

MONITORING REPORT

Monitoring Period

28/03/2006 to 31/10/2008

(Both days included)

Version: 02

Date: 29/08/ 2010

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

Project Site:

Satia Industries Ltd. (SIL)

Village- Rupana, District- Muktsar, State-Punjab

Table of Contents

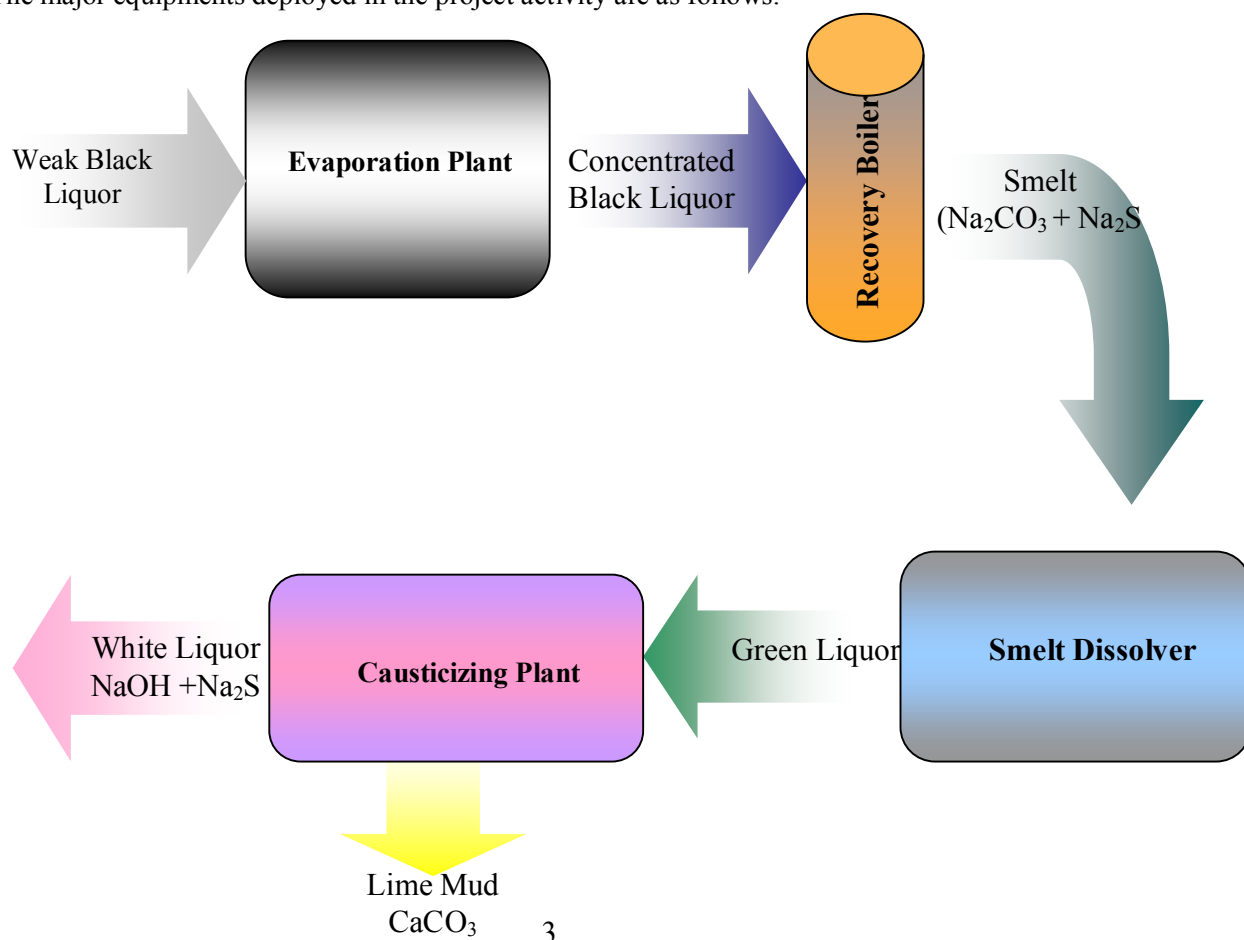
S. No.	Content	Page
1.	Project Details	3
2.	Parameters monitored	6
3.	Recorded observations for monitored parameters	11
4.	Emission reduction	12
5.	Emission reduction Table	14
6.	Measures to ensure the Results / uncertainty analysis	15
7.	Roles and responsibilities	16
8.	Details of Down Time at the plant	17

Project Details

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 look out 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:



Black Liquor Boiler details

The configuration details of the boilers are as follow:

Black Liquor Boiler:

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

Monitoring Period

The Monitoring Period is chosen from 28th March 2006 to 31st October '2008 (both days included).

