



VERIFICATION REPORT

HYDROLOGIC SOCIAL ENTERPRISE, LTD.

VERIFICATION OF THE PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA

REPORT NO.BVC/BRUNEI-VR/BRUNEI/002/2016
REVISION No. 02

BUREAU VERITAS CERTIFICATION

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VERIFICATION REPORT

Date of first issue: 10/12/2016	Organizational unit: Bureau Veritas Certification Holding SAS
Client: Hydrologic Social Enterprise, Ltd.	Client ref.: Ms. Rachel Pringle
Summary: Bureau Veritas Certification has conducted the 5th periodic verification of PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA, GS Registration Reference Number GS1020, owned by Hydrologic Social Enterprise, Ltd., which is located in Hydrologic's factory: Trapeang Samrong Village, Sub-district of Longveak, District of Kompong Tralach, Province of Kompong Chhnang, and applying the methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011", on the basis of UNFCCC criteria for the CDM & GS, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM/GS rules and modalities and the subsequent decisions by the CDM Executive Board/ GS Secretariat as well as the host country criteria. The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the submitted revised project design documents. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 149,003 tons of CO₂e for the monitoring period. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, submitted revised monitoring plan and its associated documents. Reporting period: 01/05/2015 to 30/04/2016 Baseline emissions: 405,139 t CO₂ equivalents. Project emissions: 203,968 t CO₂ equivalents. Leakage emissions: 2,917 t CO₂ equivalents. Emission Reductions: 149,003 t CO₂ equivalents.	

Report No.: BVC Brunei/VRBrunei/002/2016	Subject Group: Gold Standard
Project title: PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA	
Work carried out by: Mr. Ram M. Desai - Team Leader Mr. Palinisamy Murugappan - Tech Specialist Ms. Wat (Interpreter)	
Internal Technical Review carried out by: Sanjay Patankar – Internal Technical Reviewer	
Date of this revision: 09/02/2017	Rev. No.: 02
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Indexing terms

Work approved by:

Ms. Sapana Pednekar

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Abbreviations

CAR	Corrective Action Request
GS	Gold Standard
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DRR	Daily Reading Record
ETN	Electricity Transaction Note
FAR	Forward Action Request
GHG	Green House Gas(es)
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
MRR	Monthly Reading Record
PDD	Project Design Document
PLF	Plant Load Factor
PP	Project Participant
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard



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1. INTRODUCTION

Hydrologic Social Enterprise, Ltd. has commissioned Bureau Veritas Certification to verify the emissions reductions of its GS project PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA (hereafter called “**the Project**”) at Hydrologic's factory: Trapeang Samrong Village, Sub-district of Longveak, District of Kompong Tralach, Province of Kompong Chnang.

This report summarizes the findings of the verification of the Project, performed on the basis of Gold Standard criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1. Objective

The objective of GS verification is to conduct a thorough, independent assessment of the registered project activities.

In carrying out its verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. In particular, this assessment shall:

- (a) Ensure that the project activity has been implemented and operated as per the registered PDD or any approved revised PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- (b) Ensure that the monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of VERs, verifiable, and in accordance with applicable Gold Standard Ver 2.1 / CDM requirements;
- (c) Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan or any revised approved monitoring plan, and the approved methodology including applicable tool(s) / Gold standard Passport, Sustainability indicators;
- (d) Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

1.2. Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions. The verification is based on the validated and registered project design document, the monitoring report, emission reduction calculation spreadsheet, and supporting documents. The information in these documents is reviewed against Gold Standard Rules, Kyoto Protocol requirements, UNFCCC rules and associated interpretations.



The verification is not meant to provide any consulting service towards the PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3. GHG Project Description

The Project involves production and distribution of Ceramic water filters in Cambodia. Access to potable water in Cambodia (Host country) in villages is a common problem and people living in villages are boiling the available water (i.e. ponds, dug wells, bore wells) for drinking and cooking purpose (for safe consumption purpose). While boiling water people use various fuels i.e. forest wood, kerosene, gas and coal etc. The objective of project is to reduce / eliminate the water boiling practice and thereby reduce the CO₂ emissions due to usage of fossil fuel.

Ceramic filtration is the use of porous ceramic (fired clay) to filter microbes or other contaminants from drinking water. Pore size can be made small enough to remove up to 99.99% bacteria. Produced locally, the ceramic pot-style filters have the advantages of being lightweight, portable, relatively inexpensive, and chemical free, low-maintenance, effective, and easy to use.

Through the use of a clay and rice husk mixture combined with the application of silver nitrate, Hydrologic's filters provide for removal of microorganisms from water by gravity filtration through porous ceramics, with typical flow rates of 2-3 liters per hour. CWPs cool the treated water through evapotranspiration and, used with a proper storage receptacle, as provided by Hydrologic safely stores water for use. The ceramic filter surface is regenerated through regular scrubbing to reduce surface deposits.

Hydrologic Enterprise Ltd. is producing a ceramic filter from the clay locally available to filter the water. This is the well-known ancient technology and is improvised by Hydrologic to enhance the filtration rate. Hydrologic has a full-fledged factory situated in Trapeang Samrong Village, where these filters are produced utilising local skilled and unskilled workers. By implementing the project Hydrologic has provided an opportunity for local community to generate steady and continual income for their livelihood.

Hydrologic has introduced two models as given below along with the specifications. PP has provided detailed specifications along with pictures of CWP's in the PDD section A.3. The actual production and dissemination is found in accordance with the specifications provided in the Registered PDD. Verification team herewith confirms that the specifications of Ceramic water Purifiers (CWP) are same as provided in the following table. There is no deviation / change evidenced during this monitoring period.

<u>Model</u>	<u>TUNSAI CWP</u>	<u>SUPER TUNSAI CWP</u>
Filter Element Type	Ceramic Clay Pot	Ceramic Clay Pot
Filter Capacity (Volume)	Approx. 10 L	Approx. 10 L
Filter Capacity (flow)	Typically - 2-3 L/Hr Typically – 30/Day	Typically - 2-3 L/Hr Typically – 30/Day
Receptacle Type	Closed safe storage food grade plastic receptacle	Closed safe storage food grade plastic receptacle
Receptacle Storage Capacity (Volume)	Approx. 12 L	Approx. 14 L
Spigot Type	Plastic	Plastic
Plastic Type	Food Grade Polypropylene	Food Grade Polypropylene



Hydrologic Social Enterprise Ltd. has so far distributed 265,656 units of ceramic filters in different provinces of host country, and the annual average estimated emission reductions over 7 years crediting period is 89,474 tCO₂e **/Ref-2/**.

Project title: PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA

GS ref number: GS1020

Registration Date: 08/08/2012

Crediting Period: 01/12/2010 to 30/11/2017 (renewable)

Monitoring Period: 01/05/2015 to 30/04/2016

Project Participants: Hydrologic Social Enterprise, Ltd.
Nexus, Carbon for Development

Methodologies used: Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011"

Location of the Project: Hydrologic's factory: Trapeang Samrong Village, Sub-district of Longveak, District of Kompong Tralach, Province of Kompong Chnang

Geo coordinates: Longitude: 104° 74'19" E Latitude: 11° 85'04" N

[Post Registration Changes]

During this verification of 5th monitoring period, there was no post registration changes to the project design hence not applicable.

1.4. Verification Team

The assessment team and internal technical reviewer team consist of the following personnel:

FUNCTION	NAME	TA 1	TA 3	TASK PERFORMED*
Team Leader	Mr. Ram M. Desai	☒	☐	☒ DR ☒ SV ☐ RI ☐ TR
Technical Specialist	Murugappan Palinisamy	☐	☒	☒ DR ☒ SV ☐ RI ☐ TR
Internal Technical Reviewer (ITR)	Sanjay Patankar	☒	☒	☒ DR ☐ SV ☐ RI ☒ TR
Final Approval	Sapana Pednekar	☐	☐	☐ DR ☐ SV ☒ RI ☐ TR

*DR = Document Review; SV = Site Visit; RI = Report issuance; TR = Internal Technical Review

2. METHODOLOGY

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.



In order to ensure transparency, a verification protocol was customized for the project, according to the version 09.0 of the Clean Development Mechanism Validation and Verification Standard, issued by CDM Executive Board /9/, and Gold Standard Validation & Verification Manual and Gold standard version 2.1 for GS Projects. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a Gold Standard project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed verification protocol is enclosed in Appendix A to this report.

2.1. Review of Documents

The assessment of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 2 dated 17/01/2017 **/6/** and emission reduction calculation spreadsheet version 02 dated 17/01/2017 **/7/**. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

The monitoring report version 01, Dated 19th October 2016 submitted by the project participant was considered as an initial input to verification and site visit.

In addition to the monitoring documentation provided by the project participants, the DOE reviews:

- (a) The registered PDD and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PDD, and the corresponding validation opinion **/1/3/**;
- (b) The validation report
- (c) Previous verification reports **/Ref-53/**;
- (d) The applied monitoring methodology **/8/**;
- (e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board / GS Secretariat;
- (f) Other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, laboratory analysis or national regulations).
- (g) Previous GS Review Records Dtd. 02/12/2015. **/Ref-69/**

2.2. Follow-up Interviews

On 07/11/2016 to 10/11/2016, Bureau Veritas Certification performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Hydrologic Social Enterprise, Ltd. and Nexus, Carbon for Development were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Hydrologic Social Enterprise, Ltd. (the Project Owner)	➤ Project Design and implementation ➤ Technical equipment, calibration and operation ➤ Monitoring Plan and management procedures ➤ Monitoring data ➤ Data uncertainty and residual risks (QA/QC) ➤ GHG Calculation ➤ Environmental Impacts ➤ Compliance with National Laws and Regulations
Nexus, Carbon for Development (the Consultant)	➤ Monitoring Plan ➤ Monitored data and Monitoring Report ➤ GHG Calculations
House Holds	➤ CWP Usage practices ➤ CWP Benefits ➤ CWP Problems while using it ➤ Boiling water consumption for house ➤ Wood Consumption and charcoal Consumption pre and post usage of CWP. ➤ Health Issues after using CWP ➤ Accessibility to Hydrologic Sales personnel ➤ After sale services by Hydrologic

2.3. Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to resolve 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 prior to Bureau Veritas Certification's positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

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

- (a) Non-compliance with the monitoring plan or methodology 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;
- (b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- (c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;



(d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM / GS requirements have been met.

A Forward Action Request (FAR) is raised, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

2.4. Internal Technical Review

The verification report underwent an Internal Technical Review (ITR) before requesting issuance of CERs for the project activity.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM / GS rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader.

After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

3. VERIFICATION CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow up visit are described in the Verification Protocol in Appendix A.



The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 00 CAR(s), 03 CL(s) and 00 FAR(s).

The CARs, CLs and FARs were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section corresponds to the VVS paragraph.

3.1. Remaining issues from validation or previous verification (354)

During this Verification visit CARs and CLs raised during previous verification were verified and found that all are closed successfully, no remaining issues were left open.

There was no FARs found raised during last verification, hence no pending issue from previous verification to be verified for compliance. However one FAR raised by Gold Standard during review of MP 3 Issuance was verified for continual compliance and noted that the information provided in the monitoring report is inadequate on the replacement of filter and hence CL03 was issued. Subsequently PP provided adequate information in the monitoring report and supported by the base data on replacement of filter in transparent manner and hence the CL03 is closed.

