expenses as 15% in boilers and cost of civil construction for turbine as 30%. Certificate from Cost Accountants dated 18-07-2008 was provided for assumptions and calculations of levelized cost of generation. The first of its kind letter dated 18-07-2008 mentions "with reference to your letter dated 18-07-2008". Please provide the document. The letter dated 16-12-2002 & 28-01-2003 from Mecon specifies about the production reduction from DRI kiln due to quality of coal and Iron ore. Also mentions that the Operating parameters and its raw material are considered high temperature and pressure configuration and may create difficulties in implementation and operation. This is not clear from the letter if any written query was asked by the PP to Mecon. This is also not clear if this is for the project activity or running of kilns only. Please clarify and provide the documentary evidence for the same. Common practice analysis is clear and supported with JPC report. This was accepted.</p>	<p>Verified Document Reference: Revised PDD Cost Accountant certificate dated 18-07-2008 First of its kind letter from directorate of factories dated 23-07-2007 & 18-07-2008. Letters from Mecon limited dated 16-12-2002 & 28-01-2003 for technological risks. Joint Plant committee report 2005-2006 page 38 & page 39</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR06 is open for first of its kind proof. This is not clear from the MECON letter if any written query was asked by the PP to Mecon. This is also not clear if this is for the project activity or running of kilns only. Please clarify and provide the documentary evidence for the same.</p>	
Project Participant Response:	Date: 30/10/2008
<p>Covering letter to Directorate of factories is enclosed as Annexure-3. The letter addressed to Mecon on the technological risks is attached as Annexure-4. It is to be noted that the performance of the project activity is linked to the performance to the kiln.</p>	
Acceptance and Close out by Lead Assessor:	Date: 11/11/2008
<p>Information Provided: Covering letter to Directorate of factories is enclosed as Annexure-3. The letter addressed to Mecon on the technological risks is attached as Annexure-4.</p> <p>Information Verified: Covering letter to Directorate of factories is enclosed as Annexure-3. The letter addressed to Mecon on the technological risks is attached as Annexure-4 were verified.</p>	<p>Verified Document Reference: Covering letter to Directorate of factories is enclosed as Annexure-3. The letter addressed to Mecon on the technological risks is attached as Annexure-4.</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR06 closed as documentary evidences provided is transparent now.</p>	

Date:	31/03/2008				Raised by:	Pankaj Mohan			
No.:	7.	Type:	NIR	Issue:	Monitoring			Ref.:	B.10.1
Lead Assessor Comment						Date: 31/03/2008			

The description towards the data and parameters to be monitored under monitoring plan is not clear. The methodology requires monitoring of the net electricity produced by the project activity and if part of the electricity is produced from other fuels, the monitoring of the amount of waste gas recovered and NCV of waste gas has to be monitored, which are not clearly described.

The project seems to be focussing on the monitoring of steam parameters however it is not clear why this replaces monitoring of the waste gas or where these monitored parameters will be used as no formula which is actually applying the monitored parameters for the steam is absent.

Provide clarification for the parameters to be monitored for estimation of net electricity generation

Project Participant Response:	Date: 19/06/2008
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(a) The description of the data and the parameters to be monitored under the monitoring plan is detailed in section B.7.1 of the revised PDD (based on ACM0012)

(b) It may be noted that previously the project (PDD ver 1) was web-hosted using ACM0004 (ver 2) methodology as per which it was required to monitor the amount of waste gas recovered and the NCV of waste gas. However now in PDD (ver2), the ACM0012 (ver 2) methodology has been applied to the project activity.

The ACM0012 (ver 2) methodology has an option under 'Calculation of the energy generated (electricity and/or steam) in units supplied by waste gas/heat and other fuels' called Situation (2) which states that 'An alternative method that could be used when it is not possible to measure the net calorific value of the waste gas/heat, and steam generated with different fuels in dedicated boilers are fed to turbine/s through common steam header takes into account that the relative share of the total generation from waste gas is calculated by considering the total steam produced and the amount of steam generated from each boiler'. This approach has been used as clearly defined in Section B.6.1 of the revised PDD based on ACM0012 methodology.

Therefore, the parameters monitored (available under Section B.7.1) are as per the requirement of ACM0012 (ver 2) methodology. Further the equation used to 'calculate electricity generated using waste gas' is also in line with the methodology ACM0012 (ver 2) and are detailed in Section B.6.1 and B.6.3 of the PDD (ver 2)

(c) Please refer to Response (b) above

(d) Please refer to Response (b) above

Acceptance and Close out by Lead Assessor:	Date: DD/MM/YYYY
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<p>Information Provided:</p> <p>Revised PDD & Monitoring Methodology ACM0012 version 02.</p> <p>Information Verified:</p> <p>Revised PDD section B.7.1, B.6.1 & B.6.3 were checked and found to be correct and in accordance with Methodology ACM0012 version 02.</p>	<p>Verified Document Reference:</p> <p>Revised PDD Monitoring Methodology ACM0012 version 02.</p>
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Reasoning for not acceptance or acceptance and close out:

NIR07 closed as revised PDD provided is transparent for monitoring of parameters.

Date:	31/03/2008				Raised by:	Pankaj Mohan				
No.:	8.	Type:	NIR	Issue:	QA/QC				Ref.:	B.11.1
Lead Assessor Comment						Date: 31/03/2008				
The description of QA/QC for the data and parameters to be monitored as required under monitoring methodology is inadequate.										
Project Participant Response:						Date: 19/06/2008				
The QA/ QC procedures are clearly defined in the section B.7.1 of the PDD (as per ACM0012)										
Acceptance and Close out by Lead Assessor:						Date: 08/07/2008				

<p>Information Provided:</p> <p>Revised PDD</p> <p>Information Verified:</p> <p>Revised PDD section B.7.1 is found to be in order and conforming to ACM0012 version 02.</p>	<p>Verified Document Reference:</p> <p>Revised PDD Methodology ACM0012 version 02.</p>
<p>Reasoning for not acceptance or acceptance and close out:</p> <p>NIR08 closed as revised PDD is transparently mentioning the section B.7.1 and according to ACM0012 version 02.</p>	

