

# **Validation & Verification Report A-Gas US, Inc.**

**American Carbon Registry**

**December 2022**

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## 1. Introduction

First Environment, Inc. (First Environment) provides this validation/verification report to A-Gas US Inc. (A-Gas) as a deliverable of the American Carbon Registry (ACR) project validation and verification process. It covers the validation and verification of the following Project and reporting period:

Project Name	ACR Project ID	Reporting Period
A-Gas V9	ACR774	8/5/2020 – 12/30/2020

The Project reports emission reductions for a single 40-year crediting period beginning on August 5, 2020.

First Environment conducted validation and verification activities from the date of the kickoff meeting through December 8, 2022.

## 2. Objectives

The purpose of the validation and verification was, through review of appropriate evidence, to establish that:

- the objectives of the ACR Validation and Verification Standard Chapters 1.B and 8.B are met;
- the Project conforms to the requirements of the criteria discussed in Section 3 of this report; and
- the data reported are accurate, complete, consistent, transparent, and free of material error or omission.

Validation activities also include an assessment of the likelihood that implementation of the project will result in the emission reductions as stated by A-Gas in the GHG Project Plan.

## 3. Validation/Verification Scope & Criteria

Specific scope metrics for the validation/verification are outlined in the table below:

<b>Geographic Boundaries</b>	HFC Reclamation Facility, Bowling Green, OH
<b>Greenhouse Gases Verified</b>	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO <sub>2</sub> -e) resulting from HFC reclamation and resale to displace virgin material
<b>Reporting Period</b>	8/5/2020 – 12/30/2020
<b>Data Sources</b>	Historical A-Gas accounting and operational records
<b>Level of Assurance</b>	Reasonable assurance
<b>Definition of Materiality</b>	Misstatements greater than five percent of the emission reductions assertion for the reporting period were considered material. Qualitative non-conformities with and discrepancies in the GHG Project Plan and Monitoring Report between the validation and verification criteria were also considered material.

The following outlines the guidance and protocols used to conduct the validation and verification:

<b>Standards of Validation/Verification</b>	<ul style="list-style-type: none"><li>• ACR Standard, Version 7.0, December 2020 (ACR Standard)</li><li>• Methodology for the Quantification, Monitoring, Reporting and Verification of the Greenhouse Gas Emissions Reductions and Removals from Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants Version 2.0 (the Methodology), including Errata and Clarification issued May 5, 2022</li></ul>
<b>Validation/Verification Process</b>	<ul style="list-style-type: none"><li>• ACR Validation and Verification Standard, Version 1.1, May 2018</li><li>• ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006</li></ul>

The GHG Project Plan—the final version of which is dated December 8, 2022—was also used to inform the verification process.

## 4. Project Description

The Project consists of the reclamation and reuse of HFC-125 and HFC-227ea from fire suppression systems. A-Gas purchases, recovers, and reclaims used HFCs from fire suppression systems being decommissioned, serviced, or retrofitted.

Used fire suppressants are transferred to A-Gas's EPA-certified reclamation facility in Bowling Green, Ohio and processed for resale. The subsequent reuse of certified reclaimed HFC material in the fire suppression application displaces virgin materials and results in a net reduction of HFC emissions.

The GHG Project Plan provides additional details about the Project.

## 5. Overview of the Validation and Verification Process

To review the Project's GHG information, the following validation and verification process was used:

- conflict of interest review;
- selection of Audit Team;
- initial interaction and kickoff meeting with primary A-Gas contacts;
- development of the validation/verification plans and sampling plan;
- site visit;
- review and evaluation of GHG information systems and data;
- follow-up interaction with A-Gas contacts for corrective action or supplemental data as needed; and
- final statement and report development.

The process was utilized to gain an understanding of the Project's emission sources and reductions, to evaluate and verify the collection and handling of data, the calculations that lead to the results, and the means for reporting the associated data and results.

### **5.1 Conflict of Interest Review**

Prior to beginning any third-party assessment, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the engagement. No potential conflicts were found for the Project. A project-specific conflict of interest form was also filed with the ACR for the project.

### **5.2 Audit Team**

First Environment's Audit Team consisted of the following individuals who were selected based on their validation and verification experience, as well as familiarity with industrial gas operations:

Team Leader – Michael Carim  
Validation/Verification Team – Logan Simpson  
Internal Reviewer – Jeff Daley

### **5.3 Audit Kick-off**

The audit process was initiated with a kick-off meeting on May 20, 2022 with the primary A-Gas contacts. The meeting focused on confirming the scope, schedule, and data required for validation and verification.

