



VERIFICATION REPORT PT HOLLAND FOR WATER

VERIFICATION OF THE NAZAVA WATER FILTER PROJECT

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VERIFICATION REPORT

Date of first issue: 25/02/2019	Organizational unit: Bureau Veritas (India) Private Limited
Client: PT Holland For Water	Client ref.: Mr. Guido Van Hofwegen
Summary: Bureau Veritas (India) Private Limited has conducted the 1st periodic verification of Nazava Water Filter Project, GS Registration Reference Number GS4290, owned by PT Holland For Water, which is located in Jalan Kolonel Masturi 345. Kav 1, KM 1.4 RW 22, RT 01 Kel. Cipageran Kec. Cimahi Utara, 40511 Cimahi Indonesia, and applying the methodology AMS-III.AV, version 04.0, Small-scale Methodology, "Low greenhouse gas emitting safe drinking water production systems", 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 (India) Private Limited internal procedures. In summary, Bureau Veritas (India) Private Limited confirms that the project is implemented as planned and described in the submitted revised project design documents. Installed equipment's 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 28,879 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: 19/12/2015 to 18/12/2018 Baseline emissions: 30,399 t CO₂ equivalents. Project emissions: 00,000 t CO₂ equivalents. Leakage emissions: 1,520 t CO₂ equivalents. Emission Reductions: 28,879 t CO₂ equivalents.	

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Project title: Nazava Water Filter Project	
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Indexing terms

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
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
VVB	Validation & Verification Body
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



Table of Contents	Page
1. INTRODUCTION	4
1.1. Objective	4
1.2. Scope	4
1.3. GHG Project Description	4
1.4. Verification Team	6
2. METHODOLOGY	7
2.1. Review of Documents	7
2.2. Follow-up Interviews	7
2.3. Resolution of Clarification, Corrective and Forward Action Requests	8
2.4. Internal Technical Review	9
3. VERIFICATION CONCLUSIONS.....	9
3.1. Remaining issues from validation or previous verification	10
3.2. Compliance of the project implementation with the registered project design document	10
3.3. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s)	14
3.4. Compliance of monitoring activities with the monitoring plan	15
3.5. Compliance with the calibration frequency requirements for measuring instruments	24
3.6. Assessment of data and calculation of emission reductions	24
4. VERIFICATION OPINION.....	27
5. REFERENCES	28
6. CURRICULA VITAE OF THE DOE'S VERIFICATION TEAM MEMBERS	32
Table 1 Verification requirements based on the Gold Standard Validation and Verification Manual	33



1. INTRODUCTION

PT Holland For Water has commissioned Bureau Veritas (India) Private Limited to verify the emissions reductions of its GS project Nazava Water Filter Project (hereafter called “**the Project**”) at Jalan Kolonel Masturi 345. Kav 1, KM 1.4 RW 22, RT 01 Kel. Cipageran Kec. Cimahi Utara, 40511 Cimahi Indonesia.

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 2.2 / 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 Candle water filters in Indonesia.



VERIFICATION REPORT

The project owner PT Holland For Water (PTH) is a social enterprise that distributes ceramic candle water filters across Indonesia, targeting low-income households (<\$7/day) in rural and urban areas through a wide network of resellers or micro-entrepreneurs under the brand name Nazava Water Filters which means “cleanliness” in Arabic.

The activity that is implemented under the “Nazava Water Filter Project” (here referred as “the proposed project”) is the sale and distribution of Nazava ceramic water filtration technology by PT Holland For Water (PTH) in regions of Indonesia. The applied technology is a ceramic water filter that produces water of safe drinking water quality

Prior to the implementation of this project within the project boundary, there is limited access to clean drinking water. Lack of ready access to a water source also limit the quantity of suitable drinking water that is available to a household. Even if the water is obtained from an improved source, water that must be fetched from a source that is not readily accessible to the household and may be contaminated during transport or storage. Nationally, boiling water prior to drinking is the most common treatment method (70.1 percent of total population). The percentage of urban people and rural people boiling water is 60.0 percent and 80.1 percent, respectively.

The baseline scenario is the continuation of current practice, thus identical to the existing scenario prior to the implementation of this project. Under the project scenario, dissemination of Nazava Filter will reduce GHG emissions by replacing the use of non-renewable biomass or fossil fuel to boil water to purify the water for drinking purposes. This purification method is energy intensive, creates indoor air pollution that is damaging to health, and emits significant GHG. Thus, the project activity contributes to the reduction in the GHG emissions associated to fossil fuel combustion for obtaining safe drinking water (SDW) as per conventional methods of water purification and also provides access to SDW to the consumers at an affordable price.

PT Holland for Water aims to enhance the dissemination of Ceramic Candle Water Filter (CWF) as a way to filter safe drinking water for end-users in Indonesia. The CWF units treat contaminated drinking water and reduce conventional water treatment through boiling water with non-renewable biomass thus reducing carbon emissions. The project aims to address the issues described in the scenario existing prior to the implementation of the project activity below, by introducing CWFs to effectively remove over 99% of bacteria. The primary objective of the project activity is to disseminate over 165,379 CWFs between 2014 and 2024 i.e. during entire crediting period, potentially providing safe water to approximately 0.83 million people and reducing water boiling using non-renewable biomass.

Ceramic water filtration unit uses porous candle filters installed in the plastic container (housing Unit) which are produced locally. CWF has three main components as mentioned below.

Ceramic filter

The filters are made of diatomaceous earth with pores of 0.4 micron (0.0004 millimeter) and remove micro-organisms: bacteria, cysts, parasites, fungi, sand, clay and other particles greater than 0.4 micron.

Activated Carbon

The ceramic is filled with activated carbon which reduces the content of harmful chemicals such as pesticides and chlorine. It improves the taste and reduces smell.

Anti-microbial Silver

The ceramic is impregnated with silver (0.08 % by weight), which kills micro-organisms like bacteria that are trapped at the surface of the ceramic. The silver content is very low and not harmful for frequent use.

PTH's filters are ceramic filters that remove microorganisms such as bacteria, fungi, sand, clay and other particles greater than 0.4 micron. PTH's water filter technologies conservatively purifies 3 litres per hour, is certified to last for 7,000 litres

PT Holland for Water has introduced Ceramic Candle Water Filter in Indonesia with the specifications as provided in the table below. PP has provided detailed specifications along with pictures of CWF's in the



VERIFICATION REPORT

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 Candle Water Filter (CWF) /**Ref-40**/ are same as provided in the registered PDD Section A.3 /**Ref-1**/. There is no deviation / change evidenced during this monitoring period.

PT Holland for Water has so far distributed 87,879 units of Ceramic Candle Water Filter in different provinces of host country Indonesia since start of the project. During this 1st monitoring period i.e. from 19/12/2015 to 18/12/2018 total sale of Ceramic Candle Water Filter is 57,251 units. and the annual average estimated emission reductions over 10 years crediting period is 22,735 tCO₂e /**Ref-1**/.

Project title: Nazava Water Filter Project
 GS ref number: GS4290
 Registration Date: 15/02/2016
 Crediting Period: 01/03/2014 to 29/02/2024
 Monitoring Period: 19/12/2015 to 18/12/2018
 Project Participants: PT Holland For Water
 Nexus, Carbon for Development
 Methodologies used: AMS-III.AV, version 04.0, Small-scale Methodology, "Low greenhouse gas emitting safe drinking water production systems"
 Location of the Project: Jalan Kolonel Masturi 345. Kav 1, KM 1.4 RW 22, RT 01 Kel. Cipageran Kec. Cimahi Utara, 40511 Cimahi Indonesia

[Post Registration Changes]

During this verification of 1st monitoring period, there was no post registration changes related to Project Design observed hence not applicable. However it was noted that during this monitoring period PP has raised a deviation request to Gold Standard for following change in the Monitoring process

- Usage of Mobile Test Kit for monitoring Water Quality Test instead of 3rd party Laboratory Test as described in the registered PDD.
- Delay in performing Project Survey, Usage Survey

These Deviations are found approved by the Gold Standard and the decision of approval is verified during the Site Visit through physical evidences, Project Survey Report /**Ref-18**/ and Water Quality Test Results /**Ref-28**/ as well as using approved deviation request /**Ref-37**/.