Date:	31/03/2008			Raised by:		Pankaj Mohan		
No.:	9.	Type:	CAR	Issue:	Annex 4		Ref.:	B.13.1.
Lead Assessor Comment					Date: 31/03/2008			
<p>Management structure toward the monitoring plan is not well explained in the PDD:</p> <ul style="list-style-type: none">• Please provide documentary evidence of modalities and procedures towards periodic training for the monitoring personnel.• Please provide procedures for emergency preparedness due to emergencies.• Please provide documentary evidences for calibration procedure for monitoring equipments.• Please provide description towards maintenance of monitoring equipment and installations.• Please provide explanation regarding procedures for monitoring, measurements and reporting of the data and parameters required under monitoring methodology.• Please provide detail procedure and plan for internal CDM audit team.								
Project Participant Response:					Date: 19/06/2008			
<p>(a) The management structure is clearly depicted in Section B.7.2 of the PDD based on ACM0012. Please refer to the section "Organisation structure and Procedure for Monitoring and Reporting of data"</p> <p>(b) BPSL maintains a training calendar for Controls and Instrumentation system every year and the training is imparted on the various aspects such as preventive maintenance, man and machine safety, PLC programming, operation of turbine, DCS system, environment and pollution control, steps for trouble shooting etc. Enclosure 6 (submitted to SGS during Oct 2007) provides the training calendar for the year 2007. The details related to periodic training of the monitoring personnel are also provided in B.7.2 and Annex 4 of the revised PDD (ver.2) as per ACM0012 methodology. Further as per request of SGS, the training calendar duly authenticated by BPSL was also submitted to SGS as Appendix 4 during Feb 2008.</p> <p>(c) A well laid out emergency preparedness plan exists at BPSL. The monitoring procedure of the parameters during emergency situations is detailed in section B.7.2 and Annex 4 of the PDD (ver. 2) as per ACM0012.</p> <p>(d) A yearly calibration schedule is maintained at BPSL for the monitoring equipments. Documentary evidence for calibration procedure of monitoring equipments is provided in Enclosure 7 submitted to SGS during October 2007. Further the frequency of calibration of monitoring equipments is provided in Section B.7.1 of the revised PDD (ver 2) based on ACM0012. The calibration procedure duly authenticated by BPSL has been submitted as Appendix 5 to SGS during Feb 2008</p> <p>(e) A detailed laid out maintenance plan is followed at BPSL for the monitoring equipments. Enclosure 8 submitted to SGS during October 2007 provides the annual maintenance plan for instruments at BPSL. The maintenance plan duly authenticated by BPSL has been submitted as Appendix 6 during Feb 2008.</p> <p>(f) The procedures for monitoring, measurements and reporting of data and parameters required under the monitoring methodology are detailed in Section B.7.1 and B.7.2 of the revised PDD (ver 2) as per ACM0012</p> <p>(g) A structured internal CDM audit team exist at BPSL. A brief description on the internal CDM audit team is provided in section B.7.2 and Annex 4 of the revised PDD (ver 2) as per ACM0012 methodology.</p>								
Acceptance and Close out by Lead Assessor:					Date: 08/07/2008			

<p>Information Provided:</p> <p>Revised PDD (Annex 4, Section B.7.1, B.7.2), Training calendar Enclosure 6, Appendix 4, Calibration procedure as Appendix 5, Maintenance plan as Appendix 6</p> <p>Information Verified:</p> <p>The revised PDD was checked and found that Section B.7.1, B.7.2 and Annex 4 has been revised and mentions the details transparently. The training calendar and training records provided were also verified during site visit. The calibration procedure and maintenance plan provided was also checked and found to be in order as checked during site visit.</p>	<p>Verified Document Reference:</p> <p>Revised PDD (Annex 4, Section B.7.1, B.7.2), Training calendar Enclosure 6, Appendix 4, Calibration procedure as Appendix 5, Maintenance plan as Appendix 6</p>
<p>Reasoning for not acceptance or acceptance and close out:</p> <p>CAR09 closed as The revised PDD was checked and found that Section B.7.1, B.7.2 and Annex 4 has been revised and mentions the details transparently. The training calendar and training records provided were also verified during site visit. The calibration procedure and maintenance plan provided was also checked and found to be in order as checked during site visit.</p>	

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	10.	Type:	CAR	Issue:	EIA	Ref.:	D.1.1
Lead Assessor Comment					Date: 31/03/2008		
Provide analysis of the environmental aspects and impacts due to the project activity as documented under EIA report.							
Provide detailed EIA report and relevant environmental clearances from state Pollution Control Board and Ministry of Environment and Forests; Government of India.							
Project Participant Response:					Date: 19/06/2008		
(a) The analysis of environmental aspects and impacts due to the project activity are detailed in Section D.1 of the revised PDD (ver 2).							
(b) EIA report was enclosed in Enclosure 9 provided to SGS during October 2007. All relevant clearances from the State Pollution Control Board and Ministry of Environment and Forests, GoI were provided to the DOE during the validation site visit in July 2007.							
Acceptance and Close out by Lead Assessor:					Date: 08/07/2008		
Information Provided:					Verified Document Reference: Revised PDD EIA Report of September 2003 SPCB Clearances		
Revised PDD, EIA report as Enclosure 9, PCB clearances							
Information Verified:							
Revised PDD section D.1 is mentioning the environmental aspects clearly. EIA report and SPCB clearances were also provided and found to be in order.							
Reasoning for not acceptance or acceptance and close out: CAR10 was closed as Revised PDD section D.1 is mentioning the environmental aspects clearly. EIA report and SPCB clearances were also provided and found to be in order.							

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	11.	Type:	CAR	Issue:	Environmental clearances	Ref.:	D.1.3
Lead Assessor Comment					Date: 31/03/2008		

Provide Consent to Establish and the Consent to Operate for the project activity from the State Pollution Control Board.	
Project Participant Response:	Date: 19/06/2008
The Consent to Establish; and Consent to Operate the project under the Air Act and Water acts; received from the State Pollution Control Board (SPCB) has been provided to SGS during the validation site visit held in July 2007.	
Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
Information Provided: Consent to establish and consent to operate under Air act and water acts by SPCB. Information Verified: Consent to establish and operate was checked and found to be OK.	Verified Document Reference: Consent to establish and operate.
Reasoning for not acceptance or acceptance and close out: CAR11 closed as Consent to establish and operate was checked and found to be OK.	

Date:	31/03/2008	Raised by:	Pankaj Mohan
No.:	12.	Type:	CAR
Issue:	Ownership	Ref.:	A.4.2
Lead Assessor Comment		Date: 31/03/2008	
Provide ownership or licenses which will allow the implementation of the project activity.			
Project Participant Response:		Date: 19/06/2008	
The land ownership documents are enclosed in Enclosure E .			
Acceptance and Close out by Lead Assessor:		Date: 08/07/2008	
Information Provided: Land ownership documents Information Verified: Land ownership documents provided were checked and found to be OK.		Verified Document Reference: Land ownership documents	
Reasoning for not acceptance or acceptance and close out: CAR12 closed as Land ownership documents provided were checked and found to be OK.			