### **5.4 Development of the Validation & Verification Plans**

The Audit Team formally documented the validation/verification plan as well as determined the data sampling plan. The validation/verification plan was informed by the kick-off meeting where key elements of the validation and verification scopes were discussed including project team members, project level of assurance, materiality threshold, and standards of reporting and evaluation. It also provided an outline of the validation and verification processes and established project deliverables. A-Gas was afforded the opportunity to comment on the key elements of the plans for validation and verification. A separate data-sampling plan was designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

### **5.5 Site Visit**

Mr. Michael Carim performed a site visit at the project reclamation facility in Bowling Green, Ohio on March 15, 2022 during previous validation/verification activities for A-Gas to assess GHG project boundaries, site operations, data collection processes, and information management systems, as well as to conduct interviews with key project personnel. During the site visit, First Environment conducted interviews with:

Sandra Hoffman – A-Gas  
Eric Ripley – A-Gas

The data management system assessed during the previous site visit is the same system utilized for data collection in the current Project and no changes to site operations were identified during validation/verification assessments; therefore, no additional on-site inspection was warranted for the current validation/verification process.

## **5.6 Emissions Reduction Data and Calculation Assessment**

This assessment used information and insights gained during the previous steps to evaluate the collected data and the reported emissions reduction quantities and identify if either contained material or immaterial misstatements.

## **5.7 Corrective Actions and Supplemental Information**

The Audit Team made requests for corrective action during the validation and verification processes. A-Gas provided sufficient responses to all requests. These requests and A-Gas's responses are described in Appendix A of this report.

## **5.8 Validation & Verification Reporting**

Validation and verification reporting, represented by this report, documents the validation and verification processes and identifies their findings and results. Validation and verification reporting consist of this report for A-Gas, along with a verification statement. Both the report and statement are submitted to ACR as part of the validation/verification reporting process.

# **6. Validation Results**

## **6.1 Project Boundary**

The Project boundary is defined as HFC emissions from equipment or system manufacture and installation (SSR 3), leaks during the operation of fire suppression systems (SSR 4), servicing or recharging of old systems or charging new systems (SSR 5), and emissions from equipment disposal (SSR 6). Fugitive emissions of virgin HFC material occurs in the baseline scenario during fire suppression system use, maintenance, and end-of-life. Emission reductions occur from the reclamation and reuse of existing HFC material.

The Audit Team assessed the source, sink, and reservoir (SSR) determination included in the GHG Project Plan and found the justification accurate and in accordance with the Methodology.

Overall, A-Gas provided an accurate description of the Project boundary and a comprehensive justification for the project SSRs.

## **6.2 Baseline Scenario**

The baseline scenario is defined as the continued use of virgin HFC material to charge new and existing fire suppression systems. A-Gas correctly selected the associated global warming potentials for project HFCs from Table 3 in the Methodology for the 2020 vintage year.

## **6.3 Emission reduction quantification methodologies and calculations**

Emission reductions are quantified in accordance with the procedures described in the Methodology and the ACR Standard. The equations are correctly identified and the calculation of GHG emission reductions is presented in a transparent manner, incorporating all relevant GHG sources, sinks, and reservoirs.

Baseline emissions are quantified according to Equation 1 in the Methodology based on the quantity of eligible HFC sold during the reporting period.

No sources of project or leakage emissions are relevant under the Methodology.

Total net emission reductions are determined according to Equation 2 in the Methodology by setting total emission reductions during the reporting period equal to total baseline emissions.

After reviewing the quantification procedure and supporting evidence, the Audit team concluded that the methodologies and the applicable tools have been applied correctly to calculate baseline emissions and net GHG emission reductions and removals.

#### **6.4 Data Monitoring and Management System**

The monitoring plan described within the GHG Project Plan includes all relevant data and parameters required to obtain a reliable result of generated emission reductions and meets the requirements of the Methodology. The primary variable monitored in order to determine and account for emission reductions is presented in Table 1 below.

