



Industrie Service

Choose certainty.
Add value.

Evaluation Report

**Evaluation of proposed new Methodology – Statement of
the Audit team**

**“Greenhouse gas emission reductions by recovering and
destroying ozone depleting substances from products”**

Report No. 600500418

25 August 2011

**TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich - GERMANY**

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology



Industrie Service

Report No.	Date of first issue	Version	Date of this revision	Certificate No.
600500418	18-11-2010	03	25-08-2011	-
Subject:	Preliminary evaluation of a new Methodology according to VCS – statement of the audit team			
Executing Operational Unit:	TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199 - 80686 Munich, GERMANY			
Client:	USG Umweltservice GmbH Franz Fritsch Str. 11/Süd/104 4600 Wels AUSTRIA			
Contract approved by:	Rachel Zhang (deputy head of Certification Body)			
Report Title:	Preliminary evaluation of the proposed new methodology "Greenhouse gas emission reductions by recovering and destroying ozone depleting substances (ODS) from products"			
Scope of work	11 (Halogens in the life cycle of cooling equipment)			
Number of pages	22 (excluding cover page and annexes)			
Summary:	<p>The TÜV SÜD Industrie Service GmbH Carbon Management Service has been ordered by USG Umweltservice GmbH to carry out the preliminary evaluation of the new methodology "Greenhouse gas emission reductions by recovering and destroying ozone depleting substances (ODS) from products" according to the Voluntary Carbon Standard 2007-1 requirements for new methodologies and considering project specific methodology. Changes of the methodology caused by the 2. evaluation by Bureau Veritas have been assessed by TÜV SÜD as well.</p> <p>The evaluation of this methodology which is regarded to be a statement of the Audit team in this phase, has been performed by document reviews, discussions between the project proponent and the assessment team, interviews at the office of TÜV SÜD and by e-mail.</p> <p>The evaluation team confirms that the proposed methodology reflects methodology-specific information. The baseline scenario identification has a clear, transparent and concise presentation of methodological steps to identify baseline scenario and description of baseline scenario to which the methodology is applicable. The baseline methodology is internally consistent with the qualified monitoring methodology.</p> <p>The evaluation team can confirm that the emission reductions calculation section has relevant formula provided, all variables used adequately explained, and from the technical point of view it is obvious that this methodology will contribute to a robust quantification of emission reduction of the covered gases.</p> <p>The methodology is in line with the eligibility requirements for ODS methodology elements specified in "Update to the VCS 2007.1: Extension of Scope to Include Ozone-Depleting Substances" effective 26 January 2010.</p>			
Work carried out by:	Robert Mitterwallner (ATL) Marisol Bacong (Expert, GHG Auditor-T)		Internal Quality Control by Thomas Kleiser	

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 2 of 22



Industrie Service

Abbreviations

Abbreviations that have been used in the report here:

CAR	Corrective Action Request
CFC	Chlorofluorocarbon
CB	Certification Body
CR	Clarification Request
CO2	Carbon Dioxide
GHG	Greenhouse Gas
GWP	Global Warming Potential
IETA	International Emission Trading Association
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol
MP	Monitoring Plan
PDD	Project Design Document
QMS	Quality Management System
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	UN Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCU	Verified Carbon Units

Evaluation of a new methodology

“Greenhouse gas emission reductions by recovering and destroying ODS from products ” - proposed new VCS methodology



Industrie Service

Table of Contents

1	INTRODUCTION.....	4
1.1	Objective	4
1.2	Scope.....	4
2.	Methodology Description.....	6
	Resolution of Clarification Requests and Corrective Action Requests	6
3.	Evaluation Findings.....	7
4.	Methodology.....	7
4.1	Summary and applicability of the baseline and monitoring methodology	7
4.2	Baseline methodology description	9
4.3	Additionality.....	13
4.5	Monitoring methodology description	18
5.	Re-Assessment of the revised methodology version 03 from 09-06-2011.....	21
6.	Evaluation opinion.....	22

Evaluation of a new methodology

“Greenhouse gas emission reductions by recovering and destroying ODS from products ” - proposed new VCS methodology

Page 4 of 22



1 INTRODUCTION

The USG Umweltservice GmbH has commissioned an independent evaluation by TÜV SÜD Industrie Service GmbH of its new methodology “Greenhouse gas emission reductions by recovering and destroying ozone depleting substances (ODS) from products Version 02 ” issued in January, 2011. The evaluation objective with TÜV SÜD report version 01 from 16-01-2011 is an assessment by a validator or verifier accredited for the VCS Program of a proposed new methodology used for project development against all defined criteria set for the double approval process by the VCS Board. The second evaluation by Bureau Veritas (report PL/VCS-4366293/01/2011 from 16.08.2011) caused a revision of the methodology. Hence, the revised methodology version 03 from 19.06.2011 has been re-assessed by TÜV SÜD by the report version 03 on hand taking into account some adjustments for clarification and better transparency, improvement in the presentation of the methodology, inclusion of the additionality tool, clarification on weighting parameter and clearer guidance in the monitoring section.

