



December 18, 2009

To: Climate Action Reserve

From: Stephen P. Mandracchia  
VP Legal & Regulatory, Hudson Technologies

Re: PUBLIC DRAFT Protocol – November 20, 2009  
Destruction of Domestic Ozone Depleting Substances  
Destruction of Ozone Depleting Substances from Article 5 Countries

We have reviewed the November 20, 2009 Public Drafts of the U.S. Ozone Depleting Substances Project Protocols, entitled Destruction of Domestic Ozone Depleting Substances, and Destruction of Ozone Depleting Substances from Article 5 Countries. Set forth below are our comments to each. Page and section numbers refer to the page and section numbers in the WG Version 1.0, September 2009 draft.

## **DOMESTIC PROTOCOL**

### **Section 2. The GHG Reduction Project**

Page 4, section 2.2, last Sentence: As written, the last sentence could be construed as requiring the entire quantities of ODS destroyed to be documented on a single Certificate of Destruction, which is not the intent. We would simply recommend changing the wording of the last sentence to read as follows: “However, all quantities of eligible ODS destroyed must be documented on a Certificate of Destruction issued by a qualifying destruction facility.”

Page 6, section 2.3.1, last line: The last sentence refers to the reporting and operation requirements of Section 0. We presume the references should be to the reporting and operation requirements of Sections 6 and 7.

Page 6, section 2.3.2, last line: The last sentence refers to the reporting and operation requirements of Section 0. We presume the references should be to the reporting and operation requirements of Sections 6 and 7.

### **Section 3. Eligibility Rules**

Page 8, section 3.2, 2<sup>nd</sup> paragraph: This second sentence seems to suggest that projects started 24 months prior to the effective date of the protocol are eligible if submitted within the first twelve months, which is not the intent. We would suggest simply stating that projects with start dates between February 7, 2008 and the effective date must be submitted within 12 months of the effective date (on or before February 7, 2011).

Page 8, section 3.2, 3<sup>rd</sup> sentence of the 1<sup>st</sup> paragraph: The use of the words “recycling market” appears to be incorrect. Suggest replacing it with the words “air conditioning and refrigeration market”.

Page 9, section 3.4.1, 2<sup>nd</sup> paragraph: In order to avoid confusion, we suggest replacing the word “legislation” with “the American Clean Energy and Security Act”.

## **Section 5. GHG Reduction Calculation Method**

Page 22, section 5.2.1, last paragraph: The draft protocol states that “(t)he use of site-specific substitute parameters (refrigerant, GWP, and leak rate) are not permitted.” However, a project developer may, in a number of circumstances, be able to identify the replacement for the ODS system and should be able to provide site specific information if available. As is done with other parameters in this protocol, we suggest giving the project developers the flexibility to provide site-specific information, with full documentation, or to use the calculated substitute emissions as the default, at their option.

Pages 68-69, Tables D-4 and D-6: Refrigerants R-404a, R-410a and R507 are not substitutes for CFC’s and should not be included in the calculation of replacement leak rates, as summarized in Table 5.3 on page 22.

## **Section 6. Project Monitoring and Operation**

Page 27, section 6.1, bullet points following 2<sup>nd</sup> paragraph: Recovered CFC refrigerants are typically not considered hazardous waste, and therefore the “generator” may not have an EPA identification number. We suggest requiring the EPA ID number or, if no EPA ID number exists, requiring the FEIN/TID number instead. Also, recovered CFC refrigerants may not require shipment via a Hazardous Waste Manifest. Therefore, we suggest changing the fourth bullet point to require “Hazardous Waste Manifest of Bill of Lading Numbers, or Non-RCRA Destruction ID Numbers”.

