



Verification and certification report form for GS programme of activities

VERIFICATION AND CERTIFICATION REPORT

Title of the programme of activities (PoA)	Programme for the application of advanced hull coatings to reduce shipping fuel consumption (PAHSF)	
GS reference number of the PoA	GS 3492	
Version number(s) of the PoA-DD(s) applicable to this report	5	
Version number of the verification and certification report	2.0Aa	
Completion date of the verification and certification report	08/02/2018	
Monitoring period number	2 nd Monitoring period	
Duration of this monitoring period	01/07/2015 to 30/06/2016	
Number and version number of the MR to which this report applies	3	
Coordinating/managing entity (CME)	International Paint Ltd., a company in the AkzoNobel Group	
Host Party(ies)	Host Party(ies) of the PoA	Is this a host Party to a CPA covered in this report?(yes/no)
	N/A	
Sectoral scope(s)	Sectoral scope 7. Transport	
Selected methodology(ies)	Gold Standard methodology: Reducing Vessel Emissions Through the Use of Advanced Hull Coatings (version 2)	
Total estimated GHG emission reductions or net GHG removals for this monitoring period in the included VPA(s) covered in this report	58,604 tCO ₂	
Total certified GHG emission reductions or net GHG removals for this monitoring period for the included VPA(s) covered in this report	48,889 tCO ₂	
Name of DOE	RINA Services S.p.A. (RINA)	
Name, position and signature of the approver of the verification and certification report	Laura SEVERINO Unit Manager Sustainability & Climate Change	
		

SECTION A. Executive summary

Purpose and general description of the project

The VPA under the PoA will be ships travelling between ports in different countries. The fuel consumed in these trips is classified as international bunker fuels and the emissions from the combustion are not part of the GHG national inventories. Each VPA comprises a set of ships that are coated with an advanced hull coating and each ship can claim carbon credits for a single docking cycle with the application of the advanced hull coating. The advanced hull coating helps in reduction of hull friction and hydrodynamic drag, thereby reducing fuel consumption. Since ships typically use fossil fuels, reduced fuel consumption would reduce CO₂ emissions.

Location

N/A.

As discussed in the Monitoring Report, each VPA within the PoA comprises a set of ships, identified by the ship names and their unique ship identification numbers according to the International Maritime Organisation (IMO). Further the names and IMO numbers of the ships within this VPA are discussed in the table in section D.1 of the MR.

Scope of verification

Verification is the periodic independent review and ex-post determination by a DOE of the monitored reductions in GHG emissions and monitored sustainability indicators that have occurred as a result of the registered GS VPA during a defined monitoring period. Certification is the written assurance by a DOE that, during a specific period in time, a VPA achieved the emission reductions as verified. The objective of this verification is to verify and certify emission reductions reported for the PAHSF (Programme for the application of advanced hull coatings to reduce shipping fuel consumption) Project 1 for the period 01/07/2015 to 30/06/2016.

The scope of the verification is to verify that:

- The VPA has been implemented and operated in accordance with VPA-DD under the registered PoA;
- The monitoring plan and sustainability monitoring plan is in compliance with GS principles and requirements and the registered monitoring plan and/or applied methodology;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

Verification process

Verification is conducted using RINA procedures in line with the GS requirements and principles, and applying standard auditing techniques. RINA assesses and determines that the implementation and operation of the VPA, and steps taken to report emission reductions comply with the GS criteria. The verification assessment involved a document review of relevant documentation and the on-site visit.

Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

Conclusion

In conclusion, it is RINA's opinion that the project activity "PAHSF Project 1", as described in the Monitoring Report version 02 of 27/09/2017, meets all relevant requirements for GS PoA/CPA activities and correctly applies the GS baseline and monitoring methodology "Reducing vessel emissions through the use of advanced hull coatings", version 2.0 of 17/11/2014. Hence, RINA is able to certify that the emission reductions from the project during the monitoring period 01/07/2015 to 30/06/2016 amount to 48,889 tCO₂e.

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 review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	MENON	Rekha	RINA India	☒		☒	☒
2.	Technical Expert	IR	ZHOU	Jun	RINA China	☒		☒	☒

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	IR	LIU	Hui Feng	RINA China Office
2.	Technical Expert	IR	SCHENONE	Michela	RINA Head Office
3.	Approver	IR	SEVERINO	Laura	RINA Head Office

SECTION C. Means of verification**C.1. Desk review**

The monitoring report version 01 of 15/02/2017, version 02 of 27/09/2017 and version 03 of 06/02/2018, the GS PoA-Passport version 03 of 03/09/2015, GS VPA-Passport of version 07 of 22/09/2015, the VPA-DD under the registered PoA version 05 of 25/08/2015, the emission reductions calculation provided in the form of spread sheets, were assessed as part of the verification. The list of all documents reviewed are referenced during the verification is available in Appendix 3 below.

C.2. On-site inspection

N/A

It is confirmed by GS that the audit can be performed virtually by means of collection of relevant evidence and data and is not necessary to physically visit all the ships.

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Morrison	Alison	Senior Business Manager (The Fremco Corporation Inc.)	27/02/2017	Project description, operational life time, crediting period, baseline and project	Rekha Menon,
2.	Dutt	Gautam	Vice President, Science and Technology (MGM Innova)	27/02/2017	estimation, Emission Reduction calculations, data recording, data transfer and storage, QA/QC procedures.	Rekha Menon,
3	Portolano	Alberto	Energy saving Dept- Technical Dept (Grimaldi Group)	10 to 15/03/2017	Baseline Data and project data, technical issues, fuel consumption monitoring, data collection, storage and technical specifications of hull coat.	Rekha Menon
4	Wei	Ronnie	Product Manager- Fouling Release (Akzonobel)			

C.4. Sampling approach

>>N/A

C.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CR	No. of CAR	No. of FAR
General			
Compliance of the monitoring report with the monitoring report form			
Remaining forward action requests from validation and/or previous verification			
Specific-case CPA(s) considered for verification and covered in this report			
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	01		
Implementation and operation of the management system			
Post-registration changes			
Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline			
Corrections			
Inclusion of a monitoring plan in a registered PoA-DD (including its generic CPA-DD(s))			

Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline			
Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA			
Types of changes specific to afforestation and reforestation activities			
Component project activity(ies)			
Compliance of the CPA implementation with the included CPA design document	01		
Post-registration changes			
Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline			
Corrections			
Changes to the start date of the crediting period			
Inclusion of a monitoring plan to an included CPA-DD			
Permanent changes to the monitoring plan as described in the included CPA-DD, applied methodology, or applied standardized baseline			
Changes to the programme design of the included CPA-DD			
Types of changes specific to afforestation and reforestation component project activities			
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline			
Compliance of monitoring activities with the registered monitoring plan			
Data and parameters fixed ex ante or at renewal of crediting period			
Data and parameters monitored	01		
Implementation of sampling plan			
Compliance with the calibration frequency requirements for measuring instruments	01		
Assessment of data and calculation of emission reductions or net removals			
Calculation of baseline GHG emissions or baseline net GHG removals by sinks			
Calculation of project GHG emissions or actual net GHG removals by sinks			
Calculation of leakage GHG emissions			
Summary of calculation of GHG emission reductions or net GHG removals by sinks	01		
Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included specific-case CPA			
Remarks on difference from estimated value in registered PDD			
Assessment of the sustainability parameters	01		
Others (please specify)			
Total	06		

SECTION D. Internal quality control

The draft final verification report before being submitted to the client is subjected to an independent technical review to confirm that all validation activities has been completed according to the pertinent RINA's

procedures. The technical review is performed by a technical reviewer(s) qualified in accordance with the RINA's qualification procedure.

SECTION E. Verification opinion

RINA Service Spa (RINA) has performed verification of the emission reductions reported for the project activity "PAHSF Project 1", GS Registration Reference N° 2767, for the period 01/07/2015 to 30/06/2016, with regard to the relevant requirements for GS activities.

The project participants of the "PAHSF Project 1" project are responsible for:

- the preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the VPA-DD version 5 of 28/05/2015.
- the development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project.

It is the responsibility of RINA to express an independent verification opinion about the project's conformity with the requirements of paragraph 62 of the CDM modalities and procedures and on the reported greenhouse gas emission reductions from the project.

Based on documented evidence, collected data and interviews with the Project Participants, RINA can confirm that:

- the project has been implemented and operated as per the registered VPA-DD and the passport;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable GS VER requirements;
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring complies with the monitoring plan in the registered VPA-DD;
- the monitoring plan in the registered VPA-DD is as per the applied baseline and monitoring methodology.

SECTION F. Certification statement

It is RINA's opinion that the GHG emission reduction stated in the monitoring report version 02 of 27/09/2017 for the "PAHSF Project 1" for the period 01/07/2015 to 30/06/2016 are fairly stated. The GHG emission reductions were calculated correctly and the sustainable development indicators were correctly monitored on the basis of the Approved baseline and monitoring methodology "Reducing vessel emissions through the use of advanced hull coatings", version 2.0 of 17/11/2014 and the monitoring plan contained in the registered VPA-DD.

Hence RINA is able to certify that the emission reductions from the project during the monitoring period 01/07/2015 to 30/06/2016 amount to 48,889 tCO₂e.

SECTION G. Verification findings - General

G.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The monitoring report form used is the CDM-PoA-MR-FORM, version 01, which is the latest form available with UNFCCC. The same was accepted by RINA.
Findings	N/A
Conclusion	Gold Standard does not provide any specific monitoring report template. PP has developed the monitoring report and included the required details, which is accepted by RINA. Further RINA confirms that the CDM-PoA-MR-FORM is based on the currently valid MR template /16/ and is completed in accordance with the instructions for filling out applicable instructions for filling out the monitoring report form for CDM programme of activities.

G.2. Remaining forward action requests from validation and/or previous verification

>>This is the 2nd monitoring period. RINA checked the previous verification report /15/, noted that no FARs were raised. Also, no FAR raised during this verification.

