

**"Forced Methane extraction from Organic
wastewater", at Mandya District, Karnataka by M/s
Sri Chamundeswari Sugars Ltd.**

CDM Registration Reference No. 1088

Revision in Monitoring Plan

Project Location

Bharathinagara in KM Doddi village, Maddur Taluk, Mandya district
Karnataka. India

Registered Office

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**Revision in Monitoring plan for "Forced Methane extraction from Organic wastewater", at Mandya District, Karnataka by M/s Sri Chamundeswari Sugars Ltd.
UNFCCC No – UN1088**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$Q_{y, ww}$
Data unit:	m^3
Description:	Volume of wastewater entering the wastewater treatment plant
Source of data to be used:	Actual measurements
Value of data	Value of data would be used to calculate project emissions
Description of measurement methods and procedures to be applied:	Flow meter would be used to measure the volume of wastewater entering the treatment plant and readings would be recoded and archived electronically for the entire crediting period and two years thereafter.
QA/QC procedures to be applied:	Flow meters would be calibrated as per manufacturer's prescribed standards which is once in a year.
Any comment:	

Data / Parameter:	$COD_{y, ww, untreated}$
Data unit:	ton/ m^3
Description:	Chemical Oxygen Demand of the untreated wastewater
Source of data to be used:	Actual measurements in the in-house lab.
Value of data	Value of data would be used to calculate project emissions
Description of measurement methods and procedures to be applied:	COD would be analysed in the in-house lab by internationally accepted standards and archived electronically for the entire crediting period and two years thereafter. Average monthly values would be adopted for estimation of emissions.
QA/QC procedures to be applied:	COD of the untreated wastewater would be analysed in external accredited laboratories once in a month. In case of any major variation between the in-house and external laboratory value, the conservative among them would be considered.
Any comment:	-

Data / Parameter:	$COD_{y, ww, treated}$
Data unit:	ton/ m^3
Description:	Chemical Oxygen Demand of the wastewater leaving the digesters/ entering lagoons
Source of data to be used:	Actual measurements in the in-house lab.
Value of data	Value of data would be used to calculate project emissions
Description of measurement methods and procedures to be applied:	COD would be analysed in the in-house lab by internationally accepted standards and archived electronically for the entire crediting period and two years thereafter. Average monthly values would be adopted for estimation of emissions.
QA/QC procedures to be applied:	COD of the untreated wastewater would be analysed in external accredited laboratories once in a month. In case of any major variation between the in-house

	and external laboratory value, the conservative among them would be considered.
Any comment:	

Data / Parameter:	E_{y, consumed}
Data unit:	MWh/day
Description:	Electricity consumed per day
Source of data to be used:	Actual measurements
Value of data	Data is required to estimate project activity emissions for estimating emissions due to electricity consumed by the facilities in the wastewater treatment plant.
Description of measurement methods and procedures to be applied:	Monthly electricity consumption data of the installations in the wastewater treatment plant shall be recorded.
QA/QC procedures to be applied:	Electricity meters would be calibrated as per standards.
Any comment:	-

Data / Parameter:	MCF_{ww, final} / MCF_{ww, treatment}
Data unit:	Fraction
Description:	Methane correction factor
Source of data to be used:	Default values from Chapter 6 of Volume 5, Waste, IPCC 2006 guidelines and Table III.H.1 of AMS III H/version 4
Value of data	1.0
Description of measurement methods and procedures to be applied:	Required to estimate ex-ante project activity emissions.
QA/QC procedures to be applied:	-
Any comment:	Higher value of Table III.H.1. in AMS III.H./version 4 for anaerobic deep lagoon (depth more than 2 metres)

Data / Parameter:	CH_{4, y, ww, treated}
Data unit:	Tons/ m ³
Description:	Dissolved methane in wastewater leaving the reactors
Source of data to be used:	Default value as per AMS III.H/version 4
Value of data	10e-4
Description of measurement methods and procedures to be applied:	Data is applied to estimate methane dissolved in wastewater leaving the treatment plant
QA/QC procedures to be applied:	Default value as per methodology
Any comment:	If default value is amended subsequently, same would be adopted.