3.2. Compliance of the project implementation with the registered project design document (383 - 384)

Bureau Veritas Certification has performed a site visit and found that the Project has been put into operation and Ceramic Water Purifiers are being distributed and it is found that the implementation of the project activity is in accordance with the registered PDD. The changes in the factors and parameters used during this 5th monitoring period to arrive at the emission reduction calculations are transparently described in the Monitoring Report Section 3.3., PP has provided justifications for the changes and these changes are accounted correctly while calculating emission reductions.

The details of verification against changes incorporated by PP during this monitoring period are provided in the respective sections and there is no significant change observed in the listed monitoring parameters since last verification.

This is the 5th Monitoring period and verification team herewith confirms that the project implementation is consistent since the Start date of project as mentioned in the Registered PDD. There are no major obstructions or gaps noted during this monitoring period. After 2nd verification, the project has undergone a design change and it is noted that the scale of project is shifted to Large scale since the project has crossed the threshold limit of energy saving per annum i.e. 180 GWh / Annum. PP has obtained an approval from gold standard and it is verified by the Verification team in detail through a communication document /Ref-12/



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As per the revised PDD it is noted that the emission reductions are calculated on the basis of the Sales of numbers of units of Ceramic Water Purifiers, hence it is considered as an important parameter for calculation of Emission reductions during particular monitoring period. PP has an effective system to keep a track of manufactured number of Ceramic Water filters through unique Serial number and a Sales record. PP has established adequate QA /QC methods and reporting structure to capture relevant information in transparent manner. The data collected and processed is found auditable.

Application of Materiality:

With reference to Guideline on Application of Materiality in Verification, EB69 annex 6, Para (c) 2 percent of the emission reductions or removals for large-scale project activities achieving a total emission reduction or removal of 300,000 tons of carbon dioxide equivalents per year or less. Since the Emission Reductions achieved during this 5th monitoring period by the project activity is 149,003 tCO₂e, the materiality threshold for project activity determined is 0.5 percent (0.5 %).

Consideration of materiality in planning the verification

No	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Risk of human error in transferring monitoring data from Survey Results (Primary sources) to calculation spreadsheet (secondary sources). This including transferring of data against various monitoring parameters which are having direct bearing on the Emission reduction calculations.	High	Though PP has established comprehensive sampling methods and Survey Protocols for verifying the Usage rate and Water consumption during project scenario. However there is a risk of error in transferring the data to the Emission Reduction Calculation spreadsheet which will has significant impact on total Baseline calculation and emission reductions.	Survey results to be verified in detailed and Verification Team has established a sampling plan which is in accordance with the International Accreditation Forum (IAF): Guidance on the Application of ISO/IEC Guide 62:1996: 'General Requirements for Bodies Operating Assessment and Certification/registration of Quality Systems'. Total Survey records for Project Survey and Water Consumption Field Test Survey are 261 hence 16 random samples from each survey records selected during verification for cross checking the Emission Reduction calculations. Also During site visit totally 123 House hold samples were selected randomly to confirm that the information obtained is representative and reflecting actual project scenario.
2.	Inaccuracy in Sales Data base and number of Sales reported during monitoring period.	High	PP has established a suitable method to record the sales. Sales are done through different channels i.e. Direct Sales, NGO sales and Agent Sales. However there is a risk of overestimation of Sales due to the error in recording and reporting sale as the baseline emissions and Emission Reductions are directly proportional to the number of cWP sold during monitoring period.	During 5 th Monitoring period PP has reported that 45,768 number of CWP's are sold and from the monthly sales data base it was noted that there totally 1200 sales invoices or transactions are made for all three channels i.e. Direct Sales, NGO sales and Agent Sales. Verification Team derived 35 samples across all months to check the accuracy. Invoices were verified against the sales data base and found that the sales data is correct and has no materiality. The random



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No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
				sample is determined using International Accreditation Forum (IAF): Guidance on the Application of ISO/IEC Guide 62:1996: 'General Requirements for Bodies Operating Assessment and Certification/registration of Quality Systems'. Sales data base is also supported with the Accounting system where payment received against each invoice is traceable.
3.	Human error in providing incorrect calculation formulae in calculation spreadsheet	Medium	The Calculation is done using Excel based spreadsheet and the calculations are done as per the PDD requirement. Formulae used in the Excel sheet are transparently demonstrated and is found verifiable. The same spread sheet used since 1st Monitoring period. The Formulae presented in the spreadsheet are validated during past verifications.	Conducting calculation formulae check at stage of document review prior to onsite inspection covering these calculations • Baseline Emission • Project Emission • Leakage Emissions • Total Emission Reduction Done and confirmed that there is no material error evidence during Verification of Emission Reduction spreadsheet.
4.	Error due to delay of calibration on monitoring equipment	Low	During Project survey and Water Consumption Field Test PP is using Analog Scales for measurement of Weight of remaining water during 4 days and this will not be having significant impact on the emission reduction calculation. The risk identified is low.	PP has established a calibration regime for the scales. Scales issued to field staff during WCFT are thoroughly checked for the condition and are calibrated internally before issuing them to field staff. PP maintains the calibration records.
5.	Risk related to Survey methods and accuracy	High	Although PP has established comprehensive protocols and methods to perform various survey during project scenario, there is an inherent risk in the accuracy and transparency. Field staff engaged for such activities are either Hydrologic own staff or hired staff for temporary purpose. The accuracy is depends on the competence of the person and the quality controls established by the PP on survey activities. Since the data obtained from survey is very crucial and is directly proportional to the assumptions and calculations for emission reductions.	Conduct cross-checking of all survey analysis spreadsheets for sureys submitted to verification to verify the trends and accuracy. The sampled survey questionnaires also to be verified during site visit. Verification team selected 16 Samples of each survey records to verify the input values / information. In order to ensure that surveys are carried out under controlled conditions PP has ensure that teams selected for survey has a proper composition i.e experienced personnel from hydrologic and trained hired staff on the survey requirement. Training records of survey staff is maintained appropriately.



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No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
			There is risk of wrong data provided by the field staff which will misrepresent the actual project condition and results into overestimation of Emission Reductions.	Photographic evidences are also taken against each house hold surveyed. Program manager supervises entire process and ensures that the data obtained is correct and transferred to survey data base accurately. There is no material error noted during verification and it is confirmed that the surveys are accurate.

During verification site visit, verification team took a due account of this method by cross checking Monitoring information Flow **/Ref-28/** as well as manufacturing data base **/Ref-10/** and sales data base **/Ref-11 & 30/** and warrantee cards issued against each CWP. Sales Data and Sales invoices were verified in detailed for each month during the 5th Monitoring period based on the sampling approach.

To verify the accuracy and correctness of monitored data, verification team has utilized sampling approach. The sample size for the verification of monitored data was determined as per the International Accreditation Forum (IAF): Guidance on the Application of ISO/IEC Guide 62:1996: 'General Requirements for Bodies Operating Assessment and Certification/registration of Quality Systems' **/Ref-54/**. In line with the mentioned IAF guidance, the sample size from the verification body should be square root of the total sample size. Based on this approach verification team has made a sample plan and utilized the same during verification site visit to cross check the Sales Records, Invoices and Manufacturing data, Wood purchase records etc. which are the input to the calculation Baseline emission, Leakage emissions, project emissions and Emission reductions.

DOE made the sampling plan for visiting house hold during this verification using Simple random Sampling approach as specified in the EB69, Annex 5, Version 2.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities" **/Ref-65/**.

These sampling approaches found to be appropriate as the household using water filter are homogenous.

As per the paragraph 50 of EB 69 Annex 5 states that the Sample size calculation by Simple Random Sampling can be done using following formulae:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 \times 1.645^2 p(1-p)}$$

Where:

- n : Sample size
- N : Total number of Households in the project Activity using CWP
- p : Our expected proportion
- 1.645 : Represents the 90% confidence required
- 0.1 : Represents the 10% relative precision ($0.1 \times 0.5 = 0.05 = 5\%$ points either side of p)

The Calculation made for determining the Sample size is provided in the following Table

Total number of House Holds involved in the Project activity using CWP (N)	265,656 <i>[Total units sold until this monitoring period from the start of the project.]</i>
Our expected proportion (p)	90% *
Represents the 90% confidence required	1.645
Represents the 10% relative precision ($0.1 \times 0.5 = 0.05 = 5\%$ points either side of p)	0.1
Sample size (n)	$1.645^2 \times 265,656 \times 0.9(1 - 0.9)$



	$(265,656 - 1) \times 0.1^2 \times 0.9^2 + 1.645^2 \times 0.9(1 - 0.9)$
	$2.706025 \times 265,656 \times 0.09$
	$(265,655 \times 0.01 \times 0.81) + (2.706025 \times 0.09)$
	Outcome = 123 – Sample to be Verified

*From the previous experience and the level of confidence established in methods of survey implemented by PP during crediting period, DOE expects that 90% of the samples taken / visited shall comply with the project requirements.

Based on the review of background documents submitted by PP prior to Site Visit, DOE selected 3 provinces for selection of House hold visit during this monitoring plan and this selection is done using following criteria

1. Selection of Provinces during past verifications
2. Number of CWP sales in the province against overall sales.

It was noted from the Sampling protocol prepared by the Hydrologic for the usage survey and project survey, that the sales is higher in Kampong Speu (with 25% of overall sales) and hence this province was selected primarily, other two provinces selected were Takeo (with 6% of overall sales) and Battambang (with 2.5% of overall sales). These three provinces were not visited during previous verifications.

Sampling Plan:

Important Records as supporting evidences to calculate ER	Total Data Points	Sampled Data Points
CWP Production Records	89754	300
Sales Records (CWP Tungsai & Super Tungsai)	1200	35
Wood consumption Records	42	6
Fuel purchase Records	10	10 [All records Verified]
Water Consumption Field Test Records	261	16
Monitoring survey Records	261	16
Usage Survey Records	261	16
Households selected for the interview during Site Visit [For Household sampling during site visit Verification Team used EB69, Annex 5, Version 2.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"]	-	123

[Management and Operation]

The PP has operated the Project as per the registered PDD. The monitoring organization has been set up and all monitoring staff have been trained. Relevant data monitoring and reporting activity is been practiced as per the registered PDD. Staff engaged in the monitoring, surveying, marketing and manufacturing is found adequately trained and PP has maintained relevant training records to demonstrate that the Project activity is monitored by competent staff and follows the monitoring plan correctly **/Ref-66/**



Corresponding to the paragraph 383 - 384 of VVS version 09.0, Bureau Veritas Certification can confirm that:

- The implementation of the Project is consistent with the approved revised PDD.
- The Project is operated as per the approved revised PDD by the PP.

3.3. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) (386 - 387)

The verification team has verified the monitoring plan, including the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the approved/submitted revised PDD.

✌ Corresponding to the paragraph 386 - 387 of VVS version 09.0, Bureau Veritas Certification can confirm that the monitoring plan is in accordance with the approved methodology including applicable tool(s) applied by the Project.

