

**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006**

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Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none">• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.
03	22 December 2006	<ul style="list-style-type: none">• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

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SECTION A. General description of small-scale project activity**A.1 Title of the small-scale project activity:**

>> Fuel Switch at Durgapur Chemicals Ltd.
Version 1, Date – 06/10/2007

A.2. Description of the small-scale project activity:

>>

The project activity is being carried out at the caustic soda manufacturing plants of Durgapur Chemicals Ltd. at Durgapur, West Bengal. It is aimed at replacing the usage of coal with Furnace Oil (F.O.) and Hydrogen, thus contributing towards reduction in CO2 emission.

The project activity consists of fuel switching measures by switching from Coal to F.O. / Hydrogen as a fuel in the boiler for producing steam.

Durgapur Chemicals Ltd. would be installing a new 8 TPH Steam Boiler based on F.O. / Hydrogen as a fuel and hence reducing CO2 emissions which would have otherwise been caused due to combustion of coal.

Durgapur Chemicals Ltd. is accredited with ISO 9001:2000, ISO 14001:2004.

The fuel switching measures are being taken by Durgapur Chemicals Ltd. with the view of switching to a lesser green house gas intensive fuel and thus reducing emissions of greenhouse gases (GHG), hence providing the community with a cleaner environment.

The company is also contributing to sustainable development by:

- a) Complying fully to Corporate Responsibility for Environment Protection
- b) Giving Financial Aid to the local schools.
- c) Providing drinking water to the neighbouring village's.
- d) Promoting social awareness towards Environment Protection by way of planting and preventing cutting of trees etc.

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A.3. Project participants:

>> The Party which is hosting the proposed CDM project activity i.e. the host country for the CDM project activity is **India**.

India has already ratified the Kyoto Protocol on 26 August 2002 (Type A). Ratification details are available on the UNFCCC website.

Name of Party Involved (*) (host indicates a host party)	Private and/or Public entity (ies) Project Participants (*) as applicable	Kindly indicate if the party involved wishes to be considered as a project participant (Yes / No)
Government of India (Host Country)	Durgapur Chemicals Ltd.	No

(*) In accordance with the CDM Modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting the registration, the approval by the party (ies) involved is required.

As yet, the project activity has no Annex I party.

The entity who is investing in the project activity is Durgapur Chemicals Ltd., which is also the Project Participant for the project activity.

A.4. Technical description of the small-scale project activity:**A.4.1. Location of the small-scale project activity:**

>>

A.4.1.1. Host Party(ies):

>> India

A.4.1.2. Region/State/Province etc.:

>> West Bengal

A.4.1.3. City/Town/Community etc:

