

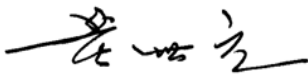


**Verification and certification report form for  
CDM programme of activities  
(version 02.0)**

Complete this form in accordance with the instructions attached at the end of this form.

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the programme of activities (PoA)</b>	Title: International Water Purification Programme Reference No. 5962	
<b>Version number(s) of the PoA-DD(s) to which this report applies</b>	07	
<b>Version number of the verification and certification report</b>	06	
<b>Completion date of the verification and certification report</b>	02/02/2019	
<b>Monitoring period number and duration of this monitoring period</b>	4th monitoring period Duration: 01/06/2016 to 31/12/2017	
<b>Number and version number of the monitoring report to which this report applies</b>	Number:1 Version No.04	
<b>Coordinating/managing entity (CME)</b>	Pure Water Ltd.	
<b>Host Parties</b>	<b>Host Parties of the PoA</b>	<b>Is this a host Party to a CPA covered in this report? (yes/no)</b>
	<b>Uganda</b>	<b>Yes</b>
	Ethiopia	No
	Gambia	No
	Kenya	No
	Madagascar	No
	South Africa	No
	Egypt	No
	El Salvador	No
	Mexico	No
	Nicaragua	No
	Chile	No
	Iran	No
	Vietnam	No
	Cambodia	No
	Malawi	No

<b>Applied methodologies and standardized baselines</b>	AMS-III.AV. Version 03 Low greenhouse gas emitting safe drinking water production systems
<b>Mandatory sectoral scopes linked to the applied methodologies</b>	Sectoral scope 03 : Energy demand
<b>Conditional sectoral scopes linked to the applied methodologies, if applicable</b>	N.A.
<b>Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report</b>	426,597 tCO <sub>2</sub> e
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report</b>	239,885 tCO <sub>2</sub> e
<b>Name and UNFCCC reference number of the DOE</b>	China Classification Society Certification Company (CCSC) Ref. Number: E-0046
<b>Name, position and signature of the approver of the verification and certification report</b>	<b>Mr. HUANG Shiyuan, General Manager</b> 

**SECTION A. Executive summary**

&gt;&gt;

The Coordinating/managing Entity (CME) Pure Water Ltd. (hereinafter referred to as PWL) has commissioned China Classification Society Certification Company (hereafter referred to as "CCSC") to carry out the 4th periodic verification of the CDM PoA "International Water Purification Programme" (hereafter referred to as "the PoA") registered with UNFCCC PoA reference No. 5962, covering the monitoring period from 01/06/2016 to 31/12/2017.

The verification is based on the currently valid documentation of the United Nations Framework Convention on Climate Change (UNFCCC).

The verification process includes three phases: 1) desk review of documents; 2) on-site inspection and follow-up interviews with the relevant personnel; 3) resolution of outstanding issues and the issuance of final verification report and opinion.

Eight Corrective Action Requests (CAR) and Five Clarification Requests (CLs) were raised in the verification process and successfully closed upon the Coordinating/managing Entity (CME) taken actions and submitted the revised monitoring report and supporting evidence. Two Forward Action Requests (FAR) were raised for this monitoring period.

In summary, CCSC confirms that the PoA and CPAs are implemented as planned and described in the approved revised PoA-DD and included CPA-DDs. The monitoring plan contained in the approved revised PoA-DD and included CPA-DDs is in accordance with the applied methodology and the monitoring system is in place and functional. The installed equipment for measuring parameters required for calculating emission reductions are operated appropriately. The PoA and CPAs are generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements.

Based on the amount of verified emission reductions stated in the verification report, CCSC confirms the following statement, and requests the CDM-EB to issue the CERs:

Specific-case CPA reference number	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e)		
	Results achieved in the period up to 31 December 2012	Results achieved in the period from 1 January 2013 onwards	Results achieved in the entire monitoring period
5962-0001	0	0	0
5962-0002	0	66,180	66,180
5962-0003	0	45,436	45,436
5962-0008	0	37,281	37,281
5962-0009	0	39,480	39,480
5962-0017	0	31,039	31,039
5962-0018	0	20,469	20,469
Total	0	239,885	239,885

**A.1. Objective**

CDM PoA Verification is the periodic thorough, independent review and ex-post determination by a DOE of the monitored reductions in GHG emissions during defined verification period. 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. The verification shall:

- Ensure that the PoA and its CPAs have been implemented and operated as per the registered PoA-DD and CPA-DDs or any approved revised PoA-DD and CPA-DDs, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the PoA and CPAs are in place;
- 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 CERs and verifiable and in accordance with applicable CDM requirements;
- 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);
- Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

## A.2. Scope

The verification scope covers the relevant documents (e.g. the approved revised PoA-DD, included CPA-DDs, the Monitoring Report, the emission reduction calculation spreadsheet, supporting documents available to the verifier and information collected through performing interviews and during the on-site assessment, EB's request and guidelines publicly available, relevant rules, including the host country legislation, etc.) to be independently reviewed, the local stakeholders to be interviewed with, and processes that are necessary to acquire objective evidence for the evaluation of the PoA compliance to the CDM verification requirements.

The above verification activities are conducted according to the CDM requirements. In doing so, the principles of accuracy and completeness, relevance, reliability and credibility were followed.

The verification is not meant to provide any consulting service towards the CME/PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the PoA.

## A.3. PoA Description

The PoA seeks to further the access of households and communities to clean and safe drinking water, by promoting low greenhouse gas emitting water purification technologies in the host Parties. The PoA is thus primarily designed for the long-term improvement of the living conditions of local people. The targeted users of such technologies will be households and/or communities. Examples of technologies include, but are not limited to, water filters (e.g. membrane, activated carbon, ceramic filters), solar technologies (Ultra violet disinfection devices, solar water disinfection SODIS), photocatalytic disinfection equipment, pasteurization appliances, chemical disinfection methods (eg. chlorination), combined treatment approaches (eg. Flocculation plus disinfection), etc. The PoA reduces the use and demand for fossil fuels and non-renewable biomass that would have been used to boil water as a mean of water purification in the absence of the Programme of Activities. This directly leads to reduced greenhouse gas emissions. The PoA is implemented by Pure Water Ltd. who is the coordinating/managing entity (hereafter referred to as "CME"). The CME is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the CPAs.

PoA Title:	International Water Purification Programme
UNFCCC PoA Reference No.:	5962
Registration Date:	16/11/2012
PoA Renewal Period:	16/11/2012-15/11/2019

PoA Duration	19/11/2012-18/11/2040	
Monitoring Period:	4th monitoring period: 01/06/2016 to 31/12/2017	
Specific-case CPA reference number	<b>CPA Reference No.</b>	<b>CPA No. in the report</b>
	5962-0001	CPA-1
	5962-0002	CPA-2
	5962-0003	CPA-3
	5962-0008	CPA-9
	5962-0009	CPA-10
	5962-0017	CPA-21
	5962-0018	CPA-22
Coordinating/managing entity (CME):	Pure Water Ltd.	
Methodologies used	AMS-III.AV. Version 03 "Low greenhouse gas emitting safe drinking water production systems"	
UNFCCC view page:	<a href="http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/RG9OBX48DCT65YUZV03A7KELJ2SMFW/view">http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/RG9OBX48DCT65YUZV03A7KELJ2SMFW/view</a>	

This monitoring period includes the implementation and monitoring of seven CPAs, as part of registered PoA within the geographical boundary of Uganda. The CPAs that were included after the end of the current monitoring period were not considered as part of verification.

Items	Technology	Location*	Dispensers installation Start date	Dispensers Installed	CPA Included Date	Operation days in this monitoring period (days)
CPA-1	Gravity Driven Membrane Filters	/	/	0	/	0
CPA-2	Chlorine dispenser system	Budaka, Kibuku, Manafwa district	08/04/2013	1,133	17/07/2014	579
CPA-3		Manafwa, Mbale district	22/01/2014	1,006	15/04/2015	579
CPA-9		Budadiri East and Budadiri West in Sironko District, Bungokho North and Bungokho South in Mbale District	03/08/2014	1,101	13/09/2016	475
CPA-10		Agule, Pallisa and Butebo,	27/04/2015	810	13/09/2016	475

		Pallisa District				
CPA-21		Butaleja District (involved counties: Bunyole East and Bunyole West) and Namutumba District (involved county: Busiki)	10/12/2014	845	01/02/2017	334
CPA-22		Busia District (involved county: Samia North) and Tororo District	04/11/2015	580	01/02/2017	334

\*Detail location please refer to section E.3.1 of the report.

During this monitoring period (01/06/2016 to 31/12/2017), the CME has informed that CPA-1 (5962-0001) has not been implemented as yet. The PoA and other CPAs have been operated normally and there have been no event or situation that occurred which may impact the applicability of the applied methodology. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions.

## SECTION B. Verification team, technical reviewer and approver

### B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	LI	Xingtong	CCSC Central Office	√	√	√	√
2.	Verifier	IR	ZHOU	Wusen	CCSC Central Office	√	√	√	/
3	Verifier (Trainee Auditor)	IR	LI	Yong	CCSC Central Office	√	√	√	√

**B.2. Technical reviewer and approver of the verification and certification report**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	EI	TANG	Xuemei	CCSC Central Office
2.	Technical reviewer	IR	XIE	Fengjun	CCSC Central Office
3.	Approver	IR	HUANG	Shiyuan	CCSC Central Office

**SECTION C. Application of materiality in conducting the verification****C.1. 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	Human error in conducting and get the result from surveys and test.	Low	The CME has established the CDM monitoring and management manual and appointed the CDM technical staffs, field team and Programme manager who were trained to be responsible for conducting surveys, spot-checks and data aggregating, recording in the ODK system. The promotor in the waterpoint will also be trained for chlorine refilling and dispenser daily maintenance. CME also established the QA/QC procedure to ensure the veracity and validity of the monitoring procedure and monitoring records. In summary, the risk level is low.	The DOE will check/crosscheck through acceptance sample approach.
2	Error in transferring/typing the data to system.	Medium	The data was typed into database. Error will occur sometimes.	The DOE will check/crosscheck through acceptance sample approach, and against the original records.

**C.2. Consideration of materiality in conducting the verification**

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In accordance with Para.307/VVS-PoA version 01.0, the applicable materiality threshold is 5% as PoA includes only small-scale CPAs.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Final)
Emission reductions achieved (tCO <sub>2</sub> e) in this monitoring period	345,958	239,885

Identified Threshold (%) as per Para.307 of CDM VVS-PoA Verison 01.0	5.0%	5.0% (11,994 tCO <sub>2</sub> e)
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The sampling approach and the calculations are checked by the assessment team with available evidences/sources. Since most of the data is confirmed through ex-post monitoring survey conducted by the CME, the verification team has crosschecked the ex-post survey data by applying sampling approach. And the ex-ante parameters were also been checked against the PoA-DD and CPA-DDs. There was no gap identified in the values of ex-ante parameters.

For the diesel consumption for chlorine transportation, the emission source can be ignored for it's not addressed in the applied methodology and the contribution is 0.25%, less than 1% of the overall average annual emissions reductions according to the Para.110 of VVS-PoA Version 01.0, and it's below the threshold of materiality.

After closing out the findings raised in Annex 4 of the report, the verification team confirms that the claimed emission reductions or removals are free from material errors, omissions or misstatements, with a reasonable level of assurance.

## SECTION D. Means of verification

### D.1. Desk/document review

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After receiving the Monitoring Report Version 01 dated 12/07/2018, CCSC made it be publicly available on the UNFCCC CDM dedicated website on 16/07/2018. (link: [http://cdm.unfccc.int/ProgrammeOfActivities/poa\\_db/RG9OBX48DCT65YUZV03A7KELJ2SMFW/view](http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/RG9OBX48DCT65YUZV03A7KELJ2SMFW/view)).

A desk review of the Monitoring Report Version 01 dated 12/07/2018 and supporting documents was conducted by the CCSC verification team. The aim of the desk review of the documentation was to verify the completeness of the data and the information presented, to carry out the compliance check of the MR with respect to the monitoring plan and the applied methodology. Particular attention was given to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures. The evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions was also conducted.

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

- The approved revised PoA-DD Version 07 dated 13/04/2015 /5/, the included CPA-DDs /9//10//11//12//13//14/;
- The PoA validation report /6/ and the Inclusion Validation Reports of CPAs /15/-/20/;
- The Post Registration Changes (PRC) Validation Opinion for the PoA /8/;
- The applied monitoring methodologies /52//53/;
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /54/-/59/;
- Other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, laboratory analysis or national regulations) /47//48/.

Appendix 3 of this report contains a complete list of all documents and proofs reviewed by the verification team.



**D.2. On-site inspection**

Duration of on-site inspection: 21/08/2018-24/08/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	<b>Opening meeting</b> (Scope of work, timetable, approval process, CDM procedure for verification, verification methodology, confidentiality)	Evidence Action Mbale Office	21/08/2018	Mr. LI Xingtong Mr. ZHOU Wusen Mr. LI Yong
2.	<b>Field Visit</b> including the status of the project implementation: Sampled 30 dispensers of the CPAs Data acquisition and processing system ODK software and its Raw Database Water quality test system	Project site	21/08/2018-23/08/2018	
3.	<b>Interview</b> (Refer to the table in section D.3 and Appendix 5)	Project site	21/08/2018-23/08/2018	
4.	<b>Document Review</b>	Evidence Action Mbale Office	21/08/2018-23/08/2018	
5.	<b>Closing Meeting</b> CARs/CLs discussion, findings compilation, agreement on the time frame for replies Recommendations, impacts of the findings and delayed response upon timings and next steps.	Evidence Action Mbale Office	24/08/2018	

**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	PANT	Arjun	Implementer: Evidence Action (EA) head office	21/08/2018, 24/08/2018	Water Quality Implementation, Records Operation and Management Implementation, Records Monitoring, Survey, Database	Mr. LI Xingtong  Mr. ZHOU Wusen  Mr. LI Yong
2.	OCAMA	Andrew	Implementer: EA-Uganda			
3.	KIBUUKQ	Richard				
4.	NEOMBE	Irene				
5.	NANGALA	Hilda				
6.	WERIKHE	Susan				
7.	OSTERWALDER	Lars	CME: Pure Water Ltd.(PWL)			
8.	GANG	Rohit				
9.	ZHANG	Jessie				

**D.4. Sampling approach**

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**CME's sampling approach:**

As indicated in Section E.2 and E.3 of the monitoring report, three parameters were quantified through surveys i.e. *Water quality*, *Fraction of water treated with the dispenser that is actually drunk (Drink %)* and *Fraction of delivered chlorine available for use in dispenser (Refill %)*. The sampling design was implemented in line with the Section D.7.2 of included CPA-DDs.

The three parameters for each CPAs have been monitored by grouped survey for all of them applied the same technology and located in the same country, which complied with the approved revised PoA-DD and included CPA-DDs /9//10//11//12//13//14/.

The CME has applied clustered sampling approach for the water quality monitoring, clustered sampling approach for *Drink%* and *Water quality* and simple random sampling approach for *Refill%*. The 95/10 confidence/precision requirement has been fulfilled. The complete details of CME's sampling are included under section E.3 of the monitoring report.

**Verification team's sampling approach:**

Considering the targets of DOE field survey and CME survey are not the same lots because of difference of survey time. The verification team has to assume promoters/users' habit and preference will not change for between DOE and CME surveys. However, the chlorine water quality may be changed by a number of factors, eg. Turbidity of water, keeping days of chlorinated water, user habit etc. Therefore, the result of water quality is used for crosscheck.

In order to meet the requirements of *Standard for Sampling and surveys for CDM project activities and programme of activities, Version 07.0 /54/*, the CCSC verification team applied acceptance sampling concept, combined with DOE's sample approach, in the verification. The verification team selected random sample of CME's sampled records with Microsoft EXCEL, checked the acceptability of the data for each such record with CME's sample records, and then based on the number of records where there is agreement, determined if the CME's sample records meet the requirements.

The verification team determined the sample size for acceptance sampling by evaluating the following, using the team's professional judgment and guidance in the *Standard Sampling and surveys for CDM project activities and programme of activities Version 07.0 /54/*:

Parameters	Quality Limits and Risks		Sample Size and Remark	Acceptance Number (Ac)
Refill%	AQL:1.0%	Producer Risk:5%	<b>30</b>	1
	UQL:20%	Consumer Risk: 10%	<p>The recommended sample size and acceptance number are 18/1.</p> <p>Considering a total 14 cluster/dispenser were sampled in CME's water quality and Drink% survey. And the verification team will visit all the 14 dispensers (for WQ and Drink %) together with the 18 dispensers/promoters (for Refill %) in DOE's survey.</p> <p>One promoter will be interviewed for one dispenser.</p> <p>And CME samples share two dispensers in both Drink% surveys and Refill% surveys. Therefore, the sample size for Refill% has</p>	

			been determined as 30 (=18+14-2).	
<b>Water Quality</b>	AQL:1.0%	Producer Risk:5%	<b>28</b> The recommended sample size and acceptance number are 22/1. Considering the redundancy, for all the 30 waterpoints surveyed, DOE will randomly require one interviewee a cup of chlorinated drinking water for TCR test onsite and further E.coli test in CME's laboratory.	1
	UQL:20%	Consumer Risk: 5%		
<b>Drink%</b>	AQL:1.0%	Producer Risk:5%	<b>62</b> The recommended sample size and acceptance number are 61/2. In CME's sample, 14 clusters/dispensers and 702 households were sampled. As per the description in refill%, CCSC will interview 1-3 users (usually, promoter is also a user) around each dispenser listed in the verification field survey. Thus, the sample size is determined as 62.	2
	UQL:10%	Consumer Risk: 5%		

The verification team has actually combined the acceptance sampling approach and random sampling approach in the framework of acceptance sampling, which can fulfill the requirement of the Sampling and surveys Standard. And by the combined sampling approach, the verification team can also survey the clusters/waterpoints not involved in CME's survey, eg.16 extra waterpoints, to crosscheck the value of water quality and Drink%.

The verification team has designed questionnaires for Promoter and User separately. Besides the parameters mentioned above, the verification team also obtained the information of household (Name, household size), user habit and frequency, promoter check and refill frequency, etc. The verification team also inspected the information of the waterpoints (Name and waterpoint ID), location, install date and functionality of dispensers.

#### D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
<b>General</b>	-	-	-
Compliance of the monitoring report with the monitoring report form	-	-	-
Remaining forward action requests from validation and/or previous verification	-	-	-
CPA(s) considered for verification and covered in this report	-	-	-
<b>Programme of activities</b>	-	-	-
Compliance of the programme implementation with the registered PoA-DD	-	-	-
Implementation and operation of the management system	-	-	-
Post-registration changes			
<ul style="list-style-type: none"> <li>Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Corrections</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Inclusion of a monitoring plan</li> </ul>	-	-	-

<ul style="list-style-type: none"> <li>Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Changes to the programme design or project design</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Change of coordinating/managing entity</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Changes specific to afforestation and reforestation activities</li> </ul>	-	-	-
<b>Component project activities</b>			
Compliance of the CPA implementation with the included CPA design document	CL-1 CL-2 CL-3	CAR-1	
Post-registration changes			
<ul style="list-style-type: none"> <li>Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Corrections</li> </ul>	-	-	FAR-1
<ul style="list-style-type: none"> <li>Changes to the start date of the crediting period of component project activities</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Inclusion of a monitoring plan</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Changes to the programme design of project design</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Changes specific to afforestation and reforestation component project activities</li> </ul>	-	-	-
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan			
<ul style="list-style-type: none"> <li>Data and parameters fixed ex ante or at renewal of crediting period</li> </ul>	CAR-2	-	-
<ul style="list-style-type: none"> <li>Data and parameters monitored</li> </ul>	CAR-3	CAR-4 CAR-5 CAR-6 CAR-7 CAR-8	-
<ul style="list-style-type: none"> <li>Implementation of sampling plan</li> </ul>	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	FAR-2
Assessment of data and calculation of emission reductions or net removals			
<ul style="list-style-type: none"> <li>Calculation of baseline GHG emissions or baseline net GHG removals by sinks</li> </ul>	CL-4	-	-
<ul style="list-style-type: none"> <li>Calculation of project GHG emissions or actual net GHG removals by sinks</li> </ul>	-	-	-
<ul style="list-style-type: none"> <li>Calculation of leakage GHG emissions</li> </ul>	CL-5	-	-
<ul style="list-style-type: none"> <li>Summary of calculation of GHG emission reductions or net GHG removals by sinks</li> </ul>	-	-	-

• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	-	-	-
• Remarks on difference from estimated value in included CPA	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
<b>Total</b>	<b>5</b>	<b>8</b>	<b>2</b>

## SECTION E. Verification findings

### E.1. General

#### E.1.1. Compliance of the monitoring report with the monitoring report form

<b>Means of verification</b>	Through cross-check and comparison to confirm if the applied PoA monitoring report form is valid and listed in UNFCCC website.
<b>Findings</b>	Through document review of the provided monitoring report (MR) /2/ and comparison with the latest PoA-MR template, the verification team confirm: <ul style="list-style-type: none"> <li>• The MR /2/ used the latest PoA-MR form available at UNFCCC website.</li> <li>• The MR /2/ is completed and meets all requirements of Instructions for filling out the monitoring report form for CDM programme of activities /60/ and “Clean development mechanism project standard” /49/.</li> </ul> No CARs/CLs/FARs raised in this section.
<b>Conclusion</b>	According to Para. 337 of VVS-PoA Version 01.0 /50/, CCSC verification team confirms that the monitoring report /2/ was in compliance with relevant monitoring report form and instructions therein.

#### E.1.2. Remaining forward action requests from validation and/or previous verifications

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Through checking the previous verification reports and revised validation report of PoA-DD and inclusion validation reports for the CPAs, it's identified that two FARs were raised from the 3<sup>rd</sup> verification for CPA-2 and CPA-3.

It's the first monitoring period for CPA-9, 10, 21, 22, and the verification team confirmed no remaining FAR raised in their validation stage.

#### **Remaining FAR-1:**

*The target of the parameter of Water quality should be drinking water, however, in their survey of CME/Implementer, it has not specified that the intended use of the sample water will be drinking. Therefore, the CME/Implementer are required to update the questions in their survey in the following monitoring period.*

The survey questions have been updated and the field officer has been trained by the CME to specify that the intended use of the sample water will be drinking.

CCSC verification team checked the WQT households list and WQT IDEXX Form and the training records finalised during October and November 2017, and confirmed that the survey questions had been updated and the field officers had been trained to specify that the intended use of the sample water is drinking.

Thus, the **FAR-1** from previous verification was closed out.

**Remaining FAR-2:**

*In the following verification, the emission reductions of each CPAs should be capped at 60k tCO<sub>2</sub> per annum to ensure the applicability of the methodology will not be impacted.*

The total annual emission reductions for both CPA-2 and CPA-3 remain below the 60,000 CERs small-scale threshold, and has been checked at the end of 4<sup>th</sup> monitoring period which covers the period from 01/06/2016 to 31/12/2017 by CME.

CCSC verification team checked the emission reductions for each CPA in 2016 and 2017, and confirmed the total annual emission reductions for each CPA remained within the thresholds of 60,000 CERs for small-scale Type III project.

Thus, the **FAR-2** from previous verification was closed out.