3.4. Compliance of monitoring activities with the monitoring plan (389-390)

Monitoring has been carried out in accordance with the monitoring plan contained in the approved/submitted revised PDD.

[Parameters and information flow]

The parameters required by the monitoring plan and how Bureau Veritas Certification has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring report are described below:

Parameters monitored:

Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
Litres per person per day	$Q_{p,y}$	Before first verification and every two years.	This Parameter represents The Quantity of safe water per day per person supplied in the project scenario p during the year y, using CWP. PP has applied 1.632 Liters per day per person for this monitoring period. This value is obtained from the Water Consumption Field Test Report /Ref-29/ which was conducted during July and August 2016 (over a period of 30 days). The value applied is found statistically correct. PP has ensured that adequate QA/QC measures are implemented and the data is verified, entered and analyzed independently. During last Water consumption Field test the monitored value applied was 1.780. This decrease in the value is due to the increased number of persons per house hold consuming the water. This was confirmed during Verification site visit to house holds and it found that average persons per house hold are found to be increased from 5 persons to 7 persons. PP has established a comprehensive Sampling approach /Ref-61/ based on the approved Gold standard procedure for Sampling. Statistical calculations are found addressing all points and found that stratified sampling is followed. This is confirmed using Sampling protocol /Ref-67/ and Sample Calculation Spreadsheets /Ref-68/	- Not Applicable as there is no measurement required to determine this parameter.
Litres per person	$Q_{p,rawboil,y}$	Before first	This Parameter represents The quantity of raw or	



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Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
per day		verification and every two years	unsafe water that is still boiled per day per person after installation of the CWP. PP has applied 1.554 Liters per day per person for this monitoring period. This value is obtained from the Water Consumption Field Test Report /Ref-29/ which was conducted July and August 2016. The value applied is found statistically correct. PP has ensured that adequate QA/QC measures are implemented and the data is verified, entered and analyzed independently. PP has established a comprehensive Sampling approach /Ref-61/ based on the approved Gold standard procedure for Sampling. Statistical calculations are found addressing all points and found that stratified sampling is followed. This is confirmed using Sampling protocol /Ref-67/ and Sample Calculation Spreadsheets /Ref-68/	- Not Applicable as there is no measurement required to determine this parameter.
Litres per person per day	$Q_{p, \text{cleanboil}, y}$	Before first verification and every two years	This Parameter represents Quantity of safe water (treated or from safe supply) boiled per day per person in the project scenario p, after installation of the CWP. PP has applied 0.050 Liters per day per person for this monitoring period. This value is obtained from the Water Consumption Field Test Report /Ref-29/ which was conducted in July and August 2016. The value applied is found statistically correct. PP has ensured that adequate QA/QC measures are implemented and the data is verified, entered and analyzed independently. PP has established a comprehensive Sampling approach /Ref-61/ based on the approved Gold standard procedure for Sampling. Statistical calculations are found addressing all points and found that stratified sampling is followed. This is confirmed using Sampling protocol /Ref-67/ and Sample Calculation Spreadsheets /Ref-68/	- Not Applicable as there is no measurement required to determine this parameter.
Quality of the water treated		Before first verification and every two years	PP has maintained Third party Laboratory Analysis reports to prove that the water treated through the CWP is bacteria free and the CWP's are working as required for supplying potable quality water consistently. Verification team verified the results of analysis submitted by the Food And Chemical Services during 1 st May 2015 to 12 th April 2016 /Ref-44-46/ . The Laboratory is an accredited Laboratory /Ref-37/ . Results are showing the Bacterial load of influent water and the load after treatment. This test was done for 12 – 15 CWP's every time. The result is found satisfactory. The Quality of treated water through CWP is tested as per the established Water Quality Assurance Protocol (HSE-HH-MP5) /Ref-35/ .	- Not Applicable as there is no measurement required to determine this parameter.
Usage rate in project scenario p during year y	$U_{p, y}$	Annually	This is the calculated (Weighted Average) value to know what the usage rate of the CWP's Sold is during this Monitoring Period. The Value applied by PP for this monitoring period is 75.52%, which is obtained from the Usage Survey Report /Ref-32/ . This Value is revised from 92.97% to 75.52% as a result of CL 01, raised during Validation site visit. PP has arrived at the usage rate calculation based on the Usage survey and the past data of units sold and the Age of filters. PP has conservatively calculated usage rate by	- Not Applicable as there is no measurement required to determine this parameter. -



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Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
			taking the average usage value of each age group from MP1 to MP5 and drop the usage rate of the units' age 5-6 year to 0%. This calculation is transparently provided in the ER spreadsheet under tab "MP5 Usage Rate Calculation". The Calculation is found correct and acceptable and hence CL 01 is closed. Adequate QA/QC arrangements are made by the PP and the data is found verified by the Programme manager. The usage survey is done as per the defined frequency. The Value is found conservative and this was verified during onsite visit to various villages and sampled households. Out of total selected house hold during site visit only one household mentioned that the CWP is not been used.	
Number of persons consuming water supplied by project scenario p through year y	$N_{j,y}/N_{p,y}$	Before first verification and every two years	This is a calculated value based on the survey done during July and August 2016 by PP. The value applied by the PP is 1875.74 persons who are consuming Water supplied by the CWP's. This value is calculated using formula provided in the registered PDD and it is found applied correctly. PP obtains the main input from the WCFT Survey report <i>/Ref-29/</i>. PP has value of 5.139 persons on average consuming water from one CWP, this is the outcome of the survey done by PP in July and August 2016. Based on the review of survey forms during this survey it is confirmed that the value calculated based on transparent data analysis.	- Not Applicable as there is no measurement required to determine this parameter.
Leakage in project scenario p during year y	$LE_{p,y}$	Every two years	This value represents the leakage due to project activity. PP has applied value of 0.013 tCO₂e Per water filter per year. This is a calculated value and the important inputs to arrive at this factor is consumption of Wood in Factory for firing of Pots (Baking Process). PP has used Specific formula provided in the Registered PDD. The Application of Formula found correct and the input values are taken from Wood purchase records. <i>/Ref-27/</i>. During the monitoring period totally 1094 M³ wood was purchased and this value is transparently used to arrive at the final value of 0.013 tCO₂e for further calculations. Total leakage emission calculated using this factor is 2917 tCO₂e, found correct and conservative. PP has only used the Fire wood consumption for calculating Leakages due to implementation of Project. PP has not considered the leakages due to elimination of lower carbon emission method of Water treatment. PP has provided a justification for excluding this emission. The justification found correct as there is no water treatment in use which has a lower emissions – this decision is taken based on the results of Project survey done by the PP. The Exclusion is found correct and hence acceptable. During Verification site visit it was again confirmed that the usage of Diesel for power generation at factory is negligible and is found to be less than 1% of total emissions and hence it is excluded from the	- Not Applicable as there is no measurement required to determine this parameter.



Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
			leakage emissions. PP has provided a transparent justification in the Monitoring report section 2, for the exclusion of emissions on account of consumption of diesel for power generation at Hydrologic Factory. Verification Team verified Diesel purchase records and confirmed that totally 9200 liters of Diesel was purchased and consumed during Monitoring period. The calculation done is found conservative and PP has used UNFCCC default value for diesel emission factor.	
Number of units sold during project activity	Units sold	Before each verification	PP has applied 45,768 Units sold during this monitoring period; the value is obtained from Sales record which is one of the important records from emission reduction calculation point of view. PP has established effective mechanism to capture sales data of CWP units sold on regular basis. This value is being updated on daily basis and compiled on monthly basis and tallied against invoices raised. Sales records and invoices are found auditable documents and found correct – the input to sales records are taken from three different types of sales channels i.e. Direct sales, Retail sales and NGO sales. PP has maintained daily and monthly sales and presented transparently during site visit for verification, the compiled data province wise is also made a part of emission reduction spread sheet i.e. Sheet “Unit Per Month” /Ref-07/. Verification team has verified the data using sampling approach /Ref-61/- The sample size for the verification of monitored data was determined as per the International Accreditation Forum (IAF): Guidance on the Application of ISO/IEC Guide 62:1996: ‘General Requirements for Bodies Operating Assessment and Certification/registration of Quality Systems’/Ref-54/	- Not Applicable as there is no measurement required to determine this parameter.
Non-renewable biomass ratio	fNRB _y	The NRB will be updated when new values are available.	PP has applied value of 77% , this value is a default value applied as per UNFCCC based on the revised CDM –EB 77. Earlier PP has calculated this value as the Host Country has not approved the default value and the calculation approach is described in the registered PDD which is in accordance with the Gold Standard Methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011”. The calculation is shown transparently in section B.4 of the PDD. /Ref-1 & 2/ PP has revised the fNRB value from 73.28% to 77% based on the Value published by the Executive board of Clean Development Mechanism. PP has obtained a formal approval through email from GS to apply this changed value during last Monitoring period. PP has shared this information with Verification Team /Ref-62/ The applied value is found correct based on the relevant information and formal approval by GS. This change was further cross checked and confirmed with the revised documents available on the UNFCCC website i.e. Information note on default values of fraction of nonrenewable biomass for Cambodia Version 01.0 /Ref-63/ and CDM-EB-77 /Ref-64/	- Not Applicable as there is no measurement required to determine this parameter.



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Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
<u>Default Values fixed at Validation / prior to the 1st Verification</u>				
Non-renewability of woody biomass fuel in year y in baseline scenario	Xnrb _{bl,y}	Default Value	PP has applied 0.77 as a fraction of Non-renewability of woody biomass fuel in year y in baseline scenario - this value is obtained from the Registered PDD Section B.6.1 based on the study conducted at the time of validation. This is found in accordance with the Revised CDM – EB 77, and hence accepted.	- Not Applicable as there is no measurement required to determine this parameter.
Portion of users of the project technology j who in the baseline were already consuming safe water without boiling it	Cj	Default Value	PP has applied a default value of 2.60% as a fraction / portion of users of the project technology who were in baseline scenario already using safe drinking water (i.e. without boiling water) – This value is sourced from the Baseline survey report carried out in April 2011 and the report was found lastly revised in 2012 Dtd. 16th February 2012. The executive summary of this report summarizes this value based on findings of the survey. The value applied found conservative and found valid.	- Not Applicable as there is no measurement required to determine this parameter.
Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day	Qp _y	Default Value	PP has applied a default value of 1.35 Liters per day per person for this monitoring period. The value represents the liters of safe water consumed by each individual supplied by the project technology. This value is obtained from the Baseline survey report carried out in April 2011 and the report was found lastly revised in 2012 Dtd. 16th February 2012. The executive summary of this report summarizes this value based on findings of the survey. The value applied found conservative and found valid this value is further compared against US EPA (1.89 Liters/Day/person) and British Dietetic Association (1.8 liters/day/Person) guidance and found conservative in the host party scenario	Not Applicable as there is no measurement required to determine this parameter.
CO2 emission factor arising from use of fuels in baseline/project scenario	EFb _{wood,CO2} / EFp _{wood,CO2}	Default Value	PP has applied a default value of 112.00 tCO2 for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Non-CO2 emission factor arising from use of fuels in baseline/project scenario	EFb _{wood,nonCO2} / EFp _{wood,nonCO2}	Default Value	PP has applied a default value of 8.69 Tonnes for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 For GWP: IPCC (2007) "IPCC Fourth Assessment Report: Climate Change 2007/ Climate Change 2007/ Working Group I: The Physical Science Basis 2.10.2 Direct Global Warming Potential" available at [last accessed 15-06-2015]: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
CO2 emission factor arising from use of fuels in baseline scenario	EFb _{charcoal,CO2} / EFp _{charcoal,CO2}	Default Value	PP has applied a default value of 112.00 tCO2 for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 – This value is found correct and conservative hence acceptable. Base on the FAR by the Gold Standard PP has considered Wood as the Baseline fuel and applied Emission factors of wood for calculating Baseline and	- Not Applicable as there is no measurement required to determine this parameter.