G.3. Specific-case VPA(s) considered for verification and covered in this report

Reference number of the specific-case VPA included in the PoA as of the end of this monitoring period	Is the specific-case VPA considered for this verification? (yes/no)	Version number of the registered PoA-DD to which the specific-case VPA complies with	Confirmation that a request for issuance including the specific-case VPA has been published for the previous monitoring period (Y/N)
GS 2767	Yes	Version 05 of 25/08/2015	Y

SECTION H. Verification findings – Programme of activities**H.1. Compliance of the programme implementation with the registered programme design document**

Means of verification	The PoA implementation and operation is as per the registered PoA design document (PoA-DD). The Coordinating/Managing Entity (CME) of the PoA is International Paint Ltd., a private company, which is also part of the AkzoNobel Group. International Paint Ltd. is also the manufacturer of the advanced hull coating products. It is checked that projects within the PoA are ships travelling between ports in different countries. The project doesn't have a geographic boundary, since projects within the PoA comprise shipping, often international. The PoA boundary potentially includes all shipping in the world. Ships within the PoA are likely to be large like cargo vessels, oil tankers, ferries, etc., the same was checked and confirmed during the previous onsite visit by RINA team and interviews with the CME and the other project participants.
Findings	N/A
Conclusion	RINA confirms that the project activity has been implemented and it is in operation as described above in accordance with the PoA and VPA in the registered PoA-DD and VPA-DD /01/ /02/.

H.2. Implementation and operation of the management system

Means of verification	It is checked that International Paint Ltd., the manufacturer of the advanced hull coatings is the Co-ordinating Managing Entity (CME), who is responsible for inclusion of ships in the VPA, have signed separate agreement with each ship owner /11/. After invitation of the ship owners to participate to the PoA, an initial screening of ships is carried out by the CME to determine if each ship qualifies or not. For the qualified ships the analysis covering the baseline period is done; the analysis includes a regression analysis of fuel consumption rate versus average speed and other parameters. For a ship to be included in a VPA associated with this PoA, regression results should be considered satisfactory in terms of standard error of estimate, if the regression results are not satisfactory for a given ship, the ship is not included in the VPA. After the above analysis a technical review is taken ensuring that the methodology applicability conditions and other eligibility conditions for inclusion of VPA in the PoA are met. To avoid double counting each VPA lists the names of the ships and their identification International Maritime Organisation. The CME keeps records of all the ships included in the VPAs to guarantee that no double counting could occur and check with Gold Standard to ensure that other Gold Standard projects or PoAs presented for similar project activities do not include any of the ships included in the proposed VPA. It is checked that CME has signed an agreement with Grimaldi, whose ships are included in the monitoring period /18/. It is further checked that International Paint Ltd is supported by PoA/VPA consultants Fremco and MGM Innova , who help in evaluation of ships, regression analysis of fuel consumption rate versus average speed, applicability and eligibility criteria, emission reduction calculations and all other requirements of GS VPA and PoA. This was further confirmed with the service agreement between International Paint Ltd and The Fremco Corporation Inc, dated 11/03/2015 /19/. It is further noted that the Management and operation of the VPA is as discussed in the
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	registered VPA-DD, which was also confirmed during the interviews with the project participants and the contract documents email between the CME, ship owners and the PoA/VPA consultant's /18/ /19/.
Findings	CR 01 1. PP is requested to provide the management plan with roles and responsibilities of CME and the project participants involved in the VPA inclusion along with the review report of their competence. 2. Provide records of the training conducted in 2016. 3. Provide records to ensure that the implementation and operation of the management plan is the same as discussed in the PoA-DD/MR. For more information, please refer to Appendix-4 of this report. CR01 is closed.
Conclusion	RINA confirms that the implementation and operation of the PoA management system, including the record-keeping system, complies with the registered PoA design document (PoA-DD) in accordance with applicable verification requirements in the VVS.

H.3. Post-registration changes

H.3.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

>>N/A

H.3.2. Corrections

>>N/A

H.3.3. Inclusion of a monitoring plan in a registered PoA-DD (including its generic VPA-DD(s))

>>N/A

H.3.4. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline

>>N/A

H.3.5. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic VPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case VPAs in the PoA

>>N/A

H.3.6. Types of changes specific to afforestation and reforestation activities

>>N/A

SECTION I. Verification findings – Voluntary project activity(ies) under PoA

I.1. Compliance of the VPA implementation with the included VPA design document

Means of verification	The purpose of the VPA is reduce the GHG emissions through the application of advanced low resistance hull coatings instead of traditional coating which reduce hydrodynamic resistance thus reducing fuel consumption for ship propulsion. The VPA under the PoA will be ships travelling between ports in different countries. The fuel consumed in these trips is classified as international bunker fuels and the emissions from the combustion are not part of the GHG national inventories. Each VPA comprises a set of ships that are coated with an advanced hull
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coating and each ship can claim carbon credits for a single docking cycle with the application of the advanced hull coating.

Following are the ships that are included in the monitoring period.

S.no	IMO no.	Ship Name	Ship type
1	9465552	Eurocargo Venezia	Ro-Ro Cargo
2	9465540	Eurocargo Alexandria	Ro-Ro Cargo
3	9471056	Eurocargo Ravenna	Ro-Ro Cargo
4	9351490	Cruise Europa	Ro-Ro Passenger
5	9030864	Spes	Pure Car Carrier
6	9030852	Fides	Pure Car Carrier
7	9143702	Grand Bretagne	Pure Car Carrier
8	9138393	Grande Mediterraneo	Pure Car Carrier
9	9204568	Festos Palace	Ro-Ro Passenger
10	9204063	Knossos Palace	Ro-Ro Passenger

It is noted that the following ships have been excluded only from this monitoring period.

1. Eurocargo Cagliari , IMO no: 9471068, excluded due to inconsistent results and high energy savings.
2. Eurocargo Livorno, IMO no: 9471070, excluded due to inconsistent results from the first monitoring period, also the energy savings are too high i.e.39.1%
3. Cruise Roma, IMO no: 9351476, excluded due to negative results of energy saving - 8.8%.
4. Catania, IMO no. 9261554, no data available since the passenger ship was chartered to another company from Grimaldi.

The following ships are completely excluded from VPA-1

1. Eurocargo Malta, IMO no. 9465514, excluded since the data of the ship doesn't meet the requirements of Gold standard.
2. Cruise Barcellona, IMO no. 9351488, was excluded to avoid any errors and further delays in the submission of the project.
3. Sorrento, IMO no. 9264312, Ship no longer in service. Ship caught fire in May 2015, prior to the start of the second monitoring period.
4. Argenta, IMO no. 9289726, As noted in the Monitoring Report for the first monitoring period, Table 1, ship was recoated on 08/02/2015. Hence no carbon credits in the second monitoring period.

The operational lifetime of the VPA is determined for each ship, which is based on the length of the docking cycle which is typically 60 months for the cargo vessels, or shorter (36, 30 or 24 months) for some other ships, which was confirmed and checked at the time of validation /11/. The length of the crediting period is strictly related to the duration of the docking cycle until each ship is recoated. Thus, the overall crediting period for the VPA starts on the date that the first ship received the advanced hull coating and end when the last ship with the advanced hull coating reaches the end of its docking cycle, which are recorded in the data plan reports maintained for each ships /20/.

RINA checked the baseline coating dates and baseline coating specifications with the records of antifouling system certificates, data plan reports, supporting information complying with antifouling system /17/. The baseline coating specifications were further checked with the following websites, which confirms that the baseline coating applied, was traditional Biocidal coating.

	http://www.globalkcc.gr/eng/marinNprotective/product/marine.asp http://www.ppgpmc.com/Products/7262/SIGMA-ALPHAGEN-650.aspx http://www.nipponpaint-marine.com/en/products/datasheets/pdf/12-02.pdf http://www.international-marine.com/PDS/892-M-spa-A4.pdf http://www.csp.co.kr/downfile/prod/SEA%20GRANDPRIX%20500.pdf http://www.jotun.com/Datasheets/Download?url=%2FTDS%2FTDS_28901_SeaMate+M_Euk_GB.pdf http://www.hempel.com/en/products/hempels-antifouling-oceanic-8495k During the verification, it was further noted that the baseline coating dates of few ships were not consistent with antifouling certificates provided. The details of the same are explained in CR3. It was noted that with the revised dates, except for the ship “Eurocargo Alexandria”, the regression coefficient /emission reductions doesn’t change for any ships. For “Eurocargo Alexandria” changes slightly and the emission reductions increase to 4704 from 4404 tCO₂. However, the first version of emission reduction spread sheets has been retained in the monitoring period since the same is conservative and RINA accepted the same.
Findings	CR 02 1. PP is requested to clarify, if the ships have been completely removed from this crediting period/ monitoring period or only the ER calculations of respective ships are not accounted in this MP. Requested to correct the MR accordingly. 2. PP is requested to provide the agreements between international paint Ltd with ship owners and operators to sell the coating product, obtain information necessary to determine baseline and project emissions, and emissions, and share the carbon credits. For more information, please refer to Appendix-4 of the report. CR02 is closed.
Conclusion	Based on the interviews and the documents verified, RINA confirms that the VPA implementation and operation complies with the registered VPA-DD.

I.2. Post-registration changes

I.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

>>N/A

I.2.2. Corrections

>>N/A

I.2.3. Changes to the start date of the crediting period

>>N/A

I.2.4. Inclusion of a monitoring plan to an included VPA-DD

>>N/A

I.2.5. Permanent changes to the monitoring plan as described in the included VPA-DD, applied methodology, or applied standardized baseline

>>N/A

I.2.6. Changes to the programme design of the included VPA-DD

>>N/A

I.2.7. Types of changes specific to afforestation and reforestation component project activities

>>N/A

I.3. Compliance of monitoring plan with the monitoring methodology including applicable tool

Means of verification	The registered VPA applies the approved Gold Standard Methodology Reducing emissions through the use of advanced hull coatings, version 2.0 of 17/11/2014 /06/.
Findings	N/A
Conclusion	RINA confirms that the monitoring plan in the registered VPA-DD /02/ complies with the applied GS methodology /06/ and with the sustainability indicators established by the Gold Standards requirements /07/ /09/.

I.4. Compliance of monitoring activities with the registered monitoring plan

I.4.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	The following table list the data and parameters fixed ex ante.				
		Data/parameter	Unit	Value applied	Assessment
	1	NCV residual fuel oil	TJ/Gg	40.4	The values are consistent with the registered VPA . The same was also cross checked with the IPCC guidelines Volume Energy (table 1.2 and 3.5.2) /13/ and found to be correct.
	2	NCV marine diesel	TJ/Gg	43.0	
	3	NCV low Sulphur heavy fuel oil	TJ/Gg	40.4	
	4	NCV liquefied natural gas	TJ/Gg	48.0	
	5	EF residual fuel oil	Kg/GJ	77.4	
	6	EF marine diesel	Kg/GJ	74.1	
	7	EF low Sulphur heavy fuel oil	Kg/GJ	77.4	
	8	EF liquefied natural gas	Kg/GJ	56.1	
Findings	N/A				
Conclusion	RINA confirms that the parameters listed above are fixed ex-ante and used for baseline, project emissions and leakage emissions calculation in accordance with the applied methodology and methodological tools and they are the same used at the validation stage.				

