BIOMASS BASED COGENERATION PROJECT AT NECTAR LIFE SCIENCES LTD.

By M/s Nectar Lifesciences Limited

Project Title	Biomass Based Cogeneration Project at Nectar Life Sciences Ltd.
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1 PROJECT DETAILS

1.1 Summary Description of Project

Nectar Lifesciences Ltd (NecLife) is a 200 million US$ integrated pharmaceutical organization, offering comprehensive range of Cephalosporin Active Pharmaceutical Ingredients and Finished Dosage Forms. NecLife is engaged in the development and manufacture of quality intermediates, bulk actives and are one of the largest manufacturers of cephalosporin range of products and delivering innovative and affordable products to domestic as well as international markets. NecLife has tactically positioned itself in the global pharmaceutical industry. It has developed sustainable production systems to manufacture highest quality pharmaceutical products meeting diverse requirements of its customer base in over 45 countries worldwide.

The project activity at Neclife involved installation of a new biomass based cogeneration system at the pharmaceutical unit of Nectar Lifesciences Limited (NecLife). The cogeneration system included a Triveni make 6 MW single extraction cum condensing turbine generator and a Thermax make 40 TPH capacity AFBC boiler with a pressure rating of 67 kg/cm2 and temperature 490 ℃. However the extraction from the turbine would be 20 TPH but if the process requirement for steam is like 25 TPH then the electricity generation capacity would be decreased accordingly.

The aim of the project activity was the installation of a biomass fired cogeneration plant to meet the demand of power in Unit 1 complex and Unit 2 complex and process steam for the manufacturing process of Unit 2 complex of the pharmaceutical plant. The project activity was proposed considering the thermal and electrical energy required for the proposed menthol plant, menthol crystal plant, menthol distillation plant, sterile plant and the expansion of solvent recovery plant. The project activity is catering to existing electricity requirement of unit 1 complex and steam and electricity requirement of unit 2 complex.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 1. Energy Industries (Renewable/Non-Renewable Sources)

Type: I – Renewable Energy Projects

Category: C Thermal Energy production with or without electricity.

1.3 Project Proponent

Contact information of project proponent and credit owner is shown as below:

Organization:	Nectar Lifesciences Ltd.
Village:	Saidpur
Tehsil:	Dera Bassi
District:	Mohali

State/Region:	Punjab
Postfix/ZIP:	
Country:	India
Telephone:	+91-1762-308000/01
FAX:	+91-1762-281187
E-Mail:	sales@neclife.com
URL:	www.neclife.com
Represented by:	
Title:	Senior Vice President
Salutation:	Mr.
Last Name:	Singh
Middle Name:	P.
First Name:	H.
Department:	
Mobile:	+91-9447768858
Direct Fax:	
Direct tel:	
Personal E-Mail:	hpsingh@neclife.com

Project proponent is fully responsible for the development of the project and will credit all VCUs.

1.4 Other Entities Involved in the Project

No other entities are involved in the project.

1.5 Project Start Date

Start date of the project is 27-May-2007.

1.6 Project Crediting Period

Start Date of Crediting Period: 27/05/2007

End Date of Crediting Period: 26/05/2017

Choice of Crediting Period: Fixed (10 Years)

1.7 Project Location

Nectar Lifesciences Ltd.

Village: Saidpura

Tehsil: Derabassi

District: Mohali

The Project activity is located near NH-21 (Ambala- Mandi Highway) in Eastern Punjab. The major town near the project activity is Chandigarh which is only 25 km away from the site.

The following table gives an idea about geographical location of project activity.

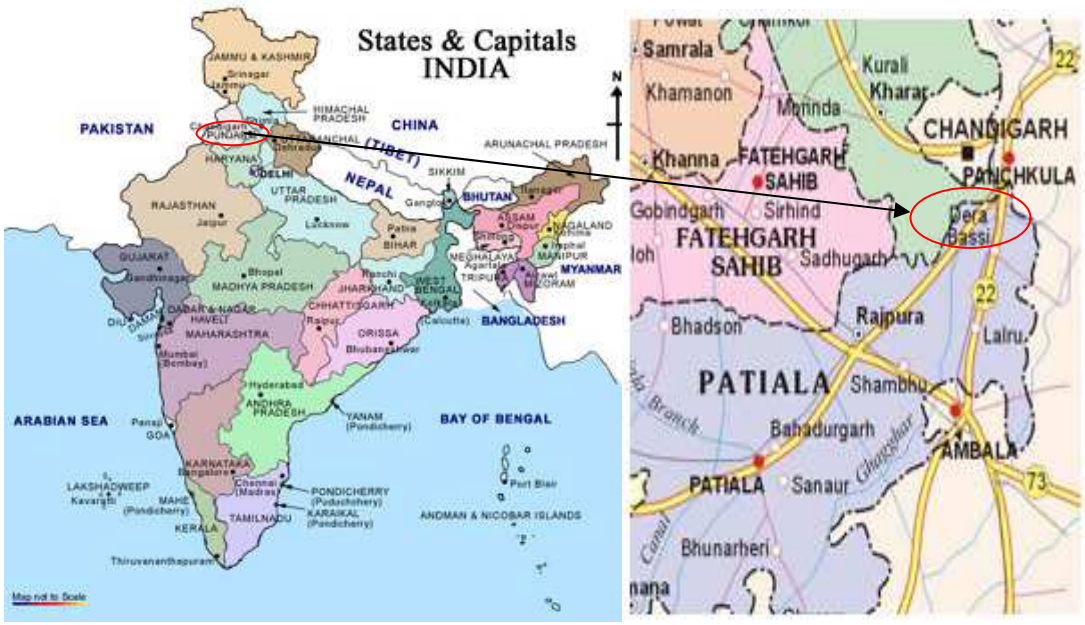
Table 1A: Longitude and Latitude (Unit I Complex)

Longitude	76°52'41'' (East)	76.8780 (East)
Latitude	30°35'07'' (North)	30.5852 (North)

Table 1B: Longitude and Latitude (Unit II Complex)

Longitude	76°52'51'' (East)	76.8808 (East)
Latitude	30°35'10'' (North)	30.5861 (North)

The following figure shows the location of the project activity:



Map showing the project site

The following are the ways of accessing to the project site:

Road : National Highway 21 (Ambala- Mandi Highway)

Rail : Chandigarh Railway Station

Airport : Chandigarh Airport

1.8 Title and Reference of Methodology

Title: Thermal energy production with or without electricity.