This report summarizes the findings of the evaluation based on VCS 2007.1; VCS Program Normative Document – Double Approval Process Version 1.1, 21 January 2010.

Evaluation of this methodology consisted of a desk review of the proposed new baseline and monitoring methodology and further documentations.

The verification team consists of the following personnel:

Robert Mitterwallner	TÜV SÜD, Munich	Assessment Team Leader
Marisol Bacong	TUV SUD America Inc.	GHG Auditor Trainee

1.1 Objective

The private company, The USG Umweltservice GmbH, has commissioned TÜV SÜD Industrie Service GmbH to conduct the first validation of its new methodology “Greenhouse gas emission reductions by recovering and destroying ozone depleting substances (ODS) from products Version 8.0, October 8, 2010” with regard to the relevant requirements of VCS Program requirements including its Normative Document Double Approval Process Version 1.1. and VCS “.In particular, the baseline methodology, it’s consistence with the monitoring methodology, emission reduction calculations and the methodology element’s adherence to the project level principles of the VCS program are evaluated in order to confirm that the methodology is reasonable and meets the stated requirements and identified criteria.

1.2 Scope

The scope of evaluation of proposed new methodology is defined as an independent and objective review of the eligibility criteria, baseline approach, additionality, project boundary, emissions, leakage, monitoring, data and parameters and other relevant documents. The information in these documents is reviewed against the project specific approach of VCS 2007.1; VCS Program

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 5 of 22



Industrie Service

Update: Extension of Scope to Include Ozone-Depleting Substances, 26 January 2010 and VCS Program Normative Document Double Approval Process Version 1.1.

To meet the eligibility criteria for validators for VCS Program, TÜV SÜD has assembled an evaluation team in accordance with the appointment rules of the TÜV SÜD certification body "Climate and Energy":

Robert Mitterwallner is a GHG-Validator as well as Assessment Team Leader with a background as auditor for environmental management systems, as expert in environmental permit procedures for industrial plants and as expert for environmental impact studies assessment. He is located at TÜV SÜD Industrie Service in Munich since 1990. He has received training in the JI determination as well as CDM validation process and applied successfully as GHG Validator and verifier for the scope energy industries, among others.

Marisol Bacong is a GHG auditor trainee based at TÜV America, Inc in Peabody, Massachusetts. She has received extensive training on CDM validation and verification processes and has performed VCS project validation and verification in the US. Ms. Bacong is a certified Ozone Depleting Substances (ODS) Lead Verifier by the Climate Action Reserve for the U.S. ODS Project Protocol and the Article 5 ODS Project Protocol.

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 6 of 22



Industrie Service

2. Methodology Description

The methodology is designed for project activities recovering and destroying ozone depleting substances (ODS) refrigerants and ODS blowing agents contained in insulation foam of end of life refrigerator appliances. The project boundary includes the recovery facility, the destruction facility and the transportation from the recovery facility to the destruction facility. Project activities can be implemented in Article 5 and/or non-Article 5 countries defined under the Montreal Protocol.

In the absence of the project activity ODS are released partially or uncontrolled to the atmosphere; The eligibility requirements for ODS methodology elements in the Update to the VCS 2007.1: Extension of Scope to Include Ozone-Depleting Substances are prescribed.

The baseline and monitoring methodology were based on the following methodologies, guidelines and tools:

- "Tool for the demonstration and assessment of additionality" approved by UNFCCC CDM Executive Board to identify the most plausible baseline scenario.
- Performance Standard Test of Climate Action Reserve – Article 5 Ozone Depleting Substances Project Protocol establishing that project activities for recovery and destruction of refrigerants ODS CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115 are additional
- VCS 2001.1 Additionality Test 1 – "The project test", to assess additionality of project activities covering other ODS and blowing agents or are located in non-Article 5 countries.
- Climate Action Reserve – US Ozone Depleting Substances Project Protocol to determine composition and quantities of refrigerants and ODS blowing agents prior to destruction
- RAL Quality Assurance and Test Specifications for the Demanufacture of Refrigeration Equipment version: 2007/09 to determine recovery efficiency of blowing agents contained in foam of refrigeration appliances
- UNEP Technology and Economic Assessment Panel (TEAP) Report of the Task Force on Destruction Technologies requirements on screening criteria for ODS destruction technologies.

The results of the VCSA global stakeholder consultation have been taken into account in the evaluation of project methodology. TÜV SÜD confirms that all public comments have been addressed adequately by the developer. Comments by TÜV SÜD have been raised in the first loop by addressing them directly in the pdf version of the methodology to the client. Additionally, a telephone conference has been held with the client and the audit team in order to clarify the requests. The revised methodology in track change mode has been checked again by TÜV SÜD. The client was able to solve all issues in the second comment loop. Further comments raised by the Certification Body of TÜV SÜD have been implemented in a revised methodology and evaluation report.