Data / Parameter:	Q_{y, biogas, generated}
Data unit:	Nm ³
Description:	Volume of biogas generated

Source of data to be used:	Actual measurements
Value of data	-
Description of measurement methods and procedures to be applied:	The data would be measured by continuous flow meters and recorded. The data would be electronically archived for the entire crediting period and two years thereafter.
QA/QC procedures to be applied:	Flow meters would be calibrated as per manufacturer's recommendations or atleast once in a year.
Any comment:	-

Data / Parameter:	$Q_{y, \text{biogas, sent to boiler}}$
Data unit:	Nm ³
Description:	Volume of biogas sent to boiler
Source of data to be used:	Actual measurements
Value of data	-
Description of measurement methods and procedures to be applied:	The data would be measured by continuous flow meters and recorded. The data would be electronically archived for the entire crediting period and two years thereafter.
QA/QC procedures to be applied:	Flow meters would be calibrated as per manufacturer's recommendations or atleast once in a year.
Any comment:	-

Data / Parameter:	$Q_{y, \text{biogas, flared}}$
Data unit:	Nm ³
Description:	Volume of biogas flared
Source of data to be used:	Actual measurements
Value of data	-
Description of measurement methods and procedures to be applied:	The data would be measured by continuous flow meters and recorded. The data would be electronically archived for the entire crediting period and two years thereafter.
QA/QC procedures to be applied:	Flow meters would be calibrated as per manufacturer's recommendations or atleast once in a year.
Any comment:	-

Data / Parameter:	C_{CH_4}
Data unit:	%
Description:	Methane content in the biogas
Source of data to be used:	Actual measurements
Value of data	Data would be used to estimate methane content in the biogas generated and the baseline emissions
Description of measurement methods and procedures to be applied:	The methane content of the biogas would be measured once in a month by internationally accepted methods. Average value would be used for estimation of methane content and baseline emissions. The data would be electronically archived for the entire crediting period and two years.
QA/QC procedures to be applied:	-

Any comment:	-
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Data / Parameter:	D_{CH4}
Data unit:	Tons/ m ³
Description:	Density of methane
Source of data to be used:	Default value as given in ACM0001“Consolidated baseline and monitoring methodology for landfill gas project activities”
Value of data	0.0007168
Description of measurement methods and procedures to be applied:	-
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	T_{flare}
Data unit:	° C
Description:	Temperature of the flare
Source of data used:	Actual measurement
Value applied:	actual values
Justification of the choice of data or description of measurement methods and procedures actually applied :	Temperature records would detect the flame and provide an indication that flare was operational for minimum period of 20 minutes within the hour during which 50% flare efficiency would be considered. In an hour the flame is not detected for more than 20 minutes during the hour 0% flare efficiency would be considered during that hour. Thus, the temperature of the flare is monitored using a thermocouple. Calibration as per manufacturer’s recommendations or at least once in every three years.
Any comment:	

Data / Parameter:	H_{flare}
Data unit:	Hours
Description:	Number of hours of operation of flare
Source of data to be used:	Measured and Recorded
Value of data	Data would be used to estimate project emissions due to emissions of flare inefficiency.
Description of measurement methods and procedures to be applied:	The number of hours of operation of flare would be recorded and electronically archived for the entire crediting period and two years thereafter.
QA/QC procedures to be applied:	-