Reference: AMS-I C, Version – 15

http://cdm.unfccc.int/methodologies/DB/6EL4AG49US2S1DNH55Y4S7GDQFA2JF

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

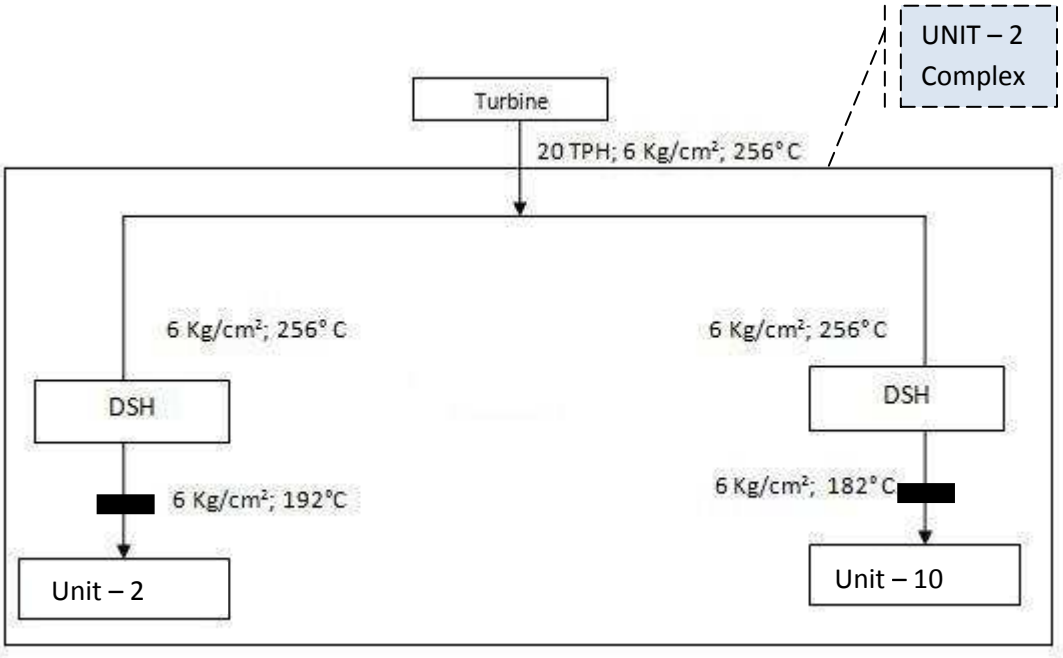
The project activity is in operation since 27/05/2007. The project is operating in successful manner.

As project activity is cogeneration activity it includes both steam generation and electricity generation.

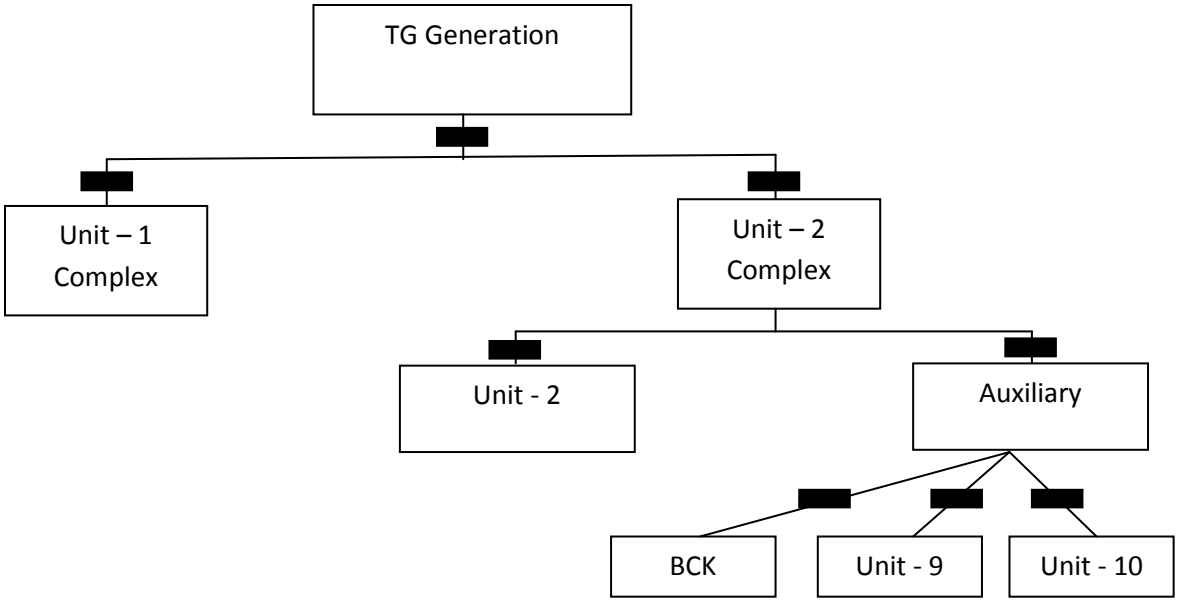
Steam

Final steam is supplied to Unit – 2 (SRP Plant, API Plant) and Unit – 10 (Menthol Distillation). Steam is extracted from the turbine and supplied to Unit – 2 and Unit – 10 passing through Desuperheating Systems (DSH). DSH reduces the temperature of superheated steam by injecting water into high velocity steam.