Date:	31/03/2008	Raised by:	Pankaj Mohan
No.:	13.	Type:	CAR
Issue:	Local stake holder	Ref.:	E.1.1
Lead Assessor Comment		Date: 31/03/2008	
Provide documentary evidence towards invitations for local stakeholder comments and the procedure of compilation of the comments received during local stakeholder consultation process. Provide detail documentary evidence towards public hearing process and NOC from Village Panchayat. Provide the summary of comments received during local stakeholder consultation process and relevant actions taken in this regard with supporting.			
Project Participant Response:		Date: 19/06/2008	

<p>(a) The invitations for local stakeholder comments were through the public hearing process which was available in the local (in both English and Vernacular language) news papers. The documentary evidence was provided to SGS during the validation site visit in July 2007. The proceedings of public hearing process conducted on 16/07/2003 at the Tahsil office, Rengali which also details the recommendations of the public hearing panel are documented and the same has been provided to SGS.</p> <p>(b) The documentary evidence towards the public hearing process is available in the 'Proceedings of the public hearing on M/s Bhushan Limited (an integrated steel plant), Rengali, Sambalpur held on 16/07/2003 at the Tahsil office, Rengali'. This document has been provided to SGS during the validation visit. The NOC from the village panchayat has also been provided to SGS during the validation site visit.</p> <p>(c) The comments received during the stakeholder consultation process and relevant actions taken in this regard are detailed in Section E.2 and E.3 of the PDD (based on ACM0012) respectively. The documentary evidences / supporting of the same are provided to SGS during the validation site visit.</p>	
Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
<p>Information Provided:</p> <p>Revised PDD section E.2 & E.3, Invitation through newspaper in English and local language. Proceedings of Public hearing dated 16-07-2003.</p> <p>Information Verified:</p> <p>Revised PDD was checked along with all the documentary evidences and found to be correct.</p>	<p>Verified Document Reference:</p> <p>Revised PDD section E.2 & E.3. Invitation through newspaper in English and local language. Proceedings of Public hearing dated 16-07-2003.</p>
<p>Reasoning for not acceptance or acceptance and close out:</p> <p>CAR13 closed as Revised PDD was checked along with all the documentary evidences and found to be correct.</p>	

Date:	31/03/2008			Raised by:		Pankaj Mohan		
No.:	14.	Type:	CAR	Issue:	Monitoring plan		Ref.:	B.9.1
Lead Assessor Comment					Date: 31/03/2008			
<p>Provide description of the sources and gases included in the project boundary for the purpose of calculating project emissions and baseline emissions under Section B.3 of PDD with proper justification.</p> <p>Provide proper explanation of methodological choices and project specific assumptions and explanations under section B.6.1 of PDD version 1.</p> <p>Provide proper and complete description towards data and parameters that are available at validation under section B.6.2 of PDD.</p>								
Project Participant Response:					Date: 19/06/2008			
<p>(a) Project description of the sources and gases included in the project boundary for the purpose of calculating the project emissions and baseline emissions has been presented appropriately as apparent in Section B.3 of the revised PDD (ver 2) as per ACM0012</p> <p>(b) Explanation of methodological choices and project specific assumptions and explanations under section B.6.1 is provided in the PDD (ver 2) as per ACM0012</p> <p>(c) Proper and complete description towards data and parameters that are available at validation has been provided in section B.6.2 of the revised PDD (ver 2) as per ACM0012.</p>								
Acceptance and Close out by Lead Assessor:					Date: 08/07/2008			

Information Provided:	Verified Document Reference:
Revised PDD	Revised PDD Methodology ACM0012 version 02
Information Verified:	
The Revised PDD submitted by PP. The revised PDD was checked and found that the sections B.6.3, B.6.1, B.6.2 are mentioning the description of monitoring transparently and according to ACM0012 version 02.	
Reasoning for not acceptance or acceptance and close out: CAR14 closed as The Revised PDD submitted by PP. The revised PDD was checked and found that the sections B.6.3, B.6.1, B.6.2 are mentioning the description of monitoring transparently and according to ACM0012 version 02.	

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	15.	Type:	CAR	Issue:	Start Date and delay reasons	Ref.:	B.4.3
Lead Assessor Comment					Date: 31/03/2008		
Provide documentary evidence for the project activity start date. Also, It is not clear why the proponent has taken considerable gap in the preparation of the PDD (more than 4years).Justify timeline with supporting.							

Project Participant Response:	Date: 19/06/2008
<p>Project activity start date is taken as the purchase order date for the first 2 WHRBS of the project activity which is 27 Feb 2003. (Reference: Enclosure 3 as submitted to SGS during October 2007). Prior to the project start, BPSL was aware of the technological hurdles/ challenges pertaining to the high technical configuration WHRB system (with high pressure and temperature parameters that were first of its kind in the region i.e. State of Orissa) and was also aware that CDM revenues are available for waste heat recovery based power projects (Documentary evidences provided to the DOE in July/August by BPSL). After placing order on the WHRBs, BPSL had faced a number of barriers before implementing/ commissioning the project considering the following:</p> <ul style="list-style-type: none"> • Delays in design and engineering work and delays in supply of equipment by equipment supplier (Themax Ltd) • Delay in civil and structural drawings for the power plant by the Technical consultant (MECON Ltd) • Delays in supply of material (belts and conveyors) from TRF Ltd • Delays in erection and commissioning of 40 MW STG set • Delays in supply of steel products from the concerned manufacturer <p>Though BPSL had given commitments to the Bankers, Financial Institutions and Govt of Orissa that the operation of the plant would start in September 2004, the project got delayed due to the above mentioned reasons and eventually got commissioned only in July 2005. The documentary evidences related to the above delays are provided in Enclosure F to SGS.</p> <p>Further it may be noted that the Phase 1 (WHRB 1&2) and Phase II (WHRB 3&4) of the project activity were commissioned in July 2005 and May 2006 respectively. Considering the high pressure and temperature configuration of the WHRBs at BPSL, the project activity faced some operational problems post commissioning of the Phase I of the project. The technology supplier who designed the WHRBs in the project activity could not identify an immediate solution to the various technological problems as the operating parameters of the boilers were the first of the kind to be used with a 500 TPD kiln. The screen tube failure during Phase I occurred for several months and during each time, a short term action was taken but that was not sufficient to prevent the recurrence of the problem as boiler tube leakage problems were encountered in the Phase II as well¹.</p> <p>After several deliberations between BPSL and technology provider, the modifications were proposed in the WHRBs considering repeated screen tube failures. Due to operational issues, BPSL had to focus in getting the problems rectified on priority and eventually the process of CDM got delayed. Despite this BPSL had already approached CDM consultants during early 2006, and had received an engagement letter/ proposal from one of the CDM consultants in March 2006 (Reference: Enclosure 10 submitted to SGS during October 2007).</p> <p>However after several negotiations with a few CDM consultants, the contract was signed for CDM advisory services with Ecoinvest Carbon S.A during December 2006. The PDD was initially developed based on ACM0004 – ver 2 methodology and was web-hosted for public comments during June – July 2007. The validation site visit based on ACM0004 methodology was during July 2007 subsequent to which BPSL has revised the PDD and responded to the validation findings of SGS during October 2007 along with essential documentary evidences</p>	

