



VERIFICATION REPORT FOR

“CHEMICAL RECOVERY PROJECT AT
SATIA INDUSTRIES LTD. (SIL), FORMERLY
KNOWN AS SATIA PAPER MILLS LIMITED
VILLAGE RUPANA, PUNJAB”



Document Prepared by Earthhood Services Private Limited

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Summary:

Earthood Services Private Limited (hereafter referred to as ESPL) has been contracted by Infinite Solutions to conduct the verification of the project - "Chemical Recovery project at Satia Industries Ltd. (SIL), formerly known as Satia Paper Mills Limited village Rupana, Punjab", VCS ID 614 with regard to the relevant requirements of VCS programme guidelines and standard (VCS standard version 4.0, & VCS program guide version 04.0). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for verification.

The monitoring period covers under this verification are from 01/09/2010 to 27/03/2016 (including both days).

The verification includes confirming the implementation of the monitoring plan of the registered VCS PD and MR (VCS ID 614) and the application of the monitoring methodology as per AMS III.M., Version 02: "Reduction in Consumption of Electricity by Recovering Soda from Paper Manufacturing Process".

The purpose of the project activity is to recover the caustic soda from waste black liquor generated at the pulping stage of the paper manufacturing process. During the site visit the assessment team has verified that the electricity consumption for the process of recovery of one ton of soda is much lesser than that consumed in the production of fresh stock of soda, hence project would help curb the GHG emissions into the atmosphere.

The project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable, and verifiable and also plays beneficial role in the mitigation of climate change.

A risk-based approach has been followed to perform this verification. In the course of verification, 02 Corrective Action request (CARs), 00 Forward Action request (FARs), and 01 Clarification request (CLs) were raised and successfully closed.

The review of the project design documentation, monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and stakeholders have provided ESPL with sufficient evidence to validate the fulfillment of the stated criteria.

ESPL confirms that the project is implemented in accordance with the registered VCS PD. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the emission reductions from the project activity "Chemical Recovery project at Satia Industries Ltd. (SIL), formerly known as Satia Paper Mills Limited village Rupana, Punjab" in India during the period 01/09/2010 to 27/03/2016 (including both days) amount to 117,415 tons of CO₂e.

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1 INTRODUCTION

1.1 Objective

Earthood Services Private Limited (ESPL) has been contracted by Infinite Solutions (other entity in the project activity), to undertake the verification of the renewable energy project titled “Chemical Recovery project at Satia Industries Ltd. (SIL), formerly known as Satia Paper Mills Limited village Rupana, Punjab” (VCS ID-614) The verifiers have reviewed the GHG data collected to date for the monitoring period from 01/09/2010 to 27/03/2016 (both days included) covered in this verification. The objective of this verification is a thorough and independent assessment of registered project activities against the applicable VCS requirement by the VVB. The verification process shall determine whether the proposed project activity complies with the requirements of latest VCS guidelines, applicability conditions of the selected methodology, relevant host country regulations and guidance issued by the VCS Board.

1.2 Scope and Criteria

The scope of verification is to assess the claims and assumptions made in the VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard, applied methodology and other relevant rules and requirements established for VCS project activities.

The Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

The level of assurance of the verification report falls under reasonable assurance engagements as selected by the Client. Reasonable assurance is a high level of assurance regarding material misstatements, but not an absolute one.

Reasonable assurance includes the understanding that there is a remote likelihood that material misstatements will not be prevented or detected on a timely basis. To achieve reasonable assurance, the auditor needs to obtain sufficient appropriate audit evidence to reduce audit risk to an acceptably low level. This means that there is some uncertainty arising from the use of sampling, since it is possible that a material misstatement will be missed.

1.4 Summary Description of the Project

The project activity involves the recovery of caustic soda from waste black liquor generated in paper manufacturing unit. Production of caustic soda in traditional soda manufacturing processes requires more energy in comparison to recovery of equivalent amount of caustic soda hence the reduction of the additional GHGs from the environment. The chemical recovery plant in SIL's plant premises at Muktsar, Punjab.

The weak black liquor generated in paper manufacturing unit is evaporated and burned in the recovery boiler to recover the soda for reuse in the pulping process. The assessment team has physically checked the equipment involved in project activity such as, evaporation plant, recovery boiler, smelt dissolver and Causticizing Plant. All the equipment's is well connected to the online data monitoring system (DCS), functioning and monitoring of all the components was verified through DCS. 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 of soda.