DSH reduces the temperature and increases the quantity of the steam therefore extracted steam goes higher up to 24 TPH for process heat. There are two DSH, one is between turbine and Unit- 2 and another is between turbine and Unit – 10. The pressure of the steam supplied to Unit- 2 and Unit – 10 is same, however temperature is slightly different. Following flow diagram of the extracted steam makes it clearer:



The metering system for electricity is explained by following flowchart:



As shown in the flowchart, unit – 1 complex feeder[1] , unit – 2 complex feeder and auxiliary feeder are connected to total generation feeder and further BCK feeder and unit -10 feeder are connected to auxiliary feeder. The electricity from auxiliary feeder is being dispatched to BCK unit, unit 10 and for meeting the net auxiliary requirement of co-generation plant. Moreover, Unit -9 was not operated in the monitoring period of 01/01/2011 to 31/12/2011. Net auxiliary consumption of co-generation plant can be calculated by subtracting the electric units consumed by BCK unit and unit 10 from the units of auxiliary meter as shown below.

Net Auxiliary Consumption = Reading of Auxiliary meter – (BCK meter + Unit 10 meter + Unit 9 meter)

At the time of registration it was assumed that plant would operate for an average of 330 days but on actual for the year 2011 the plant was operated for 339 days. Detailed information is given in section 4 of this report.

There are no events that may impact the GHG emission reductions or removals and monitoring during the current crediting period.

2.2 Project Description Deviations

There are no deviations from the monitoring plan in the project description.

2.3 Grouped Project

The project is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	η
Data unit:	%
Description:	Efficiency of the plant using fossil fuel that would have been used in the absence of the project activity
Source of data:	Being conservative taken 100% as per methodology AMS IC.
Value applied:	100%
Purpose of the data:	This data was used for the calculation of baseline emissions.
Any comment:	-

[1] All the feeders are getting metered.

Data Unit / Parameter:	EF_{coal}
Data unit:	tCO_2e/TJ
Description:	Emission factor of coal
Source of data:	IPCC default values
Value applied:	96.1
Purpose of the data:	This data was used for the calculation of baseline emissions.
Any comment:	-

Data Unit / Parameter:	EF_D
Data unit:	tCO_2/TJ
Description:	Emission Factor of Diesel
Source of data:	IPCC default value
Value applied:	74.1
Purpose of the data:	This data was used for the calculation of Project emission and Leakage emission.
Any comment:	-

Data Unit / Parameter:	NCV_{Diesel}
Data unit:	TJ/Tonne
Description:	Net Calorific Value of Diesel
Source of data:	IPCC default value
Value applied:	0.043
Purpose of the data:	This data was used for the calculation of Project emission and Leakage emission.
Any comment:	-

Data Unit / Parameter:	TL
Data unit:	Tonnes
Description:	Load of biomass on each truck.
Source of data:	It was estimated as the capacity of truck which carries biomass.
Value applied:	8

Purpose of the data:	This data was used for the calculation of Leakage emission.
Any comment:	-

Data Unit / Parameter:	M
Data unit:	KM/Lit
Description:	Average mileage of each truck
Source of data:	A normalized and conservative fixed value was used.
Value applied:	4
Purpose of the data:	This data was used for the calculation of Leakage emission.
Any comment:	-

Data Unit / Parameter:	D
Data unit:	KG/Lit
Description:	Density of Diesel
Source of data:	A normalized and conservative fixed value was used.
Value applied:	0.87
Purpose of the data:	This data was used for the calculation of Leakage emission.
Any comment:	-

3.2 Data and Parameters Monitored

Data Unit / Parameter:	EG_y
Data unit:	KWh
Description:	Gross electricity generated from co-generation plant.
Source of data:	Electricity log book.
Description of measurement methods and procedures to be applied:	Measured using energy meter and reading is taken daily.
Frequency of monitoring/recording:	Daily
Value monitored:	42,182,600

Monitoring equipment:	Sr. No.: 06744912 Make: L&T Accuracy: +/- 0.5% Data type: Measured Frequency: Daily Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly measured from gross energy meter.
Any comment:	-

Data Unit / Parameter:	$EC_{Net\ Aux}$
Data unit:	KWh
Description:	Net electricity consumed by the co-generation plant.
Source of data:	Calculated on actual basis as per the method described in “Calculation Method”.
Description of measurement methods and procedures to be applied:	Value has been calculated on actual basis with the help of the various energy meters installed at the co-generation plant as per the formula mentioned below.
Frequency of monitoring/recording:	Daily
Value monitored:	7,650,416
Monitoring equipment:	Data type: Calculated Archiving policy: Paper & Electronic

	Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	Calculated data is based on the calibrated energy meter.
Calculation method:	The value has been calculated as per the following formula: $EC_{Net\ Aux} = EC_{Aux.} – (EC_{BCK} + EC_{Unit\ 10})$
Any comment:	-

Data Unit / Parameter:	EC_{Aux}
Data unit:	KWh
Description:	This meter is connected to Auxiliary Feeder which supplies electricity to BCK Unit, Unit - 10 and Net Auxiliary consumed by the Co-generation Plant.
Source of data:	Electricity log book.
Description of measurement methods and procedures to be applied:	Measured using an energy meter and reading is taken daily.
Frequency of monitoring/recording:	Daily
Value monitored:	13,580,300
Monitoring equipment:	Sr. No.: UPB09919 Make: Secure Accuracy: +/- 0.5% Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from Auxiliary Feeder energy meter.