**E.1.3. CPAs considered for verification and covered in this report**

Title and UNFCCC reference number of the CPA included in the PoA as of the end of this monitoring period	Is the CPA considered for this verification? (yes/no)	The date when the CPA was included	Version of the PoA-DD	Confirmation that a request for issuance including the CPA has been published for the previous monitoring period (Y/N)
5962-0001: Gravity Driven Membrane Filters in Uganda - CPA 1	Yes	16/11/2012	07	Y
5962-0002: Chlorine Dispensers in Uganda – CPA 2	Yes	17/07/2014	07	Y
5962-0003: Chlorine Dispensers in Uganda – CPA 3	Yes	15/04/2015	07	Y
5962-0004: Chlorine Dispensers in Malawi – CPA 5	No	19/11/2015	07	N
5962-0005: Chlorine Dispensers in Kenya - CPA 6	No	21/01/2016	07	N
5962-0006: Chlorine Dispensers in Kenya - CPA 7	No	21/01/2016	07	N
5962-0007: Chlorine Dispensers in Malawi - CPA 8	No	21/01/2016	07	N
5962-0008: Chlorine Dispensers in Uganda - CPA 9	Yes	13/09/2016	07	N
5962-0009: Chlorine Dispensers in Uganda - CPA 10	Yes	13/09/2016	07	N
5962-0010: Chlorine Dispensers in Malawi - CPA 11	No	13/09/2016	07	N
5962-0011: Chlorine Dispensers in Kenya - CPA 12	No	13/09/2016	07	N
5962-0012: Chlorine Dispensers in Kenya - CPA 13	No	13/09/2016	07	N

5962-0013: Chlorine Dispensers in Kenya - CPA 14	No	13/09/2016	07	N
5962-0014: Water Kiosks in Cambodia – CPA 4	No	5/12/2016	07	N
5962-0015: Chlorine Dispensers in Kenya – CPA 15	No	01/02/2017	07	N
5962-0016: Chlorine Dispensers in Kenya – CPA 20	No	01/02/2017	07	N
5962-0017: Chlorine Dispensers in Uganda – CPA 21	Yes	01/02/2017	07	N
5962-0018: Chlorine Dispensers in Uganda – CPA 22	Yes	01/02/2017	07	N
5962-0019: Chlorine Dispensers in Kenya - CPA 16	No	06/06/2017	07	N
5962-0020: Chlorine Dispensers in Kenya - CPA 17	No	06/06/2017	07	N
5962-0021: Chlorine Dispensers in Kenya - CPA 18	No	06/06/2017	07	N
5962-0022: Chlorine Dispensers in Kenya - CPA 19	No	06/06/2017	07	N

## E.2. Programme of activities

### E.2.1. Compliance of the programme implementation with the registered programme design document

<b>Means of verification</b>	<p>Based on the review of documentation provided, and the on-site visit, CCSC verification team assessed whether the PoA have been implemented and operated in accordance with operational criteria set out in the PoA-DD /5/, and whether any deviation or proposed or actual changes in the implementation or operation of the PoA has taken place.</p> <p>During the site inspection, the verification team:</p> <ul style="list-style-type: none"> <li>• Visited the sites of all CPAs;</li> <li>• Checked dispensers in a sample and interviewed householders about their use;</li> <li>• Interviewed staff responsible for monitoring and implementation of the project, and reviewed relevant documents;</li> <li>• Reviewed the relevant training materials and training records.</li> </ul>
<b>Findings</b>	<p>The introduction of low greenhouse gas emitting water purification systems to provide clean drinking water to low income households. The PoA serves as an open platform for various water treatment technologies which are eligible under the methodology AMS-III.AV. Version 03 /52/.</p> <p>The management system has been implemented as described in the approved revised PoA-DD ('Operational and management plan') and in accordance with applicable provisions on the implementation of the management system in the Project Standard /7//49/. The PoA is managed by the CME (Pure Water Ltd. based in Switzerland) with CPA Managers responsible for the coordination with the CPA Implementers (Evidence</p>

	<p>Action). At the end of the current monitoring period, in Uganda, seven CPAs were included in the registered PoA i.e., CPA-1, CPA-2, CPA-3, CPA-9, CPA-10, CPA-21, CPA-22. The CME has informed that CPA-1 (5962-0001) has not been implemented as yet, which has been confirmed by the verification team by reviewing the Dispenser Installation Records and interviewing with the CME. The CME will not claim the emission reductions during this monitoring period.</p> <p>The overall responsibility of implementation and operation is with CME (Pure Water Ltd.), which was also confirmed during the site visit. This is consistent with PoA-DD /7/.</p> <p>This monitoring period includes the implementation and monitoring of two CPAs as part of revised PoA. The implementation of all CPAs, as referenced above, are within the geographical boundary of the PoA-DD, which constitutes the physical boundary as well.</p> <p>The verification team has checked the dispenser installation records and ODK Raw Data, detail information has been checked and described in Section E.3.1 of the verification report.</p> <p>There is no information (data and variables) provided in the monitoring report that is different from that stated in the registered PoA-DD and CPA-DD.</p> <p>Further, based on the review of Dispenser Installation Records /36/, physical observations and interview conducted during the site visit, the verification team found that the actual implementation of the PoA is consistent with PoA DD /7/ and respective CPA-DDs /9//10//11//12//13//14/.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	<p>According to Para. 341 of VVS-PoA Version 01.0 /50/, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• The implementation status and equipments installation of the PoA and its included CPAs are consistent with the approved revised PoA-DD and CPA-DDs;</li> <li>• The actual operation of the PoA is as per the approved revised PoA-DD and CPA-DDs;</li> <li>• Information (data and variables) provided in the monitoring report is in accordance with that stated in the approved revised PoA-DD and CPA-DDs;</li> <li>• An opinion on the cause of any increase in the actual GHG emission reductions achieved by the registered PoA in the current monitoring period that was reported in monitoring report.</li> </ul>

#### E.2.2. Implementation and operation of the management system

<b>Means of verification</b>	<p>The CCSC verification team reviewed the description of the operation and management system as set out in the approved revised PoA-DD /7/, and conducted on-site inspection to determine whether the operation and management structures required for monitoring have been put in place.</p>
<b>Findings</b>	<p>Based on the interview of CME representative and monitoring team during the on-site visit, it was confirmed that the CME has organized an appropriate management and operational system for implementation, monitoring and reporting functions.</p> <p>The CME appointed a PoA Manager who is supported by CPA Manager in the host Party (Uganda). The host Party CPA manager overlooks the representatives from CPA implementers.</p>



	<p>Considering only six CPAs (CPA-2,3,9,10,21,22) have been implemented in the current monitoring period, it was verified by the verification team that Evidence Action, which acts as CPA implementer, is managing the implementation of water purifiers (chlorine dispensers), operating, monitoring (field surveys, physical check and spot checks), and maintaining.</p> <p>A community member volunteers to be the dispenser “promoter”, who encourages use of the dispenser, reports any problems, and refills the dispenser with chlorine.</p> <p>The actual records (hard copies) are retained by Evidence Action and provided to CME. The verification team reviewed relevant documents, which were kept in order by Evidence Action viz., Installation Records /36/, Carbon Rights Waiver Records /35/, ODK Raw Records /27/, Survey Records /28/, Community Meeting Records /37/, and Chlorine Delivery Records /31/ among others. CME was also found to have access to all the records mentioned above, maintained by CPA implementer.</p> <table border="1" data-bbox="464 703 1455 1317"> <tr> <td data-bbox="464 703 774 1111" rowspan="8"><b>Hard copy</b></td><td data-bbox="774 703 1455 757">Installation Forms</td></tr> <tr> <td data-bbox="774 757 1455 810">Carbon Rights Waiver Records</td></tr> <tr> <td data-bbox="774 810 1455 864">Community Meeting Education Records</td></tr> <tr> <td data-bbox="774 864 1455 918">Population Cross check records</td></tr> <tr> <td data-bbox="774 918 1455 972">Chlorine purchase order and invoice</td></tr> <tr> <td data-bbox="774 972 1455 1025">Training Records</td></tr> <tr> <td data-bbox="774 1025 1455 1079">Survey Records (Drink% and water quality)</td></tr> <tr> <td data-bbox="774 1079 1455 1133">IDEXX Test Records</td></tr> <tr> <td data-bbox="464 1133 774 1317" rowspan="4"><b>ODK system and recorded in the server</b></td><td data-bbox="774 1133 1455 1187">Promoter survey Records (Refill %)</td></tr> <tr> <td data-bbox="774 1187 1455 1240">Chlorine Delivery Records</td></tr> <tr> <td data-bbox="774 1240 1455 1294">Spot check records</td></tr> <tr> <td data-bbox="774 1294 1455 1348">Dispenser database</td></tr> </table> <p>CME is responsible for QA/QC of the data, analysis and reporting into the monitoring report. For survey data, a monitoring team has been organized by the CME consisting of trained monitoring staff, who conducted the monitoring and surveys.</p> <p>The organizational structure and roles and responsibilities for monitoring are in line with the situation as observed during the site visit, and the structure is considered appropriate.</p> <p>No CARs/CLs/FARs raised in this section.</p>	<b>Hard copy</b>	Installation Forms	Carbon Rights Waiver Records	Community Meeting Education Records	Population Cross check records	Chlorine purchase order and invoice	Training Records	Survey Records (Drink% and water quality)	IDEXX Test Records	<b>ODK system and recorded in the server</b>	Promoter survey Records (Refill %)	Chlorine Delivery Records	Spot check records	Dispenser database
<b>Hard copy</b>	Installation Forms														
	Carbon Rights Waiver Records														
	Community Meeting Education Records														
	Population Cross check records														
	Chlorine purchase order and invoice														
	Training Records														
	Survey Records (Drink% and water quality)														
	IDEXX Test Records														
<b>ODK system and recorded in the server</b>	Promoter survey Records (Refill %)														
	Chlorine Delivery Records														
	Spot check records														
	Dispenser database														
<b>Conclusion</b>	<p>In conclusion, based on document review, and on-site inspection, together based on their local and sectoral expertise, CCSC verification team confirms that the monitoring management system of the PoA is in place with the responsibilities properly identified and established.</p>														

### E.2.3. Post-registration changes

#### E.2.3.1. Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline

>>

There is no temporary deviation from monitoring plan or applied methodology has been identified for this monitoring period.

### **E.2.3.2. Corrections**

>>

There is no correction identified for this monitoring period.

### **E.2.3.3. Inclusion of a monitoring plan**

>>

N.A. The CCSC verification team has checked the approved revised PoA-DD (Version 07, dated 13/04/2015) /7/ and included CPA-DDs /9//10//11//12//13//14/to confirm a monitoring plan included in the DDs.

### **E.2.3.4. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools**

>>

No permanent changes to the monitoring plan in the approved revised PoA-DD or applied methodology was identified for this monitoring period.

### **E.2.3.5. Changes to the programme design or project design**

>>

The approved revised PoA-DD, with regard to inclusion of two additional host Parties - Cambodia and Malawi, which was approved on 05/11/2015 by CDM EB as checked from <http://cdm.unfccc.int/PRCCContainer/DB/prcp705942171/view>.

### **E.2.3.6. Change of coordination/managing entity**

>>

The CME is not changed.

### **E.2.3.7. Changes specific to afforestation and reforestation activities**

>>

N.A.

## **E.3. Component project activities**

### **E.3.1. Compliance of the CPA implementation with the included CPA design document**

<b>Means of verification</b>	<p>The verification team has performed an on-site inspection to assess:</p> <p>a) If all physical features (technology, project equipment, and monitoring and metering equipment) of the CPA-DDs are in place.</p> <p>b) If the CME/PP has operated the project activity as per the PoA-DD and CPA-DDs /7//9//10//11//12//13//14/.</p> <p>The verification team has:</p> <ul style="list-style-type: none"> <li>• Applied the GPS instruments to check the location and geo-coordinates;</li> <li>• Field checked the dispensers, QC certificates and specifications for components, and Installation Records, to confirm that the project equipment installation is consistent with the PoA-DD and CPA-DDs/7//9//10//11//12//13//14/.</li> <li>• Interviewed relevant personnel for the project implementation information, and assessed the construction and implementation status with the Installation</li> </ul>
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	<p>Records and the ODK Raw Data to check the implementation status of the Project /27//36/.</p> <ul style="list-style-type: none"> <li>• Interviewed the promoters and households and field surveyed/checked the monitoring parameters</li> <li>• Reviewed ODK operation procedure and ODK Raw Data to confirm the Project has been operated as per the PoA-DD and CPA-DDs.</li> </ul>
<b>Findings</b>	<p>There are seven specific CPAs (CPA-1, CPA-2, CPA-3, CPA-9, CPA-10, CPA-21, and CPA-22) that were included in the PoA in this monitoring period.</p> <p>The implementation and operation status of each CPA has been verified as follows:</p> <p><b>CPA-1:</b></p> <p>It will consist of the distribution and installation of Gravity-Driven ultrafiltration membranes (GDM) in Buikwe District, Uganda. However, as referenced in Section E.2.1 above, CPA-1 has not been implemented as yet. The CME has indicated that once the funds are secured, the efforts would be made to implement the CPA.</p> <p><b>CPA-2, CPA-3, CPA-9, CPA-10, CPA-21, CPA-22:</b></p> <p>The six CPAs consist of the distribution and installation of chlorine dispensers in Uganda. The CPAs seek to further the access of households and communities to safe drinking water, using a low greenhouse gas emitting water purification technology, chlorine dispensers. The CPAs reduce the use and demand of non-renewable biomass that would have been used to boil the water as a mean of water purification in the absence of the CPAs. The CPAs are undertaken by the coordinating/managing entity (CME) of the PoA, Pure Water Ltd., and implemented on a voluntary basis by Evidence Action.</p> <p><b><u>CL-1</u> was raised that: For the Implementation status:</b></p> <ol style="list-style-type: none"> <li>1) <u>Information on the implementation and actual operation of each CPAs is absent in the monitoring report.</u></li> <li>2) <u>The verification team has checked the dispenser installed against the included CPA-DDs, and found most of completion rates crossed 85% except CPA-22, which completion rate was 61.1%. The implementation status and further plan for all the CPAs should be reported in the monitoring report.</u></li> <li>3) <u>During onsite inspection, the verification team found that the install dates of three dispensers (waterpoint ID: 7056647, 7050048, 70120316) marked on their concrete base are inconsistent with those in the database.</u></li> </ol> <p><b><u>Response from the CME:</u></b></p> <ol style="list-style-type: none"> <li>1) The Information on the implementation and actual operation of each CPA is added in the updated monitoring report.</li> <li>2) Currently, the chlorine dispenser program in Uganda has no further installation plan.</li> </ol> <p>CPA-22 was the latest CPA installed in Uganda and started in November 2015, this project was not fully completed during this monitoring period. The project implementer was not able to fully implement CPA-22 as originally planned due to financial issues, so it was considerable to include the new dispensers if the financial issues had been solved. Therefore, the number of installed dispensers is below that planned in the CPA DD.</p> <p>Furthermore, during this monitoring period, the CME has set eligibility criteria for the installed dispensers for conservative consideration. Dispensers were considered as non-eligible if key information like GPS coordinates of the</p>

water point are missing or if chlorine dispensers were not maintained during the monitoring period.

Dispensers which do not meet the eligibility criteria are not included in the final database and no CERs will be claimed from the non-eligible dispensers. Therefore, the number of eligible dispensers is below the indicated installation number in the CPA DDs.

This approach is considered to be conservative.

- 3) The inconsistencies of the installation dates for the three dispensers are shown as below:

Waterpoint ID	CPA	Installation date in dispenser database	Installation date on the dispenser foundation
7050647	CPA-3	23/10/2014	07/10/2014
7050048	CPA-3	28/09/2014	29/09/2014
70120316	CPA-22	12/11/2015	11/11/2015

The installation date on the dispenser foundation reflects the date when the dispenser was installed. On the other hand, the installation date in the dispenser database reflects the date when the chlorine is filled into the dispenser for the first time, which normally takes place within 3 days after installation of the dispenser foundation. Therefore, for the dispensers with water point IDs of 70120316, 1-day variance between the date on the dispenser foundation and that in the dispenser database is reasonable.

However, for 7050048 and 7050647, the reported installation dates in the database are data entry errors and have been updated as per the date in the installation record and that marked in the foundation of the dispenser. The installations of the three dispensers took place in 2014 or 2015, which is well before the start date of the monitoring period. Such discrepancy will have no impact on the ER calculation anyway.

CCSC verification team have checked the updated monitoring report, Updated dispenser database and Installation record of waterpoint ID 7050647, 7050048 which were provided by CME, and confirmed the information on the implementation and actual operation of each CPA has been added in the updated MR.

The implementation status for all the CPAs have been reported in the updated MR. Because of the financial issues, the completion rate of CPA-22 was only 61.1%, the CME had no further plan for CPA-22 until the financial issues had been solved. The reported installation dates of 7050048 and 7050647 in database have been updated as per the date in the installation record and that marked in the foundation of the dispenser. For the water point IDs of 70120316, 1 day variance between the date on the dispenser foundation and that in the dispenser database is reasonable. Thus, the **CL-1** was closed out.

**CL-2 was raised that:**

By documents review, the verification team found the geo-coordinates in the database for 16 dispensers are incorrect.

During onsite inspection, the verification team also found the GPS coordinates for dispenser (Waterpoint ID: 70120316) is incorrect as per the information obtained onsite.

**Response from the CME:**

16 incorrect GPS coordinates

The information of the wrong GPS coordinates for the 16 dispensers is shown as below:

Waterpoint Name	Waterpoint ID	Latitude	Longitude
Kiwongo_Protected_Sp_7040052	7040052	1.17794	-21880.63943
Miwu_Sp_7040173	7040173	1.20649	-21880.63265
Namukuyu_Sp_7040311	7040311	1.12953	-21880.71139
Negugu_Sp_7040314	7040314	1.11833	-21880.70432
Mazuguni_7050421	7050421	1.08488	-21880.77435
Kadugala_Protected_Sp_7050435	7050435	1.08224	-21880.79296
Kibagala_Protected_Sp_7050436	7050436	1.08273	-21880.79361
Lusato 1 Spring_7030547	7030547	0.96024	34369597.00000
Namunyiri_7030587	7030587	0.94071	34368431.00000
Bunambale Primary School Spring_7030554	7030554	0.96287	34367836.00000
Nadenmu Spring_7030388	7030388	0.90201	34362789.00000
Bungati Cou Primary School_7030946	7030946	0.97026	34358477.00000
Shebwondye_7030540	7030540	0.87489	34354176.00000
Sikimbilo_7030968	7030968	0.91493	34338724.00000
Mumbya_7030497	7030497	0.89738	34328537.00000

It is obvious that the incorrect GPS coordinates in the database derive from a data entry error (wrong coordinate format was entered). For this input error, CME has corrected the dispenser database. The updated dispenser database and relevant evidence documents are submitted for DOE review.

Updated GPS information:

Waterpoint Name	Waterpoint ID	Latitude	Longitude
Kiwongo_Protected_Sp_7040052	7040052	1.17794	34.17280
Miwu_Sp_7040173	7040173	1.20649	34.36722
Namukuyu_Sp_7040311	7040311	1.12953	34.28611
Negugu_Sp_7040314	7040314	1.11833	34.29556
Mazuguni_7050421	7050421	1.08488	34.22556
Kadugala_Protected_Sp_7050435	7050435	1.08224	34.23083
Kibagala_Protected_Sp_7050436	7050436	1.08273	34.23083
Lusato 1 Spring_7030547	7030547	0.96024	34.36944
Namunyiri_7030587	7030587	0.94071	34.36833
Bunambale Primary School Spring_7030554	7030554	0.96287	34.37389
Nadenmu Spring_7030388	7030388	0.90201	34.36278

Bungati Cou Primary School_7030946	7030946	0.97026	34.35833
Shebwondye_7030540	7030540	0.87489	34.35417
Sikimbilo_7030968	7030968	0.91493	34.33861
Mumbya_7030497	7030497	0.89738	34.32833

1 inaccurate GPS coordinates spotted during onsite verification

During onsite verification, in total 29 out of 30 visited sites the GPS coordinates matched with an accuracy of 20 meters. Only the GPS coordinates of 1 water point (70120316) had a deviation of approximately 100 meters.

The inconsistent GPS coordinate obtained during onsite inspection derive from GPS accuracy on the phones of Evidence Action field staff. GPS accuracy is affected e.g. by weather conditions and poor GPS signals; also, GPS coordinates can vary slightly between different GPS receivers.

All water points visited during onsite inspection could still be uniquely identified using the water point name and village name, which are proof that the correct water points were visited during on-site verification.

CCSC verification team have checked the Updated dispenser database and relevant evidence documents for GPS coordinates which were provided by CME, and confirmed the 16 dispensers coordinates in dispenser database have been corrected according to the Install forms. The GPS accuracy may be affected e.g. by weather conditions and poor GPS signals; also, GPS coordinates can vary slightly between different GPS receivers. Therefore, the GPS coordinates of water point (70120316) had a deviation of approximately 100 meters is reasonable. By google map, the verification team have also checked the inaccurate coordinates (0.609207443°N, 33.93968071° E) of water point (70120316) and found no other dispenser there.

Thus, the **CL-2** was closed out.

**CL-3 was raised that:**

As per the included CPA-DDs, the unique dispenser ID (barcode ID) of each dispenser will also be recorded and updated in its central database.

By the onsite inspection, the verification team confirms the barcode IDs are marked in dispenser casing. However, the barcode IDs are not included in the database provided by the CME.

CME should also demonstrate that double counting has been avoided for each dispenser in the CPAs.

**Response from the CME:**

Barcode IDs are now included in the updated dispenser database.

Dispenser barcodes are attached to the surface of each dispenser at the time of installation, but it is prone to damage/loss. If the barcode is missing and inspected by promoter or spot-check, the dispenser ID in the database will be marked as "missing" until the dispenser outer casing gets replaced with new barcode. Actually, it is difficult for Evidence Action to maintain and renew the barcode IDs of each dispenser considering the large amount of dispensers and the supplier's reason that could not be fully controlled by the CME and implementer. Therefore, in the dispenser database there are records of missing barcodes.

As per the eligibility criteria to avoid double counting defined in the CPA-DDs, a unique numbering or identification system for the water purification devices disseminated is applied in dispenser database. The identification system can be

the Waterpoint ID or Dispenser barcode ID. And the criterion has been validated and confirmed by the validating DOE through on-site visit and documents review. Since only one dispenser is dispatched to each waterpoint involved in the PoA, a waterpoint is uniquely linked to a dispenser. Each dispenser was given one unique waterpoint ID in the dispenser database at the time of dispenser installation and recorded dynamically in the central database. So the project developer adopted the waterpoint ID as the unique identification for each dispenser because the waterpoint name will not change during the CPA operation and can easily be identified using the GPS coordinates, waterpoint name, villages name and county/sub-county information and CPA information.

In addition, all the 30 randomly selected dispensers can be correctly identified by water point ID during the onsite verification. Therefore, it can be demonstrated that no double counting occurs in the CPAs.

For future verifications, the project implementer is considering visually marking waterpoint IDs on the backside of the case of each dispenser as unique identification.

#### **DOE Assessment:**

The verification team has checked the provided dispenser database against the randomly selected install forms, and confirmed consistent with each other. However, the verification team checked the database and found that some dispenser ID marked "missing" in the database, which was explained by the CME that the dispenser tags were lost and the updated have not been attached on time due to the supplier reason that could not be fully controlled by the CME and implementer.

The verification team checked the onsite pictures of the dispenser ID against the database and found consistent. And as per the onsite interview of the promoters and users, and confirmed that:

- 1) The waterpoints' names are consistent with the database
- 2) The promoters usually checked the dispenser on a daily basis
- 3) Local users frequently use the dispensers.

And then the verification team can confirm there is a one-to-one correspondence among the waterpoint ID, the dispenser installed in the waterpoint, and their GPS information. Thus, the dispenser ID is not regarded as the critical information to identify the dispenser, and it's not the only approach to avoid double counting.

In addition, the verification team inputted the GPS information of all the dispensers and water points into Google-My Maps, and visually confirmed there was no geographically overlap among the distributed dispensers.

Furthermore, there are 171 dispensers marked as "missing", which is 3.3% of the total eligible & functional dispensers. And it's below the materiality threshold of 5%, evening considering of the potential emissions due to the transportation of chlorine.

And the CME and the implementer are considering visually marking waterpoint IDs on each dispenser as unique identification, which is reasonable and practical for the operation of the CPAs.

In summary, the barcode IDs are included in the database, and double counting has been avoided for each dispenser in the CPAs even some dispenser ID marked "missing" in the database.

Therefore, **CL-3** was closed out.

Furthermore, there is no event or situation occurred during the monitoring period that may have impacted the applicability of the applied methodology AMS-III.AV. Version 03.

CPA	Dispensers Installed	Dispensers installation Start date
CPA-1	0	/
CPA-2	1,133	08/04/2013
CPA-3	1,006	22/01/2014
CPA-9	1,101	03/08/2014
CPA-10	810	27/04/2015
CPA-21	845	10/12/2014
CPA-22	580	04/11/2015

The verification team has reviewed each validation reports and CPA-DDs, and concluded that the physical project boundaries of the CPAs are identified by sub-counties instead of districts. Therefore, although some CPAs such as CPA0003/0008 are located in the same district, (i.e. Mbale District), they still located in different geographic areas (i.e. sub-counties).

The location of the six CPAs are listed as below according to the registered CPA DDs:

CPA	District	Sub-counties
5962-0002 (CPA-2)	Budaka	All sub-counties
	Kibuku	All sub-counties
	Manafwa	Tsekukulu, Mukoto, Buwabala, Bukhabusi, Bukhaweka, Bupoto, Namabaya, Bumbu and Bukhoko
5962-0003 (CPA-3)	Manafwa	Bubutu, Bukiabi, Bumwoni, Lwakhakha TC, Magale, Namboko, Bugobero, Bukhofu, Bukhusu, Bunabwana, Busukuya, Butiru, Butta, Buwagogo, Kaato, Khabutoola, Manafwa TC, Nalondo, Sibanga, Sisuni and Wesswa
	Mbale	Bubyangu, Bufumbo, Bukhiende, Lukhonge, Busiu, Bumasikye, Busoba, Nyondo and Busano
5962-0008 (CPA-9)	Mbale	All sub-counties of Bungokho North and Bungokho South counties.
	Sironko	All sub-counties of Budadiri East and Budadiri West counties.
5962-0009 (CPA-10)	Pallisa	All sub-counties of Agule, Pallisa and Butebo counties.
5962-0017 (CPA-21)	Butaleja	All sub-counties of Bunyole East and Bunyole West counties.
	Namutumba	All sub-counties of Busiki county.
5962-0018 (CPA-22)	Busia	All sub-counties of Samia North county.
	Tororo	All sub-counties of Tororo, West Budama North, and West Budama South counties.



	<p>By checking the dispenser database against each CPA-DDs, the verification team confirms the dispensers were distributed to different sub-counties as the CPA-DDs.</p> <p><b><u>CAR-1 was raised that:</u></b></p> <p><u>In the MR ver.01 and CPA-DDs, the CPA-9 and CPA-10 locates with southern latitude, however, as per the onsite inspection and dispenser install forms, the dispensers of CPA-9 and CPA-10 locate in the north of equator.</u></p> <p><b><u>Response from the CME;</u></b></p> <p>The southern latitudes in the CPA-DDs of CPA-9 and CPA-10 are typo. According to Google Maps and onsite GSP coordinates check, all the CPAs of Uganda are located in north of equator. The locations of CPA-9 and CPA-10 in MR has been updated to north of equator. The DDs of CPA-9 and CPA-10 will be updated before or during the next verification.</p> <p>As per the onsite inspection and dispenser install forms, the dispensers of CPA-9 and CPA-10 locate in the north of equator. CME has provided the updated MR according to the on-site GSP coordinates inspection and Google Maps. And the CME will correct the locations of CPA-9 and CPA-10 DDs before or during the next verification as per the requirement of PS-PoA Ver.01, CCSC verification team raised a FAR towards the problem before or during the next verification.</p> <p>Therefore, the CAR-1 was closed out.</p> <p>The GPS information has been modified in the MR. And <b><u>FAR-1 is then raised that the CME is required to correct the CPA-DDs before or during the next verification as per the requirement of PS-PoA Ver.01.</u></b></p>
<b>Conclusion</b>	<p>According to Para. 341 of VVS-PoA Version 01.0 /50/, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• The implementation status and equipments installation of the PoA and its included CPAs are consistent with the approved revised PoA-DD and CPA-DDs;</li> <li>• The actual operation of the PoA is as per the approved revised PoA-DD and CPA-DDs;</li> <li>• Information (data and variables) provided in the monitoring report is in accordance with that stated in the approved revised PoA-DD and CPA-DDs;</li> <li>• An opinion on the cause of any increase in the actual GHG emission reductions achieved by the registered CDM project activity in the current monitoring period that was reported in monitoring report.</li> </ul>

### E.3.2. Post-registration changes

#### E.3.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

>>

There are no temporary deviations from registered monitoring plan or applied methodology has been identified for this monitoring period.

#### E.3.2.2. Corrections

>>

There are no corrections has been identified for this monitoring period.

**E.3.2.3. Changes to the start date of the crediting period of component project activities**

&gt;&gt;

N.A.

**E.3.2.4. Inclusion of a monitoring plan**

&gt;&gt;

N.A. The CCSC verification team has checked the included CPA-DDs to confirm the monitoring plan included in the CPA-DDs.