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Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
project emissions and hence it is found conservative.				
Non-CO2 emission factor arising from use of fuels in baseline scenario	EF _{b, charcoal, non-CO2} / EF _{p, charcoal, non-CO2}	Default Value	PP has applied a default value of 8.69 Tonnes for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Net calorific value of the fuels used in baseline/ project scenario	NCV _{b, wood} / NCV _{p, wood}	Default Value	PP has applied a default value of 0.015 TJ/Ton for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
	NCV _{b, charcoal} / NCV _{p, charcoal}	Default Value	PP has applied a default value of 0.0295 TJ/Ton for this monitoring period, and the value is obtained from IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy, Chapter 2, Stationary Combustion, Table 2.5 – This value is found correct and conservative hence acceptable.	
Amount of wood required to boil 1 litre of water in baseline scenario	W _{b, y, wood}	Once before first verification	- Until 3rd Verification PP has used a default value of 0.000218 for calculation of emission reductions. However during this Monitoring period it was noted that PP has changed this default value to 0.000211. This is based on the results of Project Survey analysis (HSE HH MP5 Project Survey Report Dtd. 22/06/2015) /Ref-58/& /Ref-59/. The outcome of Project Survey provides clear information that 100% of respondents are using improved cook stoves. Hence the result is reduction in the quantity of wood consumption for the boiling of water. As per the registered PDD this value to be calculated once before the first Verification. PP has established a detailed protocol i.e. "Hydrologic (2012) Annex IV - WBT, Water Boiling Test Protocol 2012-06-08", however the change in value is found conservative and hence acceptable. - The Value is validated using /Ref-58/ & /Ref-59/ The Value applied by the PP is found correct and conservative hence accepted.	As per the Monitoring plan defined in the Registered PDD PP has established a detailed protocol for calibrating "Hydrologic (2012) Calibration & Inventory" for equipment calibration requirements. As per the protocol PP has to use calibrated equipment's to perform the Water Boiling Test. PP is maintaining an inventory of equipment's which are calibrated. Equipment's used during this test are Digital Scale, Digital Thermometer, Stopwatch etc.
Amount of charcoal required to boil 1 litre of water in baseline scenario	W _{b, y, charcoal}	Once before first verification.	- During this Monitoring period PP applied 0.000002 as the value based on the result of project survey. - The Value applied by the PP is found correct and conservative hence accepted. - The project survey reveals that larger population of the target group is using the improved cook stove. As per recently conducted project survey it is observed that around 80.3% of population is now using the improved cook stoves which is the significant increase since baseline and hence PP decided to apply the revised monitored value for the sake of conservatism.	As per the Monitoring plan defined in the Registered PDD PP has established a detailed protocol for calibrating "Hydrologic (2012) Calibration & Inventory" for equipment calibration requirements. As per the protocol PP has to use calibrated equipment's to perform the Water Boiling Test. PP is maintaining an inventory of equipment's which are calibrated. Equipment's used during



Operational Parameter	Data Parameter as per monitoring plan	Frequency of Monitoring	Monitoring Arrangement	Accuracy Class and Calibration Frequency and status
				this test are Digital Scale, Digital Thermometer, Stopwatch etc.
Amount of wood required to boil 1 litre of water in project scenario	$Wp_{y,wood}$	Once before first verification.	- The Value presented in the Monitoring report is now a calculated values based on the result of Project Survey. - During This Monitoring Period PP Conducted the Project survey and the results of Project survey reveals that around 80.3 % of targeted population is using Improved Cook stove, hence the value become more conservative. - The Value applied by the PP i.e. 0.000211 is found correct and conservative hence accepted.	As per the Monitoring plan defined in the Registered PDD PP has established a detailed protocol for calibrating "Hydrologic (2012) Calibration & Inventory" for equipment calibration requirements. As per the protocol PP has to use calibrated equipment's to perform the Water Boiling Test. PP is maintaining an inventory of equipment's which are calibrated. Equipment's used during this test are Digital Scale, Digital Thermometer, Stopwatch etc.
Amount of charcoal required to boil 1 litre of water in project scenario	$Wp_{y,charcoal}$	Once before first verification.	- As a result of project survey done by the PP before this verification reveals that the Default value applied earlier is no longer valid due to the change in the baseline fuel usage pattern. During this Project survey it was noted that around 80.3% of target population is using improved cooking stove, which reduces the level of emissions considerably. The calculation of this value is found transparently described in the Monitoring report. - The Value applied by the PP i.e. 0.000002 is found correct and conservative hence accepted.	As per the Monitoring plan defined in the Registered PDD PP has established a detailed protocol for calibrating "Hydrologic (2012) Calibration & Inventory" for equipment calibration requirements. As per the protocol PP has to use calibrated equipment's to perform the Water Boiling Test. PP is maintaining an inventory of equipment's which are calibrated. Equipment's used during this test are analog Scale, Thermometer & Stopwatch etc.

Compliance of the monitoring with Sustainability Monitoring Plan :

During verification of the monitoring period 5 verification team verified compliance towards Sustainability Monitoring plan. PP has established Monitoring plan in the Passport and established suitable methods for monitoring the same and ensuring compliance towards project objective of sustainable development.

Verification Team Verified the compliance in detailed and verification conclusion is provided in the following table.

<u>Description of Do Not Harm</u>	<u>Monitoring Requirement and Verification Conclusion</u>
Human rights	As there is no risk of human rights issues, no action has been included to monitor this activity according to Hydrologic (2014) "Passport – DESIGN CHANGE". <i>Verification Conclusion:</i>



<u>Description of Do Not Harm</u>	<u>Monitoring Requirement and Verification Conclusion</u>
	During verification factory visit was arranged and assessed the human right related issues and noted no violations. Employees engaged in production of CWP's are employed with proper employment contract and the salary paid as per the employment Contract. Transparency in employment and payment is demonstrated well through employment records.
Involuntary settlements	As there are no risk involuntary settlements caused by the project activity, no action to monitor this activity has been included in the document Hydrologic (2014) "Passport – DESIGN CHANGE". <i>Verification Conclusion:</i> <i>There are no incidents of Involuntary settlements noticed during this verification site visit.</i>
Cultural heritage	As there is no risk of harm towards cultural heritage, no action to monitor this activity has been identified according to Hydrologic (2014) "Passport – DESIGN CHANGE". <i>Verification Conclusion:</i> <i>There are no incidents of violation of cultural heritage noticed during this verification site visit.</i>
Labor – collective bargaining and freedom of association. Has the project demonstrated that it will not limit freedom of association and right to collective bargaining more than required by law?	All staff signed a document titled "Right to Collective Bargaining and Freedom of Association" acknowledging they understand this right. Scanned copies of these records are made available during Site Visit for verification. <i>Verification Conclusion:</i> <i>PP has explained this to each employee at the time of joining the organization and the instructions are in the local language. Each employee has signed this on understanding. Verified sampled employment contracts during this verification site visit and confirmed that PP has implemented the policy effectively. Interviews conducted with the workers at factory reveal that there are no limitations or restrictions on freedom of association have been established. People are free to talk and express their concerns freely.</i>
Forced labor - Are employees free to quit their services without the menace of penalty? Are all employees offering their services on a voluntary basis?	All staff signed a document titled "Right to Collective Bargaining and Freedom of Association" acknowledging they understand this right. A scanned copy is available –to the DOE. <i>Verification Conclusion:</i> <i>PP has explained this to each employee at the time of joining the organization and the instructions are in the local language. Each employee has signed this on understanding. Verified sampled employment contracts during this verification site visit and confirmed that PP has implemented the policy effectively. Also the staff working at factory was interviewed to understand any concern regarding forced labour and it was understood that all</i>



<u>Description of Do Not Harm</u>	<u>Monitoring Requirement and Verification Conclusion</u>
	Workers working at the factory are with their will and all are paid as per prevailing minimum wage.
Child Labor - Does the project employ or intend to employ children below the age of 15 in regular work or hazardous work? Does the project employ or intend to employ children below the age of 18 in hazardous work?	Hydrologic does not employ anybody under 18 years old, therefore there is no risk of child labor working in hazardous conditions. All staff signed a document titled “Right to Collective Bargaining and Freedom of Association” acknowledging they understand this issue. A scanned copy is available to the DOE. <i>Verification Conclusion:</i> <i>During visit of Factory it is verified that there is no child labor is employed by the PP. PP maintains an attendance register at the factory. Sampled few employees and interviewed for the date of joining and date birth by verifying local identification document. PP also maintains the record of each individual employee. Verified and confirmed that the information collected during factory site visit is correct. There is no Child labor seen in the factory. Hence it is confirmed that PP fulfills the conditions as mentioned in the Passport.</i>
Labor discrimination - Does the project’s employment policy discriminate, exclude or prefer people based on race, colour, gender, religion, sexual orientation, political opinion, national extraction, social origin or physical or mental disability?	PP does not discriminate in any form. All staff signed a document titled “Anti-Labor Discrimination and Harassment Policy” acknowledging they understand that discrimination has no place at Hydrologic. A scanned copy is available in available to the DOE. <i>Verification Conclusion:</i> <i>PP has explained this to each employee at the time of joining the organization and the instructions are in the local language. Each employee has signed this on understanding. Verified sampled employment contracts during this verification site visit and confirmed that PP has implemented the policy effectively. There is no evidence of violation towards labor discrimination reported. During factory visit interview with male and female workers were conducted and observed that salary is paid based on the position and working experience there is no discrimination i.e. racial colour, physical capabilities were observed.</i>
Labor safety - Has there been a credible and sufficient investigation to identify potential hazards for workers? Are workers exposed to hazardous chemicals or other material? Are workers involved in processes which are potentially dangerous? Have other hazardous been identified? Has the risk of sexual harassment and abuse of women been considered sufficiently? Is there an emergency action plan in the case of	All potential hazards for workers have been assessed and measures have been put in place to reduce the risks. Trainings and close monitoring are in place to ensure safety measures are in place and used by all staff as per the document “Health and Safety Precaution”. A scanned copy is available to the DOE. <i>Verification Conclusion:</i> <i>The Factory production activities are found to be very simple and having low risk potential except the Baking activity where Fire hazard is identified. Relevant operational Controls and safety measures are implemented</i>