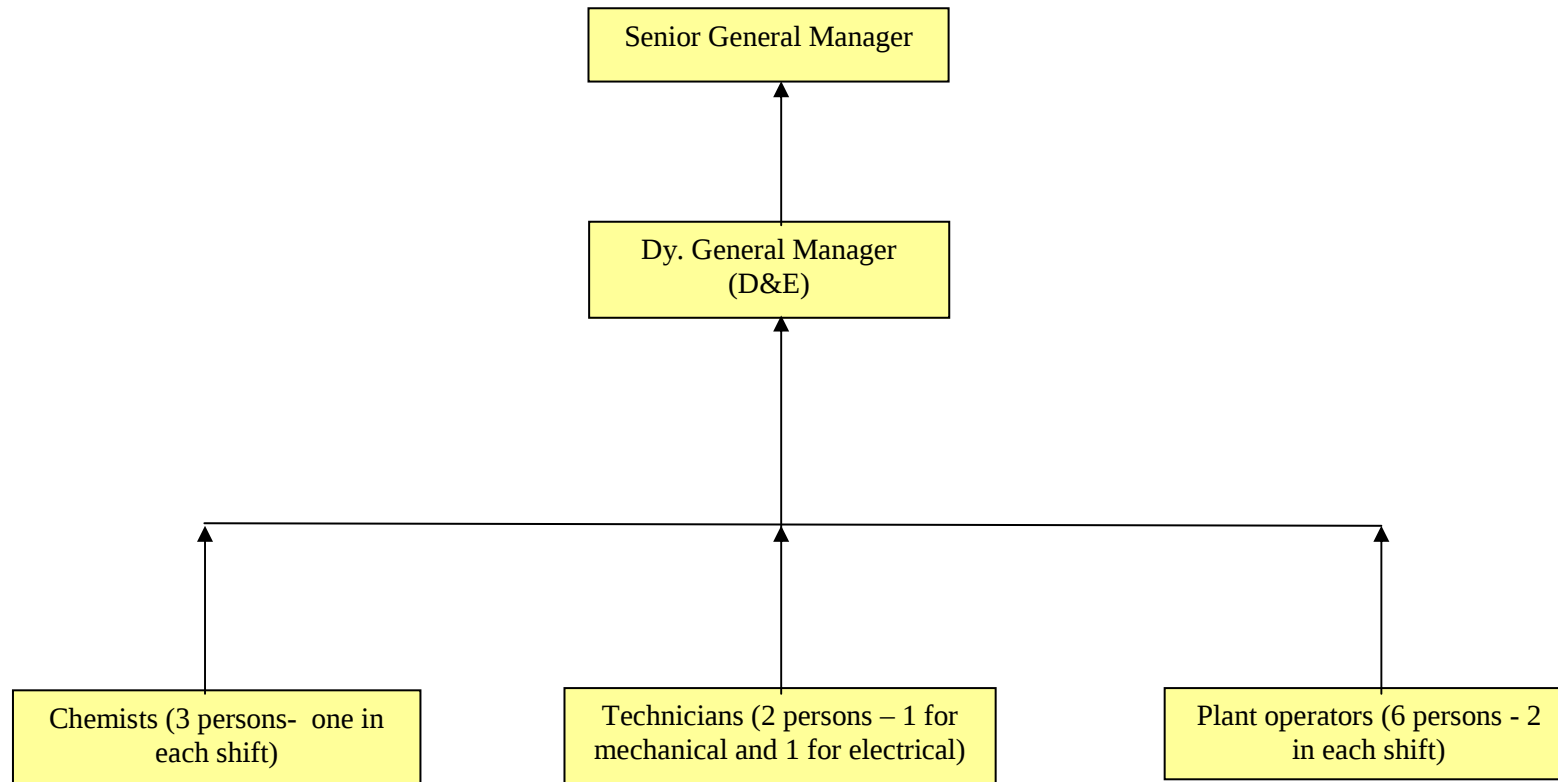
Data / Parameter:	S_{y, generated}
Data unit:	tonnes
Description:	Quantity of final sludge from UASB reactors
Source of data to be used:	Actual measurement
Value of data	Monitored to neglect the emissions due to decay of this sludge

Description of measurement methods and procedures to be applied:	The sludge derived from the UASB is loaded on to vehicles. Weight of these vehicles loaded with final sludge out of the premises would be measured.
QA/QC procedures to be applied:	Calibration of weighbridge been conducted once in a year by the Weight and Measurement Department of Government of Karnataka
Any comment:	-

Data / Parameter:	S_y, composted
Data unit:	tonnes
Description:	Quantity of final sludge from UASB reactors sent to compost yard
Source of data to be used:	Actual measurement
Value of data	Monitored to neglect the emissions due to decay of this sludge
Description of measurement methods and procedures to be applied:	The vehicles carrying final sludge left from the premises would be received at the compost yard. Weight of these vehicles loaded with final sludge would be determined before dumping to compost yard.
QA/QC procedures to be applied:	Calibration of weighbridge been conducted once in a year by the Weight and Measurement Department of Government of Karnataka
Any comment:	-

B.7.2 Description of the monitoring plan:

The project activity is located in the premises of sugar mill and distillery complex. Senior General Manager is the overall head of operations of the complex. The Senior General Manager is in charge of operations of the wastewater treatment plant including methane recovery system and other facilities in the wastewater treatment plant.



The organization structure illustrated shall be in charge of the operation and maintenance of the wastewater treatment plant.

Training of personnel

UEPL, the technology provider for the methane recovery system, has trained the personnel of SCSL in operation, trouble shooting and maintenance of the methane recovery system. UEPL's personnel were at site for one year from the date of commissioning the plant. During this period SCSL 's personnel were trained in operation, maintenance, trouble shooting, analysis of operating parameters, measuring COD, analysis of biogas and other safety measures of the anaerobic digestion plant.