The electricity consumption in the process of recovery of soda is being measured through the energy meters, the quantity of soda recovered is measured through flow meter and quantity of furnace oil used for thermal energy generation in recovery process by measuring scale. The assessment team has verified the calibration certificates of all the measuring instruments and interviewed the site personnel during the site visit and confirmed that all the meters/instruments were working satisfactorily during the monitoring period. Based on the assessment of the documents, the assessment team is able to confirm that the project activity is fully functional and implemented as described in the registered VCS PD.

2 VERIFICATION PROCESS

The registered VCS project is undergoing third verification, the approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

The verification approach consists two phases.

In the first phase, ESPL completed a strategic review and risk assessment of the project's activities and processes in order to gain a full understanding of;

Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;

Protocols used to estimate or measure GHG emissions from these sources;

Collection and handling of data;

Controls on the collection and handling of data;

Means of verifying reported data; and

Compilation of the Monitoring Report.

At the end of this phase, ESPL produced a Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

In the second phase using the Verification checklist, ESPL verified the implementation of the monitoring plan and the data presented in the VCS MR/04/ for the period in question. This involved physical site visit & interviews of project proponent representative's and a desk review of the Monitoring Report. This verification report describes the findings of this assessment.

2.2 Document Review

The verification is performed primarily as a document review of the registered VCS PD/01/, previous MR and Verification report/02/ and associated documents as stated in details in appendix 1 of this document. A verification team using a protocol performs the assessment. The cross checks between information provided in the Monitoring report, VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

The on-site visit for the project location, by the assessment team, was conducted on 23/08/2019 and the following stakeholders were interviewed.

Location: District - Muktsar, State - Punjab	Date: 23/08/2019
Coverage	Source of Information / Persons Interviewed
Project implementation, start date as per the VCS requirements. Electricity Generation Records (monthly energy statements, Invoices) Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure	Mr. Ajay Jindal (SIL) Mr. Jimmy Sah (Infinite Solutions)

Monitoring and measuring system Collection of measurements Observations of established practices Data Verification of monitoring parameters	Mr. Deepak Sharma (SIL)
QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations	Mr. Ajay Jindal (SIL)

2.4 Site Inspections

A site visit was undertaken by ESPL team on 23/08/2019 to carry out the following:

- An assessment of the implementation and operation of the registered project activity as per the registered VCS PD/01/ and VCS MR/05/;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PD/01/;
- A cross check between information provided in the monitoring report and data from other sources such as plant logbooks/12/, inventories, purchase records or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PD/01/, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;
- A review of calculations and assumptions made in determining the GHG data and emission reductions/07/;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions. This is done based on the desk review and interaction with site personnel over phone. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

CAR (Corrective Action Request) is raised if one of the following occurs:

Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;

Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants. Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised by the ESPL during verification shall be resolved prior to submitting a request for issuance.

FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period. All the findings that are raised and communicated to project participant during the verification are included under Appendix 3. The section also includes the response, if provided, by the project participants and an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is undergoing third verification in VCS; there were no FARs raised during the validation or previous verification/03/.

2.6 Eligibility for Validation Activities

No validation activities are undertaken as part of the verification and hence not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is already registered under VCS program (VCS ID-614) and is not registered under any other emissions trading program or any other mechanism that includes GHG allowance trading. PP also confirms that net GHG emission reductions or removals generated during this monitoring period shall not be used for compliance under any such programs or mechanisms. This was confirmed through a declaration/15/ submitted by the PP and hence accepted by the assessment team.

There is no methodology deviation identified during the current monitoring period.

3.2 Project Description Deviations

No project deviations identified during the current monitoring period.

3.3 Grouped Project

Not applicable. The project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The purpose of the project activity is to recover the caustic soda from waste black 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 of soda. The project proponent has commissioned a chemical recovery plant in SIL's plant premises at Muktsar, Punjab/16/ with the ultimate objective to reduce the GHG emissions in the atmosphere.

The calibration records/certificates of the flow meters, energy meters (in recovery plant), vaporization plant, causticizing plant installed at site/08/ were verified during the site visit and found that the calibration records were valid for the current monitoring period. The project proponent has installed the biomass based captive power plant to meet the electricity requirement of project activity in soda recovery process and hence project emission from the electricity consumption is accounted as zero. The assessment team has physically verified the biomass-based power plant, associated with project activity, log book maintained at the power plant and interviewed the personnel involved in the plant operations.

The project proponent has submitted an undertaking/19/ declaring that the project activity is solely dependent on the biomass based captive power plant for electricity requirement and biomass-based power plant will not claim the credits under any GHG emission reduction schemes.

