JCM Verification Report Form

A. Summary of verification

A.1. General Information

Title of the project	Project of Introducing High Efficiency Refrigerator to a Frozen Food Processing Plant in Indonesia
Reference number	ID003
Monitoring period	02/02/2015 – 31/07/2015
Date of completion of the monitoring report	12/09/2015
Third-party entity (TPE)	Japan Quality Assurance Organization (JQA)
Project participant contracting the TPE	MAYEKAWA MFG. CO., LTD.
Date of completion of this report	02/11/2015

A.2 Conclusion of verification and level of assurance

Overall verification opinion	☒ Positive ☐ Negative
☒ Unqualified opinion	Based on the process and procedure conducted, JQA (TPE's name) provides reasonable assurance that the emission reductions for "Project of Introducing High Efficiency Refrigerator to a Food Industry Cold Storage in Indonesia" (project name) ✓ Are free of material errors and are a fair representation of the GHG data and information, and ✓ Are prepared in line with the related JCM rules, procedure, guidelines, forms and other relevant documents
(If overall verification opinion is negative, please check below and state its reasons.) ☐ Qualified Opinion ☐ Adverse opinion ☐ Disclaimer	<State the reasons> N/A

A.3. Overview of the verification results

Item	Verification requirements	No CAR or CL remaining
The project implementation with the eligibility criteria of the applied methodology	The TPE determines the conformity of the actual project and its operation with the eligibility criteria of the applied methodology.	☒
The project implementation against the registered PDD or any approved revised PDD	The TPE assesses the status of the actual project and its operation with the registered/validated PDD or any approved revised PDD.	☒
Calibration frequency and correction of measured values with related requirements	If monitoring Option C is selected, the TPE determines whether the measuring equipments have been properly calibrated in line with the monitoring plan and whether measured values are properly corrected, where necessary, to calculate emission reductions in line with the PDD and Monitoring Guidelines.	☒
Data and calculation of GHG emission reductions	The TPE assesses the data and calculations of GHG emission reductions achieved by/resulting from the project by the application of the selected approved methodology.	☒
Avoidance of double registration	The TPE determines whether the project is not registered under other international climate mitigation mechanisms.	☒
Post registration changes	The TPE determines whether there are post registration changes from the registered PDD and/or methodology which prevent the use of the applied methodology.	☒

Authorised signatory:	Mr. ☒	Ms. ☐
Last name: Yano	First name: Tadayuki	
Title: Senior Executive		
Specimen signature:		Date: 02/11/2015

B. Verification team and other experts

	Name	Company	Function*	Scheme competence*	Technical competence*	On-site visit
Mr. ☒ Ms. ☐	Koichiro Tanabe	JQA	Team leader	☒	Authorized	☒
Mr. ☐ Ms. ☒	Sachiko Hashizume	JQA	Team member	☒	N/A	☐
Mr. ☒ Ms. ☐	Hiroshi Motokawa	JQA	Internal reviewer	☒	Authorized	☐
Mr. ☐ Ms. ☐	N/A	N/A	N/A	☐	N/A	☐

Please specify the following for each item.

* *Function: Indicate the role of the personnel in the verification activity such as team leader, team member, technical expert, or internal reviewer.*
* *Scheme competence: Check the boxes if the personnel have sufficient knowledge on the JCM.*
* *Technical competence: Indicate if the personnel have sufficient technical competence related to the project under verification.*

C. Means of verification, findings and conclusions based on reporting requirements

C.1. Compliance of the project implementation and operation with the eligibility criteria of the applied methodology

<Means of verification>

The project has been registered as a JCM project on 29 March 2015, with applying the approved methodology “Installation of Energy-efficient Refrigerators Using Natural Refrigerant at Food Industry Cold Storage and Frozen Food Processing Plan”(ID_AM003) under the scheme of Joint Crediting Mechanism between Indonesia and Japan. The registered PDD indicates that the starting date of the project operation is 18 December 2014, as the newly installed refrigerator (one unit) was handed over to PT. Adib Global Food Supplies (hereinafter called “the plant owner”) from MAYEKAWA MFG. CO., LTD. (hereinafter called “the project developer”) on that date.

Through a review of relevant documents, the verification team verified whether the project implementation and operation after the starting date of project operation complied with the eligibility criteria of the applied methodology during the monitoring period. After the desk review, the on-site assessment was conducted on 10 September 2015. The assessment results regarding the eligibility criteria are summarized as below:

Criterion 1: The project installs cooling system at a frozen food processing plant for the

purpose of chilling the food products to below -35 deg. C.