¹ References: Documentary evidences already submitted to the DOE as Enclosure 4b (during Oct 2007) and as Appendix 3 – Boiler tube leakage records (during Feb 2008)

However, considering the replacement of ACM0004 methodology by ACM0012 methodology (in June 2007) and due to the monitoring methodology requirements under ACM0004, BPSL was advised to go ahead with ACM0012 methodology by the DOE during November 2007. However, BPSL having responded to the validation findings request of SGS went ahead and requested clarification to the UNFCCC regarding applicability of the ACM0004 methodology to the project in light of the monitoring requirements / methodology and as the ACM0004 methodology was valid until March 5, 2008, BPSL waited a response from UNFCCC until then. Though the PDD as per ACM0012 methodology was already completed by Dec - Jan 2008, the same could be web-hosted for public comments only during March 2008 considering that ACM0004 was applicable upto 5 March 2008 and BPSL was still awaiting the feedback from UNFCCC on the clarification request until this date. However it may be noted that subsequently the clarification was responded to by the Meth Panel of the UNFCCC in April 2008 (Meth Panel meeting date 7 – 11 April 08) for the request made by BPSL (Reference: F-CDM-AM-Clar_Resp_ver 01.1 - AM_CLA_0067) and clarifying that the procedure proposed by BPSL could be used as a modification of ACM0004. However the clarification by Meth Panel was provided only after March 5, 2008 which was the last date for submitting the project for registration under the methodology ACM0004 and therefore BPSL could not go ahead with ACM0004 methodology for the project but had to re-webhost the PDD based on ACM0012.

As apparent from the chronology of activities, the project proponent had initiated the project during early 2003 with the consideration of CDM revenues, however considering the delays and problems in the commissioning and operation of the project, the onset of CDM process also got delayed². As also apparent there have been innumerable delays even after initiating the CDM documentation in 2006 due to methodological related aspects

Acceptance and Close out by Lead Assessor:		Date: 08/07/2008
<p>Information Provided: PO copy as proof for start date as 27th February 2003. The justification for delay.</p> <p>Information Verified: The start date of project activity is mentioned as 27th February 2003 and the PO copy provided as proof for the same is accepted. The justification for delay in preparation of PDD is not acceptable as the delay provided in reply is for delay in construction and start of the power plant and not for delay in PDD preparation from the conceptualization of project as CDM project. The delay from June 2007 till date is acceptable due to methodological delays and the project is under validation since June 2007.</p>		<p>Verified Document Reference: PO copy for start date of project activity E&Y letter dated 24th March 2006 as Engagement letter for climate change Advisory services.</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR15 is Open as the justification for delay in preparation of PDD is not acceptable as the delay provided in reply is for delay in construction and start of the power plant and not for delay in PDD preparation from the conceptualization of project as CDM project. The E&Y letter provided showed that the PP started looking for consultants in 2006 only and not earlier. Please justify the delay with proper third party evidences.</p>		
Project Participant Response:		Date: 01/09/2008
<p>BPSL had already interacted with consultants in 2005 and explored the opportunity to initiate the CDM work. However, due to the various issues related to the commissioning of the plant, deferred the CDM related work till the plant was operating smoothly. Documentary evidence of the discussions with the consultant prior to 2006 is enclosed as Annexure-8.</p>		
Acceptance and Close out by Lead Assessor:		Date: 18/09/2008
<p>Information Provided: MECON Letter dated 22-03-2005 for the justification for delay.</p> <p>Information Verified: The justification for delay in preparation of PDD is not provided clearly. Please provide the chronology for the delay in preparation of PDD from 27th February 2003 to June 2007 with proper third party evidences.</p>		<p>Verified Document Reference: MECON Letter dated 22-03-2005</p>

² Reference: The documentary evidence supporting the delays has been provided to the DOE.

Reasoning for not acceptance or acceptance and close out:
CAR15 is Open as The justification for delay in preparation of PDD is not provided clearly. Please provide the chronology for the delay in preparation of PDD from 27th February 2003 to June 2007 with proper third party evidences.

Project Participant Response: Date: 30/10/2008

The detailed chronology on the real actions taken to avail CDM benefits is attached as **Annexure-5**.

Acceptance and Close out by Lead Assessor: Date: 11/11/2008

Information Provided:

The detailed chronology on the real actions taken to avail CDM benefits is attached as **Annexure-5**.

Information Verified:

The justification for delay in preparation of PDD is provided clearly.

The chronology for the delay in preparation of PDD from 27th February 2003 to June 2007 with proper third party evidences is provided but still there is a gap of more than one year from the start date till the first CDM consultant was contacted in March 2004.

Verified Document Reference:

The detailed chronology on the real actions taken to avail CDM benefits is attached as **Annexure-5**.

Reasoning for not acceptance or acceptance and close out:

CAR15 is Open.

Project Participant Response: Date: 01/12/2008

The chronology on the real action has been provided to the validator.

Acceptance and Close out by Lead Assessor: Date: 10/12/2008

Information Provided:

The detailed chronology on the real actions taken to avail CDM.

Information Verified:

The justification for delay in preparation of PDD is provided clearly.

The chronology for the delay in preparation of PDD from 27th February 2003 to June 2007 with proper third party evidences has been provided.

Verified Document Reference:

The PDF documents on detailed chronology on the real actions taken to avail CDM benefits.

Reasoning for not acceptance or acceptance and close out:

PP has provided the detail chronology on the real actions taken to avail CDM benefits which is acceptable. Thus, CAR 15 was closed.

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	16	Type:	CAR	Issue:	Project boundary & Project emissions	Ref.:	B.2.1
Lead Assessor Comment					Date: 31/03/2008		
The project boundary includes DRI Kiln but the Project emissions due to the coal used in DRI kiln is not included in the PDD.							
Project Participant Response:					Date: 19/06/2008		