I.4.2. Data and parameters monitored

Means of verification	The ex-post parameters that are mentioned in the methodology are included in the VPA-DD and in the monitoring plan, and are provided in compliance with the methodology.		
		Parameter	Description/Assessment
	1	j ship	Identification number and name of the ship. The data is available from the ship owner or from the coating manufacturer. The monitoring frequency is once when the ship is coated. Cross checked the vessel IMO numbers with the website vesselfinder.com /22/ and the same is found to be consistent and appropriate.
	2	date_prev(j).	Date on which the previous coating application was finished on ship j. The data is available from the ship owner or from the coating manufacturer /17/. The monitoring frequency is once when the ship is coated and it is recorded at the dry dock where the coating is applied.
	3	Previous coating material (j). The data is available from the ship owner or from the coating manufacturer.	

		detailed day-by-day record of what was done to the ship while it was in the dry dock /20/. It was confirmed that there were no engine modifications done to improve efficiency, nor any change in fuel. The coating diary sheet is also confirmed and signed by the coating manufacturer and vessel owner. The monitoring frequency is once at the time of hull coating.	
	10	Change in fuel at the same time as the application of advanced hull coating: the same justification as above. The monitoring frequency is once at the time of hull coating.	
	11	Voyage data for ships operating on shorter voyages or on long routes	(a) Date (b) Daily distance (nautical miles) (c) Daily streaming time (hours) (d) Average daily speed through water since last daily record (Knots) (e) Sea state (Beaufort number) (f) Vessel condition (ballast/loaded or displacement) (g) Fuel consumption of the main engine since last daily record (tonnes) (h) Daily fuel consumption of the auxiliary engine(s) since last daily record (tonnes) The data are available from ship operator and the monitoring frequency is daily. The same was checked with the performance and consumption monitoring records of all the ships /27/ and accepted by RINA. The details are provided as per the above requirement /27/ and the same is accepted by RINA.
	12	Voyage data for ships operating on shorter voyages	(a) Date of voyage start and end (b) Distance between departure port and arrival port (nautical miles) (c) Voyage time (hours) (d) Average navigation speed during voyage (Knots) (e) Sea state (Beaufort number) (f) Vessel condition of ship at the time of data recording (Ballasts/Loaded or displacement) (g) Fuel consumption of the main engine for navigation part of voyage (tonnes) (h) Fuel consumption of the auxiliary engine for navigation part of voyage (tonnes) The data are available from ship operator and the monitoring frequency is daily. The same was checked with the performance and consumption monitoring records of all the ships /27/ and accepted by RINA. The details are provided as per the above requirement /27/ and the same is accepted by RINA.
Findings	CR 03 1. PP is requested provide records of the dates on which the baseline coats are applied, coating material, evidences of the dates of hull cleaning during the baseline coating cycle, dates of advanced hull coat application, the material used for advanced coating. 2. Evidences from third party to ensure, no engine or other modifications or change in the fuel are undertaken, at the same time of the advanced hull coating. 3. Copy of fuel purchase invoices. 4. Provide a third party report, which ensures that there was no change in the fuel at the same time of application of advanced hull coat. 5. PP to clarify on how they ensure that there is no additional underwater hull cleaning after the application of advanced hull coating. For more information please refer to Appendix-4 of this report. CR03 is closed.		
Conclusion	The monitoring has been carried out in accordance with the monitoring plan contained in the		

	registered VPA-DD. All the parameters were monitored and determined as per the registered monitoring plan. RINA confirms from the document review and interviews with PPs that the actual monitoring system complies with the registered monitoring plan. During the verification, all the relevant monitoring parameters of the registered monitoring plan have been verified with regard to the appropriateness of the verification method; the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. It is confirmed that all the monitoring parameters have been measured/determined without material misstatements and are in line with all applicable standards and relevant requirements. RINA confirms: - That all the parameters stated in the registered VPA-DD have been monitored; - The responsibilities and authorities for monitoring and reporting are in accordance with those stated in the registered VPA-DD; - The monitoring results are consistently recorded as per the approved frequency; Quality assurance and quality control procedure have been applied in accordance with the registered VPA-DD.
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I.4.3. Implementation of sampling plan

Means of verification	N/A
Findings	N/A
Conclusion	N/A

I.5. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	As per the interactions with Grimaldi and confirmation from Grimaldi, following are the details of the flow meters that are used in monitoring fuel consumption.				
	Ship name	Flowmeter make	Flowmeter model	Serial number	Accuracy
	Eurocargo Venezia	Endress+Hauser	F100	L6136E02000	±0.10 %
	Eurocargo Alexandria	Emerson	R100	3845612	±0.5%
	Eurocargo Ravenna	Endress+Hauser	F100	L60E0202000	±0.10 %
	Cruise Europa	Emerson	R100	143594 and 1436546	±0.5%
	Spes	VAF	B5025	586779	±0,3%
	Fides	Aquametro Contoil	VZO 40 FL 180/25	55107	+/-1%
	Grand Bretagna	Endress+Hauser	F100	H50E6502000	±0.10 %
	Grande Mediterraneo	Endress+Hauser	F100	M808EB02000	±0.10 %
	Festos Palace	VAF	J5050E and B5050	J5050E: S/N 709901 B5050: S/N 591538	+/-2% ±0,3%
	Knossos Palace	VAF	B5050	600970 and 591534	±0,3%
	The above mentioned flow meter specifications were checked with the given websites /28/. The ship operator Grimaldi has confirmed that only zero calibration is performed for the fuel flowmeters annually by Chief engineer /29/. Note that the flow meters used in Grimaldi ships are all very accurate, as shown in right column of table above. It is checked that meters doesn't require calibration except when extremely high accuracy is sought. This was checked with the document "Coriolis flow meter calibration" by Micromotion /30/ and Contoil fuel oil meters by DMS metering solutions /34/. The same was further confirmed with the letter from Emerson, dated 18/09/2017.				
Findings	CR 04 PP is requested to provide the calibration certificates of each fuel flow meters used in checking the fuel consumption for all the ships included in the MP.				
Conclusion	As discussed above , the fuel flow meters doesn't require calibration because of the externally accurate and stable flow meters. The verifier confirms that the calibration requirements are met as per the manufacturer specifications for the current monitoring period.				

I.6. Assessment of data and calculation of emission reductions or net removals

I.6.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The baseline emissions are calculated as the fuel consumption which is the fuel that the ship would consumed if it had the historical, baseline coating. The historical data on daily fuel consumption are analysed using the regression approach which is in accordance with the applied methodology /06/. The following formula is used: $BE_{j,y} = \sum_i \left(\sum_k BFC_{i,j,k} \right) \times COEF_{i,y}$ Where BFC is the quantity of fuel type that would have been combusted in ship during a specific year (excluding the fuel not used for propulsion), and COEF is the CO₂ emission coefficient of fuel type in year (tCO₂/mass or volume unit). According to the methodology the COEF is determined as per the methodological tool to calculate project or leakage CO₂ emissions from fossil fuel combustion /14/. Option B is chosen where COEF is determined using NCV and EF standard values as per the IPCC guidelines /13/. Each analysis contains data provided by the ship owner, as weather parameters, voyage parameters, fuel consumption separately for navigation and manoeuvring activities /12/.
Findings	N/A
Conclusion	It is concluded that the Project and baseline emissions are each directly proportional to the respective fuel consumption as per the equations 1 and 2 of the methodology. (as given by Eq. (1) and (2) of the methodology). Baseline emissions are determined in a dynamic manner for each Voyage / Noonday of project data. RINA confirms that the emission reductions have been appropriately calculated and are consistent with raw data, the applied methodology, registered PoA-DD and the VPA-DD /01/ /02/.

I.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	It was checked that the project emissions are calculated based on the emissions associated with actual fuel consumption in ship propulsion. It was further noted that the PP has considered the fuel consumption, which was used only for navigation /12/, which is also as per the methodology /06/ after the advanced hull coat. It was also noted that in some of the ships the total fuel consumption was used in regression analysis and in such cases, it was also checked that in both the cases the same boundary of fuel consumption data was used, in both project as well as in baseline scenario /12/. The same is as per the methodology and accepted by RINA. It is to be also noted that the project emissions are calculated directly and the baseline emissions correspond to the emissions for the same energy service (Voyage, distance) that would have happened in the baseline scenario, which is demonstrated or estimated by means regression analysis of baseline fuel consumption for the project period, which as per the methodology and accepted by RINA. It is also checked that the client receives the raw data directly from the ship operators and the raw data is also part of the ER sheets /12/. The ER sheet includes several comments on excluding the false data and the data, which doesn't meet the requirements of the methodology. It was also checked that the client has provided a check at every point to make sure that the wrong data is not used in the estimations, which was also cross checked by RINA team and accepted.
Findings	N/A
Conclusion	RINA confirms that the emission reductions have been appropriately calculated and are consistent with raw data, the applied methodology, registered PoA-DD and the VPA-DD /01/ /02/.