>>District : Burdwan

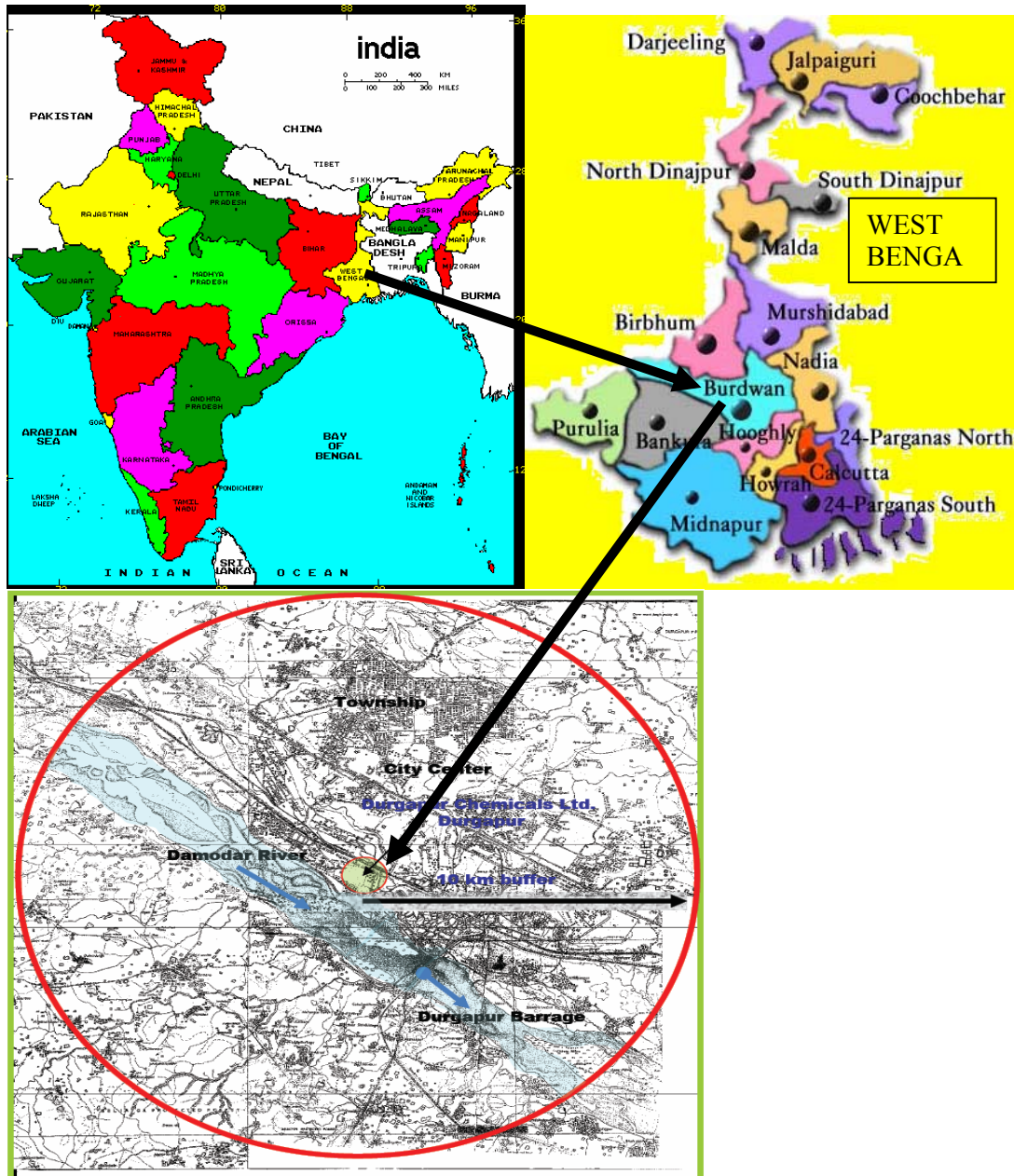
City : Durgapur

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>> Durgapur Chemicals Ltd. is situated on the banks of River Damodar and the exact plant location is within 5 km from the Durgapur Railway Station.

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The geographical co – ordinates of the plant are:
 Latitude: 23°30'11" to 23°30'31" N
 Longitude: 87°17'16" to 87°17'26" E



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A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

 >> Type and Category

Since, the emission reduction from the proposed project is 4,563 t CO₂, which is less than the qualifying capacity of 60,000 t CO₂, the project activity can be regarded as a small scale CDM project activity and UNFCCC indicative simplified modalities and procedures can be applied. The technology to be used is a hydrogen fuel based boiler which is by combustion of hydrogen fuel producing thermal energy, which in turn is producing steam.

Technology

The project activity utilizes hydrogen as a replacement to coal for usage in the steam boiler and thus reduces emission reductions which would have been caused by the standard practice of usage of coal in the steam boilers.

According to small-scale CDM modalities the project activity falls under **Type III – Other Project Activities**

Category III B (Version - 11) – Switching of Fossil Fuels

The technology being used is completely safe and sound and has been developed by the leading boiler manufacturer in India.

No Technology Transfer is taking place.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

 >> Quantity of emissions reductions out of the project:

The annual emission reduction works out to be 4,563 tonnes of CO₂ equivalent and the total emission reduction for the first crediting period of 7 years (March 2008- February 2015) works out to be 29,687 tonnes of CO₂ equivalent.

year	Estimation of annual emission reduction in tonnes of CO ₂ e
March 2008 – February 2009	4,563
March 2009 – February 2010	4,563
March 2010 – February 2011	4,563
March 2011 – February 2012	4,563
March 2012 – February 2013	4,563
March 2013 – February 2014	4,563
March 2014 – February 2015	4,563
Total Estimated Reductions (tCO ₂ e)	31,941
No. of Crediting Years	7
Annual Average of Estimated Reductions over the Crediting Period	4,563

A.4.4. Public funding of the small-scale project activity:

>> No ODA has been utilised in the project activity.