<p>As per the requirement under the methodology ACM0012, version 02, 'the geographical extent of the project boundary shall include the following: 'The industrial facility where the waste gas/ heat/ pressure is generated (generation of waste energy)'</p> <p>In the project activity, it needs to be noted that the industrial facility where the waste gas/ heat is generated is BPSL's sponge iron plant/ DRI kiln. The source of waste heat is the After Burning Chamber (ABC) where the waste gas from the DRI kiln of BPSL facility is combusted. The DRI Kiln and the ABC are therefore included in the project boundary as per the requirement of ACM0012. However as per ACM0012 (ver 2) it is not required to account for project emissions from coal combustion in the DRI Kiln.</p> <p>As a further justification, it needs to be noted that the DRI kiln produces sponge iron and in the process of production waste gas/ heat is also generated. This waste gas/ heat generated during the production of sponge iron is used by the project activity for power generation and in the absence of the project, the waste gas would have been released into the atmosphere. Coal would anyway have been used in the sponge iron kiln for the production of sponge iron. The project activity did not result in the implementation/ setting up of the sponge iron kiln and therefore the use of coal. Therefore the combustion of coal in the DRI kiln need not be accounted for in the project emissions as it is not directly related to the project activity.</p>	
Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
<p>Information Provided: Revised PDD Information Verified: The revised PDD is mentioning the Project boundary and Project emissions transparently as checked during the desk review. These are found to be in accordance with methodology ACM0012 version 02.</p>	<p>Verified Document Reference: Revised PDD and ACM0012 version 02.</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR16 closed as the revised PDD is mentioning the Project boundary and Project emissions transparently as checked during the desk review. These are found to be in accordance with methodology ACM0012 version 02.</p>	

Date:	31/03/2008			Raised by:	Pankaj Mohan				
No.:	17	Type:	CAR	Issue:	Baseline selection			Ref.:	B.1.1
Lead Assessor Comment						Date: 31/03/2008			
In the baseline comparison the 2004 report is used. It is not clear why? The PDD mentions document provided to DOE but the PDD no where mentions this was earlier on ACM0004 and now on ACM0012. Please clarify.									
Project Participant Response:						Date: 19/06/2008			

In the baseline comparison the Feb 2004 report of Central Electricity Authority (CEA) has been used as it is the most authentic information available on cost of power generation prior to project commissioning in July 2005. However the following document can be referred to which is the Orissa Electricity Regulatory Commission (OERC) Order on M/s Sree Metaliks Ltd dated 28 Jan 2002 (Enclosure J). It is to be noted from this Order that considering frequent power failure of the grid and poor quality of power and also the industry/unit being a process industry requiring continuous power, M/s Sree Metaliks had applied to OERC for 1000 KVA Diesel Generator (DG) sets to be used as a standby to their existing D.G sets. From this Order, it may be noted that the cost of electricity available from the grid is Rs.2.83/ unit at 80% Load Factor (L.F) as compared to the cost of electricity at more than Rs 4.00 / unit if generated through the D.G sets and therefore the power supply from the grid being more economical than the power to be available from the D.G sets. It may be noted that the same power unavailability (frequent power failure) and poor quality of power is relevant to BPSL's project as well, apart from the higher costs of grid power and diesel based power.

Further the above cost of power generation is also justified based on the Feb 2004 CEA report that the cost of diesel based power is in the range of 5.96 INR/kWh. From the information available it can be inferred that power generation from coal, coal char and coal washery rejects based power plant would be the cheapest (in the range of 1.13 INR/kWh as computed by BPSL) when compared with grid power and diesel based power. The revised PDD provides in Section B.5 the details of cost computation of coal, coal char and coal washery rejects based power plant.

The version history has been provided in Section A.1 of the revised PDD (ver 3) indicating the use of ACM0004 methodology in Version 01 and use of ACM0012 methodology in Version 02 of the PDD.

Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
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<p>Information Provided:</p> <p>Revised PDD, CEA document of Feb 2004 and OERC document dated 28th Jan 2002.</p> <p>Information Verified:</p> <p>The revised PDD (Section A.1, B.5) along with the FEB 2004 and OERC document dated 28th Jan 2002 was verified and found to be in order.</p>	<p>Verified Document Reference:</p> <p>Revised PDD</p> <p>CEA document Feb 2004</p> <p>OERC order dated 28th Jan 2002.</p>
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Reasoning for not acceptance or acceptance and close out:
CAR17 closed as the revised PDD (Section A.1, B.5) along with the FEB 2004 and OERC document dated 28th Jan 2002 was verified and found to be in order.

Date:	31/03/2008			Raised by:	Pankaj Mohan			
No.:	18	Type:	CAR	Issue:	Additionality		Ref.:	B.4.7
Lead Assessor Comment					Date: 31/03/2008			
<p>The PDD is not mentioning the serious CDM consideration in section B.5 of PDD. This mentions documentary evidence provided to DOE. Please clarify which documentary evidence and include that reference in PDD.</p> <p>Technological barriers mentioned are also not clear. Please provide documentary evidence for training related barrier, risk of technological barrier, Waste gas quality, temperature control related, boiler operations problem, and other equipments.</p>								
Project Participant Response:					Date: 19/06/2008			

(a) The evidence relating to serious CDM consideration has been provided to the DOE and also explained in the PDD (ver 3) under Section B.5. The evidences include the Board note on CDM consideration dated 29 October 2002 also indicating that BPSL was aware of the technological hurdles and challenges due to high pressure and temperature configuration of the waste heat recovery boiler which was prior to project decision. The reference to the same has been indicated in Section B.5 of the PDD.

(b) Technological barriers section clearly indicates that there were training related barriers, risk of technological failures, quality of waste gas, temperature control related, boiler operational problem and due to failure of other equipments. The documentary evidences of training related barriers, risk of technological failures, boiler operational problems are already provided to SGS in the Enclosures and Appendices provided during October 2007 and Feb 2008.

Regarding waste gas quality aspects, it may be noted that WHRB's are designed based on flue gas emanating from the DRI Kiln having definite parameters. A copy of the basis of design provided by BPSL is enclosed as **Enclosure G**. Any change in the parameters would have adverse impact on performance of the boiler. For example, the flue gas inlet temperature is 1000°C and in case temperature goes beyond 1000°C, it would have adverse impact on boiler tubes and there may be premature failure due to excessive heat

Further, coal is a vital raw material used in the DRI Kiln to produce DRI/ sponge iron. Better coal quality is related directly with the productivity of DRI and quality of flue gas which has a direct impact on steam generation. On the other hand inferior coal quality (having high ash content) will generate flue gas with high ash content and this has got impact on wear and tears on the boiler tubes. Evidence from BPSL on desired ash content in coal is enclosed in **Enclosure G** which indicates that the ash content desired is about 27.5% Further other equipments such as electrostatic precipitator (ESP) is an integral part of the boiler which is placed between boiler and the stack. Any breakdown in ESP would paralyse the performance of WHRB.

Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
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<p>Information Provided: CDM Board note, Enclosure G for Design basis of WHRB and Preferred ash content in coal as per technology provider, Information Verified: The board note provided for CDM consideration is not acceptable. Please provide credible third party evidence for the serious CDM consideration. The documentary evidence for technological barriers could be accepted but the documentary evidence for breakdown in ESP would paralyse the performance of WHRB to be provided by PP.</p>	<p>Verified Document Reference: CDM board note dated 29th October 2002. Enclosure G for Design basis of WHRB and Preferred ash content in coal as per technology provider.</p>
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Reasoning for not acceptance or acceptance and close out:
CAR18 is open as the board note provided for CDM consideration is not acceptable. Please provide credible third party evidence for the serious CDM consideration. The documentary evidence for technological barriers could be accepted but the documentary evidence for breakdown in ESP would paralyse the performance of WHRB to be provided by PP.