I.6.3. Calculation of leakage GHG emissions

Means of verification	As per the applied methodology /06/ the PoA/VPA comprise the use of one coating product instead of another, thus no leakage effects are expected
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Findings	N/A
Conclusion	RINA confirms that the leakage justification provided in the MR is as per the applied methodology, registered PoA-DD and the CPA-DD /01/ /02/

1.6.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	It is checked that the emission reductions are calculated based on the energy savings (fuel savings). The fuel savings are calculated based on the difference between estimated baseline fuel use and actual project fuel use for each valid day/voyage of project voyages. The emission reductions of the respective monitoring period was cross checked from the ER spread sheets. Noted that the ER spread sheets provided to RINA is continuous addition of data from the day of baseline coat application. Irrespective of the MP, the client has clearly marked the emission reduction pertaining to this MP, which can be checked from the sheet 2MP project for the ships (Eurocargo Ravenna, Cruise Europa , Grand Bretagne, Grande Mediterraneo, Knossos Palace) sheet 2MP Project no D for the ships (Spes, Fides, Festos Palace) sheet 2MP Project ratchet D for ship (Eurocargo Alexandria) and 2CP Project no D for ship (Eurocargo Venezia) /12/. It was further noted that the stormy days were excluded from the regression analysis i.e. the days when the wind orio is 6 or more than 6 are excluded. In fact in baseline only the days for >6 were excluded. However, in the Project case the days for 6 and > 6 were excluded. Since the same is conservative, it was accepted by RINA. Apart from this the data corresponding to days in which voyaging time, which was below 23 hours on the day were also excluded from the regression analysis. The same was also applied for project period, which thereby helps in improving the accuracy of regression co-efficient. As discussed above, the ER sheet includes several comments and coloured highlights on excluding the false data and the data, which doesn't meet the requirements of the methodology and being excluded. It was also checked that the ER sheet provides multiple checks at various parameters to make sure that wrong data is not used in the estimations. Once fuel savings have been estimated for each day, total savings is determined by summing over the days in each year. The fuel savings multiplied by the emission factor of the fuel gives the total emission reductions.
Findings	CR 05 It is noted that in the ER sheet "Eurocargo Alexandria analysis 20jan16.xls" the average saving comes to -28%. Pls clarify if the ship can be qualified in getting the emission reduction savings. For the ship "Festos palace analysis 20jan16.xls", "Knossos Palace analysis 20jan16.xlsx" the average savings are 24% and 27% respectively. As per the comments from GS during the first verification, the calculations are accepted if the overall savings are less than 18%, which is conservative. PP is requested to clarify. For more information, please refer to Appendix-4 of this report . CR05 is closed.
Conclusion	RINA confirms: - All the data and parameters were monitored in accordance with the registered VPA-DD; - The data presented in the monitoring report /02/ were assessed by reviewing in detail project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. - The calculation of emission reductions have been carried out in accordance with the formulae and methods described in the registered VPA-DD, the applied methodology and methodological tools; Emission factor and default values have been applied in the calculation in accordance to the registered VPA-DD.

1.6.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included specific-case VPA

Means of verification	The emission reductions from the project for the monitoring period as reported in the monitoring report revision version 02 of 27/09/2017 /05/ is equivalent to 48,911
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	tCO_{2e} . The reported emission reductions are 16% lower than the estimated emission reduction of 58,604 tCO _{2e} for the period as per the registered VPA-DD /02/.
Findings	N/A
Conclusion	The emission reduction calculations provided in the spreadsheet /12/ have been verified to be correct and in line with the registered VPA-DD /02/.

Specific-case VPA reference number	Value estimated in ex ante calculation in the included specific-case VPA-DD(s)	Actual values achieved by the specific-case VPA(s) during this monitoring period
GS 2767	58, 604	48,88 9
Total	58, 604	48, 889

I.6.6. Remarks on difference from estimated value in registered VPA-DD

Means of verification	As discussed in section H.6 of the MR, it is noted that the actual Ers are more or less similar to ex ante estimates for many of the ships. Moreover, the ex- ante ER estimates are based on the project data that were available at the time of submission of the VPA-1. Thus there would be difference in the emission reductions estimated and reported. Further it was also noted that there were many days, which were excluded and most of the places conservative values were used in calculations.
Findings	N/A
Conclusion	The emission reduction calculations provided in the spreadsheet /12/ have been verified to be correct and in line with the registered VPA-DD /02/.

I.6.7. Assessment of the sustainability parameters

Means of verification	Parameter	Sub-parameter	Assessment
	Air Quality	VOCs	Noted that emissions due to VOCs have already been quantified in the previous monitoring period, since the no ships were coated with advanced hull coat. This was confirmed from the previous verification report and accepted /15/.
	Water quality and quantity Biodiversity	Biocide content (kg)	It is confirmed that the biocide content doesn't depend on the monitoring period and would be released over the baseline docking cycle, which is confirmed with the spread sheets (VPA 1 2MP Environmental data parameters_26jan17 .xlsx) /32/. In the ER sheets, the total reduced biocide release is prorated by the duration of the monitoring period. The values and equations used in calculating the biocide content checked and the same is accepted.
	Soil condition	Paint volume (litres) Waste tins (kg)	From the (VPA 1 2MP Environmental data parameters_26jan17 .xlsx) /32/ it is checked and confirmed that the paint volume is low compared to the baseline system, which will further reduced the no. of waste tins. The advance hull coat is not only biocide free but also reduces the predicted toxic load associated with paint components to both humans and marine environment /33/. It is further confirmed from the PP that the waste tins are collected and recycled by the shipyard and shipyards will charge a nominal fee per drum as disposal cost from the ship owners.
	Other pollutants	Acidification potential	The data is not quantified. The same was checked and accepted during the validation and the passport is registered.
	Quality of employment	Labour conditions (job related health and safety)	The application of the Intersleek system reduces emissions of VOC compared to the biocidal systems thus workers are exposed to less contamination /37/. The corresponding application is cross checked with the dataplan reports /30-32/ /38-52/ and with the Fouling control eco-efficiency analysis summary /12/. The same is not applicable to this monitoring period since, no

			advanced hull coating is carried out.
	Human and institutional capacity	Training and education	Noted that the following trainings were provided to the employees in this monitoring period. - GloMEEP GPTF-1 Minutes of the Meeting draft Final 20 October 2015.pdf /34/ - MSDP Silver 2016-01 Attendees.pdf - MSDP Silver Attendees 2015-09.pdf
	Technology transfer and technological self-reliance	Number and types of events attended and/or press releases published	PP has provided the list of events, media coverage and press release publications with links of the website, references and copy of the press release. The same was accepted by RINA.
	It is, also checked that the PP has ensured to address the grievance mechanism throughout the crediting period by designating people to monitor the email id , website and phone no. provided, with also copy to gold standard. It is confirmed by the PP that no comments were received during this monitoring period.		
Findings	CR06 Water quality and quantity - PP is requested to clarify on how the biocide content in baseline for the respective monitoring period is calculated. Prove the same with evidences. Soil condition - It is not clear on why this parameter is considered as 0 because the degradation doesn't happen once and its continuous mechanism. Also clarify how the waste tins are disposed. Human and institutional capacity - Please provide the evidences of the trainings and webinars provided in this monitoring period. PP is further requested to clarify on how the grievance mechanism of stakeholders is followed throughout the project and provide evidences of the same. For more information, please refer to Appendix-4 of this report. CR06 is closed		
Conclusion	RINA confirms that monitoring of all the sustainable development monitoring parameters during this monitoring period is in line with registered GS passport and are consistent with documents provided for verification.		

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CDM-PCP	Clean Development Mechanism Project Cycle Procedure
CDM-PS	Clean Development Mechanism Project Standard
CDM-VVS	Clean Development Mechanism Validation and Verification Standard
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CR	Clarification Request
CME	Coordinating and Managing Entity
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Certification Program
VPA	Voluntary Programme Activities
CPA-DD	Component Project Activity Design Document
DD	Design Document
DNA	Designated National Authority
DNHA	Do No Harm Assessment
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact assessment
ER	Emission Reductions
FAR	Forward Action Request
FR	Feedback Round
GS	Gold Standard
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LSC	Local Stakeholders Consultation
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
MSC	Micro Scale
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PoA	Programme of Activities
PoA-DD	CMD Programme of Activities Design Document
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services S.p.A.
SD	Sustainability Development
SMP	Sustainability Monitoring Plan
SS(s)	Sectoral Scope(s)
SSC	Small Scale
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile Organic Component

Appendix 2. Competence of team members and technical reviewers



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI* QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Rekha Menon

è qualificato come:
is qualified as:

TEC, VAL, VER, TL, ITRP

per le seguenti aree tecniche:
for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13
13.2	Manure	13
14.1	Afforestation and reforestation	14

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
Scheme Leader
Rita Valoroso

*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

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VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
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Ecologia Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
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AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
5.1	Chemical industry	5
7.1	Transport	7
11.1	Emission of fluorinated gases	11
13.1	Solid waste and wastewater	13

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

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 Scheme Leader
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TEC, VAL, VER, TL, ITRP

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 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
8.1	Mining and mineral processes	8
9.2	Iron, steel and Ferro alloy production	9
13.1	Solid waste and wastewater	13

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)

Responsabile di schema
 Scheme Leader
 Rita Valoroso

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Michela Schenone

è qualificato come:
 is qualified as:

TEC

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
7.1	Transport	7

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	27/11/2017	First issue

Head of QPT
 Laura Severino

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	International Paint Ltd	CDM-PoA-DD for PoA "Programme for the application of advanced hull coatings to reduce shipping fuel consumption (PAHSF)",.	Version 5 of 25/08/2015	PP
2	International Paint Ltd	CDM-CPA-DD for VPA "PAHSF Project 1"	version 5 of 25/08/2015.	PP
3	International Paint Ltd	PoA Passport for PoA "Programme for the application of advanced hull coatings to reduce shipping fuel consumption (PAHSF)".	Version 2 of 25/02/2015	PP
4	International Paint Ltd	PoA Passport for VPA PAHSF Project 1"	version 5 of 25/08/2015	PP
5	The FreMCo Corporation Inc and MGM Innova	2 nd Monitoring report for VPA PAHSF Project 1	version 01 of 15/02/2015 version 02 of 27/09/2017 version 03 of 06/02/2018	PP
6	Gold Standard Foundation	Gold Standard Methodology Reducing emissions through the use of advanced hull coatings	version 2.0 of 17/11/2014	Others
7	Gold Standard Foundation:	The Gold Standard Requirements,	version 2.2 of 01/06/2012	Others
8	Gold Standard Foundation	The Gold Standard Principles	May 2013	Others
9	Gold Standard Foundation	The Gold Standard Toolkit	version 2.2 of 01/06/2012	Others
10	Gold Standard Foundation	The Gold Standard PoA rules and guidance – Annex F	GSV2.2	Others
11	RINA SERVICES Spa	Validation Report No. 2014DG28MD	version 2.0 of 02/09/2015	Others
12	The FreMCo Corporation Inc and MGM Innova	Emission reduction calculation spread sheets VPA_1 Claim 2 summary for monitoring report 24jan17.xlsx Eurocargo Venezia analysis 21jan16 no D update 1dec16.xlsx Eurocargo Alexandria analysis 20jan16 update 1dec16.xls Eurocargo Ravenna analysis 20jan16 update 6dec16.xlsx Cruise Europa Analysis no D 19jan16 update 11dec16.xlsx Spes analysis 6jan16 no D update 18dec16.xlsx Fides analysis no D 21jan16 update 30dec16.xlsx Grand Bretagna analysis 22nov15 updated	Submitted on 16/02/2017 Version 02 submitted on 27/09/2017 Version 03 submitted on 06/02/2018	PP