**TABLE 1: Monitoring Parameters**

<b>Monitoring Parameter</b>	<b>Method of Estimation</b>	<b>Frequency of Measurement</b>	<b>Unit of Measurement</b>	<b>Frequency of Recording</b>
Total quantity of virgin HFC <sub>j</sub> that would have been used to recharge equipment during the reporting period ( $VR_{HFC,j,rp}$ )	Sales invoices	As sold throughout reporting period	Kilograms	As sold throughout reporting period

The GHG Project Plan includes a complete description of the frequency, responsibility, and procedures for recording, storing, monitoring, and measuring all project data. All requirements in Section 5.1 of the Methodology are addressed by the monitoring plan contained with the GHG Project Plan.

The sections below discuss relevant aspects of the monitoring plan as they relate to the requirements for data collection and parameters to be Monitored in Section 5.2 of the Methodology.

##### **6.4.1 Fire Suppressant Recovery**

Used HFCs are purchased from domestic sources and reclaimed by A-Gas. The used HFC's arrive at the A-Gas Bowling Green facility in tanks that were previously part of fire suppression systems. The HFC material is recovered in-house and put into bulk tanks until reclamation. Technicians' complete recovery reports that identify relevant information regarding the type and origin of the HFC material, the cylinder serial numbers, and its delivery to the reclamation facility. Shipment statements and other associated recovery records are logged and retained in A-Gas's data management system.

All recovered fire suppressant HFCs are collected by A-Gas in-house. For the V9 Project, all material was recovered in individual quantities less than 500 lbs. of gross material weight.

Upon receipt at the reclamation facility, cylinders are scanned and logged in A-Gas's Cyltrak inventory management system. The Cyltrak system records all cylinder movements within the facility.

##### **6.4.2 Fire Suppressant Reclamation**

A-Gas is an EPA-certified reclaimer.



Used fire suppressant material is processed through A-Gas's reclamation equipment and sent to bulk storage tanks on-site. Smaller cylinders are filled from the bulk tanks in preparation for sale. For each individual cylinder that is filled, a sample is taken and sent for analysis to either National Refrigerants Inc. or A-Gas's in-house lab. Both labs were confirmed to be AHRI-certified testing laboratories. Certificates of analysis generated during laboratory analyses confirm that all testing is performed according to the ASTM D6231 and ASTM D6064 standards and that all reclaimed fire suppressant material in the project activity meet the definition of certified reclaimed fire suppressants.

#### **6.4.3 Sale of Reclaimed Fire Suppressant Material**

Sales of reclaimed fire suppressant material is tracked in A-Gas's financial system. An individual customer invoice documenting the type and net quantity of reclaimed material sold is generated for every transaction in the reporting period. Customer data stored in A-Gas's financial system further confirms that all material is used in an eligible sector and segment as defined by the Methodology.

The adequacy of the data management systems described in the monitoring plan was assessed during the previous site visit by reviewing data management system procedures and controls with A-Gas personnel as well as during the desktop review performed for the current assessment through tracing data back to its origin.

#### **6.5 QA/QC Procedures**

The GHG Project Plan includes QA/QC procedures for data that meet the requirements of the Methodology.

A-Gas's internal Quality Control department reviews all weight and materials transfers within the reclamation facility. The Finance Department is responsible for customer billing and reconciles all invoiced quantities internally. Environmental Services staff collect all information required for GHG emission reduction reporting and perform data validation prior to submission for verification.

Further, all sales data used in emission reduction calculations serves as the basis for customer billing by A-Gas and are subject to accounting controls and procedures, thereby providing an additional layer of quality assurance.

Due to the strong QA/QC and inventory tracking procedures surrounding recorded and reclaimed fire suppressant material quantities, minimal data uncertainty is foreseen.

#### **6.6 Project-specific conformance to ACR eligibility criteria, including additionality**

The Project meets the eligibility requirements set forth in the ACR Standard as described in Table 2 below.

**TABLE 2: ACR Eligibility Criteria**

<b>Eligibility Requirement</b>	<b>Conformance Details</b>	<b>Validation Conclusion</b>
Start Date	The start date is August 5, 2020	Consistent with requirement.
Minimum Project Term	N/A – project type does not contain risk of emission reduction reversal	N/A