Project Participant Response:	Date: 01/09/2008
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BPSL had initiated the dialogue with various institutions for the financing of the project in which CDM revenues was also considered. The application to financial institution highlighting the CDM revenues from the proposed project and the communications thereof are enclosed as **Annexure-9**.
The gas coming out from the kiln contains moisture and un-burnt coal which could stick to the wall of the electrodes and adversely affect the performance of the ESP connected to the WHRB. The functioning of the ESP is dependent on the quality of the waste gas from the kiln as against that of the AFBC. The PDD has been accordingly revised.

Acceptance and Close out by Lead Assessor:	Date: 18/09/2008
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<p>Information Provided: The letters dated 06-07-2003; 21-07-2003 & 25-07-2003 were provided. Information Verified: The letters dated 06-07-2003, 21-07-2003 & 25-07-2003.</p>	<p>Verified Document Reference: The letters dated 06-07-2003, 21-07-2003 & 25-07-2003</p>
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Reasoning for not acceptance or acceptance and close out: Please provide the serious CDM consideration as per EB41 Annex 46 in the chronological order so CAR18 is still open.	
Project Participant Response:	Date: 30/10/2008
The detailed chronology on serious CDM consideration in accordance with EB 41 Annex 46 is attached as Annexure-6.	
Acceptance and Close out by Lead Assessor:	Date: 11/11/2008
Information Provided: The board note dated 30-12-2004 is provided. Information Verified: As per EB41 Annex 46 the documentary evidences needs to be provided.	Verified Document Reference: Board resolution 30-12-2004
Reasoning for not acceptance or acceptance and close out: Please provide the serious CDM consideration as per EB41 Annex 46 in the chronological order so CAR18 is still open.	
Project Participant Response:	Date: 01/12/2008
The detailed chronology on serious CDM consideration in accordance with EB 41 Annex 46 is attached as Annexure-6.	
Acceptance and Close out by Lead Assessor:	Date: 10/12/2008
Information Provided: The detail chronology for the project activity is provided. Information Verified: The detail chronology for the project activity in the documents provided is as per EB41 Annex 46.	Verified Document Reference: The PDF documents on detail chronology for the project activity.
Reasoning for not acceptance or acceptance and close out: PP has provided the detail chronology for the project activity which is as per the EB41, Annex 46. Thus, CAR 18 was closed.	

Date:	31/03/2008	Raised by:	Pankaj Mohan
No.:	19	Type:	CAR
Issue:	Capping of baseline emissions	Ref.:	B.5.1
Lead Assessor Comment	Date: 31/03/2008		
Fcap calculation in methodology says three years data is needed but the PDD does not mention that. Please clarify.			
Project Participant Response:	Date: 19/06/2008		

As per the requirement of the ACM0012 (ver 2), the baseline emissions calculation needs to include the 'f_{cap}'. In case of the project activity f_{cap} is derived based on 'Method 2' i.e. the 'The manufacturer's data for the industrial facility shall be used to estimate the amount of waste gas/heat/pressure the industrial facility generates per unit of product generated by the process that generates waste gas/heat/pressure'.

In this context,
$$f_{cap} = \frac{Q_{WG,BL}}{Q_{WG,y}}$$

Where $Q_{WG,BL} = Q_{BL,product} \times q_{wg,product}$

Q_{WG,BL} is the Quantity of waste gas generated prior to the start of the project activity;

Q_{WG,y} is the Quantity of waste gas used for energy generation during year y (Nm³);

Q_{BL product} is the Production by process that most logically relates to waste gas generation in baseline and;

q_{wg, product} is the Amount of waste gas/heat/pressure the industrial facility generates per unit of product generated by the process that generates waste gas/heat/pressure.

As per manufacturers specifications (also as indicated in B.6.2 of PDD (ver 2)),

- Q_{BL product} is 6,00,000 tons of sponge iron production (maximum potential sponge iron production output of the kilns as per the rated capacity of the kiln) which relates to waste gas generation in the baseline. The maximum potential sponge iron production output of each 500 TPD kiln as per the rated capacity of the kiln, obtained from the technology specification/ manufacturers specification (i.e. Outokumpu technology by Lurgi Metallurgie GmbH) is 150,000 tons a year. For four numbers 500 TPD kiln the sponge iron production would be 150,000 X 4 = 600,000 tons / year. This is evidenced in **Enclosure H** sourced from the document submitted to BPSL by Lurgi Metallurgie GmbH (an Outokumpu technology company) for the SL/RN Direct Reduction Plant
- q_{wg, product} is the waste gas/ heat generation per unit of sponge iron which is calculated by BPSL from the manufacturers specifications. As per the design basis provided by Thermax Ltd (provided as **Enclosure I**) the waste gas generation rate is 1,20,000 m³/hr from the sponge iron kiln and the capacity of the kiln being 500 TPD, the waste gas generation works out to 5760 m³/ton of DRI or sponge iron
- Q_{WG,BL} = Q_{BL product} X q_{wg, product} and is therefore 6,00,000 tons/yr X 5760 m³/ton = 3,456,000,000 m³/yr as indicated under Section B.6.2 of PDD (ver 2)

It may be noted that while the other parameters (Q_{WG,BL}) as per manufacturer's specifications is available to compute f_{cap}, only Q_{WG,y} (quantity of waste gas used for energy generation during a year) is not available at the moment as this was not measured in BPSL previously however as indicated under Section B.7.1 of the PDD (ver 2), the Q_{WG,y} is proposed to be directly measured by BPSL through appropriate metering device (this is proposed to be installed shortly at BPSL) during the crediting period towards estimating f_{cap}. However in the ex-ante emission reduction calculations as detailed under Section B.6.3 of the PDD, f_{cap} has been assumed as 1. This has been clearly mentioned under Section B.6.3 of the revised PDD (ver 3) under 'Computation of f_{cap}'.

