

# Draft Intent to Develop Alberta Offset System Quantification Protocol: *Quantification Protocol for the Destruction of Ozone-Depleting Substances*

Please contact Climate Change Central  
with any questions or clarification of  
requirements at  
[contact@climatechangecentral.com](mailto:contact@climatechangecentral.com).

This Intent to Develop an Alberta offset system Quantification Protocol document is intended to provide Alberta Environment with an overview of the proposed protocol idea to demonstrate how this protocol will meet the requirements of the Alberta offset system. The protocol developer is required to present this information to Alberta Environment and must receive approval in concept for the protocol before the protocol idea will be considered for development in the Alberta offset system.

Familiarity with and general knowledge of the Alberta offset system is required prior to initiating a protocol. Information on the Alberta offset system is available on the Carbon Offset Solution website (<http://carbonoffsetsolutions.climatechangecentral.com>) and on the Alberta Environment website (<http://environment.alberta.ca/02275.html>).

Alberta Environment will review the submitted information in order to assess and provide feedback on the following elements:

- How the proposed protocol meets the eligibility criteria in Section 7 of the Specified Gas Emitters Regulation;
- Applicability of the proposed protocol against purpose and intent of the Alberta Offset System;
- Baseline adoption levels and credit potential for Alberta;
- Baseline, project condition, and key assumptions for the proposed protocol;
- Key stakeholders and technical experts in the field; and
- Relevant science and technical information

## General Description of the Proposed Protocol

Historically, the majority of climate change reduction frameworks have focused on reducing emissions of three most common greenhouse gases (GHGs) -carbon dioxide, methane, and nitrous oxide – and two groups of gases – HFCs and PFCs. More recently, the handling of a class of refrigerants called chlorofluorocarbons (CFCs) is becoming a focus area for climate change authorities. Chlorofluorocarbons (CFCs), were once widely used in residential and commercial refrigeration systems until the 1980s when their deleterious effects on atmospheric ozone were discovered. Since then, the production and consumption of CFCs have become increasingly regulated. Refrigerants with the potential to deplete atmospheric ozone such as CFCs and hydrofluorochlorocarbons (HCFCs), are now commonly referred to as ozone-depleting substances (ODS). Although the volume of these gases is relatively small compared to other sources, they are potent GHGs with high global warming potential (GWP) values. For this reason, more attention is being given to the use and stockpiling of CFCs and HCFCs and their role in the context of climate change.

This document is written with the understanding that although CFCs meet the definition of a specified gas under the Climate Change and Emissions Management Act (CCEMA) in that they are gases that trap heat near the earth's surface, they are not currently identified under the Specified Gas Emitters Regulation (SGER) and thus projects destroying them are not currently eligible to generate offsets. It should be noted that hydrofluorocarbons (HFCs), which are a proposed replacement for CFCs and HCFCs, are included under SGER.

The objective of submitting this document to Alberta Environment is to provide a context for the potential inclusion of CFCs and HCFCs under SGER. It aims to:

- Describe the current state of ODS stockpiling and destruction activities in Alberta and Canada;
- Review the Climate Action Reserve (CAR) U.S. ODS Project Protocol, which has received broad stakeholder support and regulatory approval by the California Air Resources Board (CARB);
- Summarize the current ODS legislation in Alberta and Canada;
- Clarify the scope and effect of the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol);
- Lay-out a common platform for discussion should Alberta Environment consider including CFCs, HCFCs or other ODS as a specified gases; and
- Provide background information and context.

The major piece of international ODS control legislation is the Montreal Protocol which is administered by the United Nations Environment Programme (UNEP) Ozone Secretariat. It is an international treaty signed by Canada and other countries that stipulates phase out schedules for the production and consumption of ODS. The first phase-out period under the Montreal Protocol included CFCs and set a target of zero production and consumption by 1996. The second phase-out period included HCFCs and set reduction targets in 2004 (65%), 2010 (15%), and 2015 (10%), with nearly complete phase-out by 2020 (0.05%).

The Montreal Protocol makes a distinction between Article 5 and Non-Article 5 countries. Developed countries, such as Canada, are non-article 5 countries and have stricter deadlines in the phase-out schedule for reducing the production and consumption of CFCs and HCFCs.