		12jan17.xls Grande Mediterraneo analysis 20jan16 update 12jan17.xls Festos palace analysis 20jan16 update 3jan17.xls Knossos Palace analysis 20jan16 update 3jan17.xlsx Knossos Palace analysis 20jan16 update 5feb18 VPA_1 Claim 2 summary for monitoring report 27sep17.xlsx VPA_1 Claim 2 summary for monitoring report 6feb18		
13	IPCC	IPCC – 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Table 1.2, Table 3.5.2.		Others
14	CDM Executive Board	Methodological tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion,	Version 02 of 02/08/2008.	Others
15	RINA	GS CPA verification report No. 14DG28MD	Revision No. 2.2 Aa, dated 26/02/2016	Others
16	CDM Executive Board:	CDM-PoA-MR-Form	Version 01.0, dated 01/04/2015	Others
17	RINA	International antifouling system certificate no. 86375 for Eurocargo Venezia (IMO: 9465552)	Dated 03/2011	PP
	RINA	International antifouling system certificate no. 86374 for Eurocargo Alexandria (IMO: 9465540)	Dated 10/02/2011	
	RINA	International antifouling system certificate no. 86376 for Eurocargo Ravenna (IMO: 9471056)	Dated 01/02/2012	
	RINA	Record of antifouling system certificate no. 71590 for SPES (IMO: 9030864)	Date of application 19/06/2009	
	Website	Baseline coating date of Cruise of Europa https://en.wikipedia.org/wiki/MS_Cruise_Europa Completion date 09/2009.	Date considered is 01/10/2009	
	International Paint	Fides data plan report (IMO : 9030852)	Dated 02/09/2008	
	KCC corporation	Grand Bretagne :Confirmation of application of antifouling Paint (IMO: 9143702)	Dated 20/08/2010	
	Boat SpA	Supporting information complying with antifouling system (IMO: 9138393)	Dated 09/2009	
	RINA	Record of antifouling system , certificate no. 88032 for Festos Palace (IMO:9204568)	Dated 01/2010	
	-	International antifouling system certificate no. 88027 for Knossos Palace (IMO:9204063)	Dated 17/10/2010	
18	-	Carbon credit sharing agreement between International Paint Limited and Grimaldi	Dated 11/06/2014	PP
19	-	Service agreement between International Paint Ltd and Fremco Corporation Inc.	Dated 11/03/2015	PP
20	International Paint Ltd	Cruise Europa :Data plan (coating and inspection reports)	Dated 20/12/2010	PP
		Euro Cargo Alexandria :Data plan (coating and inspection reports)	Dated 29/08/2012	
		Euro Ravenna :Data plan (coating and inspection reports)	Dated 20/08/2013	
		Euro cargo Venezia :Data plan (coating and inspection reports)	Dated 25/08/2012	
		Festos Palace :Data plan (coating and inspection reports)	Dated 08/01/2013	
		Fides :Data plan (coating and inspection reports)	Dated 26/08/2011	

		Gran Bretagna :Data plan (coating and inspection reports)	Dated 26/09/2013	
		Grande Mediterraneo :Data plan (coating and inspection reports)	Dated 10/09/2013	
		Knossos Palace : :Data plan (coating and inspection reports)	Dated 20/12/2012	
		Spes : :Data plan (coating and inspection reports)	Dated 31/08/2013	
/21/	The FreMCo Corporation Inc and MGM Innova	1. Eurocargo Alexandria analysis 20jan16 update 10oct17.xlsx (revised) 2. Eurocargo Ravenna analysis 20jan16 update 10oct17.xlsx (revised) 3. Grand Bretagna analysis revised 10oct17.xlsx (revised) 4. Knossos Palace analysis 20jan16 update 10oct17.xlsx (revised)	Submitted on 10/10/2017	PP
/22/	Website	www.vesselfinder.com	In English Language and last accessed on 16/11/2017	PP
/23/	Website to check the baseline coating specifications	http://www.globalkcc.gr/eng/marinNprotective/product/marine.asp http://www.ppgpmc.com/Products/7262/SIGMA-ALPHAGEN-650.aspx http://www.nipponpaint-marine.com/en/products/datasheets/pdf/12-02.pdf http://www.international-marine.com/PDS/892-M-spa-A4.pdf http://www.csp.co.kr/downfile/prod/SEA%20GRANDPRIX%20500.pdf http://www.jotun.com/Datasheets/Download?url=%2FTDS%2FTDS_28901_SeaMate+M_Euk_GB.pdf http://www.hempel.com/en/products/hempels-antifouling-oceanic-8495k	In English Language and last accessed on 16/11/2017	PP
/24/	-	Confirmation email from Grimaldi to International paint stating "UWC is not there is the companies policy and they haven't done any UWC in previous years.	Submitted on 11/04/2017	PP
/25/	Grimaldi	Bunker delivery notes for the vessels covered in the monitoring period.	Submitted on 15/06/2017	PP
/26/	Grimaldi	Performance and consumption monitoring records of the ships involved in the current monitoring period	Submitted on 11/04/2017	PP
/27/	Akzonobel	Typical drydocking procedure	Submitted on 11/04/2017	PP
/28/	Website for flow meter specifications	Aqua metro contoil: www.cmar.hk/vzo_catalog.pdf Emerson: http://www.emerson.com/documents/automation/66048.pdf Endress & Hauser: https://portal.endress.com/wa001/dla/5000523/1568/000/00/TI01034DEN_0112.pdf VAF (B5025/ B5050): https://vaf-technik.de/messtechnik/durchflussmessung/modell/proflow/tab/1/lang/en VAF (J5050E): https://www.vaf.nl/media/1041/midflow-hiflow-meters-j1xxx-j3xxx-j5xxx-pb-127-qb-	Submitted on 07/11/2017	PP

		0614.pdf?type=Brochure		
/29/		Email from Grimaldi to International Paint Ltd on the calibration requirements of fuel flow meters.	Dated 12/06/2017	PP
/30/	Micromotion	Verifying Coriolis flow meter calibration	Dated March 2016	PP
/31/	Emerson Automation Solutions	Letter on calibration interval of micro motion oriolis flow meters	Dated 18/09/2017	PP
/32/	International Paint Ltd	VPA 1 2MP Environmental data parameters_26jan17 .xlsx	Submitted on 16/11/2017	PP
/33/	Akzonobel sustainability	Eco-efficiency assessment report of Intersleek products verified	Dated 27/02/2015	PP
/34/	GEF/IMO/U NDP	Minutes of the 1 st GPTF (Global Project task force) and project inception meeting	Dated 30/09/2015	PP
/35/	International Paint Ltd	Confirmation on “no comments received from stakeholders”.	Dated 26/05/2017	PP
/34/	DMS Metering solutions	Contoil fuel oil meters	Dated 06/2010	Others

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

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

FAR ID	N/A	Section no.	Date: DD/MM/YYYY
Description of FAR			
CME response			Date: DD/MM/YYYY
Documentation provided by the CME			
DOE assessment			Date: DD/MM/YYYY

Table 2. CR from this verification

CR ID	01	Section no.	H.2	Date:04/03/2017
Description of CR				
CR 01				
1. PP is requested to provide the management plan with roles and responsibilities of CME and the project participants involved in the VPA inclusion along with the review report of their competence. 2. Provide records of the training conducted in 2016. 3. Provide records to ensure that the implementation and operation of the management plan is the same as discussed in the PoA-DD/MR.				
CME response				Date:11/04/2017

1. The Management Plan indicated in Sec. C of PoA DD, ver. 5, pp. 19-22, has been followed strictly. The text is repeated in Sec. B.1 (Implementation of the management system of the PoA) of the Second Monitoring Report, ver. 1, pp 4-9. With respect to the competence, the CME is the manufacturer of advanced hull coatings, the application of which is the project activity. The CME supplies the materials to shipping companies, and therefore has the records to determine and document all the sustainable development indicators. For the PoA and VPA 1, the consultancy is being undertaken by FReMCo and MGM Innova. For details see document "CR 01 item 1 reply 27mar17.docx"
2. The list of training conducted is included in the abovementioned Sec. B.1 of the second monitoring report. They are further detailed in "Parameter 7. Human and Institutional Capacity (Training and Education)"
3. The second monitoring period (2MP) for VPA-1 included only one shipping company, Grimaldi. The one other ship from the other shipping company in the first monitoring period had already been recoated before the 2MP. The raw data for all ships were received by International Paint and forwarded to FReMCo/ MGM Innova on 14 Nov. 2016. See files "Email from IP with data for VPA1 2MP.docx" and "VPA1#2 data.zip". The zip file contained 13 Excel workbooks, one for each ship. The sheets for each ship were added to the right of the Excel workbooks submitted with the monitoring report for the first monitoring period (1MP). This way the baseline data analysis as well as the data analysis leading to the emissions reductions for both monitoring periods would remain in the updated Excel workbooks. For each ship, additional sheets were added to the right to complete the analysis for the second monitoring period. All Excel workbooks were submitted with the monitoring report for 2MP.

Documentation provided by the CME

1. CR 01 item 1 reply 27mar17.docx
2. No additional documentation
3. Email from IP with data for VPA1 2MP.pdf
4. VPA1#2 data.zip

DOE assessment**Date:**22/06/2017

1 & 3. The management plans along with the roles and responsibilities of CME and project participants involved in the VPA are discussed in section B.1 of the MR. The implementation and operation of the management plan is the same as discussed in the PoA-DD/MR, the same was confirmed by means of interviews with consultants, CME and ship owners and further cross checked with the CMEs agreement with Grimaldi (ship owner) and with consultants (MGM Innova & FReMCo). RINA also checked that the transfer of raw data from shipping companies to the CME and then to the consultants, which confirms that the roles and responsibilities, implementation and operation of the VPA is as per the registered VPA.

4. The details of training conducted for the current monitoring period has been listed in section B.1 of the MR. The same was confirmed with the attendance list of documents GloMEEP GPTF-1 Minutes of the Meeting draft Final 20 October 2015.pdf, MSDP Silver 2016-01 Attendees.pdf, MSDP Silver Attendees 2015-09.pdf

CR 01 is closed.