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	-	☐	☐	☐ DR ☐ SV ☐ RI ☐ TR
Internal Technical Reviewer (ITR)	Hong Linh Nguyen	☐	☒	☒ DR ☐ SV ☐ RI ☒ TR
Specialist supporting ITR	Sanjay Patankar	☐	☒	☒ DR ☐ SV ☐ RI ☒ TR
Final Approval	Sapna 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 (India) Private Limited internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 02.0 of the CDM Validation and Verification Standard for Project Activities (CDM-EB93-A05-STAN), issued by CDM Executive Board /9/, and Gold Standard Validation & Verification Manual and Gold standard version 2.2 for GS Projects /Ref-2/. 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 2.0 dated 24/01/2019 /6/ and emission reduction calculation spreadsheet version 3.0 dated 24/01/2019 /7/. Qualitative information comprises information on internal management controls, calculation procedures, and procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

The monitoring report Version 01, dated 14/12/2018 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) The applied monitoring methodology /8/;
- (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board / GS Secretariat;
- (e) Other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, laboratory analysis or national regulations).

2.2. Follow-up Interviews

On 19/12/2018 to 23/12/2018, Bureau Veritas (India) Private Limited performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of PT Holland For Water 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
PT Holland For Water (the Project Owner)	➤ Project Design and implementation ➤ Technical equipment, calibration and operation ➤ Monitoring Plan and management procedures



VERIFICATION REPORT

	➤ 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	➤ CWF Usage practices ➤ CWF Benefits ➤ CWF Problems while using it ➤ Boiling water consumption for house ➤ Wood Consumption and charcoal Consumption pre and post usage of CWF. ➤ Health Issues after using CWF ➤ Accessibility to PT Holland for Water Sales personnel ➤ After sale services by PT Holland for Water

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 (India) Private Limited'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.

VERIFICATION REPORT

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 (India) Private Limited 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 / submitting to Gold Standard.

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 03 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

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 One Forward Action Request (FAR) found raised by Gold Standard during the validation process and registration review stage, PP has provided responses to GS during last Registration review stage. The action taken towards the response provided by PP is reviewed for ensuring effectiveness/compliance towards the response. This FAR was reviewed during this Verification for the effectiveness of the Actions taken. The Verification details against these FAR's are provided below.

FAR #01

The validation team did not see direct evidence of the end users receiving warranty cards that specifically detail that the rights to carbon savings will be transferred to the project implementer.

The PP plans to design a sticker for the filter buckets that will detail product information as well as carbon rights waiver. The verifying DOE is to check these filter buckets with new stickers to ensure that the end users are being provided with enough information to be aware that they are ceding rights to VERs.

Verification Review Comments:

A detailed review of the action taken against FAR #01 was done by the Verification team during site visit. It was noted that suitable actions are taken and implemented by PP in order to close the gaps Identified during Validation.

PP has created one sticker which shall be pasted on each filter unit which informs about warrantee and rights of carbon savings to be transferred to the project implementer.

This is verified during site visit to the households, also it was noted that Household owner is aware of the warrantee and rights to carbon savings are with project implementer. The Corrective actions are found effectively implemented. Hence it is concluded that the FAR is closed.

Based on the verification of relevant evidences of implementation actions towards FAR found to be satisfactory and hence it is acceptable and hence verification team closes the FAR.

3.2. Compliance of the project implementation with the registered project design document

Bureau Veritas (India) Private Limited has performed a site visit and found that the Project has been put into operation and Ceramic Candle Water Filter 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 1st 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 1st 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



VERIFICATION REPORT

obstructions or gaps noted in the implementation of project as described in the registered PDD during this monitoring period.

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 Candle Water Filter, 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 (d) The CMP materiality decision prescribes the thresholds for the application of materiality in verifications, by defining that information is material if it might lead, at an aggregated level, to an overestimation of the total emission reductions or removals achieved by a CDM project activity equal to or higher than 5 per cent of the emission reductions or removals for small-scale project activities other than project activities covered under subparagraph (e) of EB 69 Annex 6. Since the Emission Reductions achieved during this 1st monitoring period by the project activity is 28,879 tCO₂e, the materiality threshold for project activity determined is 5 percent (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 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'/ Ref-37/ . Total Survey records for Project Survey and Usage Survey are 213 and 503 respectively and hence during this verification 15 samples of Project Survey records and 30 samples of Usage survey records were sampled randomly for cross checking the Emission Reduction calculations. Also During site visit totally 65 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	During 1st Monitoring period PP has reported that 87,879 number of CWF's are sold. Verification Team derived 207 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 sample is determined using International



VERIFICATION REPORT

			emissions and Emission Reductions are directly proportional to the number of CWF sold during monitoring period.	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-37/. Sales data base is also supported with the Accounting system where payment received against each invoice is traceable. During this verification few errors in the Sales Data base were identified and reported as a CAR (refer CAR 03). Subsequently PP has reviewed and revised the Sales database to correct emission reduction, hence the CAR is closed.
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 spread sheet used is found correct and correctly calculating the Baseline emissions, project emissions and emission reductions. The Formulae presented in the spreadsheet are validated during validation.	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. Except few error in the sales data base.
4.	Error due to delay of calibration on monitoring equipment	Low	The project activity does not include any monitoring and measurement equipment, hence calibration is not required, hence there is no perceived risk.	Not Required.
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 PT Holland for Water 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 survey submitted to verification to verify the trends and accuracy. The sampled survey questionnaires also to be verified during site visit. Verification team selected adequate number of 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 PT Holland for Water and trained hired staff on the survey requirement. Training records of survey staff is maintained appropriately.



VERIFICATION REPORT

			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.
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During verification site visit, verification team took a due account of this method by cross checking Monitoring information Flow as well as manufacturing data base and sales data base /Ref-11/ and warrantee cards issued against each CWF. Sales Data and Sales invoices were verified in detailed for each month during the 1st 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-37/. 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 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 CDM-EB67-A06-GUID, Version 4.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/Ref-27/.

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 CWF
- 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 CWF (N)	87,879 [Total units sold until this monitoring period from the start of the project.]
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)	$1.645^2 \times 87,879 \times 0.9(1 - 0.9)$

VERIFICATION REPORT

	$(87,879 - 1) \times 0.1^2 \times 0.9^2 + 1.645^2 \times 0.9(1 - 0.9)$
	$\frac{2.706025 \times 87,879 \times 0.09}{(87,878 \times 0.01 \times 0.81) + (2.706025 \times 0.09)}$
	Outcome = 30.057 – Sample to be Verified Rounded up to 31 Household.

*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 based on the project database and sales data base
2. Number of CWF sales in the province against overall sales.

Sampling Plan:

<i>Important Records as supporting evidences to calculate ER</i>	<i>Total Data Points</i>	<i>Sampled Data Points</i>	<i>Remark</i>
Sales Records of CWF units	10927	155+52	OK
Project survey Records	231	16	OK
Usage Survey Records	503	30	OK
Households selected for the interview during Site Visit			
[For Household sampling during site visit Verification Team used CDM-EB67-A06-GUID, Version 4.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"]	-	66	OK

[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 provided relevant awareness trainings to demonstrate that the Project activity is monitored by competent staff and follows the monitoring plan correctly.



Corresponding to the paragraph 360 - 364 of CDM Validation and Verification Standard for Project Activities, Version 02.0, Bureau Veritas (India) Private Limited 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)

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.