**E.3.2.5. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline, or other applied standards or tools**

&gt;&gt;

For CPA-2 and CPA-3, the monitoring frequency of parameter “Water quality”, “Refill%” and “Drink%” has been changed from “Annual” to “Annual or biennial”, which are listed in the following table:

Parameter	Frequency in former CPA-DD	Frequency in revised CPA-DD
<b>Refill%</b> Fraction of delivered chlorine available for use in dispenser	At least annually	Annual or biennial
<b>Drink%</b> Fraction of water treated with the dispenser that is actually drunk	At least annually	Annual or biennial
<b>Water quality</b>	At least annually	Annual or biennial

After CCSC’s positive validation, the validation team has notified the secretariat of the changes to the included CPA by submitting the revised CPA-DD, a duly completed post-registration changes form (CDM-PRC-FORM) and PRC validation report as per the PCP-PoA Ver.02.0.

Please refer to the revised CPA-DDs and the PRC Validation Report on the changes issued by CCSC.

**E.3.2.6. Changes to the programme design or project design**

&gt;&gt;

No changes to the programme design of the included CPA-DD has been identified for this monitoring period.

**E.3.2.7. Changes specific to afforestation and reforestation component project activities**

&gt;&gt;

N.A.

**E.3.3. Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline**

<b>Means of verification</b>	The monitoring plan included in the included CPA-DDs /9//10//11//12//13//14/of the PoA has been assessed against the monitoring methodology AMS-III.AV. Version 03 /52/.
<b>Findings</b>	The verification team has checked the monitoring plan in the included CPA-DDs, which is in accordance with the applied monitoring methodology AMS-III.AV. Version 03 /52/.

	<p>The on-site assessment further demonstrated there are no monitoring aspects of the Project that are not specified in the methodology AMS-III.AV. Version 03 /52/.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	<p>CCSC verification team confirms that the monitoring plan in the included CPA-DDs is in accordance with the applied methodology, i.e. AMS-III.AV. Version 03 /52/.</p> <p>Therefore, the PoA is also in compliance with Para. 344 of VVS-PoA Version 01.0 /50/.</p>

### E.3.4. Compliance of monitoring activities with the registered monitoring plan

#### E.3.4.1. Data and parameters fixed ex ante or at renewal of crediting period

<b>Means of verification</b>	<p>The data and parameters fixed ex-ante include:</p> <ol style="list-style-type: none"> <li>1) Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted (<math>EF_{\text{projected\_fossilfuel}}</math>)</li> <li>2) Specific heat of water (WH)</li> <li>3) Final temperature (<math>T_f</math>)</li> <li>4) Initial temperature (<math>T_i</math>)</li> <li>5) Latent heat of water evaporation (WHE)</li> <li>6) Efficiency of the water boiling system being replaced (<math>\eta_{wb}</math>)</li> <li>7) Non Renewable Biomass factor (<math>f_{NRB}</math>)</li> <li>8) Capacity of the water purification equipment (<math>L_P</math>)</li> <li>9) Number of persons supplied with purified water from each of the functional project appliances (<math>POP_P</math>)</li> <li>10) Average volume of drinking water per person per day (<math>DW_{POP}</math>)</li> <li>11) Proportion of total population attended by the project that is serviced at households/buildings where water boiling would have been the purification practice (<math>POP_{Boiling}</math>)</li> <li>12) Ex-ante determined parameters for the project emissions from fossil fuel combustion</li> <li>13) Ex-ante determined parameters for the project emissions from electricity consumption</li> <li>14) Fractional increase in NRB usage by households outside the project boundary (leakage)</li> </ol> <p>These parameters reported in the MR /2/ have been checked against the approved revised PoA-DD, CPA-DDs and the applied methodology /52/ by the verification team.</p>
<b>Findings</b>	<p><b>1) Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted (<math>EF_{\text{projected\_fossilfuel}}</math>)</b></p> <p>The parameter represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis, which used in the monitoring report (81.6 tCO<sub>2</sub>/TJ) has been verified against the PoA-DD and CPA-DDs, and found that consistent with the methodology AMS-I.E.</p> <p><b>2) Specific heat of water (WH)</b></p>

The parameter used in the monitoring report is 4.186 kJ/L °C, which has been verified against the PoA-DD and CPA-DDs, the methodology AMS-III.AV and found them to be consistent.

### 3) Final temperature ( $T_f$ )

The default value of boiling point of water at standard conditions of 100°C has been applied in the MR, which is consistent with the PoA-DD and CPA-DD and the applied methodology.

### 4) Initial temperature ( $T_i$ )

The default value of initial temperature of 20°C has been applied in the MR, which is consistent with the PoA-DD and CPA-DD and the applied methodology.

### 5) Latent heat of water evaporation (WHE)

The default value of 2,260 kJ/L has been applied in the MR, which is consistent with the PoA-DD and CPA-DD and the applied methodology.

### 6) Efficiency of the water boiling system being replaced ( $\eta_{wb}$ )

The default value of 10.83% (CPA-2), 10.92%(CPA-3), 10.65% (CPA-9), 10.44%(CPA-10), 10.17% (CPA-21), 10.35% (CPA-22) have been applied in the MR, which is consistent with the PoA-DD and CPA-DDs and the applied methodology.

The verification team has also checked the value against the Baseline Survey Records /45/, and found consistent.

### 7) Non Renewable Biomass factor ( $f_{NRB}$ )

The ex-ante default value of 82% has been applied in the MR, which is consistent with the PoA-DD and CPA-DDs, and is consistent with the default country-specific  $f_{NRB}$  values approved by the Board /47/.

### 8) Capacity of the water purification equipment ( $L_P$ )

The default value of 32,971 Liters/refill (CPA-2), 32,680 Liters/refill (CPA-3), 33,115 Liters/refill (CPA-9), 33,293 Liters/refill (CPA-10), 32,715 Liters/refill (CPA-21), 33,333 Liters/refill (CPA-22) have been applied in the MR, which is consistent with the CPA-DDs and the validation reports.

The parameter was determined ex-ante in CPA-DDs, which was calculated based on 3 ml dose of solution treats 20 Liters of water if turbidity is below 10 NTU (Nephelometric Turbidity Units) and 6ml if turbidity is above 10 NTU, and the value of  $L_P$  is calculated by  $(5,000 \text{ ml}/3.x \text{ ml}) * 20 \text{ L}$ .

The CCSC verification team has confirmed that:

- The concentration of Sodium Hypochlorite Solution is 1.2% (m/v) by checking the Description in the 5L Jerrican and the SGS sample report.
- The dispenser will release 3ml chlorine solution with one turn, by checking the technical specifications.
- The concentration of Sodium Hypochlorite Solution 20L treated water will be 0.18mg/L ( $=0.003\text{L} * 1.2\text{g/L} \div 20\text{L} = 1.8\text{mg/L}$ )

- d) A standard dosage of 1.875 mg/L for clear water and 3.75 mg/L for turbid water was found to maintain adequate chlorine residual levels<sup>1</sup>.

Therefore, the verification team concluded that the value 33,333 Liters/refill of capacity of the water purification equipment are appropriate.

#### 9) Number of persons supplied with purified water from each of the functional project appliances (POP<sub>p</sub>)

The default values have been applied in the MR as the following table, which is consistent with the CPA-DDs, the validation reports, baseline survey records and the methodology AMS-III.AV. Version 03.

CPA	POP <sub>p</sub> in the CPA-DD	Updated POP <sub>p</sub> in the PCC
CPA-2	301	198
CPA-3	286	157
CPA-9	243	178
CPA-10	336	225
CPA-21	364	219
CPA-22	334	229

POP<sub>p</sub> is an ex-ante parameter for CPAs falling under **Case 1** as per the applied methodology AMS-III.AV Version 03 paragraph 3a, and it is used to determine the maximal allowed value for parameter QPW<sub>y</sub> (quantity of purified water) which can be used for the emission reduction calculation. The number of households per dispenser (POP<sub>p</sub>) was established as part of the Water Point Inspection conducted by Evidence Action at CPA validation stage by visiting each water point.

By checking the Community Education Meeting (CEM) records, the verification team confirmed that the household lists were compiled during the CEMs, and that most households have attended the CEMs to learn about the dangers of contaminated drinking water and how to use the chlorine dispensers properly, and they will use the dispenser.

To enhance the accuracy, completeness and conservativeness of the monitoring program, Evidence Action performed a population cross check (PCC) survey and voluntarily updated the POP<sub>p</sub> for all the related CPAs.

During the acceptance sampling, CCSC team has crosschecked the value of POP<sub>p</sub> via following methods:

- By interviewing promoters and users, it is recognized all the interviewees often use dispensers to purify water.
- By interviewing promoters and local users, verification team noticed the number of households (HH#) served by the dispensers are in line with the PCC records for the visited dispensers and a larger average household size of 6.7 obtained in DOE survey.

In summary, the verification team confirmed the Number of persons supplied with purified water from each of the functional project appliances (POP<sub>p</sub>) is accurate and conservative for this monitoring period.

#### 10) Average volume of drinking water per person per day (DW<sub>POP</sub>)

<sup>1</sup> <http://users.physics.harvard.edu/~wilson/arsenic/remediation/Lantagne-JAWWA-08-1.pdf>

	<p>The default value of 3.5 Liters/person/day has been applied in the MR, which is consistent with the CPA-DDs, which has not exceeded the value of 5.5 liters per person per day as per the applied methodology /52/.</p> <p><b>11) Proportion of total population attended by the project that is serviced at households/buildings where water boiling would have been the purification practice (POP<sub>Boiling</sub>)</b></p> <p>For Case 2, the values of 85.9% (CPA-9) and 83.0% (CPA-22) from Baseline Survey have been applied in the MR, which is consistent with the CPA-DDs. The other CPAs fall under Case 1 per paragraph 3(a) in AMS-III.AV. Version 03 and thus POP<sub>Boiling</sub> does not need to be considered.</p> <p><b>CAR-2</b> was raised that:</p> <p>As per the applied methodology AMS-III.AV. Ver.03 and included CPA-DDs, Situation Case 1 or Case 2 for each CPA shall be reassessed at the beginning of each crediting period. And it's the first monitoring period for CPA-9/10/21/22, however, the situations have not been reassessed in the monitoring report.</p> <p>The CME has checked the most recent public data available and found the data of "Water Supply Atlas 2010" was not updated at the beginning of the crediting period for CPA-9 (13/09/2016), CPA-10 (13/09/2016), CPA-21 (01/02/2017) and CPA-22 (01/02/2017). Therefore, the Case 1 or Case 2 for CPA-9/10/ 21/22 remains the same without any update.</p> <p>The description on the reassessment for Case 1/2 in the updated MR has been reviewed by the verification team.</p> <p>The verification team has checked the latest Water Atlas data 2017 issued in June 2017, and confirmed the data in 2010 were still valid for the CPAs and will not be updated, because the beginning of each crediting period of all CPA-DDs were before the issuance of Water Atlas data 2017.</p> <p>Therefore, the CAR-2 was closed out.</p> <p><b>12) Ex-ante determined parameters for the project emissions from fossil fuel combustion</b></p> <p>No consumption of fossil fuel by chlorine dispenser, which has been confirmed by the verification team by the onsite inspection.</p> <p><b>13) Ex-ante determined parameters for the project emissions from electricity consumption</b></p> <p>No consumption of electricity by chlorine dispenser, which has been confirmed by the verification team by the onsite inspection.</p> <p><b>14) Fractional increase in NRB usage by households outside the project boundary (leakage)</b></p> <p>The default value of 0.95 has been applied in the MR, which is consistent with the CPA-DDs and the methodology AMS-I.E. Version 5 /53/.</p>
<b>Conclusion</b>	<p>In conclusion, according to Para. 348-349 of VVS-PoA (Version 01.0) /50/ and based on CCSC's local and sectorial knowledge, CCSC confirms that:</p> <ul style="list-style-type: none"> <li>• The data and parameters fixed ex-ante have been correctly listed. Parameters fixed ex-ante for required parameters have been verified by</li> </ul>

	checking the information flow and in compliance with the monitoring plan of the CPA-DDs /9//10//11//12//13//14/.
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### E.3.4.2. Data and parameters monitored

<b>Means verification of</b>	<p>According to Para. 345 of VVS-PoA Version 01.0, CCSC has performed the following activities to determine whether the monitoring of parameters related to the GHG emission reductions has been implemented in accordance with the registered monitoring plan.</p> <ul style="list-style-type: none"> <li>● Through the on-site inspection of the monitoring system, interview with the operation staff, document review including relevant records, procedures and technical specifications, the verification team has assessed the implementation of the registered monitoring plan followed by the PP;</li> <li>● The parameters stated in the registered monitoring plan and relevant Board decisions has been checked by means above;</li> <li>● The verification team has checked the ODK survey system, the water quality test equipment and procedure.</li> <li>● The relevant records/database were checked by the team to confirm the frequency of the monitoring results;</li> <li>● Based on the interview with the management, operation staff and the review of the CDM monitoring manual, the CCSC has assessed the quality assurance and quality control procedures applied by the CME/PP.</li> </ul> <p>And according to Para. 347 of VVS-PoA Version 01.0 /50/, CCSC has assess the compliance of the sampling efforts and surveys with the validated sampling plan in the accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities” Version 07.0 /54/.</p>
<b>Findings</b>	Findings ( <b>CAR-3, CAR-4, CAR-5, CAR-6 and CAR-7</b> ) from CCSC verification teams for each monitored parameter are presented in following tables.
<b>Conclusion</b>	<p>Corresponding to the paragraph 348 and 349 of VVS-PoA Version 01.0, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>● The monitoring has been carried out in accordance with the monitoring plan contained in the CPA-DDs.</li> <li>● 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.</li> </ul>

<b>Parameter</b>	Number of functional chlorine dispensers in monitoring period ( <b>N<sub>y</sub></b> )
<b>Findings</b>	<p>The value is derived from regular functionality checks. In case a dispenser was found to be non-functional, the status of the respective dispenser was recorded as “non-functional” in the central database, and it will be excluded from the emission reduction calculation for the whole monitoring period.</p> <p>The verification team has checked the dispenser installed and the functionality rate with the ODK Raw Data and found consistent.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the physical inspection of all dispensers should be performed at least annually for the CPAs. The verification team</p>

has checked the spot-check records /28/, and found the spot-check has been performed in rotation.

**CAR-3** was raised that:

- 1) The monitoring frequency for parameters  $N_v$  is absent in the monitoring report. And the monitoring frequency for water quality is inconsistent with requirements described in included CPA-DDs.
- 2) The survey for parameters of Drink% and water quality of the CPAs has been conducted during Oct.2017 to Nov.2017. And as per the included CPA-DDs, the survey frequency is annual. Please clarify the rationality that the results obtained between October and November 2017 can be applied for the entire monitoring period (01/06/2016 to 31/12/2017) for CPA-2 and CPA-3, and also for newly included CPAs (CPA-9, 10, 21, 22).
- 3) As per the monitoring plan of 5962-0008 (CPA-9), the parameter of  $POP_v$  should be monitored annually. However, it is stated in the MR that "Number of persons supplied with purified water from each chlorine dispenser ( $POP_v$ ) of Case 2 CPAs (CPA-9 and CPA-22) should be checked once every two years".

**Response from the CME:**

- 1) The monitoring frequency for parameters  $N_v$  and water quality is revised in the updated monitoring report.

And the survey dates were also included.

- 2) For CPA-2, CPA-3, CPA-9 and CPA-10, Evidence Action has performed monitoring survey for Drink% and water quality before Oct/Nov 2017. However, the DOE's verification of the 2<sup>nd</sup> and 3<sup>rd</sup> monitoring period revealed some issues with the implementation of the monitoring plan (see Remaining-FAR-1). Consequently, Evidence Action has decided to ensure compliance with the registered monitoring plan.

**A.** For CPA-2/3, the CME has applied the "General guidelines for SSC CDM methodologies version 22.1" (hereafter referred to as SSC-guideline) to demonstrate the monitoring validity.

Applicability requirements in the SSC Guideline	Justification for <b>CPA-2 and CPA-3</b>
Small-scale project activities (PAs) and component project activities (CPAs) solely comprising distributed units, to estimate parameter values required by the methodologies. Distributed units, in the context of monitoring surveys, are units of size equal to or below one per cent of Small-Scale CDM threshold (e.g. 150 kW of installed capacity for type I PAs/CPAs, 600 MWh of energy savings for type II PAs/CPAs and 600 tCO <sub>2</sub> of emission reductions for type III PAs/CPAs);	Yes CPA-2 and CPA-3 are small-scale CPAs with distributed units below one per cent of Small-Scale CDM threshold (e.g. 600 tCO <sub>2</sub> of emission reductions for type III CPAs);
The requirements in this document do not overrule any provisions in the approved methodologies (for example, methodology AMS-III.AR. version 4.0 allows, under certain conditions, project activities for	Yes According to paragraph 10 of the Methodology AMS III. AV. Version 03.0, the monitoring allows that



	<p>distribution of LED lamps to claim emission reductions for a maximum of two years without a survey). The simplified requirements described under section 4.8.2 are applicable only if the applied methodology allows for biennial monitoring. If coordinating/managing entities or project participants choose to switch from annual monitoring to biennial monitoring to apply the provisions in the guidelines, the confidence/precision requirements of biennial monitoring stipulated in the applied methodology should be met, i.e. survey results show the confidence/precision of 95/10 (or 95/5 if it is specified in the applied methodology).</p>	<p>"Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial)". However, the CME choose to apply annual monitoring of Drink% and the survey results in MR show the confidence/precision of 95/10 in line with the adopted methodology and registered CPA DDs.</p>
	<p>To apply these simplified requirements, PAs/CPAs shall not have more than 24 months gap between consecutive surveys, and shall implement their first survey within 24 months of the implementation of the first unit of the PA/CPA.</p>	<p>Yes</p> <p>The former survey was conducted from Oct.2015 to May.2016, and the latest survey was done during Oct.-No.2017. Thus, the gap between the consecutive surveys are less than 24 months.</p>
	<p>In case that the registered monitoring plan has not included biennial option, a post-registration change would be required to include it in the monitoring plan.</p>	<p>Yes</p> <p>The option of biennial survey has been included in updated CPA-DDs version 06 for CPA-2/3, which has been assessed by CCSC and the notification of changes has been submitted to secretariat as per PCP Ver.02.0.</p>
	<p>Since both values of parameter of Drink% and water quality in previous survey in 3<sup>rd</sup> monitoring period were lower than 50%, which means less than 50% dispensers can provide safe drinking water, i.e. less than 50% of the distributed units are functional. Thus, the surveys did not satisfy the conditions in paragraph 27 of SSC-Guideline.</p> <p>Therefore, the CME adopted the result obtained from the surveys started from 19/10/2017 for the period from 01/06/2016 to 19/10/2017 referring to Para.30 and the first figure in Figure 2 of the SSC-Guideline.</p> <p>For no eligible survey could cover the period from 20/10/2017 to 31/12/2017 (73-day), the values of parameter Drink% and water quality are conservatively assumed to be 0%. As a result, a deduction factor of 87.39% (i.e. (579-73)/579) was introduced in the ER calculation for CPA-2/3.</p> <p><b>B. <u>The survey for parameters of Drink% and water quality of the CPAs has been conducted during Oct.2017 to Nov.2017, and the survey validity can cover the period of 2017.</u></b></p> <p>Because no eligible survey could cover the period from 13/09/2016 to 31/12/2016 (110-day) for CPA-9 and CPA-10, the values of parameter Drink% and water quality are conservatively assumed to be 0 during this period.</p>	

Therefore, a deduction factor of 76.84% (i.e.(475-110)/475) was introduced in the ER calculation for CPA-9/10.

- C.** For CPA-21 and CPA-22, of which the start of monitoring period is 01/02/2017, the survey performed in 2017 is in line with the annual monitoring requirement.

Therefore, the survey in October and November 2017 can be adopted for the relevant periods for the CPAs.

- 3) The monitoring frequency of POP<sub>y</sub> for CPA-9 is revised to annual in the updated MR.

Since the PCC survey conducted in November and December 2017 could not cover the entire monitoring period, the CME decided to adopt 0 for POP<sub>y</sub> for CPA-9 during period of 13/09/2016 to 31/12/2016 (110-day).

And the PCC survey is valid for the period of 2017.

#### **DOE's Assessment:**

- 1) CCSC verification team have checked the updated MR and confirmed that the monitoring frequency for parameters N<sub>y</sub> has been added in updated MR. The monitoring frequency for parameters N<sub>y</sub> and water quality is consistent with requirements described in included CPA-DDs.
- 2) For CPA-2 and CPA-3, as remaining FAR on intended use for drinking which will influence the claimed emission reductions, so the CME has conducted the survey between Oct. and Nov 2017.

Considering the validity of survey, the verification team has reviewed CME's response as per the SSC guideline.

- A.** For CPA-2/3, the team confirms it complied with the applicability condition of the simplified requirements for validity of monitoring surveys against the section 4.8.1 of SSC-guideline.

Considering the statistical concept of both parameters, the verification team regards less than 50% dispensers can provide safe drinking water, i.e. less than 50% of the distributed units are functional. And then the surveys did not satisfy the conditions in paragraph 27 of SSC-Guideline.

It's reasonable for CME to apply the survey result for the period of 01/06/2016 -19/10/2017. And for period of 20/10/2017-31/12/2017, the CME conservatively assumed the values of parameter Drink% and water quality are 0%. The verification team checked the deduction factor of 87.39% in the ER calculation for CPA-2/3 was reasonable.

- B.** For CPA-9/10, the survey conducted since 19/10/2017 is insufficient to cover the entire 4<sup>th</sup> monitoring period.

For the period of 01/01/2017 to 31/12/2017, it's reasonable for the CME to apply its survey results. And for the period of 13/09/2016 to 31/12/2016, the CME voluntarily assumed the values of parameter Drink% and water quality to be 0, which is consider to be conservative. The verification team checked the deduction factor of 76.84% in the ER calculation for CPA-9/10 was reasonable.

In summary, the approaches for CPA-9/10 are reasonable and can ensure the parameters has been monitored annually.

- C.** For CPA-21/22, both CPAs started since 01/02/2017, and the survey happened in October and November 2017. The monitoring frequency complied with the requirement of monitoring plan.

In summary, considering the deduction factors, the results of the survey in October and November 2017 are rational for the 4<sup>th</sup> monitoring period (01/06/2016 to 31/12/2017) for the CPA-2, CPA-3, CPA-9, CPA-10, CPA-21 and CPA-22.

- 3) The monitoring frequency of POP<sub>y</sub> for CPA-9 in the MR has been revised as per the included CPA-DD.

It's reasonable for the CME to adopt the PCC value for the period of 01/01/2017 to 31/12/2017. And towards the period of 13/09/2016 to 31/12/2016, the CME voluntarily assumed the value of parameter as 0, which is consider to be conservative.

Considering the deduction factor of 76.84% has already been taken into account for CPA-9/10 in ER calculation, the problem of monitoring frequency of POP<sub>y</sub> could be simultaneously eliminated by the deduction factor.

In summary, **CAR-3** was closed out.

**CAR-4 was raised that:**

The number of eligible & functional dispenser (N<sub>y</sub>) for CPA-9 in the Dispenser Database is 1,081, however, it's 1,082 in ER spreadsheet.

One non-eligible dispenser was incorrectly marked as the "non-functional", and it was removed from the Chlorine usage database. And the chlorine usage for CPA-9 was changed from 10,214 jerricans to 10,202 jerricans.

The verification team has checked the revised MR against the database of dispenser, chlorine usage, and ER spreadsheet, and found the dispenser number and chlorine usage amount have been correct and unified in different databases. Thus, the CAR-4 was closed out.

**Values of monitored parameter:**

CPA	Number of dispensers installed	Dispenser functionality rate	N <sub>y</sub>
CPA-2	1,133	95.9%	1,087
CPA-3	1,006	94.3%	949
CPA-9	1,101	98.2%	1,081
CPA-10	810	98.8%	800
CPA-21	845	88.5%	748
CPA-22	580	93.6%	543

Through the field survey, the verification team has randomly sampled 30 dispensers and found most of them are functional, and the dispenser functionality rate in the ER calculation is conservative. And the values are consistent with the Dispenser Installation Records /36/ and spot-check records /28/.