Parameters Monitored

The following parameters have been monitored:

B.7.1 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:	2006-07 - 7699 tonne 2007-08 - 11779 tonne 2008- 09 - 10063 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 through flow meter & GPL on daily basis. The strength of the soda recovered (GPL) is calculated at the laboratory at the plant site. Monitoring Frequency: The tonnes of soda recovered are calculated & 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 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 section 3.3 of this document. The uncertainty level of the equipment used for the monitoring is $\pm 1\%$
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 calculating expected emission	2006-07 – 5297906 kWh 2007-08 - 7213002 kWh

reductions:	2008- 09 - 5953494 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 will be 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 3.4 of this document. The accuracy level of the electronic energy meters used is $\pm 1\%$
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:	2006-07 - 2587 kWh/tonne 2007-08 - 2603 kWh/tonne 2008- 09 - 2607 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 will be procured from the manufacturer either through the published annual reports of the company or any other authentic published data. Monitoring Frequency: Annually
QA/QC procedures to be applied:	The energy consumption for the production of one tonne of soda would be procured directly form the manufacturer's annual report or from the authentic published data available.
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:	Tonnes
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:	2006-07 - 549 tonne 2007-08 - 628 tonne 2008- 09 - 457 tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The quantity shall be measured using standard scales and the observed values will be reported in the plant log books on a daily basis and can be cross checked with the purchase records of furnace oil 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:	IPCC Guideline 2006
Value of data applied for the purpose of calculating expected emission reductions:	3.13 Tonne CO2/ tonne of fossil fuel(furnace oil)
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:	2006-07 – 8445 tonne 2007-08 - 14745 tonne 2008- 09 - 13404 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 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:	

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 in section 3.3 of this document.
Any comment:	

Recorded observations for monitored parameters

Months	Quantity of Soda	Electricity consumed in producing soda by recovery proces	Quantity of fossil fuel consumed for thermal energy furnace Oil)	Quantity of residues produced from the plant
	(Tonnes)	(kWh/month)	(Tonnes)	(Tonnes)
Mar-06	114.99	68960	7.64	202.17
Apr-06	872.27	524240	65.05	1028.94
May-06	839.39	561751	64.73	820.40
Jun-06	725.78	526088	47.57	765.80
Jul-06	865.25	560190	83.42	1064.00
Aug-06	840.37	575400	68.27	968.80
Sep-06	796.65	555224	46.74	704.20
Oct-06	924.65	640768	59.01	980.00
Nov-06	841.99	633476	46.76	929.60
Dec-06	877.24	651809	60.05	981.40
Sub Total	7699	5297906	549	8445
Jan-07	911.26	608294	37.40	1029.70
Feb-07	887.02	587449	48.96	939.40
Mar-07	881.64	613372	65.00	1026.20
Apr-07	960.04	596432	44.97	1096.20
May-07	986.58	631122	72.99	1113.00
Jun-07	1036.84	598464	48.36	1157.80
Jul-07	1099.78	603437	57.13	1520.40
Aug-07	992.08	619650	74.90	1240.40
Sep-07	998.54	572251	46.54	1465.80
Oct-07	1051.67	602184	42.81	1483.61
Nov-07	981.14	595469	43.85	1314.60
Dec-07	992.86	584878	44.94	1358.20
Sub Total	11779	7213002	628	14745
Jan-08	1059.93	608287	44.49	1538.60
Feb-08	992.55	574795	39.81	1271.00
Mar-08	1118.29	626831	34.38	1395.16
Apr-08	1127.04	582250	37.45	1330.00
May-08	991.70	595785	51.84	1192.80
Jun-08	926.29	570469	38.54	1264.20
Jul-08	991.88	586892	43.63	1370.60
Aug-08	1088.13	614102	44.80	1615.60
Sep-08	913.11	601847	49.79	1208.20
Oct-08	853.78	592236	71.97	1218.00
Sub Total	10063	5953494	457	13404
Total	29541	18464402	1634	36595

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

$$BE_y = Q_{rec,y} \times E_{BT} \times E_{FB}$$

where:

BE_y Baseline emissions (CO₂ 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)

E_{FB} Emission factor of the electricity used for soda production (tCO₂/KWh)

Project Emissions

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

$$PE_{y,electrical} = Q_{rec,y} \times E_{PT} \times E_{FP}$$

where

PE_y Project activity emissions in the year “y” (tonnes of CO₂ 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 (tCO₂/KWh)

The project activity consumes 625 KWh of energy for the recovery of 1 ton of soda. Since this requirement of the recovery plant would be 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 , $PE_{y,electrical} = 0$

$$PE_{y,thermal} = Q_{ff,y} \times E_{ff,y}$$

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 (tCO₂/tonne)