Resolution of Clarification Requests and Corrective Action Requests

The objective of this phase of the evaluation is to resolve the requests for corrective actions and clarification and any other outstanding issues, which need to be clarified in order to achieve a positive conclusion during the assessment process. Clarification Requests raised by TÜV SÜD have been resolved in emails and phone conferences. A revised proposed new methodology, version 02, dated 11.01.2011 has been submitted to the evaluation team. The methodology ver-

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 7 of 22



sion 03 from 19.06.2011 revised due to 2. Assessment of Bureau Veritas, has been re-assessed by TÜV SÜD by the report version 03 on hand.

3. Evaluation Findings

In the following sections the findings of the evaluation are stated. The evaluation findings for each subject are presented as follows:

- 1) The findings from the desk review of the methodology and the findings from interview during the follow up meeting are summarised.
- 2) Where TÜV SÜD has identified issues that needed clarification or that represented a risk to the fulfilment of the methodology objectives, a Clarification or Corrective Action Request, respectively, has been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections. In total for determination steps 17 Corrective Action Requests and 20 Clarification Requests have been raised.
- 3) Where Clarification and Corrective Action Requests have been issued, the response by the project participants to resolve these requests is summarized in the final evaluation report.
- 4) The final conclusions of the evaluation are presented consecutively.

4. Methodology

4.1 Summary and applicability of the baseline and monitoring methodology

4.1.1 Discussion

The methodology element is applicable to project activities destroying ODS recovered from refrigeration and ODS blowing agents contained in insulation foam of end of life refrigerator appliances where the baseline scenario is the partial and total atmospheric release of ODS. The methodology covers ODS controlled by the Montreal Protocol under Annex A, Group I; Annex B, Group I and Annex C, Group I and which the IPCC publishes a global warming potential (GWP). Eligibility criteria set by VCS Program Update: Extension of Scope to Include Ozone-Depleting Substances, 26 January 2010 are applied in the methodology element.

The applicability criteria and methodology procedure are appropriate and described in complete manner. The applicability conditions are internally consistent i.e., project boundary, baseline emissions estimation procedure, project emission estimation procedure, leakage, and monitoring section are consistent with each other.

4.1.2 Findings

Clarification Request No. 1:

Clarify applicability of this methodology to location(s) of sources within the project boundary. It possible that ODS recovery and/or destruction will happen in an Article 5 country and/or non-article 5 country or both.

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 8 of 22



Response:

Has been clarified (p1) in the revised version 8 of the proposed methodology.

Corrective Action Request No. 1:

The methodology should include the latest approved versions of methodologies, guidelines and tools

Response:

It has been included (p1) in the revised version 8 of the proposed methodology.

Corrective Action Request No. 2:

Clearly define or identify eligible ODS covered under this methodology. Project activity should be limited to destruction of ODS refrigerants phased-out for production in the applicable country.

Response:

Under applicability the methodology states: In addition, the Eligibility Requirements for ODS Methodology Elements in the Update to the VCS 2007.1: Extension of Scope to Include Ozone Depleting Substances shall apply.

In respect to covered ODS VCS says:

The project shall comply with at least one of the following in relation to project start date:

- 1) The project start date shall not be before the Montreal Protocol production phase-out deadline (except for critical/essential uses) for the relevant ODS as it applies to the host country and/or any country from which ODS destroyed by the project is imported (as applicable); or
- 2) The project start date shall not be before the date the host country and/or any country from which ODS destroyed by the project is imported (as applicable) implements the production phase-out, or consumption phase-out where such country does not produce the relevant ODS, of the relevant ODS (critical/essential uses exempted). Such phase-outs shall be implemented in combination with an import ban on the relevant ODS (critical/essential uses exempted).

Where the project imports ODS, it shall provide documentary evidence, such as shipping manifests and bills of lading to demonstrate that the ODS originates from a country meeting with the above.

Note - The project can destroy ODS that has not been phased out under 1) or 2) above (e.g., if one ODS has contaminated another), but it shall receive no credit for the destruction of such ODS.

Note - The relevant production phase-out deadlines are those of the individual substances and not the substance groups.

The following sentence has been included in version 8 (applicability criteria) of the proposed methodology:

Only ODS listed in Annex I of this methodology and for which Article 4 of the 26 January 2010 Update to the VCS 2007.1: Extension of Scope to Include Ozone-Depleting Substances applies, are eligible

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 9 of 22



Industrie Service

4.1.3 Conclusion

The revised proposed new methodology contains all required additional information and the requested corrections and clarifications.

4.2 Baseline methodology description

4.2.1 Discussion

The spatial boundary of the project boundary encompasses the following:

- ODS recovery
- Transport
- Destruction

The relevant emission source within this boundary includes:

- Emissions from on-site fossil fuel and electricity consumption at the recovery facility
- Emissions from transport of ODS from recovery facility to the destruction facility
- Emissions associated to the destruction process of ODS.