Acceptance and Close out by Lead Assessor:		Date: 08/07/2008
Information Provided:		Verified Document Reference: Enclosure H by Lurgi Metallurgie GmbH (an Outokumpu technology company) Enclosure I Basis of design for Boiler by Thermax Methodology ACM0012 version 02.
Enclosure H & Enclosure I		
Information Verified:		
The justification provided could be accepted but the document Enclosure H by Lurgi Metallurgie GmbH (an Outokumpu technology company) is not clear and some points are mentioned by other ink. Please send the clear document to verify the data. Enclosure I – Basis of design is OK.		
Reasoning for not acceptance or acceptance and close out: CAR19 is open as the document Enclosure H by Lurgi Metallurgie GmbH (an Outokumpu technology company) is not clear and some points are mentioned by other ink. Please send the clear document to verify the data.		
Project Participant Response:		Date: 01/09/2008

The document is enclosed as Annexure-10. The document is authenticated by BPSL	
Acceptance and Close out by Lead Assessor:	Date: 08/07/2008
<p>Information Provided: Annexure 10</p> <p>Information Verified: The document Annexure 10 by Lurgi Metallurgie GmbH (an Outokumpu technology company) is not clear and some points are mentioned by other ink. Please send the clear document to verify the data.</p>	<p>Verified Document Reference: Annexure 10 by Lurgi Metallurgie GmbH (an Outokumpu technology company)</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR19 is open as the document Annexure 10 by Lurgi Metallurgie GmbH (an Outokumpu technology company) is not clear and some points are mentioned by other ink. Please send the clear document to verify the data.</p> <p>The original document has been sent to the DOE for verification.</p>	
Project Participant Response:	Date: 30/10/2008
The original document has been sent to the DOE for verification.	
Acceptance and Close out by Lead Assessor:	Date: 11/11/2008
<p>Information Provided: Lurgi Metallurgie GmbH (an Outokumpu technology company)</p> <p>Information Verified: The document by Lurgi Metallurgie GmbH (an Outokumpu technology company) is clear and verified the data.</p>	<p>Verified Document Reference: Lurgi Metallurgie GmbH (an Outokumpu technology company)</p>
<p>Reasoning for not acceptance or acceptance and close out: CAR19 is closed as the document by Lurgi Metallurgie GmbH (an Outokumpu technology company) is verified for the data by the validator with original copy.</p>	

Date:	31/03/2008				Raised by:	Pankaj Mohan			
No.:	20	Type:	CAR	Issue:	Emission reductions			Ref.:	B.7.1
Lead Assessor Comment						Date: 31/03/2008			
The emission reductions mentioned in the PDD are not clear and how it has increased from previous PDD on ACM0004. It is not clear. Please clarify. Also provide the emission reduction calculation spreadsheet.									
Project Participant Response:						Date: 19/06/2008			

(a) ER calculations as per ACM0004 (previously used):

In the ER calculations based on ACM0004, the efficiency used to compute the baseline emission factor has been derived based on potential power generation and steam generation (based on 2006 – 2007 data at BPSL) and the corresponding heat equivalent per unit of power as well as enthalpy of steam at turbine inlet (from steam tables based on steam pressure and temperature). As per the PDD based on ACM0004 to arrive at the efficiency of the captive power plant the following method has been adopted: Efficiency (This is the turbine efficiency - since boiler efficiency has been assumed at 100% turbine efficiency will represent the overall power plant efficiency) = Thermal equivalence of power generated from the Captive Power Plant / Energy input to the turbine

(a) For 40 MW CPP

$$\text{Eff}_{40 \text{ MW_CPP}} = P_{40 \text{ MW_Gen}} \times H_{\text{eq}} / (Q_{\text{STG1}} \times H_{\text{TG1}})$$

$P_{40 \text{ MW_Gen}}$ = Power generated in kWh (actual in the year 2006-07) from 40 MW CPP

H_{eq} = Heat equivalent in kCal/kWh

Q_{STG1} = Steam at turbine inlet in kg (actual in the year 2006-07) for 40 MW CPP

H_{TG1} = Enthalpy of steam at turbine inlet in kCal/kg (based on steam pressure and steam temperature at turbine inlet) for 40 MW CPP

(b) For 60 MW CPP:

$$\text{Eff}_{60 \text{ MW_CPP}} = P_{60 \text{ MW_Gen}} \times H_{\text{eq}} / (Q_{\text{STG2}} \times H_{\text{TG2}})$$

$P_{60 \text{ MW_Gen}}$ = Power generated in kWh (actual in the year 2006-07) from 60 MW CPP

H_{eq} = Heat equivalent in kCal/kWh

Q_{STG2} = Steam at turbine inlet in kg (actual in the year 2006-07) for 60 MW CPP

H_{TG2} = Enthalpy of steam at turbine inlet in kCal/kg (based on steam pressure and steam temperature at turbine inlet) for 60 MW CPP

For the 40 MW and 60 MW CPPs the efficiency worked out to 28% and 29% respectively and the corresponding emission factor of the CPP worked out to 1.25 and 1.19 tCO₂e/MWh. Based on this baseline emission factor, the ER was computed.

(b) ER calculations as per ACM0012 (currently used):

As per the requirement of ACM0012, for determining the efficiency of the captive power plant (based on coal, coal char and coal washery rejects) at BPSL which would have supplied power to the facility in the absence of the project, option (ii) i.e. "Highest of the efficiency values provided by two or more manufacturers for power plants with specifications similar to that that would have been required to supply the recipient with electricity that it receives from the project activity" mentioned in ACM0012 methodology has been used. As per this option (ii), the efficiency of the captive power plant at BPSL has been estimated/ derived to be 23.89% considering the following values (Documentary evidences are provided in Enclosure B to SGS):

- Boiler efficiency as per manufacturer's specifications which is 84% for the 75 TPH AFBC boiler (based on coal, coal char and coal washery rejects) which is a part of the 40 MW CPP at BPSL. The boiler efficiency is as per the 'Designs specification of the Steam generator' provided in the Operations and Maintenance (O&M) Manual of Thermax Babcock and Wilcox Ltd for BPSL's project.
- The net calorific value of the blend of the fuel (coal, coal char and coal washery rejects) that is an input to the AFBC boiler is considered as 2500 kCal/kg (as per Analysis report conducted by BPSL)
- Turbine heat rate is 3022.715 Kcal/kWh for the 40 MW Turbogenerator (TG) set at BPSL

It needs to be noted that there is a 100 MW CPP at BPSL which includes the 40 MW CPP (AFBC1 (75 TPH) and WHRB 1&2) and 60 MW CPP (AFBC2 (150 TPH) and WHRB 3&4). However the values of the boiler efficiency (84%) and the turbine heat rate (3022.715 kcal/kWh) considered above have been selected on a conservative basis. Considering the above captive power plant efficiency of 23.89%; and considering that the emission factor of coal as per NATCOM report (Indian's Initial National Communication submitted to the UNFCCC, <http://unfccc.int/resource/docs/natc/indnc1.pdf>) is 26.1 tC/TJ, the CO₂ emission factor of the captive power plant is derived as 1.44 tCO₂/MWh.