<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.
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Parameter	Quantity of purified water in year y (QPW <sub>y</sub> )																																																							
Findings	As per the registered CPA-DDs and methodology AMS-III.AV. Version 03, the quantity of purified water is derived from the device specification, monitored number of functional project appliance, monitored number of chlorine refills, and two adjustment factors (Refill% and Drink%)																																																							
	QPW <sub>y</sub> = MIN (L <sub>P</sub> * N <sub>y</sub> * Refill# * Refill% * Drink%, CAP)																																																							
	L <sub>P</sub> : Capacity of the water purification equipment (has been determined ex-ante as listed in section E.3.4.1.																																																							
	The other parameters have been verification in section E.3.4.2 of the report.																																																							
	<table><tr><th>CPA</th><th>QPW<sub>y,sample</sub> (L)</th><th>L<sub>P</sub> (L)</th><th>N<sub>y</sub></th><th>Refill #</th><th>Refill %</th><th>Drink %</th></tr><tr><td>CPA-2</td><td>504095187</td><td>32,971</td><td>1,087</td><td>14.69</td><td>99.64 %</td><td>96.1%</td></tr><tr><td>CPA-3</td><td>371691368</td><td>32,680</td><td>949</td><td>12.52</td><td>99.64 %</td><td>96.1%</td></tr><tr><td>CPA-9</td><td>277881957</td><td>33,115</td><td>1,081</td><td>9.44</td><td>99.64 %</td><td>96.1%</td></tr><tr><td>CPA-10</td><td>285256804</td><td>33,293</td><td>800</td><td>11.19</td><td>99.64 %</td><td>96.1%</td></tr><tr><td>CPA-21</td><td>167875681</td><td>32,715</td><td>748</td><td>7.16</td><td>99.64 %</td><td>96.1%</td></tr><tr><td>CPA-22</td><td>112669141</td><td>33,333</td><td>543</td><td>7.83</td><td>99.64 %</td><td>96.1%</td></tr></table>	CPA	QPW <sub>y,sample</sub> (L)	L <sub>P</sub> (L)	N <sub>y</sub>	Refill #	Refill %	Drink %	CPA-2	504095187	32,971	1,087	14.69	99.64 %	96.1%	CPA-3	371691368	32,680	949	12.52	99.64 %	96.1%	CPA-9	277881957	33,115	1,081	9.44	99.64 %	96.1%	CPA-10	285256804	33,293	800	11.19	99.64 %	96.1%	CPA-21	167875681	32,715	748	7.16	99.64 %	96.1%	CPA-22	112669141	33,333	543	7.83	99.64 %	96.1%						
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As per the registered PoA-DD and CPA-DDs, the calculated value should be subject to the CAP based on the number of persons supplied with purified water from each of the functional project appliances (POP <sub>P</sub> ) multiplied by the average volume of drinking water per person per day (DW <sub>POP</sub> .)																																																								
<table><tr><th>CPA</th><th>N<sub>y</sub></th><th>POP<sub>P/y</sub></th><th>DW<sub>P</sub><sub>OP</sub></th><th>Operation Days</th><th>POP<sub>Boiling</sub></th><th>CAP(L)</th><th>QPW<sub>y</sub> (L)</th></tr><tr><td>CPA-2</td><td>1,087</td><td>198</td><td>3.5</td><td>579</td><td>100%</td><td>436,155,489</td><td>436,155,489</td></tr><tr><td>CPA-3</td><td>949</td><td>157</td><td>3.5</td><td>579</td><td>100%</td><td>301,934,315</td><td>301,934,315</td></tr><tr><td>CPA-9</td><td>1,081</td><td>178</td><td>3.5</td><td>475</td><td>85.90 %</td><td>274,789,741</td><td>274,789,741</td></tr><tr><td>CPA-10</td><td>800</td><td>225</td><td>3.5</td><td>475</td><td>100%</td><td>299,250,000</td><td>285,256,804</td></tr><tr><td>CPA-21</td><td>748</td><td>219</td><td>3.5</td><td>334</td><td>100%</td><td>191,496,228</td><td>167,875,681</td></tr><tr><td>CPA-22</td><td>543</td><td>229</td><td>3.5</td><td>334</td><td>83.00 %</td><td>120,650,164</td><td>112,669,141</td></tr></table>	CPA	N <sub>y</sub>	POP <sub>P/y</sub>	DW <sub>P</sub> <sub>OP</sub>	Operation Days	POP <sub>Boiling</sub>	CAP(L)	QPW <sub>y</sub> (L)	CPA-2	1,087	198	3.5	579	100%	436,155,489	436,155,489	CPA-3	949	157	3.5	579	100%	301,934,315	301,934,315	CPA-9	1,081	178	3.5	475	85.90 %	274,789,741	274,789,741	CPA-10	800	225	3.5	475	100%	299,250,000	285,256,804	CPA-21	748	219	3.5	334	100%	191,496,228	167,875,681	CPA-22	543	229	3.5	334	83.00 %	120,650,164	112,669,141
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<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.
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Parameter	Average number of refills per functional dispenser per year (Refill#)																																																																						
Findings	<p>When new chlorine is delivered to a promoter, the number of containers delivered and the number of containers in stock are recorded in the chlorine delivery records /31/. As per the registered CPA-DDs, it was assumed that the chlorine was consumed constantly.</p> <p>The verification team checked the Chlorine delivery records/database /31/, and found the number of refills of the functional dispensers during this monitoring period is counted and calculated correctly.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the parameter should be monitored annually, the verification team has checked the chlorine delivery records /31/, and confirmed the monitoring frequency is in line with the included CPA-DDs.</p> <p><b><u>Values of monitored parameter:</u></b></p> <p><b><u>CAR-5 was raised that:</u></b></p> <p>1) <u>By checking the Chlorine Usage Data and Calculation spreadsheet, it is found that the chlorine used (column Q) by dispensers marked “non-functional” (column B) were taken into the account in the calculation, which is incorrect.</u></p> <p>2) <u>The verification team calculated and compared the data as follows:</u></p> <table><tr><th>Items</th><th>CPA-2</th><th>CPA-3</th><th>CPA-9</th><th>CPA-10</th><th>CPA-21</th><th>CPA-22</th></tr><tr><td>Refill#</td><td>15.3</td><td>13.22</td><td>9.54</td><td>11.29</td><td>7.7</td><td>8.27</td></tr><tr><td>HH#</td><td>40.4</td><td>32.2</td><td>36.3</td><td>46.1</td><td>44.8</td><td>46.9</td></tr><tr><td>Operation Days</td><td>579</td><td>579</td><td>475</td><td>475</td><td>334</td><td>334</td></tr><tr><td>Chlorine usage(ml)/HH#/day</td><td>3.3</td><td>3.5</td><td>2.8</td><td>2.6</td><td>2.6</td><td>2.6</td></tr></table> <p><u>Please clarify the chlorine usage difference among the CPAs.</u></p> <p><b>Response from the CME:</b></p> <p>1) CME corrected the calculation error and updated the ER spreadsheet and MR accordingly. The corrected values are shown as below:</p> <table><tr><th>Items</th><th>CPA-2</th><th>CPA-3</th><th>CPA-9</th><th>CPA-10</th><th>CPA-21</th><th>CPA-22</th></tr><tr><td>Refill#</td><td>14.69</td><td>12.52</td><td>9.44</td><td>11.19</td><td>7.16</td><td>7.83</td></tr><tr><td>HH#</td><td>40.4</td><td>32.2</td><td>36.3</td><td>46.1</td><td>44.8</td><td>46.9</td></tr><tr><td>Operation Days</td><td>579</td><td>579</td><td>475</td><td>475</td><td>334</td><td>334</td></tr><tr><td>Chlorine usage(ml)/HH#/day</td><td>3.1</td><td>3.4</td><td>2.7</td><td>2.6</td><td>2.4</td><td>2.5</td></tr></table>	Items	CPA-2	CPA-3	CPA-9	CPA-10	CPA-21	CPA-22	Refill#	15.3	13.22	9.54	11.29	7.7	8.27	HH#	40.4	32.2	36.3	46.1	44.8	46.9	Operation Days	579	579	475	475	334	334	Chlorine usage(ml)/HH#/day	3.3	3.5	2.8	2.6	2.6	2.6	Items	CPA-2	CPA-3	CPA-9	CPA-10	CPA-21	CPA-22	Refill#	14.69	12.52	9.44	11.19	7.16	7.83	HH#	40.4	32.2	36.3	46.1	44.8	46.9	Operation Days	579	579	475	475	334	334	Chlorine usage(ml)/HH#/day	3.1	3.4	2.7	2.6	2.4	2.5
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	<p>2) Based on the updated value of daily chlorine usage per household the average value is 2.8 with a maximal deviation of +/- 20%. This is deemed to be a reasonable deviation when considering the different circumstances of monitoring a relatively big decentralized community-based project in rural Africa.</p> <p>Furthermore, the chlorine usage (ml/HH/day) can fluctuate because of:</p> <ol style="list-style-type: none"> <li>Household size might vary between CPAs. The DDs are adopting a fixed household size for all the CPAs (average for rural Uganda); however, the actual household sizes vary slightly between CPAs.</li> <li>The use of dispensers becomes more regular for the CPAs operations longer in the community. In the newer areas for CPA operation, the usage could be lower. CPA 2 and 3 usage are the highest because the influence of knowledge levels about the dispenser usage in the nearby municipality is higher in this area.</li> <li>Different geographical and environmental conditions. Some of the CPAs are located in mountainous area, and some are located in flat planes. The environment and living habits vary slightly from area to area, which leads to variance of chlorine consumption between CPAs.</li> </ol> <p>Therefore, the variance of the chlorine usage between CPAs is considered reasonable.</p> <p>CCSC have checked the updated ER calculation spreadsheet and updated MR provided by CME, confirmed that:</p> <ol style="list-style-type: none"> <li>The CME have corrected the results of Refill# and the verification team has checked the Chlorine Deliver Records /31/ and the Chlorine Usage Data and Calculation /44/, and found the value of Refill# was calculated correctly.</li> <li>Because of the different circumstances (e.g, Household size might vary between CPAs; Different geographical and environmental conditions; Knowledge level of the dispenser usage), the variance of the chlorine usage between CPAs is considered reasonable.</li> </ol> <p>Thus, the <b>CAR-5</b> was closed out.</p>
<b>Conclusion</b>	<p>The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</p>

<b>Parameter</b>	Fraction of delivered chlorine available for use in dispenser ( <b>Refill %</b> )
<b>Findings</b>	<p>The parameter is monitored by grouped promoter survey for the CPAs, and a total of 853 randomly selected promoters were interviewed with the survey question of "From the time that you receive the jerrican of chlorine to the time that the chlorine is put into the dispenser, is any chlorine lost?"</p> <p>The verification team found the sample is in line with the sample plan in the registered CPA-DDs, detail please refer to section E.3.4.3 of the report.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the parameter should be monitored annually, with a total of 853 promoters were sampled.</p> <p><b>CAR-6</b> was raised that:</p>

- 1) It is stated a total of 854 randomly selected promoters were interviewed for parameter of Refill%, however, there are actually 853 interviewees and records in the raw data of the survey. The result and its confidence/precision should be re-calculated accordingly.
- 2) The monitoring frequency for parameter Refill% should be annual as per the CPA-DDs. And during this monitoring period, the promoter surveys were collected every month and the results have been consolidated into one single value for this monitoring period with 18 months in total.

CME's response:

- 1) The error of refill% was corrected and its confidence/precision are re-calculated accordingly. The correction of the error has no impact on the reliability of refill%. The updated refill% calculator is provided to DOE.
- 2) The values of refill% during this monitoring period has been re-calculated separately for 2016 and 2017, which are 99.446% and 99.797% with precisions of 0.7% and 0.4% respectively. The weighted average value is 99.67% (i.e.  $(99.446\% \times 7 + 99.797\% \times 12) / 19$ ), however, for CPA-9/10/21/22, their weighted average value will be higher. Therefore, to be conservative, the former value of 99.64% is kept in the ER calculation for all the CPAs.

CCSC assessment:

- 1) The verification team checked the revised number of promoters interviewed and updated confidence/precision and confirmed it has been corrected and the value of confidence/precision is not changed.
- 2) The verification team has checked the updated calculation and corresponding precisions and confirmed the values of Refill% in 2016 and 2017 were calculated correctly as per the monitoring plans. And the team also confirmed the adopted value of 99.64% for the monitoring period could be most conservative in the ER calculation.

Thus, the CAR-6 was closed out.

The verification team has checked the result of promoter surveys from the ODK Raw Data /27/, and found consistent with that in the ER spreadsheet. And the monitoring frequency is complied with the requirement of the CPA-DDs and the applied methodology.

**Values of monitored parameter:**

99.64%.

The verification team has checked the result of promoter surveys from the ODK Raw Data /27/, and found consistent with that in the ER spreadsheet /4/.

The verification team reviewed the sample size determination and Reliability Calculation of the promoter surveys, and reproduced the same result as per the Standard: Sampling and surveys for CDM project activities and programme of activities /54/, Guideline: Sampling and surveys for CDM project activities and programme of activities /55/, and Sample Size Calculator /56/.

Besides, during the DOE's acceptance survey, the verification team interviewed the randomly selected promoters with the same question, and found no chlorine was lost based on the interview. However, one promoter (at waterpoint 7050656) was observed to splash some chlorine as she

	refilling the dispenser. And the result from acceptance sample is still within the threshold of 1/30.  Therefore, the verification team can accept the value and confirm it is accurate.
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

Parameter	Fraction of water treated with the dispenser that is actually drunk ( <b>Drink %</b> )														
Findings	<p>The parameter is monitored by grouped survey for the CPAs with clustered sampling approach. 702 households were interviewed for each dispenser with the survey question of “What is your primary use for chlorinated water?” and “How much of your chlorinated water is used for [primary use]?” As a result, a response from 702 households (located around 14 dispensers) that had total chlorine residual in their stored drinking water were used for calculating Drink%.</p> <p>The verification team has verified the sample is in line with the sample plan in the registered CPA-DDs, detail please refer to section E.3.4.3 of the report.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the parameter should be monitored at least annually. And during this monitoring period, the monitoring survey has been collected in Oct.-Nov.2017 and the results have been consolidated into one single value for this monitoring period.</p> <p><b><u>Pending on CAR-3</u></b></p> <p>The verification team has checked the result of monitoring survey from the ODK Raw Data /27/, and found consistent with that in the ER spreadsheet. And the monitoring frequency is complied with the requirement of the CPA-DDs and the applied methodology.</p> <p><b><u>Values of monitored parameter:</u></b></p> <p>Drink% is a proportional value as the response to “How much of your chlorinated water is used for [primary use]?” could be chosen by the respondent as:</p> <table><tr><td>All</td><td>Almost all</td><td>Most</td><td>About Half</td><td>Some</td><td>Little</td><td>None</td></tr><tr><td>100%</td><td>90%</td><td>75%</td><td>50%</td><td>25%</td><td>10%</td><td>0%</td></tr></table>	All	Almost all	Most	About Half	Some	Little	None	100%	90%	75%	50%	25%	10%	0%
	All	Almost all	Most	About Half	Some	Little	None								
	100%	90%	75%	50%	25%	10%	0%								
	<p>The verification team has checked the result of monitoring survey from the ODK Raw Data /27/, and found consistent with that in the ER spreadsheet. And the value is 96.1% for the parameter during this monitoring period with the precision of 0.6%.</p> <p><b><u>CAR-7 was raised that:</u></b></p> <p><u>During the monitoring period, the verification team applied the acceptance sample to verify CME sample result as per the Standard of Sampling and surveys for CDM project activities and programmes of activities Ver.07.0.</u></p> <p>1) <u>In the DOE survey, 12 responses out of 62 could not reach average value of CME sample (99.33%), i.e. CCSC verification team observed</u></p>														



greater discrepant records for Drink% than thresholds (2/62). Therefore, the CME's set of records is not accepted.

- 2) In the CME survey, it is found that one interviewee used none (0%) chlorinated water for drinking, however, the primary use for his household was recorded as drinking. Please clarify the contradiction between the answers.

#### Response from the CME:

- 1) The discrepancy between the CCSC verification team and CME survey can be explained as follows:

Time of the survey is different. Drink% survey performed by Evidence Action happened in the end of 2017; however, the verification on-site survey was performed in August 2018; since the survey time is changed (around 9 months' difference), the survey result may not be exactly the same.

The number of survey samples is different. CME has conducted a survey including 702 households (Drink% = 99.3%), whereas the survey performed during the onsite verification only covered 62 households (Drink% = 96.1%). Even then, the difference in the results is relatively small (approximately 3%).

To justify the CME survey data, CME has adopted a T-test method to demonstrate that the results obtained in the two surveys are not significantly different. Result are as follows: (Drink% C = CME and Drink% D = DOE)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Drink% C	14	.9933002	.0029677	.0111041	.9868888	.9997115
Drink% D	30	.9608333	.0120275	.0658771	.9362344	.9854323
combined	44	.9711637	.0085255	.0565519	.9539703	.988357
diff		.0324668	.0178303		-.0035162	.0684499

diff = mean(Drink% C) - mean(Drink% D) t = 1.8209  
Ho: diff = 0 degrees of freedom = 42

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0  
Pr(T < t) = 0.9621 Pr(|T| > |t|) = 0.0758 Pr(T > t) = 0.0379

The T-test indicates that the means are the same with a significance level of 7.6%, which is higher than the commonly used significance level of <5% to demonstrate a significant difference between two datasets. Therefore, the CME argues that the DOE's results actually confirm the CME's survey results.

However, for the consideration of conservativeness, the result of DOE's survey on Drink%, i.e. 96.1% is adopted for this monitoring period.

- 2) During the CME's Drink% survey,

In the survey the household responded to mainly use chlorinated water for drinking purpose; however, there was a data entry error for Drink% in the ODK App which showed 408%. For conservativeness, CME put Drink% = 0% for this specific survey result instead of 408%.

	<p>CCSC have checked the updated ER calculation spreadsheet and updated MR provided by CME, confirmed that:</p> <p>1) In the DOE sampling for parameter of Drink%, 16 clusters out of the CME's sampling have been selected, i.e. no result from respondents could be found correspondingly in CME's sampling. Furthermore, some of the respondents could not be found in the other 14 clusters sampling result of CME because that the respondents from the same household are different persons between CME sampling and DOE sampling, or the households moved around the water points.</p> <p>And due to the characteristic of the parameter, it may be not reasonable to take average value of <u>99.33% to justify</u> the threshold for acceptance sampling.</p> <p>The verification team has repeated the T-test for the two surveys and confirmed the two results showed no significant difference. However, for the consideration of conservativeness, the Drink%=96.1% is adopted for this monitoring period.</p> <p>Therefore, the value of 96.1% for drink% is reliable and conservative.</p> <p>2) In the CCSC verification onsite survey, the chlorinated water was mainly used for drinking. CCSC have checked the ODK App which showed Drinking%=408% for one user, therefore, CME put Drink% = 0% for this specific survey result instead of 408% is more conservativeness and reasonable.</p> <p>Thus, the <b>CAR-7</b> was closed out.</p> <p>The verification team reviewed the sample size determination and Reliability Calculation of the monitoring survey, and reproduced the same result as per the Standard: Sampling and surveys for CDM project activities and programme of activities /54/, Guideline: Sampling and surveys for CDM project activities and programmes of activities /55/, and Sample Size Calculator /56/.</p>
<b>Conclusion</b>	<p>The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</p>

<b>Parameter</b>	Existence of public distribution network supplying safe drinking water to the project boundary in year y
<b>Findings</b>	<p>As per the registered PoA-DD, the parameter should be monitored at least annually by Interviews with officials, end-users, NGOs, or local experts or published reports, maps, pictures, official documents.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the parameter should be monitored annually. Interviews have been conducted with officials in District Water Offices /46/. The information given by the personnel was confirmed and the interview records were provided to the verification team /46/.</p> <p><b><u>Values of monitored parameter:</u></b></p> <p>The conclusion was found consistent as witnessed during the verification team's field survey.</p> <p>By onsite inspection and interview with the officials via email, the verification team confirmed no public distribution network supplying safe drinking water</p>

	exists in the project boundary, and no dispenser has been affected. No CARs/CLs/FARs raised in this section.
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

<b>Parameter</b>	<b>Water quality</b>
<b>Findings</b>	<p>As per the registered CPA-DDs, the parameter is indicated by the presence of up to 10 E.coli CFU/100ml for the purified water. Hach Color Wheel is used to determine Total Chlorine Residual (TCR) and IDEXX machine is used for testing E.coli.</p> <p><b><u>Monitoring Frequency:</u></b></p> <p>As per the registered CPA-DDs, the parameter should be monitored annually. As a part of the 4th monitoring period water quality samples were collected in Oct.-Nov.2017 and the results were consolidated into one single value over the monitoring period, with a total of 14 dispensers targeted and 702 households sampled.</p> <p><b><u>Pending on CAR-3</u></b></p> <p><b><u>Values of monitored parameter:</u></b></p> <p><b><u>CAR-8 was raised that:</u></b></p> <p><u>In order to crosscheck the water quality for the chlorine treated drinking water, CCSC verification team applied acceptance sampling as per the Standard of Sampling and surveys for CDM project activities and programmes of activities Ver.07.0.</u></p> <p><u>In the survey, 5 out of 29 water samples could not reach average value of CME sample (100%), i.e. CCSC verification team observed greater discrepant records for Drink% than thresholds (1/28). Therefore, the CME's set of records is not accepted.</u></p> <p><b><u>Response from the CME:</u></b></p> <p>The discrepancy can come up due to the following reasons:</p> <ol style="list-style-type: none"> <li>Potential hygiene risks during water collection and handling. During the onsite verification, the water samples may have been cross-contaminated. It was observed that a big crowd of local people was attracted by the survey team and gathered mainly around the EA field officer who was in charge of processing the water samples. Unlike during the monitoring survey in 2017, the EA field officer was not able to fully control the collection of the water sample. At times several people were holding the cup of drinking water close to their nose and face and some of them trying to identify the chlorine smell of the water; all of which pose a higher risks of sample cross-contamination during water sample collection than during the standard process.</li> <li>Potential cross-contamination during transport and E. coli testing. It should be noted that all of the four (4) out of five (5) positive results for E. coli were obtained from TCR positive water samples, which means that these drinking water samples were indeed chlorinated. However, the sampling container (Whirl-Pak®) contains a tablet of sodium thiosulfate which deactivates the disinfection capacity of any remaining chlorine in the water sample. Thus, after sample collection the water</li> </ol>

	<p>samples are prone to re-contamination. One (1) of the <i>E. coli</i> positive results showed very high TCR, i.e. 2.6 ppm. <i>E. coli</i> is very unlikely to survive in such a high TCR concentration. The positive result indicates cross-contamination post-collection e.g. during processing the <i>E. coli</i> test.</p> <p>c) Regrowth of <i>E. coli</i> during transport. During transport water samples should be kept at 4°C and processed within 6 hours to prevent regrowth of micro-organisms. As the field visits during the verification exceeded the 6 hours threshold, there is a chance that <i>E. coli</i> multiplied in the sampling containers (as the chlorine was deactivated). Note that three of the non-compliant water samples were amongst the first four collected in the morning of 22/08/2018 and their transport/storage time exceeded 6 hours (7020680, 7020894 and 7040188).</p> <p>d) The water sample collected from water point (ID 7050048) was tested with chlorine negative during verification, which means the chlorine already expired at the time of sample collection. The household who provided the sample also confirmed that the water had already been kept about 2-4 days though it was clearly educated by Evidence Action that the chlorine only effective in the water for 2-3 days after dosing.</p> <p>However, to eliminate the bias/error between the CME sample and DOE sample, the result of DOE's survey on WQ, i.e. 82.75% (=CME result*correction factor=100*24/29) is adopted for this monitoring period.</p> <p><b>DOE assessment</b></p> <p>Applying the acceptance sampling during on-site inspection, the DOE rejected the result of the CME as per the Para.32 of the sampling standard. However, the DOE sample shows more than 80% of the users can be ensured to get the safe drinking water. And CME may not operate strictly following the water quality testing protocol, which caused cross-contamination. resulting in a series of unexplained phenomena. Based on verification team's experience, if the TCR is 0.3~0.5mg/L, the <i>E. coli</i> will be lower than 2-CFU/100ml. But for water point ID 7020894, its TCR is 2.6 mg/L, but the <i>E. coli</i> colonies/100ml is 39.</p> <p>Subsequently, the verification team regards the CME's response is possible. To eliminate the bias between the CME sample and DOE sample, a <b>correction factor</b> has been involved in the calculation. The factor of 82.75% (=24/29) is considered reasonable.</p> <p>Thus, the water quality applied in the ER calculation is 82.75% (=100%*82.75%).</p> <p>Therefore, the CCSC verification team regards the process of correction factor to water quality is reasonable, and the bias between CME sample and DOE sample is deem eliminated. And the updated value of water quality is reprehensive to the whole group.</p> <p>Thus, the <b>CAR-8</b> was closed out.</p> <p>For the parameter of Water Quality, the verification team has interviewed the Analyst in the Lab, and found the <i>Protocol for Processing Samples</i> was strictly carried out <b>/38/</b>. And the Protocol of the Project is in line with the Quanti-Tray System User Manual issued by the IDEXX <b>/40/</b>.</p>
<b>Conclusion</b>	<p>The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</p>

<b>Parameter</b>	Number of persons supplied with purified water from each of the functional project appliances ( <b>POP<sub>y</sub></b> )
<b>Findings</b>	<p>Number of persons supplied with purified water from each chlorine dispenser (POP<sub>y</sub>) of Case 2 CPAs (CPA-9 and CPA-22) should be checked annually and biennially respectively. For other CPAs which fall under Case 1, as per paragraph 3(a) in AMS-III.AV version 03, POP<sub>y</sub> is an ex-ante determined value as POP<sub>P</sub> and does not need to be updated.</p> <p>However, to enhance the accuracy, completeness and conservativeness of the monitoring program, Evidence Action performed a population cross check (PCC) survey and voluntarily updated the POP<sub>P</sub> for all the related CPAs.</p> <p><del>Pending on CAR-3</del></p> <p>During the survey, the number of households that were using the dispensers for drinking water purification was identified. The household size was also updated based on most recent public data of Uganda.</p> <p>The verification team has checked the PCC records and the Uganda National Household Survey 2016/17, and confirmed the updated values of POP<sub>y</sub> are accurate and conservative.</p>
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan.

<b>Parameter</b>	<b>Monitoring parameters for the project emissions from fossil fuel combustion</b>
<b>Findings</b>	<p>As per the applied methodology, CO<sub>2</sub> emissions from on-site consumption of fossil fuels due to the project activity shall be calculated as the project emissions using the latest version of the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”.</p> <p>The verification team has checked the specification of the dispensers <b>/43/</b>, and by the onsite inspection, and confirmed that the chlorine dispensers are operated manually and there is no consumption of fossil fuel and/or electricity for the operation of the water purification systems.</p> <p>The verification team has also reviewed the first verification report for the assessment of GHG emissions from chlorine transportation, and confirmed that emission source can be ignored for it's not addressed in the applied methodology and the contribution is 0.25%, less than 1% of the overall average annual emissions reductions according to the Para.110 of VVS-PoA Version 01.0 <b>/50/</b>.Moreover, the ignored 0.25% contribution to the emission reductions is far less than the materiality threshold 5%.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

<b>Parameter</b>	<b>Monitoring parameters for the project emissions from electricity consumption</b>
<b>Findings</b>	As per the applied methodology, CO <sub>2</sub> emissions from electricity consumption by the project activity shall be calculated as the project emissions using the latest version of the “Tool to calculate baseline, project and/or leakage emissions.”