The baseline is the emission from release of ODS refrigerants and blowing agents into the atmosphere.

Baseline scenario identification will be carried out using Step 1 of the latest version of the "Tool for the demonstration and assessment of additionality". The approach considers relevant policies and regulations related to management of ODS banks. The methodology is only applicable for ODS refrigerants where the baseline scenario is the total atmospheric release of the ODS; partial capture and destruction of ODS; or partial capture and reuse of the existing products. For ODS blowing agents, baseline scenarios may include emissions from foam shredding and from its subsequently disposal at an incineration facility, at a landfill /dump, or by open burning or emissions of ODS blowing agents extracted from appliance foam that are partially captured and destroyed.

The baseline emissions for ODS refrigerants are calculated based on the amount of ODS destroyed by the project activity which would have vented into the atmosphere, destroyed and/or reused in the baseline. Baseline emissions for ODS blowing agents will be calculated based on the amount of ODS blowing agents contained in insulation foams of refrigeration appliances from which ODS is recovered and the amount of ODS blowing agent sent to the destruction facility.

The methodology is consistent with VCS 2007.1: Extension of Scope to Include ODS eligibility requirements on regulatory surplus, by allowing gradual increase in compliance rate, up to 50 percent, when the destruction of ODS by project is mandated by law, statute or other regulatory framework. When the monitored compliance during the project crediting period exceeds 50%, the project shall not receive any credit.

The approach for determining the project baseline is considered appropriate, adequate and consistent with the VCS program. The definition of the project's physical boundary and sources and

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 10 of 22



types of gases are properly identified and consistent with applicability of the methodology element and the VCS program.

4.2.2 Findings

Clarification Request No. 2

Clarify how ODS refrigerants are recovered and collected from products and stored (when applicable) prior to transport to the destruction facility? Describe sources of emissions during ODS recovery. Explain why ODS emissions from recovery facilities (project activity) were excluded in Table 1

Response:

The following sentence has been included in the revised version 8 (applicability criteria) of the proposed methodology

All ODS must be collected, stored, and transported in cylinders or other hermetically sealed containers.

ODS **refrigerant emissions** from recovery facility (see CAR U.S. ODS Project Protocol Table 4.1):

Source Description

Emissions of ODS from the recovery and collection of refrigerant at end-of-life or servicing

Are excluded

Justification

Excluded, as project activity is likely to decrease these emissions. Therefore, exclusion is conservative

ODS **blowing agent emission** from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{\text{ODS_foam},y} = \sum_{i=1}^n ((M_{\text{APPLIANCE,foam},i,y} \times ER_{\text{foam},i} - (M_{\text{APPLIANCE,foam},i,y} - M_{\text{DESTR,foam},i,y})) \times GWP_{\text{foam},i})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances $M_{\text{APPLIANCE,foam},i,y}$ and the amount of ODS blowing agent i sent to destruction $M_{\text{DESTR,foam},i,y}$ (specified in the Certificate of Destruction). By deducting the difference $M_{\text{APPLIANCE,foam},i,y} - M_{\text{DESTR,foam},i,y}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS available) from the total baseline potential (which is $M_{\text{APPLIANCE,foam},i,y} \times ER_{\text{foam},i}$) ODS blowing agent emissions from recovery are covered

Example

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 11 of 22



$$M_{\text{APPLIANCE,CFC-11}} = 10\text{tCFC-11}$$

$$ER_{\text{CFC-11}} = 0.44$$

$$M_{\text{DESTR,CFC-11}} = 9\text{tCFC-11}$$

$$GWP_{\text{CFC-11}} = 4,750$$

$$BE_{\text{ODS_foam,y}} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Clarification Request No. 3:

Describe how ODS refrigerants are released to the atmosphere or describe sources of emissions.

Response:

It is commonly accepted that ODS refrigerants if not destroyed properly will finally be released into the atmosphere: (see for example CAR Article 5 ODS Project Protocol (p4) as quoted below)

"Rather, virgin stockpiles may be sold for use, and installed banks may be recovered, recycled, reclaimed, and reused indefinitely, often in equipment with very high leak rates. Because the Montreal Protocol does not forbid the use of existing or recycled controlled substances beyond the phase-out dates, even properly managed ODS banks will eventually be released to the atmosphere during equipment servicing, use, and end-of-life"

Clarification Request No. 4:

Describe how ODS blowing agent is released in the atmosphere or describe sources of emissions.