VERIFICATION REPORT



Corresponding to the paragraph 357 - 359 of CDM Validation and Verification Standard for Project Activities, Version 02.0, Bureau Veritas (India) Private Limited 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

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 (India) Private Limited 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
Quantity of purified water in year y (litres)	QPW _y	Every two years.	This Parameter represents The Quantity of safe / purified water per supplied by each filter unit for the period of one year. PP has applied 4,320 (L/yr/unit) for this monitoring period. This value is the calculated value, arrived using equation $QPW_y = \sum_{i=0}^i T_{y,i} * N_{y,i} * R_{y,i} * 365 * \text{Water Quality} * \text{Operational Units} * X_{\text{unit}}$ The Formula was verified in detailed and found correct and suitable to calculate the quantity of Purified water in year y supplied by each individual unit. This formula is correctly applied by the PP in the emission reduction calculation spreadsheet.	- Not Applicable as there is no measurement required to determine this parameter. This parameter is established based on the result of project survey and default values fixed at ex ante.
Total distributed water purification units	Ty,i	Continuous and aggregated monthly	This Parameter represents the number of water purification units distributed by the PP during monitoring period. During this monitoring period PP has distributed 87,879 units. This value is obtained from the Sales Data base /Ref-11/, in order to assess the accuracy in accounting the distributed filter units during this monitoring period Verifier took random samples of invoices /Ref-12 -14 & 16-17/ and other relevant records for verification. Out of total 10297 Data points in the sales data base Verifier selected 207 samples and noted few errors and hence CAR 03 was reported during site visit. Subsequently this CAR was closed by PP taking appropriate corrections to the data base. Subsequently Verifier took additional samples to check if the same error persists in the data base and found that the data base is clean and conservative enough to provide confidence that the Accounted filter units during this monitoring period are real.	- Not Applicable as there is no measurement required to determine this parameter.
The average population serviced by water	Ny,i	Every two years	This Parameter represents the number of persons served by one unit of CWF during year y. PP has applied 4.32 persons/unit person for this monitoring	- Not Applicable as there is no measurement required to



VERIFICATION REPORT

purification system					period. This value is obtained from the Project Survey /Ref-18/. 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. As per the Registered PDD it was noted that PP has applied Value of 4.57 person/unit. Since the value presented in the Monitoring Report is based on the Actual Survey result it was considered correct, based on the verification of Results of Project and usage survey presented by PP during site visit. PP has established a comprehensive Sampling approach /Ref-28 & 40/ 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-40/ and Sample Calculation Spreadsheets /Ref-28/	determine this parameter.																
Water Quality Passed Rate (WHO standard)	WQ _{passedWHO}	Every two years			PP has maintained in-house test reports to demonstrate that the purified water meets the WHO Standard for drinking water quality. In order to test the Water sample collected from the house hold, PP has proposed to use mobile test kit to monitor the E-Coli content in the water. However in the registered PDD it was mentioned that water samples shall be tested through approved laboratory, hence the method adopted by the PP is considered as deviation to the registered PDD. PP has requested an approval on this deviation from Gold Standard and in regards to this PP submitted a Deviation Request form /Ref-37/ Dtd. 12/04/2018. The deviation was found approved by the Gold Standard and hence it is conclude that the water quality test results presented during this monitoring period are acceptable. Verifier further checked the specification of the Test kit /Ref-42/ and observed that the test method and test kit utilized by the PP for gathering information on Water Quality results found to be correct. PP has applied the water quality pass rate as 88.71% Verification team verified the results of analysis submitted by the PP in the form of MP1 Water Quality Test Survey Report /Ref-25/,	- Not Applicable as there is no measurement equipment is used which needs calibration for determining this parameter. - However PP has used a Portable / Mobile test kit to monitor the water quality. Mobile testing kit: Compact dry E. coli/Coliform Count (EC) https://www.ncbi.nlm.nih.gov/pubmed/16512235 } /Ref-42/																
Usage rate in project scenario p during year y	Usage rate	Every two years			This is the calculated (Weighted Average) value to know what the usage rate of the CWF's Sold is during this Monitoring Period. The Value applied earlier by PP for this monitoring period was 66.05% this Monitoring period. PP has applied the usage rate based on the age of the filter unit and hence this approach is found conservative. The usage rate applied by the PP for different age groups of filter units is assessed based on the usage survey results presented in the form of Excel spreadsheet, where PP has provided the Raw survey data and statistical calculation. /Ref-18/ Age wise USAGE rates applied by PP are provided in the below table	- Not Applicable as there is no measurement required to determine this parameter. - Usage rate is determined age wise and it is an average based on the feedback during usage survey conducted by the PP.																
Percentage of sold unit in operation					<table><thead><tr><th>Year</th><th>Annual usage rate</th></tr></thead><tbody><tr><td>Year 5 - 6</td><td>4.90%</td></tr><tr><td>Year 4 - 5</td><td>47.62%</td></tr><tr><td>Year 3 - 4</td><td>71.67%</td></tr><tr><td>Year 2 - 3</td><td>78.15%</td></tr><tr><td>Year 1 - 2</td><td>97.56%</td></tr><tr><td>Year 0 - 1</td><td>96.39%</td></tr><tr><td>Average Usage Rate for MP 1</td><td>66.05%</td></tr></tbody></table>	Year	Annual usage rate	Year 5 - 6	4.90%	Year 4 - 5	47.62%	Year 3 - 4	71.67%	Year 2 - 3	78.15%	Year 1 - 2	97.56%	Year 0 - 1	96.39%	Average Usage Rate for MP 1	66.05%	
Year	Annual usage rate																					
Year 5 - 6	4.90%																					
Year 4 - 5	47.62%																					
Year 3 - 4	71.67%																					
Year 2 - 3	78.15%																					
Year 1 - 2	97.56%																					
Year 0 - 1	96.39%																					
Average Usage Rate for MP 1	66.05%																					
The Usage Survey (Project Survey) is found conducted as per																						

VERIFICATION REPORT

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			"Guidelines for carrying out usage surveys for projects implementing household water filtration technologies – 05/02/2014" A detailed Usage Survey Questionnaire has been established and presented during site visit for assessment – PP has done tablet based survey and the format created in the tablet is found complying with the established Questionnaire.	
Existence of public distribution network of safe drinking water	SDW	Annually	In order to assess the existence of Public Distribution Networks of safe drinking water in host country Indonesia, PP has adopted two approaches i.e. Desk Review and Project Survey. During Desk review PP has obtained relevant information on the Host country status of having distribution network of Safe drinking water across the country, however from the reliable sources i.e. WHO / Unicef (Published Data in year 2015) /Ref-20/ and the survey results published in 2017 by IPB (agricultural institute in Bogor) /Ref-43/ as well as using reference document published by Ministry of Health of Indonesia in year 2013 /Ref-36/ it was confirmed that there is no existence of the Public distribution network of safe drinking water in host country Indonesia. This was further confirmed using the result of Water quality Test using mobile test kit during month Oct – Nov 2018 that the Water used by Public / house hold within the project boundary is not safe for drinking as it is. PP conducted microbial tests on water before the CWF and water after filtration. PP is maintaining a brief SDW monitoring report to summarize the finding of desktop review and other published data available in Host country Indonesia to demonstrate actual situation of public distribution network of drinking water in the form of "SDW Monitoring Report" /Ref-30/ Found satisfactory in arriving at the conclusion in a transparent manner. <u>Default Values fixed at Validation / prior to the 1st Verification</u>	- Not Applicable as there is no measurement required to determine this parameter.
Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable	f _{NRB,y}	The NRB will be updated when new values are available.	PP has applied value of 82.1%, this value is a default value applied by PP for the entire crediting period. The Value is determined by PP using credible references and the calculation is presented transparently in the Spreadsheet /Ref-23/ and a detailed report i.e. "Appendix 4 in the Registered PDD" is made available for verification/Ref-1/. This was confirmed using UNFCCC Information note/Ref-24/. The Value was validated earlier and GS has approved this value earlier.	- Not Applicable as there is no measurement required to determine this parameter.
The average volume of drinking water per person per day	R _{y,i}	Default Value	PP has applied a default value of 3.5 liters/person/day as the average volume of drinking water per person per day - The Value is found obtained from "Minimum water quantity needed for domestic uses" by WHO Regional Office for South-East Asia. - This is found to be a reliable source for the information and this was also validated earlier and approved by the GS as default value hence accepted.	- Not Applicable as there is no measurement required to determine this parameter.
Emission factor for the substitution of non-renewable woody biomass or the emission factor of the	EF _{projected_fossilfuel}	Default Value	PP has applied a default value of 81.6 tCO₂/TJ for this monitoring period, and the value is representing Emission factor for the substitution of non-renewable woody biomass or the emission factor of the fossil fuel substituted by similar consumers. The Value is a default value and it is obtained from Approve Small scale Methodology AMS-I.E and it is found in accordance with the applied methodology AMS-III.AV Version 4 for this project activity. – This value is found correct and conservative	- Not Applicable as there is no measurement required to determine this parameter.