CR ID	02	Section no.	I.1	Date:04/03/2017
Description of CR				
CR 02				
1. PP is requested to clarify, if the ships have been completely removed from this crediting period/ monitoring period or only the ER calculations of respective ships are not accounted in this MP. Requested to correct the MR accordingly. 2. PP is requested to provide the agreements between international paint Ltd with ship owners and operators to sell the coating product, obtain information necessary to determine baseline and project emissions, and emissions, and share the carbon credits.				
CME response				Date: 11/04/2017

1. In the table listing ships in Sec. D.1 of the Monitoring Report, some ships were not included. These were shown in red in the table. A number of possible reasons for exclusion were given in the text above the table. The attached table "Ships included and excluded from VPA-1 Second Monitoring Period 31mar17.xlsx" provides explanations for specific ships, including whether the ships would be considered for the third monitoring period.
2. The ships in the Second Monitoring Period of VPA_1 all belong to Grimaldi. Attached is the file "Grimaldi Agreement.pdf" which describes the advanced coating product, and the potential for carbon credits. The section Rights/Obligations deals with issues related to the applicability conditions specified in the methodology (**Reducing vessel emissions through the use of advanced hull coatings, ver. 2**), Section 4, p.10 and 11.

Documentation provided by the CME

1. Ships included and excluded from VPA-1 Second Monitoring Period 31mar17.xlsx
2. Grimaldi Agreement.pdf

Given the documentation provided as well as confirmation from RINA, we believe all of the points in CR 02 have been addressed and satisfactorily closed.

DOE assessment**Date:**22/06/2017

1. The excel sheets "Ships included and excluded from VPA-1 Second Monitoring Period 31mar17.xlsx" clearly states, the ships, which has been completely removed from the VPA and the ships which are only removed from the current monitoring period , with justification. The same was checked by RINA and accepted.
2. CMEs contract agreement with Grimaldi, dated 11/06/2014 checked and the same was accepted.

CR02 is closed.

CR ID	03	Section no.	I.4.2	Date: 04/03/2017
Description of CR				
CR 03				
1. PP is requested provide records of the dates on which the baseline coats are applied, coating material, evidences of the dates of hull cleaning during the baseline coating cycle, dates of advanced hull coat application, the material used for advanced coating. 2. Evidences from third party to ensure, no engine or other modifications or change in the fuel are undertaken, at the same time of the advanced hull coating. 3. Copy of fuel purchase invoices. 4. Provide third party reports, which ensures that there was no change in the fuel at the same time of application of advanced hull coat. 5. PP to clarify on how they ensure that there is no additional underwater hull cleaning after the application of advanced hull coating.				
CME response				Date: 11/04/2017

1. The type of baseline coating and application date for each ship is summarized in the sheet "Baseline coating" of the Excel workbook "Grimaldi_answers.xlsx". The folder "Baseline coatings" includes copies of the baseline coating reports for all ships included in 2MP.
2. The activities undertaken during the drydocking are detailed in the attached document "Dry docking procedure.pdf". Moreover, the Dataplan report, prepared at the time of Intersleek hull coating application, includes a detailed day-by-day record of what was done to the ship while it was in the dry dock. An example of the sheet is shown below, for Eurocargo Ravenna. The Dataplan reports for all ships are being provided to RINA. For all the ships it can be seen that there were no engine modifications to improve efficiency, nor any change in fuel.



MIN "EUROCARGO RAVENNA" Docked in Naples on AGO 2012

Dataplan
Coating Diary

AREA CODES										PORTSIDES				STARBOARD			
A FLATS										E DECKS				J FRESHWATER TANKS			
B U/W SIDES										F SUPERSTRUCTURE				K ENGINE ROOM			
C BOTTOM										G HOLD/CARGO TANKS				L VOID SPACES			
D TOPSIDES										H BALLAST				M OTHER INTERNAL AREAS			
Operation	Areas				Start Date-Time	End Date-Time	Weather/wind	1	Air temperature	2 Wet	Dry	Surface Temp.	Rel. Humidity	Dew Point	Date-Time of Measurement		
Vessel Docked					05/08												
HPFW washing	A	B	C	D	06/08	07/08											
BLASTING SA 2	A	B			07/08	20.15/08/08	7.30	SUNNY	STILL								
ENA 300	A	B			08/08	8.15/08/08	9.45	SUNNY	MOD	31	33		56%	21	08/08	8.00	
BLASTING SA 2	A	B			08/08	20.00/09/08	7.45	SUNNY	STILL								
ENA 300	A	B			09/08	8.15/09/08	9.45	SUNNY	MOD	32	34		50%	23	09/08	8.00	
BLASTING SA 2	A	B			09/08	20.00/10/08	8.15	SUNNY	STILL								
ENA 300	A	B			10/08	8.30/10/08	10.30	SUNNY	MOD	32	34		52%	21	10/08	8.00	
BLASTING SA 2	A	B			10/08	20.00/11/08	8.15	SUNNY	STILL								
ENA 300	A	B			11/08	8.30/11/08	10.30	SUNNY	MOD	33	35		64%	25	11/08	8.00	
BLASTING SA 2	A	B			11/08	20.00/12/08	8.15	SUNNY	STILL								
ENA 300	A	B			12/08	8.30/12/08	10.30	SUNNY	MOD	33	36		62%	24	12/08	8.00	
BLASTING SA 2	A	B			12/08	20.00/13/08	8.15	SUNNY	STILL								
ENA 300	A	B			13/08	8.30/13/08	10.30	SUNNY	MOD	35	36		58%	25	13/08	8.30	
BLASTING SA 2	A	B			13/08	20.00/14/08	6.45	SUNNY	STILL								
ENA 300	A	B			14/08	8.00/14/08	9.45	SUNNY	STILL	35	36		64%	27	14/08	9.45	
HPFW	A	B	C	D	16/08	8.40/16/08	14.30	SUNNY									
ENA 301	A	B			17/08	8.30/17/08	12.45	SUNNY	MOD	34	36		52%	22	17/08	12.45	
BXA 385	A	B			17/08	14.30/17/08	20.00	SUNNY	MOD	35	37		58%	25	17/08	14.30	
BXA 757	A				18/08	8.30/18/08	12.45	SUNNY	STILL	33	36		60%	24	18/07	12.45	
BXA 1100 SR	B				18/07	13.30/18/08	16.00	SUNNY	MOD	33	36		58%	23	18/07	13.30	
BALLASTING					18/07	22.00/19/08		SUNNY									
DRAFTMARKS	A	B			19/08	8.45/19/08	15.30	SUNNY									
IWS	A	B			19/08	8.45/19/08	15.30	SUNNY									
OUT FROM DOCK	A	B			20/08	10.00		SUNNY									

MAR 10

3. The supply of fuel purchases for each ship is listed in the sheet "Bunker" of the Excel workbook "Grimaldi_answers.xlsx". The list notes ship name, port, date, fuel company, type of fuel supplied and quantity (metric tonnes). Grimaldi has noted "If Rina executive wish, we can provide, as done in previous verification process, spot BDR cross-check upon his request." RINA later provided selection of fuel purchase invoices it asked Grimaldi to provide, by highlighting select rows in master file provided by Grimaldi noted above, the "Bunker" tab of the file "Grimaldi_answers.xlsx". All fuel purchase invoices uploaded to Dropbox – see below in Documentation provided by the CME.
4. See file "CR 03 item 4 reply 27mar2017.doc"
5. Grimaldi has noted that it is impossible to provide proof that there was no underwater cleaning (UWC) in previous years. Grimaldi has noted: "UWC was not in our company policy and no UWC have been carried out for Eurocargo, Cruise and Knossos and Festos". Since all ships included in VPA1 2MP fall into one of these families, there was no additional underwater cleaning after the application of advanced hull coating.

Documentation provided by the CME

1. For all ships included in 2MP.
Baseline coating details (in folder "Baseline coatings"):
 - Grimaldi_answers 10apr17.xlsx
 - Record of AF system Eurocargo Venezia.pdf
 - Record of AF system Eurocargo Alexandria.pdf
 - Record of AF system Eurocargo Ravenna.pdf
 - Record of AF Cruise Europa.pdf
 - Record of AF system Spes.pdf
 - Fides Dataplan Sept 2008.pdf
 - Record of AF Cruise Europa.pdf
 - Gran Bretagna20170407141445491.pdf and Gran Bretagna_KCC_Aug 2010.pdf
 - Grande Mediterraneo 20170407141512727.pdf
 - Record of AF system FestosPalace.pdf
 - Record of AF Knossos Palace.pdf
 Advanced hull coating details (in folder "Advanced coatings"):
 - Dataplan reports
 2. Dry docking procedure.pdf
 3. See sheet "bunker" of Grimaldi_answers 10apr17.xlsx
The requested fuel purchase invoices have been provided in 2 batches in the following subfolders of the shared Dropbox file – "CR Responses 28sep17" in subfolder "CR03 point 3" and "CR responses 15jun17" in subfolder "CR03 point 3".
 4. See "CR 03 item 4 reply 27mar2017.doc"
 5. See files in subfolder entitled "CR03 point 5" within subfolder "CR responses 16nov17" for documentation provided, email replies from Grimaldi on this matter.
- From email from RINA to FReMCo/MGM, 10may17: "Yes, these documents are fine to close the issues CR01: point 1 and CR03: point 5."

DOE assessment	Date:22/06/2017
Point 1 above, subdivided into four comments (Items 1.1 to 1.4) Item 1.1. The date mentioned in the International antifouling system certificate no. 86374 for Eurocargo Alexandria, Revenna is not consistent with VPA-DD. As per the sheet "Grimaldi comments 16Jun17.xls", the date is taken as per the new built date. Provide the reference to cross check the same. Item 1.2. Gran Bretagna baseline date not consistent with letter provided by KCC Corporation. Item 1.3. For Festos Palace, As per the certificate it is January 2010 and VPA-DD it is 12/04/2011. Item 1.4. The certificate provided for Knossos palace is from GL. The IMO no provided in the document (9204568), which is the same as Festos palace. Please clarify and Provide evidence to confirm the baseline cost date. Point 3 of previous set of comments, above, subdivided into three comments (Items 3.1 to 3.3) Item 3.1 Verification of fuel deliveries. 3.1. Evidences for the yellow highlighted not provided. Could cross check the one, which is highlighted green. 3.2. Further was not able to cross check BDR12, BDR13, BDR 16 and 18 against the one highlighted yellow in Grimaldi_answers.xls 3.3. For Festos Palace, As per the certificate it is January 2010 and VPA-DD it is 12/04/2011.	
CME response	Date:28/09/2017

Item 1.1

Eurocargo Alexandria. Newbuild year is 2011, as found in public sources, e.g.

https://www.marinetraffic.com/en/ais/details/ships/shipid:280898/mmsi:247296500/imo:9465540/vessel:EUR OCARGO_ALEXANDRIA. In the Basic data sheet of "Eurocargo Alexandria analysis 20jan16 update 1dec16.xls" the Newbuild is shown as 2011, and delivery from shipyard is given as 01/02/2011. The RINA certificate "Record of AF system Eurocargo Alexandria com GD.pdf" is dated 10 February 2011, which is consistent.