Response:

ODS blowing agent emission from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{\text{ODS_foam,y}} = \sum_{i=1}^n ((M_{\text{APPLIANCE,foam,i,y}} \times ER_{\text{foam,i}} - (M_{\text{APPLIANCE,foam,i,y}} - M_{\text{DESTR,foam,i,y}})) \times GWP_{\text{foam,i}})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances

$M_{\text{APPLIANCE,foam,i,y}}$ and the amount of ODS blowing agent i sent to destruction $M_{\text{DESTR,foam,i,y}}$ (specified in the Certificate of Destruction). By deducting the difference $M_{\text{APPLIANCE,foam,i,y}} - M_{\text{DESTR,foam,i,y}}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS avail-

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 12 of 22



Industrie Service

able) from the total baseline potential (which is $M_{APPLIANCE,foam,i,y} \times ER_{foam,i}$) ODS blowing agent emissions from recovery are covered

Example

$$M_{APPLIANCE,CFC-11} = 10\text{tCFC-11}$$

$$ER_{CFC-11} = 0.44$$

$$M_{DESTR,CFC-11} = 9\text{tCFC-11}$$

$$GWP_{CFC-11} = 4,750$$

$$BE_{ODS_foam,y} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Clarification Request No. 5:

Clarify why ODS emissions from extraction of ODS blowing agent from appliances are not included?

Response:

ODS blowing agent emission from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{ODS_foam,y} = \sum_{i=1}^n ((M_{APPLIANCE,foam,i,y} \times ER_{foam,i} - (M_{APPLIANCE,foam,i,y} - M_{DESTR,foam,i,y})) \times GWP_{foam,i})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances $M_{APPLIANCE,foam,i,y}$ and the amount of ODS blowing agent i sent to destruction $M_{DESTR,foam,i,y}$ (specified in the Certificate of Destruction). By deducting the difference $M_{APPLIANCE,foam,i,y} - M_{DESTR,foam,i,y}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS available) from the total baseline potential (which is $M_{APPLIANCE,foam,i,y} \times ER_{foam,i}$) ODS blowing agent emissions from recovery are covered

Example

$$M_{APPLIANCE,CFC-11} = 10\text{tCFC-11}$$

$$ER_{CFC-11} = 0.44$$

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 13 of 22



Industrie Service

$$M_{\text{DESTR,CFC-11}} = 9\text{tCFC-11}$$

$$\text{GWP}_{\text{CFC-11}} = 4,750$$

$$\text{BE}_{\text{ODS_foam,y}} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Corrective Action Request No. 3:

VCS requires using the term "project proponent" as the individual or organization that has overall control and responsibility for a greenhouse gas project. Ensure that project proponent is consistently used in the document.

Response:

Has been changed in the revised version 8 of the proposed methodology

Clarification Request No. 6:

Clarify what "mechanically manipulated" means?

Response:

"Mechanically manipulated" shall have the meaning of "shredding" The term "Mechanically manipulated" has been replaced by the term "shredding" in revised version 8 (p4) of the proposed methodology.

4.2.3 Conclusion

The clarifications given by methodology developer are sufficient. The revised proposed new methodology contains all required additional information and the requested corrections and clarifications.

4.3 Additionality

4.3.1 Discussion

Additionality of the project activity is determined as follows:

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 14 of 22



Industrie Service

- Following the Performance Standard Test of Climate Action Reserve – Article 5 Ozone Depleting Substances Project Protocol, this methodology established that the project activities for recovery and destruction of refrigerants ODS CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115 are additional
- Project activities covering other ODS (including blowing agents) or are located in non-Article 5 countries shall be demonstrated and assessed using the latest version of the VCS additionality Test No. 1 – “The Project Test” according to Voluntary Carbon Standard 2007.1.

4.3.2 Findings

Clarification Request No. 7:

Climate Action Reserve's conclusion on additionality is limited to all phased-out CFC refrigerants (to include: CFC 11, CFC 12, CFC 113, CFC 114 and CFC 115). Clarify how CAR's Protocol relates to this methodology. Also see CAR No. 2 2. Also explain how VCS 2007.1 additionality test requirements are complied.

Response:

Application of CAR additionality has been limited to CFC 11, CFC 12, CFC 113, CFC 114 and CFC 115 in revised version 8 (p4-5) of the proposed methodology.

CAR Article 5 ODS Project Protocol defines an ODS project as any set of activities undertaken by a single project developer resulting in the destruction⁵ of eligible imported ODS at a single qualifying destruction facility over a 12-month period and herewith also covers activities under the proposed methodology.

CAR uses a Performance Standard Test based on an evaluation of Article 5 “common practice” for managing ODS. *As detailed in Appendix B (of the Protocol), destruction of ODS is not common practice in Article 5 countries. Because the Reserve has determined that destruction of CFC refrigerant from Article 5 countries is not common practice, projects that meet the project definition and other eligibility requirements of this protocol pass the Performance Standard Test*

Revised version 8 replaces the CDM Additionality Tool with VCS Additionality Test test 1 “The Project Test” according to Voluntary Carbon Standard 2007.1

4.3.3 Conclusion

The clarifications given by methodology developer are sufficient. The revised proposed new methodology contains all required additional information and the requested corrections and clarifications. The additionality tools identified in the methodology element are appropriate and in accordance with VCS 2007.1.