VERIFICATION REPORT

fossil fuel substituted by similar consumers.			hence acceptable.	
Specific Heat of Water	WH	Default Value	PP has applied a default value of 4.186 kJ/L °C for this monitoring period, and the value is obtained from AMS-III.AV Version 4 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Final Temperature	T _f	Default Value	PP has applied a default value of 100 °C for this monitoring period, and the value is obtained from AMS-III.AV Version 4 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Initial Temperature	T _i	Default Value	PP has applied a default value of 20 °C for this monitoring period, and the value is obtained from AMS-III.AV Version 4 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Latent Heat of Water Evaporation	WHE	Default Value	PP has applied a default value of 2,260 kJ/L for this monitoring period, and the value is obtained from AMS-III.AV Version 4 – This value is found correct and conservative hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.
Leakage relating to non-renewable woody biomass	L	Once before first verification	- PP has applied 0.95 as default value for this Monitoring period. This value is obtained from AMS I.E, Version 6 /Ref-44/ and it is found in line with the applied Small Scale Methodology AMS III.V, Version 4. - The Value is validated using Registered PDD /Ref-1/and the Value applied by the PP is found correct and conservative hence accepted.	- Not Applicable as there is no measurement required to determine this parameter.
Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling	X _{boil}	Once before first verification.	- During this Monitoring period PP applied 88.26% as the value based on the result of project survey completed by PP in year 2018 /Ref-30/. - During this verification it was noted that PP has changed the value from 70.1 % which was applied at the time of validation. - The Change in the default value is acceptable as Applied methodology AMS III.AV, version 4, para 11 allows under Case 2 Project scenario. - The Value applied by the PP is found correct and conservative hence accepted.	- Not Applicable as there is no measurement required to determine this parameter.
Efficiency of water boiling system being replaced	η _{wb,y}	Once before first verification.	- The Value applied by the PP i.e. 0.4 is found correct and conservative hence accepted. - Default efficiencies from AMS-III.AV Version 4 for each baseline technology Percentage of fuel types i.e. LPG, Wood, Charcoal, Kerosene and other. - This is found validated earlier and hence acceptable.	- Not Applicable as there is no measurement required to determine this parameter.

Compliance of the monitoring with Sustainability Monitoring Plan :

During verification of the monitoring period 3 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 REPORT



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 PT Holland for Water (2015) “GS Passport”. Dtd. 9/04/2015, Version 1.0/Ref-4/ <i>Verification Conclusion:</i> <i>During verification, verification team assessed the employment process and found that employees are hired in a rightful manner and this is found demonstrated through Employment contracts signed between PT Holland for Water and the employee. The Salary and other details are found clearly and transparently documented in such Contracts. Interviews of various employees were conducted to understand the fairness and found that there is no violation. Human rights of each employee are maintained properly.</i>
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 PT Holland for (2015) “GS Passport”. Dtd. 9/04/2015, Version 1.0/Ref-4/ <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 PT Holland for Water (2015) “GS Passport”. Dtd. 9/04/2015, Version 1.0/Ref-4/ <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?	As there is no risk of harm towards Labor issues i.e. Collective Bargaining and freedom of association, no action to monitor this activity has been identified according to PT Holland for Water (2015) “GS Passport”. Dtd. 9/04/2015, Version 1.0/Ref-4/ <i>Verification Conclusion:</i> <i>There are no incidents of violation of cultural heritage noticed during this verification site visit.</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?	As there is no risk of forced labor foreseen by the PP and hence, no action has been included to monitor this activity according to PT Holland for Water (2015) “GS Passport”. Dtd. 9/04/2015, Version 1.0/Ref-4/ <i>Verification Conclusion:</i> <i>During verification, verification team assessed the employment process and found that employees are hired in a rightful manner and this is found demonstrated through Employment contracts signed between PT Holland for</i>



	<i>Water and the employee. The Salary and other details are found clearly and transparently documented in such Contracts. Interviews of various employees were conducted to understand the fairness and found that there is no violation. Human rights of each employee are maintained properly.</i>
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?	The project does not employ and is not complicit in any form of child labor and it is in line with PT Holland for Water (2015) "GS Passport". Dtd. 9/04/2015, Version 1.0/<i>Ref-4/</i> <i>Verification Conclusion:</i> <i>During verification, verification team assessed the employment process and found that employees are hired in a rightful manner and this is found demonstrated through Employment contracts signed between PT Holland for Water and the employee. The Salary and other details are found clearly and transparently documented in such Contracts. Interviews of various employees were conducted to understand the fairness and found that there is no violation. Human rights of each employee are maintained properly. Also during this verification there was no forced labor was found working in the Factory of PT Holland for Water.</i>
Labor discrimination - Does the project's employment policy district, exclude or prefer people based on race, colour, gender, religion, sexual orientation, political opinion, national extraction, social origin or physical or mental disability?	The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis. And hence it is according to PT Holland for Water (2015) "GS Passport". Dtd. 9/04/2015, Version 1.0/<i>Ref-4/</i> <i>Verification Conclusion:</i> <i>During verification, verification team assessed the employment process and found that employees are hired in a rightful manner and this is found demonstrated through Employment contracts signed between PT Holland for Water and the employee. The Salary and other details are found clearly and transparently documented in such Contracts. Interviews of various employees were conducted to understand the fairness and found that there is no violation. Human rights of each employee are maintained properly. There is no labor discrimination is found during this verification (race, color, gender, religion, sexual orientation, political)</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	The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. This is found in accordance with PT Holland for Water (2015) "GS Passport". Dtd. 9/04/2015, Version 1.0/<i>Ref-4/</i> <i>Verification Conclusion:</i> <i>During verification, verification team assessed the employment process and found that relevant Personal protection has been provided from any occupational hazards and health hazards by PT Holland for Water to its employee. This was very much evident during the site visit</i>



emergency action plan in the case of accidents for every site? Is there an insurance or pension system for workers in place in case of health impacts?	<i>and factory visit.</i> <i>Employees are aware of the occupational and health hazards while working in the factory or field and they are found using relevant PPE's to safeguard themselves from safety hazards at workplace.</i> <i>Based on the physical site visit as well as interview with employees it is confirmed that the Safeguarding Principle "Labor safety" is ensured and correctly implemented by the PP and PP has taken appropriate efforts to ensure compliance on regular basis.</i>
Environmental harm	The project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle. This is found in accordance with PT Holland for Water (2015) "GS Passport". Dtd. 9/04/2015, Version 1.0/Ref-4/ <i>Verification Conclusion:</i> <i>There is no harm to environment noted during the site visit</i>
Degradation of habitats	No risk of degradation of habitats has been identified and therefore monitoring is not required according to PT Holland for Water (2014) "Passport " /Ref-4/. The project does not involve and is not complicit in significant conversion or degradation of critical natural habitats, including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value, or (d) recognized as protected by traditional local communities. <i>Verification Conclusion:</i> <i>From the Production activity it is observed that there is no degradation of habitats is possible and hence no specific monitoring arrangements evidenced.</i>
Corruption Is the project known to employ practiced where entrusted power is abused for private gain?	As there is no risk of corruption issues During project scenario and hence no action has been included to monitor this activity according to PT Holland for Water (2015) "GS Passport". Dtd. 9/04/2015, Version 1.0. /Ref-4/ The project does not involve and is not complicit in corruption. <i>Verification Conclusion:</i> <i>During verification, verification team assessed the entire process of sales and distribution and after sales support and it was noted that there is no chance of Bribery or corruption while performing above activities and hence there is no envisaged negative impact of corruption or bribery incidences on the project.</i>

Sustainability Matrix	Monitoring method Conclusion
Water Quality and quantity: Surveys and records of number of HHs/People served with the CWF units	As per PT Holland for Water MP3 ER Calculation Sheet, the data shows 57,263 /Ref-11/ CWF's are distributed during 1st monitoring period which have served an average of 171,308 persons. The calculation of the Total persons served with safe water quality is done using correct formula i.e.