Pages 29-30, section 6.5.1: There does not appear to be any requirement in the protocol for composition analysis prior to shipment to the destruction facility. We suggest that the protocol should be clarified and that it specify that each container of ODS should be sampled prior to shipment to the destruction facility utilizing the same sampling procedure. This will help confirm the destroyed ODS was in fact the same ODS that was sent to the destruction facility by the project developer. In addition, to ensure the accuracy of the sample, the procedures for circulation of mixed refrigerants should be implemented at the project developer’s storage site prior to sampling and shipment for destruction. In addition, the protocol could require that the sampling and circulation provisions in sections 6.5.1 and 6.5.2 take place at the material originator’s location (rather than at the destruction facility) if the process is properly verified and the material then shipped to the destruction facility in a sealed and tagged container to prevent tampering and insure that it is the same product. The destruction facility would not need to arrange for further processing of the container’s contents.

Page 30, section 6.5.1 regarding the five requirements for the sample analysis: Items 2 (Purity) and Item 5 (Other refrigerants) are duplicative. The AHRI 700 standard requires gas chromatography to measure refrigerant purity for the detection of other refrigerants. Additionally, the requirement for the sample to be “less than “90% of the saturation point” in item 3 may not be effective for CFCs which have very low saturation points (e.g., at 40 degrees F, R12 is fully saturated at 36ppm and R11 is fully saturated at 42ppm of moisture). In such cases, 90% saturation only provides a 3-4 ppm cushion. Temperature changes could dramatically alter the results of a moisture test and could, in certain circumstances, fail to identify a refrigerant that is fully saturated and has floating water inside the container. We suggest that the requirement be that the sample be less than 50% of the saturation point to insure that, regardless of the refrigerant, there is no possibility of floating water inside the container.

Page 30, section 6.5.1, last two paragraphs: The 99% threshold purity level for requiring the additional mixing requirements is too high. To the extent that mixed refrigerants have the ability to stratify within a container, such a concern would only arise in cases where the purity level is much less than the 99.5% AHRI standard. Simply stated, a refrigerant mixture that is 99% pure will have no ability to stratify, and certainly could not stratify to the point of skewing the analysis. Any issue of stratification will only arise in cases of more highly mixed refrigerants where the stratification of one component (to the extent it can occur) could have a material effect on the analysis. Moreover, the benefit of mixing must be weighed against the risk of refrigerant losses during the process of transferring the refrigerant from one container to another, then back again after mixing. Every time that the refrigerant is moved (that is every hose connection) there is a risk of loss of some amount of the refrigerant, whether through accident, defective hoses or fittings, or human error. This additional procedure will also impose significant logistical and cost concerns, while providing little if any benefit in terms of accuracy. Therefore, this procedure should only be implemented where the possibility of stratification could materially affect the accuracy of the analysis. We submit that a threshold level of 80% is more than sufficient to ensure the accuracy of the analysis. In light of the foregoing, we strongly suggest that the 99% threshold level needs to be reduced to 80%, if not lower.

Page 31, section 6.5.2, first paragraph: We feel that if the sampling and circulation is to take place either at the destruction facility or at some other location prior to the destruction, then this paragraph should be revised to make it clear that the sampling and circulation must be conducted after the ODS leaves the possession of the material originator (or the company holding it for the material originator). Alternatively, as suggested above, the protocol could provide that the sampling and circulation take place at the material originator’s location if it is properly verified and the material then shipped to the destruction facility in a sealed and tagged container to prevent tampering and insure that it is the same product. The destruction facility would not need to arrange for further processing of the container’s contents.

Page 31, section 6.5.2 (circulation procedures): With regard to the five requirements for the mixing container, we have a number of comments. First, since the shipping container could be used as the circulation container if it meets the other requirements, the requirement that the container be in a vacuum state should be removed from the list of requirements. We suggest, instead, adding a statement in the next paragraph to require that the “mixed ODS must be transferred into a fully evacuated temporary holding tank or container...”.