4.4. Emission Reduction Calculation

4.4.1 Findings

Clarification Request No. 8:

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 15 of 22



Clarify how ODS recovery efficiency from products are factored into the quantity of ODS refrigerant i sent to destruction in equation 2.

Response:

Neither VCS nor CAR have made provisions for any recovery efficiencies for refrigerants.

CAR (U.S. Ozone Depleting Substances Project Protocol Destruction of U.S. Ozone Depleting Substances Banks) states the following: Emissions of ODS from the recovery and collection of refrigerant at end-of-life or servicing are excluded as project activity is likely to decrease these emissions. Therefore, exclusion is conservative.

Corrective Action Request No. 4:

Define crediting period (tcp)

Response:

In the revised version 8 (p6) of the proposed methodology the word "project" has been added According to Voluntary Carbon Standard 2007.1 for non-AFOLU projects and ALM projects focusing exclusively on emissions reductions of N₂O, CH₄ and/or fossil-derived CO₂, the project crediting period is a maximum of 10 years which may be renewed at most two times.

Clarification Request No. 9:

Clarify and provide specific section in CAR Article 5 Protocol. CAR Article 5 ODS Project Protocol requires the use of an annual emission rate of used ODS refrigerants recovered from end-of-life equipment of 100% or VR_{refr} = 1 (Table 5.1). Equation 3 in the proposed methodology allows values of VR_{refr} from 0 to 100%.

Response:

In revised version 8 of the proposed methodology sentence has been deleted.

Clarification Request No. 10:

Clarify how recovery efficiency was considered?

Response:

ODS blowing agent emission from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{\text{ODS}_{\text{foam},y}} = \sum_{i=1}^n ((M_{\text{APPLIANCE},\text{foam},i,y} \times ER_{\text{foam},i} - (M_{\text{APPLIANCE},\text{foam},i,y} - M_{\text{DESTR},\text{foam},i,y})) \times GWP_{\text{foam},i})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances $M_{\text{APPLIANCE},\text{foam},i,y}$ and the amount of ODS blowing agent i sent to destruction $M_{\text{DESTR},\text{foam},i,y}$ (specified in the Certificate of Destruction). By deducting the difference $M_{\text{APPLIANCE},\text{foam},i,y} - M_{\text{DESTR},\text{foam},i,y}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS avail-

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 16 of 22



able) from the total baseline potential (which is $M_{APPLIANCE,foam,i,y} \times ER_{foam,i}$) ODS blowing agent emissions from recovery are covered

Example

$$M_{APPLIANCE,CFC-11} = 10tCFC-11$$

$$ER_{CFC-11} = 0.44$$

$$M_{DESTR,CFC-11} = 9tCFC-11$$

$$GWP_{CFC-11} = 4,750$$

$$BE_{ODS_{foam,y}} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Clarification Request No. 11:

Clarify if this is cumulative rate and how many years?

Response:

It is the total percent of ODS foam blowing agent that would be released throughout the end-of-life processing (i.e., lifetime emission rates) for each ODS foam blowing agent. These values include emissions from:

1. ODS blowing agent released during foam shredding, plus
2. ODS blowing agent released during foam compaction, plus
3. Landfilled ODS blowing agent that is released during anaerobic conditions (but is not degraded).

Value of HCFC-141b (scenario BAF4.2) has been corrected in revised version 8 of the proposed methodology

Corrective Action Request No. 5:

Provide specific name of CAR reference

Response:

U.S. Ozone Depleting Substances Project Protocol, Destruction of U.S. Ozone Depleting Substances Banks *Version 1.0* February 3, 2010 p 23/24, has been included in revised version 8 of the proposed methodology

Corrective Action Request No. 6:

Provide available countries' data.

Response:

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 17 of 22



Such data has to be identified specifically for each project

Clarification Request No. 12:

Clarify why quantity of ODS blowing agent released during ODS extraction

Response:

ODS blowing agent emission from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{\text{ODS_foam},y} = \sum_{i=1}^n ((M_{\text{APPLIANCE,foam},i,y} \times ER_{\text{foam},i} - (M_{\text{APPLIANCE,foam},i,y} - M_{\text{DESTR,foam},i,y})) \times GWP_{\text{foam},i})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances $M_{\text{APPLIANCE,foam},i,y}$ and the amount of ODS blowing agent i sent to destruction $M_{\text{DESTR,foam},i,y}$ (specified in the Certificate of Destruction). By deducting the difference $M_{\text{APPLIANCE,foam},i,y} - M_{\text{DESTR,foam},i,y}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS available) from the total baseline potential (which is $M_{\text{APPLIANCE,foam},i,y} \times ER_{\text{foam},i}$) ODS blowing agent emissions from recovery are covered

Example

$$M_{\text{APPLIANCE,CFC-11}} = 10\text{tCFC-11}$$

$$ER_{\text{CFC-11}} = 0.44$$

$$M_{\text{DESTR,CFC-11}} = 9\text{tCFC-11}$$

$$GWP_{\text{CFC-11}} = 4,750$$

$$BE_{\text{ODS_foam},y} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Clarification Request No. 13:

Explain why CAR Article 5 ODS Project Protocol emission factor of 7.5 is applicable to other countries.