{= Number of Sold CWFs * Usage Rate * Water Quality passed rate * Number of people per household per CWF}, PP has monitored the water quality and it was noted that 88.71% of filters are passing the criteria of water quality i.e. E.Coli presence in the output water from CWF. This is shown in latest Water Quality Test Reports /Ref-25/.

Verification Conclusion:

PP has performed Project survey and usage survey during year 2018 and the results are documented in a report and the persons served during this monitoring period is calculated based on the Field water Quality test report. Verified the data for this survey and found transparent.

PP conducts Bacterial Analysis using mobile test kit and this is found reported in the Water Quality Survey Report and Water quality Test reports.

During This MR PP has considered only those number of CWF's which passes the WHO standard and this is transparently shown in the ER spread sheet - The Calculation is found correct and in line with the Revised GS TAC rule.- Hence found satisfactory.

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 CWF will also be monitored.

PP has established an adequate monitoring methodology i.e. Project Survey, which is found in accordance with the description provided in the Passport. The questionnaire established for Project survey is found satisfactory.

PP has obtained information through Project survey against following criteria to assess the compliance towards indicator "Livelihood of the Poor"

- Amount of fuel save (Increased income through fuel savings)
- Percentage of user claimed time saving via eliminating/reducing the need to boil water for Drinking.

As per the Project Survey, the data collected shows that Time saving due to reduction in boiling of water is 97.21% reported that they save time from avoiding boiling water.

Money saving due to use of water filter (Source: Project Survey Report)/Ref-30/. The financial savings was mostly resulted by not buying, purchasing less fuel i.e. Wood (12,422 tonnes of wood equivalent) and LPG (6,383 tonnes of LPG) during this monitoring period.

Verification Conclusion:

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>Verified below documents</i> <i>Project Survey Report - /Ref-30/</i> <i>ER Spread Sheet (Tab ER&SD) /Ref-7/</i>
Quantitative employment and income generation: employment record	At the end of December 2018, PT Holland for Water employed 103 staff, 47 of which are female: PT HOLLAND FOR WATER OFFICE AND FIELD STAFF: Direct: 23 Total (03 Female) Indirect : 80 Total (44 Female) The Staffing information presented in the Monitoring report was verified against the Employment Record /Ref-26 & 32/. <i>Verification Conclusion:</i> <i>During site visit Verifier verified the Employment data and confirmed that the claims are correct /Ref-55/. It is evident that 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> <i>Based on the documents verified which supports this claim it was noted that PP is paying its employees as per the minimum wage act prevailing at the time of Verification..</i>

The PP has collected Project relevant data during this monitoring report using established Project Survey Sample Plan **/Ref-40/**. The Sampling Plan is the comprehensive document to ensure consistency in the sampling for various surveys and analyzing the data obtained through such surveys. As per the guidelines provided by UNFCCC and 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 Sample plan established is based on the CDM Methodology Guidelines, EB 86 Report Annex 4 "Guidelines for sampling and surveys for CDM Project Activities and Programme of Activities, Version 4 **/Ref-27/**."

The Sampling Plan considers following surveys as an important representation

1. Project Sample Group – Representative Sample of all participating households in the target population. Stratified Random Sampling method is selected.
2. Project Survey and Usage Survey - Representative of purchasers across geography and age group of filters disseminated during the monitoring period. As well as representative of users across geography and age groups
3. Water Quality Test Survey – Representative of users across geography and age group (Subsample of monitoring survey)

While reviewing the results of Surveys performed by PP during November 2018 it is confirmed that the Sampling plan established is followed correctly and results obtained during surveys are representative of the particular sample group and fulfills the objective of survey.

Corresponding to the paragraph 360 - 364 of CDM Validation and Verification Standard for Project Activities, Version 02.0, Bureau Veritas (India) Private Limited can confirm that:

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

VERIFICATION REPORT

- 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

There is no monitoring parameter in the monitoring plan where PP has to use a calibrated instrument or equipment to ensure that the result of monitoring is consistent and reliable and hence this section is not applicable for this project.

✌ Corresponding to the paragraph 365 - 371 of CDM Validation and Verification Standard for Project Activities, Version 02.0, Bureau Veritas (India) Private Limited 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

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 CWF'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-18/
2. Water Quality Test Record /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 2.0.

As per the methodology AMS-III.AV, version 04.0, Small-scale Methodology, "Low greenhouse gas emitting safe drinking water production systems" 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:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

BE_y	Emissions for baseline scenario during the year y in tCO ₂ e
PE_y	Emissions for project scenario during the year y in tCO ₂ e
$LE_{p,y}$	Leakage emissions for project scenario during year y in tCO ₂ e

[Baseline emissions]

In order to arrive at the Baseline emissions PP has utilized Equation 1 and Equation 2 from Approved Small Scale Methodology AMS-III.AV, version 04.0. Baseline calculation needs to establish QPW i.e. Quantity of purified water in year y (litres) and for this Equation 2 is provided by the Approved Methodology. PP has calculated Baseline emissions using following formula,

$$BE_y = QPW_y \times SEC \times f_{NRB,y} \times EF_{projected_fossilfuel} \times 10^{-9}$$

Equation 1



VERIFICATION REPORT

Where:

Parameter	Description
BE _y	Baseline Emission in year y
QPW _y	Quantity of purified water in year y (litres)
SEC	Specific energy consumption required to boil one litre of water
f _{NRB,y}	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable
EF _{projected_fossilfuel}	Emission factor for the substitution of non-renewable woody biomass or the emission factor of the fossil fuel substituted by similar consumers

For Calculation of QPW following formula is used

$$QPW_y = \sum_i T_{y,i} * N_{y,i} * R_{y,i} * 365 * Water\ Quality * Operational\ Units * X_{Boil}$$

Equation 2

Where:

Parameter	Description
QPW _y	Quantity of purified water in year y (litres)
T _{y,i}	Total distributed water purification units
N _{y,i}	The average population serviced by water purification system
Water Quality	PP has applied Water Quality Pass Rate in %
R _{y,i}	The average volume of drinking water per person per day
Operational Units	Usage rate of the sold units based on its age group
X _{boil}	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling

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:

$$BE_y = 30,399 \text{ tCO}_2\text{e}$$

[Project emissions]

Based on the proposed methodology and the registered PDD. There is no project emission.

The Project Emissions calculated and presented in monitoring report is 00,000 tCO₂e.

[Leakage emissions]

Leakage related to the non-renewable woody biomass saved by the project activity: The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. To account for leakages associated to non-renewable woody biomass a fixed adjustment factor of 0.95 was applied according to the AMS I.E version 6.0.

The conditions set in the registered PDD Section B.6.1 under Leakage were verified during this verification to confirm that there is no change. The conditions set at the time of registration are still found valid and hence it is acceptable that the Leakage calculation presented by PP during this monitoring period in monitoring report section E.3 is accurate and in line with the Registered PDD.