Criterion 2: The project system is a secondary loop cooling system using natural refrigerant (NH3 and CO2). CO2 is used as the secondary refrigerant in the system.

Criterion 3: The refrigerator applied in the project cooling system is a two stage compressor refrigerator for individual quick freezer with 70kW cooling capacity.

Criterion 4: The refrigerator installed under the project is NewTon F-300 (HFS-45L-PR4I-01), and its compressor is controlled by an inverter.

Criterion 5: The COP of the NewTon F-300 (HFS-45L-PR4I-01) installed under the project is 1.63.

The above-mentioned parameters in the criteria (No.1 to No.5) were confirmed through a review of the general specification of the cooling system (NewTon), and the newly installed main/incidental equipments were also cross-checked through a physical inspection during the on-site assessment. As a result, the verification team determined that the cooling system and the project refrigerator were in place in line with the parameters, which are specified in the criteria, and thus no issue was raised.

Criterion 6: Periodical check is planned once a year.

It was confirmed through interview with the project developer that operating conditions of the installed refrigerator were monitored by the project developer's remote sensing system to maintain its proper operation, and the data monitored by the on-site measuring equipment was automatically transferred to the project developer’s data centre, which is located in Japan, through the internet. This enables the project developer to establish the comprehensive structure of monitoring system that can track and maintain the performance of refrigerators in operation over the world.

Meanwhile, the verification team could not confirm whether a periodical check, which has been defined in the registered PDD to maintain refrigerator performance, was planned at least once a year. As a result, CL01 was raised on Criterion 6.

Criterion 7: The plan for not releasing the primary refrigerant used in the project refrigerator has been prepared. The project refrigerator has been newly installed at the project site in addition to the existing refrigerator. The refrigerant used in the existing refrigerator is not released to the air through proper management of the refrigerant including proper destruction.

It was confirmed through interview with the project developer that the comprehensive plan for not releasing the primary refrigerant (ammonia) used in the project refrigerator was based on leakage prevention measures applying the advanced technology of NewTon, which includes indirect cooling system, downsizing and minimizing ammonia

charge, and employing bellows-sealed valves for use in high-pressure applications. The plan was also established in accordance with standard operation and maintenance procedures of the project developer. In addition, a follow-up interview with the operational manager was conducted at the storage site, in order to check the conditions of the existing refrigerator. As a result, the verification team confirmed that the old refrigerator was still in operation for a standby facility, even after the installation of the project refrigerator. Therefore, it was concluded that there was no releases of refrigerants, which was used for the existing refrigerator, caused by the project implementation.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

(Issue raised as CL01)

As for Criterion 6 of the registered PDD, it is requested to clarify "Periodical check at least once a year", which is indicated in the registered PDD, and the plan that specify the periodical check.

(Summary of the response provided by the PP on CL01)

The detail of the periodical compressor inspection for NewTon F-300 is described in “6.2 Equipment inspection” of the manual. The other details such as the service parts replacement will be determined by the plant owner.

(Assessment result of the responses on CL01)

It was confirmed through the response provided and the follow-up interview with the project developer that the periodical check for compressor, which is the most important parts of the refrigeration unit, had been proceduralized in the manual. A periodical check is conducted at least once a year, in accordance with the periodical inspection list of the manual at a minimum level. Therefore, CL01 is closed. Besides, no other outstanding issue was raised.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The verification team reached the conclusion that the actual project and its operation were in compliance with the eligibility criteria of the applied methodology during this monitoring period. The issue raised by the verification team was fully clarified, resulting in no changes in the monitoring report or supporting annexes.

C.2. Assessment of the project implementation against the registered PDD or any approved revised PDD

<Means of verification>

Physical features of the project

It was observed during the on-site assessment that the frozen fish processing plant installed one refrigeration unit (NewTon F-300), which is within the scope of the financing programme for the JCM model project. The refrigeration unit consists of a refrigerator, a cooling tower, a primary cooling loop pipeline using NH_3, a secondary cooling pipeline using CO_2 and a defrost tank.

Meanwhile, the verification team checked and confirmed through the on-site assessment that no on-site captive electricity generator had been connected to the power system of the project refrigerator. According to the explanation by the storage owner, the plan to install a new generator in the plant site for the purpose of a back-up emergency electricity was still effective but not implemented yet during the monitoring period as it was not budgeted yet.

To sum up, it was confirmed through the on-site assessment that all facilities indicated in the registered PDD were in place and had been operated by the plant owner, otherwise the plan was still active, as per the PDD during the monitoring period.