Response:

CAR has used very conservative assumptions (and has additionally made an extra contingency) and basically allows the same technologies for ODS destruction as under the proposed metho-

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 18 of 22



dology (TEAP recommendation). Therefore it can be assumed that this factor could be also used for other countries.

Corrective Action Request No. 7:

Projects that destroy used refrigerant recovered from end-of-life products do need to account for substitute refrigerants, as the destruction of this ODS does not increase the demand for substitute refrigerants. For products that will be used after refrigerant recovery, substitute chemicals can be identified when the product and its specific use is known. Clarify scope. Also see CR No. 3

Response:

In the opinion of the project proponents Version 7 of the proposed methodology is clear:

For every project the baseline has to be determined specifically, which is the fundamental difference to CAR methodology. Leakage emissions occur in projects where in the (project specific) baseline ODS refrigerants would have been re-used (*e.g. for products that will be used after refrigerant recovery, substitute chemicals can be identified when the product and its specific use is known*) and in the project scenario must be substituted by other chemicals.

Clarification Request No. 14:

Clearly identify specific sections/tables in the CAR protocol. Provide leak rates and names of substitute chemicals for other countries.

Response:

In the revised version 8 of the proposed methodology the reference to relevant table of U.S. Ozone Depleting Substances Project Protocol, Destruction of U.S. Ozone Depleting Substances Banks *Version 1.0* February 3, 2010 has been included

For projects in other countries substitute chemicals and leak rates have to be determined on a project specific basis (for example in CDM the grid emission factor also has to be determined during PDD development)

4.4.2 Conclusion

The clarifications giving by methodology developer are sufficient. The revised proposed new methodology contains all required additional information and the requested corrections and clarifications.

4.5 Monitoring methodology description

4.5.1 Findings

Corrective Action Requests No. 8 to 15:

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 19 of 22



Provide available data and Names of references/sources under the following parameters: VR_{refr} , DR_{refr} , $RR_{refr,i}$, $LR_{refr,i}$, $ER_{foam,i}$, $LR_{refr,l}$ ODS_i contained in foam of refrigeration appliance in host country

Response:

Has to be determined on a project specific basis

Clarification Request No. 15:

Clarify the minimum requirements. What would apply if there are no national standards available or the national standard is inferior in comparison to US AHRI standard should be the minimum requirement. Identify the ISO standard.

Response:

In the case there will be an International Organization for Standardization (ISO) standard applicable such ISO standard shall be used. Further, where national standards exist they may be used in lieu of ISO standards provided that they have been the subject of a verification or validation process addressing their accuracy and representativeness. In the case where no such standards exist the US Air-Conditioning, Heating and Refrigeration Institute 700-2006 standard shall be applied.

Clarification Request No. 16:

Clarify the minimum requirements. What would apply if there are no national standards available or the national standard is inferior in comparison to US EPA requirements. Identify the ISO standard.

Response:

In the case there will be an International Organization for Standardization (ISO) standard applicable such ISO standard shall be used. Further, where national standards exist they may be used in lieu of ISO standards provided that they have been the subject of a verification or validation process addressing their accuracy and representativeness. In the case where no such standards exist the US Air-Conditioning, Heating and Refrigeration Institute 700-2006 standard shall be applied.

Clarification Request No. 17:

Explain how recovery efficiency of blowing agents contained in foam of refrigeration appliances factored in to emission reduction calculation

Response:

ODS blowing agent emission from recovery facility are taken into account in revised version 8 of the proposed methodology (Baseline Emissions) as following

$$BE_{ODS_foam,y} = \sum_{i=1}^n ((M_{APPLIANCE,foam,i,y} \times ER_{foam,i} - (M_{APPLIANCE,foam,i,y} - M_{DESTR,foam,i,y})) \times GWP_{foam,i})$$

Calculations of ODS blowing agent baseline emissions in the proposed methodology are based on the total amount of ODS blowing agent i contained in the total number of appliances

$M_{APPLIANCE,foam,i,y}$ and the amount of ODS blowing agent i sent to destruction $M_{DESTR,foam,i,y}$ (speci-

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 20 of 22



Industrie Service

fied in the Certificate of Destruction). By deducting the difference $M_{APPLIANCE,foam,i,y} - M_{DESTR,foam,i,y}$ of ODS destroyed and ODS contained in the appliances (which is the total potential of ODS available) from the total baseline potential (which is $M_{APPLIANCE,foam,i,y} \times ER_{foam,i}$) ODS blowing agent emissions from recovery are covered

Example

$$M_{APPLIANCE,CFC-11} = 10\text{tCFC-11}$$

$$ER_{CFC-11} = 0.44$$

$$M_{DESTR,CFC-11} = 9\text{tCFC-11}$$

$$GWP_{CFC-11} = 4,750$$

$$BE_{ODS_{foam,y}} = (10 \times 0.44 - (10-9)) \times 4,750 = 16,150$$

Furthermore P 16 of version 7 of the proposed methodology further incorporates recovery efficiency as follows:

The recovery facility must achieve a recovery efficiency of at least 90% otherwise no credits can be generated for the respective monitoring period.