The Formula for calculation of Leakage emission is provided in the monitoring report is as given below.

$$\begin{aligned}
 \text{Leakage emissions} &= BE_y \cdot (1 - 0.95) \\
 &= 30,399 \cdot (1 - 0.95) \\
 &= \mathbf{1,520 \text{ tCO}_2\text{e}}
 \end{aligned}$$

[Emission reductions]

The emission reductions during the monitoring period from 19/12/2015 to 18/12/2018 are calculated as:

$$ER_y = BE_y - PE_y - LE_y$$

The result of ER calculation is presented in the below table

Vintage (including both start and end date)	Baseline GHG emissions or baseline net GHG removals BE _y (t CO ₂ e)	Project GHG emissions or actual net GHG removals PE _y (t CO ₂ e)	Leakage GHG emissions LE (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals ER _y (t CO ₂ e)
From 19/12/2015 to 31/12/2015	228	0	11	217
From 01/01/2016 to 31/12/2016	7,888	0	394	7,493
From 01/01/2017 to 31/12/2017	10,713	0	536	10,177
From 01/01/2018 to 18/12/2018	11,571	0	579	10,992
Total	30,399	0	1,520	28,879

The ER Calculated in the ER spread sheet i.e. 28,879 tCO₂e is done using correct formulae and presented in a transparent manner and hence the Verification team accepted that ER Calculation method presented in ER spreadsheet as per the PDD.

[Comparison of ERs]

The annual estimated emission reductions are 22,735 tCO₂e as per the registered PDD. The actual operation days of the Project in the monitoring period are 1096 days. The corresponding estimate during 1st monitoring period i.e. from 19/12/2015 to 18/12/2018 are 32,108 tCO₂e [(5,432/365)*13+7,440+10,452+ (14,541/365)*352] tCO₂e. However the Actual emission reductions calculated by the PP for 1st Monitoring period are 28,879 tCO₂e which is found to be 10.06% lower than that of estimated emissions as per the PDD.

This decrease in the Emission reduction is attributed to the low sales and decreasing usage rate over a period of 5 years. Average usage rate applied for this monitoring period is. 66.05% which is obtained through Usage Survey performed by the PP during year 2018. Based on this comparison it is concluded that the Emission Reductions calculated and presented by PP in the form of Monitoring report and emission reduction calculation spreadsheet found to be conservative and no over estimation noted.



Corresponding to the paragraph 372 - 374 of CDM Validation and Verification Standard for Project Activities, Version 02.0, Bureau Veritas (India) Private Limited 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.



4.0 Verification opinion

Bureau Veritas (India) Private Limited has performed the 1st periodic verification of Nazava Water Filter Project, GS Registration Reference Number GS4290, which is located in Jalan Kolonel Masturi 345. Kav 1, KM 1.4 RW 22, RT 01 Kel. Cipageran Kec. Cimahi Utara, 40511 Cimahi Indonesia, and applying the methodology AMS-III.AV, version 04.0, Small-scale Methodology, "Low greenhouse gas emitting safe drinking water production systems". 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.

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 PT Holland For Water 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 (India) Private Limited has verified the project Monitoring Report version 2.0 dated 24/01/2019 for the reporting period as indicated below. Bureau Veritas (India) Private Limited 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 (India) Private Limited 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 (India) Private Limited confirms the following statement:

Reporting period:	19/12/2015 to 18/12/2018
Baseline emissions:	30,399 t CO ₂ equivalents
Project emissions:	00,000 t CO ₂ equivalents
Leakage emissions:	1,520 t CO ₂ equivalents
Emission Reductions:	28,879 t CO ₂ equivalents

Hong Linh Nguyen
Internal Technical Reviewer
Date: 28/02/2019

Mr. Ram M. Desai
Team Leader
Date : 28/02/2019

4. REFERENCES

Documents reviewed:

- /1/ Registered PDD version 3.0 dated 13/04/2016, GS ref no.GS4290
- /2/ Gold Standard Validation & Verification Manual and Gold standard version 2.2
- /3/ Previous Validation Report
- /4/ GS passport, version 05.0, dated of 2014-12-05
- /5/ Monitoring Report version 1.0, dated 03/11/2018
- /6/ Monitoring Report version 2.0, dated 24/01/2019
- /7/ ER Calculation Spreadsheet version 3.0, dated 24/01/2019
- /8/ AMS-III.AV, version 04.0, Small-scale Methodology, "Low greenhouse gas emitting safe drinking water production systems"
- /9/ Validation and Verification Standard Version 09.0
- /10/ Gold Standard website: GS registration number: GS4290
https://mer.markit.com/br-reg/public/project.jsp?project_id=103000000009787
- /11/ PT Holland for Water MP1 (2018)_Sales Data base
- /12/ PT Holland for Water MP1 (2018) Direct Sales Invoice
- /13/ PT Holland for Water MP1 (2018) NGO Sales Invoice
- /14/ PT Holland for Water MP1 (2018) NGO Sales Receipt
- /15/ NAZAVA_MP1(2018)_Project_Survey_Questionnaire(EN_Final)
- /16/ PT Holland for Water MP1 (2018) Retail Sales Invoice
- /17/ PT Holland for Water MP1 (2018) Retail Sales Receipt
- /18/ Nazava_MP1(2018)_ProjectSurveyData_20181212
- /19/ NAZAVA_MP1(2018)_US_Quest_20180126(EN)
- /20/ "Domestic Water Quantity, Service Level and Health", World Health Organization 2003; URL:
http://www.who.int/water_sanitation_health/diseases/WSH03.02.pdf
- /21/ NAZAVAP Customer Database All MP1 Sales_20181003
- /22/ GS4290_6W_registration_review
- /23/ fNRB Value Calculation Sheet: NAZAVA19_fNRB_updated 20150808
- /24/ UNFCCC Information note: Default values of fraction of non-renewable biomass for least developed countries and small island developing States v01.0; EB 67 dated 11 May 2012
- /25/ Nazava_MP1(2018)WaterQualityTest_20181212
- /26/ PT Holland for Water MP1 (2018) List of Employee
- /27/ CDM-EB67-A06-GUID, Version 4.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"
- /28/ Sample size Calculation Spreadsheet for MP 1.
- /29/ Nazava_MP1(2018)_Project SurveyData_20181212
- /30/ Nazava_MP1(2018)_SDW_MonitoringReport
- /31/ Guidance on Application of ISO /IEC Guide 62:1996 for determining the sample size for data to be sampled for the 1st monitoring period.
- /32/ NAZAVA_MP1(2018)_Employment Report.
- /33/ Gold Standard Toolkit – Ver 2.1 and 2.2
- /34/ PTH_MP1_Nazava_SamplePlan20180813
- /35/ Independent assessments on effectiveness of Nazava Filter in removal of bacteria by Thunderbird School of Management: http://knowledge.network.thunderbird.edu/tem-indonesia-kopernik-7_11/2011/08/01/how-can-a-water-filter-make-a-difference/
- /36/ Indonesian Demographic and health survey report published by Indonesian Ministry of Health on Aug 2013
- /37/ MP1_US&PS_Deviation – Email Communication with GS TAC

VERIFICATION REPORT

- /38/ *Summary of responses for GS4290_MP1 deviation request_12042018*
- /39/ *Economics of CWF v/s Boiling of water for drinking purpose- .*
http://kopernik.info/sites/default/files/instructions/Nazava%20more%20info_0_0.pdf
- /40/ *Nazava Filter Specifications -* http://www.nazava.com/english/nazava_filter_solution.php
- /41/ *Summary of testing reports from Basic Water Needs ceramic water filters -*
<http://www.basicwaterneeds.com/wpcontent/uploads/qaqc/Netherlands/Netherlands/Netherlands%20Waterlab%20Noord%20Analysis.pdf>
- /42/ *Mobile testing kit: Compact dry Compact Dry E. coli/Coliform Count (EC)*
<https://www.ncbi.nlm.nih.gov/pubmed/16512235>.
- /43/ *Demographic Survey Results Published by IPB(Agricultural Institute in Bogor)*
- /44/ *Approved Small Scale Methodology AMS.I.E, Version 6 “Switch from non-renewable biomass for thermal applications by the user”*

Persons interviewed:**PT Holland For Water**

Mr. Guido van Hofwegen - Co Founder & Director of PT Holland for Water	
Mr. Lieselotte Jantine Heederik	Marketing Director
Mr. Syahri Abdillah	Country Manager
Ms. Gita Nurul Fajriani	Admin Office Assistant
Mr. Suherman	Logistic & Production
Mr. Asep Supendi	Logistic & Production