<u>Description of Do Not Harm</u>	<u>Monitoring Requirement and Verification Conclusion</u>
accidents for every site? Is there an insurance or pension system for workers in place in case of health impacts?	and PP has provided adequate training to all employees working in factory. There was no accident / incident was reported in past in factory. The Controls established are in accordance with the document "Health and Safety Precautions"/Ref-40/
Environmental harm	No risk of environmental harm has been identified and therefore no monitoring is required according to Hydrologic (2014) "Passport – DESIGN CHANGE". <i>Verification Conclusion:</i> There is no harm to environment noted during the site visit except, Clay usage for making pots, however the clay is sourced from government approved Quarries/ fields and there is no exploitation of environmental resource observed. Also PP has taken adequate measure to address the air pollution due to pot baking activity. The Smoke generated due to burning of fire wood is released in the atmosphere using appropriate stack length / height. There is no specific legal requirement in the host country for such kind of smoke. The smoke generated is considered as harmless to the atmosphere.
Degradation of habitats	No risk of degradation of habitats has been identified and therefore monitoring is not required according to Hydrologic (2014) "Passport – DESIGN CHANGE". <i>Verification Conclusion:</i> From the Production activity it is observed that there is no degradation of habitats is possible and hence no specific monitoring arrangements evidenced.
Corruption Is the project known to employ practiced where entrusted power is abused for private gain?	All staff signed a document titled "Anti-Corruption Policy" acknowledging they understand that corruption has no place at Hydrologic. A scanned copy is available to the DOE. <i>Verification Conclusion:</i> PP has explained this to each employee at the time of joining the organization and the instructions are in the local language. Each employee has signed this on understanding. Verified sampled employment contracts during this verification site visit and confirmed that PP has implemented the policy effectively.
Human Resources There should be a facility where employees can raise issues directly to their supervisors or to a dedicated HR person (outside the factory)	The contact details of the Human Resource department are provided to all staff in case they want to talk to somebody else other than their manager to discuss sensitive issues or complaint. This is available in the document titled "Code of Ethics." /Ref-42/ This is available to the DOE. <i>Verification Conclusion:</i> PP has explained this to each employee at the time of joining the organization and the instructions are in the local language. Each employee has signed code of ethics document on joining. Verified sampled employment



<u>Description of Do Not Harm</u>	<u>Monitoring Requirement and Verification Conclusion</u>
	contracts during this verification site visit and confirmed that PP has implemented the policy effectively. Verified code of ethics for sampled employees which mostly covered the newly joined staff and it was observed that all newly joined staff has signed the code of ethics as per there requirement established by the PP.

Sustainability Matrix	Monitoring method Conclusion																								
Water Quality and quantity: Surveys and records of number of HHs/People served with the CWP units	As per HSE HH MP5 Water Consumption Field Test", the data shows 45,768 additional households have been served with an average of 5.139 persons, which is the equivalent of (45,768 * 5.139 persons = 235,202 more people served during this monitoring period.) The CWP removes at least 99.99% of E.Coli and Coliforms as shown in HSE HH MP5 Water Quality Test Reports. <i>Verification Conclusion:</i> <i>PP has performed Water consumption Field Test in July & August 2016 and the results are documented in a report and the persons served during this monitoring period is calculated based on the Field test report. Verified the data for this survey and found transparent.</i> <i>PP conducts Bacterial Analysis using third party laboratory and results are found good and the treated water is found with no E Coli and Coliform content /Ref-44 to 46/.</i>																								
Livelihood of the Poor: Project Survey and relevant academic reports or literature; fuel savings from kitchen performance tests multiplied by current market price for charcoal and wood (if purchased). The Project Survey will ask how people are using the time saved, this will be reported in the monitoring report. The price of the CWP will also be monitored.	1) As per the Project Survey in HSE HH MP5 Project Survey Report", the data collected shows the following the fuel saving and money savings extrapolation as per the table below: <table><tr><th>Percent of fuel Purchase d</th><th>Percent of users who purchase this percent of fuel</th><th>Annual saving if fuel purchased is wood</th><th>Annual saving if fuel purchased is charcoal</th></tr><tr><td>100.0%</td><td>8.1%</td><td>US\$27.56</td><td>US\$1.26</td></tr><tr><td>75.0%</td><td>10.8%</td><td>US\$20.67</td><td>US\$0.94</td></tr><tr><td>50.0%</td><td>1.8%</td><td>US\$13.78</td><td>US\$0.63</td></tr><tr><td>25.0%</td><td>16.2%</td><td>US\$6.89</td><td>US\$0.31</td></tr><tr><td>0.0%</td><td>63.1%</td><td>\$ -</td><td>\$ -</td></tr></table> From the comparison of the data provided in the Project survey report for 5th monitoring period and previous monitoring period it is clear that the percentage of wood users are reducing for the water boiling purpose and also the coal consumption is found reducing gradually. This shows that filter dissemination is good and project is helping people to	Percent of fuel Purchase d	Percent of users who purchase this percent of fuel	Annual saving if fuel purchased is wood	Annual saving if fuel purchased is charcoal	100.0%	8.1%	US\$27.56	US\$1.26	75.0%	10.8%	US\$20.67	US\$0.94	50.0%	1.8%	US\$13.78	US\$0.63	25.0%	16.2%	US\$6.89	US\$0.31	0.0%	63.1%	\$ -	\$ -
Percent of fuel Purchase d	Percent of users who purchase this percent of fuel	Annual saving if fuel purchased is wood	Annual saving if fuel purchased is charcoal																						
100.0%	8.1%	US\$27.56	US\$1.26																						
75.0%	10.8%	US\$20.67	US\$0.94																						
50.0%	1.8%	US\$13.78	US\$0.63																						
25.0%	16.2%	US\$6.89	US\$0.31																						
0.0%	63.1%	\$ -	\$ -																						



Sustainability Matrix	Monitoring method Conclusion
	save money on fuel expenditure. 2) 93.2% of respondents report spending less time collecting fuel after purchasing the Tunsai water filter, this time is mainly spent: a. Working to make money (33.3%) b. Working around the home (58.2%) c. Relaxing (6.1%) d. With family (2.3%) 3) The project survey revealed that 90.3% of those interviewed had purchased their filter. 37.2% reported that they had paid between US\$20 and US\$30 and 56.3% responded that they purchased filter at more than US\$ 30 price for their filters, which is in line with current pricing policy. The PP keeps track of the break-even price of CWP's to ensure that end users are buying a subsidized CWP compared to the real costs of the CWP as shown in the document "HSE HH MP5 Break Even Price". The Average price of the Filter is 38 USD\$, which is in accordance with the project requirement and it also confirms that the filter is reaching the end user at affordable cost. <i>Verification Conclusion:</i> <i>PP has established adequate arrangements for monitoring and measurement of the sustainability indicators. The Data collected through Surveys found properly analyzed to arrive at the conclusion. The claims made by the PP towards compliance of the Sustainability indicator are correct.</i> <i>Verified below documents</i> HSE HH MP5 Project Survey Report - /Ref-47/ HSE HH MP5 Break Even Price /Ref-50/
Quantitative employment and income generation: employment record	At the end of April 2014, Hydrologic employed 90 staff, 20 of which are female: • 28 factory staff, 11 of which are female • 14 office staff, 9 of which are female • 48 field staff, 25 of which are female The Staffing information presented in the Monitoring report was verified against the HSE HH MP5 Employment Record and Income Generation /Ref-60/. From the data and presented information in the monitoring report it was observed that during the current monitoring period, 57 new staff joined Hydrologic, the breakup of which is provided below: • 3 factory staff, all (01) of them are female



<i>Sustainability Matrix</i>	<i>Monitoring method Conclusion</i>
	• 3 office staff, all (01) of them are female • 51 field staff, (15) of them are female <i>Verification Conclusion:</i> <i>During site visit Verifier verified the Employment data and confirmed that the claims are correct /Ref-55/& /Ref-60/. There is evidence that the project is generating employment opportunities for the local people and helping them to gain financial stability. It was observed that the attrition rate is prevailing which also creates opportunities for new personnel.</i>

The PP has collected Project relevant data during this monitoring report using established Carbon Credits Verification Sampling Protocol **/Ref-61/**. The Verification Sampling protocol is the comprehensive process established by the PP to ensure consistency in the sampling for various surveys and analyzing the data obtained through such surveys. As per the guidelines provided by Gold Standard PP has established various stratified Sampling and survey approach to ensure that representation of data is correct and this provides consistent and accurate results to arrive at the Emission Reduction Calculations.

The Sampling Protocol considers following surveys as an important representation

1. Usage Survey - Representative of purchasers across geography and age group of filters disseminated during the monitoring period.
2. Monitoring Survey – Representative of users across geography and age groups
3. Water Consumption Survey – Representative of users across geography and age group (Subsample of monitoring survey)

Corresponding to the paragraph 386 and 387 of VVS version 09.0, Bureau Veritas Certification can confirm that:

- The monitoring has been carried out in accordance with the monitoring plan contained in the approved/submitted revised PDD.
- All parameters required by the monitoring plan have been sufficiently monitored and correctly listed. The monitored data for required parameters have been verified by checking the whole information flow.

3.5. Compliance with the calibration frequency requirements for measuring instruments (373 - 374)

During this monitoring period, it was observed that PP has used Weighing scale during Water consumption field test, and as per the monitoring plan defined in the registered PDD it is required to verify the accuracy of the scale prior to conducting the Field test. PP has done the calibration to confirm that the Scale is good and giving desired results with required accuracy.

Last calibration check was done on 5th July 2016 and it is confirmed that the scales are in good condition and delivering correct outcome of measurement. The Records of internal Verification was found maintained in the

“HSE HH MP5 Calibration & Inventory”**/Ref-26/**, Verification team reviewed this and confirmed that it is in accordance with the method established for the calibration.

**[Instrument accuracy]**

The verification team has verified the calibration records, since the Calibration is done internally and this is just to confirm the correctness of the scale accuracy level, PP has utilized standard weight for calibrating the scale, standard weight is found maintained well and there is no deterioration is observed to the standard weight. PP has established Accuracy requirement of +/- 0.2 Kg and it is found clearly documented in "HSE HH MP5 Calibration & Inventory"/**Ref-26/**.

From the Calibration check done in June 2016 it is observed that the scale is found good.

[Calibration frequency]

The calibration frequency fulfills the requirement as described in the monitoring plan and is in compliance with internal requirement defined in the document "HSE HH MP5 Calibration & Inventory"/**Ref-26/**. As per the Monitoring plan it is required to calibrate the scale every time prior to the Water consumption Field Test. Internal Calibration records of scales used for water consumption test were verified during site visit and found satisfactory. Sampled scales were inspected for the correctness of the Calibration and found accurate, during site visit a weighment of known weights were done and all sampled scales are showing correct results. Hence verification team concluded that the records of Calibration produced by the PP are reliable and acceptable.



Corresponding to the paragraph 373 - 374 of VVS version 09.0, Bureau Veritas Certification can confirm that:

- The calibration is conducted at the frequency as specified by the methodology and the monitoring plan contained in the approved/submitted revised PDD.

3.6. Assessment of data and calculation of emission reductions (401 – 402)

A complete set of data for the specified monitoring period is available.

The critical parameter used for the determination of the Emission Reductions is the total number of units of CWP's sold and other parameters which are derived from the Surveys done during the monitoring period. Important surveys which are critical to arrive at the emission reductions are as listed below.

1. Project Survey Report **/Ref-47/**
2. Usage Survey Report **/Ref-32/**
3. Water consumption Field Test Survey Report **/Ref-29/**

The data obtained through above survey and monitoring methods is maintained in the form of relevant records. All the data are in compliance with that stated in the Monitoring Report version 02.

