

PUBLIC COMMENT TEMPLATE

An *Emission Reduction Measurement and Monitoring Methodology for the Conversion of Foam Blowing Agents from High-GWP Materials to Low-GWP Materials* was prepared by Dentons US, LLP. The methodology was formally submitted to ACR on July 7, 2014. ACR reviewed the methodology and provided comments on several occasions; the authors submitted multiple methodology revisions throughout the ACR review process.

The methodology was posted for public comment from February 17 – March 27. Public comments and responses by the authors are provided via the below template.

Following public consultation, the methodology will be submitted to an expert scientific peer review panel.

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1. Background and Applicability

Comment	Commenter	Author Response	Author Changes to Methodology
<p>Section 1.1 – Issue: p.3: ... based on a robust data set and the UNFCCC methodology AMS-III.N</p> <p>Comment: The proposed methodology is in direct contradiction to AMS-III.N because it prohibits pentane whereas AMS-III.N is used to credit the shift to pentane as blowing agent</p>	<p>Thomas Grammig</p>	<p>The comment is inaccurate and misleading. The proposed Methodology used the approach and MRV principles of AMS-III.N. The methodology restricts the eligible low-GWP materials to GWP<5 and to non-VOCs. This is necessary to fit into the Performance Standard approach which ARB and ACR currently use. The AMS-III.N was created before the Performance Standard limitation was developed, principally by US-based registries.</p> <p>The methodology takes the CDM data set and information to create a new protocol. It is not simply trying to replicate the CDM protocol but to improve on it.</p> <p>The methodology does recognize that Pentane has been increasing in use in the industry; the methodology provides incentive for the industry to further develop additional low-GWP alternatives that do not carry the same risks as Pentane.</p>	

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<p>Section 1.3 – Issue: p.5 a hydrocarbon based substitute BA Comment: Ambiguity: what blend of CO2 and ethanol makes a blowing agent Hydrocarbon based?</p>	<p>Thomas Grammig</p>	<p>So long as the blend is a VOC, it would not be eligible.</p> <p>In the commenter’s “General Methodology Comments on Background and Applicability” the comment refers to pentane and ethanol as a hydrocarbon. “Another indication on the nature of these issues is that the Montreal Protocol has funded the conversion of PUR manufacturers from HCFCs to low-GWP blowing agents and frequently to Hydrocarbons (pentane or ethanol).”</p>	
<p>Section 1.3 – Issue: p.5 They contribute to the formation of tropospheric ozone Comment: Assertion with no basis given. IPCC Fifth Assessment Report 2013 WG I chapters 2.2.2.3, 2.2.2.4 and 8.2.3.1 provide further detail to the IPCC/TEAP 2002 assertion (p.7): “Substitution for ODS ... are not expected to have a significant effect on global tropospheric chemistry”.</p>	<p>Thomas Grammig</p>	<p>High concentrations of tropospheric ozone occur over local and regional areas, and pose health risks to the local populations living and working in those areas. We are aware that Europe does not presently regulate tropospheric ozone. However, in the United States, tropospheric ozone is a “criteria pollutant”, i.e. one for which a National Ambient Air Quality Standard (NAAQS) has been adopted. Further, a lowering of the existing standard has been proposed. The areas which would violate such a health based standard cover most of the urban areas of the United States,</p>	

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		<p>including most of California. Global tropospheric chemistry, while an important consideration, is not relevant to U.S. air quality issues or regulations. For a summary of the U.S.EPA findings on this health-based air quality standard, see 79 FR 75234 (December 17, 2014).</p>	
<p>Section 1.3 – Issue: p.5 ... and pose unique safety issues Comment: Assertion in contradiction to well established PUR industry practice</p>	<p>Thomas Grammig</p>	<p>According to the UNEP-TEAP, 2014, Decision XXV/5 Task Force Report Additional Information to Alternatives on ODS, “the foam sector has made significant strides in addressing the phase-out of ozone depleting substances since the signing of the Montreal Protocol in 1987. The availability of hydrocarbons at an early stage of the transition period has made it that a genuine low-GWP and cost-effective alternative has been available for large parts of the foam sector throughout that period, even at the time of the phase-out of CFCs in non-Article 5 Parties.</p> <p>Therefore, the account of the transition history since 1987 in the polyurethane and phenolic product sectors is dominated by whether a</p>	

