MONITORING REPORT

Monitoring Period

1/11/2008 to 31/08/2010

(Both days included)

Version: 03
Date: 09/08/2011

Project: Chemical Recovery project at Satia Industries Ltd. (SIL), formely known as Satia Paper Mills Ltd. , village Rupana , Punjab.

Project Site:

Satia Industries Ltd. (SIL)

Village- Rupana, District- Muktsar, State-Punjab

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Project Details

Project Reference

Title of the project : Chemical Recovery project at Satia Industries Ltd. (SIL), formely known as Satia Paper Mills Ltd. , village Rupana , Punjab.
Project activity scale : Small scale
Sectoral Scope : 05 , Chemical industries
Approved baseline methodology : AMS III.M., Version02 EB-33
Approved monitoring methodology : AMS III.M., Version02 EB-33
Title of the methodology used : "Reduction in Consumption of Electricity by Recovering Soda from Paper Manufacturing Process"
Standard followed : Validated under VCS 2007.1

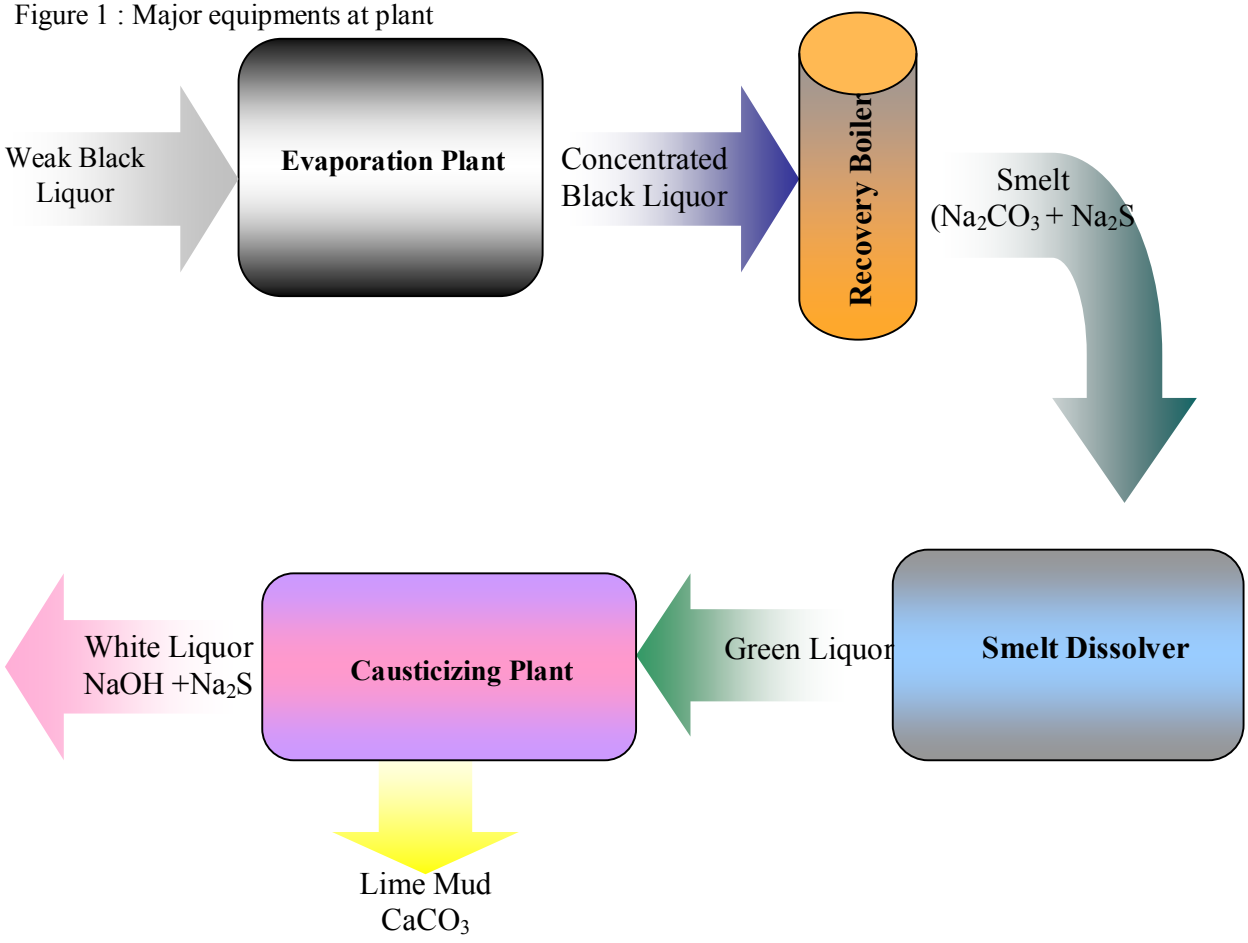
Project description

Satia Industries Ltd. (SIL) previously known as Satia Paper Mills Ltd. (SPML) is one of the leading integrated paper manufacturing unit in Punjab with daily production in the range 130 Tons per day (TPD) of paper. SIL, being an environmentally concerned citizen has always been on the lookout for protecting the environment from degradation. Thus the proponent commissioned a chemical recovery plant in SIL's plant premises at Muktsar, Punjab with the ultimate objective to reduce the Green House Gases emissions in the atmosphere.

The purpose of the project activity is to recover the caustic soda from waste liquor generated at the pulping stage of the paper manufacturing process. Since the electricity consumption for the process of recovery of 1 tonne of soda is much lesser than that consumed in the production of fresh stock, the proposed project activity would help curb the green house gases emissions into the atmosphere. The electricity consumed at project activity is generated inhouse from biomass based power project.

The major equipments deployed in the project activity are as follows:

Figure 1 : Major equipments at plant



Black Liquor Boiler details

The configuration details of the boilers are as follow:

Black Liquor Boiler:

Table 1 : Boiler details

Description	**1no.**
Steam generating capacity (tons per hour)	12 TPH
Steam pressure (kg/cm^2)	42 Kg/cm^2
Steam outlet temperature (^{0} C)	405+/- 5°C

Other Technical Details

The weak black liquor is evaporated **(in Evaporation plant)** and burned in the **recovery boiler** to recover the inorganic chemicals for reuse in the pulping process. The combustion is carried out such that sodium sulfate is reduced to sodium sulfide by the organic carbon in the mixture:

1. $Na_2SO_4 + 2\ C \rightarrow Na_2S + 2\ CO_2$

The molten salts ("smelt") from the recovery boiler are dissolved in aprocess water (**in Smelt Dissolver**). This process water, is composed of all liquors used to wash lime mud and green liquor precipitates. The resulting solution of sodium carbonate and sodium sulfide is known as "green liquor". This liquid is mixed with calcium oxide (**in Causticizing Plant**), which becomes calcium hydroxide in solution, to regenerate the white liquor used in the pulping process through an equilibrium reaction (Na_2S is shown since it is part of the green liquor, but does not participate in the reaction):

2. $Na_2S + Na_2CO_3 + Ca(OH)_2 \longleftrightarrow Na_2S + 2\ NaOH + CaCO_3$

Monitoring Period

This is the second monitoring period associated with the project activity. It covers the period from 1st November 2008 to 31st August 2010 (Both days included).

The first monitoring period for the project activity from 28th March 2006 to 31st October 2008(Both days included)

Parameters Monitored

The following parameters have been monitored:

Data and parameters monitored:

Data / Parameter:	**Quantity of soda**
Data unit:	Tonnes/annum
Description:	Quantity of soda recovered in the process
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	2008- 09 - 1947 tonne 2009- 10 - 9532 tonne 2010- 11 - 8685 tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The volume of the soda recovered per day is measured in m3 through flow meter on daily basis. The strength of the soda recovered (grams per litre (gpl)) is calculated at the laboratory at the plant site. Strength in gpl is multiplied with flow & divided by 1000 (gpl*m3/1000)to calculate the soda recovered in tonnes. Monitoring Frequency: The tonnes of soda recovered are measured & recorded in log books in 8 hours shift basis & 24 hours basis
QA/QC procedures to be applied:	In order to ensure the highest levels of accuracy in the monitoring procedure the monitoring equipments (i.e flow meter for measuring flow and burette and pipette for measuring the strength of soda recovered) are calibrated annually. Also the observed values are compiled to arrive at a consolidated value reported in the log books on a daily basis by the monitoring supervisors. The log book reported values are used to prepare reports on a monthly basis which are finally reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan described under the heading "Roles and Responsibilities " in this document. The uncertainty level of the equipment used for the monitoring is ± 1%
Any comment:	This is used to calculate baseline as well as project emissions