As per the methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011" and the registered PDD, the emission reductions for the Project are calculated as the baseline emissions minus the project emissions and leakage. Hence the emission reduction is determined by the following formula:

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$$ER_y = (\sum BE_{b,y} - \sum PE_{p,y}) * U_{p,y} - \sum LE_{p,y}$$

Where:

$BE_{b,y}$	Emissions for baseline scenario b during the year y in tCO ₂ e
$PE_{p,y}$	Emissions for project scenario p during the year y in tCO ₂ e
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p during year y, based on cumulative installation rate and drop off rate
$LE_{p,y}$	Leakage emissions for project scenario p during year y in tCO ₂ e

[Baseline emissions]

PP has calculated Baseline emissions using following formula,

$$B_{b,y} = \text{Number of person-days} * \text{Baseline Fuel used to Treat Water (T/L)} * \text{Total Safe Water consumed in project scenario (L/p/d)}$$

Where

$N_{j,y}$	Number of person. Days consuming water supplied by project scenario p through year y
C_j	Expressed as a percentage, this is the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it
$Q_{p,y}$	Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day
$Q_{p,rawboil,y}$	Quantity of raw water boiled in the project scenario p per person per day
$W_{b,y}$	Quantity of fuel in tons required to treat 1 litre of water using technologies representative of baseline scenario b during project year y, as per Baseline Water Boiling Test

The input to calculate baseline emissions are taken from the Surveys done during monitoring period i.e. Water consumption Field Test, Project Survey and Usage survey. The Values monitored and recorded during these surveys are summarized and compared against previous monitoring period. The values monitored during such surveys are transparently shown in the Monitoring Report Section 3.1 and 3.3. During Onsite Verification team verified these values in detail using various supporting records and documents. The Baseline emission calculation is provided in the Emission reduction calculation spreadsheet in a transparent manner and the calculation found correct. There is no material error noted in the accounting and application of various data against monitored parameters.

The baseline emissions of the Project are calculated as:

$$BE_y = 405,139 \text{ tCO}_2\text{e}$$

[Project emissions]

The Project emission is calculated by PP using following formula

$$B_{p,j} = \text{Number of person.days} * \text{Project Fuel used to boil water (T/L)} * \text{Total volume of water boiled in project scenario (L/p/d)}$$

$$B_{p,y,wood} = (1 - C_j) * N_{p,y} * W_{p,y,wood} * (Q_{p,rawboil,y} + Q_{p,cleanboil,y})$$



The Project involves displacement of fossil fuel usage i.e. wood and charcoal however still the water is boiled in the project scenario using Wood or Charcoal, hence according to Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011” the project emissions are to be accounted and the values against project fuel used to boil water and total volume of water boiled in project scenario are obtained from the Water consumption field test and Usage survey reports. These values are found applied correctly to calculate the Project emissions. The Project emission calculation is found transparently shown in the emission reduction Spreadsheet **/Ref-07/**. To calculate this emissions PP has only considered wood as the baseline and project Fuel and it found conservative.

The Project Emissions calculated and presented in monitoring report is 203,968 tCO₂e.

[Leakage emissions]

As per the Gold Standard Methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011”, it is required to account the leakage emissions, in case project activity is using any fossil fuel during the Project Scenario. In accordance with this requirement PP has accounted consumption of fire wood while baking the CWP’s. The input for calculating Leakage emissions are taken from the wood purchase records and it is found in accordance with the Monitoring plan. During onsite verification it was observed that PP is using Electricity generated by the onsite diesel generators for running factory operations, the Diesel consumption for generating electricity at Factory found contributing negligible emissions i.e. 0.02% of total Emission Reductions calculated for this Monitoring Period, hence PP has not accounted the same as Leakages. PP has maintained the diesel purchase records and Diesel consumption records in transparent manner and is found satisfactory, the calculation of emissions on account of Diesel consumption is correctly provided in the Monitoring report and hence PP’s claim on not accounting these emissions are acceptable.

Leakage Emissions are calculated using formula

Leakage = Weight of wood per m³ * Quantity of wood purchased for factory * Carbon content in wood * (molecular weight of CO₂/molecular weight of Carbon) / conversion from kg to tonnes / number of units sold

The formula applied is found correct. PP has provided a detailed calculation on conversion of Wood Purchased Quantity to M³ Quantity in emission reduction spreadsheet **/Ref-07/** and purchased quantity of wood is obtained from the Wood Purchase Records **/Ref-27/**.

The Leakage Emissions calculated for this monitoring period are 2,917 tCO₂e

[Emission reductions]

The emission reductions during the monitoring period from 01/05/2015 to 30/04/2016 are calculated as:

$$ER_y = (BE_y - PE_y) \times \text{Cumulative Usage Rate} - L_y = (405,139 - 203,968) \times 75.52\% - 2,917 = 149,007.3 \text{ tCO}_2\text{e}$$



The calculation shown above is the representative calculation, if the above approach is followed using BE and PE and LE values it shows ER of 149,007.3 tCO₂e, however the calculation shown in the ER Spreadsheet is accurate which is based on the number of filters sold. The approach showed in the ER spreadsheet is the same, however the BE and PE calculation is related to the units of Filters sold (cumulative), hence the Calculation is found to be more conservative.

The ER Calculated in the ER spread sheet i.e. 149,003 tCO₂e is correct and hence the Verification team accepted that ER Calculation method presented in ER spreadsheet as more accurate and conservative.

[Comparison of ERs]

The annual estimated emission reductions are 122,301 tCO₂e as per the registered PDD. The actual operation days of the Project in the monitoring period are 365 days. The corresponding estimate in the monitoring period are 122,301 (=122,301*365/365) tCO₂e. However the Actual emission reductions calculated by the PP for 5th Monitoring period are 149,003 tCO₂e which is found to be 21.83% more than that of estimated emissions as per the PDD.

This increase in the Emission reduction is attributed to the increase in the usage rate as compare to the rate considered at the time of registration. During this monitoring period PP has applied 75.52%, which is equivalent to the usage rate applied during previous monitoring period. Another reason for increase in the ER is the application of revised value of parameter fNRB from 73.28% to 77% during last monitoring period. This increases the Baseline emission and results in the increased emission reduction. The justification provided is found correct and it is found reflected appropriately in the calculation spread sheet.



Corresponding to the paragraph 401 - 402 of VVS version 09.0, Bureau Veritas Certification can confirm that:

- Data used for the determination of the emission reductions are available and monitored in accordance with the monitoring plan contained in the approved/submitted revised PDD.
- Information and data provided in the monitoring report have been cross-checked with other sources such as plant logbooks, inventories, purchase records, laboratory analysis.
- Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed.
- Assumptions, emission factors and default values that were applied in the calculations have been justified.

4. VERIFICATION OPINION

Bureau Veritas Certification has performed the 5th periodic verification of PRODUCTION AND DISSEMINATION OF CERAMIC WATER PURIFIERS BY HYDROLOGIC IN THE KINGDOM OF CAMBODIA, GS Registration Reference Number GS1020, which is located in Hydrologic's factory: Trapeang Samrong Village, Sub-district of Longveak, District of Kompong Tralach, Province of Kompong Chnang, and applying the methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011". The verification was performed based on the requirements set by the CDM / GS and relevant guidance provided by CMP and the CDM Executive Board & GS Secretariat.

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The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of Hydrologic Social Enterprise, Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the monitoring plan contained in the approved/submitted revised PDD. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification has verified the project Monitoring Report version 02 dated 17/01/2017 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as described in the validated and approved/submitted revised project design documents. Installed equipment's being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions as a GS project.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, approved/submitted revised monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

Reporting period:	01/05/2015 to 30/04/2016	
Baseline emissions:	405,139	t CO ₂ equivalents
Project emissions:	203,968	t CO ₂ equivalents
Leakage emissions:	2,917	t CO ₂ equivalents
Emission Reductions:	149,003	t CO ₂ equivalents



Mr. Sanjay Patankar
Internal Technical Reviewer
Date : 26/02/2017



Mr. Ram M. Desai
Team Leader
Date: 26/02/2017



5. REFERENCES

Documents reviewed:

- /1/ Registered PDD version 7 dated 10/09/2012, UNFCCC ref no.GS1020
- /2/ Revised PDD Version 10 dated 25/03/2014
- /3/ Previous Validation Report
- /4/ Assessment Opinion on the Changes, GS1020_Design Change Review_final 2014-03-27
- /5/ Monitoring Report version 01, dated 19/10/2016
- /6/ Monitoring Report version 02, dated 17/01/2017
- /7/ ER Calculation Spreadsheet version 02, dated 17/01/2017
- /8/ Technologies and Practices to Displace Decentralized Thermal Energy Consumption – 11/04/2011” dated 11/04/2011
- /9/ Validation and Verification Standard Version 09.0
- /10/ HSE HH MP5 Serial numbers CWP
- /11/ HSE HH MP5_Sales Data base
- /12/ Assessment Opinion on the Changes, GS1020_Design Change Review_final 2014-03-27
- /13/ HSE HH MP5 SFR GS PUBLICATION EMAIL REQUEST
- /14/ Hydrologic (2014) PDD - DESIGN CHANGE 2014-03-25 CLEAN
- /15/ HSE HH MP5 Direct Sales Invoice
- /16/ HSE HH MP5 NGO Sales Invoice
- /17/ HSE HH MP5 NGO Sales Receipt
- /18/ HSE HH MP5 PROJECT SURVEY FORM COMPLETE
- /19/ HSE HH MP5 Retail Sales Invoice
- /20/ HSE HH MP5 Retail Sales Receipt
- /21/ HSE HH MP5 TEST AND SURVEY SAMPLE CONSENT FORM
- /22/ HSE HH MP5 TEST AND SURVEY SAMPLE COVER SHEET
- /23/ HSE HH MP5 USAGE SURVEY FORM COMPLETE
- /24/ HSE HH MP5 Warranty Card Example
- /25/ HSE HH MP5 WCFT DATA SHEET COMPLETE
- /26/ HSE HH MP5 Calibration & Inventory
- /27/ HSE HH MP5 FACTORY WOOD AND DIESEL USE
- /28/ HSE HH MP5 Monitoring Info Flows
- /29/ HSE HH MP5 WCFT REPORT (September 2016)
- /30/ HSE HH MP5_Sales Data base
- /31/ Hydrologic Carbon Credits Verification Sampling Protocol
- /32/ HSE HH MP5 USAGE SURVEY REPORT Dtd 20/09/2016
- /33/ HSE HH MP5 SURVEY AND TEST COVER SHEET&CONSENT
- /34/ HSE HH MP5 PROJECT SURVEY QUESTIONNAIRE
- /35/ HSE HH MP5 Water Quality Assurance Procedure
- /36/ Food Tech Patent 2013
- /37/ Food Tech - Certification of incorporation
- /38/ Hydrologic (2012) DNH Collective Bargaining & Freedom of Association English
- /39/ Hydrologic (2012) DNH Labor discrimination policy in English
- /40/ Hydrologic (2012) DNH Health and Safety Precaution