Eligibility Requirement	Conformance Details	Validation Conclusion
Crediting Period	Forty years – August 5, 2020 through August 4, 2060	Consistent with requirement.
Real	HFC reclamation activities are performed in accordance with an approved ACR methodology to produce verifiable evidence of emissions mitigation.	Consistent with requirement.
Emission or Removal Origin	The project proponent reduces non-energy direct emissions by end users utilizing reclaimed HFCs.	Consistent with requirement.  A-Gas retains ownership of emission reductions via contractual agreements with upstream and downstream customers.
Offset Title	A-Gas retains rights to GHG emission reductions associated with the reclaimed HFC material through the terms and conditions agreed upon with its customers.	Consistent with requirement.  A-Gas retains ownership of emission reductions via contractual agreements with upstream and downstream customers.
Additional	Project satisfies additionality test in approved methodology and Regulatory Test in ACR Standard.	Project conforms to ACR additionality criteria. See Section 6.7 below for conformance details.
Regulatory Compliance	Reclamation facility was in compliance with regulatory requirements during the reporting period.	A-Gas provided an attestation to First Environment to confirm regulatory compliance throughout the reporting period.
Permanent	N/A – project type does not contain risk of emission reduction reversal.	N/A
Net of Leakage	N/A – leakage does not apply under the Methodology	N/A
Independently Validated and Verified	A-Gas contracted First Environment, Inc. to provide independent, trustworthy, and objective third-party validation and verification services to the Project.	First Environment is an ANAB-accredited and ACR-approved validation/verification body.  Audit activities were performed independently and in accordance with all ACR requirements.
Environmental & Community Assessments	No negative community or environmental impacts are identified. Net positive impact due to lower GHG emission and contributions to UN SDGs.	Consistent with requirement.  Project occurs at a private industrial facility. No negative external environmental or community impacts are created from the activity.

The Project activities comply with the applicability requirements of the Methodology. The table below lists the relevant applicability requirements and identifies how the Project meets them.

**TABLE 3: Methodology Criteria**

Eligibility Requirement	Conformance Details	Validation Conclusion
Location	The reclamation facility is located in Bowling Green, OH. All fire suppressant material recovery occurs in the United States.	Consistent with requirement.
Sector/Segment	A-Gas maintains tax forms and customer profiles that confirm customers purchasing reclaimed HFC material fall within an eligible Sector/Segment.	Consistent with requirement.  Reclaimed HFC materials are used in the following Refrigerant Sectors from Table 1 in the Methodology: <ul style="list-style-type: none"> <li>• Fire suppression</li> </ul>
Certified Reclaimed HFC Fire Suppressant	Certificates of Analysis from A-Gas Americas, Inc.	Consistent with Requirement  All reclaimed fire suppressant material analyses are performed to ASTM D6231 and D6460 standards.  All laboratories provided analytical services to the Project are AHRI-accredited.

The Project has not participated in any other GHG emission trading or compliance programme nor has it been rejected by another GHG programme.

### **6.7 Additionality**

The Project satisfies the requirements for the demonstration of additionality specified by the ACR Standard by passing an approved practice-based performance standard and a regulatory surplus test.

Certified reclaimed HFCs are used in eligible Refrigerant Sectors and Segments as defined by the Methodology; therefore, the Project satisfies the performance standard specified by the Methodology.

Additionally, A-Gas provided a management attestation confirming that HFC reclamation activities were not mandated by law.

### **6.8 Approved Variance or Deviations**

The Project did not obtain deviations from ACR during the validation/verification process.

## **7. Verification Results**

During the verification process, First Environment reviewed the Project's Monitoring Report, GHG emission reduction assertions, and supporting documentation for the current reporting period to ensure consistency with the GHG Project Plan and the Methodology. Discrepancies between Project documentation and the verification criteria were considered material and identified for corrective action. Additionally, First Environment assessed the GHG emission

reduction assertions and underlying monitored data to determine if either contained material or immaterial misstatements. The results of these reviews are discussed in greater detail below.

### **7.1 GHG Information Verified**

Emission reduction calculations were reviewed to ensure accuracy in the formulas used and the raw data used as inputs. Formulae were tested to ensure they were consistent with the calculation methodology described in the Methodology and GHG Project Plan. Total baseline emissions were quantified in accordance with Equation 1 from the Methodology. The amount of HFC reclaimed and sold into the market is determined from A-Gas sales records during the reporting period. The GWPs of the reclaimed fire suppressant material ( $GWP_{HFC,j}$ ) were determined from Table 3 in the Methodology. Total emission reductions were computed using Equation 2 from the Methodology. All emission sources within the project boundary are properly accounted for in calculations.