Any comment:	-

Data Unit / Parameter:	EC_{BCK}
Data unit:	KWh
Description:	Electricity supplied to BCK unit.
Source of data:	Electricity log book.
Description of measurement methods and procedures to be applied:	Measured using an energy meter and reading is taken daily.
Frequency of monitoring/recording:	Daily
Value monitored:	1,374,698
Monitoring equipment:	Sr. No.: 07882301 Make: L&T Accuracy: +/- 1% Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from BCK energy meter.
Any comment:	-

Data Unit / Parameter:	$EC_{Unit-10}$
Data unit:	KWh
Description:	Electricity supplied to Unit-10.
Source of data:	Electricity log book.
Description of measurement methods and	Measured using an energy meter and reading is

procedures to be applied:	taken daily.
Frequency of monitoring/recording:	Daily
Value monitored:	4,555,186
Monitoring equipment:	Sr. No.: 07884932 Make: L&T Accuracy: +/- 1% Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from Unit-10 energy meter.
Any comment:	-

Data Unit / Parameter:	EG_{Net}
Data unit:	KWh
Description:	Net electricity supplied from the cogeneration plant.
Source of data:	Electricity log book.
Description of measurement methods and procedures to be applied:	Data was calculated by difference of gross electricity generation and net auxiliary electricity consumption by the cogeneration plant.
Frequency of monitoring/recording:	Daily
Value monitored:	34,532,184
Monitoring equipment:	Data type: Calculated Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant)

QA/QC procedures to be applied:	The meter for measuring EG_y and EG_{Aux} is calibrated annually by the accredited NABL approved independent third party. The consistency of metered net electricity generation should be crosschecked with factory receipts / records
Calculation method:	The data was calculated as following method: $EG_{Net} = EG_y – EC_{Net\ Aux}$
Any comment:	-

Data Unit / Parameter:	Q_{Unit-2}
Data unit:	Tonnes
Description:	Quantity of Steam supplied to unit-2.
Source of data:	Plant log book
Description of measurement methods and procedures to be applied:	Measured using a totalizer and reading is taken from the DCS of Cogeneration plant.
Frequency of monitoring/recording:	Daily
Value monitored:	157,909
Monitoring equipment:	Sr. No.: 91G216756 Make: Yokogawa Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from the DCS of the Co-generation plant.
Any comment:	-

Data Unit / Parameter:	$Q_{Unit-10}$
Data unit:	Tonnes
Description:	Quantity of Steam supplied to unit-10.
Source of data:	Plant log book.
Description of measurement methods and procedures to be applied:	Measured using a totalizer and reading is taken from the DCS of the Co-generation plant.
Frequency of monitoring/recording:	Daily
Value monitored:	43,392
Monitoring equipment:	Sr. No.: 0700043 Make: ABB Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from the DCS of the Co-generation plant.
Any comment:	-

Data Unit / Parameter:	T_{Unit-2}
Data unit:	℃
Description:	Temperature of the Steam supplied to unit-2.
Source of data:	Plant log book.
Description of measurement methods and procedures to be applied:	Measured using a temperature gauge and reading is taken from the DCS of the Co-generation plant.
Frequency of monitoring/recording:	Hourly

Value monitored:	212.67
Monitoring equipment:	Sr. No.: DSR 3219 Make: Actuasys Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from the DCS of the Co-generation Plant.
Any comment:	-

Data Unit / Parameter:	$T_{Unit-10}$
Data unit:	℃
Description:	Temperature of the Steam supplied to unit-10.
Source of data:	Plant log book.
Description of measurement methods and procedures to be applied:	Measured using a temperature gauge and reading is taken from the DCS of the Co-generation plant.
Frequency of monitoring/recording:	Hourly
Value monitored:	165.07
Monitoring equipment:	Sr. No.: TE 1100 Make; Actuasys Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually

QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from DCS of the Co-generation Plant.
Any comment:	-

Data Unit / Parameter:	P
Data unit:	KG/cm^2
Description:	Pressure of Steam supplied to unit-2 and unit-10.
Source of data:	Plant log book.
Description of measurement methods and procedures to be applied:	Measured using a pressure gauge and reading is taken from DCS of the Co-generation plant.
Frequency of monitoring/recording:	Daily
Value monitored:	5.63
Monitoring equipment:	Sr. No.: 91F935651 Make: Yokogawa Data type: Measured Archiving policy: Paper & Electronic Responsibility: Manager (Power Plant) Calibration: Calibrated annually
QA/QC procedures to be applied:	The meter is calibrated annually by the accredited NABL approved independent third party. Previous Calibration date: 21-04-2010 to 20-04-2011 Current Calibration date: 21-04-2011 to 20-04-2012
Calculation method:	The data was directly recorded from the DCS of the Co-generation plant.
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Rice Husk used.
Source of data:	Daily log Sheets.
Description of measurement methods and procedures to be applied:	Quantity of rice husk used in the boiler was calculated by number of times the Hopper is filled in a day.
Frequency of monitoring/recording:	Daily
Value monitored:	76,352
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The values shown here can be cross checked from factory records.
Calculation method:	The total consumption of daily rice husk is calculated from number of times hopper is filled in a day multiplied by the quantity of rice husk filled in a hopper in singe time. For rice husk quantity, the volume of hopper is multiplied with the density of the fuel. This is estimated figure at operation level. However for conservative estimation of emission reductions, the purchase quantity of biomass is used.
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Paddy Straw used.
Source of data:	No consumption of paddy straw in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of paddy straw in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0

Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Mustard husk used.
Source of data:	No consumption of mustard husk in current monitoring period
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of mustard husk in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of barely used.
Source of data:	No consumption of barely in current monitoring period
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of barely in current monitoring period

Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Sugarcane used.
Source of data:	No consumption of Sugarcane trash in current monitoring period
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Sugarcane trash in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of cotton sticks used
Source of data:	No consumption of cotton sticks in current monitoring period.

Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of cotton sticks in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-.
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Bajra Stalk used.
Source of data:	No consumption of Bajra stalk in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Bajra stalk in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Sunflower stalk used

Source of data:	No consumption of Sunflower stalk in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Sunflower stalk in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Moong Straw used.
Source of data:	No consumption of Moong straw in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Moong straw in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y

Data unit:	Tonnes
Description:	Quantity of Arhar stick used
Source of data:	No consumption of Arhar stick in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Arhar stick in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Saw chips used
Source of data:	No consumption of Saw chips in current monitoring period.
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Saw chips in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	Quantity of Saw dust used.
Source of data:	Daily log sheets.
Description of measurement methods and procedures to be applied:	Quantity of Saw dust used in the boiler was calculated by number of times the Hopper is filled in a day.
Frequency of monitoring/recording:	Daily
Value monitored:	10,719
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The values shown here can be cross checked from factory records.
Calculation method:	The total consumption of daily saw dust is calculated from number of times hopper is filled in a day multiplied by the quantity of saw dust filled in a hopper in singe time. For saw dust quantity, the volume of hopper is multiplied with the density of the fuel. This is estimated figure at operation level. However for conservative estimation of emission reductions, the purchase quantity of biomass is used.
Any comment:	-

Data Unit / Parameter:	Q_y
Data unit:	Tonnes
Description:	No consumption of Bushes (sarkanda) in current monitoring period.
Source of data:	-
Description of measurement methods and procedures to be applied:	Not required, since there is no consumption of Bushes (sarkanda) in current monitoring period.
Frequency of monitoring/recording:	Daily
Value monitored:	0

Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	$GCV_{Rice\ Husk}$
Data unit:	Kcal/Kg
Description:	Gross Calorific Value of the fuel (Biomass).
Source of data:	Plant log books
Description of measurement methods and procedures to be applied:	GCV of the fuels has been calculated by Bomb Calorimeter present in the Lab at the project site.
Frequency of monitoring/recording:	Daily
Value monitored:	3414.92
Monitoring equipment:	Data type: Measured Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The Bomb calorimeter is calibrated annually by the accredited NABL approved independent third party. Latest calibration date: 31-01-2011 Next Calibration due on: 31-01-2012
Calculation method:	The value of GCV is calculated from Bomb calorimeter maintained at plant.
Any comment:	-

Data Unit / Parameter:	$GCV_{Saw\ Dust}$
Data unit:	Kcal/Kg
Description:	Gross Calorific Value of the fuel (Biomass).
Source of data:	Plant log books
Description of measurement methods and	GCV of the fuels has been calculated by Bomb

procedures to be applied:	Calorimeter present in the Lab at the project site.
Frequency of monitoring/recording:	Daily
Value monitored:	3847.67
Monitoring equipment:	Data type: Measured Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The Bomb calorimeter is calibrated annually by the accredited NABL approved independent third party. Latest calibration date: 31-01-2011 Next Calibration due on: 31-01-2012
Calculation method:	The value of GCV is calculated from Bomb calorimeter maintained at plant.
Any comment:	-

Data Unit / Parameter:	MOISTURE $_{\text{Rice Husk}}$
Data unit:	%
Description:	It represent the moisture content in the rice husk which resultant to decrease in calorific value.
Source of data:	Plant log books
Description of measurement methods and procedures to be applied:	Moisture of the fuel has been calculated using Dry Oven. A fixed quantity of fuel is weighted and then it is dried in the oven to remove the moisture. Dried fuel is weighted again and the difference between the weight represents the moisture in the fuel.
Frequency of monitoring/recording:	Daily
Value monitored:	7.38
Monitoring equipment:	Data type: Measured Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The value can be cross checked from the plant records.
Calculation method:	Moisture% = (Weight $_{\text{Before Drying}}$ –Weight $_{\text{After Drying}}$)/ Weight $_{\text{Before Drying}}$
Any comment:	-

Data Unit / Parameter:	MOISTURE $_{Saw\ Dust}$
Data unit:	%
Description:	It represent the moisture content in the rice husk which resultant to decrease in calorific value.
Source of data:	Plant log books
Description of measurement methods and procedures to be applied:	Moisture of the fuel has been calculated using Dry Oven. A fixed quantity of fuel is weighted and then it is dried in the oven to remove the moisture. Dried fuel is weighted again and the difference between the weight represents the moisture in the fuel.
Frequency of monitoring/recording:	Daily
Value monitored:	13.02
Monitoring equipment:	Data type: Measured Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	The value can be cross checked by from the plant records.
Calculation method:	Moisture% = (Weight $_{Before\ Drying}$ –Weight $_{After\ Drying}$)/ Weight $_{Before\ Drying}$
Any comment:	-

Data Unit / Parameter:	D_T
Data unit:	KM
Description:	Distance travelled by each truck carrying biomass.
Source of data:	Nectar Lifesciences Limited factory log book in which records of the suppliers detail and declaration from the supplier stating the distance between initial point and dumping station are being maintained.
Description of measurement methods and procedures to be applied:	The maximum round trip distance is 120 km. Being conservative fixed value of 150 km is used.
Frequency of monitoring/recording:	Fixed conservative value is used.
Value monitored:	150

Monitoring equipment:	Fixed conservative value is used.
QA/QC procedures to be applied:	Declaration from all the husk providers is being submitted for this purpose.
Calculation method:	Fixed value is used.
Any comment:	-

Data Unit / Parameter:	Q_D
Data unit:	Lit / Annum
Description:	Quantity of diesel consumed in tractors used for levelizing the piles/heaps of biomass.
Source of data:	This value has been referred from the diesel purchase log book at Nectar Lifesciences Limited factory
Description of measurement methods and procedures to be applied:	The value has been taken from the data recorded at the project site.
Frequency of monitoring/recording:	Monthly
Value monitored:	34,145
Monitoring equipment:	Data type: Measured Frequency: Monthly Archiving policy: Electronic Responsibility: Manager (Power Plant)
QA/QC procedures to be applied:	
Calculation method:	This value has been referred from the diesel purchase log book at Nectar Lifesciences Limited factory
Any comment:	-

3.3 Description of the Monitoring Plan

- **Monitoring Plan**

Nectar Lifesciences Ltd is responsible for the implementation of the monitoring plan.

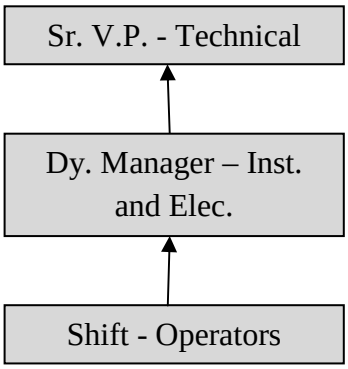
There are total 6 separate energy meters to measure the power produced and consumed at various units in the project activity. The electrical energy monitoring is required as the calculation of emission reduction is based on the electricity displaced from the grid. The net auxiliary energy consumed by power plant is calculated as described in section 3.2.