Data / Parameter:	**E_{PT}**
Data unit:	kWh/annum
Description:	Annual Electricity consumed to recover soda in recovery plant
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of	2008- 09 - 1228507 kWh

calculating expected emission reductions:	2009- 10 - 6413925 kWh 2010- 11 - 4990700 kWh
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The parameter would be measured using the electronic energy meters installed at the plant location and the observed values are reported on a daily basis in the plant log books. Monitoring Frequency: Readings taken daily and compiled on a monthly basis
QA/QC procedures to be applied:	In order to ensure the highest levels of accuracy in the monitoring procedure the monitoring equipment has been calibrated annually. Also the observed values are compiled to arrive at a consolidated value reported in the log books on a daily basis by the monitoring supervisors. The log book reported values are then used to prepare reports on a monthly basis which are finally reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan described section under the heading "Roles and Responsibbilities " in this document. The accuracy level of the electronic energy meters used is ±1%
Any comment:	This is used to calculate project emissions

Data / Parameter:	**E_{BT} (ex- post)**
Data unit:	kWh/tonne annually
Description:	Annual Electricity consumed in producing 1 tonne of soda by the soda manufacturer during the crediting period.
Source of Data to be used :	Annual reports of the soda manufacturers or any other authentic published data.
Value of data applied for the purpose of calculating expected emission reductions:	2008-09 - 2608 kWh/tonne 2009-10 - 2634 kWh/tonne 2010- 11 – 2654 kWh/tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The details regarding the energy consumption in the production of soda by the chemical manufacturer has been procured from the manufacturer through the published annual reports of the company Monitoring Frequency: Annually
QA/QC procedures to be applied:	The energy consumption for the production of one tonne of soda is procured directly from the manufacturer's annual report
Any comment:	The NEWNE/northern grid emission factor has been taken into consideration for the baseline emissions as the NEWNE/northern grid is the supplier of electricity for the soda manufacturers.

Data / Parameter:	$Q_{ff,Y}$
Data unit:	**Litres**
Description:	Quantity of fossil fuel (furnace oil) consumed for thermal energy in the recovery process
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	2008- 09 – 111 tonne 2009- 10 – 630 tonne 2010- 11 – 415 tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The quantity is measured using standard scales and the observed values are reported in the plant log books on a daily basis and can be cross checked with the purchase records of furnace oil Furnace oil received in kl is multiplied with density of oil i.e.0.95(kl*0.95) to arrive at quantity in tons Monitoring Frequency: Readings taken daily and compiled on a monthly basis.
QA/QC procedures to be applied:	The scale with least count of 1mm is used for the measurement of the quantity would be calibrated annually to ensure the highest levels of accuracy in the monitoring. The daily reading recorded by the shift supervisors are reported in the log books. The log book reported values are used to prepare reports on daily and monthly basis which are thoroughly reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan of the PD.
Any comment:	To be used for Project emissions related to thermal energy consumption

Data / Parameter:	$EF_{ff,y}$
Data unit:	Tonne CO2/ tonne of fossil fuel (furnace oil)
Description:	Emission factor of the fossil fuel used for generating thermal energy
Source of data to be used:	Calculated from the NCV and emission factor value mentioned in the IPCC Guideline 2006[1]
Value of data applied for the purpose of calculating expected emission reductions:	2008-09:3.127 Tonne CO2/ tonne of fossil fuel(furnace oil) 2009-10: 3.127 Tonne CO2/tonne of fossil fuel 2010-11: 3.127 Tonne CO2/tonne of fossil fuel The emission factor has been calculated using the following: EF for Furnace oil = 77.4 g CO2/MJ Net Calorific Value for Furnace oil 77400 kgl/TJ EF (t CO2/t Furnace oil used) = (40.4*77400)/1000000

[1] http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html

	= 3.127
Description of measurement methods and procedures to be applied:	Data Type: Estimated Monitoring Procedure: Default value as per IPCC. Value obtained from published sources Monitoring Frequency: Annually Archiving Procedure: Paper / Electronic
QA/QC procedures to be applied:	No QA/QC procedures are required as the data is obtained from published national/ IPCC sources
Any comment:	To be used for Project emissions related to thermal energy consumption