Nexus, Carbon for Development

Mr. Chanvibol Meng	Carbon Project Manager
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Sr. No.	Name of Person Interviewed	Position
Cihanguang - Bandung		
1	Ms. Mila Tajmilah	House hold owner / End user
2	Ms. Boni	House hold owner / End user
3	Mr. Gumilar	House hold owner / End user
4	Mrs. Tokanah	House hold owner / End user
5	Ms. Iyul	House hold owner / End user
Ciawi Tali - Bandung		
6	Mrs. Fitri	House hold owner / End user
7	Ms. Imas	House hold owner / End user
8	Ms. Dedeh	House hold owner / End user
9	Ms. Ani Susanti	House hold owner / End user
10	Ms. Nani	House hold owner / End user
11	Ms. Indri	House hold owner / End user
12	Ms. Susi	House hold owner / End user
13	Ma. Yati	House hold owner / End user
Pada Suka - Bandung		
14	Ms. Ageline	House hold owner / End user
15	Ms. Eni	House hold owner / End user
16	Ms. Murni	House hold owner / End user
17	Ms. Yanti	House hold owner / End user
18	Ms. Nani	House hold owner / End user
19	Ms. Riyani	House hold owner / End user
20	Ms Tetti	House hold owner / End user
21	Mr. Eden Suriyana	House hold owner / End user
22	Mr. Yanto	House hold owner / End user
23	Mr. Ganjar	House hold owner / End user
24	Ms. Siswanti	House hold owner / End user
25	Ms. Yanti Susanti	House hold owner / End user
26	Ms. Siti	House hold owner / End user
27	Mr. Atis Surana	House hold owner / End user
28	Ms. Ariyanti	House hold owner / End user
29	Ms. Yati Supriyati	House hold owner / End user
Village Tawang (Semarang / Province Central Jawa/ Dist Kendal		
30	Ms. Soleha	House hold owner / End user
31	Ms. Winerati	House hold owner / End user
32	Ms. Pokhaitul	House hold owner / End user
33	Ms. Ngatini	House hold owner / End user
34	Ms. Nurhalimah	House hold owner / End user
35	Ms. Winarti	House hold owner / End user
36	Ms. Wasmi	House hold owner / End user

VERIFICATION REPORT


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Sr. No.	Name of Person Interviewed	Position
37	Ms. Sumiyati	House hold owner / End user
38	Ms. Junainah	House hold owner / End user
39	Ms. Supartini	House hold owner / End user
40	Ms. Dewi	House hold owner / End user
Village - Sukorjo		
41	Ms. Vita	House hold owner / End user
42	Ms. Aning	House hold owner / End user
43	Ms. Jaeni	House hold owner / End user
44	Ms. Sari	House hold owner / End user
Village - Kendal Payak - Malang Regency		
45	Ms. Wiwik	House hold owner / End user
46	MS. Siti Aminah	House hold owner / End user
47	Ms. Martha	House hold owner / End user
48	Ms. Hari	House hold owner / End user
49	Ms. Ifa	House hold owner / End user
50	Ms. Sufriyani	House hold owner / End user
51	Ms. Fatiyah	House hold owner / End user
52	Ms. Christine Octavia	House hold owner / End user
53	Ms. Sutipah	House hold owner / End user
54	Mr. Tribuwano	House hold owner / End user
55	Ms. Ulum	House hold owner / End user
56	Ms. Fatimawati	House hold owner / End user
57	MS. Endang	House hold owner / End user
58	Ms. Bukhori	House hold owner / End user
59	Ms. Kud	House hold owner / End user
60	Ms. Nurjannah	House hold owner / End user
61	Ms. Tutut	House hold owner / End user
62	Ms. Didi	House hold owner / End user
63	Ms. Rita	House hold owner / End user
64	Ms. Solikhaa	House hold owner / End user
65	Ms. Erma	House hold owner / End user

5. 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).</i> <i>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. Murugappan Palanisamy	Bureau Veritas Certification, 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>
Mr. Sanjay Patankar	Bureau Veritas (India) Private Limited India	Technical Specialist (ITR), 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 (India) Private Limited (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>
Mr. Hong Linh Nguyen	Bureau Veritas Vietnam	Technical Reviewer, Climate change Lead Verifier: <i>He has graduated in Environmental Studies and had a Master Degree of Quality Management. He has undergone intensive training on Clean Development Mechanism. His working experience includes more than 7 years of auditing works in the field of Quality Management System and Environmental Management System. He has been involved in the validation / verification / technical review work of more than 30 GHG projects</i>



VERIFICATION REPORT

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

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
Project implementation in accordance with the registered project document			
Are all physical features of the proposed GS project proposed in the registered PD in place?	Yes, The Compliance to the registered PDD verified during this verification period exclusively and found satisfactory.	OK	OK
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 1st monitoring period.	OK	OK
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 during 1st monitoring period.	OK	OK
If not, justify the rationale of the decision.	Not applicable	NA	NA
Does the implementation or operation of GS project conform with the description contained in the registered PD?	Yes, During Last registration submission, GS has raised one FAR, which was verified during site visit for the compliance and found satisfactory, PP has established necessary monitoring arrangements. The response and action taken towards FAR verified and closed based on the verification satisfactory implementation Corrective actions agreed at the time of last Verification.	OK	OK
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
Compliance of the monitoring plan with the monitoring methodology			
Is the validated monitoring plan in accordance with the approved methodology applied by the proposed GS project?	Yes- there are few deviations found reported during this monitoring period. PP has requested the deviation on the Water Quality monitoring method, earlier at the time of registration monitoring plan mentions that the water quality shall be monitored using 3 rd party laboratory for detecting the microbial presence in the treated water, however during this monitoring period PP proposed to change this method to the use of mobile test kit, which is found accepted by the GS and PP has provided relevant evidences to support the approval on the deviation request.	OK	OK
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
Compliance of monitoring with the monitoring plan			
Have the monitoring plan and the applied methodology been properly	Yes – there is no deviation observed during this varification	OK	OK



VERIFICATION REPORT

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
implemented and followed by the project participants?			
Have all parameters stated in the monitoring plan, the applied methodology been sufficiently monitored and updated as applicable, including:	Yes.	OK	OK
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
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
Leakage parameters?	Not Applicable and Leakage parameters are not applicable as defined in the registered PDD.	NA	NA
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
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
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
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
Assessment of data and calculation of greenhouse gas emission reductions			
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 1st monitoring period. Monitoring Report section provides monitoring information on Quantitative – Employment and income Generation. For this monitoring period PP has given total Employee count, however, year wise data is not provided for the current monitoring period – Please provide data to establish compliance towards this monitoring parameter for the current monitoring period.	GAR-01	OK



VERIFICATION REPORT

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	Yes – Various back up records were seen during this verification site visit i.e. Factory log books for production and quality control – Survey records, Sales Records, Invoices and interview with house hold using CWF's in the remote villages (selected villages in three different provinces)	OK	OK
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 & 01 CAR reported during this verification.	OK	OK
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
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 Nazava Water Filter Project
GOLD STANDARD PROJECT VERIFICATION Protocol
Table 2 – CAR & CL List

VERIFICATION REPORT

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
<u>CLARIFICATIONS (CL)</u>		
CL 1 In Section D.1 of the Monitoring Report it is observed that X Boil factor is described as the fixed ex Ante parameter and it is taken from the registered PDD however PP has changed it from 70.1% to 88.26% which is impacting the baseline significantly. There is no clarity how this increase is justified?	According to the applied methodology, the project fall to Case 2. Therefore the following adjustment is required: <i>«For Case 2, total project population needs to be <u>adjusted for the fraction of the population serviced by the project equipment at households/buildings for which it can be demonstrated through documentation or survey that the practice of water purification would have been water boiling»</u></i> - AMS III.AV, version 4, paragraph 11. During the validation stage, due to no available survey with the project filter users (or «the population serviced by the project equipment»), PP applied the Xboil factor of 70.1% according to the Indonesian Demographic and health survey 2012 report for ex-ante ER calculation. This survey was a general survey and was not targeted the specific project user group of having CWF. Therefore, during the first verification, the PP conducted the survey according to methodology requirement. Thus, PP proposes to apply this latest survey result which well reflects the baseline situation of the project targeted households.	OK Accepted, As clarified by PP, applied methodology AMS III. AV Version 4 Para 11 provides this concession for the CASE 2 project scenarios that values which represents population serviced by the project equipments can be adjusted based on the survey results. Moniotirng parameter X boil factor is also representing the population served by the project equiprment, hnece it is acceptable that PP has revised the factor fro, 70.1 % to 88.26%, which is obtained from the result of 1st survey conducted by PP after registration of the project. Based on the Clarification provided and the Result of 1st survey it concluded that the CL 1 is closed.