The steam input is also required to be monitored, in order to calculate the emission reductions due to thermal energy displacement. The flow rate, pressure and temperature of steam supplied to processes of Unit – 2 & Unit – 10 are also monitored by steam flow meter, pressure gauge, totalizer, temperature gauge & RTD sensors. All instruments are calibrated annually so that the accuracy of the measurement can be ensured.

All monitoring parameter according to the monitoring plan are being recorded as specified in section 3.2 above. Since the shift wise data logging is being carried out along with daily reporting, the uncertainity level of the monitored data used for calculating emission reduction is low.

- **Organizational Structure, responsibilities & competencies**

Nectar Lifesciences Ltd would ensure accuracy of the measurement system by adopting the following operational & management structure.



Sr. V.P. – Technical: is responsible for overall VCS project activity.

Dy. Manager – Inst. and Elec.: is responsible for maintenance all records pertaining to net electricity generation and net steam used for the process, calibration of meters & monitoring. Dy. Manager is qualified technical person with more than 5 years of experience in relevant field.

Shift - Operators: is responsible for monitoring of the eight hourly data recording of the relevant parameters mentioned in the monitoring plan.

- **Methods for generating, recording, storing, aggregating, collating and reporting data on monitored parameters.**

Data generation for the monitored parameters is on actual readings shown by the various meters. The meters are calibrated annually with NABL accredited lab so that the accuracy of the data can be assured.

Recording of data is done on hourly basis from the steam flow and temperature and pressure in the log books and electricity is measured every eight hourly.

Data is stored in plant log books.

Aggregation and collection of data is done by engineers at the power plant on the daily basis in the excel sheet. Aggregation and collation of data is done in the excel sheet from the plant log books.

- **Procedure for handling internal audits and non conformities**

In order to ensure the accurate reporting of the monitored parameters and to avoid any kind of disparity in the reported data, the following quality assurance measures have been adopted.

Shift operator is assigned with the responsibility of recording of parameters as per the monitoring plan. The shift engineer records / checks the observations in the plant log books on a daily basis and forwards the same in the soft form and hard form to the Dy. Manager. The Dy. Manager review the data received and compiles and generates a daily report and sends it to the Sr. V.P. (Technical) for his perusal.

Emergency Preparedness Plan

In order to avoid any kind of discrepancies in the monitoring procedures the following emergency preparedness plan has been adopted at the plant.

- The spare meter duly calibrated is available at the plant for replacement in case of failure of any of the installed meters.
- In orders to monitor the parameters with the acceptable accuracy, all the meters are calibrated annually.

The above mentioned emergency preparedness plan has been in place at the plant site since beginning of the monitoring period.

No failure of any meter was reported during the current monitoring period.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The actual annual emission reductions are calculated considering 6 MW of electricity and 24 TPH of steam extraction.

For electricity and thermal energy (steam/heat) produced in a cogeneration unit, using fossil fuel, the following equation shall be used:

$$BE_{cogen,CO2,y} = [(EG_{PJ,thermal,y} + EG_{PJ,electrical,y} * 3.6)/\eta_{BL,cogen}] * EF_{FF,CO2}$$

Where:

$BE_{cogen,CO2,y}$	The baseline emissions from electricity and steam displaced by the project activity during the year y; tCO_2

$EG_{PJ,thermal,y}$	The net quantity of thermal energy supplied by the project activity during the year y; TJ
$EG_{PJ,electrical,y}$	The amount of electricity supplied by the project activity during the year y; GWh
3.6	Conversion factor; TJ/GWh
$\eta_{BL,cogen}$	The total efficiency (including both thermal and electrical) of the cogeneration plant using fossil fuel that would have been used in the absence of the project activity. Efficiency should be calculated as the total energy produced (electricity and steam/heat extracted) divided by thermal energy of the fuel used
$EF_{FF,CO2}$	The CO2 emission factor of the fossil fuel that would have been used in the baseline cogeneration plant; tCO2 / TJ obtained from reliable local or national data if available, otherwise IPCC default emission factors are used

Summary of data related to electricity generation and steam generation (Unit – 2 & Unit – 10 separately) is provided in Section - 5 at the end of this report. All the supporting related to data has been provided for cross verification.

Calculation for the month of January – 2011 is shown below:

$BE_{cogen, CO2, Jan-2010}$ = [(40.37 TJ + 3 * 3.6) /100%] *96.1

= 4918 tCO_2e

Being conservative, efficiency of the plant has been considered 100%.

Similarly the baseline emissions from the project activity have been calculated for subsequent months.

Month	EG(PJ, thermal)	EG(PJ, Electrical)	Conversion Factor	□(BL, Cogen)	EF(Coal, CO2)	BE(Cogen, CO2, 2011)
	TJ	GWh	TJ/GWh	100%	tCO2/TJ	tCO2
	a	b	c	d	e	{(a+b*c)/d}*e
Jan – 11	40.37	3	3.6	100%	96.1	4918
Feb – 11	37.42	2.89	3.6	100%	96.1	4597
Mar – 11	42.91	3.24	3.6	100%	96.1	5245
Apr – 11	37.18	2.88	3.6	100%	96.1	4568
May – 11	37.94	2.76	3.6	100%	96.1	4601

Jun – 11	35.59	2.66	3.6	100%	96.1	4339
Jul – 11	44.82	3.19	3.6	100%	96.1	5412
Aug – 11	42.82	3.12	3.6	100%	96.1	5194
Sep – 11	38.11	2.70	3.6	100%	96.1	4598
Oct – 11	37.28	2.73	3.6	100%	96.1	4526
Nov - 11	30.68	2.30	3.6	100%	96.1	3744
Dec – 11	43.61	3.06	3.6	100%	96.1	5250
Total	**468.74**	34.53				**56992**

Baseline emissions for project activity calculated ex ante in registered PD dated 20th Oct 2010 is 54878 tCO2 , but for the year 2011 the baseline emission are increased up to 56992 tCO_2 which is 3.85 % higher.