Measuring equipment

As for the parameters to be monitored ex post, the following measuring equipment and its project implementation were checked at this verification, with satisfactory results:

(1) $EC_{PJ,i,p}$ (Amount of electricity consumed by the project refrigerator)

The source of data is “Monitored data”. It was confirmed through the on-site assessment that the project refrigerator had been equipped with a power meter for measuring electricity consumed by the refrigerator. According to the explanation by the plant owner, the power meter was used for its internal operation and maintenance purpose. A complete set of raw data monitored and recorded by the monitoring system was available in electronic forms, covering the monitoring period (from 02/02/2015 through 31/07/2015).

(2) EI_{grid} (Amount of electricity imported from the grid to the project site)

The source of data is “Invoice from the power company”. It was confirmed through the on-site assessment that the electricity measuring meter had been installed in the plant owner site, and the power company operated and maintained it for electricity transaction. According to explanation by the plant owner, monitored data was recorded manually by a record keeper of the power company, and the official invoice was issued on a monthly basis. The issued invoices, covering the monitoring period

(from 01/02/2015 through 31/07/2015), were available at the on-site assessment.

(3) $h_{gen,p}$ (Elapsed time indicator for the captive electricity generator)

The source of data is “Monitored data”. It was confirmed through the on-site assessment that the captive electricity generator had not been installed yet, and thus, no electricity generated by a captive electricity generator was consumed by the project refrigerator. Therefore, it is not necessary to consider the monitoring point and its monitoring activity during this monitoring period.

Monitoring Structure

Through interview with the Project Manager and QA/QC team of the project developer, the structure of the monitoring personnel were identified as follows:

(1) Project Manager (Shigeru Takahashi)

The Project Manager authorizes the monitoring report to be a final version.

(2) Deputy Project Manager (Osamu Mogi)

The Deputy Project Manager conducts final check on the recorded data, gives feedback to Record keeper when any issue was raised, summarizes a draft monitoring report and then submit it to Project Manager.

(3) QA/QC team (Shuichi Shiseki)

The responsible person of QA/QC team detects an error, omission or misstatement on the recorded data on a monthly basis, and reports to Deputy Project Manager.

(4) Record keeper (Naohisa Ueno)

The Record keeper keeps records of the measured raw data in electronic forms, and reports to QA/QC team on a monthly basis.

As for the monitoring structure listed above, it was confirmed that the project developer had organized it for its proper monitoring activities, and it was considered reasonable and appropriate.

Training for technology transfer

It was explained by the plant owner that the project developer had given training on the trial operation of the newly installed refrigerator, with providing a manual book on operation, maintenance and safety measures.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team concluded that the project implementation was in accordance with the registered PDD during the monitoring period, and no change was found from the registered PDD.

C.3. Compliance of calibration frequency and correction of measured values with related requirements

<**Means of verification**>

(1) $EC_{PJ,i,p}$ (Amount of electricity consumed by the project refrigerator)

It was confirmed through the on-site assessment that an electricity measuring equipment (Model No. KM50-E, produced by OMRON) had been installed in the project refrigerator, for monitoring of the amount of power consumption. According to the explanation by the project developer, in general, a power meter to monitor electricity consumed by a refrigerator is installed for internal operation and maintenance purpose (not for electricity transaction) and hence the accuracy of such power meter is not usually calibrated by a qualified entity. Therefore, the verification team raised CL02 on the calibration status of the power meter.

(2) EI_{grid} (Amount of electricity imported from the grid to the project site)

It was confirmed through the on-site assessment that the electricity measuring equipment had been operated and maintained by the power company for electricity transaction. Therefore, it was considered reasonable that monitoring of this parameter was in line with the definition of monitoring Option B, which is defined in the PDD and Monitoring Guidelines.

(3) $h_{gen,p}$ (Elapsed time indicator for the captive electricity generator)

As mentioned above, the monitoring point and its monitoring activity are not required, since no electricity generated by a captive electricity generator was consumed by the project refrigerator.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

(Issues raised as CL02)

Firstly, it is requested to clarify when the refrigerator was installed in the plant area. If the power meter was still within one year after the installation during this monitoring period, it would be considered reasonable that the meter accuracy was covered by a product guarantee by the manufacturer. Secondly, it is requested to clarify how the plant owner, otherwise the project developer, will manage the accuracy of the power meter in and after one year after the installation, by calibrating or replacing it on an

annual basis.

(Summary of the responses provided by the PP on CL02)

The delivery date of the installation to the plant owner was 18/12/2014. The warranty against defects for one year is to be counted from this date. The project developer is in charge of the annual electricity meter replacement.