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A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

>> In accordance with Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities “DETERMINING THE OCCURANCE OF DEBUNDLING”, it can be confirmed that this project activity is not a debundled component of a larger CDM project.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>> According to small-scale CDM modalities the project activity falls under **Type III – Other Project Activities**
Category III B (Version –11) – Switching of Fossil Fuels

B.2 Justification of the choice of the project category:

>> The emission reduction from the project is 4,563 t CO₂e, which is less than the qualifying capacity of 60,000 tCO₂e and hence can adopt simplified methodologies. Further, the project activity is a fuel switch from coal to hydrogen. Hence, the type and category of the project activity matches with III.B. as specified in Appendix B of the indicative simplified baseline and monitoring methodologies for small scale CDM project activities.

B.3. Description of the project boundary:

>> According to the selected methodology project boundary is described as the physical and geographical site where the fuel combustion process has been affected fuel-switching measure. Hence, for the project activity boiler house is considered as the project boundary.

B.4. Description of baseline and its development:

>> The baseline for the proposed project activity is usage of coal in the boiler.

Baseline emissions would be calculated using the average of last two year coal consumption data.

To know the fixed carbon content in the coal being used, a proximate analysis test was done. The finding of the test was that the fixed carbon content of the coal being used is 34.84% by weight.
(Kindly refer Annex: 5 for coal analysis)

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

Preliminary screening based on the starting date of the project activity

CDM was considered before the Project Activity was considered by Durgapur Chemicals Ltd. The project participants became cognizant of carbon credits and CDM activities through various seminars and conferences. This realization provided great boost to the decision of taking up the project.

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Investment Analysis

OPERATING COST ANALYSIS OF COAL FIRED BOILER Vs F.O. CUM H2 FIRED BOILER			
Particulars	Coal Fired Boiler	F.O./ H2 Fired Boiler	
No. of Boilers	1.00	1.00	
Boiler Efficiency	0.82	0.90	
Steam Generation Capacity in Kg / Hr	8,000	8,000	
Average Steam Produced in Kg / Hr*	6,000	6,000	
Fuel	Coal	F.O. / H2	
Calorific Value of Fuel	Coal – 4,475 Kcal / kg (from lab analysis of coal)	F.O. – 9,650 Kcal / kg Hydrogen – 2,500 Kcal / Nm3	* H2 available from process = 750 NM3 / Hr Steam Available from Free H2 = $(750*2500*0.9)/540$ is equal to 3,125 Kg / Hr Hence steam from F.O. = 2,875 Kg / Hr Total = 6,000 Kg / Hr
Fuel Consumed per Day**	21,190 Kg	F.O. – 4,290 Kg Hydrogen – 18,000 Nm3	** 24 Hours of operation a day
Cost of Fuel (based on average price of last two years)	Rs. 2.76 / Kg	F.O. - Rs. 16.21 / Kg	
Cost of Fuel per Day	Rs. 58,484	Rs. 69,540	
Yearly Loss on account of Fuel Switch	Rs 3,648,480		
Clearly without the CER Revenue the project is accruing a financial loss to the company			
No. of CER's	4,563		
Price per CER	€ 14		
Exchange Rate	Rs. 56		
CER Revenue	Rs.3,577,392		
Yearly Loss after considering CER Revenue	Rs.71,088		

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It is an unusual practice for an industry in India to lose such sum of money every year only to contribute for GHG reduction and to be an initiative taker to develop the carbon free form of energy – hydrogen.

Barrier due to prevailing practice

DCL is the one of the first in chlor-alkali industry in India to put up a H₂ based boiler. Thus, it has taken not only the financial risk of making investment in a technology which is not prevalent in India but also technological risk. The risk increases because any failure in the boiler has a direct effect on the productivity of caustic soda plant which requires steam from the boiler.