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		<p>specific foam sub-sector could adopt hydrocarbon technologies or not.</p> <p>There have been a number of reasons cited over the period to explain why hydrocarbon solutions were not appropriate. These have included:</p> <ul style="list-style-type: none"> • The flammability risks associated with the production/deposition process • The flammability risks associated with product installation and use • The higher gaseous thermal conductivity leading to poorer thermal efficiency of the foam • The cost of flame-proofing measures for production processes in relation to the size of the manufacturing plant (lack of economies of scale) • Local health & safety regulations • Local regulations on volatile organic compounds (VOCs) 	

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		<ul style="list-style-type: none"> • Waste management issues <p>Some of these have largely been discounted in more recent times, but others continue to be of importance and some are even growing in significance (e.g. waste management issues) as hydrocarbon blown foams reach end-of-life.”</p>	
<p>General Methodology Comments on Background and Applicability:</p> <p>The nature of these 6 issues (above 4 comments and 2 below on Section 3.1) suggests not particular professional judgment, but an intention to allow contradictions between offsetting systems. There are few particular features of technology, baseline determination or monitoring in the proposed methodology, the structure is taken from AMS-III.N but one aspect only is turned on its head, the introduction or exclusion of Hydrocarbons. This is not fungibility (as defined in the CARB compliance process¹). The CDM methodology credits the replacement of HFC with Hydrocarbons and the proposed methodology excludes Hydrocarbons².</p> <p>Another indication on the nature of these issues is that the Montreal Protocol has funded the conversion of PUR manufacturers from HCFCs to Low-GWP blowing agents and frequently to Hydrocarbons (pentane or ethanol). Only six countries in the developing world (such as Libya or Syria) do currently not have a “HCFC Phaseout Management Plan”</p>	<p>Thomas Grammig</p>	<p>1. CAR references fungibility with regard to the ability for offsets to be traded across linked and/or regional cap and trade programs under the same protocol. According to CARB’s Process for the Review and Approval of Compliance Offset Protocols in Support of the Cap-and-Trade Regulation published in May 2013 “There may be instances where a protocol is not applicable in every jurisdiction of a linked program. In all cases, all linked jurisdictions will have to agree on offset project protocols to ensure nothing will impact the fungibility of offsets across a regional Cap-and-Trade Program.” It is not suggesting that similar protocols in linked programs need to be fungible between each other. Additionally, CAR is not linked with CDM so it is not applicable.</p>	

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<p>(HPMP) from the Montreal Protocol (see www.multilateralfund.org). The Montreal Protocol has thus used many millions US\$ for technologies in PUR manufacturing that the proposed methodology would prevent³. This proposed foam blowing agent methodology diminishes the impacts of the Montreal Protocol in a likely purposeful manner.</p> <p>The contradiction with the Montreal Protocol is stronger than the contradiction to the Kyoto Protocol because AMS-III.N has been used only in India so far. The contradiction to the Montreal Protocol is more extensive. One should see the irony if the originators of this proposed methodology are in that US corporation which historically benefitted the most from the Montreal Protocol⁴.</p> <p>A secondary contradiction to the Montreal Protocol, related to the impact on Montreal promoted technology, is in Article 5 countries where national producers get Multilateral Fund (MLF) funding and multi-national producers were excluded, which occurs in Mexico. The exclusion of Hydrocarbons in the proposed methodology should be related to:</p> <p style="padding-left: 40px;">UNEP–TEAP, 2014, Decision XXV/5 Task Force Report Additional Information on Alternatives to ODS, esp. chapter 3.2 and 10.2.</p> <p>In particular the differences between Article 5 countries and non-Article 5 countries with respect to the preferences for Low-GWP choices.</p> <p>It is a long standing climate policy of the US government to advocate an extension of the Montreal Protocol to HFC⁵. Such an HFC amendment has been tabled at every Meeting of the</p>		<p>2. This methodology is intended to reflect the most recent developments in the foam blowing industry. We have determined that there are better foam blowing substitutes in the market that have a lower GWP and VOC (hydrocarbon) risk. The goal of the methodology is to promote these extremely low GWP and low VOC products and to incentivize the market to create more of them.</p> <p>3. The Commenter suggests that this methodology would “prevent” the use of technologies invested in by the Montreal Protocol. This methodology is not a regulation, nor is it required in any other way. It is designed to go above and beyond existing regulatory requirements for an entity to receive carbon credits. Indeed, if this were not the case the market would be accepting “anyway tons” for projects completed under another program. It is not the intention of this protocol to credit projects for “anyway tons”.</p> <p>4. The proposed amendments to the Montreal Protocol would gradually phase down production of HFCs over the next several decades. The U.S. and other amendment sponsors recognize the availability of low-GWP alternatives in</p>	