	<p>The verification team has checked the specification of the dispensers' /43/, and by the onsite inspection, and confirmed that the chlorine dispensers are operated manually and there is no consumption of electricity for the operation of the water purification systems.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	<p>The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</p>

#### E.3.4.3. Implementation of sampling plan

Means verification	of	CCSC verification team reviewed the sampling plan in the approved revised PoA-DD and included CPA-DDs, reviewed the actual sampling efforts carried out, including through a visit to the project site, interviews with personnel involved in sampling and surveys, and visits to a subset of households that were included in the CME/PP's sample survey, and assessed the compliance of the sampling efforts and surveys with the validated sampling plan in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities" Version 07.0.												
Findings		<p>The monitoring has been carried out in accordance with the monitoring plan contained in the CPA-DDs /9//10//11//12//13//14/.</p> <p><b><u>Sampling Design/Method/Target Population/Sampling Frame/Reliability:</u></b></p> <p>The sampling method applied for parameter Drink% (clustered sampling), Refill% (simple random), and clustered sampling was used for parameter of water quality monitoring, which is in line with the monitoring plan of the PoA DD (Section B.7.2) as referred in CPA-DDs /9//10/.</p> <p>The parameters were monitored by grouped survey for the CPAs, which is verified to be in line with criteria of same technology and host-country in the approved revised PoA-DD and CPA-DDs.</p> <p>The sampling frame considered confidence/precision as 95/10 in order to meet the requirement of Standard for sampling and surveys for CDM project activities and PoAs /54/. The target population was the households served by the chlorine dispensers installed as part of the CPAs located in Uganda. Each dispenser had the equal chance of selection.</p> <p><b><u>Sample Size (Required and Actual) for Parameter of Interest:</u></b> The sampling is applied to the following monitoring parameters:</p> <ul style="list-style-type: none"><li>– Refill%</li><li>– Drink%</li><li>– Water Quality</li></ul> <p>The sample sizes were determined, separately for each of them as under. The outcome of sample size calculation (required and actual samples) based on the considered confidence level and precision is presented below:</p> <table><tr><th></th><th>Sampling Approach</th><th>Required Sample Size</th><th>Actual Sample Size</th><th>Results</th><th>Precision Achieved</th></tr><tr><td>Refill%</td><td>Simple Random sampling</td><td>21 dispensers</td><td>853 dispensers</td><td>99.64%</td><td>0.4%</td></tr></table>		Sampling Approach	Required Sample Size	Actual Sample Size	Results	Precision Achieved	Refill%	Simple Random sampling	21 dispensers	853 dispensers	99.64%	0.4%
	Sampling Approach	Required Sample Size	Actual Sample Size	Results	Precision Achieved									
Refill%	Simple Random sampling	21 dispensers	853 dispensers	99.64%	0.4%									

<b>Drink%</b>	Clustered sampling	12 dispensers	14 dispensers (702 samples among 702 households)	96.1% (Updated)	0.6%
<b>Water Quality</b>	Cluster sampling	12 dispensers	14 dispensers (702 samples among 702 households)	82.75% (Updated)	0.0%

In this regard, sample size calculation (required and actual) is included in the ER spreadsheet /4/ that was checked and found the parameters inputted (eg. Required confidence/precision, Total number of groups in the population or Number of chlorine dispensers, Expected unit variance, Expected overall proportion) were consistent with the CPA-DDs and corresponding calculation were correct as per registered monitoring plan.

The verification team reviewed the sample size determination and Reliability Calculation of the surveys, and reproduced the same result as per the Standard: Sampling and surveys for CDM project activities and programme of activities /54/, Guideline: Sampling and surveys for CDM project activities and programme of activities /55/, and Sample Size Calculator /56/.

The actual number of dispensers covered by the CME' sample were clearly larger than the minimum size required. The precision achieved for the confidence level 95% is within the limit (<10%) for all the parameter of interest. For the sampling of parameter "Water quality" and "Drink%", cluster sampling has been applied, and 14 clusters/dispensers have been randomly selected, within the selected dispensers, a total 702 households have been surveyed. The verification team reviewed the documents for WQT and Drink% survey against the PCC records, and also interviewed the users in CCSC field survey against the PCC records, and confirmed that the records were consistent with each other, and all the households around the dispensers have been surveyed. The verification team can conclude that the sampling approach complied with requirement of the Sampling and surveys for CDM project activities and programmes of activities guideline.

The randomization was undertaken in Microsoft-Excel, and the same has been verified by the verification team. The samples were drawn from the database. Hence the verification team able to confirm that the samples were representative of the total population.

The reliability (demonstration of precision achieved after the survey results) is depicted in the ER spreadsheet /4/ corresponding to final Monitoring Report /2/, which were also found correct.

Based on the verified results the verification team found that the required precision is met in all the cases and therefore the results were directly used in the calculation of ERs.

The verification team has checked different version of PoA-DDs (registered version 06 and revised version 07) and found there is no change for the sample plan, i.e. the sampling approach are the same in different versions of the PoA-DDs. The verification team has ensured that a statistically sound sample of CPAs from each version of the PoA is being verified.

For other information, please refer to section E.3.4.2 of the report.

No CARs/CLs/FARs raised in this section.

<b>Conclusion</b>	As per the VVS-PoA Version 01.0, the CCSC verification team confirmed that:
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	<ul style="list-style-type: none"> <li>The sampling and surveys were carried out in line with the sampling plan and monitoring plan in the registered PoA-DD and CPA-DDs.</li> <li>The sampling approach and sample size determination was consistent with the sampling plan, and the sampling and surveys were carried out in accordance with the requirements of the '<i>Standard: Sampling and surveys for CDM project activities and programme of activities</i>' and the '<i>Guideline: Sampling and surveys for CDM project activities and programme of activities</i>'.</li> <li>A statistically sound sample of CPAs from each version of the PoA is being verified.</li> </ul>
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#### E.3.4.4. Compliance with the calibration frequency requirements for measuring instruments

<b>Means of verification</b>	<p>In the registered monitoring plan (of respective CPA-DDs and PoA-DD) does not state the calibration requirements for any of the parameter (Section I.4.2).</p> <p>However, the CME's spot-check for dispenser's functionality can be regarded as the self-calibration. During site inspection, the verification team have reviewed the relevant documents and onsite tested whether the dispensers' valves can dose 3ml chlorine solution properly in one turn.</p>
<b>Findings</b>	<p><b><u>FAR-2:</u></b></p> <p><u>During the operation period of the dispensers, no calibration for valves has been performed by the implementer, because that the volume of one turn of the valve has been guaranteed by its manufacture.</u></p> <p><u>However, during onsite inspection, it is observed that two dispensers' valves (waterpoint ID: 7031064, 70110084) were not able to dose 3ml chlorine solution properly in one turn. The CME/implementer is required to conduct the valve calibration on a sample basis in next monitoring period.</u></p> <p><u>And, since the malfunction of the two dispensers is not observed within the fourth monitoring period, both of them are required to be marked as "non-function" in next monitoring period.</u></p> <p><b>Response from the CME:</b></p> <p>According to the specification of the valves, 3ml of chlorine solution will be dosed in one turn.</p> <p>Evidence Action also performed calibration check on valves at the time that the organization switched to the current model of valve in 2012.</p> <p>Though the two dispensers were not able to properly dose 3ml of chlorine solution in one turn, both samples collected from households using these dispensers showed positive TCR during on-site verification; in addition, the water quality tests showed negative results for E.coli (&lt; 1 MPN/100 ml), and are thus compliant with the WQ threshold.</p> <p>To be conservative, the emission reductions from the two dispensers (waterpoint ID: 7031064, 70110084) will not be claimed for the 5th monitoring period.</p> <p>In the future, the monitoring of functionality spot-checks will be improved. The project implementer will explore feasible ways to check proper chlorine dosage.</p>



	<p>CCSC verification have checked the specification of the valves which shows the dispensers' valves can dose 3ml of chlorine solution in one turn. In a conservative manner, we required the CME to conduct the valve calibration on a sample basis in next monitoring period and the emission reductions from the two dispensers (waterpoint ID: 7031064, 70110084) will not be claimed for the 5th monitoring period.</p> <p>For the CPAs, the unit of MPN (most probable number) is almost the same as CFU (colony forming unit) as per the instruction of IDEXX /62/ and ISO9308-2 /64/.</p>
<b>Conclusion</b>	There is no specific requirement prescribed in the registered monitoring plan and applied methodology. However, the dispensers' valves are required to be quantitatively calibrated during the following monitoring period.

### E.3.5. Assessment of data and calculation of emission reductions or net removals

#### E.3.5.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<b>Means of verification</b>	<p>According to the Para.357 of VVS-PoA Version 01.0 /50/, the verification team has performed the following activities to assess the data and calculations of GHG emission reductions achieved by the PoA and its CPAs as per the methodology /52/:</p> <p>(a) Through desk review and on-site inspection on the ODK Raw Data /28/ to verify that a complete set of data for the specified monitoring period is available.</p> <p>(b) Information provided in the monitoring report /2/ has been cross-checked with other sources.</p> <p>(c) Review the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the included CPA-DDs /9//10//11//12//13//14/, and the methodology /4/;</p> <p>(d) Justify the assumptions used in emission calculations</p> <p>(e) Review emission factors, IPCC default values, GWPs and other reference values as per the included CPA-DDs /9//10//11//12//13//14/.</p>								
<b>Findings</b>	<p>The following equations were used to determine the baseline emissions as provided in the monitoring report /2/ and applied in the corresponding ER sheet /4/. The expressions used were found consistent with the approved revised PoA DD /7/, included CPA-DDs /9//10//11//12//13//14/ and the applied methodology AMS-III.AV. Version 03 /52/:</p> $BE_y = QPW_y * SEC * f_{NRB,y} * EF_{projected\_fossilfuel} * 10^{-9}$ <p><b>(1)</b></p> <p>Where:</p> <table> <tr> <td><math>BE_y</math></td><td>Baseline emissions during the year <math>y</math> (tCO<sub>2</sub>e)</td></tr> <tr> <td><math>QPW_y</math></td><td>Quantity of purified water in year <math>y</math></td></tr> <tr> <td><math>SEC</math></td><td>Specific energy consumption required to boil one liter of water</td></tr> <tr> <td><math>f_{NRB,y}</math></td><td>Fraction of non-renewable biomass = 82% (default value for Uganda)</td></tr> </table>	$BE_y$	Baseline emissions during the year $y$ (tCO <sub>2</sub> e)	$QPW_y$	Quantity of purified water in year $y$	$SEC$	Specific energy consumption required to boil one liter of water	$f_{NRB,y}$	Fraction of non-renewable biomass = 82% (default value for Uganda)
$BE_y$	Baseline emissions during the year $y$ (tCO <sub>2</sub> e)								
$QPW_y$	Quantity of purified water in year $y$								
$SEC$	Specific energy consumption required to boil one liter of water								
$f_{NRB,y}$	Fraction of non-renewable biomass = 82% (default value for Uganda)								

$EF_{\text{projected\_fossilfuel}}$ 

Emission factor  
= 81.6 tCO<sub>2</sub>/TJ (default value)

The specific energy consumption required to boil one liter of water was calculated as follows:

$$SEC = [WH * (T_f - T_i) + 0.01 * WHE] / \eta_{wb}$$

(2)

Where:

$WH$  Specific heat of water  
= 4.186 kJ/L °C (default value)

$T_f$  Final temperature  
= 100 °C (default value)

$T_i$  Initial temperature of water  
= 20 °C (default value)

$WHE$  Latent heat of water evaporation  
= 2,260 kJ/L (default value)

$\eta_{wb}$  Efficiency of the water boiling systems being replaced  
(source from baseline survey)

The water quality was monitored on sample basis for contamination with Escherichia coli (E. coli). A presence of up to 10 E. coli CFU/100 ml shall be acceptable. The fraction of water quality measurements providing water of insufficient quality needs be excluded from the calculation of emission reductions and BE<sub>y</sub> was adjusted accordingly. The CME will not claim the ERs generated from 20/10/2017 to 31/12/2017 (73-day) for CPA-2/3, nor ERs generated from 13/09/2016 to 31/12/2016 (110-day) for both CPA-9/10, and the adjusting factors of 87.39% (i.e.506/579) and 76.84% (i.e.365/475) are introduced respectively for CPA-2/3 and CPA-9/10 to fulfil the monitoring validity.

96,332 tCO<sub>2</sub>e \* 82.75% \* 87.39% = 69,664 tCO<sub>2</sub>e [CPA-2]

66,137 tCO<sub>2</sub>e \* 82.75% \* 87.39% = 47,828 tCO<sub>2</sub>e [CPA-3]

61,717 tCO<sub>2</sub>e \* 82.75% \* 76.84% = 39,244 tCO<sub>2</sub>e [CPA-9]

65,357 tCO<sub>2</sub>e \* 82.75% \* 76.84% = 41,558 tCO<sub>2</sub>e [CPA-10]

39,484 tCO<sub>2</sub>e \* 82.75% = 32,673 tCO<sub>2</sub>e [CPA-21]

26,039 tCO<sub>2</sub>e \* 82.75% = 21,547 tCO<sub>2</sub>e [CPA-22]

#### Assumptions Justification:

1) It was assumed that the chlorine was consumed constantly.

In case of missing data, it is assumed that no chlorine was used (e.g. in case no chlorine delivery record was collected for a certain dispenser before the start date of the monitoring period but chlorine delivery records are available since the start date of monitoring period, no chlorine usage is assumed before the date of the chlorine delivery record collected during the monitoring period).

	<p>The verification team confirmed that with the assumptions, the total chlorine consumption during this monitoring period can be calculated reasonably and conservative.</p> <p>2) Dispensers for which no functionality records were collected after monitoring start date are assumed to be non-functional.</p> <p>The verification team confirmed that it's conservative and can be accepted.</p> <p>The verification team has reviewed the calculation in the MR Version 03 and ER spreadsheet, and found a complete set of data for the specified monitoring period is available, which has been crosschecked against the ODK Raw Data/other documents and the on-site inspection by the verification team, and the calculation of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology.</p> <p><b><u>CL-4:</u></b></p> <p><u>The critical parameters, eg. Chlorine usage, POP<sub>y/p</sub> etc, involved in the baseline emissions calculation are not transparent. Necessary equations in the cells of the ER spreadsheet are required in order to reproduce the result for verification.</u></p> <p><b>Response from the CME:</b></p> <p>Equations and calculation process are provided for Chlorine usage, POP<sub>y/p</sub> and other calculated parameters in the updated datasheet, which is provided to the DOE.</p> <p>CCSC verification team has confirmed that the equations and calculation process for Chlorine usage, POP<sub>y/p</sub> and other calculated parameters have been added in the Updated chlorine usage and ER calculation spreadsheet.</p> <p>Thus, the <b>CL-4</b> was closed out.</p>
<b>Conclusion</b>	<p>Corresponding to the paragraph 359 of VVS-PoA Version 01.0, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• A complete set of data for the monitoring period is available,</li> <li>• Information on the baseline GHG emission calculation provided in the monitoring report has been cross-checked with other sources,</li> <li>• Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document,</li> <li>• The assumptions in emission calculations has been justified,</li> <li>• Appropriate emission factor, IPCC default values, GWPs and other reference values have been correctly applied.</li> </ul>

#### E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

<b>Means of verification</b>	The verification team has reviewed the project emission calculation as per the included CPA-DDs /9//10//11//12//13//14/ and the methodology /52/.
<b>Findings</b>	<p>The operation of the chlorine dispensers does not involve the consumption of fossil fuels or electricity. Therefore, the project emissions are zero. The on-site visit and project design also did not reveal any potential source to be considered in this regard.</p> <p>No CARs/CLs/FARs raised in this section.</p>

<b>Conclusion</b>	<p>Corresponding to the paragraph 359 of VVS-PoA Version 01.0 /50/, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• A complete set of data for the monitoring period is available.</li> <li>• Information on the project GHG emission calculation provided in the monitoring report has been cross-checked with other sources.</li> <li>• Calculations of project emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document.</li> <li>• Appropriate emission factor, IPCC default values, GWPs and other reference values have been correctly applied.</li> </ul>
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#### E.3.5.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	The verification team has reviewed the leakage calculation as per the included CPA-DDs /9//10/ and the methodology /52/.
<b>Findings</b>	<p>Leakage relating to the non-renewable woody biomass is assessed as per the relevant procedures of AMS-I.E Version 5 explained below i.e., BE<sub>y</sub> is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.</p> <p><b>CL-5</b> was raised that:</p> <p><u>The leakage indicated in the MR and the ER spreadsheet are inconsistent. The complete calculation should be included in the monitoring report.</u></p> <p><b>Response from the CME:</b></p> <p>The leakage in the MR and the ER spreadsheet is updated. The complete calculation is included in the monitoring report.</p> <p>CCSC verification team have checked leakage in the Updated monitoring report was consistent with Updated ER calculation spreadsheet. The complete calculation of leakage has been included in the updated monitoring report.</p> <p>Thus, the <b>CL-5</b> was closed out.</p>
<b>Conclusion</b>	<p>Corresponding to the paragraph 359 of VVS-PoA Version 01.0, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• A complete set of data for the monitoring period is available.</li> <li>• Information on the leakage GHG emission calculation provided in the monitoring report has been cross-checked with other sources.</li> <li>• Calculations of leakage have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document.</li> </ul>

#### E.3.5.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

<b>Means of verification</b>	The verification team has reviewed the calculation of GHG emission reductions in the MR Version 04 /2/ and ER Calculation Sheet /4/ as per the included CPA-DDs /9//10//11//12//13//14/, and the methodology /52/.
<b>Findings</b>	As elaborated above, the entire emission reductions from the PoA were based on baseline emissions and leakage emissions. The calculations presented in this regard in the final monitoring report /2/ and corresponding

	<p>ER sheet /4/ were found appropriate and complying with the provisions prescribed in the monitoring plan of respective CPA-DD, PoA-DD and applied methodology.</p> <p>The verification team confirms that the calculation is accurate and conservative. The total number of ERs achieved during this monitoring period is 239,885tCO<sub>2</sub>e.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	<p>Corresponding to the paragraph 359 of VVS-PoA Version 01.0, CCSC verification team confirms that:</p> <ul style="list-style-type: none"> <li>• A complete set of data for the monitoring period is available.</li> <li>• Information provided in the monitoring report has been cross-checked with other sources.</li> <li>• Calculations of baseline emissions, and project activity 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.</li> <li>• The assumptions in emission calculations are reasonable.</li> <li>• Appropriate emission factor, IPCC default values, GWPs and other reference values have been correctly applied</li> </ul>

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
5962-0001: Gravity Driven Membrane Filters in Uganda - CPA 1	0	0	0	0	0	0
5962-0002: Chlorine Dispensers in Uganda – CPA 2	69,664	0	3,484	0	66,180	66,180
5962-0003: Chlorine Dispensers in Uganda – CPA 3	47,828	0	2,392	0	45,436	45,436
5962-0008: Chlorine Dispensers in Uganda - CPA 9	39,244	0	1,963	0	37,281	37,281
5962-0009: Chlorine Dispensers in Uganda - CPA 10	41,558	0	2,078	0	39,480	39,480
5962-0017: Chlorine Dispensers in Uganda – CPA 21	32,673	0	1,634	0	31,039	31,039
5962-0018: Chlorine Dispensers in Uganda – CPA 22	21,547	0	1,078	0	20,469	20,469
<b>Total</b>	252,514	0	12,629	0	239,885	239,885

### E.3.5.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

<b>Means of verification</b>	The comparison of actual GHG emission reductions with estimates in the included CPA-DDs /9//10//11//12//13//14/ has been checked and re-calculated by the verification team.
<b>Findings</b>	Based on the above assessment, the emission reductions during the monitoring period from 01/06/2016 to 31/12/2017 is verified as 239,885 tCO <sub>2</sub> e for all the CPAs. The actual emission reductions are 43.8% lower than the value of estimated emission reductions during the same period as per the included CPA-DDs of 426,597 tCO <sub>2</sub> e. Please refer to the following table for comparison of specific CPA.  No CARs/CLs/FARs raised in this section.
<b>Conclusion</b>	Corresponding to the paragraph 272 of CDM Project Standard for PoA version 01.0, CCSC can confirm that: A comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the included CPA-DDs has been provided, and the results are correct.

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
5962-0001: Gravity Driven Membrane Filters in Uganda - CPA 1	0	0
5962-0002: Chlorine Dispensers in Uganda – CPA 2	94,006(=59,261/365*579)	66,180
5962-0003: Chlorine Dispensers in Uganda – CPA 3	70,974(=44,742/365*579)	45,436
5962-0008: Chlorine Dispensers in Uganda - CPA 9	77,586(=59,619/365*475)	37,281
5962-0009: Chlorine Dispensers in Uganda - CPA 10	74,817(=57,491/365*475)	39,480
5962-0017: Chlorine Dispensers in Uganda – CPA 21	54,464(=59,519/365*334)	31,039
5962-0018: Chlorine Dispensers in Uganda – CPA 22	54,749(=59,831/365*334)	20,469
<b>Total</b>	<b>426,597</b>	<b>239,885</b>

### E.3.5.6. Remarks on difference from estimated value in included CPA

<b>Means of verification</b>	The CCSC verification team reviewed the emission reduction spreadsheet, description set out in the monitoring report, and other evidence presented by
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	the CME where applicable to justify the reasons for the difference in emission reductions between the included CPA-DDs and the actual monitored values.
<b>Findings</b>	<p>The verified emission reductions of each CPA are lower than estimated valued in included CPAs.</p> <p>Furthermore, in order to meet the small-scale threshold, the average annual emission reductions for the Type III components need to be below 60k tCO<sub>2</sub> per annum. If the threshold is exceeded the emission reductions shall be capped at 60k tCO<sub>2</sub> per annum. The small-scale threshold is not reached for all of the CPAs in 2016 and 2017.</p> <p>No CARs/CLs/FARs raised in this section.</p>
<b>Conclusion</b>	<p>Corresponding to the paragraph 273 of CDM Project Standard for PoA version 01.0 and paragraph 341 (c) and (d) of VVS-PoA Version 01.0, CCSC verification team confirms confirm that:</p> <ul style="list-style-type: none"> <li>The project participants have explained the cause of any increase in the actual GHG emission reductions achieved during the current monitoring period, and including all information (i.e. data and/or parameters) that is different from that stated in the registered PDD.</li> <li>The variation is deemed to be reasonable.</li> </ul>

**E.3.6. Assessment of reported sustainable development co-benefits**

<b>Means of verification</b>	N.A. for the project participants have not monitored the sustainable development co-benefits of the registered project.
<b>Findings</b>	N.A.
<b>Conclusion</b>	N.A.

**E.3.7. Global stakeholder consultation**

<b>Means of verification</b>	After the publication of the first monitoring report in accordance with the PCP-PoA, no comment was received during the global stakeholder consultation period.
<b>Findings</b>	N.A.
<b>Conclusion</b>	As per the Para.370 of the VVS-PoA Ver.01.0, no authentic and relevant comments was received after the publication of the first monitoring report.

**SECTION F. Internal quality control**

&gt;&gt;

CCSC has taken the following quality control measures within the verification team and of the verification process according to relevant CCSC's internal procedures:

- The application review of the verification was conducted and concluded that CCSC has the accredited scope and competence to verify the PoA and CPAs with impartiality as well;
- The verification team was selected with due considerations given in terms of the competence and impartiality;
- The verification team carried out the verification work and compiled a verification report strictly following CCSC's Procedures for Implementation of Verification.

The verification report submitted by the verification team was subjected to a technical review and decision-making process, the technical reviewers and decision-makers are qualified and independent from the verification team. If any issue is raised during technical review and/or decision-making the same is to be discussed between the issue-raiser and the team leader as well as the CME/PPs. All issues must be satisfactorily addressed before the submission of the report for final approval. The persons who conducted the technical review and decision-making for the



PoA and CPAs are shown in section B.2 this report and their Certificates of Competence can be found in Appendix 2 of this report.

The report approved by the authorized official of CCSC as the final report together with relevant documents are submitted to CDM EB through the UNFCCC dedicated web-platform for request for issuance (only if an unconditioned positive verification/certification opinion is concluded).

## **SECTION G. Verification opinion**

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The verification team assigned by the China Classification Society Certification Company (CCSC) concludes that the CDM-PoA “International Water Purification Programme”, as described in the monitoring plan contained in the approved revised PoA-DD and included CPA-DDs /9//10//11//12//13//14/, and Monitoring Report (Version 04) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification is conducted in line with the VVS-PoA requirements /50/.

The verification was executed by taking the following methods and in the following steps so far:

- Publication of the MR on the UNFCCC website (on 16/07/2018)
- Desk review of Monitoring Report Version 01 dated 12/07/2018 and related documents
- On-site inspection and interviews (21/08/2018-24/08/2018)
- Raise verification findings: corrective action requests (CAR), Clarification Requests (CL) and Forward Action Request (FAR)
- Desk review of revised MR (Version 04) /2/ and responses to verification findings
- Issue of this version of the verification report

The PoA and its CPAs are implemented according to selected monitoring methodology AMS-III.AV. Version 03 /52/ and the monitoring plan contained in the approved revised PoA-DD and included CPA-DDs /9//10//11//12//13//14/. The monitoring equipment was installed, calibrated and maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions.

CCSC therefore issues the positive verification opinion expressed in the Certification statement in SECTION H.

## **SECTION H. Certification statement**

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CCSC has carried out the 4th periodic verification of the PoA “International Water Purification Programme” (UNFCCC PoA reference No.5962). This verification covers the period from 01/06/2016 to 31/12/2017 (both days inclusive).

In the course of the verification Eight Corrective Action Requests (CAR) and Five Clarification Requests (CL) were raised and successfully closed. Two Forward Action Request (FAR) was raised for this monitoring period. The verification is based on the Monitoring Report Version 01 dated 12/07/2018, the revised Monitoring Report Version 04, the approved revised PoA-DD, included CPA-DDs, ER Spreadsheet, and supporting documents available to CCSC.

As the result of the 4th periodic verification, CCSC confirms that:

- The PoA and its CPAs have been implemented and operated as per the approved revised PoA-DD and included CPA-DDs and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- The monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of CERs and in accordance with applicable CDM requirements;

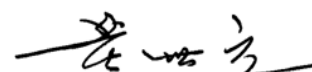
- The actual monitoring systems and procedures are in place and functional, and comply with the monitoring systems and procedures described in the monitoring plan;
- The monitoring plan is in accordance with the applied methodology, i.e., AMS-III.AV. Version 03;
- The installed equipment for measuring parameters required for calculating emission reductions are operated appropriately.

The GHG emission reductions are calculated without material omission, errors, misstatements and in a conservative and appropriate manner.