Each party of the Montreal Protocol is responsible to enact the appropriate regulations to meet the phase-out schedule. The use and handling of ODS are regulated at the federal and provincial levels in Canada. There are currently no regulations or direct market incentives to encourage the destruction of surplus CFCs and refrigerants mixed with CFCs. Unless these CFCs are voluntarily collected and destroyed, they could be stockpiled indefinitely, which is an allowable practice under most provincial laws. The Canadian Council of Ministers of the Environment (CCME) states in their 2001 strategy document "...unless new initiatives are put in place to take CFCs (and halons) out of service and dispose of them, most of the Canadian inventory of these substances will ultimately be released to the environment."<sup>1</sup> According to industry experts, ODS stockpiling practices are common in Canada because the cost of destruction is prohibitive and most regulations do not place a limit on how long ODS can be stockpiled. However, even well managed stockpiles have the potential to release ODS into the atmosphere through slow leakage or accidental discharge.

Through its parent organization, the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) Refrigerant Management Canada (RMC) was created as a non-profit organization to provide a solution to the problem of surplus ODS in Canada. RMC, in conjunction with certain chemical manufacturers, has developed a voluntary, industry-led program to collect a levy on refrigerant substances being imported into Canada which in turn they use pay to operators for their stockpiles of surplus ODS.<sup>2</sup> The federal, provincial, and municipal governments do not have any direct responsibility for this program.

The proposed protocol has been developed specifically for quantifying the carbon offsets from the elimination of emissions from stockpiles of surplus CFCs through the destruction of these substances by incineration. Used ODS can be stored indefinitely or, depending on the type, recovered and recycled indefinitely, often in equipment with high leakage rates.<sup>3</sup> When stored indefinitely, the gases are susceptible to release into the atmosphere through slow leakage, and/or accidental release. The opportunity for generating carbon offsets with this protocol arises from the elimination of leaked ODS into the atmosphere by their destruction in an incinerator. The baseline practice would be the continued stockpiling of regulated ODS, specifically CFCs and HCFCs. RMC uses the services of licensed destruction facilities in Canada and in the US. In Canada, the only destruction facility capable of handling ODS is the Swan Hills Treatment Centre located near Swan Hills,

Alberta.

The formal government approval of an ODS destruction protocol would provide an opportunity for the important work of RMC to continue and possibly expand to include substances slated to be phased out at future dates. In addition, an approved protocol would support and improve the financial viability and sustainability of the Swan Hills Treatment Centre.

At present, Alberta Environment's Specified Gas Emitters Regulation (SGER) does not recognize ODS as a specified gas and thus there are no government approved Offset System Quantification protocols for ODS collection and destruction in Alberta. However, the Climate Action Reserve (CAR) has developed and approved (Feb 2010) two ODS project protocols for ODS within the United States and ODS imported from Article 5 countries.

<sup>1</sup> CCME "Canada's Strategy to Accelerate the Phase-Out of CFC and Halon Uses and to Dispose of the Surplus Stocks" (May 2001) [http://www.ccme.ca/assets/pdf/cfc\\_halons\\_dpslstrtg\\_e.pdf](http://www.ccme.ca/assets/pdf/cfc_halons_dpslstrtg_e.pdf)

<sup>2</sup> Environment Canada <http://www.ec.gc.ca/epr/default.asp?lang=En&n=0817E2BF-1>

<sup>3</sup> Climate Action Reserve "U.S. ODS Project Protocol" [http://www.climateactionreserve.org/wp-content/uploads/2010/02/U.S.\\_ODS\\_Protocol\\_V1.0\\_050710\\_package1.pdf](http://www.climateactionreserve.org/wp-content/uploads/2010/02/U.S._ODS_Protocol_V1.0_050710_package1.pdf)

The proposed protocol is intended to build off this work done by CAR and promote the inclusion of ODS, specifically CFC and HCFCs, as specified gases under the regulation.

The scope of the proposed protocol is specific to the collection of ODS containing CFCs originating in Canada and destroyed by incineration in Alberta. The proposed protocol is only applicable to ODS collected and destroyed within Canada and not ODS imported or exported for the purposes of destruction. The proposed protocol covers the aggregation of ODS for stockpiling, transfer and transportation, and ultimate destruction by incineration.

The proposed protocol has been developed based on best practice guidance from UNEP Ozone Secretariat, US Environmental Protection Agency (EPA), Intergovernmental Panel on Climate Change (IPCC), the International Organization for Standardization's (ISO) standard 14064-2, Alberta Environment's Ozone-Depleting Substances and Halocarbons Regulation and Alberta Environment's Specified Gas Emitters Regulation (SGER). The proposed protocol also builds off the CAR protocols U.S. Ozone Depleting Substances Project Protocol Version 1.0 and Article 5 Ozone Depleting Substances Project Protocol Version 1.0 and their respective errata and clarification documents. The proposed protocol adapts the requirements of these protocols to the regulatory requirements and common practices in Canada while maintaining the integrity and intent.