Data / Parameter:	**$Q_{residue}$**
Data unit:	**Tonne**
Description:	Quantity of residues produced from the recovery plant
Source of data to be used:	Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	2008- 09 - 2471 tonne 2009- 10 – 11873 tonne 2010-11 - 11548 tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The quantity of residues generated from the recovery unit would be monitored daily through weighbridge (by accounting for the moisture content) and the observed values would be reported in the log books on daily basis. Monitoring Frequency: Readings taken daily and compiled on a monthly basis
QA/QC procedures to be applied:	The equipment with uncertainty level of 3% used for the measurement of the quantity is calibrated annually to ensure the highest levels of accuracy in the monitoring. The daily reading recorded by the shift supervisors are reported in the log books. The log book reported values are used to prepare reports on daily and monthly basis which are thoroughly reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan of the PD.
Any comment:	

Data / Parameter:	**% residue used for the production of lime**
Data unit:	**%**
Description:	Portion of residue used for the production of lime.
Source of data to be used:	Plant records
Value of data applied for the purpose of calculating expected emission reductions:	Nil
Description of measurement methods and procedures to be applied:	No amount of residue generated from the project activity is used for the production of lime.
QA/QC procedures to be applied:	

Any comment:	

Data / Parameter:	**% residue disposed off**
Data unit:	**-**
Description:	Portion of residue that is disposed in a solid waste disposal site
Source of data to be used:	Plant records
Value of data applied for the purpose of calculating expected emission reductions:	100% residue generated
Description of measurement methods and procedures to be applied:	The complete amount of the residue generated from the project plant is disposed off to fill the low lying areas at the project location.
QA/QC procedures to be applied:	The amount of the quantity of the residue disposed off will be reported in the daily log books which would be further used to generate the monthly reports and would be reviewed by the top management officials responsible for the monitoring procedures as outlines under the heading "Roles and Responsibilities " in this document
Any comment:	

Recorded observations for monitored parameters

Table 2 : Observations

Month	Quantity of Soda (Tonnes)	Electricity consumed in producing soda by soda Recovery process (kWh/month)	Quantity and type of fossil fuel consumed for thermal energy in the recovery process (D) (Furnace Oil) (Tonnes)	Quantity of residues produced from the recovery plant (Tonnes)
Nov-08	967.50	600755.00	51.86	1259.80
Dec-08	979.39	627752.00	59.48	1211.00
Sub Total	**1946.89**	**1228507.00**	**111.34**	**2470.80**
Jan-09	991.69	650206.00	53.18	1103.20
Feb-09	1010.00	570298.00	41.80	1103.20
Mar-09	1063.07	632551.00	58.06	1216.60
Apr-09	1030.59	590623.00	50.38	1184.40
May-09	1066.60	622148.00	57.95	1241.80
Jun-09	937.67	566837.00	69.63	1150.80
Jul-09	778.28	561453.00	86.97	1072.40
Aug-09	596.07	477631.00	59.32	925.40
Sep-09	763.07	571159.00	54.20	1113.00
Oct-09	607.99	492399.00	47.58	809.00
Nov-09	0.00	124051.00	0.00	0.00
Dec-09	686.74	554569.00	50.96	953.40
Sub Total	**9531.76**	**6413925.00**	**630.03**	**11873.20**
Jan-10	923.41	585173.00	51.35	1202.60
Feb-10	965.73	543438.00	44.39	1393.00
Mar-10	1200.25	614769.00	46.68	1534.40
Apr-10	1069.92	603983.00	44.10	1449.00
May-10	1144.90	670015.00	58.45	1513.60
Jun-10	1078.07	640439.00	58.55	1435.00
Jul-10	1099.24	665318.00	61.65	1428.35
Aug-10	1203.66	667565.00	50.00	1592.50
Sub Total	**8685.18**	**4990700.00**	**415.17**	**11548.45**
Total	**20163.83**	**12633132.00**	**1156.54**	**25892.45**

Emission reduction

Baseline and project emissions are calculated as per the formulas mentioned in Section 4 of the PD. The same is given below:

Formulae used

The emission reduction is given by

Emission reduction = Baseline emissions – Project emissions

1.1 Explanation of methodological choice:

The following Formulas have been used for estimating the Net Emission Reductions arising out of the project activity:

A. **Baseline Emissions**

$$\mathbf{BE_y = Q_{rec,y} \ X \ E_{BT} \ X \ EF_B}$$

where:

BE_y Baseline emissions (CO_2 emissions in absence of the project activity, tonne)

$Q_{rec,y}$ Quantity of soda recovered in the process (tonnes per annum)

E_{BT} Electricity consumed for producing 1 tonne of soda (KWh/tonne)

EF_B Emission factor of the electricity used for soda production (tCO_2/KWh)

Thus ,

For 1st November '08 – 31st December'08 , BE_y = 4077 tCO_2 (Refer monthly emission reduction sheet i.e. Table 4)

For 1st January '09 – 31st December'09 , BE_y = 20097 tCO_2

For 1st January '10 – 31st August'10 , BE_y = 18461 tCO_2

Total Baseline emissions for 1st November '08 – 31st August '10 = 42635 tCO_2

Project Emissions

$\mathbf{PE_y = PE_{y,electrical} + PE_{y,thermal}}$

$\mathbf{PE_{y,electrical} = Q_{rec,y} \ X \ E_{PT} \ X \ EF_P}$

where

PE_y Project activity emissions in the year "y" (tonnes of CO_2 eq)

$Q_{rec,y}$ Quantity of soda recovered in year "y" (tonnes)

E_{PT} Electricity consumed for recovering 1 tonne of soda (kwh/tonne of NaOH)

EF_P Emission factor of the electricity used for recovering soda (tCO_2/KWh)

The electricity requirement of the recovery plant has been met by the power produced at the plant site from the biomass fired power generation plant. , the emission due to this consumption is not being considered in project emissions.

Thus , $PE_{y,electrical} = 0$

$\mathbf{PE_{y,thermal} = Q_{ff,y} \ X \ EF_{ff,y}}$

where

$PE_{y\ thermal}$: Emissions due to thermal energy consumption by the recovery process (tCO2 e)

$Q_{ff,y}$: Quantity of fossil fuel consumed for thermal energy in the recovery process in year "y" (tonnes)

$EF_{ff,y}$: Emission factor for the fossil fuel (tCO_2/tonne)

Thus,

For 1st November '08 – 31st December'08 , $PE_{y,\ thermal}$ = 347 tCO_2 (Refer monthly emission reduction sheet i.e. Table 4)

For 1st January '09 – 31st December'09 , $PE_{y,\ thermal}$ = 1964 tCO_2

For 1st January '10 – 31st August'10 , $PE_{y,\ thermal}$ = 1293 tCO_2

Total Project emissions for 1st November '08 – 31st August '10 = 3604 tCO_2

Leakage

No leakages are considered under the project activity

The quantity of residues produced is monitored and disposed off in a solid waste disposal site and hence is not used for producing lime CaO within the project boundary or outside of it. Thus no leakage calculation is applicable in this case.

Emission reductions

Emission reductions = Baseline emissions- Project emissions- Leakage emissions

Baseline emissions (t CO_2) for 1st November '08 – 31st August '10 = 42635 (Refer monthly emission reduction sheet i.e. Table 4)

Project emissions (t CO_2) for 1st November '08 – 31st August '10 = 3604

Emission reductions (t CO_2) = 39031

Comparison of actual emission reduction with estimated emission reductions

The actual emission reductions being claimed in the monitoring period are 39,031 tCO_2. The emission reductions estimated in the PD are 21,902 tCO_2 per annum. Since the current monitoring period covers duration of twenty two months instead of a year (i.e. twelve months), emission reductions have been extrapolated to estimate emission reductions for twenty two months, i.e. 1st November 2008 to 31st August 2010. The emission reductions estimated in the PD for this period works out to be 40,154 tCO_2 $\left(\frac{22}{12}\times 21902\right)$.

Table 3 : Comparison of actual emission reduction with estimated emission reductions

Item	Values applied in ex-ante calculation of the PD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**40,154**	**39,031**

Calculation for the emission factor for the combustion of Fossil Fuel:

Furnace Oil:

The emission factor has been calculated using the following:

EF for Furnace oil = 77.4 g CO2/MJ

Net Calorific Value for Furnace oil 77400 kgl/TJ

EF (t CO2/t Furnace oil used) = (40.4*77400)/1000000 = 3.127

Table 4: Emission reduction calculations

Month	Quantity of Soda (Tonnes)	Grid Emission Factor tCO2/MWh	Electricity consumed for producing 1 tonne of soda (KWh/tonne)	Baseline Emissions tCO2	Quantity and type of fossil fuel consumed for thermal energy in the recovery process (D) (Furnace Oil) (Tonnes)	Emission Factor of fossil fuel (furnace oil) tCO2/tonne	Project Emissions tCO2	Emissions Reductions tCO2
Nov-08	967.50	0.80317	2608	2026.00	51.86	3.127	162	1864.00
Dec-08	979.39	0.80317	2608	2051.00	59.48	3.127	185	1866.00
Sub Total	1946.89			4077.00	111.34		347.00	3730.00
Jan-09	991.69	0.80317	2608	2077.00	53.18	3.127	166	1911.00
Feb-09	1010.00	0.80317	2608	2115.00	41.80	3.127	130	1985.00
Mar-09	1063.07	0.80317	2608	2227.00	58.06	3.127	181	2046.00
Apr-09	1030.59	0.80317	2634	2180.00	50.38	3.127	157	2023.00
May-09	1066.60	0.80317	2634	2256.00	57.95	3.127	181	2075.00
Jun-09	937.67	0.80317	2634	1983.00	69.63	3.127	217	1766.00
Jul-09	778.28	0.80317	2634	1646.00	86.97	3.127	271	1375.00
Aug-09	596.07	0.80317	2634	1261.00	59.32	3.127	185	1076.00
Sep-09	763.07	0.80317	2634	1614.00	54.20	3.127	169	1445.00
Oct-09	607.99	0.80317	2634	1286.00	47.58	3.127	148	1138.00
Nov-09	0.00	0.80317	2634	0.00	0.00	3.127	0	0.00
Dec-09	686.74	0.80317	2634	1452.00	50.96	3.127	159	1293.00
Sub Total	9531.76			20097.00	630.03		1964.00	18133.00
						3.127		
Jan-10	923.41	0.80317	2634	1953.00	51.35	3.127	160	1793.00
Feb-10	965.73	0.80317	2634	2043.00	44.39	3.127	138	1905.00
Mar-10	1200.25	0.80317	2634	2539.00	46.68	3.127	145	2394.00
Apr-10	1069.92	0.80317	2654	2280.00	44.10	3.127	137	2143.00
May-10	1144.90	0.80317	2654	2440.00	58.45	3.127	182	2258.00

Jun-10	1078.07	0.80317	2654	2298.00	58.55	3.127	183	2115.00
Jul-10	1099.24	0.80317	2654	2343.00	61.65	3.127	192	2151.00
Aug-10	1203.66	0.80317	2654	2565.00	50.00	3.127	156	2409.00
Sub Total	8685.18			18461.00	415.17		1293.00	17168.00
Total	20163.83			42635.00	1156.54		3604.00	39031.00

Table 5: Yearly Emission reductions

Crediting Period	Baseline Emissions tCO2 (A)	Project Emissions tCO2 (B)	Emissions Reductions tCO2 (A)-(B)
November 2008-December 2008	4077.00	347.00	3730.00
January 2009- December 2009	20097.00	1964.00	18133.00
January 2010- August 2010	18461.00	1293.00	17168.00
Total	42635.00	3604.00	39031.00

Emission Reduction Table

Table 6 : Emission reductions table

Crediting Period	Emissions Reductions tCO2
01/11/2008- 31/12/ 2008	**3730**
01/01/ 2009- 31/12/ 2009	**18133**
01/01/ 2010- 31/08/2010	**17168**
Total	**39031**

Measures to ensure the Results / uncertainty analysis

In order to ensure the highest levels of accuracy the monitoring instruments are calibrated regularly as per the manufacturers' specifications. The white liquor production, auxiliary power consumption, Furnace Oil consumption are recorded daily in the plant log books which are reviewed, verified and finally approved by the Director of the company.