VERIFICATION REPORT

CL 2 In Monitoring report section D.2 PP has explained monitoring arrangements towards monitoring parameter "Existence of public distribution network of safe drinking water" [SDW] - Please explain how this parameter is monitored annually? And provide relevant evidences of survey done. (CL)	SDW is monitored annually by using desk review and/or field survey method. It was concluded from the result of the desk review and monitoring survey that during this monitoring period (2015 to 2018), there has been no reliable public water supply utilities that could provide reliable safe drinking water to the public in Indonesia. That means SDW is zero. PP has compiled a review report on water quality of public water pipe system by integrating its desk review and the result of the monitoring survey. Please see the details of the report name Nazava_MP1(2018)_SDW_MonitoringReport.	Verifier assessed the response provided by PP to the CL 2 and it was noted that PP has provided relevant evidence to support that parameter SDW is monitored using publicly available information of Water Supply scenario in the host country and sepcific Project area. The method adopted for monitoring SDW is found to be conservative and relevant, hence it is concluded that the CL 2 is closed.
CL 3 In section E.1 of Monitoring report PP has described parameters used for calculating Baseline emissions in a table form, however description against parameter $EF_{\text{projected_fossilfuel}}$ is found missing - please provide clear description against this parameter.	PP has added the description for $EF_{\text{projected_fossilfuel}}$ as "<i>Emission factor for the substitution of non-renewable woody biomass or the emission factor of the fossil fuel substituted by similar consumers</i>".	Response to the Clarification 3 is found satisfactory as PP has revised section E.1 of the Monitoring report to make it more clear.
<u>CORRECTIVE ACTION REQUEST (CAR)</u>		

VERIFICATION REPORT

CAR 01	In section D.2 of the Monitoring Report it was noted PP has explained the monitoring arrangement for Monitoring parameter Quantity of purified water in year y (litres) [QPW_y], and it is noted that the parameter is calculated parameter, however there is no calculation method found described in the Monitoring report.	The calculation method is added to the section as following: The value is estimated using below equation: $QPW_y = \sum_0^i T_{y,i} * N_{y,i} * R_{y,i} * 365 * Water\ Quality * Operational\ Units * X_{boil}$ <table><tr><th>Parameter</th><th>Description</th><th>Value</th><th>Source/comment</th></tr><tr><td>QPW_y</td><td>Quantity of purified water in year y (litres)</td><td>4,320 (L/y/unit)</td><td>Calculated</td></tr><tr><td>T_{y,i}</td><td>Distributed water purification unit</td><td>1 (1 unit)</td><td>For one unit</td></tr><tr><td>N_{y,i}</td><td>The average population serviced by water purification system</td><td>4.32</td><td>See below (section D.2)</td></tr><tr><td>R_{y,i}</td><td>The average volume of drinking water per person per day</td><td>3.5 (L/day)</td><td>See section D.1</td></tr><tr><td>Water Quality</td><td>Water quality</td><td>88.71 %</td><td>See below (section D.2)</td></tr><tr><td>Operational Units</td><td>Usage rate of the sold units based on its age group</td><td>100%</td><td>Assumption 100% for 1 in use.</td></tr><tr><td>X_{boil}</td><td>Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling</td><td>88.26 %</td><td>Section D.1</td></tr></table>	Parameter	Description	Value	Source/comment	QPW _y	Quantity of purified water in year y (litres)	4,320 (L/y/unit)	Calculated	T _{y,i}	Distributed water purification unit	1 (1 unit)	For one unit	N _{y,i}	The average population serviced by water purification system	4.32	See below (section D.2)	R _{y,i}	The average volume of drinking water per person per day	3.5 (L/day)	See section D.1	Water Quality	Water quality	88.71 %	See below (section D.2)	Operational Units	Usage rate of the sold units based on its age group	100%	Assumption 100% for 1 in use.	X _{boil}	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling	88.26 %	Section D.1	The Calculation approach to parameter QPW is now found presented in the Monitoring report section D.2 and it is found to be correct and in line with the applied Approved Methodology AMS III. AV. Based on the correction to the Monitoring report it is concluded that the CAR is closed.
Parameter	Description	Value	Source/comment																																
QPW _y	Quantity of purified water in year y (litres)	4,320 (L/y/unit)	Calculated																																
T _{y,i}	Distributed water purification unit	1 (1 unit)	For one unit																																
N _{y,i}	The average population serviced by water purification system	4.32	See below (section D.2)																																
R _{y,i}	The average volume of drinking water per person per day	3.5 (L/day)	See section D.1																																
Water Quality	Water quality	88.71 %	See below (section D.2)																																
Operational Units	Usage rate of the sold units based on its age group	100%	Assumption 100% for 1 in use.																																
X _{boil}	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling	88.26 %	Section D.1																																



VERIFICATION REPORT

CAR 2 In Monitoring Report Section E.5 PP has provided Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD and arrived at the value of 32,968 tCO₂e towards estimated ex ante emission, however based on the prorated calculation as per PDD the value shall be 32,108 tCO₂e. There is an error in the estimation of ex ante estimation of emission reductions noted.	PP has corrected this figure and updated it in monitoring report (page 24) to 32,108 tCO₂e.	Verifier verified the correction in monitoring Report Section E.5 and found correct and hence it is concluded that the CAR 2 is closed.
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VERIFICATION REPORT

CAR 3 While reviewing sales database during verification site visit at Nazava head office in Bandung following discrepancies were noted. - There is a double accounting of the Sales noted. - There is no mechanism available for proactive detection of duplicate entry of sales data. –it is not clear how QA/QC on Sales data is ensured to avoid duplication.	It should be noted that Nazava project has started since 09/11/2011 as described in its registered PDD. Although sale database is the main record, Nazava could manage to do it online just after mid-2017. Before that, at its head office, the database was made by manually inputting data from hardcopy invoices which were collected from its different branches. Furthermore, the sale database presented for carbon project has to be breaking down from the original invoice per filter model. As a result, the same invoice number could be used multiple time with different filter model. This could be one of the main roots of double counted invoice or filters. To prevent this, PP has put in place a multiple variable cross-checking mechanism including invoice number & quantity, invoice & CWF model & quantity and scanning for outlying numbers. Another issue is that the data from the sales database was not cross checked with audited financial records until mid-2017. However, as part of its improvement, PP have been using an online database that is an integral part of Nazava accounting, credit collection and tax records system since mid-2017. The later data (from mid-2017 up to present) is therefore 100% in line with financial records and subject to financial and tax audits. In sum, by employing the integrated online database and introducing the multiple variable cross-checking system, the sale database is now having a clear mechanism to proactively detect duplication. The data is revised as seen in file named “Nazava_MP1(2018)_SaleDatabase_updated20190111” and ready for DoE to be verified.	Verifier Verified the Corrections in the Sales data base and it was noted that the data base is now cleaned to reflect correct sale data in the dataabase and it was also noted that PP has established relevant method to identified duplicated sales entry and the correction is found to in line with the root cause identified. On review of the corrected Data base Verifier selected additional samples for verification of sales invoices. Verifier selecteed additional 52 samples and found that the data is accurate. The correction in the database resulted in the change in the emission reductions i.e. Emission reductions are reduced by 4,012.00 tCO₂e as compare to the emission reductions calculated in the MR version 1.0 i.e. before site visit. The data provided in the Sales data base is found conservative and it is ensured that duplicated entries are avoided
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