Verification Report

CAR1480 – Phlogiston Phase 1
Reporting Period: January 1, 2024 – March 31, 2024

Prepared for:

Ascend Performance Materials Operations LLC and ClimeCo

July 31, 2024

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1.0 Introduction

TÜV SÜD America Inc. (TÜV SÜD) was contracted by ClimeCo LLC (ClimeCo) to perform the verification of Ascend Performance Materials Operations LLC's (Ascend) Phlogiston Phase I project (Project) for the reporting period January 1, 2024 through March 31, 2024 to the Climate Action Reserve (Reserve) Adipic Acid Production Project Protocol Version 1.0 (Protocol). The Project Developer is Ascend Performance Materials Operations LLC. The Project involves GHG emission reductions from the enhancement of an existing control technology at a single adipic acid plant (AAP) that destroys N_2O emissions above the baseline destruction rate that would otherwise have been vented to the atmosphere.

1.1 Project Background & Site Description

The Project activity consists of the installation and operation of a new absorption column at Ascend's adipic acid plant in Cantonment, FL. The column converts NO_x to nitric acid via a high-pressure water absorption process. This absorption column allows the plant's Thermal Reduction Unit (the control unit or TRU) to accept a higher percentage of the adipic off gas flow from the adipic acid plant rather than directing it to the non-N_2O emissions control unit (the NO_x-specific selective catalytic reduction unit or SCR). Longer TRU operating times result in more N_2O destroyed. The Project is considered an enhancement of the existing control technology per the Protocol's definition for eligible projects.

In 2023, Phase II of the project commenced, and a new control device was installed. A second TRU effective at destroying both N_2O and NO_x was added to provide redundancy and reliability to maintain the highest possible level of N_2O destruction.

Ascend is responsible for ongoing operation and maintenance of the monitoring system and data acquisition and handling system. ClimeCo is the technical consultant to Ascend and is responsible for overall program management, development of monitoring reports, and oversight of the verification process.

This is the verification of the twelfth reporting period for the Project.

1.2 Responsible Parties

Adipic Acid Plant Owner and Operator
Ascend Performance Materials Operations LLC
3000 Old Chemstrand Rd.
Cantonment, FL 32533

Technical Consultant
ClimeCo LLC
10 North Reading Avenue
Boyertown, PA 19512

Ascend and ClimeCo are responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria listed below in Table 1.

1.3 Verification Team

TÜV SÜD is responsible for expressing an opinion on the GHG statement based on the verification. The TÜV SÜD verification team consisted of the following individuals who were selected based upon verification experience under the Reserve's program and knowledge of U.S. EPA regulations and the adipic acid plant sector.

Lead Verifier: Phillip Cunningham
Senior Internal Reviewer: Zach Eyler
Verifier: Garrett Heidrick

1.4 Objectives

The goal of the verification activities was to ensure that the claimed GHG emission reductions are complete, consistent, accurate, transparent, and permanent and that the Project followed the Protocol's project additionality, monitoring, and reporting requirements. Furthermore, the verification activities ensure that the data provided to TÜV SÜD is well documented and free of any material errors or omissions.

1.5 Scope

The scope of the verification consisted of the following independent and objective activities:

- Review the Project Monitoring Plan,
- Review Project boundaries,
- Review Project eligibility,
- Review Project data acquisition and quality control procedures,
- Review the Project's baseline emissions data,
- Review the Project's project emissions data,
- Review the Project's emission reduction calculations,
- Review Project documents and data against the Verification Criteria listed in Table 1,
- Issue requests for corrective actions, non-material findings, additional documentation, and clarifications, as necessary, and
- Issue a Verification Report, Verification Opinion, and List of Findings to Ascend, ClimeCo and the Reserve.

1.6 Verification Criteria

The verification criteria are shown in Table 1.

Table 1 - Verification Criteria

Criteria	Details
Standard of Verification	• Adipic Acid Production Project Protocol Version 1.0 (September 30, 2020) (Protocol) • Errata and Clarifications to the Adipic Acid Production Project Protocol Version 1.0 (July 27, 2021) • Reserve Offset Program Manual Version 9.2 (April 2024) • Policy Memo: Use of Global Warming Potential Values for All Offset Protocols (July 13, 2022)
Verification Process	• The Reserve Verification Program Manual (February 3, 2021) • ISO 14064-3:2019 "Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas statements"
Level of Assurance	Reasonable assurance
Materiality	99% materiality threshold (<1% error) because total annual ERs are >100,000 tCO_2e.