The no. of baseline emissions increased due to increase in the no. of working days. At the time of registration it was assumed that plant would operate on an average 330 days but on actual for the year 2011 the plant was operated for 339 days (Shut down details are given below).

Shut-Down Details

Month	Date	Hours
Jan	1	14
Feb	23	3
March	1	24
	2	18
April	2	24
	3	24
	4	24
	8	8
May	1	15
	2	24
	3	15
	27	4
	28	24
	29	19
June	1	3
	3	2
	4	24
	5	24
	6	1
	25	24
	26	24
August	29	2

Sep	12	6
	16	12
	25	2
	27	24
Oct	12	2
	15	6
	30	24
	31	22
Nov	8	19
	9	16
	11	14
	14	1
	15	24
	16	22
	17	24
	18	24
	19	24
	20	2
Total Shutdown Hours		612
Total Shutdown Days		26
Total Working Days		339 (365-26)

4.2 Project Emissions

The project emission in the project activity is accounted from the quantity of diesel used in the tractors for levelizing the piles/heaps of biomass. Data for diesel consumption is taken from the plant records.

As described in section 4.3 of the PD, the algorithm used in the calculation of project emission is explained below and the complete calculation is being submitted to the DOE.

Algorithm for the calculation of Project Emission:

$P.E. = (Q_D * D / 1000) * NCV_{Diesel} * EF_D$

Where:

P.E. Project emission from the project activity; tCO_2e

Q_D Quantity of diesel consumed in tractors used for levelizing the piles/heaps of biomass; Liters

D Density of diesel; Kg/Liter

NCV_{Diesel} Net Calorific Value of diesel; TJ/Tonnes

EF_D Emission factor of diesel; tCO_2e/TJ

Values of the above variables are taken from the monitoring plan.

For the month of January 2011, project emissions from the project activity are calculated as:

P.E. = (2760 * 0.87/1000) * 0.04303 * 74.1

= 7.66 tCO_2e

The project emission on the account of tractor used for levelizing the piles of biomass for subsequent months is tabulated below:

Month	Q_D	$Density_{Diesel}$	Conversion	NCV_{Diesel}	EF_{Diesel}	PE_{2011}	PE_{2011}
	Litres	Kg/Litre	Tonnes/Kg	TJ/Tonnes	t_{CO2} / *TJ*	t_{CO2}	t_{CO2}
	a	B	c	d	*E*	*(a*b/c)*d*e*	*Roundup*
Jan-10	2760	0.87	1000	0.04303	74.1	7.66	8.00
Feb-10	2780	0.87	1000	0.04303	74.1	7.71	8.00
Mar-10	2870	0.87	1000	0.04303	74.1	7.96	8.00
Apr-10	2880	0.87	1000	0.04303	74.1	7.99	8.00
May-10	2825	0.87	1000	0.04303	74.1	7.84	8.00
Jun-10	2870	0.87	1000	0.04303	74.1	7.96	8.00
Jul-10	2930	0.87	1000	0.04303	74.1	8.13	9.00
Aug-10	2880	0.87	1000	0.04303	74.1	7.99	8.00
Sep-10	2840	0.87	1000	0.04303	74.1	7.88	8.00
Oct-10	2820	0.87	1000	0.04303	74.1	7.82	8.00
Nov-10	2840	0.87	1000	0.04303	74.1	7.88	8.00
Dec-10	2850	0.87	1000	0.04303	74.1	7.91	8.00
Total	**34145**					**94.72**	97

4.3 Leakage

The leakage for the project activity has been calculated on the account of biomass transported. For the month of January 2011, the leakage calculation has been shown as below:

Total biomass transported in the project boundary:

Fuel	Kg	Tons
Bazra Fodder	0	0
Arhar Husk	0	0
Moongi Husk	0	0
Musterd Husk	0	0
Cotton Stick	0	0
Sarkanda	0	0
Sawdust	1490522000	1490.522

Sunflower	0	0
Rice Husk	6011172000	6011.17
Total	**7501694000**	**7502**

Leakage Estimation			
Total biomass Requirements	7502	Tonnes per month	a=Taken from plants records
Truck Capaity	8	Tonnes	b=Fixed Ex-Ante Values
Max. Return distance between project site and collection centres	150	Km	c=Conservative value choosen
Total Number of Trips	938		d=a/b
Consumption of diesel per trips (to and fro)(@4km/Litre)	37.5	Litre	e=Fixed Ex-Ante Values
Total Diesel Consumption	35164.18983	Litre	f=d*e
Density of Diesel	0.87	Kg/Litre	g=Fixed Ex-Ante Values
Mass of Diesel used	30.59284515	Tonnes	h=f*g/1000
Calorific value of Diesel	0.04303	TJ/Tonnes	i=Fixed Ex-Ante Values
Emission Factor for Diesel	74.1	tCO2/TJ	j=Fixed Ex-Ante Values
Emission due to transportation of biomass	97.55	tCO2/Month	k=h*i*j

Leakage emissions for the subsequent months have been tabulated below:

Jan	97.55	tCO2/Month
Feb	90.76	tCO2/Month
Mar	100.36	tCO2/Month
Apr	90.31	tCO2/Month
May	88.53	tCO2/Month
Jun	86.98	tCO2/Month
Jul	103.24	tCO2/Month
Aug	99.82	tCO2/Month
Sep	89.87	tCO2/Month
Oct	101.30	tCO2/Month
Nov	80.06	tCO2/Month
Dec	103.43	tCO2/Month
Total (Round Up)	**1133**	**tCO2/Month**

4.4 Summary of GHG Emission Reductions and Removals

The net GHG emission reductions from the project activity are calculated as:

ER_{2011} (tCO2e) = BE_{2011} (tCO_2e) – PE_{2011} (tCO_2e) – L_{2011} (tCO_2e)