## Intent of the Proposed Protocol

The intent of the proposed protocol is to provide a detailed quantification methodology, following the ISO 14064-2 format and the requirements of the Alberta Offset System, that will allow RMC to quantify the GHG reduction benefits from the voluntary system of collection and destruction of ODS, in Canada. The proposed protocol will quantify GHG emission reductions realized through the complete destruction of surplus ODS, specifically ODS containing CFCs, which would otherwise be stockpiled indefinitely and emitted to the atmosphere through slow leaks and/or accidental release.

## Baseline Scenario

The baseline scenario for the proposed protocol is the continued practice of indefinitely stockpiling surplus CFCs and ODS mixed with CFCs resulting in their eventual release to the atmosphere through slow leakage and/or accidental release. The baseline emissions are quantified from the measured quantity of CFCs and other ODS mixed with CFCs permanently destroyed by incineration. This type of baseline is commonly referred to as a projection-based baseline. The use of direct measurement to represent the baseline provides a high

level of accuracy.

## Project Condition

This project condition for the proposed protocol is the implementation of a system to identify, collect, transfer and destroy ODS originating in Canada which would otherwise be indefinitely stockpiled.

The proposed protocol has been written for the RMC operations, which will reduce emissions of ODS with high GWP values. The operations of RMC represent the most extensive and organized system of tracking ODS collection and destruction in Canada. In total during its operation, RMC is responsible for the destruction of over 2,000 tonnes of ODS, the majority of which is CFCs and HCFCs.

## Applicability

This protocol is applicable to projects that collect used and unwanted ODS from stockpiles and transfer it to a facility for destruction by incineration, thus avoiding the eventual release of the ODS through slow leakage and/or accidental release. Projects that intend to apply this protocol must also meet the following criteria:

1. The destroyed stockpile of ODS containing CFCs were surplus and could not have been recycled, or had limited use as a recycled material (i.e., could only be used for one year).
2. The destruction of the ODS was not required by law (i.e., there are no federal, provincial or local laws requiring the destruction of the ODS).
3. The incineration facility where the ODS are destroyed is located in Alberta.
4. The incineration facility where the ODS are destroyed is licensed to accept, handle, store, and incinerate these substances. The facility must also be in compliance with all operating permits and relevant regulations in Alberta.

## Regulatory Requirements

The ODS and Halocarbons Regulation, enacted under the Environmental Protection and Enhancement Act, regulates the use and handling of ODS and halocarbons in Alberta. The regulation states that it is an offence to release or permit the release of ODS into the environment unless it can be established that a person took reasonable steps to restrict such a release.

The ODS and Halocarbons Regulation also bans the use of CFCs, including refrigerants mixed with CFCs, in refrigeration systems after January 1, 2005 and limits the use of CFCs in chillers to one year after charging. As well, the regulation states that after January 1, 2005 sellers of ODS are required to accept and store ODS returned to them. No limit is given to how long ODS can be stored or under what conditions.

## Additionality

As stated above, the permanent destruction of stockpiles of surplus ODS is not currently required by law. Any steps taken to collect and destroy stockpiles of CFCs, or ODS mixed with CFCs, would be surplus to regulation. Stockpiles of CFCs in Alberta are considered to be surplus after January 1, 2005, since using the CFCs to charge most refrigeration equipment was a banned activity after that date.

The Canadian inventory of CFCs was estimated to be 22,863 tonnes in 1998 by the CCME.<sup>4</sup> To date, RMC has destroyed just over 2,000 tonnes of ODS consisting mostly of CFCs and HCFCs. Since RMC is the only operation of its kind in Canada and there is no other incentive to destroy ODS instead of stockpiling, it is clear that destruction of surplus ODS cannot be considered as business as usual.

<sup>4</sup> CCME "Canada's Strategy to Accelerate the Phase-Out of CFC and Halon Uses and to Dispose of the Surplus Stocks" (May 2001) [http://www.ccme.ca/assets/pdf/cfc\\_halons\\_dspslstrtg\\_e.pdf](http://www.ccme.ca/assets/pdf/cfc_halons_dspslstrtg_e.pdf)

In 2002 and 2003 RMC transferred less than 20 tonnes and less than 40 tonnes, respectively, of ODS for destruction, consisting primarily of CFCs and HCFCs. These years would be considered pilot years not claimed for offsets under this protocol. The RMC project would apply the proposed protocol to operations after January 1 2005, which meets the Alberta Offset System start date eligibility criterion of January 1, 2002.