Thus the project activity is additional as it overcomes the above mentioned barriers and hence is not a business as usual scenario.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>> The emission baseline is the current emissions of the facility.

The current emissions have been calculated on the basis of coal used in the boiler in the last two years and then multiplying it by the fixed carbon content (found by lab analysis) to find out the quantity of elemental carbon being combusted.

The quantity of elemental carbon is further multiplied by a factor of 44/12 to get CO₂ emissions.

Quantity of Elemental Carbon =
(Average of last two year coal consumption) x (Fixed Carbon Content)

Amount of CO₂ emissions = 44/12 * Quantity of Elemental Carbon

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	Fixed Carbon Content of Coal
Data unit:	%
Description:	Gives the amount of fixed carbon in the coal being used in the plant
Source of data used:	Lab Analysis
Value applied:	34.84%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Would accurately determine the amount of fixed carbon in the coal which in turn would help in calculating the baseline emissions.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>> The project activity reduces carbon dioxide through displacement of more green house gas intensive fuel by less green house gas intensive fuel. The emission reduction ERY due to project activity during a given year y is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y) as per the formula given below:

$$ER_y = BE_y - PE_y - L_y$$

where

BE_y Baseline emissions (Please refer section B)

PE_y Project emissions; PE_y = 0 for project activity

L_y Emissions due to leakage; L_y = 0 for project activity, over crediting period (7 years)

Project Emissions

YEAR	March 2008 – Feb 2009	March 2009 – Feb 2010	March 2010 – Feb 2011	March 2011 – Feb 2012	March 2012 – Feb 2013	March 2013 – Feb 2014	March 2014 – Feb 2015
PROJECT EMISSIONS	4,387	4,387	4,387	4,387	4,387	4,387	4,387
LEAKAGE	0	0	0	0	0	0	0
SUM OF ABOVE	4,387	4,387	4,387	4,387	4,387	4,387	4,387

Baseline emissions during the 1st crediting period.

YEAR	March 2008 - Feb 2009	March 2009 - Feb 2010	March 2010 - Feb 2011	March 2011 - Feb 2012	March 2012 - Feb 2013	March 2013 - Feb 2014	March 2014 - Feb 2015
Baseline emissions (tCO ₂)	8,950	8,950	8,950	8,950	8,950	8,950	8,950

Therefore the anthropogenic emissions of the baseline are 31,941 tCO₂e for 7 years of crediting period.

B.6.4 Summary of the ex-ante estimation of emission reductions:

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>>

year	Estimation of annual emission reduction in tonnes of CO ₂ e
March 2008 – February 2009	4,563
March 2009 – February 2010	4,563
March 2010 – February 2011	4,563
March 2011 – February 2012	4,563
March 2012 – February 2013	4,563
March 2013 – February 2014	4,563
March 2014 – February 2015	4,563
Total Estimated Reductions (tCO ₂ e)	31,941
No. of Crediting Years	7
Annual Average of Estimated Reductions over the Crediting Period	4,563

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B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	Furnace Oil Consumption
Data unit:	Tonnes
Description:	Gives an accurate amount of Furnace Oil Consumed in the Boiler
Source of data to be used:	Plant Records
Value of data	2,000
Description of measurement methods and procedures to be applied:	The reading of the flow meter installed would be taken twice in a day.
QA/QC procedures to be applied:	<p>The project would employ Class I high accuracy monitoring and control equipment that will measure, record, report, monitor and control of various key parameters of the plant. All meters will be calibrated and sealed as per the industry practices at regular intervals.</p> <p>Training will be provided to the operators of the project for safe, efficient operations of the plant and handling emergency situations as well as for proper monitoring of the parameters related to ascertain project emissions.</p> <p>Hence, high quality is ensured with the above parameter.</p>
Any comment:	The metered data can be also cross checked by the accounts department which would provide an accurate amount of F.O. purchased.