### **7.2 Verification Assessment Techniques and Processes Employed**

Copies of the raw data used in the calculations, including the quantities of fire suppressant material recovered, reclaimed, and sold, were compared with the data used in the final calculations and tested for transcription or mathematical errors. First Environment sampled all areas identified as being of high risk of inaccuracy, uncertainty, or misstatement and reviewed evidence such as laboratory Certificates of Analysis and performed other data checks in order to assess whether the project sufficiently mitigated data uncertainty. First Environment also performed reviews for a subsample of inbound material records, reclaimed fire suppressant material sales invoices, and customer sector/segment information to inform the verification process and assess the robustness of A-Gas's document management systems. The assessments performed on this data, as described above, confirmed the reliability of the evidence provided and verified the accuracy of the information flow. Additionally, First Environment performed recalculations of emission reductions for the entire reporting period to assess whether they were free of material misstatement. First Environment found the emission reduction calculations to be free of material misstatement.

The evidence provided was consistent with the requirements of the Methodology and the validated GHG Project Plan and meets generally accepted evidentiary standards for best practices in GHG accounting.

## **8. Audit Findings**

A-Gas provided good documentation for the emissions estimates as well as the procedures surrounding the data collection process. To complete the validation and verification processes, First Environment issued corrective action requests. Through communications with the Audit Team, A-Gas was able to resolve all requests made by First Environment during the validation and verification processes.

The findings issued, as well as A-Gas's responses, are summarized in Appendix A of this report.

## **9. Validation & Verification Conclusion**

First Environment was retained to provide validation and verification services to A-Gas for the Project's GHG emission reductions assertions based on the following fundamentals:

- *Level of assurance:* Reasonable assurance.
- *Validation/Verification objectives:* To assure project conformance with the validation/verification criteria and that the requirements of the ACR Validation and Verification Standard, Chapters 1.B and 8.B are met. Validation objectives also include an assessment of the likelihood that implementation of the Project will result in the emission reductions stated in the GHG Project Plan.
- *Validation/Verification criteria:* American Carbon Registry Standard, Version 7.0, December 2020; Methodology for the Quantification, Monitoring, Reporting and Verification of the Greenhouse Gas Emissions Reductions and Removals from Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants Version 2.0, including Errata and Clarification.
  - The verification process was also informed by the GHG Project Plan
- *Definition of materiality:* Misstatements of greater than five percent of the GHG reduction assertion and qualitative non-conformities with validation and/or verification criteria are considered material.
- *Scope, including:*
  - *Boundaries of the assertion:* A-Gas reclamation facility;
  - *The physical infrastructure, facilities, and activities within the assertion:* HFC reclamation equipment;
  - *GHG sources, sinks, and reservoirs included within the assertion:* Baseline emissions from the use of virgin HFCs in fire suppression equipment;
  - *The time period for the assertion:* August 5, 2020 to December 30, 2020.

Based on the assessments performed and the historical evidence collected, First Environment concludes that the GHG Project Plan is in conformance with the specified validation criteria and the Project GHG emissions reductions, due to the reclamation and resale of recovered HFC material for the below referenced time period, can be considered with a reasonable level of assurance:

- consistent with the GHG Project Plan,
- in conformance with the ACR Standard and the Methodology, and
- without material discrepancy.

Verified results show:

August 5 to December 30, 2020	Total
Baseline Emissions (tCO <sub>2</sub> e)	154,340
Project Emissions (tCO <sub>2</sub> e)	N/A
Emissions Reductions (tCO <sub>2</sub> e)	154,340

## 10. Lead Verifier Signature



Michael M. Carim  
Senior Associate

## 11. Independent Internal Reviewer Signature

A handwritten signature in black ink, appearing to read "Jeff Daley". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Jeff Daley  
Senior Associate

## Appendix A – Validation/Verification Findings

ID	Corrective Action Request	Summary of Participant Response	VVB Conclusion
1	The Emissions Reductions spreadsheet selects an incorrect GWP for HFC-125 and HFC-227ea in the baseline emissions calculation. Values applied correspond to reporting for vintage year 2021, not 2020.	A-Gas revised their calculation spreadsheet to correctly apply the GWP values from Table 3 in the Methodology for vintage year 2020.	Response is acceptable.
2	Section VIII of the ACR Monitoring Report does not identify the date of the last verification site visit	The Monitoring Report was revised in Section VIII to resolve the issue.	Response is acceptable.

ID	Clarification Request	Summary of Participant Response	VVB Conclusion
<i>No requests for clarification were issued during the validation/verification process.</i>			