- /41/ Hydrologic (2012) DNH Anti-corruption policy in English
- /42/ Hydrologic (2012) DNH Code of ethics in English
- /43/ HSE HH MP5 WCFT REPORT
- /44/ HSE HH MP5 Nov 2014 & May 2015 Water Quality Test Result
- /45/ HSE HH MP5 July 2015 Water Quality Test Result
- /46/ HSE HH MP5 April 2016 and July 2016 Water Quality Test Result
- /47/ HSE HH MP5 PROJECT SURVEY REPORT
- /48/ HSE HH MP5 Employment Record and Income Generation
- /49/ HSE HH MP5 Feasibility Assessment to reduce viruses and chemicals
- /50/ HSE HH MP5 Price - Break Even Price
- /51/ HSE HH MP5 Price of water filters
- /52/ Hydrologic - Baseline study report 16-02-2012
- /53/ Previous Verification Report for Monitoring periods 1,2,3 & 4
- /54/ Guidance on Application of ISO /IEC Guide 62:1996 for determining the sample size for data to be sampled for the 3rd monitoring period.
- /55/ Employment Data Base and Payroll data base.
- /56/ Gold Standard Toolkit – Ver 2.1 and 2.2
- /57/ Pot Replacement Data-2015-16-Analysis HSE_HH_Replacement_Data_MP5
- /58/ HSE HH MP5 Project Survey Report Dtd. 22/09/2016
- /59/ HSE HH MP5 Project Survey Analysis
- /60/ HSE HH MP5 Employment Record and Income Generation
- /61/ Hydrologic Carbon Credits Verification Sampling Protocol
- /62/ Email Communication from with GS by PP for obtaining permission to apply revised Value of fNRB, Dated 03rd October 2015.
- /63/ CDM-SSCWG43-A04 – Information Note on Default Values of Fraction of Non Renewable Biomass for Cambodia – Version 01.
- /64/ CDM-EB- 77 - Meeting report: CDM Executive Board seventy-seventh meeting. EB69, Annex 5, Version 2.0 “Guidelines for Sampling and Surveys for CDM Project Activities
- /65/ EB69, Annex 5, Version 2.0 “Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities”
- /66/ Training Record for Hydrologic Staff for carrying out and reporting Project Survey, Usage Survey and Water Consumption Field Test.
- /67/ Sampling protocol for Selecting Sample size for carrying out various Surveys during project Activities
- /68/ Sample size Calculation Spreadsheet for MP 5
- /69/ GS Review Outcome Dtd. 19/11/2015
- /70/ HSE_HH_Hotline_Trackig_Data_MP5

Persons interviewed:

Hydrologic Social Enterprise, Ltd.

Ms. Rachael Pringle - Program Head

Mr. Bora - Manager

Ms. Sovannary – Chief Accountant

Ms. Puttida – HR Manager

Nexus, Carbon for Development

Mr. Thomas Blackburn – Program Director, Nexus Carbon For Development

Mr. Vibol Meng – Nexus Carbon for Development



Sr. No.	Names of Factory Staff Interviewed	Position	Company Name
1	Duk Seourn	Pot Smoother	Hydrologic Social Enterprise Ltd.
2	Eaurn Sarit	Pot Smoother	
3	Ouk Sarath	Factory Manager	
4	Som Sochet	Pot Smoother	
5	Shin Sochetra	Pot Smoother	
6	Sak Tang Ngoung	Pot Smoother	
7	Trapeang Samroong	Pot Smoother	
8	San Ramhea	Pot Smoother	
9	Ho Vannak	Pot Smoother	
10	Ho Phumin	Pot Smoother	
11	Phorn Sophorn	Pot Smoother	
12	Tho Kojal	Pot Smoother	
13	Kao Piseth	Pot Smoother	

Sr. No.	Name of House hold owner	Position
Province – Kampong Takeo		
Village – Siem Dek + 1 Village		
1	Sokhenang	House Hold Owner
2	Mr.Uy Gene	House Hold Owner
3	Yung Heang	House Hold Owner
4	Dong Sokhong	House Hold Owner
5	Sum veurn	House Hold Owner
6	Hauru Hout	House Hold Owner
7	Men Navy	House Hold Owner
8	Ms. Mom Tuy	House Hold Owner
9	Ms. Ouch Samat	House Hold Owner
10	Mr. Uklou	House Hold Owner
11	Ms. Phoung seng	House Hold Owner
12	Ms. Oohan	House Hold Owner
13	Ms. Lysao	House Hold Owner
14	Momyan	House Hold Owner
15	Ms. Nhim Sopheap	House Hold Owner
16	Mr. Noun Sing	House Hold Owner
17	Ms. Pot Chun Thy	House Hold Owner
18	Ms. Hun Heang	House Hold Owner
19	Ms. Pyvanny	House Hold Owner
20	Touch Sareun	House Hold Owner
21	Dy Thamei	House Hold Owner
22	Ms. Pon Sreyla	House Hold Owner
23	Mr. Khem Khea	House Hold Owner



Village – Taleak Khang Cheung +1 Village		
24	Seang Por	House Hold Owner
25	Tip Vorn	House Hold Owner
26	Yim vana	House Hold Owner
27	Nou Chorn	House Hold Owner
28	Maung Saran	House Hold Owner
29	Mom Sen	House Hold Owner
30	Pum Ref	House Hold Owner
31	Ouv Thy	House Hold Owner
32	Lun Teng	House Hold Owner
33	Chhen Rath	House Hold Owner
34	Mong Nym	House Hold Owner
35	Sok Men	House Hold Owner
36	Kou Thy	House Hold Owner
37	Kong Sokhum	House Hold Owner
38	Nel Sen	House Hold Owner
39	Ms. Saosamang	House Hold Owner
40	Ms. Nuon Nhoo	House Hold Owner
41	Mr. Sean Khon	House Hold Owner
42	Ms. Sean Thim	House Hold Owner
43	Ms. Han Nat	House Hold Owner
44	Mr. Yan Ran	House Hold Owner
45	Mr. Engsomol	House Hold Owner
46	Mr. Hong Cheuoon	House Hold Owner
47	Sin Seng	House Hold Owner
48	Mr.Mitachamren	House Hold Owner
49	Ms. Meun Khia	House Hold Owner
50	Ms. Lim Tieng	House Hold Owner
51	Mr. Bukleng	House Hold Owner
Province – Kampong Speu		
Village – Prey Snourl + 2 Villages– Kak Commune		
52	Som Paanny	House Hold Owner
53	San Sorn	House Hold Owner
54	Ms.Sim Nget	House Hold Owner
55	Ms Noun Chen	House Hold Owner
56	Ms.Noun Chanry	House Hold Owner
57	Mr.Oeurng Somath	House Hold Owner
58	Chan San	House Hold Owner
59	Oerung Somoeurn	House Hold Owner
60	Khem Sokhorn	House Hold Owner



61	Ms. Am Yeng	House Hold Owner
62	Chhum Pou Preck	House Hold Owner
63	Thou Sarena	House Hold Owner
64	Cheung Sochan	House Hold Owner
65	Om Phat	House Hold Owner
66	Mr. DumKaila	House Hold Owner
67	Mr. Nrong Sokha	House Hold Owner
68	Mr. Kit Khen	House Hold Owner
69	Ms. Saar Srey Neang	House Hold Owner
70	Ms. YimChem	House Hold Owner
71	Ms. Yemsary	House Hold Owner
72	Ms. Ou Chakriya	House Hold Owner
73	Ms. Rosou	House Hold Owner
74	Mr. Heng Sokhea	House Hold Owner
75	Mr. Vong Hing	House Hold Owner
76	Sou Mean	House Hold Owner
77	Mr. Dul Dy	House Hold Owner
Province - Batambong		
Village - Tuolroka		
78	Meathy	House Hold Owner
79	Mrs.Mom Ngeurnh	House Hold Owner
80	Mrs.Sum Kim	House Hold Owner
81	Ms.Chim Chanthea	House Hold Owner
82	Ms.Sorng Mean	House Hold Owner
83	Ms Sen Pheap	House Hold Owner
84	Ms.Mon Nhat	House Hold Owner
85	Ms.Phan Srey Keo	House Hold Owner
86	Mr.Nget Ngoeurn	House Hold Owner
87	Ms.Em Somna	House Hold Owner
88	Ms. Porn Heap	House Hold Owner
89	Ms. Seng Ha	House Hold Owner
90	Ms. Hun Ia	House Hold Owner
91	Ms. Eechan Tha	House Hold Owner
92	Mr. Kongsamut	House Hold Owner
93	Sin Sreng	House Hold Owner
94	Ms. Lissum	House Hold Owner
95	Ms. Ram Haem	House Hold Owner
96	Phhoung Thy	House Hold Owner
97	Ms. Pot Veourn	House Hold Owner
98	Saomaly	House Hold Owner



99	Ms. Som Yen	House Hold Owner
100	Ms. Chrik Nat	House Hold Owner
101	Mr. PotPhin	House Hold Owner
102	Ms. Veourn Channy	House Hold Owner
103	Mr. Chang Po	House Hold Owner
Village – Prey Proom 2 + 3 (Mongkul Commune)		
104	Mr. He Horn	House Hold Owner
105	Ms. Chhoan Phen	House Hold Owner
106	Chhoun Phoeurt	House Hold Owner
107	Ms. But Ngoeurn	House Hold Owner
108	Ms. Lang She	House Hold Owner
109	Them Huang	House Hold Owner
110	Ms. Oohan	House Hold Owner
111	Mr. Pon Dam	House Hold Owner
112	Ms. Pinsareourn	House Hold Owner
113	Mr. Sotpeng	House Hold Owner
114	Ms. Yekha	House Hold Owner
115	Mr. Thyskey	House Hold Owner
116	Ms. Vann Then	House Hold Owner
117	Ms. Hun Peaktra	House Hold Owner
118	Pheakkley Preck	House Hold Owner
119	Ms. Kay Srey	House Hold Owner
120	Mr. Ros Koim	House Hold Owner
121	Ms. Phom Sar	House Hold Owner
122	Ms. Khorn Srey Orn	House Hold Owner
123	Ms Nou Neun	House Hold Owner
124	Ms. Leang Hun	House Hold Owner
125	Ms. Hoy Ven	House Hold Owner
126	Ms. Tuy Sreurn	House Hold Owner
127	Mr. Tuy Tou	House Hold Owner