(Assessment results of the responses on CL02)

It was confirmed through the response provided by the project developer that the installation date of the refrigerator was 18/12/2014 (as the starting date of project operation), and the meter accuracy could be covered by the one-year product warranty. As a result, it was considered reasonable that the appropriate level of the meter accuracy was maintained during the monitoring period, and any correction was not required for the measured values. It was also confirmed that the project developer will be in charge of the annual electricity meter replacement. Therefore, CL02 was closed.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The verification team finally reached the conclusion that the calibration frequency and correction of measured values were in compliance with related requirements. The issues raised by the verification team were fully clarified, resulting in no changes in the monitoring report or supporting annexes.

C.4. Assessment of data and calculation of GHG emission reductions

<**Means of verification**>

(a) The corresponding Monitoring Report Sheet of the applied methodology had been used, and the applied calculation formulas of GHG emission reductions had been utilized without modified or altered, during the monitoring period.

(b) A complete set of data for the specified monitoring period was available.

It was confirmed through a review of relevant documents that the 1st monitoring period of the registered project started from the beginning of February 2015, while the starting date of project operation was stated as 18/12/2014 in the registered PDD. To be specific, the reported values of the parameters to be monitored ex-post were available for the following period:

(1) $EC_{pj,i,p}$: From 2015/2/2 until 2015/7/31

(2) $EI_{grid,p}$: From 2015/2/1 until 2015/7/31

(3) $h_{gen,p}$: From 2015/2/1 until 2015/7/31

According to the explanation by the project developer, the monitoring system started operation from 18/12/2014, in order to monitor and record the data in an electronic form (CSV format). However, the monitored data was not transferred properly to the project developer's data center of Japan during the first a few months, due to a defect of the monitoring system. After technical troubleshooting, data transmission system started to function normally on 02/02/2015. This is the reason why the starting date of the integrated monitoring period was that date.

(c) Information provided in the monitoring report has been checked with sources listed below:

Parameters	Monitored values	Method to check values in the monitoring report with sources
$EC_{PJ,i,p}$	60.572 (MWh/p)	The reported values were checked against both electronic raw data by the automatic monitoring system and the summary records reviewed by QA/QC team through a sampling method (30 daily data was sampled out of the population180 days). As a result, no error was detected.
$El_{grid,p}$	605.597 (MWh/p)	The reported values were checked against monthly invoice through a complete survey, and no error was detected.
$h_{gen,p}$	0.0 (hours)	N/A

(d) No assumption had been used in emission calculations and hence no justification was required.

(e) Appropriate emission factors, default values, and other reference values had been correctly applied.

<**Findings**>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No outstanding issue was raised.

<**Conclusion based on reporting requirements**>

Please state conclusion based on reporting requirements.

The verification team concluded through assessment of data and calculation of GHG emission reductions that the reported values in the monitoring report were verified in an accepted manner.

C.5. Assessment of avoidance of double registration

<**Means of verification**>

According to a form of declaration for avoidance of double registration in the JCM Modalities of Communication Statement, the declaration letter signed by the project developer's representative was submitted to the Joint Committee at the validation stage, and it was also cross-checked at the verification stage. In addition, through search on the website of the CDM and JI, it was confirmed that no project with similar technology and location had been registered in the Republic of Indonesia.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team concluded that the project had not been registered under other international climate mitigation mechanisms.

C.6. Post registration changes

<Means of verification>

It was confirmed through the review of documents and the on-site assessment that the project had not been changed from the registered PDD and/or methodology.

<Findings>

Please state if CARs, CLs, or FARs are raised, and how they are resolved.

No outstanding issue was raised.

<Conclusion based on reporting requirements>

Please state conclusion based on reporting requirements.

The verification team concluded that the project had not been changed from the registered PDD and/or methodology.

D. Assessment of response to remaining issues

An assessment of response to the remaining issues including FARs from the validation and/or previous verification period, if appropriate

This is the 1st verification opportunity of the project, and no FAR was raised during the validation.

E. Verified amount of emission reductions achieved

Year	Verified Reference Emissions (tCO_2e)	Verified Project Emissions (tCO_2e)	Verified Emission Reductions (tCO_2e)
2013	0	0	0
2014	0	0	0
2015	60.8	49.3	11
2016	N/A	N/A	N/A
2017	N/A	N/A	N/A
2018	N/A	N/A	N/A
2019	N/A	N/A	N/A
2020	N/A	N/A	N/A
Total (tCO_2e)	60.8	49.3	11

F. List of interviewees and documents received

F.1. List of interviewees

(Interviewed on 31 August 2015)

・Shigeru Takahashi, Director, MAYEKAWA MFG. CO., LTD.