The project proponent has adequately maintained the log book and electricity bills at plant office and the assessment team has verified the same during the site visit and ensured that there is sufficient power generation by biomass based captive power plant to meet the power requirement for project activity and there is no double counting by accounting project emission as zero. The information relating to the project implementation, provided in the Monitoring Report /05/ is consistent with that stated in the registered PD /01/. The data and variables provided in the monitoring report are the same as stated in the registered PD/01/. Total emission reductions achieved under this monitoring period 01/09/2010 to 27/03/2016 (including both days) is 117,415 tCO₂e. Assessment team concludes the following:

- a) There are no material discrepancies between project implementation and the project description provided in the registered PD/01/.
- b) The monitoring plan is implemented completely and monitoring system (i.e., process and schedule for obtaining, recording, compiling and analysing the monitored data and parameters) is appropriate.
- c) There are no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/14/.

- d) The GHG emission reductions or removals generated by the project have not included in an emissions trading program or any other mechanism that includes GHG allowance trading/15/.
- e) The project has not received or sought any other form of environmental credit, or has become eligible to do so since validation or previous verification/19/.
- f) The project is registered under VCS only.

The project activity is complying with indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.11 of MR/05/.

4.2 Safeguards

4.2.1 No Net Harm

There is no negative impact to any socio-economic conditions of the region due to the project activity. Social and environmental impacts of the project have been sufficiently addressed. No adverse environmental impacts compared to baseline situations as well as trans-boundary impacts have been envisaged from this project activity. Compliance of environmental monitoring as per ISO 14064-2: 5.2.k has been checked and found satisfactory. As per the national law no requirement of carrying out EIA is prescribed for such kind of project.

4.2.2 Local Stakeholder Consultation

The project activity undergoing second verification and local stakeholder consultation was appropriately conducted prior to validation as a way to inform the design of the project and maximize participation from stakeholders during the validation.

The project proponent has implemented mechanism for ongoing communication with local stakeholders to allow stakeholders to raise concerns about potential negative impacts during implementation and operation of the project activity. The project proponent has placed a grievance register and a grievance box at plant office/27/, where the local villagers can register their concerns.

The assessment team has checked the copy of grievance register maintained at plant office/27/ and confirmed that no formal complaints were received during the current monitoring period.

4.3 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The calculation of the emission reductions is found to be correct. The details of the reported and the verified values for all parameters are listed in section 4.5 of this report.

The emission reductions are calculated on the basis of the data recorded through the energy meter readings at the project location. The monitoring instruments are calibrated once in a year in line with the manufacturer's specifications, hence deemed accurate. The assessment team has also verified the annual reports published by soda manufacturers/09/, electricity bills/25/, calibration certificates/08/ of instruments (energy meters, flow meter, measuring scale and weigh bridge) as evidence to determine emission reductions and to cross check the values. The values of the monitoring parameters were verified from the log books/plant records/24/, validated PD and were found to be satisfactory. All the evidences are also listed under appendix-1 of this report.

The total quantity of furnace oil used during the monitoring period are verified through the purchase records(invoices) and the quantity of soda recovered is calculated based on the data recorded through the of white liquor flow meter. The test records for strength of soda are adequately maintained at the project plant/17/ and verified during the site visit. The assessment team has reviewed the calibration records of Weigh Bridge and measuring scale /08/and found valid for the current monitoring period.

Emission factor of the Furnace Oil is considered as per the IPCC 2006 data/13/ in line with the registered PD.

As per CER excel spreadsheet/07/ submitted by the PP, the net emission reductions for the current monitoring period were verified as 117,415 tCO₂e for the current monitoring period.

The assessment team able to confirm that the GHG emission reductions and removals have been quantified correctly in accordance with the project description and applied methodology

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

All the data recorded is in compliance with the registered VCS PD and Monitoring Report. The monitoring parameters like white liquor production, power consumption, furnace Oil consumption are recorded daily in the plant logbooks which are reviewed, verified and finally approved by the Director of the company.

The assessment team has verified the receipt of furnace oil purchase, electricity bills, calibration certificates of involved equipment's such as energy meters, flow meter, weigh bridge and measuring

scale were submitted by the project participant as evidence to determine emission reductions and confirmed that the monitoring instruments are calibrated regularly as per the manufacturers' specifications to achieve highest levels of accuracy. The following parameter has been verified for current monitoring period:

Parameter: Quantity of soda recovered in the process, (Tonnes/annum):

Means of verification		
	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Quantity of soda recovered in the process is monitored through flow meter and is recorded in the log books and reporting is done on the daily / monthly basis /24/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan.
	Monitoring equipment	This parameter is measured through flow meter installed at project site.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the flow meter (0.001 mq/hrs) is in line with the registered monitoring plan.
	Calibration frequency /interval:	Calibration frequency of the meters is once in a year /01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered VCS PD/01/.

	selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	
	How were the values in the monitoring report verified?	The quantity of soda recovered in the process is measured in cubic meter and monitored in tones. Quantity of soda recovered in tones is calculated based on the strength of the Soda in white liquor in gram per 1000 ml (gpl) of liquid soda and is determined in house laboratory/17/. The value of gpl multiplied with the flow in m³ and divided by 1000 gives the value in tones. Value of soda recovered during the current monitoring period is verified as 67,590.29 tones.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the PP implemented the adequate QA/QC procedures. The flow meter is also connected with (DCS), the flow meter provides the flow data of machines, monitored as a real-time basis. The log book monitoring/24/ and calibrated meters provides a back- up (fail safe measure) in case the monitoring is not carried out or fails to function through DCS.
	In case project participants have temporarily not monitored the parameter, has either a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be	

	applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.
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Parameter 2: Annual Electricity consumed to recover soda in recovery plant, EPT (kWh/annum)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	This parameter is measured through energy meters and recorded daily basis in the plant log book/24/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, this parameter is recorded in line with the approved monitoring plan.
	Monitoring equipment	This parameter is measured through energy meters installed at plant.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of energy meters is in line with the local standards and as stated in the monitoring plan.
	Calibration frequency /interval:	Calibration frequency of the meters is once in a year /01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards,	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered VCS PD/01/.

	or as per the manufacturer's specifications?	
	How were the values in the monitoring report verified?	The electricity consumed in the soda recovery process is supplied by the in-house biomass based captive power plant and hence emission from the consumption of electricity in soda recovery is taken zero. The PP has submitted the declaration confirming that the project activity is solely dependent on the biomass based captive power plant for electricity requirement and biomass-based power plant is not claiming credits under any GHG emission reduction schemes. The monthly values of this parameter are directly sourced from plant records/24/. The PP has correctly reported the monthly values in the emission reduction spread sheet/07/. The value of E_{PT} for the current monitoring period is 46,755,533.22 kWh.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of E _{PT} for the current monitoring period were further cross-checked with the monthly electricity bills /25/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the PP implemented the adequate QA/QC procedures. This parameter is recorded in the plant log book on daily basis and checked by the monitoring supervisors. The data recorded in the log book is referred to prepare reports on a monthly basis and the monthly reports are finally reviewed by the top management officials.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.

Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

Parameter 3: Quantity of fossil fuel (furnace oil) consumed for thermal energy in the recovery process, Qff,Y (Tonnes/annum)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Quantity of furnace oil consumed for thermal energy generation in the soda recovery process is monitored on daily basis and recorded monthly/24/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan, this parameter is monitored daily and recorded on monthly basis.
	Monitoring equipment	Quantity of furnace oil consumed for thermal energy generation in the soda recovery process is monitored by standard measuring scale.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The measuring scale with least count 1mm is used which is as stated in the monitoring plan.
	Calibration frequency /interval:	Calibration frequency of the meters is once in a year /01/.

	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered VCS PD/01/.
	How were the values in the monitoring report verified?	The quantity of furnace oil consumed is measured kiloliter (kl) and same is converted to tones based on the FO density factor as per the laboratory chemical test report/17/. The monthly values of this parameter are directly sourced from plant records/24/. The PP has correctly reported the monthly values in the emission reduction spread sheet/07/. The value of $Q_{ff,Y}$ for the current monitoring period is 4911 Mt.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of $Q_{ff,Y}$ for the current monitoring period were further cross-checked with the purchase invoices/23/and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the PP implemented the adequate QA/QC procedures. This parameter is recorded in the plant log book on daily basis and checked by the monitoring supervisors. The data recorded in the log book is referred to prepare reports on a monthly basis and the monthly reports are finally reviewed by the top management officials.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation	No such issues.

	been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Parameter 4: Quantity of residues produced from the recovery plant, Q_{residue} (Tonne)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Quantity of residues produced from the recovery plant is monitored on daily basis and recorded in the log book/12/.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan, this parameter is recorded on daily basis in the log book.
	Monitoring equipment	This parameter is measured through the weighbridge.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Weighbridge of level 3% used for the measurement of the quantity of residues produced from the recovery plant in line with the monitoring plan.

	Calibration frequency /interval:	Calibration frequency of the weighbridge is once in a year/01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered VCS PD/01/.
	How were the values in the monitoring report verified?	The monthly values of this parameter are directly sourced from the plant log book/12/. The PP has correctly reported the monthly values in the emission reduction spread sheet/07/. The value of Q_{residue} for the current monitoring period is 103142 Mt.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the PP implemented the adequate QA/QC procedures. This parameter is recorded in the plant log book on daily basis and checked by the monitoring supervisors. The data recorded in the log book is referred to prepare reports on a monthly basis and the monthly reports are finally reviewed by the top management officials
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the	No such issues.

	CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Parameter 5: % residue used for the production of lime

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	This parameter accounts the portion of residue used for the production of lime and recorded in the plant log book whenever used/12/.
	How were the values in the monitoring report verified?	During the site visit, the assessment team has physically inspected the site, interviewed the plant personnel and it was found that there is no lime production from the residue generated from the recovery of soda. In line with the registered monitoring plan all the residue produced is used for land fill during the monitoring period. The PP has submitted declaration/20/ stating that no lime is produced from the residue generated from soda recovery within and outside the project boundary.

	If applicable, has the reported data been cross-checked with other available data?	
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Not applicable
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Parameter 6. % residue disposed off

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	This parameter accounts the pportion of residue that is disposed in a solid waste disposal site and recorded daily in the plant log book/12/.
	How were the values in the monitoring report verified?	During the site visit, the assessment team has physically inspected the site, interviewed the plant personnel and it was found that complete amount of the residue generated from the project plant is disposed -off to fill the low-lying areas at the project location during the monitoring period.

	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Not applicable
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CAR #1 and CAR #2 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Parameters fixed ex ante:

Annual Electricity consumed in producing 1 tonne of soda by the soda manufacturer during the crediting period, E BT (ex- post), kWh/tonne annually:

This parameter is determined based on the energy consumption in the production of soda by the chemical manufacturers published through the annual reports of the respective company. The value is considered as 2447 kWh/tonne.

Since the data for the energy consumption for the production of one tonne of soda has been directly sourced from the manufacturer's annual report/26/, hence deemed authentic.

Emission factor of the fossil fuel used for generating thermal energy, EF ff, y, Tonne CO₂/tonne of fossil fuel (furnace oil):

Emission factor of the fossil fuel used for generating thermal energy is from the NCV and emission factor value mentioned in the IPCC Guideline 2006/13/, fixed for the entire crediting period. The value is considered as 3.13 Tonne CO₂/tonne of fossil fuel (furnace oil), that is consistent with the registered VCS PD and MR.

Calibration of meters:

During the verification assessment of the project activity, accuracy of all the metering have been checked and found appropriate. The installation and working conditions of the meters were checked through calibration certificates, physical inspection and were found to be satisfactory. Details of meters are provided in below table:

Meter name	Meter Sr.No.	Accuracy class	Calibration date	Relevant Parameter
Flow meter	8813721-9000	0.001 mq/hrs	22/09/2009, 21/09/2010, 20/09/2011, 10/09/2012	Quantity of Soda
Energy meter (CRP Boiler)	15622832607- 3008(new meter)	± 1%	28/06/2010, 06/07/2011, 05/07/2012	Electricity consumed in Recovery plant
Energy meter (For Causticizing unit)	5859743	± 1%	01/03/2010, 28/02/2011	Electricity consumed in Recovery plant
Energy meter (for Evaporator	1K040562	± 1%	01/03/2010, 28/02/2011	Electricity consumed in Recovery plant
Weigh bridge	610002	0.03	29/06/2010, 27/06/2011	Residue Produced
Measuring Scale	401	1mm	06/10/2009, 21/09/2010, 20/09/2011	Quantity of fossil fuel consumed in recovery process

It is evident from the above table that calibration of all the existing meters was valid during the current monitoring period, hence no delay in calibration of meters identified.

The details of monitoring equipment are involved in the project activity and their calibration details/08/ are mentioned under Appendix-1 of the VCS MR/05/. During the site visit, the assessment team has verified the calibration records/certificates of the flow meters, Electricity meters (in recovery plant (CRP boiler), vaporization plant, causticizing plant installed at site and found that the monitoring period from 01/09/2010 to 27/03/2016 is covered by the calibration records.

In view of the above discussion the assessment team able to confirm that evidence used to determine the GHG reductions and removals are sufficient and appropriate with respect to quality and quantity.