Justification of increase in emission reductions in current PDD based on ACM0012: As apparent from the above, the input parameters used to compute the efficiency of the captive power plant (CPP) are different in the calculations used for ACM0004 and ACM0012. The computation of efficiency for ACM0012 is as per the requirement of the methodology and as per manufacturer's specification (based on Option (ii) indicated in ACM0012). Whereas the input parameters used in efficiency calculations for ACM0004 are based on actual power and steam generation data at BPSL in 2006 - 07 and also considering the corresponding heat equivalent / enthalpy of steam. This is the reason for different emission factors used in computing the emission reductions for both ACM0004 and ACM0012. The emission factor used in previous PDD (1.19 and 1.25 tCO₂e/MWh) based on ACM0004 was lower than the emission factor used in the current PDD (1.44 tCO₂e/MWh) based on ACM0012 and therefore the emission reductions in the current PDD based on ACM0012 is higher than the previous PDD based on ACM0004 methodology. It may be noted that the ER calculation spreadsheet has already been forwarded to SGS on 5th March 2008 while the PDD was sent across for re-webhosting using ACM0012 methodology.

Acceptance and Close out by Lead Assessor:

Date: 08/07/2008

Information Provided:

Enclosure B, Revised PDD, Spreadsheet of ER calculation

Information Verified:

The justification for ER calculation is accepted and found to be in line with the ACM0012 version 02. The revised PDD and Spreadsheet was checked and found to be in order. Design specifications from Thermax limited was checked and found to be in order. The turbine heat rate provided is not accepted as this is on plain paper and not a authenticated document. In-house Coal GCV calculation sheet is also not accepted as this mentions some GCV value by some other ink pen while rest of the sheet is typed.

Verified Document Reference:

Enclosure B for Calorific value of Coal, Boiler efficiency of 75TPH AFBC Boiler from Thermax Limited, Turbine heat rate for 40MW & 60MW TG sets.

Revised PDD, Spreadsheet for ER calculation

Reasoning for not acceptance or acceptance and close out:

CAR20 is open as the turbine heat rate provided is not accepted as this is on plain paper and not a authenticated document. In-house Coal GCV calculation sheet is also not accepted as this mentions some GCV value by some other ink pen while rest of the sheet is typed.

Project Participant Response:		Date: 01/09/2008
The documents authenticated by the technical consultant- BHEL is enclosed again for reference in Annexure-11 .		
Acceptance and Close out by Lead Assessor:		Date: 18/09/2008
Information Provided: Annexure 11 Information Verified: The information is not verifiable.		Verified Document Reference: Annexure 11
Reasoning for not acceptance or acceptance and close out: CAR20 is open as the document is not clear.		
Project Participant Response:		Date: 30/10/2008
The original document has been sent to the DOE for verification		
Acceptance and Close out by Lead Assessor:		Date: 11/11/2008
Information Provided: BHEL Document Information Verified: The information is verifiable.		Verified Document Reference: BHEL Document
Reasoning for not acceptance or acceptance and close out: CAR20 is closed as the documents provided were verified and found to be OK and hence this was accepted.		

Date:	31/03/2008			Raised by:	Pankaj Mohan		
No.:	21	Type:	CAR	Issue:	Participation requirement	Ref.:	Table 1
Lead Assessor Comment				Date: 31/03/2008			
Modalities of Communication to be provided by the PP.							
Project Participant Response:				Date: 19/06/2008			
The MoC is provided by the PP in Enclosure K							
Acceptance and Close out by Lead Assessor:				Date: 08/07/2008			
Information Provided: MOC not provided Information Verified:				Verified Document Reference:			
Reasoning for not acceptance or acceptance and close out: CAR21 open as MOC not provided.							
Project Participant Response:				Date: 01/09/2008			
MOC is enclosed as Annexure-12 .							
Acceptance and Close out by Lead Assessor:				Date: 18/09/2008			
Information Provided: MOC provided Information Verified: MOC dated 26-08-2008 provided and found to be OK. This was again provided in new format dated 10-03-2009.				Verified Document Reference: Enclosure K - MOC dated 26-08-2008 and Revised MOC dated 10-03-2009.			
Reasoning for not acceptance or acceptance and close out: CAR21 closed as MOC provided and found to be OK.							

A.4 Annex 4: Team Members Statements of Competency

Statement of Competence

Name: Pankaj Mohan

SGS Affiliate: SGS India Pvt. Ltd.

Status

- Product Co-ordinator ☐
- Operations Co-ordinator ☐
- Technical Reviewer ☐
- Expert ☒

Validation

Verification

- | | | |
|-------------------------|-------------------------------------|-------------------------------------|
| - Local Assessor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| - Lead Assessor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| - Assessor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| / Trainee Lead Assessor | | |

Scopes of Expertise

- | | |
|--|-------------------------------------|
| 1. Energy Industries (renewable / non-renewable) | <input checked="" type="checkbox"/> |
| 2. Energy Distribution | <input checked="" type="checkbox"/> |
| 3. Energy Demand | <input checked="" type="checkbox"/> |
| 4. Manufacturing | <input checked="" type="checkbox"/> |
| 5. Chemical Industry | <input type="checkbox"/> |
| 6. Construction | <input type="checkbox"/> |
| 7. Transport | <input type="checkbox"/> |
| 8. Mining/Mineral Production | <input type="checkbox"/> |
| 9. Metal Production | <input type="checkbox"/> |
| 10. Fugitive Emissions from Fuels (solid, oil and gas) | <input type="checkbox"/> |
| 11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride | <input type="checkbox"/> |
| 12. Solvent Use | <input type="checkbox"/> |
| 13. Waste Handling and Disposal | <input type="checkbox"/> |
| 14. Afforestation and Reforestation | <input type="checkbox"/> |
| 15. Agriculture | <input type="checkbox"/> |

Approved Member of Staff by Marco van der Linden Date: 03-04-07



Statement of Competence

Name: Kamesh Iyer

SGS Affiliate: India

Status

- Product Co-ordinator ☐
- Operations Co-ordinator ☐
- Technical Reviewer ☐
- Expert ☐

Validation

Verification

- Local Assessor ☒ ☒
- Lead Assessor ☒ ☒
- Assessor ☐ ☐
- / Trainee Lead Assessor

Scopes of Expertise

1. Energy Industries (renewable / non-renewable) ☒
2. Energy Distribution ☒
3. Energy Demand ☐
4. Manufacturing ☐
5. Chemical Industry ☐
6. Construction ☐
7. Transport ☐
8. Mining/Mineral Production ☐
9. Metal Production ☐
10. Fugitive Emissions from Fuels (solid,oil and gas) ☐
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride ☐
12. Solvent Use ☐
13. Waste Handling and Disposal ☐
14. Afforestation and Reforestation ☐
15. Agriculture ☐

Approved Member of Staff by: Siddharth Yadav

Date: 06.04.2008