Eurocargo Ravenna. Newbuild year is 2012, as found in, e.g.

https://www.marinetraffic.com/es/ais/details/ships/shipid:281549/mmsi:247318300/imo:9471056/vessel:EUR OCARGO_RAVENNA. In the Basic data sheet of "Eurocargo Ravenna analysis 20jan16 update 6dec16.xlsx", the newbuild date is given as 1/2/2012. The RINA certificate "Record of AF system Eurocargo Ravenna com GD.pdf" notes at the bottom that the survey was conducted on 28/02/2012, which is consistent.

Item 1.2

The date has been corrected in the revised Excel workbook. The previous and corrected ER are shown in a revised summary workbook. The results have been incorporated in a revised monitoring report.

Item 1.3.

As above, for Gran Bretagna

Item 1.4.

The correct Baseline coating report is attached. It includes comments indicating the type of coating and the baseline coating date: 17/10/2010. This is roughly the same as used in the data analysis (19/11/2010).

Moreover, since the D variable (days since coating application) is not statistically significant, this difference has no impact on the ER results.

Item 3.1. Additional bunker fuel delivery / fuel purchase invoices have been provided by Grimaldi

Items 3.2 and 3.3. See above (answer to item 3.1)

Documentation provided by the CME**Item 1.1**

Record of AF system Eurocargo Alexandria com GD.pdf

Record of AF system Eurocargo Ravenna com GD.pdf

Item 1.2.

Grand Bretagna analysis corrected 24jun17.xls

VPA_1 Claim 2 summary for monitoring report 27sep17.xlsx

VPA 1 GS2767 Monitoring Report Second Period Version 2 28sep17.docx

Item 1.3.

Festos palace analysis corrected 27jun17.xls

VPA_1 Claim 2 summary for monitoring report 27sep17.xlsx

VPA 1 GS2767 Monitoring Report Second Period Version 2 28sep17.docx

Item 1.4

Knossos Palace-88027-V024 IAFS com MGM.pdf

Item 3.1, 3.2, and 3.3

1.pdf; 2.pdf; 3.tif; 4.pdf; 5.pdf; 6.pdf; 7.pdf; 8.pdf; 20150817_eurocargo venezia.odf; 20160102_Eurocargo Venezia.pdf; bdn61545512345.pdf; BDR.pdf; eurocargo venezia 29 giu.pdf; EUROCARO VENEZIA 29 GIUCAN9833_000.pdf; SPES 098.pdf; SPEC 365.pdf; SPES BDR.jpg

DOE assessment

Date:10/10/2017

Item 1.1.

EurocargoAlexandria:Isn' it possible to consider 10/02/2011 as the baseline coat date. Also for Eurocargo Ravenna analysis, why not 28/02/2012?

Item 1.2:

the Grand Bretagna analysis corrected 24jun17.xls states as 15/08/2010 and the letter from KCC states as 21/08/2010. Pls clarify.

Item 1.3.

the certificate states on January 2010. The excel sheet refers to 15/01/2010. Please clarify on how the day "15" is assumed.

Item 1.4.

Is it not necessary to have the exact date. Also for the above mentioned vessels.

Item 3.1. Closed

Item 3.2. Closed

Item 3.3. Closed

CME response

Date:7/11/2017

Item 1.1

Eurocargo Alexandria. We have revised the analysis with the date of 10/02/2011. In this case, one of the regression coefficients changed slightly, and the emissions reduction changed from 4404 to 4704 tCO₂.

Eurocargo Ravenna. We revised the analysis with a coating date matching the baseline coating certification date (which may not precisely match the actual coating date). However, there is no change in the regression coefficients or in the emissions reduction.

Item 1.2.

Grand Bretagna. We have revised the analysis with the date of 21/08/2010. There is no change in regression coefficients or in emissions reduction. This is so, in part because the difference is only a few days. Moreover, the D coefficient was not statistically significant.

Item 1.3.

Festos Palace. When we do not have the exact date, we assume a mid-month date of 15. The D coefficient (no. of days since coating) is a weak variable, and often is not statistically significant at all. In the following ship, a shift of more than a month in the date did not alter regression results or emissions reduction

Item 1.4.

Knossos Palace. Again we have revised the analysis with a baseline coating date of 17/10/2010. However, for reasons noted above, there is no change in the regression coefficients or in the emissions reduction.

Documentation provided by the CME**Item 1.1**

Eurocargo Alexandria analysis 20jan16 update 10oct17.xls

Eurocargo Ravenna analysis 20jan16 update 10oct17.xlsx

Item 1.2.

Grand Bretagna analysis revised 10oct17.xls

Item 1.3: no additional documentation

Item 1.4.

Knossos Palace analysis 20jan16 update 10oct17.xlsx

DOE assessment

Date:15/11/2017

1. RINA checked the baseline coating dates and baseline coating specifications with the records of antifouling system certificates, data plan reports, supporting information complying with antifouling system /17/. The baseline coating specifications were further checked with the following websites, which confirms that the baseline coating applied, was traditional Biocidal coating.
<http://www.globalkcc.gr/eng/marinNprotective/product/marine.asp>
<http://www.ppgpmc.com/Products/7262/SIGMA-ALPHAGEN-650.aspx>
<http://www.nipponpaint-marine.com/en/products/datasheets/pdf/12-02.pdf>
<http://www.international-marine.com/PDS/892-M-spa-A4.pdf>
<http://www.csp.co.kr/downfile/prod/SEA%20GRANDPRIX%20500.pdf>
http://www.jotun.com/Datasheets/Download?url=%2FTDS%2FTDS_28901__SeaMate+M__Euk__GB.pdf
<http://www.hempel.com/en/products/hempels-antifouling-oceanic-8495k>

During the verification, it was further noted that the baseline coating dates of few ships were not consistent with antifouling certificates provided. The details of the same are explained above. It was noted that with the revised dates, except for the ship "Eurocargo Alexandria", the regression coefficient /emission reductions doesn't change for any ships. For "Eurocargo Alexandria" changes slightly and the emission reductions increase to 4704 from 4404 tCO₂. However, the first version of emission reduction spread sheets has been retained in the monitoring period since the same is conservative and RINA accepted the same.

It is confirmed by Grimaldi that under water cleaning is not in in their company's policy and further no underwater cleaning has been carried out for the vessels included in the VPA. The materials used for advanced hull coat were checked with the data plan reports.

2 & 4. RINA checked the activities that are undertaken during the drydocking from the "Dry docking procedure.pdf". Noted that the procedure doesn't discuss on the engine modifications or fuel change to be done . Moreover, the Dataplan report, prepared at the time of Intersleek hull coating application, includes a detailed day-by-day record of what was done to the ship while it was in the dry dock /20/. It was confirmed that there were no engine modifications done to improve efficiency, nor any change in fuel. The coating diary sheet is also confirmed and signed by the coating manufacturer and vessel owner,

3. Fuel consumption data was checked with ship operator (performance and consumption monitoring) records. The fuel type and the consumption was further confirmed with the bunker delivery notes /25/ and the same was found to be consistent.

5. Noted that for the respective monitoring period the ships included are only from Grimaldi. It is further confirmed by Grimaldi that under water cleaning is not in in their companies policy and further no underwater cleaning has been carried out for the vessels included in the VPA.

CR 03 is closed.

CR ID	04	Section no.	1.5	Date:04/03/2017
Description of CR				
CR 04 PP is requested to provide the calibration certificates of each fuel flow meters used in checking the fuel consumption for all the ships included in the MP.				
CME response				Date:11/04/2017
The sheet "flowmeter" of "Grimaldi_answers.xlsx" lists the models of flow meters used in the different ships. The specifications for the two models of flow meters are attached as PDF files "TI01034DEN_0515.pdf" and "R-Series-PDS-PS-00363.pdf". Grimaldi has also noted that the calibration certificates are on file. "Since there are many documents, and it is a great deal of work for Grimaldi, please randomly select a few ships for which you can spot-check the flow meter calibrations. Recall that for VPA 1, RINA made site visits and made random spot checks also."				
Documentation provided by the CME				
1. Grimaldi_answers 10apr17.xlsx 2. TI01034DEN_0515.pdf 3. R-Series-PDS-PS-00363.pdf 4. See subfolder "CR04" within subfolder "CR responses 16nov17" for the following documentation: BA01065DEN_0314.pdf; Cal interval letter 2017 from Grimaldi 26sep17.pdf; Grimaldiflowmeter info 7nov17 final.xlsx				
DOE assessment				Date:22/06/2017