The plant operators run the plant on a day today basis and are assisted by two technicians for maintenance of mechanical and electrical installations in the plant. A chemist with graduate/postgraduate qualification in chemistry would be available in each shift for analysis of all operating parameters like COD, biogas, etc,

The technicians will be responsible for maintenance of equipment and installations in the anaerobic digestion plant. Any break down shall be recorded with details like type of break down, trouble shooting done, etc., and verified by the Dy. General Manager (D&E)

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Data monitoring

Records shall be maintained for quantity of waste water entering the digesters/day, its COD, gas flowing to heating equipment, gas to flare etc., All these records shall be verified by Dy. General Manager (D&E) and after verification and approval shall be maintained in electronic form as per monitoring methodology. The records shall be maintained in office cum laboratory of the anaerobic digestion plant. A back up shall be created in electronic form for all the records and maintained for two years after last issuance of CERs. The monitoring parameters like COD of wastewater entering digesters, COD of wastewater leaving the digesters, flow of wastewater entering digesters, methane content of biogas etc., shall be measured and recorded by the chemists. These parameters shall be checked by Dy. General Manager (D&E). After approval by the Dy. General Manager (D&E) these values shall be maintained in electronic form till two years after the last issuance of CERs.

QA/QC procedures

All instruments like wastewater flow meter, gas flowmeter, temperature and pressure measuring instruments, Gas analyser shall be calibrated as per manufacturers' recommendations. The flowmeters shall be calibrated as per international/ manufacturers' recommendations or atleast once in a year.

Internal Audits

All reported results and measurements shall be periodically reviewed by Senior General Manager and any discrepancy shall be corrected with authorization from Senior General Manager.

Emergency

The project activity does not have any operation that would not result emergency emissions. Hence, there is no data monitored for emergency preparedness.

UEPL shall train the SCSL staff in all emergency requirements. The staff shall be trained in operation and maintenance of fire fighting equipments like fire extinguishers. The emergencies can be leakage of biogas from gas holders, other gas handling equipment like gas cleaning system, gas blowers. Although all the equipment, piping and instrumentation are as per explosion proof and gas tight, emergencies can happen. The staff shall be trained to feel such leakages and immediately rectify the leakage areas.

Annex 4

MONITORING INFORMATION

As per the methodology, “the emission reductions of the project activity shall be based on the amount of methane recovered and fuelled or flared, which is monitored ex-post, using continuous flow meters. The project emissions and leakage will be deducted from the emission reductions calculated from the methane recovered and combusted.”

The calculations of emission reductions from the project activity as per above monitoring procedures shall be carried out as follows:

The quantity of biogas that is generated, sent to boiler and flared, shall be measured by flow meters and recorded

The methane content of biogas in percentage shall be measured once in a month and average value shall be adopted and this value would be C_{CH_4} .

The emission reductions ER_y would be given by the following formula:

$$ER_y = BE_y - PE_y$$

$$BE_y = (Q_{y, \text{ biogas, sent to boiler}} * \text{Combustión Efficiency}) + (Q_{y, \text{ biogas, flared}} * \text{Flare Efficiency}) * C_{CH_4} * D_{CH_4} * GWP_{CH_4}$$

The project emissions (PE_y) shall be calculated as described in the section B.6.1. and deducted from emission reductions to calculate the emission reductions of the project activity. The grid emission factor is used to calculate project emissions on account electricity consumption. As per the registered PDD, the emission factor of 0.86 tCO₂e/MWh has been used for the entire crediting period.

While calculating the project emissions due to inefficiencies of the capture and flare, a default value of 0.5 (Flare efficiency) shall be used when the biogas is combusted in the open flare. When biogas is combusted in the heating equipment, a default value of 1.0 (Combustión efficiency) shall be used for the reason that, in the project activity the biogas is combusted along with bagasse in the boilers where all the biogas would combust and efficiency would be 100 %. All the biogas generated in the project activity would be consumed in the heat generating equipment. However during maintenance of heat generating equipment or exigencies, there may be occasions when flare is used to combust the biogas. The number of hours of operation of flare

shall be monitored as H_{flare} and the quantity of biogas flared shall be obtained by measuring the volume of biogas flared.

Regular maintenance of the flare would be ensured as per manufacturer recommendation.

Sludge from UASB digesters

The final sludge from UASB digesters is drained periodically from the digesters. Since sludge is there inside UASB digesters for sufficiently long time, it would have completely digested and would not decay any further. This sludge could be directly used for soil application. However, to avoid any minor decay that may happen due to the sludge, this sludge is mixed with pressmud and composted aerobically. Since the sludge is aerobically composted, anaerobic decay would not happen. The quantity of sludge generated and disposed in compost yard would be monitored.