Were CFCs to become specified gases under SGER, the proposed protocol would result in real, quantifiable and verifiable reductions through direct measurement of the quantity of CFCs, and ODS mixed with CFCs, captured and permanently destroyed by incineration.

The inclusion of CFCs under SGER and the use of this protocol to quantify carbon offsets will promote incremental GHG reductions by encouraging the continued collection and destruction of these gases in Alberta and potentially increase the volume of gases collected under this program. The value of carbon offsets will be of great importance to the economics of this type of project as the current cost of destruction exceeds the amount of the levy collected by RMC. Since RMC is structured as a not-for-profit and other sources of ODS aren't yet being addressed, the GHG reductions will be beyond business as usual.

Additionality is also demonstrated by the barriers that impede the implementation of ODS destruction projects, which are described briefly in the following section.

## Barriers

ODS collection and destruction projects face numerous barriers in Alberta and Canada. The primary barrier is financial. RMC has been operating as a not-for-profit organization to provide the service of collection and destruction of ODS. Currently, the only source of funding to RMC is the voluntary levy paid by major chemical manufacturers on new refrigerants. From 2002 to 2008 the program was generally self-sufficient. Since then, overall increases in collection, destruction and wholesaler service fees, paired with large ODS volumes have caused a significant increase in program expense, to the point of exceeding the income from levies. This trend is expected to continue, creating a large barrier to RMC's ability to effectively operate the program since there are limited options to raise capital as a not-for-profit. The situation is such that, without additional revenue, RMC may have to halt its collection services in the coming years to ensure that current stockpiles can be destroyed.

A technical barrier faced by RMC is the reliance on licensed, operational facilities to accept and destroy the ODS. Currently RMC uses a combination of Canadian and US service providers. As stated above, the only facility in Canada able to accept ODS is the Alberta Government owned Swan Hills Treatment Centre located near Swan Hills, Alberta. Unfortunately, the Treatment Centre has also been facing financial barriers to operation due to low incoming waste volumes. Currently, the operating costs of the Treatment Centre are heavily subsidized by taxpayer dollars through Alberta Infrastructure contributions. Any initiatives that increase operating revenues at the Treatment Centre reduce taxpayer liabilities. When Swan Hills is unable to accept ODS waste from RMC, they are forced to ship it to the U.S. for destruction.

## Permanence

The complete destruction of CFCs and HCFCs results in a permanent reduction because the gas is no longer in existence and therefore poses no threat of release into the environment. The process of destruction by incineration is irreversible.

## Leakage

Leakage is defined as the shifting of emissions to outside of the project boundary and has been addressed by identifying the sources, sinks and reservoirs (SSRs) of GHG emissions through a full lifecycle analysis. The proposed protocol accounts for all relevant upstream and downstream emission sources.

The main types of GHG leakage that could occur from ODS destruction projects would be related to the operations of the destruction facility. This potential form of leakage has been dealt with as SSRs to be quantified within the proposed protocol.

## Conservativeness

The proposed protocol will use testing to quantify key volumes of ODS to ensure accuracy and will include appropriate assumptions for other emission sources that are not directly measured. The general approaches outlined in ISO-14064-2 and other sources of best practice guidance will be followed to ensure that emission reductions are not overestimated. Emission factors for fuel combustion and grid electricity consumption will be referenced from Alberta Offset System guidance documents and from the Environment Canada National Inventory. Conservative assumptions will be used for insignificant sources, such as transportation, to ensure a robust calculation of total emission reductions.

## Aggregation

The volumes of ODS typically accumulated in a given stockpile are relatively small. The operations of RMC essentially represent an aggregation program through the consolidation of these small stockpiles into a quantity suitable for transportation and destruction. Currently RMC is the only organization offering this type of service. As an aggregated project, the integrity of the protocol is maintained because the requirements for measurement and destruction efficiency must be met for each kilogram of ODS destroyed.

## Verification

In order to support verification, the proposed protocol suggests that the following records be made available for verification purposes.