Data / Parameter:	Hydrogen Consumption
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Data unit:	Nm3
Description:	Gives an accurate amount of Hydrogen Consumed in the Boiler
Source of data to be used:	Plant Records
Value of data	5,940,000
Description of measurement methods and procedures to be applied:	The reading of the flow meter installed would be taken twice in a day.
QA/QC procedures to be applied:	<p>The project would employ Class I high accuracy monitoring and control equipment that will measure, record, report, monitor and control of various key parameters of the plant. All meters will be calibrated and sealed as per the industry practices at regular intervals.</p> <p>Training will be provided to the operators of the project for safe, efficient operations of the plant and handling emergency situations as well as for proper monitoring of the parameters related to ascertain project emissions.</p> <p>Hence, high quality is ensured with the above parameter.</p>
Any comment:	The metered data can be also cross checked by the accounts department which would provide an accurate amount of F.O. purchased.

B.7.2 Description of the monitoring plan:

>> The authority and responsibility for monitoring, measurement, reporting and reviewing of the data rests with the Chief Project Officer. The identified person will be in charge of the GHG monitoring activities within project's functioning. The Chief Project Officer will be assisted by a team of experienced personnel for the project. The primary responsibility of the team is to measure, monitor, and record and report the information on various data items to the Chief Project Officer, in accordance with the applicable standards. Periodic calibration of various instruments used in the monitoring of GHG related data and record keeping of the same also will be the responsibility of the team.

The responsibility of review, storage and archiving of information in good condition lies with the Chief Project Officer. The Chief project Officer will undertake periodic verifications and onsite inspections to ensure the quality of the data collected by the team and initiate steps in case of any abnormal conditions. The Chief Project Officer will review the data collected by the team and suggest corrective actions wherever required. An internal audit report will be prepared for review and will be examined.

Also refer Annex IV

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> Date of completion of the application of the baseline and monitoring methodology:
01/07/2007

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Contact information of the person / entity responsible for the application of the baseline and monitoring methodology:

Gensol Consultants Pvt. Ltd.
H. No. – I -122, Army Flats,
Sector -4, Mansa Devi Complex,
Panchkula, Haryana – 134114

The entity is not a project participant.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>> 29/06/2007

C.1.2. Expected operational lifetime of the project activity:

>> 30 Years

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>> Date of Registration of the Project or Date of Commissioning of the Project (expected 1st March 2008) whichever is later

C.2.1.2. Length of the first crediting period:

>> 7 Years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> N.A.

C.2.2.2. Length:

>> N.A.

SECTION D. Environmental impacts

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D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>> The DNA of the host country, i.e. Ministry of Environment and Forest, Government of India, does not require Environmental Impact Assessment of small developmental projects within an industrial facility.

However the Project Participant confirm that the Project has positive impact on the environment as emissions are greatly reduced.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>> N.A.



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SECTION E. Stakeholders' comments

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E.1. Brief description how comments by local stakeholders have been invited and compiled:

>> Stakeholders for the project activity:

The local inhabitants, industries, municipal body were identified as the primary local stakeholders in the project activity.

The Stakeholders were invited by advertising in two newspaper dailies which clearly mentioned the date, time and venue of the CDM Stakeholders meeting.

Stakeholders' Involvement:

The project participant had involved all the stakeholders for setting up the Project and had convened a meeting to hold extensive discussions with the stakeholders. After an address by the Project Participant regarding the project, its benefits and the CDM activities, queries were invited from them which were answered to their satisfaction. The local population welcomed the project due to its inherent benefits of improving the environment.

An attendance of the stakeholders present in the meeting was carried out and also the stakeholders were asked to present their comments in a written format in one month time duration from the meeting.

Hence, the project passed through due public consultation process.

E.2. Summary of the comments received:

>> Positive feedback for the project in the form of comments were received from the local stakeholders. The stakeholders were unanimously in favor of the project and had the opinion that it would be advantageous for the region.

E.3. Report on how due account was taken of any comments received:

>> All comments received were archived and since there was no negative comment or any clarifications sought, the project passed through the local stakeholder consultation process.