CCSC hereby certifies that the Project has achieved emission reductions as follows:

Specific-case CPA reference number	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e) achieved in the monitoring period		
	Up to 31/12/2012	From 01/01/2013	Total amount
5962-0001	0	0	0
5962-0002	0	66,180	66,180
5962-0003	0	45,436	45,436
5962-0008	0	37,281	37,281
5962-0009	0	39,480	39,480
5962-0017	0	31,039	31,039
5962-0018	0	20,469	20,469
<b>Total</b>	<b>0</b>	<b>239,885</b>	<b>239,885</b>

For and on behalf of CCSC



Authorized Signature

Name: HUANG Shiyuan

Date: 02/02/2019

## Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Level
BE	Baseline emissions
CAR	Corrective Action Request
CCSC	China Classification Society Certification Company
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CME	Coordinating/Managing Entity
CPA	Component Project Activity
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
DD	Design Document
DOE	Designated operational entity
DNA	Designated National Authority
EA	Evidence Action
EB	Executive Board
EF	Emission factor
FAR	Forward action request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LoA	Letter of Approval
LE	Leakage emissions
MPN	Most probable number
MR	Monitoring report
NTU	Nephelometric Turbidity Units
NGO	Non-governmental Organization
ODK	Open Data Kit (Mobile App)
PCP	Project Cycle Procedure
PE	Project Emissions
PP	Project Participant
PRC	Post-registration change(s)
PS	Project Standard
PWL	Pure Water Ltd.
S/N	Serial Number

TCR	Total Chlorine Residual
tCO <sub>2</sub> e	Tonne of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Level
VVS	Validation and Verification Standard
WQT	Water Quality Test

## Appendix 2. Competence of team members and technical reviewers



Appendix 9

### CERTIFICATE OF COMPETENCE

Date of issue: 15/10/2018

Mr. Li Xingtong

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.1/TA1.2/TA3.1/TA9.2/TA13.1
- CDM verifier for Technical Area(s): TA1.1/TA1.2/TA3.1/TA9.2/TA13.1
- ☐ Technical expert for Technical Area(s): \_\_\_\_\_

Huang ShiYuan  
CCSC General Manager



Appendix 9

### CERTIFICATE OF COMPETENCE

Date of issue: 15/10/2018

Mr. Zhou Wusen

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.2
- CDM verifier for Technical Area(s): TA1.2
- ☐ Technical expert for Technical Area(s): \_\_\_\_\_

Huang ShiYuan  
CCSC General Manager



Appendix 9

### CERTIFICATE OF COMPETENCE

Date of issue: 15/10/2018

Ms. Tang Xuemei

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.1/TA1.2/TA3.1/TA4.1
- CDM verifier for Technical Area(s): TA1.1/TA1.2/TA3.1/TA4.1
- ☐ Technical expert for Technical Area(s): \_\_\_\_\_

Huang ShiYuan  
CCSC General Manager



Appendix 9

### CERTIFICATE OF COMPETENCE

Date of issue: 15/10/2018

Ms. Xie Fengjun

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- CDM validator for Technical Area(s): TA1.2/TA13.1/TA13.2
- CDM verifier for Technical Area(s): TA1.2/TA13.1/TA13.2
- ☐ Technical expert for Technical Area(s): \_\_\_\_\_

Huang ShiYuan  
CCSC General Manager

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	CME	Monitoring Report	Version 01 12/07/2018	CME
2.	CME	Monitoring Report	Version 04 25/12/2018	CME
3.	CME	ER Spreadsheet	/	CME
4.	CME	Revised ER Spreadsheet	/	CME
5.	CME	Registered PoA-DD	Version 6 02/10/2012	CME
6.	GLC	Validation Report (Registered PoA DD)	Rev. 12 16/11/2012	Others
7.	CME	Approved revised PoA-DD	Version 07 13/04/2015	CME
8.	RINA	PRC Validation Opinion for the PoA	Rev1.1 Aa 16/07/2015	Others
9.	CME	Included CPA DD – CPA 02	Version 05 04/11/2016	CME
10.	CME	Included CPA DD – CPA 03	Version 05 04/11/2016	CME
11.	CME	Included CPA DD – CPA 09	Version 02 31/08/2016	CME
12.	CME	Included CPA DD – CPA 10	Version 02 31/08/2016	CME
13.	CME	Included CPA DD – CPA 21	Version 02 12/12/2016	CME
14.	CME	Included CPA DD – CPA 22	Version 02 12/12/2016	CME
15.	CARBON CHECK	Validation Report – CPA 02	Version 02 17/07/2014	Others
16.	CARBON CHECK	Validation Report – CPA 03	Version 05 27/03/2015	Others
17.	TUV NORD	Validation Report – CPA 09	Version 01 01/09/2016	Others
18.	TUV NORD	Validation Report – CPA 10	Version 01 01/09/2016	Others
19.	TUV NORD	Validation Report – CPA 21	Version 01	Others

			03/01/2017	
20.	TUV NORD	Validation Report – CPA 22	Version 01 03/01/2017	Others
21.	CME EA	Emission Reduction Purchase Agreement	-	CME
22.	EA	Evidence Action Global Organization Chart	-	CME
23.	EA	Certificate of Evidence Action Limited	-	CME
24.	EA	Evidence Action 2014 Audited Financial Statements	-	CME
25.	EA	Audited Financial Statements. 2015_Uganda	-	CME
26.	EA	Field Offices Organization Chart	-	EA
27.	EA	ODK Raw Records/Spreadsheet	-	CME
28.	EA	Survey Records (ODK based) / Spot Checks	-	CME
29.	EA	Promoter Survey Records (ODK based)	-	CME
30.	EA	Monitoring Survey Records	-	CME
31.	EA	Chlorine Delivery Records	-	CME
32.	EA	Chlorine Purchase receipts	-	CME
33.	EA	Chlorine Inventory	-	CME
34.	EA	WQT Records	-	CME
35.	EA	Carbon Rights Waiver Records	-	CME
36.	EA	Dispenser Installation Records	-	CME
37.	EA	Community Education Meeting Attendance Records	-	CME
38.	EA	Protocol for Processing Samples using IDEXX Quanti – Tray / 2000 (Water Quality Tests)	-	CME
39.	EA	IDEXX Water Quality Testing Form (Water Quality Tests)	-	CME
40.	IDEXX	Quanti-Tray System User Manual ( <a href="http://www.idexx.com/water/products/quantitrays.html">www.idexx.com/water/products/quantitrays.html</a> )	-	Others
41.	EA	Survey Back-check Protocol	-	CME
42.	EA	Dispensers for Safe Water Back-check Protocol	-	CME
43.	EA	Technical Specifications of the dispenser and its hardware		CME
44.	EA	Chlorine Usage Data and Calculation	-	CME
45.	EA	Baseline Survey Records	-	CME
46.	CME	Interview: Existence of public distribution network supplying safe drinking water	05/04/2017 (CPA-2)	CME

		(CPA-2,CPA-3,CPA-9,CPA-10,CPA-21,CPA-22)	30/03/2017 (CPA-2&CPA-3) 28/03/2017 (CPA-9&CPA-3) 31/03/2017 (CPA-9) 29/03/2017 (CPA-10) 28/04/2017 (CPA-21) 11/07/2017 (CPA-22)	
47.	EB	Default values of fraction of non-renewable biomass <a href="http://cdm.unfccc.int/DNA/fNRB/index.html">http://cdm.unfccc.int/DNA/fNRB/index.html</a>	-	Others
48.	National Statistical Office	Uganda - 2016/17 National Housing Survey	-	Others
49.	EB	CDM PS-PoA Version 01.0	01/06/2017	Others
50.	EB	CDM VVS-PoA Version 01.0	01/06/2017	Others
51.	EB	CDM PCP-PoA Version 01.0	01/06/2017	Others
52.	EB	AMS-III.AV Low greenhouse gas emitting safe drinking water production systems	Version 03 13/09/2012	Others
53.	EB	AMS-I.E. Switch from Non-Renewable biomass for thermal applications by the user	Version 05 20/07/2012	Others
54.	EB	Standard: Sampling and surveys for CDM project activities and programme of activities	Version 07.0 16/10/2015	Others
55.	EB	Guideline: Sampling and surveys for CDM project activities and programme of activities	Version 04.0 16/10/2015	Others
56.	EB	Sample Size Calculator (Appendix 6 of Guidelines for sampling and surveys for CDM project activities and programme of activities)	16/10/2015	Others
57.	EB	General guidelines for SSC CDM methodologies	Version 22.1 15/04/2016	
58.	EB	Methodological tool: Demonstration of additionality of small-scale project activities	Version 12.0 26/04/2018	Others



59.	EB	Methodological tool: Assessment of debundling for small-scale project activities	Version 04.0 16/04/2015	Others
60.	EB	Instructions for filling out the monitoring report form for CDM programme of activities in the Monitoring report form for CDM programme of activities version 02.0	Version 02.0 29/12/2017	Others
61.	CME	WQT Result_DOE samples	-	CME
62.	IDEXX	Colilert-18 <a href="http://www.idexx.com.cn/water/products/colilert-18.html">http://www.idexx.com.cn/water/products/colilert-18.html</a>	-	Others
63.	CME	Population Crosscheck (PCC)	-	CME
64.	ISO	ISO 9308-2 water quality — enumeration of Escherichia coli and coliform bacteria — part 2: most probable number method	<a href="http://www.doc88.com/p-7334058305760.html">http://www.doc88.com/p-7334058305760.html</a>	Others
65.	Ministry of Water and Environment	Uganda Water Atlas data 2017	<a href="http://www.mwe.go.ug/sites/default/files/library/Atlas%202017_1_Introduction.pdf">http://www.mwe.go.ug/sites/default/files/library/Atlas%202017_1_Introduction.pdf</a>	Others
66.	CME	Included CPA DD – CPA 02	Version 06 26/01/2019	CME
67.	CME	Included CPA DD – CPA 03	Version 06 26/01/2019	CME
68.	CCSC	Validation Opinion on CPA-2/3	01/02/2019	Others

## Appendix 4. Clarification requests, corrective action requests and forward action requests

**Table 1. Remaining FARs from validation and/or previous verification**

<b>FAR ID</b>	<b>Remaining FAR-1</b>	<b>Section no.</b>	<b>/</b>	<b>Date: 29/11/2017</b>
<b>Description of FAR</b>				
The target of the parameter of Water quality should be drinking water, however, in their survey of CME/Implementer, it has not specified that the intended use of the sample water will be drinking. Therefore, the CME/Implementer are required to update the questions in their survey in the following monitoring period.				
<b>CME response</b>				<b>Date: 30/11/2017</b>
The survey questions will be updated and the field officer will be trained to specify that the intended use of the sample water will be drinking.				
<b>Documentation provided by the CME</b>				
WQT Households list, WQT IDEXX Form, Training Records				
<b>DOE assessment</b>				<b>Date: 31/08/2018</b>
CCSC verification team checked the WQT households list and WQT IDEXX Form and the training records finalised during October and November 2017, and confirmed and confirmed that the survey questions had be updated and the field officers had been trained to specify that the intended use of the sample water is drinking.				
Thus, the FAR-1 from previous verification was closed out.				

<b>FAR ID</b>	<b>Remaining FAR-2</b>	<b>Section no.</b>	<b>/</b>	<b>Date: 19/12/2017</b>
<b>Description of FAR</b>				
In the following verification, the emission reductions of each CPAs should be capped at 60k tCO <sub>2</sub> per annum to ensure the applicability of the methodology will not be impacted.				
<b>CME response</b>				<b>Date: 19/12/2017</b>
The total annual emission reductions for both CPA-2 and CPA-3 remain below the 60,000 CERs small-scale threshold, and will be checked again at the end of next monitoring period which covers the period from 01/06/2016 to 31/12/2016.				
<b>Documentation provided by the CME</b>				
N.A.				
<b>DOE assessment</b>				<b>Date: 31/08/2018</b>
CCSC verification team checked the emission reductions for each CPA in 2016 and 2017, and confirmed the total annual emission reductions for each CPA remain within the thresholds of 60,000 CERs for small-scale Type III project.				
Thus, the FAR-2 from previous verification was closed out.				

Table 2. CLs from this verification

Table 2: CLs from this verification

CL ID	CL-1	Section no.	E.3.1	Date: 31/08/2018																
Description of CL																				
Implementation status:																				
<div>1) Information on the implementation and actual operation of each CPAs is absent in the monitoring report.</div> <div>2) The verification team has checked the dispenser installed against the included CPA-DDs, and found most of completion rates crossed 85% except CPA-22, whose completion rate was 61.1%. The implementation status and further plan for all the CPAs should be reported in the monitoring report.</div> <div>3) During onsite inspection, the verification team found that the install dates of three dispensers (waterpoint ID: 7056647, 7050048, 70120316) marked on their concrete base are inconsistent with those in the database.</div>																				
CME response				Date: 10/09/2018																
<div>1) The Information on the implementation and actual operation of each CPA is added in the updated monitoring report.</div> <div>2) Currently, the chlorine dispenser program in Uganda has no further installation plan. CPA-22 was the latest CPA installed in Uganda and started in November 2015, this project was not fully completed until this monitoring period. However, the project implementer was not able to fully implement CPA-22 as originally planned due to financial issues, so it was considerable to include the new dispensers if the financial issues had been solved. Therefore, the number of installed dispensers is below that planned in the CPA DD.  Furthermore, during this monitoring period, the CME has set eligibility criteria for the installed dispensers for conservative consideration. Dispensers were considered as non-eligible if key information like GPS coordinates of the water point are missing or if chlorine dispensers were not maintained during the monitoring period.  Dispensers which do not meet the eligibility criteria are not included in the final database and no CERs will be claimed from the non-eligible dispensers. Therefore, the number of eligible dispensers is below the indicated installation number in the CPA DDs.  This approach is considered to be conservative.</div> <div>3) The inconsistencies of the installation dates for the three dispensers are shown as below:</div> <table><tr><th>Waterpoint ID</th><th>CPA</th><th>Installation date in dispenser database</th><th>Installation date on the dispenser foundation</th></tr><tr><td>7050647</td><td>CPA-3</td><td>2014/10/23</td><td>2014/10/7</td></tr><tr><td>7050048</td><td>CPA-3</td><td>2014/9/28</td><td>2014/9/29</td></tr><tr><td>70120316</td><td>CPA-22</td><td>2015/11/12</td><td>2015/11/11</td></tr></table> <div>The installation date on the dispenser foundation reflects the date when the dispenser was installed. On the other hand, the installation date in the dispenser database reflects the date when the chlorine is filled into the dispenser for the first time, which normally takes place within 3 days after installation of the dispenser foundation. Therefore, for the dispensers with water point IDs of 70120316, 1 day variance between the date on the dispenser foundation and that in the dispenser database is reasonable.  However, for 7050048 and 7050647, the reported installation dates in the database are data entry errors and have been updated as per the date in the installation record and that marked in the foundation of the dispenser. The installations of the three dispensers took</div>					Waterpoint ID	CPA	Installation date in dispenser database	Installation date on the dispenser foundation	7050647	CPA-3	2014/10/23	2014/10/7	7050048	CPA-3	2014/9/28	2014/9/29	70120316	CPA-22	2015/11/12	2015/11/11
Waterpoint ID	CPA	Installation date in dispenser database	Installation date on the dispenser foundation																	
7050647	CPA-3	2014/10/23	2014/10/7																	
7050048	CPA-3	2014/9/28	2014/9/29																	
70120316	CPA-22	2015/11/12	2015/11/11																	

place in 2014 or 2015, which is well before the start date of the monitoring period. Such discrepancy will have no impact on the ER calculation anyway.

#### Documentation provided by the CME

Updated monitoring report  
Updated dispenser database  
Installation records

#### DOE assessment

**Date:** 12/09/2018

CCSC verification team have checked the updated monitoring report, Updated dispenser database and Installation record of waterpoint ID 7050647, 7050048 which were provided by CME, and confirmed the information on the implementation and actual operation of each CPA has been added in the updated MR.

The implementation status for all the CPAs have been reported in the updated MR. Because of the financial issues, the completion rate of CPA-22 was only 61.1%, the CME had no further plan for CPA-22 until the financial issues had been solved.

The reported installation dates of 7050048 and 7050647 in database have been updated as per the date in the installation record and that marked in the foundation of the dispenser. For the water point IDs of 70120316, 1-day variance between the date on the dispenser foundation and that in the dispenser database is reasonable.

Thus, the **CL-1** was closed out.

CL ID	CL-2	Section no.	E.3.1	Date: 31/08/2018
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#### Description of CL

By documents review, the verification team found the geo-coordinates in the database for 16 dispensers are incorrect.

During onsite inspection, the verification team also found the GPS coordinates for dispenser (Waterpoint ID: 70120316) is incorrect as per the information obtained onsite.

#### CME response

**Date:** 10/09/2018

16 incorrect GPS coordinates

The information of the wrong GPS coordinates for the 16 dispensers is shown as below:

Waterpoint Name	Waterpoint ID	Latitude	Longitude
Kiwongo_Protected_Sp_7040052	7040052	1.17794	-21880.63943
Miwu_Sp_7040173	7040173	1.20649	-21880.63265
Namukuyu_Sp_7040311	7040311	1.12953	-21880.71139
Negugu_Sp_7040314	7040314	1.11833	-21880.70432
Mazuguni_7050421	7050421	1.08488	-21880.77435
Kadugala_Protected_Sp_7050435	7050435	1.08224	-21880.79296
Kibagala_Protected_Sp_7050436	7050436	1.08273	-21880.79361
Lusato 1 Spring_7030547	7030547	0.96024	34369597.00000
Namunyiri_7030587	7030587	0.94071	34368431.00000
Bunambale Primary School Spring_7030554	7030554	0.96287	34367836.00000
Nadenmu Spring_7030388	7030388	0.90201	34362789.00000

Bungati Cou Primary School_7030946	7030946	0.97026	34358477.00000
Shebwondye_7030540	7030540	0.87489	34354176.00000
Sikimbilo_7030968	7030968	0.91493	34338724.00000
Mumbya_7030497	7030497	0.89738	34328537.00000

It is obvious that the incorrect GPS coordinates in the database derive from a data entry error (wrong coordinate format was entered). For this input error, CME has corrected the dispenser database. The updated dispenser database and relevant evidence documents are submitted for DOE review.

The updated dispenser database and relevant evidence documents are submitted for DOE review.

Updated GPS information:

Waterpoint Name	Waterpoint ID	Latitude	Longitude
Kiwongo_Protected_Sp_7040052	7040052	1.17794	34.17280
Miwu_Sp_7040173	7040173	1.20649	34.36722
Namukuyu_Sp_7040311	7040311	1.12953	34.28611
Negugu_Sp_7040314	7040314	1.11833	34.29556
Mazuguni_7050421	7050421	1.08488	34.22556
Kadugala_Protected_Sp_7050435	7050435	1.08224	34.23083
Kibagala_Protected_Sp_7050436	7050436	1.08273	34.23083
Lusato 1 Spring_7030547	7030547	0.96024	34.36944
Namunyiri_7030587	7030587	0.94071	34.36833
Bunambale Primary School Spring_7030554	7030554	0.96287	34.37389
Nadenmu Spring_7030388	7030388	0.90201	34.36278
Bungati Cou Primary School_7030946	7030946	0.97026	34.35833
Shebwondye_7030540	7030540	0.87489	34.35417
Sikimbilo_7030968	7030968	0.91493	34.33861
Mumbya_7030497	7030497	0.89738	34.32833

1 inaccurate GPS coordinates spotted during onsite verification

During onsite verification, in total 29 out of 30 visited sites the GPS coordinates matched with an accuracy of 20 meters. Only the GPS coordinates of 1 water point (70120316) had a deviation of approximately 100 meters.

The inconsistent GPS coordinate obtained during onsite inspection derive from GPS accuracy on the phones of Evidence Action field staff. GPS accuracy is affected e.g. by weather conditions and poor GPS signals; also, GPS coordinates can vary slightly between different GPS receivers.

All water points visited during onsite inspection could still be uniquely identified using the water point name and village name, which are proof that the correct water points were visited during on-site verification.

**Documentation provided by the CME**

Updated dispenser database and relevant evidence documents for GPS coordinates	
<b>DOE assessment</b>	<b>Date:</b> 12/09/2018
<p>CCSC verification team have checked the Updated dispenser database and relevant evidence documents for GPS coordinates which were provided by CME, and confirmed the 16 dispensers coordinates in dispenser database have been corrected according to the Install forms. The GPS accuracy may be affected e.g. by weather conditions and poor GPS signals; also, GPS coordinates can vary slightly between different GPS receivers. Therefore, the GPS coordinates of water point (70120316) had a deviation of approximately 100 meters is reasonable.</p> <p>By google map, the verification team have also checked the inaccurate coordinates (0.609207443°N, 33.93968071° E) of water point (70120316) and found no other dispenser there.</p> <p>Thus, the CL-2 from this verification was closed out.</p>	

<b>CL ID</b>	<b>CL-3</b>	<b>Section no.</b>	E.3.1	<b>Date:</b> 31/08/2018
<b>Description of CL</b>				
<p>As per the included CPA-DDs, the unique dispenser ID (barcode ID) of each dispenser will also be recorded and updated in its central database.</p> <p>By the onsite inspection, the verification team confirms the barcode IDs are marked in dispenser casing. However, the barcode IDs are not included in the database provided by the CME.</p> <p>CME should also demonstrate that double counting has been avoided for each dispenser in the CPAs.</p>				
<b>CME response</b>				<b>Date:</b> 10/09/2018
<p>Barcode IDs are now included in the updated dispenser database.</p> <p>Dispenser barcodes are attached to the surface of each dispenser at the time of installation, but it is prone to damage/loss. If the barcode is missing and inspected by promoter or spot-check, the dispenser ID in the database will be marked as "missing" until the dispenser outer casing gets replaced with new barcode. Actually, it is difficult for Evidence Action to maintain and renew the barcode IDs of each dispenser considering the large amount of dispensers and the supplier's reason that could not be fully controlled by the CME and implementer. Therefore, in the dispenser database there are records of missing barcodes.</p> <p>As per the eligibility criteria to avoid double counting defined in the CPA-DDs, a unique numbering or identification system for the water purification devices disseminated is applied in dispenser database. The identification system can be the Waterpoint ID or Dispenser barcode ID. And the criterion has been validated and confirmed by the validating DOE through on-site visit and documents review.</p> <p>Since only one dispenser is dispatched to each waterpoint involved in the PoA, a waterpoint is uniquely linked to a dispenser. Each dispenser was given one unique waterpoint ID in the dispenser database at the time of dispenser installation and recorded dynamically in the central database. So the project developer adopted the waterpoint ID as the unique identification for each dispenser because the waterpoint name will not change during the CPA operation and can easily be identified using the GPS coordinates, waterpoint name, villages name and county/sub-county information and CPA information.</p> <p>In addition, all the 30 randomly selected dispensers can be correctly identified by water point ID during the onsite verification. Therefore, it can be demonstrated that no double counting occurs in the CPAs.</p> <p>For future verifications, the project implementer is considering visually marking waterpoint IDs on the backside of the case of each dispenser as unique identification.</p>				
<b>Documentation provided by the CME</b>				
Updated dispenser database				

DOE assessment	Date: 12/09/2018
<p>The verification team has checked the provided dispenser database against the randomly selected install forms, and confirmed consistent with each other. However, the verification team checked the database and found that some dispenser ID marked “missing” in the database, which was explained by the CME that the dispenser tags were lost and the updated have not been attached on time due to the supplier reason that could not be fully controlled by the CME and implementer.</p> <p>The verification team checked the onsite pictures of the dispenser ID against the database and found consistent. And as per the onsite interview of the promoters and users, and confirmed that:</p> <ol style="list-style-type: none"> <li>1) The waterpoints’ names are consistent with the database</li> <li>2) The promoters usually checked the dispenser on a daily basis</li> <li>3) Local users frequently use the dispensers.</li> </ol> <p>And then the verification team can confirm there is a one-to-one correspondence among the waterpoint ID, the dispenser installed in the waterpoint, and their GPS information. Thus, the dispenser ID is not regarded as the critical information to identify the dispenser, and it’s not the only approach to avoid double counting.</p> <p>In addition, the verification team inputted the GPS information of all the dispensers and water points into Google-My Maps, and visually confirmed there was no geographically overlap among the distributed dispensers.</p> <p>Furthermore, there are 171 dispensers marked as “missing”, which is 3.3% of the total eligible &amp; functional dispensers. And it’s below the materiality threshold of 5%, evening considering of the potential emissions due to the transportation of chlorine.</p> <p>And the CME and the implementer are considering visually marking waterpoint IDs on each dispenser as unique identification, which is reasonable and practical for the operation of the CPAs. In summary, the <u>barcode IDs are included in the database, and double counting has been avoided for each dispenser in the CPAs even</u> some dispenser ID marked “missing” in the database.</p> <p>Therefore, <b>CL-3</b> was closed out.</p>	

CL ID	CL-4	Section no.	E.3.5.1	Date: 31/08/2018
<b>Description of CL</b>				
The critical parameters, eg. Chlorine usage, POP <sub>y/p</sub> etc, involved in the baseline emissions calculation are not transparent. Necessary equations in the cells of the ER spreadsheet are required in order to reproduce the result for verification.				
<b>CME response</b>				Date: 10/09/2018
Equations and calculation process are provided for Chlorine usage, POP <sub>y/p</sub> and other calculated parameters in the updated datasheet, which is provided to the DOE.				
<b>Documentation provided by the CME</b>				
Updated chlorine usage and ER calculation spreadsheet				
<b>DOE assessment</b>				Date: 12/09/2018
CCSC verification team have confirmed that the equations and calculation process for Chlorine usage, POP <sub>y/p</sub> and other calculated parameters have been added in the Updated chlorine usage and ER calculation spreadsheet.				
Thus, the CL-4 was closed out.				

CL ID	CL-5	Section no.	E.3.5.3	Date: 04/09/2018
<b>Description of CL</b>				

The leakage indicated in the MR and the ER spreadsheet are inconsistent. The complete calculation should be included in the monitoring report.	
<b>CME response</b>	<b>Date:</b> 10/09/2018
The leakage in the MR and the ER spreadsheet is updated. The complete calculation is included in the monitoring report.	
<b>Documentation provided by the CME</b>	
Updated monitoring report Updated ER calculation spreadsheet	
<b>DOE assessment</b>	<b>Date:</b> 12/09/2018
CCSC verification team have checked leakage in the Updated monitoring report was consistent with Updated ER calculation spreadsheet, the complete calculation of leakage has been included in the updated monitoring report.  Thus, the CL-5 was closed out.	