GHG Calculations

As per the clause 7 of the “Approved Small Scale methodology AMS III.M”, Version02, the formula provided for the calculation of baseline emissions is:

$$BE_y = Q_{rec,y} * EB_T * EF_B$$

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)

EB_T - Electricity consumed for producing 1 tonne of soda (kWh/tonne)

EF_B - Emission factor of the electricity used for soda production (tCO₂/MWh)

The emission factor (EF_B) for the soda production in the baseline has been determined as weighted average of the NEWNE grid emission factors according to the- CEA's Baseline Carbon Dioxide Emission Database Version 4.0, as mentioned in the registered VCS PD.

$$Q_{rec,y} = 67,590 \text{ MT}$$

$$EB_T = 2447 \text{ kWh/tonne}$$

$$EF_B = 0.80317 \text{ tCO}_2/\text{MWh}$$

$$\text{Thus, } BE_y = 67,590 \text{ MT} * 0.0080317 \text{ tCO}_2/\text{kWh} * 2447 \text{ kWh/tonne}$$

$$BE_y = 132,822 \text{ tCO}_2$$

The emission reduction achieved by the project activity shall be calculated as the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = BE_y - PE_y - \text{Leakage}$$

Where,

ER_y Emission reduction in the year “y” (tCO₂ e)

PE_y = Project emissions

Project emissions are calculated as follows:

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

$$PE_{\text{electrical}} = Q_{rec,y} * E_{PT} * EF_P$$

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/MWh)

Electricity requirement of project activity in soda recovery process is met from biomass based captive power plant and hence project emission from the electricity consumption is accounted as zero, hence the emission due to electricity consumption is not being considered in project emissions.

$$PE_{\text{electrical}} = 0$$

The project emissions due to thermal energy consumption by the recovery process (tCO₂e) are calculated as:

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

Where,

$Q_{\text{ff}, y}$ = Quantity of fossil fuel consumed for thermal energy in the recovery process in year “y” (tonnes)

$EF_{\text{ff}, y}$ = Emission factor for the fossil fuel (tCO₂/tonne)

Emission factor for the fossil fuel is considered as 3.13 Tonne CO₂/tonne of fossil fuel (furnace oil) as per the IPCC guideline 2006 in line with the registered PD.

$$Q_{\text{ff}, y} = 4911 \text{ tonnes}$$

Thus,

$$PE_{y, \text{thermal}} = 15,407 \text{ tCO}_2 \text{ (rounded up value)}$$

As per the applied methodology, leakage emissions are to be considered in the following conditions:

- i. If the caustic soda recovery equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.
- ii. If a quantity of the residue is used in producing lime (CaO) in a facility outside the boundary then CO₂ emissions from the production of lime shall be considered as leakage to conservatively estimate emission reductions.

The assessment team has verified during the onsite assessment that no equipment transferred from another activity and the project proponent has submitted the undertaking stating that 100% of residue produced is disposed off in land fill. Hence no leakage emissions are considered.

The emission reduction achieved by the project activity:

$$ER_y = BE_y - PE_y - \text{Leakage}$$

$$ER_y = 132,822 - 15,407 - 0$$

$$= 117,415 \text{ tCO}_2$$

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed. The assumptions, emission factors and default values that were applied in the calculations are justified. The actual emission reduction achieved during the current monitoring period are 3.85 % lesser than the estimated amount of emission reductions as determined in the registered VCS PD/01/. All the data were made available and have monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described

4.6 Non-Permanence Risk Analysis

Not applicable for the project activity.

5 VERIFICATION CONCLUSION

Earthood Services Private Limited (ESPL), contracted by Infinite Solutions, to perform the independent verification of the emission reductions for the VCS project activity “Chemical Recovery project at Satia Industries Ltd. (SIL), formerly known as Satia Paper Mills Limited village Rupana, Punjab” (VCS ID- 614) in India for the monitoring period 01/09/2010 – 27/03/2016 as reported in the Monitoring Report Version 03 dated 08/03/2021. The Satia Paper Mills Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. ESPL commenced the verification on the basis of the applied methodology AMS III.M., Version 02 , the monitoring plan contained in the registered VCS PD Version 02, dated 11/11/2009 and VCS guidelines version 4.0, Monitoring Report Version 03 dated 08/03/2021 as per the process described under Section 2 of this report. ESPL verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated. In our opinion the GHG emissions reductions reported for the project activity for the period 01/09/2010 – 27/03/2016 are fairly stated in the Monitoring Report Version 03 dated 08/03/2021 The GHG emission reductions were calculated correctly on the basis of the applied methodology AMS III.M., Version 02 , and the VCS standard version 4.0.