Additionally, the requirement that the container have valves “at both ends”, and that it be capable of being circulated from “end to end” should be eliminated. While tanks typically have valves on the top and bottom (vapor and liquid ports), most tanks do not have valves on either end since there is no reason for such valves. Mixing the refrigerant from bottom to top (from the liquid port into the vapor port) should be more than sufficient to ensure proper mixing, and little, if any additional benefit would result from mixing end to end. To require end to end mixing would require costly retrofitting of existing tanks to cut into the tanks and create new ports with valves, or require custom made tanks at great expense. The additional cost of complying with the tank requirements and then complying with the end to end mixing requirements is wholly unnecessary and will provide little if any benefit.

With regard to the tank requirements, the presence of baffles or other internal obstructions should not automatically disqualify a shipping container from being used as the mixing container. Hudson’s ISO containers are each fitted with a full flow spray bars connected to the top vapor port, consisting of a perforated pipe inside the container, which disperses the incoming liquid across essentially the entire length of the container. This type of fitting will work even in an ISO with baffles. The protocol should permit the use of containers that are fitted with such devices.

Additionally, the protocol should make it clear that when transferring the ODS to or from the shipping container and/or the mixing container, the container from which the ODS is being recovered should be recovered to at least the levels of vacuum required by EPA regulations (eg, 15”hg for R-12 and 29”hg for R-11). Because of the properties of refrigerant, as the liquid level within the container is reduced the vapor level will increase until all of the liquid has been removed and the vapor has filled the entire space. Accordingly, the volume and mass of the refrigerant in the vapor stage will be much higher in a nearly empty container than in a full container. An ISO container capable of holding 33,000 lbs. of refrigerant could easily hold 1500 to 2000 lbs. of vapor after all of the liquid is removed by liquid pump. Since the different refrigerant components may have greatly different boiling points, the percentage of each refrigerant in the vapor stage may be different in the liquid stage. Therefore, to ensure that most of the vapor is also transferred to the mixing container, and then ultimately back to the shipping container, the protocol should require that proper recovery and evacuation practices are followed.

Finally, with regard to the circulation technique, as stated above only circulation from top to bottom should be required. Additionally, the flow rate for the mixing is more important than the time – the higher the flow rate the greater the velocity and therefore the more effective the mixing. If the protocol requires that the mass of the mixture equal to two times the mass in the container, a requirement that we support, then the protocol should require use of a pump with a minimum flow rate of 30 gallons per minute, which equates to approximately 18,000 lbs. of refrigerant per hour (depending on the refrigerant). The time for circulation, therefore, will be based on the amount of the refrigerant being circulated.

## **ARTICLE 5 COUNTRIES**

### **Section 2. The GHG Reduction Project**

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Page 6, section 3.2, 2<sup>nd</sup> paragraph: This second sentence seems to suggest that projects started 24 months prior to the effective date of the protocol are eligible if submitted within the first twelve months, which is not the intent. We would suggest simply stating that projects with start dates between February 7, 2008 and the effective date must be submitted within 12 months of the effective date (on or before February 7, 2011).

Page 7, section 3.4.1, 2<sup>nd</sup> paragraph: In order to avoid confusion, we suggest replacing the word “legislation” with “the American Clean Energy and Security Act”.

### **Section 6. Project Monitoring and Operation**

Page 20, section 6.1, bullet points following 2<sup>nd</sup> paragraph: Recovered CFC refrigerants are typically not considered hazardous waste, and therefore the “generator” may not have an EPA identification number. We suggest requiring the EPA ID number or, if no EPA ID number exists, requiring the FEIN/TID number instead. Also, recovered CFC refrigerants may not require shipment via a Hazardous Waste Manifest. Therefore, we suggest changing the fourth bullet point to require “Hazardous Waste Manifest of Bill of Lading Numbers, or Non-RCRA Destruction ID Numbers”.

With regard to section 6.4 (ODS Composition and Quantity Analysis Requirements) on pages 22 through 25, we refer you to our comments to similar section of the Domestic Protocol (Section 6.5) set forth above.

Stephen P. Mandracchia  
Vice President Legal & Regulatory