Table 7: Calibration detail

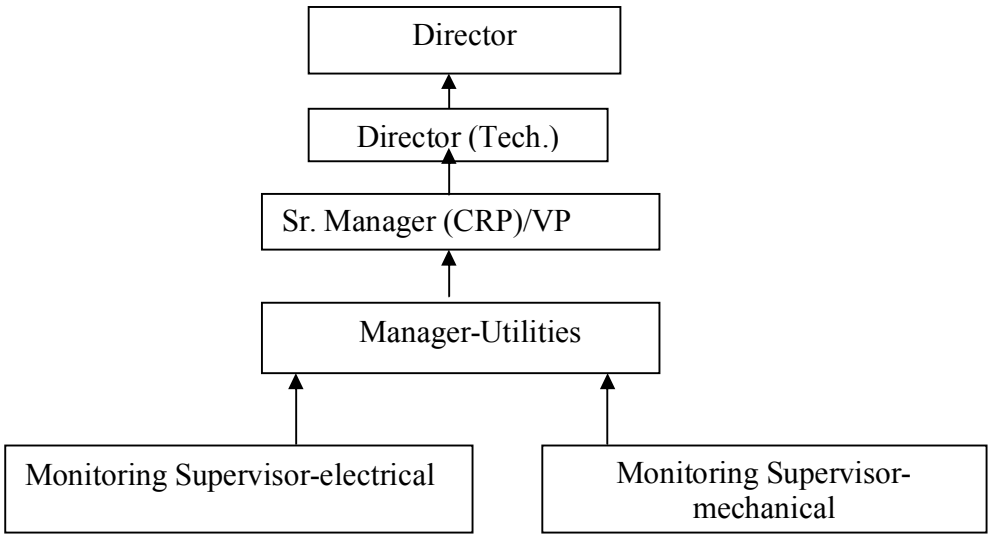
Sl. No.	Observer Parameter	Meter Used	Equipment …	Accuracy	Meter No.	Calibration Details					
						2008		2009		2010	
						Calibration date	Certificate no.	Calibration date	Certificate no.	Calibration date	Certificate no.
1.	Quantity of soda	Flow Meter		± 1%	8813721 - 9000	24/09/2008	3089467	22/09/2009	3104184	21/09/2010	7004610
2.	Electricity consumed in recovery plant	Energy Meter	CRP Boiler	± 1%	5859750	4/3/2008	6002745				
					156228/32607-3008 (new meter)	23/07/08 (New meter installed on 23/8/2008 (Since the LCD of old meter was not working properly on 22.8.2008, the meter was changed))		22/7/2009	804800	28/6/2010	YMPL/177715/30251

3.	Quantity of fossil fuel consumed in recovery process	Measuring Scale		Least Count - 1mm	401	8/10/2008	3089488	6/10/2009	075	21/09/2010	7004611
4.	Residue produced	Weigh Bridge		3%	0610002	21/7/2008	64/6086	23/9/2009	194931	29/6/2010	190515
5.	Electricity consumed in recovery plant	Energy Meter	Caustisizing	± 1%	5859743	4/3/2008	6002746	2/3/2009	6022818	1/3/2010	812249
6.	Electricity consumed in recovery plant	Energy Meter	Evaporator	± 1%	1K04056 2	4/3/2008	6002744	2/3/2009	6022819	1/3/2010	812248

Roles and responsibilities

SIL is solely responsible for the monitoring activity. Organization structure responsible for monitoring and reporting of parameters involved in VCS project activity is as presented in the following flow chart.

Figure 2 :Organization structure flow chart



The monitoring team at the shop floor level records the daily observations and report the same in the plant log books. The field data would be noted by the monitoring supervisors in the log books and then transformed into excel sheets or would be directly reported in the soft format. The daily reports would be sent to the manager for his review. The manager would generate the monthly reports based on the daily reports received from the supervisors and would forward the monthly report to the senior manager for his perusal. The senior manager would review the report and will send the same to the technical director for his perusal. The technical director will finally send the report to the director of the company.

In order to ensure the highest levels of accuracy in the monitoring process, the instruments (such as energy meters) used for monitoring will be calibrated regularly as per the manufacturers' specifications , regular inspection of the plant reports will be made by the monitoring team.

Details of Down Time at the plant

Table 8 :Shutdown details

DATE	REASON
8/4/2009	Recovery boiler shut for flue passages cleaning & maintenance
6/5/2009	Recovery boiler shut for flue passages cleaning & maintenance
2/6/2009	Recovery boiler shut for flue passages cleaning & maintenance
5/7/2009	Recovery boiler shut for flue passages cleaning & maintenance
13/8/2009	Recovery boiler shut for flue passages cleaning & maintenance
24/10/2009 to 08/12/2009	Overall maintenance of boiler, evaporator & causticizing
26/1/2010	Recovery boiler shut for flue passages cleaning & maintenance