**Table 3. CARs from this verification**

<b>CAR ID</b>	<b>CAR-1</b>	<b>Section no.</b>	<b>E.3.1</b>	<b>Date:</b> 04/09/2018
Description of CAR				
In the MR ver.01 and CPA-DDs, the CPA-9 and CPA-10 locates with southern latitude, however, as per the onsite inspection and dispenser install forms, the dispensers of CPA-9 and CPA-10 locate in the north of equator.				
<b>CME response</b>				<b>Date:</b> 10/09/2018
The southern latitudes in the CPA-DDs of CPA-9 and CPA-10 are typo. According to Google Maps and onsite GSP coordinates check, all the CPAs of Uganda are located in north of equator. The locations of CPA-9 and CPA-10 in MR has been updated to north of equator. The DDs of CPA-9 and CPA-10 will be updated before or during the next verification.				
<b>Documentation provided by the CME</b>				
Google map showing the location of the Uganda project				
<b>DOE assessment</b>				<b>Date:</b> 12/09/2018
As per the onsite inspection and dispenser install forms, the dispensers of CPA-9 and CPA-10 locate in the north of equator. CME has provided the updated MR according to the on-site GSP coordinates inspection and Google Maps. And the CME will correct the locations of CPA-9 and CPA-10 DDs before or during the next verification as per the requirement of PS-PoA Ver.01, CCSC verification team raised a FAR towards the problem before or during the next verification.  Therefore, the CAR-1 was closed out.				

<b>CAR ID</b>	<b>CAR-2</b>	<b>Section no.</b>	<b>E.3.4.1</b>	<b>Date:</b> 20/12/2018
Description of CAR				
As per the applied methodology AMS-III.AV. Ver.03 and included CPA-DDs, Situation Case 1 or Case 2 for each CPA shall be reassessed at the beginning of each crediting period. And it's the first monitoring period for CPA-9/10/21/22, however, the situations have not been reassessed in the monitoring report.				
<b>CME response</b>				<b>Date:</b> 25/12/2018



According to the registered CPA DDs, the application of Case 1 or Case 2 should be re-assessed at the beginning of each crediting period. The CME has checked the most recent public data available and found the data of "Water Supply Atlas 2010" was not updated at the beginning of the crediting period for CPA 9 (13/09/2016), CPA10(13/09/2016), CPA21(01/02/2017) and CPA22(01/02/2017). Therefore, the Case 1 or Case 2 for CPA 9/10/ 21/22 remains the same without any update.

Documentation provided by the CME

Updated monitoring report, Uganda Water Atlas data 2017

DOE assessment

Date: 26/12/2018

The description on the reassessment for case1/2 in the updated MR has been reviewed by the verification team.

The verification team has checked the latest Water Atlas data 2017 issued in June 2017, and confirmed the data in 2010 were still valid for the CPAs and will not be updated, because the beginning of each crediting period of all CPA-DDs were before the issuance of Water Atlas data 2017.

Therefore, the CAR-2 was closed out.

CL ID	CAR-3	Section no.	E.3.4.2	Date: 04/09/2018
<b>Description of CAR</b>				
<ol style="list-style-type: none"> <li>1) <u>The monitoring frequency for parameters <math>N_y</math> is absent in the monitoring report. And the monitoring frequency for water quality is inconsistent with requirements described in included CPA-DDs.</u></li> <li>2) <u>The survey for parameters of Drink% and water quality of the CPAs has been conducted during Oct.2017 to Nov.2017. And as per the included CPA-DDs, the survey frequency is annual. Please clarify the rationality that the results obtained between October and November 2017 can be applied for the entire monitoring period (01/06/2016 to 31/12/2017) for CPA-2 and CPA-3, and also for newly included CPAs (CPA-9, 10, 21, 22).</u></li> <li>3) <u>As per the monitoring plan of 5962-0008 (CPA-9), the parameter of <math>POP_y</math> should be monitored annually. However, it is stated in the MR that "Number of persons supplied with purified water from each chlorine dispenser (<math>POP_y</math>) of Case 2 CPAs (CPA-9 and CPA-22) should be checked once every two years".</u></li> </ol>				
<b>CME response</b>				<b>Date: 25/12/2018</b>
<ol style="list-style-type: none"> <li>1) The monitoring frequency for parameters <math>N_y</math> and water quality is revised in the updated monitoring report. And the survey dates were also included.</li> <li>2) For CPA-2, CPA-3, CPA-9 and CPA-10, Evidence Action has performed monitoring survey for Drink% and water quality before Oct/Nov 2017. However, the DOE's verification of the 2<sup>nd</sup> and 3<sup>rd</sup> monitoring period revealed some issues with the implementation of the monitoring plan (see Remaining-FAR-1). Consequently, Evidence Action has decided to ensure compliance with the registered monitoring plan.  <b>A.</b> For CPA-2/3, the CME has applied the "General guidelines for SSC CDM methodologies version 22.1" (hereafter referred to as SSC-guideline) to demonstrate the monitoring validity.</li> </ol>				
Applicability requirements in the SSC Guideline			Justification for <b>CPA-2 and CPA-3</b>	

Small-scale project activities (PAs) and component project activities (CPAs) solely comprising distributed units, to estimate parameter values required by the methodologies. Distributed units, in the context of monitoring surveys, are units of size equal to or below one per cent of Small-Scale CDM threshold (e.g. 150 kW of installed capacity for type I PAs/CPAs, 600 MWh of energy savings for type II PAs/CPAs and 600 tCO <sub>2</sub> of emission reductions for type III PAs/CPAs);	Yes  CPA-2 and CPA-3 are small -scale CPAs with distributed units below one per cent of Small-Scale CDM threshold (e.g. 600 tCO <sub>2</sub> of emission reductions for type III CPAs);
The requirements in this document do not overrule any provisions in the approved methodologies (for example, methodology AMS-III.AR. version 4.0 allows, under certain conditions, project activities for distribution of LED lamps to claim emission reductions for a maximum of two years without a survey). The simplified requirements described under section 4.8.2 are applicable only if the applied methodology allows for biennial monitoring. If coordinating/managing entities or project participants choose to switch from annual monitoring to biennial monitoring to apply the provisions in the guidelines, the confidence/precision requirements of biennial monitoring stipulated in the applied methodology should be met, i.e. survey results show the confidence/precision of 95/10 (or 95/5 if it is specified in the applied methodology).	Yes  According to paragraph 10 of the Methodology AMS III. AV. Version 03.0, the monitoring allows that "Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial)". However, the CME choose to apply annual monitoring of Drink% and the survey results in MR show the confidence/precision of 95/10 in line with the adopted methodology and registered CPA DDs.
To apply these simplified requirements, PAs/CPAs shall not have more than 24 months gap between consecutive surveys, and shall implement their first survey within 24 months of the implementation of the first unit of the PA/CPA.	Yes  The former survey was conducted from Oct.2015 to May.2016, and the latest survey was done during Oct.-No.2017. Thus, the gap between the consecutive surveys are less than 24 months.
In case that the registered monitoring plan has not included biennial option, a post-registration change would be required to include it in the monitoring plan.	Yes  The option of biennial survey has been included in updated CPA-DDs version 06 for CPA-2/3, which has been assessed by CCSC and the notification of changes has been submitted to secretariat as per PCP Ver.02.0.

Since both values of parameter of Drink% and water quality in previous survey in 3<sup>rd</sup> monitoring period were lower than 50%, which means less than 50% dispensers can provide safe drinking water, i.e. less than 50% of the distributed units are functional. Thus, the surveys did NOT satisfy the conditions in paragraph 27 of SSC-Guideline.

Therefore, the CME adopted the result obtained from the surveys started from 19/10/2017 for the period from 01/06/2016 to 19/10/2017 referring to Para.30 and the first figure in Figure 2 of the SSC-Guideline.

For no eligible survey could cover the period from 20/10/2017 to 31/12/2017 (73-day), the values of parameter Drink% and water quality are conservatively assumed to be 0%. As a result, a deduction factor of 87.39% (= (579-73)/579) was introduced in the ER calculation for CPA-2/3.

**B. The survey for parameters of Drink% and water quality of the CPAs has been conducted during Oct.2017 to Nov.2017, and the survey validity can cover the period of 2017.**

Because no eligible survey could cover the period from 13/09/2016 to 31/12/2016 (110-day) for CPA-9 and CPA-10, the values of parameter Drink% and water quality are conservatively assumed to be 0 during this period.

Therefore, a deduction factor of 76.84% ( $= (475-110)/475$ ) was introduced in the ER calculation for CPA-9/10.

- C.** For CPA-21 and CPA-22, of which the start of monitoring period is 01/02/2017, the survey performed in 2017 is in line with the annual monitoring requirement.

Therefore, the survey in October and November 2017 can be adopted for the relevant periods for the CPAs.

- 3) The monitoring frequency of POP<sub>y</sub> for CPA-9 is revised to annual in the updated MR.

Since the PCC survey conducted in November and December 2017 could not cover the entire monitoring period, the CME decided to adopt 0 for POP<sub>y</sub> for CPA-9 during period of 13/09/2016 to 31/12/2016 (110-day).

And the PCC survey is valid for the period of 2017.

#### Documentation provided by the CME

Updated monitoring report, Updated ER calculation sheet

#### DOE assessment

**Date:** 26/12/2018

- 1) CCSC verification team have checked the updated MR and confirmed that the monitoring frequency for parameters N<sub>y</sub> has been added in updated MR. The monitoring frequency for parameters N<sub>y</sub> and water quality is consistent with requirements described in included CPA-DDs.
- 2) For CPA-2 and CPA-3, as remaining FAR on intended use for drinking which will influence the claimed emission reductions, so the CME has conducted the survey between Oct. and Nov 2017.

Considering the validity of survey, the verification team has reviewed CME's response as per the SSC guideline.

- A.** For CPA-2/3, the team confirms it complied with the applicability condition of the simplified requirements for validity of monitoring surveys against the section 4.8.1 of SSC-guideline.

Considering the statistical concept of both parameters, the verification team regards less than 50% dispensers can provide safe drinking water, i.e. less than 50% of the distributed units are functional. And then the surveys did not satisfy the conditions in paragraph 27 of SSC-Guideline.

It's reasonable for CME to apply the survey result for the period of 01/06/2016 -19/10/2017. And for period of 20/10/2017-31/12/2017, the CME conservatively assumed the values of parameter Drink% and water quality are 0%. The verification team checked the deduction factor of 87.39% in the ER calculation for CPA-2/3 was reasonable.

- B.** For CPA-9/10, the survey conducted since 19/10/2017 is insufficient to cover the entire 4<sup>th</sup> monitoring period.

For the period of 01/01/2017 to 31/12/2017, it's reasonable for the CME to apply its survey results. And for the period of 13/09/2016 to 31/12/2016, the CME voluntarily assumed the values of parameter Drink% and water quality to be 0, which is consider to be conservative. The verification team checked the deduction factor of 76.84% in the ER calculation for CPA-9/10 was reasonable.

In summary, the approaches for CPA-9/10 are reasonable and can ensure the parameters has been monitored annually.

- C.** For CPA-21/22, both CPAs started since 01/02/2017, and the survey happened in October and November 2017. The monitoring frequency complied with the requirement of monitoring plan.

In summary, considering the deduction factors, the results of the survey in October and November 2017 are rational for the 4<sup>th</sup> monitoring period (01/06/2016 to 31/12/2017) for the CPA-2, CPA-3, CPA-9, CPA-10, CPA-21 and CPA-22.

- 3) The monitoring frequency of POP<sub>y</sub> for CPA-9 in the MR has been revised as per the included CPA-DD.

It's reasonable for the CME to adopt the PCC value for the period of 01/01/2017 to 31/12/2017. And towards the period of 13/09/2016 to 31/12/2016, the CME voluntarily assumed the value of parameter as 0, which is considered to be conservative.

Considering the deduction factor of 76.84% has already been taken into account for CPA-9/10 in ER calculation, the problem of monitoring frequency of POP<sub>y</sub> could be simultaneously eliminated by the deduction factor.

Therefore, the **CAR-3** was closed out.

CAR ID	CAR-4	Section no.	E.3.4.2	Date: 08/12/2018
<b>Description of CAR</b>				
The number of eligible & functional dispenser (N <sub>y</sub> ) for CPA-9 in the Dispenser Database is 1,081, however, it's 1,082 in ER spreadsheet.				
<b>CME response</b>				<b>Date: 10/12/2018</b>
One non-eligible dispenser was incorrectly marked as the "non-functional", and it was removed from the Chlorine usage database. And the chlorine usage for CPA-9 was changed from 10,214 jerricans to 10,202 jerricans.				
<b>Documentation provided by the CME</b>				
Updated the ER calculation spreadsheet				
Updated monitoring report				
Updated Chlorine usage database				
<b>DOE assessment</b>				<b>Date: 10/12/2018</b>
The verification team has checked the revised MR against the database of dispenser, chlorine usage, and ER spreadsheet, and found the dispenser number and chlorine usage amount have been correct and unified in different databases.				
Thus, the CAR-4 was closed out.				

CAR ID	CAR-5	Section no.	E.3.4.2	Date: 31/08/2018			
Description of CAR							
1) By checking the Chlorine Usage Data and Calculation spreadsheet, it is found that the chlorine used (column Q) by dispensers marked “non-functional” (column B) were taken into the account in the calculation, which was incorrect.							
2) The verification team calculated and compared the data as follows:							
Items		CPA-2	CPA-3	CPA-9	CPA-10	CPA-21	CPA-22
Refill#		15.3	13.22	9.54	11.29	7.7	8.27
HH#		40.4	32.2	36.3	46.1	44.8	46.9

Operation Days	579	579	475	475	334	334
Chlorine usage(ml)/HH#/day	3.3	3.5	2.8	2.6	2.6	2.6

Please clarify the chlorine usage difference among the CPAs.

**CME response****Date:** 10/09/2018

- 1) CME corrected the calculation error and updated the ER spreadsheet and MR accordingly. The corrected values are shown as below:

Items	CPA-2	CPA-3	CPA-9	CPA-10	CPA-21	CPA-22
Refill#	14.69	12.52	9.44	11.19	7.16	7.83
HH#	40.4	32.2	36.3	46.1	44.8	46.9
Operation Days	579	579	475	475	334	334
Chlorine usage(ml)/HH#/day	3.1	3.4	2.7	2.6	2.4	2.5

- 2) Based on the updated value of daily chlorine usage per household the average value is 2.8 with a maximal deviation of +/- 20%. This is deemed to be a reasonable deviation when considering the difficult circumstances of monitoring a relatively big decentralized community-based project in rural Africa.

Furthermore, the chlorine usage (ml/HH/day) can fluctuate because of:

- d) Household size might vary between CPAs. The DDs are adopting a fixed household size for all the CPAs (average for rural Uganda); however, the actual household sizes vary slightly between CPAs.
- e) The use of dispensers becomes more regular for the CPAs operations longer in the community. In the newer areas for CPA operation, the usage could be lower. CPA 2 and 3 usage are the highest because the influence of knowledge levels about the dispenser usage in the nearby municipality is higher in this area.
- f) Different geographical and environmental conditions. Some of the CPAs are located in mountainous area, and some are located in flat planes. The environment and living habits vary slightly from area to area, which leads to variance of chlorine consumption between CPAs.

Therefore, the variance of the chlorine usage between CPAs is considered reasonable.

**Documentation provided by the CME**

Updated the ER calculation spreadsheet

Updated monitoring report

**DOE assessment****Date:** 12/09/2018

CCSC have checked the updated ER calculation spreadsheet and updated MR provided by CME, confirmed that:

- 1) The CME have corrected the results of Refill# and Chlorine usage (ml)/HH#/day and the verification team has checked the Chlorine Deliver Records /23/ and the Chlorine Usage Data and Calculation /36/, and found the value of Refill# was calculated correctly.
- 2) Because of the different circumstances (e.g, Household size might vary between CPAs; Different geographical and environmental conditions; Knowledge level of the dispenser usage), the variance of the chlorine usage between CPAs is considered reasonable

Thus, the CAR-5 was closed out.

<b>CAR ID</b>	<b>CAR-6</b>	<b>Section no.</b>	E.3.4.2	<b>Date:</b> 10/12/2018
<b>Description of CAR</b>				
<p>1) It is stated a total of 854 randomly selected promoters were interviewed for parameter of Refill%, however, there are actually 853 interviewees and records in the raw data of the survey. The result and its confidence/precision should be re-calculated accordingly.</p> <p>2) <u>The monitoring frequency for parameter Refill% should be annual as per the CPA-DDs. And during this monitoring period, the promoter surveys were collected every month and the results have been consolidated into one single value for this monitoring period with 18 months in total.</u></p>				
<b>CME response</b>				<b>Date:</b> 28/12/2018
<p>1) The error of refill% was corrected and its confidence/precision are re-calculated accordingly. The correction of the error has no impact on the reliability of refill%. The updated refill% calculator is provided to DOE.</p> <p>2) The values of refill% during this monitoring period has been re-calculated separately for 2016 and 2017, which are 99.446% and 99.797% with precisions of 0.7% and 0.4% respectively. The weighted average value is 99.67% (i.e. <math>(99.446\% \times 7 + 99.797\% \times 12) / 19</math>), however, for CPA-9/10/21/22, their weighted average value will be higher. Therefore, to be conservative, the former value of 99.64% is kept in the ER calculation for all the CPAs.</p>				
<b>Documentation provided by the CME</b>				
5962_Refill% UG MP#4_ver02				
<b>DOE assessment</b>				<b>Date:</b> 03/01/2019
<p>The verification team checked the revised number of promoters interviewed and updated confidence/precision and confirmed it has been corrected and the value of confidence/precision is not changed.</p> <p>The verification team has checked the updated calculation and corresponding precisions and confirmed the values of Refill% in 2016 and 2017 were calculated correctly as per the monitoring plans. And the team also confirmed the adopted value of 99.64% for the monitoring period could be most conservative in the ER calculation.</p> <p>Thus, the CAR-6 was closed out.</p>				

<b>CAR ID</b>	<b>CAR-7</b>	<b>Section no.</b>	E.3.4.2	<b>Date:</b> 31/08/2018
<b>Description of CAR</b>				
<p>In order to check the value of Fraction of water treated with the dispenser that is actually drunk (Drink%), CCSC verification team applied acceptance sampling as per the Standard of Sampling and surveys for CDM project activities and programmes of activities Ver.07.0.</p> <p>1) In the DOE survey, 12 responses out of 62 could not reach average value of CME sample (99.33%), i.e. CCSC verification team observed greater discrepant records for Drink% than thresholds (2/62). Therefore, the CME's set of records is not accepted.</p> <p>2) In the CME survey, it is found that one interviewee in CPA-22 (waterpoint ID: 70120316) used none (0%) chlorinated water for drinking, however, the primary use for his household was recorded as drinking. Please clarify the contradiction between the answers.</p>				
<b>CME response</b>				<b>Date:</b> 10/09/2018
<p>1) The discrepancy between the CCSC verification team and CME survey can be explained as follows:</p>				

Time of the survey is different. Drink% survey performed by Evidence Action happened in the end of 2017; however, the verification on-site survey was performed in August 2018; since the survey time is changed (around 9 months' difference), the survey result may not be exactly the same.

The number of survey samples is different. CME has conducted a survey including 702 households (Drink% = 99.3%), whereas the survey performed during the onsite verification only covered 62 households (Drink% = 96.1%). Even then, the difference in the results is relatively small (approximately 3%).

To justify the CME survey data, CME has adopted a T-test method to demonstrate that the results obtained in the two surveys are not significantly different. Result are as follows: (Drink% C = CME and Drink% D = DOE)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Drink% C	14	.9933002	.0029677	.0111041	.9868888	.9997115
Drink% D	30	.9608333	.0120275	.0658771	.9362344	.9854323
combined	44	.9711637	.0085255	.0565519	.9539703	.988357
diff		.0324668	.0178303		-.0035162	.0684499
diff = mean(Drink% C) - mean(Drink% D)				t =	1.8209	
Ho: diff = 0				degrees of freedom =	42	
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.9621		Pr( T  >  t ) = 0.0758		Pr(T > t) = 0.0379		

The T-test indicates that the means are the same with a significance level of 7.6%, which is higher than the commonly used significance level of <5% to demonstrate a significant difference between two datasets. Therefore, the CME argues that the DOE's results actually confirm the CME's survey results.

However, for the consideration of conservativeness, the result of DOE's survey on Drink%, i.e. 96.1% is adopted for this monitoring period.

## 2) During the CME's Drink% survey,

In the survey the household responded to mainly use chlorinated water for drinking purpose; however, there was a data entry error for Drink% in the ODK App which showed 408%. For conservativeness, CME put Drink% = 0% for this specific survey result instead of 408%.

### Documentation provided by the CME

Updated ER calculation spreadsheet

Updated monitoring report

### DOE assessment

Date: 12/09/2018

CCSC have checked the updated ER calculation spreadsheet and updated MR provided by CME, confirmed that:

In the DOE sampling for parameter of Drink%, 16 clusters out of the CME's sampling have been selected, i.e. no result from respondents could be found correspondingly in CME's sampling. Furthermore, some of the respondents could not be found in the other 14 clusters sampling result of CME because that the respondents from the same household are different persons between CME sampling and DOE sampling, or the households moved around the water points.

And due to the characteristic of the parameter, it may be not reasonable to take average value of 99.33% to justify the threshold for acceptance sampling.

The verification team has repeated the T-test for the two surveys and confirmed the two results showed no significant difference. However, for the consideration of conservativeness, the Drink%=96.1% is adopted for this monitoring period.

Therefore, the value of 96.1% for drink% is reliable and conservative.

In the CCSC verification onsite survey, the chlorinated water was mainly used for drinking. CCSC have checked the ODK App which showed Drinking%=408% for one user, therefore, CME put Drink% = 0% for this specific survey result instead of 408% is more conservativeness.

Thus, the **CAR-7** was closed out.

CAR ID	CAR-8	Section no.	E.3.4.2	Date: 31/08/2018
<b>Description of CAR</b>				
<p>In order to crosscheck the water quality for the chlorine treated drinking water, CCSC verification team applied acceptance sampling as per the Standard of Sampling and surveys for CDM project activities and programmes of activities Ver.07.0.</p> <p>In the survey, 5 out of 29 water samples could not reach average value of CME sample (100%), i.e. CCSC verification team observed greater discrepant records for WQ than thresholds (1/28). Therefore, the CME's set of records is not accepted.</p>				
<b>CME response</b>				<b>Date: 10/09/2018</b>
<p>The discrepancy can come up due to the following reasons:</p> <ol style="list-style-type: none"> <li>Potential hygiene risks during water collection and handling. During the onsite verification, the water samples may have been cross-contaminated. It was observed that a big crowd of local people was attracted by the survey team and gathered mainly around the EA field officer who was in charge of processing the water samples. Unlike during the monitoring survey in 2017, the EA field officer was not able to fully control the collection of the water sample. At times several people were holding the cup of drinking water close to their nose and face and some of them trying to identify the chlorine smell of the water; all of which pose a higher risks of sample cross-contamination during water sample collection than during the standard process.</li> <li>Potential cross-contamination during transport and E. coli testing. It should be noted that all of the four (4) positive results for E. coli were obtained from TCR positive water samples, which means that these drinking water samples were indeed chlorinated. However, the sampling container (Whirl-Pak®) contains a tablet of sodium thiosulfate which deactivates the disinfection capacity of any remaining chlorine in the water sample. Thus, after sample collection the water samples are prone to re-contamination. One (1) of the E. coli positive results showed very high TCR, i.e. 2.6 ppm. E. coli is very unlikely to survive in such a high TCR concentration. The positive result indicates cross-contamination post-collection e.g. during processing the E. coli test.</li> <li>Regrowth of <i>E. coli</i> during transport. During transport water samples should be kept at 4°C and processed within 6 hours to prevent regrowth of micro-organisms. As the field visits during the verification exceeded the 6 hours threshold, there is a chance that <i>E. coli</i> multiplied in the sampling containers (as the chlorine was deactivated). Note that three of the non-compliant water samples were amongst the first four collected in the morning of 22/08/2018 and their transport/storage time exceeded 6 hours (7020680, 7020894 and 7040188).</li> <li>The water sample collected from water point (ID 7050048) was tested with chlorine negative during verification, which means the chlorine already expired at the time of sample collection. The household who provided the sample also confirmed that the water had already been kept about 2-4 days though it was clearly educated by Evidence Action that the chlorine only effective in the water for 2-3 days after dosing.</li> </ol> <p>However, to eliminate the bias/error between the CME sample and DOE sample, the result of DOE's survey on WQ is considered as a correction factor for CME's result, i.e. 82.75% (=CME result*correction factor=100*24/29) is adopted for this monitoring period.</p>				



<b>Documentation provided by the CME</b>	
Updated ER calculation spreadsheet	
Updated monitoring report	
<b>DOE assessment</b>	<b>Date:</b> 12/09/2018
<p>Applying the acceptance sampling during on-site inspection, the DOE rejected the result of the CME as per the Para.32 of the sampling standard. However, the DOE sample shows more than 80% of the users can be ensured to get the safe drinking water. And CME may not operate strictly following the water quality testing protocol, which caused cross-contamination. resulting in a series of unexplained phenomena. Based on verification team's experience, if the TCR is 0.3~0.5mg/L, the E.Coli will be lower than 2CFU/100ml. But for water point ID 7020894, its TCR is 2.6 mg/L, but the E. coli colonies/100ml is 39.</p> <p>Subsequently, the verification team regards the CME's response is possible. To eliminate the bias between the CME sample and DOE sample, a <b>correction factor</b> has been involved in the calculation. The factor of 82.75% (=24/29) is considered reasonable.</p> <p>Thus, the water quality applied in the ER calculation is 82.75% (=100%*82.75%).</p> <p>Therefore, the CCSC verification team regards the process of correction factor to water quality is reasonable, and the bias between CME sample and DOE sample is deem eliminated. And the updated value of water quality is reprehensive to the whole group.</p> <p>Thus, the <b>CAR-8</b> was closed out.</p>	

Table 4. FARs from this verification

<b>FAR ID</b>	<b>FAR-1</b>	<b>Section No.</b>	E.3.1	<b>Date:</b> 10/09/2018
<b>Description of FAR</b>				
In the MR ver.01 and CPA-DDs, the CPA-9 and CPA-10 locates with southern latitude, however, as per the onsite inspection and dispenser install forms, the dispensers of CPA-9 and CPA-10 locate in the north of equator. The CME is required to correct the CPA-DDs before or during the next verification as per the requirement of PS-PoA Ver.01.				
<b>CME response</b>				<b>Date:</b> 10/09/2018
The DDs of CPA-9 and 10 will be updated before or during the next verification.				
<b>Documentation provided by the CME</b>				
Updated MR				
<b>DOE assessment</b>				<b>Date:</b> /
/				