6. CURRICULA VITAE OF THE DOE'S VERIFICATION TEAM MEMBERS

Mr. Ram M. Desai	Bureau Veritas Certification, Brunei	Team Leader, Climate Change Lead Verifier, <i>Environmental Engineer with over all 13 years of experience in various industries related to Water & Waste water engineering design, installation & Commissioning, Integrated Facility Management for Environmental Services operations in various industries i.e Automotive, Pharmaceutical , IT & Electronics (With Clean Room). Management System Implementation and Maintenance, Green Building concept implementation, Lean Management Implementation, Water & Waste Water engineering Design & project Management, Project Environmental Compliance etc for a construction company.</i> <i>He is the lead auditor for Environment management system, Quality management system and Occupational health and safety management system and his auditing experience spans for 3 year with BVCI & BVCS. He has undergone intensive training on Clean Development Mechanism and was trained as Lead Verifier for CDM in the year 2005 and working as a lead Verifier for validation and verification of CDM/VCS projects</i>
Mr. Sanjay Patankar	Bureau Veritas Certification India	Technical Reviewer, Climate Change Lead Verifier. Educational qualifications: B.E. (Mech.) M.E. (Mech.) <i>He has over 20 years of experience in engineering manufacturing industry covering various functions like enterprise management, product design, engineering, tool & die design, improvements in the production shop, quality assurance & control and systems planning and implementation, including ISO 9001 based quality management systems. He is working for the last 4 years in Bureau Veritas Certification (India) Pvt. Ltd. as Lead Verifier for CDM and also Lead Auditor for ISO 9001, 14001 and OHSAS 18001 standards/specifications. Has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of CDM project activities</i>
Murugappan Palanisamy (Technical Specialist)	Bureau Veritas Marine, Singapore	Technical Specialist (Site Visit) <i>He is Bachelor of Engineering in Electrical and Electronics. He is working with Bureau Veritas Marine as Electrical Engineer. He is working in Electrical engineering field since last 09 years and is having reach hands on experience in designing, installation, commissioning of electrical systems for various applications in marine and oil and gas sector.</i> <i>He is also having experience in carrying out inspections of various marine equipment including electrical panels, rotating equipments, HVAC equipment's and operations of such equipment's.</i>

Table 1 Verification requirements based on the Gold Standard Validation and Verification Manual

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
1 Project implementation in accordance with the registered project document			
a Are all physical features of the proposed GS project proposed in the registered PD in place?	Yes, During last Verification PP proposed change to the scale of the project. PP has changed the scale from small scale to large scale as the Small scale cap of Energy Saving is crossed due to excessive sale of CWP's. The Compliance to the revised PDD verified during this verification period exclusively and found satisfactory.	OK	OK
b Have the project participants operated the proposed GS project as per the registered PD?	Yes – all requirements of PDD has been implemented and found satisfactorily meeting during 5 th monitoring period.	OK	OK
c Was an on-site visit conducted?	Yes, 3 days on site visit was conducted to verify the implementation of project and accuracy and authenticity of the data and parameters used to arrive at the emission reductions for the 5 th monitoring period.	OK	OK
d If not, justify the rationale of the decision.	Not applicable	NA	NA
e Does the implementation or operation of GS project conform with the description contained in the registered PD?	Yes, During Last issuance submission i.e. 3 rd MP, Gold standard has raised one FAR, which was verified during site visit for the compliance and found satisfactory, PP has established necessary monitoring arrangements however the information on this topic is not provided in the Monitoring report. Verification Team raised a CL to address this (Refer CL03)	CL03	Reviewed and closed the CL03
f If not, which are the potential impacts due to these changes?	Since there is no change to the PDD during this monitoring period, there is no potential impact noted on the Project Design, Project Additionality as well as Emission reduction calculations.	OK	OK
2 Compliance of the monitoring plan with the monitoring methodology			
a Is the validated monitoring plan in accordance with the approved methodology applied by the proposed GS project?	Yes- there is no deviation noted	OK	OK
b Are there any monitoring aspects of the project that are not specified in the methodology (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	No – The information provided in PDD is exactly suiting the requirement of project.	OK	OK
3 Compliance of monitoring with the monitoring plan			
a Have the monitoring plan and the applied methodology been	Yes – there is no deviation observed during this varification	OK	OK



VERIFICATION REPORT

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
properly implemented and followed by the project participants?			
b Have all parameters stated in the monitoring plan, the applied methodology been sufficiently monitored and updated as applicable, including:	Yes, except two incidences of deviations which are identified during site visit and reported as CL and CAR	OK	OK
i Project emission parameters?	Yes – Parameters which determines project emissions are monitored and presented transparently in the emission reduction spread sheet – calculation is found correct and there is not material error noted during data verification.	OK	OK
ii Baseline emission parameters?	Yes – Parameters which determines Baseline emissions are monitored and presented transparently in the emission reduction spread sheet – calculation is found correct and there is not material error noted during data verification.	OK	OK
iii Leakage parameters?	Yes – Leakage calculation is appropriately done	OK	OK
iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	Yes – Management and operational system is followed meticulously and found comprehensive – personnel and aware of their roles and responsibilities and are contributing effectively in ensuring accuracy and authenticity of data collection and monitoring – PP has provided series of training to all relevant staff.	OK	OK
c Are equipment controlled and calibrated in accordance with the monitoring plan?	Yes – Calibration of measuring equipment is seen – which is an internal cross check mechanism and PP has developed a suitable protocol for calibration of equipments.	OK	OK
d Are monitoring results consistently recorded as per approved frequency?	Yes – The Data and parameters monitored and measure are transparently recorded either in the survey sheets, Daily records and other records. – Found satisfactory – The Traceability of such raw data captured during day to day operations and Survey is found good to the ER data presented during Site visit.	OK	OK
e Have quality assurance and quality control procedures been applied in accordance with the monitoring plan?	Yes – comprehensive set up of the quality control and assurance is in place and this was demonstrated by the PP transparently during site visit.	OK	OK
4 Assessment of data and calculation of greenhouse gas emission reductions			
a Is a complete set of data for the specified monitoring period available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the validator shall make the most conservative assumption theoretically possible in finalizing the verification report).	Yes – Complete set of data is available for the verification of 5 th monitoring period.	OK	OK
b Has information provided in the monitoring report been cross-	Yes – Various back up records were seen during this verification site visit i.e.	OK	OK

VERIFICATION REPORT

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	Factory log books for production and quality control – Survey records, Sales Records, Invoices and interview with house hold using CWP's in the remote villages (selected villages in three different provinces)		
c Have calculations of baseline emissions, proposed project emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	Yes – There is no deviation noted during this Verification, 3 CLs reported during this verification	CL 01/ CL02 / CL03	Responses towards all CL verified and found OK
d Have any assumptions used in emission calculations been justified?	Yes – PP has used several inputs from Surveys, default values and these are justified adequately. Also this is found in accordance with the registered PD.	OK	OK
e Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	Yes – All emission factors used by PP are found valid and are validated in the Validation report Section 3.4	OK	OK

Appendix A: Production and dissemination of Ceramic Water Purifiers by Hydrologic in the Kingdom of Cambodia
 GOLD STANDARD PROJECT VERIFICATION Protocol Table 2 – CAR & CL List

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
<u>CLARIFICATIONS (CL)</u>			



VERIFICATION REPORT

CL-01 Project Survey report verified and found that PP has applied 75.52% as usage rate for this monitoring period. This is found to be significantly high than previous monitoring period. Please justify this increase in the usage rate during 5th Monitoring period.	MR Section 5 and ER Spreadsheet	From May 2015 to April 2016, the total number of replacement units was 4,084[*] which is about twice of that of MP4 (2,181 replacement units[†]) and 4,838[‡] units with issues were visited but they did not require any replacement parts, beside cleaning pots and advice on proper usage. By combining these two after-sale service, total after-sale service rate is estimated to be 3.55%[§] (1.62 % for replacement and 1.92% for visit) of the units in use as of 30 April 2016. Additionally, 1,343^{**} calls were received via Hydrologic's hotline call during the MP5. Furthermore, it is observed that Kampong speu and Takeo province where the usage survey took place had quite significant amount of replaced/visited units compared to other provinces, being 1,519^{††} and 1,042^{‡‡}, respectively. Therefore, it is assumed that the above improved aftersale services has led to the increase in the usage rate. However, for a conservative estimation, PP is willing to discount this usage rate by using the average value of each age group from MP1 to MP5 and drop the usage rate of the units' age 5-6 year to 0%. As a result, the usage rate for MP5 decreased to 75.52%^{§§} which is almost the same as that of MP4 (76%). The ER volume for MP5 was changed from 184,112 to 149,003 tCO₂, accordingly.	Revised calculation approach for usage rate is found conservative and acceptable. PP has calculated the usage rate considering the Age Group, thus it is noted that there are units which are more than 5 years and PP has dropped the weighted average for this age group and considere 0%. This resulted in the reduced Usage rate. The revised usage rate correctly applied in the calculation of ER and it is found satisfactory. PP has provided a transperent calcaultion of this usage rate in the Excel spread sheet. Based on the revision of the ER Spreadsheet, revised Monitoring repot and other relevant information, CL01 is now closed.
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^{*} HSE_HH_Replacement_Data_MP5, Tab Summary_Data, Cell J26

[†] HSE MP4 monitoring report, version 4

[‡] HSE_HH_Replacement_Data_MP5, Tab Summary_Data, Cell J27

[§] HSE_HH_Replacement_Data_MP5, tab Summary_Data, cell F36.

^{**} HSE_HH_Hotline_Tracking_Data_MP5, Tab Summary_issues, Cell AI18

^{††} HSE_HH_Replacement_Data_MP5, tab R&Visit_units_provinces_Data, cell D11

^{‡‡} HSE_HH_Replacement_Data_MP5, tab R&Visit_units_provinces_Data, cell D20

^{§§} HSE_HH_ER_Calculations_MP5_V2.0_2017-01-17, tab MP5 Usage Rate Calc, cell P13

VERIFICATION REPORT

CL 02 Section 3.3. of Monitoring report presents the comparison between PDD values and Values applied during 5th Monitoring period. Please justify how PP has arrived at the value of 122,301 tCO₂e as total estimates ER's as per PDD. (If we look at the PDD the estimate emission reductions during 2015 are 119,788 and during 2016 it is 123,013. During this monitoring period total days during 2015 are 121 and during 2016 are 244. If we apportion the quantity total estimated emission during 5th Monitoring period should be 121,943.89 tCO₂e – Please review the calculation)	MR Section 3.3	The ER calculation is correct based on the ER Calculation spreadsheet submitted during the design change in 2014. The detailed calculation can be found in Hydrologic - ER Calculations – 2012-09-10 validation DESIGN CHANGE 2014-03-25 (Tab units per month; Sum Cell J74-J85), which equals 122,301 VERs.	The Response is found satisfactory. Based on the information available in the ER Calculations presented and validated during Validation of Design Change in 2014, the estimate ER value applied is found tallying and hence the CL02 is closed.
CL 03 As per the FAR raised during MP 3 by Gold Standard, PP has to provide information related to the replacement of Filter elements Age wise, however Monitoring report does not provide this information, please clarify and provide necessary information transparently with relevant evidences / Supporting documents.	GS FAR during MP 3	During this MP5, 4,084 replacement units were replaced and 4,838 units with problem were visited but they did not require any replacement parts beside cleaning pots and advice on proper usage. By combining these two after-sale service, total after-sale service rate is estimated to be 3.55%^{***} (1.62 % for replacement and 1.92% for visit) of the units in use as of 30 April 2016 as shown in HSE_Replacement_Data_MP5, Tab Summary_Data.	PP has clarified the calculation of Filter replacement and it is found presented transparently in the Spreadsheet. The Values are found correct based on the raw data verified during site visit. PP is maintaining the records of after sales service and replacement. This information is now found updated in the Monitoring report Section 6 of Version 2 Dtd. 17/01/2017. The information is adequate and meeting the requirement specified by GS during Review. Hence the CL03 is closed.

*** HSE_HH_Replacement_Data_MP5, tap Summary_Data, cell F36.