For the month of January, the calculation has been shown as below:

$ER_{Jan\text{-}2011}$ = 4918 – 8 – 97.55

= 4812 tCO_2e

Emission Reductions for the subsequent months have been tabulated below:

Month	BE (2011) tCO2e	PE (2011) tCO2e	L (2011) tCO2e	ER (2011) tCO2e
	A	b	c	d=a-b-c
Jan	4918	8	97.55	4812
Feb	4597	8	90.76	4498
Mar	5245	8	100.36	5136
Apr	4568	8	90.31	4470
May	4601	8	88.53	4505
Jun	4339	8	86.98	4244
Jul	5412	9	103.24	5300
Aug	5194	8	99.82	5087
Sep	4598	8	89.87	4500
Oct	4526	8	101.30	4417
Nov	3744	8	80.06	3656
Dec	5250	8	103.43	5139
Total	**56992**	**97**	**1133**	**55762**

Total emission reductions during the period 01st January 2011 to 31st December 2011 are calculated as 55,762 **tCO_2e**.

5 ADDITIONAL INFORMATION

Data of power generation:

Month (2011)	EG(Gross)	EC(Unit-1)	EC(Unit-2)	EC(Aux)	EC(BCK)	EC(Unit-10)	EC(Net Aux)	EG(Net)	EG(Net)
	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh	GWh
	a	b	c	d	e	f	g=d-e-f	h=a-g	i=h/10^6
Jan	3586700	589400	1785500	1211800	200449	424543	586808	2999892	2.999892
Feb	3459000	519200	1813100	1126700	174627	384078	567995	2891005	2.891005
Mar	3871500	654000	1981500	1236000	179186	424569	632245	3239255	3.239255
Apr	3454200	589900	1803100	1061200	135569	347674	577957	2876243	2.876243
May	3475500	613000	1796000	1066500	114570	239515	712415	2763085	2.763085
Jun	3185800	473100	1786400	926300	97367	299837	529096	2656704	2.656704
Jul	3881900	643500	2021200	1217200	129605	399519	688076	3193824	3.193824
Aug	3850400	562300	2006000	1282100	110312	440648	731140	3119260	3.11926
Sep	3272100	355700	1789800	1126600	175801	382310	568489	2703611	2.703611
Oct	3405900	663700	1582300	1159900	57212	425014	677674	2728226	2.728226
Nov	2849100	417300	1549700	882100	0	332578	549522	2299578	2.299578
Dec	3890500	533300	2073300	1283900	0	454901	828999	3061501	3.061501
Total	**42182600**	**6614400**	**21987900**	**13580300**	**1374698**	**4555186**	**7650416**	**34532184**	**34.532184**

Data of Steam Unit-2

Month	Q (Unit-2)	P	T (Unit-2)	Enthalpy of Steam	Enthalpy of Steam	Feed Water Enthalpy	Net Enthalpy of Steam	Thermal Energy generation (Unit-2)
	Tonnes	Kg/Cm2	℃	KJ/Kg	Kcal/Kg	Kcal/Kg	Kcal/Kg	TJ
	a	b	c	d	e=d/4.1868	f	g=e-f	h=(a*1000)*(g*4.1868)/10^9
Jan	12622	5.7	220.9	2892.18	690.7853	125	565.7853	29.89937226
Feb	12141	5.56	212.5	2874.6	686.5864	125	561.5864	28.54652625
Mar	14651	5.61	213.74	2877.06	687.1740	125	562.1740	34.48420521
Apr	12918	5.6	224.5	2900.38	692.7439	125	567.7439	30.70647354
May	14058	5.62	217.2	2884.53	688.9582	125	563.9582	33.19346844
Jun	12285	5.61	225.36	2902.19	693.1762	125	568.1762	29.2240494
Jul	15496	5.49	212.91	2875.82	686.8778	125	561.8778	36.45387512
Aug	14077	5.62	215.04	2879.84	687.8380	125	562.8380	33.17230973
Sep	12617	5.59	202.3	2852.14	681.2219	125	556.2219	29.38234343
Oct	12647	5.7	188.38	2820.53	673.6720	125	548.6720	29.05243546
Nov	9914	5.8	215.4	2892.18	690.7853	125	565.7853	23.48458062

Dec	14483	5.67	203.78	2854.99	681.9026	125	556.9026	33.76914212
	157909							**371.3687816**

Data of steam – Unit 10

Month	Q (Unit-10)	P	T (Unit-10)	Enthalpy of Steam	Enthalpy of Steam	Feed Water Enthalpy	Net Enthalpy of Steam	Thermal Energy generation (Unit-10)
	Tonnes	Kg/Cm2	℃	KJ/Kg	Kcal/Kg	Kcal/Kg	Kcal/Kg	TJ
	a	b	c	d	e=d/4.1868	f	g=e-f	h=(a*1000)*(g*4.1868)/10^9
Jan	4675	5.7	163.8	2763.64	660.0841	125	535.0841	10.47335575
Feb	3964	5.56	162.9	2762.57	659.8285	125	534.8285	8.87626808
Mar	3763	5.61	163.49	2763.59	660.0721	125	535.0721	8.43002312
Apr	2889	5.6	164.02	2764.93	660.3922	125	535.3922	6.47592462
May	2110	5.62	166.49	2770.63	661.7536	125	536.7536	4.7417608
Jun	2829	5.61	167.43	2772.92	662.3006	125	537.3006	6.36403353
Jul	3722	5.49	166.04	2770.54	661.7321	125	536.7321	8.36404118
Aug	4303	5.62	164.64	2766.25	660.7075	125	535.7075	9.6511987
Sep	3883	5.59	166.45	2770.76	661.7847	125	536.7847	8.72669303
Oct	3671	5.7	163.63	2763.23	659.9861	125	534.9861	8.22259948
Nov	3214	5.8	162.8	2763.64	660.0841	125	535.0841	7.20029206
Dec	4369	5.67	169.2	2776.64	663.1891	125	538.1891	9.84462401
	43392							**97.37081436**