Verification period: From 01/09/2010 – 27/03/2016 (including both days)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2010 (from 01/09/2010 to 31/12/2010)	8,104	662	0	7,442
2011 (01/01/2011 to 31/12/2011)	24,318	1,961	0	22,357

2012 (01/01/2012 to 31/12/2012)	23,715	1,624	0	22,091
2013 (01/01/2013 to 31/12/2013)	21,005	2,221	0	18,784
2014 (01/01/2014 to 31/12/2014)	23,665	2,217	0	21,448
2015 (01/01/2015 to 31/12/2015)	25,599	5,597	0	20,002
2016 (from 01/01/2016 to 27/03/2016)	6,416	1,125	0	5,291
Total	132,822	15,407	0	117,415

Approved by



Dr. Kaviraj Singh
Managing Director
Earthood Services Privated Limited

Date: 26/03/2021
Place: Gurugram, Haryana

APPENDIX 1:DOCUMENT REFERENCES

S.No	Title of Document	Version	Date
1.	Registered VCS PD	Version 4	16/11/2009
2.	VCS Validation Report	Report Number: 53216608-08/474	19/11/2009
3.	VCS Verification Report for the monitoring period 01/11/2008 to 31/08/2010	Report No: 8107630527 - 11/114	08/09/2011
4.	VCS Monitoring Report	02	18/12/2020
5.	VCS Monitoring Report (Final)	03	08/03/2021
6.	ER spread sheet	01	18/12/2020
7.	ER spread sheet (corresponding to the final monitoring report)	02	08/03/2021
8.	Calibration records for the key instruments and measuring devices: Calibration certificate of Flow meter 1 sr.no. 88137219000 associated with CRP Calibration certificate of Flow meter 2 sr. no. 88025D20000 associated with CRP Calibration certificate of Energy meter_1 Sr.No. 05859743 associated with CRP Calibration certificate of Energy meter_2 Sr.No. 1K040562 associated with CRP dated 06-03-2006, 05-03-2007, 04-03-2008, 02-03-2009 Calibration certificate of Energy meter_3 Sr.No. 05859750 associated with CRP Weighbridge Calibration certificates	-	-
9.	Directors Report for 6 consecutive years from March 2011 to March 2016	-	-
10	Logbook of furnace oil from 2010 to 2016	-	-
11	Sample invoice copies to cross check the Soda recovered)	-	-
12	Log books for the verification period 01/09/2010 to 27/03/2016		-

S.No	Title of Document	Version	Date
13	1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2006 IPCC Guidelines for National Greenhouse Gas Inventories:		
14	Approved CDM Methodology AMS III.M, "Reduction in Consumption of Electricity by Recovering Soda from Paper Manufacturing Process"	Version 02	-
15	CEA Database	version 04	-
16.	Commissioning certificate of the VCS Project	-	Dated 02/03 2006
17	Laboratory test report for specific gravity of FO and strength of soda recovered.	-	-
18	VCS webpage for the project, VCS ID 614; https://registry.verra.org/app/projectDetail/VCS/614	-	-
19.	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	-
20	- Undertaking for not producing lime from the residue - Undertaking that project activity is consuming electricity from biomass-based power plant which is not claiming emission reductions under any emission reduction scheme.	-	-
21	VCS Standard	Version 4.0	19/09/2019
22	VCS Program Guide	Version 4.0	19/09/2019
23	Copies of invoices for furnace oil used in CRP boiler.	-	-
24	- Log books of the electricity consumption - Log books of soda recovered - Log books of fuel oil consumption	For the period 01/09/2010 to 27/03/2016	
25	Electricity Bills of the Satia Paper Industry	For the period 01/09/2010 to 27/03/2016	28/05/2019

S.No	Title of Document	Version	Date
26	Annual Reports of PACL and SIEL for the year 2010 to 2016 as the proof of electricity consumed to produce 1 ton of soda.	-	-
27	Grievance register/suggestion box placed at site office	-	-

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
ABT	Availability Based Tariff
BEF	Baseline Emission Factor
BM	Build Margin
CAR	Corrective Action Request
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CL	Clarification Request
CMS	Central Monitoring System
CMP	Conference of Parties Serving as Meeting of Parties
CO2	Carbon dioxide
DISCOM	Distribution Company
EB	Executive Board
FAR	Forward Action Request
GHG	Green House Gas
ISO	International Standards Organization
JMR	Joint Meter Reading
kW	Kilowatt
kWh	Kilowatt hour
MFR	Multi-Function Relay
MR	Monitoring Report
MWh	Megawatt-hour
PD	Project Description
PLF	Plant Load Factor
PP	Project Proponent

QA/QC	Quality Assurance and Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCSA	Voluntary Carbon Standard Association
VCS PD	VCS Project Description
VCUs	Voluntary Carbon Units

APPENDIX 3: FINDINGS OVERVIEW

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	NA	Section no.	NA	Date :DD/MM/YYYY
Description of FAR				
No FAR from validation or verification				
Project participant response				Date :DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY
NA				