- Composition and volume data for each shipment of ODS sent from a collection centre and destroyed at the Swan Hill Treatment Centre.
- Location of origination of ODS stockpile.
- Metered electricity and/or gas usage from Swan Hills Treatment Centre.
- Measured volumes of fossil fuel used by Swan Hills Treatment Centre.
- Burner temperature and efficiency records from Swan Hills Treatment Centre.
- Measured volumes of destruction waste handled at the Swan Hills Treatment Centre.
- Transportation manifests showing transfer of ownership to RMC.
- Contracts between RMC and wholesalers for the collection of ODS.
- Calibration and maintenance records for all meters.
- Relevant permits for operating destruction facilities and proof of compliance with these permits

## Ownership

For consistency with other approved Alberta Offset System protocols, this quantification methodology also does not explicitly assign ownership. As such, it is the responsibility of the project proponent to provide proof of ownership of all emission reductions claimed at the time of third party verification or upon request by Alberta Environment (e.g. through contracts with other relevant participants involved in the collection and consolidation of ODS and the transportation and destruction processes).

Where multiple proponents are involved in a project, each proponent would be required to provide documentation of the transfer of ODS ownership from the point of capture through to the point of destruction to ensure that emission reductions are only counted once, consistent with the Alberta Offset System guidelines. Given the liability and cost associated with transporting and destroying ODS and the potential value of the offsets that can be generated from these activities, it is expected that proponents will establish the necessary agreements as part of the normal course of business and should not have much difficulty providing documentation to demonstrate ownership of offsets.

## Related Protocols and/or Methodologies

The proposed protocol draws upon best practice guidance from an approved protocol under the Climate Action Reserve (CAR): U.S. ODS Project Protocol Destruction of U.S. ODS Banks. The proposed protocol is more limited in scope than the CAR protocol because it includes CFCs from refrigerants only and not any ODS from foam blowing agents. The baseline case is adapted from CAR protocol to reflect Canadian regulations and RMC's focus on surplus stocks of ODS only. Whereas the CAR protocol makes allowances for ODS to be reclaimed and recycled indefinitely, the proposed protocol assumes the ODS would be stockpiled indefinitely. The project start date and crediting period outlined in the CAR protocol have been adapted in the proposed protocol to match the requirements of the Alberta Offset System.

Sources of Canadian best practice guidance include the strategy and national action plan developed by the CCME Federal Provincial Working Group on Ozone-Depleting Substances and Halocarbon Alternatives.

International best practice guidance includes documentation on ODS GWP factors from the US EPA<sup>5</sup> and the UNEP Handbook for the Montreal Protocol

<sup>5</sup> US EPA Ozone-depleting Substances <http://www.epa.gov/ozone/science/ods/index.html> Edmonton Journal "Half a billion tax dollars later, Swan Hills' days may be numbered"  
<sup>6</sup> <http://www2.canada.com/edmontonjournal/news/story.html?id=93c592ce-b16e-4ee8-bad4-f0a15d9a317e&p=3>

## Other Benefits

The initial purpose of RMC's ODS destruction program was to eliminate the gases with potential to harm atmospheric ozone should they be released. With the identification of ODS as potent GHGs, the program now has the added benefit of reducing GHG emissions as well. With the revenue potential offered by market mechanisms like carbon offsets, the important work of this unique program can continue. In addition, the systems of tracking and collection set up by RMC could be used to manage the next generation of refrigerants, hydrofluorocarbons (HFCs), which no longer pose a threat to the ozone layer but are still potent GHGs.

It can be surmised that increased revenue for RMC through offsets would result in increased revenue for the Swan Hills Treatment Centre. Currently, the treatment centre is funded by provincial money and may be in jeopardy of closing down<sup>6</sup>. The revenue from ODS destruction would support the continued operation of the treatment centre, thus continuing to provide employment opportunities to the people of Swan Hills.

## Adverse Effects

No adverse effects of the ODS collection and destruction project have been identified at this time.

## Proposed Timing for Submission into the Offset System Review Process

Given that changes to SGER are necessary for the proposed protocol to be eligible to generate offsets, a preliminary meeting with Alberta Environment is critical prior to making decisions on protocol submission timing. We suggest that this meeting include relevant stakeholders such as RMC, Alberta Infrastructure, and the operator of the Swan Hills Treatment Centre.

## References for Additional Background Information

Canadian Council of Ministers of the Environment. Canada's Strategy to Accelerate the Phase-Out of CFC and Halon Uses and to Dispose of the Surplus Stocks. May 2001.

Canadian Council of Ministers of the Environment. National Action Plan for the Environmental Control of Ozone-Depleting Substances (ODS) and their Halocarbon Alternatives. May 2001 Update.

Climate Action Reserve. U.S. Ozone Depleting Substances Project Protocol Destruction of U.S. Ozone Depleting Substances Banks Version 1.0. February 2010.

International Organization for Standardization (ISO). Standard 14064: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements. March 2006.

United Nations Environment Programme Ozone Secretariat. Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer. Eighth Edition 2009.