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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY.**

Organization:	Durgapur Chemicals Ltd.
Street/P.O.Box:	-
Building:	-
City:	Durgapur
State/Region:	West Bengal
Postfix/ZIP:	713215
Country:	India
Telephone:	0343- 2555762
FAX:	0343- 2556667
E-Mail:	dcldgp@sancharnet.in
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Upadhayay
Middle Name:	K.
First Name:	A.
Department:	-
Mobile:	-
Direct FAX:	0343-2556667
Direct tel:	0343-2555762
Personal E-Mail:	-

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NO ODA HAS BEEN UTILISED IN THE PROJECT ACTIVITY

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Annex 3

BASELINE INFORMATION

Annex 4**MONITORING INFORMATION**

The entire process of monitoring has been streamlined and will be made available in the required format during the verification process and for subsequent useful purposes. F.O. Consumption, Hydrogen Consumption would be maintained.

The calibration of monitoring equipment would be done in a way to maintain best industry practices. F.O. and hydrogen consumption would be recorded twice daily and the same would be put up to the Chief Project Officer on a weekly basis. These records would be sent to Head Office for review by the Director and for corrective actions if necessary.

The Plant is equipped with flow meters for monitoring purpose. The flow meters shall be tested and calibrated utilizing a standard meter. The standard meter shall be calibrated once in a year at the approved laboratory of Govt. of India as per terms and conditions of supply. The tests of meters shall be conducted by authorised representatives. The flow meters shall not be interfered with, tested or checked except in the presence of representatives of company. If any of the meters is found to be registered inaccurately, the affected meter will be immediately replaced.

Monitoring Approach

The general monitoring principles are based on:

- Frequency
- Reliability
- Registration and reporting

As the emission reduction units from the project are determined by the number of units of F.O. and Hydrogen consumed it becomes important for the project to monitor the parameter.

Frequency of monitoring

The project parameter will install all metering and check metering facilities within the plant premises. The measurement will be recorded and monitored on a continuous basis.

Reliability

All measurement devices will be of microprocessor based with best accuracy and will be procured from reputed manufacturers. Since the reliability of the monitoring system is governed by the accuracy of the measurement system and the quality of the equipment to produce the result all power measuring instruments must be calibrated once a year for ensuring reliability of the system. All instruments carry tag plates, which indicate the date of calibration and the date of next calibration. Therefore the system ensures the final generation is highly reliable.

Reporting

Daily, weekly and monthly reports are prepared stating the generation.

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Annexure 5



R. V. BRIGGS & CO. PRIVATE LTD.

GOVT. RECOGNISED ANALYTICAL CHEMISTS

ESTABLISHED IN 1900

9, BENTINCK STREET, KOLKATA - 700 001

☎ : 2248 3661/2698/7803, FAX : 33 2248 0447

e-mail : nvbriggs@sly.com

Website : www.nvbriggs.com

TEST REPORT

SAMPLE SUBMITTED BY PARTY:

NO. C(S)/07-08/72	Date: April 23, 2007	Page 1 of 1
Issued to	M/s. DURGAPUR CHEMICALS LIMITED, Hahnemann Sarani, Durgapur – 713215, Dist. Burdwan.	
Your Ref. No.	DCL/CDM/6 dtd. 11.04.2007.	
Description of sample	Coal	
Mark on Sample	Nil	
Sample Received on	13.04.2007	
Test Completed on	20.04.2007	

TEST FINDINGS:

Analysis on Air Dried Basis:

PROXIMATE ANALYSIS:

Sl. No.	Test Parameters	Test Method	Unit	Results
01.	Ash	IS : 1350 (Part-I)-1984, Reaff.2001	% (w/w)	35.44
02.	Moisture	IS : 1350 (Part-I)-1984, Reaff.2001	% (w/w)	3.50
03.	Volatile Matter	IS : 1350 (Part-I)-1984, Reaff.2001	% (w/w)	26.22
04.	Fixed Carbon	IS : 1350 (Part-I)-1984, Reaff.2001	% (w/w)	34.84 100.00
05.	Gross Calorific Value (By Bomb Calorimeter)	IS : 1350 (Part-II)-1970, Reaff.2000	kcal/kg	4475

(K. P. DE)
Technical Director
Authorized Signatory

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★ The test report shall not be reproduced, except in full, without written approval of the Company.
★ Results relate only to the parameters tested.