Clarification Request No. 18:

CR No. 18: Clarify if this is 1000 units per type of appliance.

1000 fridges in total (not per type)

Corrective Action Request No. 16:

Include the overall Recovery and Destruction Efficiency that should be achieved.

Response:

Has been included in revised version 8 (p17) of the proposed methodology

Corrective Action Request No. 17:

Include requirements of TEAP.

Response:

Update to the VCS 2007.1: Extension of Scope to Include Ozone-Depleting Substances ("*Eligibility Requirements for ODS Methodology Elements*") which are part of the applicability criteria of the proposed methodology)

the project shall use a destruction technology that meets the screening criteria for destruction technologies set out in the report, as may be updated from time to time, by the UNEP Technology and Economic Assessment Panel (TEAP) Task Force on Destruction Technologies.

For further clarification: the relevant chapters of the above mentioned report have now been included in the latest version of the methodology (Annex III) as well as the Code of Good Housekeeping (Annex II) (TEAP, Code of Good Housekeeping in *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer - 7th Edition* (2006) which describes the operating parameters to be sure that ODS is being destroyed and being approved by the Montreal Protocol

Clarification Request No. 19:

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 21 of 22



Industrie Service

Clarify monitoring frequency (test of 1000 appliances) relates to data monitored, input flow of appliances into the section of the recovery facility.

Response:

Continuous monitoring but recording monthly, 1000 test annually; has been modified in revised version 8 of the proposed methodology.

Clarification Request No. 20:

Clarify monitoring frequency (test of 1000 appliances) relates to data monitored, total weight of output fraction from the section of the recovery facility.

Response:

Continuous monitoring but recording monthly, 1000 test annually; has been modified in revised version 8 of the proposed methodology. This means at least 1000 appliances annually will be tested at the recovery facility to determine recovery efficiency of blowing agents contained in foam of refrigeration appliances. This requires weighing of at least 1000 appliances entering the recovery facility and weighing the material fractions recovered (from the appliances) from the processing plant during the test, including the refrigerants.

4.5.2 Conclusions

The clarifications given by methodology developer are sufficient. The revised proposed new methodology contains all required additional information and the requested corrections and clarifications.

5. Re-Assessment of the revised methodology version 03 from 09-06-2011

The revised methodology version 03 from 09-06-2011 and the 2. Assessment report of Bureau Veritas (report PL/VCS-4366293/01/2011 from 16.08.2011) have been assessed by TÜV SÜD. During this assessment no additional requests have been addressed to USG Umweltservice GmbH by TÜV SÜD. The changes in the methodology induce more consistency and higher transparency of it.

Evaluation of a new methodology

"Greenhouse gas emission reductions by recovering and destroying ODS from products" - proposed new VCS methodology

Page 22 of 22



Industrie Service

6. Evaluation opinion

TÜV SÜD Industrie Service GmbH has performed an evaluation of the proposed new methodology "Greenhouse gas emission reductions by recovering and destroying ODS from products".

The evaluation of this methodology which is regarded to be a statement of the Audit team in this phase has been performed by document reviews, phone conferences and by e-mail.

In this context, the relevant documents are the "Voluntary Carbon Standard 2007.1", "Voluntary Carbon Standard Program Guidelines, "Update to the VCS 2007.1: Extension of Scope to Include Ozone-Depleting Substances", 26 January 2010, "VCS Program Normative Document: Double Approval Process". Additional regulations for approval of project specific methodologies under JI have been taken into account.

The evaluation team confirms that the proposed methodology reflects methodology-specific information. The baseline scenario identification has a clear, transparent and concise presentation of methodological steps to identify baseline scenario and description of baseline scenario to which the methodology is applicable. The baseline methodology is internally consistent with the qualified monitoring methodology.

The evaluation team can confirm that the emission reductions calculation section has relevant formula provided, all variables used adequately explained, and from the technical point of view it is obvious that this methodology will contribute to a robust quantification of emission reduction of the covered gases.

As the result of the evaluation procedure, it can be confirmed that the submitted methodology is in line with all requirements set by the Voluntary Carbon Standard program.

Munich, 25 August 2011

Munich, 25 August 2011

A handwritten signature in black ink that reads "Robert Mitterwallner".

A handwritten signature in blue ink that reads "Thomas Kleiser".

Robert Mitterwallner
Assessment Team Leader

Thomas Kleiser
Certification Body