As per the methodology, section III, QA/QC procedures requires calibration of fuel flow meter, periodic dip test on tanks and when same tank supplies for more than one engine, or other non-engine equipment, the dip test can only be compared with the sum of all flow meters. We have the following options: If the above mentioned procedure is not followed, then we might have to go for a revision in the methodology with valid justification and evidences as why calibrations are not required. OR I am sure that the ship owner must be at least having the installation test certificate of the flow meters. Kindly provide the same and mention in the MR the calibration frequency, which can be as per manufacturer or international standard. In case the frequency is not met, calculate the error in ER calculations based on the new calibration results. Further, I have not received the list of flow meters in each ship, with make, model, accuracy and S.No.	
CME response	Date:14/07/2017
RINA (RekhaMenon) conducted a telephone interview with Mr. Alberto Portolano of Grimaldi regarding this CR04. Grimaldi indicated that the fuel flowmeters on its vessels did not require any special maintenance work, and provided a copy of the flowmeter manual as reference. It was agreed during the call that Grimaldi would obtain a letter from the flowmeter manufacturer, Emerson, confirming this point. Documents are provided as follows: the flowmeter manual (filename "BA01065DEN_0314.pdf"), email correspondence between RINA and Grimaldi regarding the telephone interview (filename "RINA - Grimaldi telephone interview debrief 19jul17.pdf") and the letter from Emerson (filename "Cal interval letter 2017 from Grimaldi 26sep17.pdf").	
Documentation provided by the CME	
BA01065DEN_0314.pdf RINA - Grimaldi telephone interview debrief 19jul17.pdf Cal interval letter 2017 from Grimaldi 26sep17.pdf	
DOE assessment	Date:10/10/2017
Provide the flow meter details of each vessel. Like se.no, type, make and accuracy	
CME response	Date:07/11/2017
See file "Grimaldiflowmeter info 7nov17 final.xlsx", which indicates make, model and serial numbers of fuel flow meters used in the ships. The file also indicates the accuracy, repeatability, and source reference for all makes/models of flow meters used.	
Documentation provided by the CME	
Grimaldiflowmeter info 7nov17 final.xlsx	
DOE assessment	Date:15/11/2017
Flow meter specifications were checked with the given websites /28/. The ship operator Grimaldi has confirmed that only zero calibration is performed for the fuel flowmeters annually by Chief engineer /29/. Coriolis flow meters, such as those used in Grimaldi ships, are close to perfect instruments, which do not require calibration except when extremely high accuracy is sought. This was further checked with the document "Verifying Coriolis flow meter calibration "by micromotion /30/, which states that Coriolis flow meters are extremely accurate and stable over time. The perfect flow meter with zero calibration, zero proving and no zeroing. The same was further confirmed with the letter from Emerson, dated 18/09/2017, which states that based on the long-term stability of micro motions Coriolis technology, micro motion doesn't recommend a calibration interval.	
CR 04 is closed.	

CR ID	05	Section no.	1.6.4	Date: 04/03/2017
Description of CR				
- It is noted that in the ER sheet "Eurocargo Alexandria analysis 20jan16.xls" the average saving comes to -28%. Pls clarify if the ship can be qualified in getting the emission reduction savings. - For the ship "Festos palace analysis 20jan16.xls", "Knossos Palace analysis 20jan16.xls" the average savings are 24% and 27% respectively. As per the comments from GS during the first verification, the calculations are accepted if the overall savings are less than 18%, which is conservative. PP is requested to clarify.				
CME response				Date: 11/04/2017

1. *Eurocargo Alexandria*. The file for the second monitoring period for this ship was "Eurocargo Alexandria analysis 20jan16 update 1dec16.xls". In the sheet with emissions reduction for the second monitoring period, "2MP Project ratchet D". In this version, average % energy savings was not calculated. We have done this in the revised Excel workbook, "Eurocargo Alexandria analysis 20jan16 update 7mar17.xls". The average savings for the second monitoring period are 14%.
2. *Festos Palace*. The file for the second monitoring period for this ship was "Festos palace analysis 20jan16 update 3jan17.xls". For the first monitoring period, average savings were found to be 25% (see sheet "Project (3)"). As required by Gold Standard, we modified the regression using the "no D" coefficients. The results, shown in sheet "Project no D", with average savings of 23%. In both cases, the percentages were stable over time, indicating the estimates are robust. For the second monitoring period, using the "no D" approach recommended by Gold Standard earlier, results are shown in "2MP Project no D". Average savings are 24.4%. Please keep in mind that the 18% maximum was somewhat arbitrary. There were no long-term evaluation of fuel savings and emissions reduction, over entire docking cycles, until the analysis comprising this set of ships (the original list of VPA-1). The regression results as per methodology (sheet "Reg_D_InV_21sep14(2)") are excellent, as are the results for the "no D" case, required by Gold Standard (sheet "Reg No D(2)"). Therefore, we believe that the high % energy savings value is real. The higher savings could be a result of the higher operating ship of this ferry vessel. Note that hydrodynamic drag increases sharply with ship speed, so that advanced hull coatings that reduce hydrodynamic drag are more effective for faster ships. As a further confirmation of the robustness of the high energy savings, we may note that the sister ship Knossos Palace, plying on the same route, shows similar, large fuel savings.
Knossos Palace. The file for the second monitoring period for this ship was "Knossos Palace analysis 20jan16 update 3jan17.xlsx". For the first monitoring period, average savings were 25.0%. This was not calculated explicitly in the first monitoring report. It is now, in sheet "Project(3)" of the revised Excel book "Knossos Palace analysis 20jan16 update 7mar17.xlsx". For the second monitoring period, average savings are 26.6%, slightly higher than in the first monitoring period. Baseline regression results were excellent (sheet: "Reg_LnV_23sep14(2)"). Moreover, savings are stable over voyages in each monitoring period. As noted above, the savings values are very similar for the sister ships Festos Palace and Knossos Palace, as further confirmation of the robustness of the results. Finally, it should be noted that Gold Standard accepted the "too large" energy savings in the first monitoring period.

Documentation provided by the CME

1. Eurocargo Alexandria analysis 20jan16 update 7mar17.xls
2. Knossos Palace analysis 20jan16 update 7mar17.xlsx

Please note that, as stated above, in 07/11/2017 response to Item 1.1, we redid analysis for Eurocargo Alexandria and other ships, as a result of minor correction in baseline coating dates based on additional evidence documentation received. However, the emissions reductions were either unchanged or slightly higher. Therefore, we did not feel there was a need to modify the monitoring report further.

Given the documentation provided as well as confirmation from RINA, we believe all of the points in CR 05 have been addressed and satisfactorily closed.

DOE assessment

Date:15/11/2017

1. Eurocargo Alexandria ER sheets have been revised to "Eurocargo Alexandria analysis 20jan16 update 7mar17.xls". Noted that the average savings for the second monitoring period are 14%. The same was accepted by RINA.
2. The ER spread sheets checked and the justification provided by PP was found to be acceptable and satisfactory.

CR 05 is closed.

CR ID	06	Section no.	I.6.7	Date:04/03/2017
Description of CR				

Water quality and quantity

PP is requested to clarify on how the biocide content in baseline for the respective monitoring period is calculated. Prove the same with evidences.

Soil condition

It is not clear on why this parameter is considered as 0 because the degradation doesn't happen once and its continuous mechanism. Also clarify how the waste tins are disposed.

Human and institutional capacity

Please provide the evidences of the trainings and webinars provided in this monitoring period.

PP is further requested to clarify on how the grievance mechanism of stakeholders is followed throughout the project and provide evidences of the same.

CME response**Date:**11/04/2017

1.The biocide content of SPC coatings was provided in row 27 of sheet "Environmental parameters" of the Excel workbook "VPA 1 2MP Environmental data parameters_26jan17.xlsx". The assumption, provided by IP was:

"Baseline Biocidal Antifouling Scheme = 2 x 125 microns, volume solids = 50%, VOC = 420 gramme/litre, 40% by weight biocide, specific gravity = 1.9 kg/litre"

The biocide content is what is in the hull coating. It does not depend on the monitoring period. The biocide would be released over the entire baseline docking cycle, which is shown for each ship in the table on p. 57 of Monitoring report (based on sheet "Biocide release" of "VPA 1 2MP Environmental data parameters_26jan17 .xlsx". For determining the reduced biocide release during each monitoring period the total release is prorated by the duration of the monitoring period.

2.The following response has been provided by International Paint on how waste tins are disposed. As can be noted, the tins are emptied and sold for scrap, i.e. recycled. Hence there is no waste as such. Moreover, since this process takes place when the ships are painted, there is no impact whatsoever during the second monitoring period. "General practice in the UK and most of Europe is for the shipyard to charge the ship owner a nominal charge per drum (normally around £5) for disposal costs; however the yards do generate a small income from this." "For the actual disposal itself, if the drum has paint left inside it is classed as toxic waste and is very expensive to dispose, so they tend to try and drain off any unused paint where possible, if the drums are empty they can be disposed of as scrap metal, which again, the yard would make a small amount of income from, but the current rate is only £100 per ton, so negligible really. "In most of the UK shipyards, at the end of a dry docking, the yard will scrape out any unused paint into an empty 55 gallon oil drum, then dispose the empty drum as scrap metal, so disposing of the drum will not cost the yard anything apart from the labour required in cleaning, but there is a big cost associated with the 55 gallon drum of unused paint, which can be between £250-£300."

3. Evidence of training and webinars provided.

4. International Paint has provided a letter outlining the process of how the grievance mechanism is handled internally, and the fact that no feedback or comments were received via the feedback methods provided during the timeframe of this second monitoring period.

Documentation provided by the CME

- VPA 1 2MP Environmental data parameters_26jan17.xlsx
- GloMEEP GPTF-1 Minutes of the Meeting draft Final 20 October 2015.pdf
- MSDP Silver 2016-01 Attendees.pdf
- MSDP Silver Attendees 2015-09.pdf
- See attachment "RINA Services - 26.05.17.pdf"

DOE assessment**Date:**15/11/2017

1. It is confirmed that the biocide content doesn't depend on the monitoring period and would be released over the baseline docking cycle, which is confirmed with the spread sheets (VPA 1 2MP Environmental data parameters_26jan17 .xlsx) . In the ER sheets, the total reduced biocide release is prorated by the duration of the monitoring period. The values and equations used in calculating the biocide content checked and the same is accepted.
2. From the (VPA 1 2MP Environmental data parameters_26jan17 .xlsx) it is checked and confirmed that the paint volume is low compared to the baseline system, which will further reduced the no. of waste tins. The advance hull coat is not only biocide free but also reduces the predicted toxic load associated with paint components to both humans and marine environment. It is further confirmed from the PP that the waste tins are collected and recycled by the shipyard and shipyards will charge a nominal fee per drum as disposal cost from the ship owners.
3. Noted that the following trainings were provided to the employees in this monitoring period.
 GloMEEP GPTF-1 Minutes of the Meeting draft Final 20 October 2015.pdf .
 MSDP Silver 2016-01 Attendees.pdf
 MSDP Silver Attendees 2015-09.pdf
 CR 06 is closed.

Table 2. CAR from this verification

CAR ID	N/A	Section no.	Date: DD/MM/YYYY
Description of CAR			
CME response			Date: DD/MM/YYYY
Documentation provided by the CME			
DOE assessment			Date: DD/MM/YYYY

Table 3. FAR from this verification

FAR ID	N/A	Section No.	Date: DD/MM/YYYY
Description of FAR			
CME response			Date: DD/MM/YYYY
Documentation provided by the CME			
DOE assessment			Date: DD/MM/YYYY

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Document information

Version	Date	Description
01.0	30/06/2016	Initial publication.