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<p>Parties (MOP) since 2011 and continues to be opposed by China and India. The extension of the Montreal Protocol to HFCs is intensely negotiated and is the likely outcome which will lead to a large increase in funding for the MLF. Hydrocarbons will be even more prominent in the HFC replacement through MLF than they already are for HCFC replacement⁶. The proposed methodology thus opposes US government policy objectives by inventing blowing agent criteria that conflict with larger (refrigerant and blowing agent) HFC criteria. ACR might distinguish between implications of the proposed methodology for future MLF operations, from the implications of the proposed methodology for future policy development.</p> <p>The contrast between the proposed methodology and the top-down developed ODS destruction protocols of the Climate Action Reserve is stark. Where the latter apply Montreal Protocol criteria and adopt a “meets or exceeds the Montreal Protocol’s standards” position when possible, the proposed methodology avoids any mention of the Montreal Protocol⁷. Since HCFC-141b is already fully addressed by the Montreal Protocol, the proposed methodology neglects current climate policy as much as future climate policy.</p> <p>There are many producers of PUR foam using Hydrocarbons and in particular combinations of Hydrocarbons and CO₂, and so the purpose of the proposed methodology might be a defensive commercial intend to protect the HFC using foam producers until 2017 and allow them to switch in a yet unspecified manner. Indeed the sole intention of the proposed methodology could be to weaken licensing fees for CO₂ using machinery (UNEP–TEAP, 2014, p.21). And by extension to support US based global XPS producers against competition from EU and Japanese XPS producers⁸.</p>		<p>refrigeration and air conditioning, foam insulation, solvents, aerosols, fire suppression, and other sectors. However, contrary to the commenter’s theory, there is nothing in those proposed amendments, and certainly nothing in the U.S. government position, that advocates for greater use of hydrocarbon use in foam applications.</p> <p>5. The use of an offset provides an incentive for PUF manufacturers to switch to low-GWP materials and receive an economic benefit in doing so. Under a treaty such as the Montreal Protocol, PUF manufacturers receive no benefit of such innovation and have to absorb the costs of switching to new foam blowing agents. Thus, this is a “bottom up” approach, instead of the “top-down” approach used by the Montreal Protocol.</p> <p>6. Any possible future funding by the Multilateral Fund to facilitate HFC transitions in developing countries has no relevance to this methodology. This methodology is a voluntary program with applicability to North America. If projects choose to make replacements with hydrocarbons for foam production in North America they would not be able to get offset credits under this methodology</p>	

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<p>Among the references in the proposed methodology is an inventory of ODS in California, showing that Hydrocarbons are part of current transformations: “Major US building insulation producing companies such as Atlas Roofing, Firestone, RMAX, and Johns Manville have shifted from HCFC-141b to using pentane”, the Caleb study (p.29)⁹. However these results are not used or contradicted in Appendix B. Likewise the references include assessments of carbon leakage but avoids to draw conclusions about differences between cap-and-trade systems and interferences when these are not fungible.</p> <p>Perhaps a solution to improve this proposed methodology could be a substantiated rationale for a GWP threshold¹⁰. As Appendix C indicates, there is uncertainty over the low GWP values. As the vocabulary in the proposed methodology indicates (p.22):</p> <p style="padding-left: 40px;">These GWP values are based on reported GWP levels, principally as recognized by EPA or other authoritative regulatory bodies and are provided as illustrative of the low-GWP alternatives.</p> <p>“authoritative regulatory bodies” and “illustrative”, indicates a particular intent. The most authoritative source of GWP data is indeed the IPCC, strangely absent, as well as the World Meteorological Organization who gives GWP for Hydrocarbons between 1.8 and 5.5 (UNEP-TEAP, 2014, p.93). The reason for the uncertainty of Hydrocarbons GWP is that this number assumes a globally uniform distribution and Hydrocarbons exist only a few days before they oxidize. Environmental research¹¹ studies also use the stoichiometric ratio of 3.14 as GWP for cyclopentane (Fraunhofer IPA, 2005, p.8) because it is a more accurate number when the foam is burned at End-of-Life. The</p>		<p>7. References in the CAR ODS protocol to the Montreal Protocol are related to destruction technologies and procedures, which is not relevant to this protocol. “For all projects, the end fate of the ODS must be destruction at either an approved Hazardous Waste Combustor (HWC) subject to the Resource Conservation and Recovery Act (RCRA), CAA, and the National Emissions Standards for Hazardous Air Pollutants (NESHAP) standards, or any other transformation or destruction facility that meets or exceeds the Montreal Protocol’s Technology and Economic Assessment Panel (TEAP) standards provided in the Report of the Task Force on Destruction Technologies”. “Operating parameters during destruction of ODS material shall be monitored and recorded as described in the Code of Good Housekeeping approved by the Montreal Protocol.”</p> <p>8. Offset protocols are voluntary. They are not required. They provide an economic incentive to reduce emissions through a given activity. We are not following the logic of how this could be intended to weaken licensing fees of CO² using machinery or support US based global XPS producers.</p> <p>9. The purpose of this methodology</p>	