Table 1. CL from this verification

CL ID	01	Section no.	4.3	Date : 15/09/2019
Description of CL				
1. Please submit the ER calculation sheet for the current monitoring period 2. Please submit declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions. 3. Please clarify why shut down details for the project during the monitoring period is not provided in the MR				
Project participant response				Date : 18/12/2020
1. ER calculation sheet for the current monitoring period hereby submitting to the assessment team. 2. Declaration confirming that the GHG Emissions reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions hereby submitting to the assessment team. 3.Shut down details for the project during the monitoring period is now provided in the MR.				
Documentation provided by project participant				
MR version 02 ER sheet version 02 Shut down details No double accounting declaration dated.06/08/2020				
DOE assessment				Date: 30/01/2021

1. The PP has submitted the ER calculation sheet for the current monitoring period and found to be satisfactory.
2. The PP has submitted the declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions. Closed
3. The PP has mentioned the shutdown details for the project during the monitoring period in the MR, found to be satisfactory.
CL #1 is closed.

Table 2. CAR from this verification

CAR ID	02	Section no.	3.3.5	Date : 15/09/2019
Description of CAR				
Please submit the following documents: Electricity Bills of the Satia Paper Industry for the complete monitoring period. Records for the fuel oil consumption for the complete monitoring period. Records for the soda recovered in the complete monitoring period.				
Project participant response				Date : 18/12/2020
The following documents are submitted herewith along with the revised set of documents: Electricity Bills of the Satia Paper Industry for the complete monitoring period. Records for the furnace oil consumption for the complete monitoring period. Records for the soda recovered in the complete monitoring period.				
Documentation provided by project participant				
Electricity Bills Plant log books				
DOE assessment				Date: 30/01/2021
The PP has submitted the electricity bills, plant records for furnace oil consumption and soda recovered and found to be satisfactory. CAR #2 is closed.				

CAR ID	03	Section no.	4.3	Date : 15/09/2019
Description of CAR				
1. Please clarify why the calibration details of the equipment's used in the project activity are not provided in the MR. 2. Please submit the calibration certificates of the following: - Flow Meter used to measure the Quantity of soda - Energy meter used to monitor electricity consumption - Weigh Bridge				
Project participant response				Date : 18/12/2020
1. MR has been revised to provide the calibration details of the equipment's used in the project activity under the Appendix 1. 2.The calibration certificates of the following hereby submitting with this response: - Flow Meter used to measure the Quantity of soda - Energy meter used to monitor electricity consumption - Weigh Bridge				
Documentation provided by project participant				

MR Version 02 calibration certificates for the following:	
- Flow Meter used to measure the Quantity of soda - Energy meter used to monitor electricity consumption - Weigh Bridge	
DOE assessment	Date: 30/01/2021
The PP has submitted the calibration certificates of equipment's and provided the calibration details of the equipment's used in the project activity under Appendix-1 of the MR, same is verified and following issues are identified: - Calibration for the flow meter is not valid for complete monitoring period. - Calibration details of the measuring scale is not provided CAR #3 is open	
Project participant response	Date :08/03/2021
- Calibration certificate for the flow meter for the complete monitoring period is being submitted along with submission. - Calibration details for the measuring scale are now provided in the ANNEX -1 of the Monitoring Report. Hence Revised MR Version 3.0.	
Documentation provided by project participant	
Calibration Certificate for the flow meter Revised Monitoring Report Version 3.0	
DOE assessment	Date: 12/03/2021
The PP has submitted the calibration certificates of flow meter and measuring scale covering the entire monitoring period. Calibration details provided under Annex-1 of the MR is also found consistent with the calibration certificates, hence accepted. CAR #3 is closed.	

Table 3. FAR from this verification

FAR ID	NA	Section No.	NA	Date :DD/MM/YYYY
Description of FAR				
No FAR rose during the verification.				
Project participant response				Date :DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY
NA				

APPENDIX 4: COMPETENCY STATEMENTS

Competence Statement			
Name	Ravi Kant Soni		
Country	India		
Education	B. Tech. (Mechanical Engineering) M. Tech. (Energy Management)		
Experience	8 Years +		
Field	Energy and Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.C., ACM0002		
Local expert	YES (India)		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	YES (TA 1.2)		
Reviewed by	Shreya Garg	Date	04/06/2019
Approved by	Anshika Gupta	Date	04/06/2019

Competence Statement	
Name	Anshika Gupta
Country	India
Education	M.Sc. (Climate Science & Policy), TERI University
Experience	4 Years +
Field	Climate Change
Approved Roles	

Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Shreya Garg	Date	12/03/2019
Approved by	Kaviraj Singh	Date	12/03/2019