Leakage

No leakages are considered under the project activity

Emission reductions

Baseline emissions (t CO₂) for 28th March '06 – 31st October '08 = 61428

Project emissions (t CO₂) for 28th March '06 – 31st October '08 = 5109

Emission reductions (t CO₂) = 56319

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 kJ/TJ

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

Period	Emission Factor tCO ₂ /MWh	Electricity consumed producing 1 tonne of soda KWh/tonne	Quantity of soda recovered tonne	Baseline Emissions tCO ₂	Emission Factor tCO ₂ /tonne	Quantity of fossil fuel consumed for thermal energy in process tonnes	Project Emissions tCO ₂	Emissions Reductions tCO ₂
	(A)	(B)	(C)	(D)= (A)*(B)*(C)	(E)	(F)	(G)= (E)*(F)	(H)= (D)-(G)
March 06-December 06	0.80317	2587	7699	15995	3.127	549	1717	14278
January07-December 07	0.80317	2603	11779	24628	3.127	628	1963	22665
January08-October 08	0.80317	2607	10063	20805	3.127	457	1428	19377
Total			29541	61693		1634	5109	56319

Emission Reduction Table

Crediting Period	Emissions Reductions
	tCO ₂
28/03/2006- 31/12/ 2006	14278
01/01/ 2007- 31/12/ 2007	22665
01/01/ 2008- 31/10/2008	19377
Total	56319

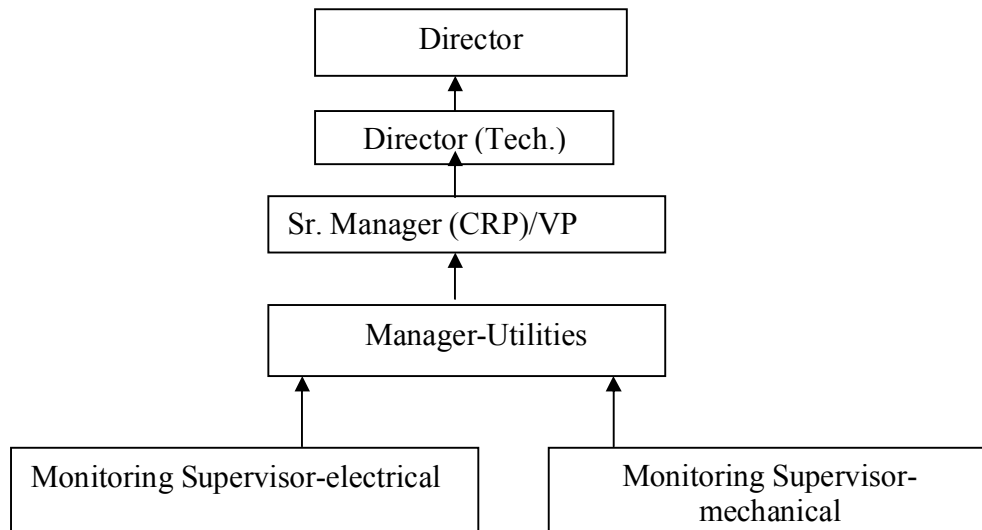
Measures to ensure the Results / uncertainty analysis

In order to ensure the highest levels of accuracy the monitoring instruments are calibrated regularly as per the manufacturers' specifications. The whit 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.

Sl. No.	Observer Parameter	Meter Used	Accuracy	Meter No.	1 st calibration date	2 nd calibration date	3 rd calibration date	4 th calibration date
1.	Quantity of soda	Flow Meter	± 1%	8813721 - 9000	20/2/2006	25/9/2006	25/9/2007	24/09/2008
2.	Electricity consumed in recovery plant	Energy Meter	± 1%	5859750	6/3/2006	5/3/2007	4/3/2008	-
3.	Quantity of fossil fuel consumed in recovery process	Measuring Scale	Least Count - 1mm	401	1/3/2006	1/1/2007	25/12/2007	8/10/2008
4.	Residue produced	Weigh Bridge	3%	0610002	21/6/2005	21/7/2006	20/7/2007	21/7/2008

Roles and responsibilities

SIL would be 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.



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

DATE	DAYS	REASON
11/6/2006	3	Recovery boiler shut for flue passage cleaning & maintenance
1/9/2006	2	Recovery boiler shut for flue passage cleaning & maintenance
9/3/2007	1	Recovery boiler shut maintenance
30/6/2007	2	Recovery boiler shut for flue passage cleaning & maintenance
1/9/2007	2	Recovery boiler shut for flue passage cleaning & maintenance
31/1/2008	2	Recovery boiler shut for flue passage cleaning & maintenance
14/6/2008	2	Recovery boiler shut for flue passage cleaning & maintenance
3/9/2008	1	Recovery boiler shut for flue passage cleaning & maintenance
23/9/2008	1	Recovery boiler shut maintenance
7/10/2008	2	Recovery boiler shut for flue passage cleaning & maintenance
13/10/2008	2	Recovery boiler shut maintenance