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<p>EPA’s SNAP lists GWP for Cyclopentane, n-Pentane and Methyl Formate as <25, while the proposed methodology in Appendix C gives <5 for Methyl FormateError! Reference source not found. The Table 4 contains differences to the EPA SNAP which can mask commercial concern only.</p> <p>Besides a scientific rationale for the GWP threshold, any methodology can use the most common thresholds in other environmental regulations, or compare thresholds used elsewhere and define a particular threshold choice with other environmental policy grounds. The proposed ACR methodology for “Use of Reclaimed HFC Refrigerants and Advanced Refrigeration Systems” applies a GWP threshold of 20. The EU legislation 2002/96/EU and subsequent 2012/19/EU (WEEE) for refrigerants and foam use a GWP threshold of 15¹</p> <p>Another interpretation would be that the proposed methodology uses the highest possible baseline and the lowest possible project case, as if the maximum distance between the two would be related to environmental integrity while it only maximizes the number of offsets and reduces the number of potential projects. This reduction to physics notably ignores all variables of real investment decisions. Instead of a false copy of AMS-III.N¹³ one could attempt to improve it by adding factors about the blowing agent using machinery and the quality factors of the PUR product.</p> <p>Industrial reality is that XPS producers invest in machinery that costs 30 to 60% more than HFC – using machinery not because they consider climate change impact but because the CO2 or ethanol using machinery results in XPS with superior thermal property and thus get a higher price. In most countries there</p>		<p>is to shift the industry beyond current practices.</p> <p>10. The GWP threshold was set to be aggressive and to shift the market towards low-GWP materials that are close to zero. As an offset protocol provides an economic incentive for the shift, the goal is to take the market down to very low levels. Especially since there is a market for such low-GWP materials. The TEAP report also suggests such an aggressive shift can be made if it is economically feasible.</p> <p>11. The GWP references in Appendix C are illustrative. Each project developer will be responsible for justifying the GWP of the low-GWP alternative product used.</p> <p>12. The GWP references in Appendix C are illustrative. Each project developer will be responsible for justifying the GWP of the low-GWP alternative product used.</p> <p>13. This methodology is not trying to copy AMS-III.N. It merely references the CDM methodology and attempts to improve on it.</p> <p>14. The economic incentive provided through this methodology should help to finance this new machinery.</p> <p>15. Section 5.3 of the TEAP report</p>	

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<p>are low cost producers with inferior XPS and HFC and high cost producers with better XPS and CO2 or Hydrocarbons. Financing for the new machinery is a major factor for the speed with which low-GWP blowing agents spread¹⁴. 15</p> <p>Finally to suggest an analytical task, consider that PUR-in-use create GHG reductions because thermal energy is saved. Now if a biased methodology increases the cost of PUR¹⁶ and thereby reduces the usage volume or quality (thermal) of PUR, how much additional electricity is consumed because of the higher PUR price? And this relates to a few GWP units more in the blowing agent.</p> <p>Conclusion</p> <p>The proposed methodology creates a threshold and a damper of ongoing industrial transformations. It contains contradictions with the two main environmental regimes, the Kyoto and the Montreal Protocols. It can shift market shares among major foam producers in the US¹⁷.</p> <p>References</p> <p>Fraunhofer Institut Produktionstechnik und Automatisierung, 2005, <i>Abschlußbericht Analyse der Verwertungswege von kohlenwasserstoffgeschäumten Kühlgeräten</i>, Zentralverband Elektrotechnik – und Elektronikindustrie, Frankfurt: ZVEI.</p> <p>IPCC/TEAP, 2002, <i>Safeguarding the Ozone Layer and the Global Climate System: Issues related to Hydrofluorocarbons and Perfluorocarbons</i>, Geneva: IPCC.</p>		<p>states “The main reason for the continued use of HCFCs and/or the adoption of saturated HFCs is that either the technical requirements cannot be met by other alternatives or that the capital investment costs are prohibitive.”</p> <p>16. Why would this methodology increase the cost of PUR? The offsets created and sold in the market are to mitigate the cost of the project. On the contrary, it is very possible a low-GWP switch under this methodology could reduce the cost of PUR</p> <p>17. This methodology seeks to improve on the CDM protocol and take it to the next level. This methodology is not related to the Montreal Protocol because it is a voluntary market-based option for reducing GWP materials in foam blowing. It is not a treaty or a regulation.</p>	