2.0 Verification Activities Summary

TÜV SÜD developed a verification evidence-gathering plan to be followed throughout the verification. The verification plan consisted of the following activities:

- TÜV SÜD completed the Project NOVA/COI form to identify any potential conflicts of interest with the Project, Project Developer or Technical Consultant. The NOVA/COI form was submitted to the Reserve and the COI assessment revealed no conflicts of interest and was approved by the Reserve on April 24, 2024. TÜV SÜD submitted an updated NOVA/COI form on July 25, 2024 indicating a change in the senior reviewer.
- TÜV SÜD held a verification kickoff meeting with Ascend and ClimeCo on April 26, 2024. During the kickoff meeting TÜV SÜD reviewed the verification objectives and process, the verification schedule, and requested the verification background documents.
- TÜV SÜD performed a strategic review and risk assessment of the received data and support documents to understand the scope and areas of potential risk in the GHG emissions reductions. The Reserve allowed TÜV SÜD to conduct the site visit virtually for the previous, tenth, reporting period verification.
- TÜV SÜD developed a risk-based evidence-gathering plan based upon the strategic review and risk assessment. The verification plan and evidence-gathering plan were used throughout the verification and were revised as needed based upon additional risk assessments.
- TÜV SÜD conducted a detailed desktop review of submitted material including evidence of regulatory compliance, documentation of ongoing QA/QC procedures, source data, and emission reduction calculations.
- TÜV SÜD submitted requests for corrective actions, non-material findings, additional documentation, and clarifications, as necessary to Ascend and ClimeCo throughout the verification.
- TÜV SÜD's Senior Internal Reviewer conducted a review of the verification evidence-gathering activities, Verification Report, and Verification Opinion.
- TÜV SÜD issued a final Verification Report, Verification Opinion, and List of Findings.
- TÜV SÜD held an exit meeting with Ascend and ClimeCo.

3.0 Verification Findings

3.1 Assessment of the GHG Reduction Project Operations

Per the Protocol project definition, the Project is considered the enhancement of an existing control technology (the TRU) at a single adipic acid plant. The Project abates N_2O emissions using an approved abatement technology, thermal destruction, which destroys N_2O using flame burners with pre-mixed CH_4 or natural gas.

The Project abates N_2O beyond historical voluntary abatement levels via an upgrade to the plant allowing more of the off gas stream to be directed to the TRU and TRU2. Historically, Ascend directed plant off gas to both the TRU and the SCR de-NO_x unit to meet permit requirements for NO_x limits. The new absorption column converts NO_x to nitric acid via a high-pressure water absorption process and allows the TRU to accept more off gas flow from the adipic acid plant than it did in the baseline. The new TRU2 improves voluntary N_2O abatement by adding redundancy and improving reliability of off gas being routed to an N_2O control device.

The N_2O concentration in the off gas and the TRU stack gas are monitored continuously using a continuous emissions monitoring system (CEMS). The plant data acquisition system (DAS) includes a programmable

logic controller (PLC), local PC, and server-based system used for CEMS data monitoring, recordkeeping, and reporting. The system monitors the adipic off gas flow rate and N_2O concentration upstream of both TRUs and the SCR as well as the gas flow rate and N_2O concentration in the TRUs' stacks on a continuous basis.

During the verification of the first reporting period, TÜV SÜD reviewed the installation and certification, calibration, and accuracy testing of the Project monitoring equipment per manufacturer's specifications, confirmed that the requirements of the Protocol were met, and verified the data management systems in place at the Project. Additionally, TÜV SÜD reviewed these requirements for the TRU2 during the tenth reporting period.

TÜV SÜD determined that the Project adhered to the methodology defined in the Monitoring Plan throughout the verification and the parameters monitored are in accordance with Table 6.2 of the Protocol including Part 75 requirements.