・Shuichi Shiseki, Mechanical Engineering Designer, MAYEKAWA MFG. CO., LTD.

(Interviewed on 10 September 2015)

・Sumitra, Head of production, PT. Adib Global Food Supplies

・Rinta Supriatna, Mechanic, PT. Adib Global Food Supplies

・Reza Aryaditya Setyagraha, Sales Engineer, PT. Mayekawa Indonesia

・Vicky Oktavianus, Sales Engineer, PT. Mayekawa Indonesia

・Ai Kawamura, Manager, EX Research Institute

・Chiharu Iida, Researcher, EX Research Institute

F.2. List of documents received

1. Monitoring Report Sheet(draft)20150828
   (ID003_3_JCM_ID_AM003_ver01.0_20150828.xlsx)
2. Monitoring Report Sheet(final)20150912
   (ID003_3_JCM_ID_AM003_ver01.0_20150912.xlsx)
3. Supporting annex of Monitoring Report(draft)20150828

4. Supporting annex of Monitoring Report(final)20150912
5. Project Design Document, dated on 13/02/2015, ver.02.0 (pdd_file.pdf & pdd_appendix_file1.pdf)
6. Monitoring Plan Sheet and Monitoring Structure Sheet (Site2_JCM_ID_AM003_ver01.0.xlsx)
7. JCM Approved Methodology ID_AM003 “Installation of Energy-efficient Refrigerators Using Natural Refrigerant at Food Industry Cold Storage and Frozen Food Processing Plant” (JCM_ID_AM003_ver01.0.pdf)
8. Form of Monitoring Plan Sheet and Monitoring Structure Sheet (JCM_ID_AM003_ver01.0.xlsx)
9. JCM Glossary of Terms (JCM_ID_Glossary_ver02.0)
10. JCM Guidelines for Developing Project Design Document and Monitoring Report (JCM_ID_GL_PDD_MR_ver02.0)
11. JCM Project Cycle Procedure (JCM_ID_PCP_ver02.0)
12. JCM Guidelines for Validation and Verification (JCM_ID_GL_VV_ver01.0)
13. JCM Validation Report, dated on 06/03/3015
14. Company profile of PT Adib Global Food Supplies
15. OJT training participant records, dated on 17/12/2014
16. Manual on operation, maintenance and safety measures (Model: MSF-1509-TJAX)
17. Specification of the project refrigerator (NewTon catalogue)
19. Periodical inspection list of the refrigerator
20. Leakage prevention measures of the primary refrigerant used for NewTon system
22. Summary of the monitored data (based on automatic CSV data readings of electrical power consumption of project refrigerator)(from Feb 2015 to Jul 2015)
23. Specification of power meter for measuring power consumption of the project refrigerator (model number:KM50-E1-FLK)
26. Invoices from the power company (from Feb 2015 to Jul 2015)
27. Monitor Log Book for JCM (from Feb 2015 to Jul 2015)
31. The modalities and communication statement signed by the project participants, including the written confirmation of the avoidance of double registration
32. A brief introduction sheet about the monitoring structure (MAYEKAWA MFG. CO., LTD.)

Annex Certificates or curricula vitae of TPE's verification team members, technical experts and internal technical reviewers

Please attach certificates or curricula vitae of TPE's validation team members, technical experts and internal technical reviewers.

Certificate of Appointment is attached to this report.

Statement of competence

Name: Mr. Koichiro Tanabe

Qualified and authorized by Japan Quality Assurance Organization.

Function

	Date of qualification
Validator	-
Verifier	2014/12/22
Team leader	2015/3/24

Technical area within sectoral scopes

	Date of qualification
TA 1.1. Thermal energy generation	2014/12/22
TA 1.2. Renewables	2014/12/22
TA 3.1. Energy demand	2014/12/22
TA 4.6. Other manufacturing industries	2014/12/22
TA 5.1. Chemical industry	2014/12/22
TA 10.1. Fugitive emissions from oil and gas	2014/12/22
TA 13.1. Solid waste and wastewater	2014/12/22

Statement of competence

Name: Mr. Hiroshi Motokawa

Qualified and authorized by Japan Quality Assurance Organization.

Function

	Date of qualification
Validator	2014/12/22
Verifier	2014/12/22
Team leader	2014/12/22

Technical area within sectoral scopes

	Date of qualification
TA 1.1. Thermal energy generation	2014/12/22
TA 1.2. Renewables	2014/12/22
TA 3.1. Energy demand	2014/12/22
TA 4.1. Cement and lime production	2014/12/22
TA 4.6. Other manufacturing industries	2014/12/22
TA 13.1. Solid waste and wastewater	2014/12/22