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<p>UNEP-TEAP, 2014, Decision XXV/5 Task Force Report Additional Information to Alternatives on ODS, Nairobi: UNEP.</p> <p>¹ http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&from=EN</p>			
<p>Section 1.1; first paragraph (page 3) – The reference to “foam manufacturing industry” in the first paragraph is specific to foam manufacturers. Suggestion that it be changed to “certain sectors and technologies that utilize foam-containing blowing agents.” This is to clarify that there may be other sectors that combine the polyol and foam in their operations beyond the spray foam application.</p>	Jeff Cohen	Comment will be accepted.	The reference to “foam manufacturing industry” in the first paragraph will be changed to “Certain industries use foam blowing agents...”
<p>Section 1.1; second paragraph (page 3) – Consistent with the above comment, the sentence should end with “and use” after “foam manufacturing.”</p>	Jeff Cohen	Comment will be accepted.	“and use” will be added after “foam manufacturing”
<p>Table 2. Definitions (note: there is no table 1 in the methodology) Add: <u>Appliance Foam</u> Foam for thermal insulation systems in domestic refrigerators and freezers. The foam may be produced using either injection or non-injection processes. <u>Domestic refrigerators and freezers</u> Appliances which are used to preserve food and beverages in residential and other consumer applications.</p> <p>Also, the definition for <u>Rigid Polyurethane Foam</u> should be clarified: Polyurethane foam used for insulation, building materials, and products manufactured with rigid PUF.</p>	Jeff Cohen		<p>Tables will be renumbered. The following definitions will be added.</p> <p><u>Appliance Foam</u> Foam for thermal insulation systems in domestic refrigerators and freezers. The foam may be produced using either injection or non-injection processes.</p> <p><u>Domestic refrigerators and freezers</u> Appliances which are used to</p>

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			<p>preserve food and beverages in residential and other consumer applications.</p> <p>The definition for <u>Rigid Polyurethane Foam</u> will be changed to “Polyurethane foam used for insulation, building materials, and <u>products manufactured with rigid PUF.</u>”</p>
<p>Section 1.4 (page 6) – The statement: “Because most of the emissions are during manufacturing...,” does not apply to appliance foam. On average, 85-90% of blowing agent emissions from appliances can be expected to occur at the end of the product’s life.</p>	Jeff Cohen		<p>Sentence will be changed to “Because, next to EOL emissions, most of the emissions occur during manufacturing and the first year,...”</p>

2. Project Boundaries

Comment	Commenter	Author Response	Author Changes to Methodology

3. Baseline Determination and Additionality

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Comment	Commenter	Author Response	Author Changes to Methodology
<p>Section 3.1 – Table 4 – Issue: p.9 Pentane with GWP 11 Comment: Assertion with no basis given</p>	<p>Thomas Grammig</p>	<p>Pentane has been widely implemented as a result of government initiatives like the Montreal Protocol. The reduction threshold of GWP < 5 is chosen so it is below all sector baselines.</p>	
<p>Section 3.1 – Table 4 – Issue: p.9 Table 4 Comment: This table suggests that all production in a foam sector uses only one blowing agent. Why this could be so is not substantiated. The reference to the American Chemistry Council’s Center for PUR “2012 End-use market survey” is only general and not specific, besides the fact that this data is not public and costly.</p>	<p>Thomas Grammig</p>	<p>This is the premise of the Performance Standard approach. It determines the most prevalent industry practice and sets that as the baseline. ACR has been provided the “2012 End-use Market Survey” backup documents with permission from the Chemistry Council.</p>	
<p>Section 3.1 (page 9) - Table 4: For the category “Rigid PUF – All Other”, the “baseline BA” for appliances should also include HFC-245fa and its corresponding GWP (1030). The appliance industry for the North American market largely uses HFC-245fa, with HFC-134a to a lesser extent (see 2010 Foam Technical Options Committee “Rigid and Flexible Foams Report” http://ozone.unep.org/Assessment_Pa</p>	<p>Jeff Cohen</p>	<p>With backup data showing that the American market largely uses HFC-245fa, we will change the baseline.</p>	<p>Baseline for “Rigid PUF – All other” will be changed to HFC-245fa.</p>