3.2 GHG Project Boundary (sources, sinks and/or reservoirs)

According to the Protocol, CO_2, CH_4, and N_2O are the GHGs included in the Baseline and Project activities. N_2O emissions from adipic acid production make up the majority of baseline and project emissions. There are emissions from increased external energy use during the Project including combustion fuel for both TRUs and electricity to run the absorption column.

Table 2 lists the sources of GHG emissions reviewed during the verification of the Project.

Table 2 - Project GHG Sources, Sinks and Reservoirs

Activity	GHG Sources, Sinks & Reservoirs
Baseline	• N_2O from adipic acid production process unit (burner inlet to stack)
Project	• N_2O from adipic acid production process unit (burner inlet to stack) • CO_2, CH_4, & N_2O emissions from increased external energy use

3.3 Project Eligibility Criteria

The Protocol specifies five eligibility rules that GHG Project developers must meet in order to register reductions with the Reserve. Below is a summary of the Protocol's eligibility rules and the Project's compliance to each requirement.

- **Eligibility Rule I: Location**
  The Project is located at an adipic acid plant in Cantonment, Florida, U.S. The Project therefore meets the location eligibility requirement.

- **Eligibility Rule II: Project Start Date**
  The Project start date for a project is defined as the date on which production first commences after installation or enhancement of a specific N_2O control technology. Although the absorption column was installed in September 2020 and production commenced after the installation, the CEMS installation and re-certification was not completed until January 20, 2021. Ascend selected the project start date as the date when system installation and certification requirements were complete.

  TÜV SÜD confirmed that prior to January 20, 2021 all RATAs and bias tests for the inlet and outlet CEMS were conducted and passed along with all absorber testing and process optimization activity related to the TRU enhancement project. TÜV SÜD verified January 20, 2021 as the project start date. TÜV SÜD reviewed evidence to support this date including all re-certifications of equipment in place

prior to the project and certification of new project equipment, except as noted in the variance determination, dated October 5, 2021, for the first reporting period.

In May 2023, a second TRU came online and started destroying adipic off gas.

- **Eligibility Rule III: Project Crediting Period**
  The crediting period for an adipic acid project is ten years. This reporting period is within the Project's first crediting period which began on the Project start date, January 20, 2021, and ends January 19, 2031.

- **Eligibility Rule IV: Additionality**
  Performance Standard Test

  TÜV SÜD verified that the Project satisfies the Performance Standard Test by meeting a performance threshold defined by the Protocol: the enhancement of an N_2O control system at an adipic acid plant that improves the N_2O abatement efficiency better than business-as-usual levels. Adipic acid projects automatically pass the performance standard test by enhancing an existing N_2O control technology that requires an upfront cost of implementation. TÜV SÜD reviewed an expense report for the cost of installing the absorption column and confirmed that this piece of equipment enhances the ability of the TRU to destroy N_2O and required an upfront cost. In May 2023 a follow-up capital investment was made to install a new redundant TRU to the Adipic Acid plant.

  Legal Requirement Test

  TÜV SÜD confirmed that there are currently no laws requiring the abatement of N_2O at the plant. In addition, the Project Developer monitors any change in regulations that may affect eligibility. TÜV SÜD also verified that the project developer accurately completed the Attestation of Voluntary Implementation form and uploaded it to the Reserve website.

- **Eligibility Rule V: Regulatory Compliance**
  TÜV SÜD verified that the Project was in material compliance with all applicable laws throughout the reporting period. TÜV SÜD reviewed the U.S. EPA's Enforcement and Compliance History Online (ECHO) database, Florida Department of Environmental Protection database, and the Occupational Safety and Health Administration (OSHA) database for any entries associated with the Ascend facility.

  Several issues were noted at the AAP, but all were determined to be unrelated to the Project or outside of the current reporting period. The issues include a pH exceedance at an outfall, a NO_X/N_2O release on 1/1/2023 initially thought to be a violation but later determined to be under the limit for total exceedance, and a powerhouse boiler that did not meet the required time frame for a tune-up. Note that these issues remain open in ECHO. Please also note that these are the same issues that were identified during the previous reporting period, and ECHO has still not updated any of the compliance statuses.