<b>FAR ID</b>	<b>FAR-2</b>	<b>Section No.</b>	E.3.4.4	<b>Date:</b> 04/09/2018
<b>Description of FAR</b>				
<p>During the operation period of the dispensers, no calibration for valves has been performed by the implementer, because that the volume of one turn of the valve has been guaranteed by its manufacture.</p> <p>However, during onsite inspection, it is observed that two dispensers' valves (waterpoint ID: 7031064, 70110084) were not able to dose 3ml chlorine solution properly in one turn. The CME/implementer is required to conduct the valve calibration on a sample basis in next monitoring period.</p>				

And, since the malfunction of the two dispensers is not observed within the fourth monitoring period, both of them are required to be marked as “non-function” in next monitoring period.	
<b>CME response</b>	<b>Date:</b> 10/09/2018
<p>According to the specification of the valves, 3ml of chlorine solution will be dosed in one turn.</p> <p>Though the two dispensers were not able to properly dose 3ml of chlorine solution in one turn, both samples collected from households using these dispensers showed positive TCR during on-site verification; in addition, the water quality tests showed negative results for E.coli (&lt; 1 MPN/100 ml), and are thus compliant with the WQ threshold.</p> <p>To be conservative, the emission reductions from the two dispensers (waterpoint ID: 7031064, 70110084) will not be claimed for the 5<sup>th</sup> monitoring period.</p> <p>In the future, the monitoring of functionality spot-checks will be improved. The project implementer will explore feasible ways to check proper chlorine dosage.</p>	
<b>Documentation provided by the CME</b>	
Specification of the valves	
<b>DOE assessment</b>	<b>Date:</b> /
/	

## Response to Incomplete during Information and Report Check

<b>ID</b>	<b>Issue-1</b>	<b>Date: 15/11/2018</b>																																	
<b>Description of Issue</b>																																			
<p>AMS-III.AV ver. 03 paragraph 3:</p> <p>The applied methodology (AMS-III.AV ver. 03 paragraph 3) allows project activities to be implemented either under either Case 1 or Case 2 (i.e. the percentage of population using improved drinking water). It is noted that CPA0003 is implemented following Case 1 whereas CPA0008 follows Case 2. The CME/DOE shall clarify how the Case allocation was determined considering that the two CPAs (CPA0003/0008) are located in the same district (i.e. Mbale District).</p>																																			
<b>CME and/or DOE Response</b>		<b>Date: 10/12/2018</b>																																	
<p>1) The information on how to justify the percentage of population using improved drinking water has been transparently described on Section A.7 of corresponding CPA-DDs for CPA-3 and CPA-9, and have been validated and confirmed by validation DOE.</p> <p>The CCSC verification team has reviewed the validation reports and CPA-DDs, and concluded that the physical project boundaries of the CPAs are identified by sub-counties instead of districts. Therefore, although some CPAs such as CPA0003/0008 are located in the same district, (i.e. Mbale District), they still located in different geographic areas (i.e. sub-counties).</p> <p>The location of the six CPAs are listed as below according to the registered CPA DDs:</p> <table border="1"> <thead> <tr> <th>CPA</th><th>District</th><th>Sub-counties</th></tr> </thead> <tbody> <tr> <td rowspan="3">5962-0002 (CPA2)</td><td>Budaka</td><td>All sub-counties</td></tr> <tr> <td>Kibuku</td><td>All sub-counties</td></tr> <tr> <td>Manafwa</td><td>Tsekukulu, Mukoto, Buwabala, Bukhabusi, Bukhaweka, Bupoto, Namabaya, Bumbu and Bukhoko</td></tr> <tr> <td rowspan="2">5962-0003 (CPA3)</td><td>Manafwa</td><td>Bubutu, Bukiabi, Bumwoni, Lwakhakha TC, Magale, Namboko, Bugobero, Bukhofu, Bukhusu, Bunabwana, Busukuya, Butiru, Butta, Buwagogo, Kaato, Khabutoola, Manafwa TC, Nalondo, Sibanga, Sisuni and Wesswa</td></tr> <tr> <td>Mbale</td><td>Bubyangi, Bufumbo, Bukhiende, Lukhonge, Busiu, Bumasikye, Busoba, Nyondo and Busano</td></tr> <tr> <td rowspan="2">5962-0008 (CPA9)</td><td>Mbale</td><td>All sub-counties of Bungokho North and Bungokho South counties.</td></tr> <tr> <td>Sironko</td><td>All sub-counties of Budadiri East and Budadiri West counties.</td></tr> <tr> <td>5962-0009 (CPA10)</td><td>Pallisa</td><td>All sub-counties of Agule, Pallisa and Butebo counties.</td></tr> <tr> <td rowspan="2">5962-0017 (CPA21)</td><td>Butaleja</td><td>All sub-counties of Bunyole East and Bunyole West counties.</td></tr> <tr> <td>Namutumba</td><td>All sub-counties of Busiki county.</td></tr> <tr> <td rowspan="2">5962-0018 (CPA22)</td><td>Busia</td><td>All sub-counties of Samia North county.</td></tr> <tr> <td>Tororo</td><td>All sub-counties of Tororo, West Budama North, and West Budama South counties.</td></tr> </tbody> </table>			CPA	District	Sub-counties	5962-0002 (CPA2)	Budaka	All sub-counties	Kibuku	All sub-counties	Manafwa	Tsekukulu, Mukoto, Buwabala, Bukhabusi, Bukhaweka, Bupoto, Namabaya, Bumbu and Bukhoko	5962-0003 (CPA3)	Manafwa	Bubutu, Bukiabi, Bumwoni, Lwakhakha TC, Magale, Namboko, Bugobero, Bukhofu, Bukhusu, Bunabwana, Busukuya, Butiru, Butta, Buwagogo, Kaato, Khabutoola, Manafwa TC, Nalondo, Sibanga, Sisuni and Wesswa	Mbale	Bubyangi, Bufumbo, Bukhiende, Lukhonge, Busiu, Bumasikye, Busoba, Nyondo and Busano	5962-0008 (CPA9)	Mbale	All sub-counties of Bungokho North and Bungokho South counties.	Sironko	All sub-counties of Budadiri East and Budadiri West counties.	5962-0009 (CPA10)	Pallisa	All sub-counties of Agule, Pallisa and Butebo counties.	5962-0017 (CPA21)	Butaleja	All sub-counties of Bunyole East and Bunyole West counties.	Namutumba	All sub-counties of Busiki county.	5962-0018 (CPA22)	Busia	All sub-counties of Samia North county.	Tororo	All sub-counties of Tororo, West Budama North, and West Budama South counties.
CPA	District	Sub-counties																																	
5962-0002 (CPA2)	Budaka	All sub-counties																																	
	Kibuku	All sub-counties																																	
	Manafwa	Tsekukulu, Mukoto, Buwabala, Bukhabusi, Bukhaweka, Bupoto, Namabaya, Bumbu and Bukhoko																																	
5962-0003 (CPA3)	Manafwa	Bubutu, Bukiabi, Bumwoni, Lwakhakha TC, Magale, Namboko, Bugobero, Bukhofu, Bukhusu, Bunabwana, Busukuya, Butiru, Butta, Buwagogo, Kaato, Khabutoola, Manafwa TC, Nalondo, Sibanga, Sisuni and Wesswa																																	
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5962-0008 (CPA9)	Mbale	All sub-counties of Bungokho North and Bungokho South counties.																																	
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- 2) And the data were based on the data of sub-counties sourced from “Water Atlas data” 2010. The information has already been validated by the DOEs before CPA inclusion.

For each district, there is a statistic of access of population using improved drinking water (PoP<sub>idw</sub>) at subcounty level in “Water Atlas data” 2010 which were published by Ministry of Water & Environment of Uganda. The overall PoP<sub>idw</sub> for each CPA was re-calculated based on subcounty level data. Therefore, though some CPAs are located in the same district, the calculation result of PoP<sub>idw</sub> is different.

Furthermore, the verification team has checked the latest Water Atlas data 2017 issued in June 2017, and confirmed the data in 2010 were valid for the CPAs and will not be updated since the beginning of each crediting period of all CPA-DDs were before the issuance of Water Atlas data 2017.

ID	Issue-2	Date: 15/11/2018
<b>Description of Issue</b>		
<p>Sampling and surveys for CDM project activities and programmes of activities ver. 07, paragraphs 13 and 24 (a):</p> <p>For the parameters “water quality and Drink%”:</p> <p>i. The water quality was checked by collecting water samples from households who use the programme dispensers for water purification. It is noted that the sample size of 702 households selected by the CME covered only 14 water points out of the possible 5,476 water points. The parameter “Drink%” was also sampled from the same 702 households. The DOE shall provide information on how it verified that the selected sample size for the “water quality and Drink%” was sufficient and representative of the total water points population;</p> <p>ii. The monitoring report does not indicate the dates when the sampling surveys for the parameters “water quality and Drink%” were conducted.</p>		
<b>CME and/or DOE Response</b>		<b>Date: 10/12/2018</b>
<p>I. In the survey of water quality and Drink% in Uganda, grouped cluster sampling approach has been applied as per each CPA-DDs.</p> <p>As per the Guideline: Sampling and surveys for CDM project activities and programmes of activities (hereafter referred to as sampling guideline, Ver.04), the sample size of 12 (cluster) for cluster sampling has been determined as the first step in WQ and Drink% Spreadsheet.</p> <p>The verification team has checked the values of total number of clusters (water points), average proportion or cluster mean, and Variance between clusters (villages) contained in the WQT Drink% spreadsheet and confirmed consistent with the CPA-DDs, and the confidence/precision level of 95/10 were inputted in the calculation as required by the standard of sampling.</p> <p>In the survey, 14 clusters/water points were randomly sampled among the 5,476 water points, and it's more than the minimum number of sample size 12 calculated as per the guideline.</p> <p>As described in the verification report (Section E.3.4.3), the verification team reviewed the documents for WQT and Drink% survey against the PCC records, and interviewed the users in CCSC field survey against the PCC records, and then confirmed that the records were consistent with each other, and all the households (702 households) around the 14 dispensers have been surveyed, which complied with requirement about cluster sampling as per the Para.16 of the sampling guideline.</p>		

In step 2-Reliability Calculation, the relative precisions of the surveys are calculated as 0.0% (water quality) and 0.6% (Drink%), lower than the threshold of 10%, i.e. the data are within the required precisions.

In summary, the cluster sampling approach has been correctly adopted in the survey, and the CCSC verification team can concluded that the 14 randomly sampled water points are sufficient and representative of the total population using the dispensers.

The dates of sampling surveys for the parameters “water quality and Drink%” have been added in the updated MR.

ID	Issue-3	Date: 15/11/2018
<b>Description of Issue</b>		
<p>General guidelines for SSC CDM methodologies version 22.1, paragraphs 27 and 30 (b):</p> <p>The monitoring surveys were conducted in Oct/Nov 2017 for the current monitoring period 01/06/16-31/12/17. The DOE shall provide information on how it considered:</p> <p>i. The validity of the survey results for CPA0002/0003 with operational dates 01/06/16-31/12/17 (refer to the General guidelines for SSC CDM methodologies version 22.1, paragraph 27 which requires that survey results for monitoring period can only be used up to 12 months after the date of survey).</p> <p>ii. Raising FAR-3 regarding CPA0008/0009 to adjust the emissions reductions during the next monitoring period appropriate instead of adjusting for the current monitoring period (please refer to the General guidelines for SSC CDM methodologies version 22.1 paragraph 30 (b)) which requires that survey results beyond 12 months cannot be used to quantify emission reductions).</p>		
<b>CME and/or DOE Response</b>		<b>Date: 10/12/2018</b>
<p>I. The applicability conditions of General guidelines for SSC CDM methodologies Ver.22.1 (hereafter refer to SSC-Guideline) has been analyzed for the surveys in CPA-2/3 and CPA-9/10 respectively in the updated Verification Report.</p> <p>For CPA-2/3, it complies with the section 4.8.1 of SSC-Guideline.</p> <p>Since both values of parameter of Drink% and water quality in previous survey in 3<sup>rd</sup> monitoring period were lower than 50%. Considering the statistical concept of both parameters, the verification team regards less than 50% dispensers can provide safe drinking water, i.e. less than 50% of the distributed units are functional. Thus, the surveys did <b>NOT</b> satisfy the conditions in paragraph 27 of SSC-Guideline.</p> <p>Therefore, the CME adopted the result obtained from the surveys started from 19/10/2017 for the period from 01/06/2016 to 19/10/2017 referring to para.30 and the first figure in Figure 2 of the SSC-Guideline.</p> <p>By onsite inspection and document review, the verification team can conclude the dispensers were still working functionally during 20/10/2017 to 31/12/2017, however, the team cannot confirm the exact value during this period, even in the team's opinion the value of the parameters keep stable in the operation period for local communities are familiar to use the dispensers. Since no verifiable evidence on new survey has been provided, relevant ERs during the gap period (20/10/2017 to 31/12/2017) cannot be certified according to Para.304/VVS-PoA Ver.01.</p> <p>II. The applicability of the validity of monitoring surveys of distributed units has been re-judged. For the first survey was conducted after 24 months of the implementation of first unit of the CPA-9 and CPA-10, the condition of applicability cannot be satisfied by both CPAs.</p> <p>In order to solve CL-4 (updated to <b>CAR-3</b> in the report) raised by the verification team, the CME only claims the emission reductions from 01/01/2017 to 31/12/2017.</p>		

By introducing the deduction factor of 76.84% in the ER calculation, the CME will not claim the ERs generated from 13/09/2016 to 31/12/2016 for CPA-9 and CPA-10.

Therefore, the verification team confirms the monitoring frequency of both parameters for CPA-9/10 was conducted annually in 2017.

ID	Issue-4	Date: 15/11/2018
<b>Description of Issue</b>		
<p>VVS-PoA ver. 01 paragraph 359 (a):</p> <p>The emission reduction calculation has considered dispensers with missing barcodes (refer UG Dispenser Database MP#4, column C). The DOE shall provide information on how it verified that these dispensers also belong to this programme activity.</p>		
<b>CME and/or DOE Response</b>		<b>Date: 10/12/2018</b>
<p>Dispenser barcodes are attached to the surface of each dispenser at the time of installation, but it is prone to damage/loss. If the barcode is missing and inspected by promoter or spot-check, the dispenser ID in the database will be marked as “missing” until the dispenser outer casing gets replaced with new barcode. Actually, it is difficult for Evidence Action to maintain and renew the barcode IDs of each dispenser considering the large amount of dispensers and the supplier’s reason that could not be fully controlled by the CME and implementer. Therefore, in the dispenser database there are records of missing barcodes.</p> <p>As per the eligibility criteria to avoid double counting defined in the CPA-DDs, a unique numbering or identification system for the water purification devices disseminated is applied in dispenser database. The identification system can be the Waterpoint ID or Dispenser barcode ID. The verification team can confirm these dispensers fulfill the eligibility criterion at the time of installation by reviewing the latest dispenser database, the installation form, validation reports and previous verification report.</p> <p>Since only one dispenser is dispatched to each waterpoint involved in the PoA, a waterpoint is uniquely linked to a dispenser. Each dispenser was given one unique waterpoint ID in the dispenser database at the time of dispenser installation and recorded dynamically in the central database. So the project developer adopted the waterpoint ID as the unique identification for each dispenser because the waterpoint name will not change during the CPA operation and can easily be identified using the GPS coordinates, waterpoint name, villages name and county/sub-county information and CPA information.</p> <p>During site verification, all the 30 randomly selected dispensers can be correctly identified by water point ID, and the verification team has checked the information of GPS, waterpoint name/village marked in the waterpoint concrete (if available) or by interviewing with the user and promoter, and confirmed all the information consistent with the updated database.</p> <p>In summary, it can be verified the dispensers belong to this programme activity by identifying the waterpoint ID and its geographical information.</p>		

ID	Issue-5	Date: 15/11/2018
<b>Description of Issue</b>		
<p>VVS-PoA ver. 01 paragraph 359 (c):</p> <p>The CPA-DDs indicate that the “quantity of drinking (<math>QPW_{\text{sampled}}</math>) is calculated taking into account for the fraction of population which would have boiled water (<math>POP_{\text{boiling}}</math>). However, the emission reduction spreadsheet (ER calculation UG MP4, Row 53) does not consider the <math>POP_{\text{boiling}}</math>.”</p>		

CME and/or DOE Response	Date: 10/12/2018
<p>Referring to the equation of the latest version of AMS-III.AV, the POP<sub>boiling</sub> was also considered for QPW<sub>sampled</sub> in the update ER and MR, and the ER was re-calculated.</p> <p>The verification team confirms the process of POP<sub>boiling</sub> has now been considered for the calculation of QPW<sub>sampled</sub>, and the ER has been calculated correctly.</p>	

ID	Issue-6	Date: 15/11/2018
<b>Description of Issue</b>		
<p>Sampling and surveys for CDM project activities and programmes of activities ver. 07, paragraph 32:</p> <p>The DOE's sample size on water quality indicated that 4 out of 28 water samples could not reach the CME's average value of 100% (i.e. greater discrepant records were observed). The DOE shall provide information on how it complied with paragraph 32 of the Sampling and surveys for CDM project activities and programmes of activities which requires the DOE not to accept the CME's set of records if greater discrepant records are observed.</p>		
<b>CME and/or DOE Response</b>		<b>Date: 10/12/2018</b>
<p>Applying the acceptance sampling during on-site inspection, the DOE did NOT accept CME's results per the Para.32 of the sampling standard.</p> <p>However, the DOE sample shows more than 80% of the users can be ensured to get the safe drinking water. And CME may not operate strictly following the water quality testing protocol, which caused cross-contamination, resulting in a series of unexplained phenomena. Based on verification team's experience, if the TCR is 0.3~0.5mg/L, the E.Coli will be lower than 2-CFU/100ml. But for water point ID 7020894 with TCR of 2.6 mg/L, it showed E.Coli 39 CFU/100ml.</p> <p>Subsequently, the verification team regards the CME's response to CAR-6 is possible.</p> <p>During the TCR test onsite, the team leader declared to take this TCR negative water sample (ID: 7050048) for E.Coli test for contrast and got the result of 21.1CFU/100ml. Considering it is not objective nor conservative, the result of water sample (ID:7050048) is also counted into DOE sample result, as <b>5 out of 29 water samples could not reach the CME's average value of 100%.</b></p> <p>In order to eliminate the bias between the CME sample and DOE sample, a <b>correction factor</b> shall be involved in the calculation. The factor of 82.75% (=24/29) is considered reasonable for the result was witnessed by the DOE and CDM Assessment Team. Thus, the water quality applied in the ER calculation is 82.75% (=100%*82.75%).</p> <p>Therefore, the CCSC verification team regards the process of correction factor to water quality is reasonable, and the bias between CME sample and DOE sample is deemed to be eliminated.</p>		

ID	Issue-7	Date: 15/11/2018
<b>Description of Issue</b>		
<p>VVS-PoA ver. 01 paragraph 343:</p> <p>The monitoring report (page 7) indicates that the dispenser databases for CPA IDs 2, 3, 9, 10, 21 and 22 contain details about the unique waterpoint IDs (i.e. 7030587 etc.), installation dates and administrative units in which the dispensers were installed. The DOE raised and closed clarification No. 3. However, it is noted that:</p> <p>i. No information is provided on how the dispensers are identified across the CPAs considering that some CPAs are located in the same districts (i.e. CPAs 0002/0003 in Manafwa</p>		

District and CPAs 0003/0008 in Mbale District);

ii. No information on how households supplied with clean water from the programme dispensers and participating in other CDM programmes (i.e. energy efficiency cookstoves) are identified and discounted.

**CME and/or DOE Response**

**Date:** 10/12/2018

I. Although some CPAs such as CPA-3/9 are located in the same district, (i.e. Mbale District), they still located in different geographic areas (i.e. sub-counties). Therefore, there is no dispenser located cross CPAs (Please refer to response to issue 1).

Besides, each dispenser was given one unique waterpoint ID in the dispenser database at the time of dispenser installation and recorded dynamically in the central database. The waterpoint ID can easily be identified using the GPS coordinates, waterpoint name, villages name and county/sub-county information and CPA information.

Such Information has been included in the updated verification report.

II. There is no requirement for monitoring other CDM programmes providing safe water contained in the methodology AMS-III.AV Ver.03 and its latest version 06.0. As per the monitoring plans contained in each CPA-DDs and the applied methodology, only the "Existence of public distribution network supplying safe drinking water to the project boundary in year y" needs to be monitored as the similar subject.

According to Para.343/VVS-PoA, for the question raised as the potential cross effect with other clean water programme, the CME and DOE would like to clarify as follows:

1) The calculation of QPW is based on the chlorine usage for drinking water and will be capped by population serviced by each CPA. Other potential programs may only affect the population number for CAP in the algorithm of the CPAs.

However, the CME has taken the population cross check (PCC) during Nov.-Dec.2017 to identify the exact number of households serviced by chlorine dispensers for all the CPAs included. And the latest, conservative value were adopted in the calculation (see section E.3.4.1). By onsite inspection, the verification team checked the randomly selected interviewees against the PCC form and confirmed consistent. Thus, households who are not using chlorine dispenser have been excluded from the population ( $POP_{P/Y}$ ).

2) The parameter of Drink% is monitored by the CME to obtain the fraction of water treated with the dispenser that is actually drinking. The water used for other purpose than drinking, i.e. cooking, has already been excluded from the calculation of ER by drink% adoption. And it is specified to the drinking chlorinated water.

In verification team's opinion, the monitoring system and emission reduction algorithm are robust and complete, the households supplied with clean water from the programme dispensers and participating in other CDM programmes have been demonstrated to be excluded as above.

## Appendix 5. List of Interviewees during Onsite Inspection

No.	First Name	Last name	Village	Role	Gender
1.	MAGUMBA	LILIAN	Bunawodya	Promoter	F
2.	NATUNA	LOYCE	Bunawodya	User	F
3.	NAGWEOE	Amura	Nankusi	Promoter	M
4.	NAMUDDU	Faimah	Nankusi	User	F



No.	First Name	Last name	Village	Role	Gender
5.	WAFULA MOSES	Dawiel	Bukhumeka_2	Promoter	M
6.	MUKHAYE	Eva	Bukhumeka_2	User	F
7.	WOCHAMU	Elias	Bumuluya_Main	Promoter	M
8.	NAMUKOSE	Shakila	Bumuluya_Main	User	F
9.	NAMADUWA	Amina	Magakhala	Promoter	F
10.	NABUMADI	Sabiya	Magakhala	User	F
11.	KAKA	Zoe	Bunywaka	Promoter	F
12.	MUYAMA	Daphae	Bunywaka	User	F
13.	NAMUROS	Elesic	Bunywaka	User	F
14.	WAMUWAYA	Fred	Wandeka	Promoter	M
15.	NABIFO	Bira	Wandeka	User	F
16.	SHADNA	Yasin	Negina	Promoter	F
17.	NAMUMBA	Susan	Negina	User	F
18.	NAMBORO	Madina	Nabiini	Promoter	F
19.	NAMAKAMBO	Faridah	Nabiini	User	F
20.	FLORENCE	Sakwa	Nabuyaka	Promoter	F
21.	NAKAYEMLE	Evalyne	Nabuyaka	User	F
22.	LUNYOLO	Rose	Namwalye	Promoter	F
23.	NAMUROS	Scovia	Namwalye	User	F
24.	OKELLO	Lawrance	Poyem_B	Promoter	M
25.	ADODE	John	Poyem_B	User	F
26.	OKIRING	David	Abwanget	Promoter	M
27.	APADET	Anna	Abwanget	User	F
28.	ONYAPID	Stephen	Kadapanyi	Promoter	M
29.	OMOIT	Geofrey	Kadapanyi	User	M
30.	OGMANG	Aomminl	Pamaraka_South	Promoter	M
31.	MACWO	Jujihe	Pamaraka_South	User	F
32.	WANDAJA	Jane	Bubangali	Promoter	F
33.	MUHUNGO	Esan	Bubangali	User	M
34.	KATO	Salimu	Nabweyo	Promoter	M
35.	/	Silina	Nabweyo	User	F
36.	SEMPAWA	Miltou	Kisega_Buwalira	Promoter	M
37.	KINTU	Kuzaham	Kisega_Buwalira	User	M
38.	MUDOUDO	Janet	Kawesye	Promoter	F
39.	BABIRYE	Louisa	Kawesye	User	F
40.	MUGAMDA	Richard	Lyama	Promoter	M

No.	First Name	Last name	Village	Role	Gender
41.	KAPATA	Isaac	Lyama	User	M
42.	MWAYI	Anderson	Namuyago	Promoter	M
43.	KESE	Latif	Namuyago	User	M
44.	SAJABI	Wilson	Kasasira 1	Promoter	M
45.	SPECIOZA	Kirya	Kasasira 1	User	F
46.	WAKWALE	Fredrick	Lilima	Promoter	M
47.	BURUKWA	Thomas	Lilima	User	M
48.	MUKHWANA	Enos	Buhika	Promoter	M
49.	KSOKOTA	Caroline	Buhika	User	F
50.	KAWIJO	Sam	Kirika	Promoter	M
51.	MEERI	Patrick	Kirika	User	M
52.	Neiksea	Esther	Kakwanga	Promoter	F
53.	NAPIO	Mamjeri	Kakwanga	User	F
54.	LOGOSE	Salama	Kakwanga	User	F
55.	WEILAGALA	Silva	Nabitende_Kagoli	Promoter	M
56.	OKUDO	Yokolam	Nabitende_Kagoli	User	M
57.	WAISWA	Patriul	Kalecheru_Kasajja	Promoter	M
58.	PANDE	Mulabi	Kalecheru_Kasajja	User	F
59.	NAMUKOSE	Janat	Bunamwera_Putti	Promoter	F
60.	KIRYA	Amuza	Bunamwera_Putti	User	M
61.	OPOLOT	Joseph	Super_Central_Ea stward	Promoter	M
62.	OKIROR	Rose	Super_Central_Ea stward	User	F

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	29 December 2017	Revision to align with the requirements of the “CDM validation and verification standard for programme of activities” (version 01.0).
01.0	5 June 2015	Initial publication.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory		
Document Type: Form		
Business Function: Issuance		
Keywords: programme of activities, verifying and certifying		