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<p>nels/TEAP/Reports/FTOC/FTOC-2010-Assessment-Report.pdf).</p> <p>HFC-245fa has a lower GWP than HFC-134a so designating the former blowing agent as the baseline BA for appliances would be the most conservative approach. Alternatively, ACR could derive a weighted-average GWP if relevant market data were available.</p>			
<p>Section 3.1 (Page 9) - Paragraph below Table 4 – Suggestion is to replace the paragraph that starts with “The EPA SNAP program has new regulations...” with the following:</p> <p><i>“In July 2014, the U.S. EPA proposed new regulations under its SNAP program would prohibit the use of HFC 134a XPS applications and HFC-134a and HFC-245fa in domestic refrigerators and freezers starting in January 2017. The proposed listing would not affect spray foam. If the SNAP rule is finalized as proposed, after 2017 the default baseline will be determined by the GWP of the BA predominantly used by the industry in those applications in place of the delisted HFC BAs. When EPA issues its final rulemaking, ACR will update this methodology to adjust the baseline as needed.”</i></p>	Jeff Cohen		<p>Paragraph that starts with “The EPA SNAP program has new regulations...” will be replaced with the following:</p> <p>“In July 2014, the U.S. EPA proposed new regulations under its SNAP program would prohibit the use of HFC 134a XPS applications and HFC-134a and HFC-245fa in domestic refrigerators and freezers starting in January 2017. The proposed listing would not affect spray foam. If the SNAP rule is finalized as proposed, after 2017 the default baseline will be determined by the GWP of the BA predominantly used by the industry in those applications in place of the delisted HFC BAs. When EPA issues its final rulemaking, ACR will update this methodology to adjust the baseline as needed.”</p>

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<p>Section 3.2.1 (page 9) – Suggested additions to 2nd paragraph: <i>“As noted above, the proposed SNAP 20 rule by U.S. EPA would prohibit the use of HFC-134a and HFC-245fa starting in January 2017 in specific applications if the rule is adopted as proposed.”</i></p>	Jeff Cohen		<p>The following will be added to the 2nd paragraph: <i>“As noted above, the proposed SNAP 20 rule by U.S. EPA would prohibit the use of HFC-134a and HFC-245fa starting in January 2017 in specific applications if the rule is adopted as proposed.”</i></p>

4. Quantification of GHG Emission Reductions

Comment	Commenter	Author Response	Author Changes to Methodology

Section 4.0 - Table 5 (page 11) –The foam technology for appliances should also include HFC-245fa as discussed above. The corresponding data for the table are listed below.					Jeff Cohen	Commenter provided backup data showing that baseline for “Rigid PUF – All Other (appliance)” should be HFC-245fa	
Foam Sector/Technology	Product life in yrs	First Year Loss (%)	Annual Loss (%)	Max Potential End of life loss (%)			
Domestic Refrigerators and Freezers – Polyurethane Injected-134a	15	7	.5	85.5			
Domestic Refrigerators and Freezers – Polyurethane Injected-245fa	15	4	.25	92.25			

5. Monitoring and Data Collection

Comment	Commenter	Author Response	Author Changes to Methodology

Appendix A: Foam Blowing Agent Industry Background

Comment	Commenter	Author Response	Author Changes to Methodology

Appendix B: Basis for Sectors and Technology For Methodology

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Appendix C: Sample Low-GWP Materials

Comment	Commenter	Author Response	Author Changes to Methodology
Appendix C Table (page 22) – Table should include HFO-1233zd(e) as a low GWP alternative.	Jeff Cohen		HFO-1233zd(e) will be added to Appendix C table

Appendix D: References and Other Information

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