  Finally, TÜV SÜD verified that the Attestation of Regulatory Compliance was correctly completed and uploaded to the Reserve.

3.4 Ownership of GHG Reductions

The Project Developer, Ascend Performance Materials Operations LLC, owns full right to any emission reductions associated with the project. TÜV SÜD reviewed the Title V permit which is issued to the project developer as well as the company website as evidence. TÜV SÜD also verified that the Attestation of Title was correctly completed and uploaded to the Reserve website after the end of the reporting period.

3.5 Assessment of Information System Controls

TÜV SÜD's review of the GHG management systems took place during the virtual site visit conducted as part of the verification of the tenth reporting period through observations of onsite procedures and interviews with Project key personnel. The reviews included confirming that the Project monitoring was done by direct measurements from the CEMS for a total of five different gas flow rates (flow to the SCR/TRU inlet, SCR II inlet, TRU 1 outlet, TRU 2 inlet, and TRU 2 outlet) and three different N_2O concentrations (concentration at the TRU/SCR 1 inlet, TRU 1 outlet, and TRU 2 outlet).

The Project uses three Rosemount 3051S flow meters to measure plant off gas flows to the TRU 1 & 2 inlets and SCR, a Kurz K-BAR 2000B flow meter to measure off gas exiting the TRU 1 and a Kurz K-BAR-2000B-HT flow meter to measure off gas exiting the TRU 2. Ascend uses an ABB 3502 multiwave analyzer to measure N_2O concentrations in the off gas prior to the TRUs and SCR and two Thermo Fisher Scientific EM-46i-ALNPCA to measure N_2O concentrations in the off gas exiting the TRU 1 & 2 stacks. TÜV SÜD confirmed the locations of the sample probes within the stack during a video tour of the Project during the virtual site visit.

The Project uses the CEMS DAS coupled with the PLC to electronically log the data. CEMS reports are stored in electronic records for 10 years from the date of generation or a minimum of 7 years from the date of the last verification. TÜV SÜD verified that the data management systems met the data management requirements of Section 6.2.2 of the Protocol.

3.6 CEMS Installation and Certification

The Protocol requires that the project developers follow the CEMS installation and certification requirements from 40 CFR Appendix A to Part 75:

- 7-day calibration error test (Section 3.1 and 6.3)
- Linearity check (Section 3.2 and 6.2)
- Relative Accuracy Test Audit (Section 3.3 and 6.5)
- Bias Test (Section 3.4 and 6.5)
- Cycle time test (Section 3.5 and 6.4)
- Automated data acquisition and handling system (Section 4)

TÜV SÜD verified that the Project met the initial CEMs installation and certification requirements during its verification of the first reporting period. Parts of the Project CEMS were installed prior to the Project; however, the Project conducted the tests to meet the Part 75 CEMS installation and certification requirements specifically for this Project. Some of the tests were conducted after the start of the reporting period, which does not meet Protocol requirements, but ClimeCo requested and was granted a variance, dated October 5, 2021 to meet the Protocol requirements for the first reporting period.

During the tenth reporting period, two additional flow meters and one additional gas analyzer were installed to measure project parameters necessary to quantify emission reductions from TRU 2. Below are listed the dates of the initial certification from reporting period 1 and an additional paragraph describing the new equipment's certification.

TÜV SÜD verified that the following requirements were met for installation and certification of the CEMS:

7-day Calibration Error Test:

TRU 1:

The 7-day calibration error test was conducted for each flow meter and analyzer in November 2020, January 2021, or February 2021. TÜV SÜD reviewed the results of the 7-day calibration error tests performed for the TRU/SCR 1 inlet flow meter (2/16/2021 – 2/22/2021), SCR 2 inlet flow meter (2/16/2021 – 2/22/2021), TRU outlet stack flow meter (11/8/2020 – 11/14/2020), TRU/SCR inlet analyzer (1/15/2021 – 1/21/2021) and TRU outlet analyzer (11/8/2020 – 11/14/2020). The percent calibration errors were within the allowable range. The tests for the TRU/SCR 1 inlet flow meter and SCR 2 inlet flow meter occurred after the start of the reporting period. The Reserve approved a variance dated 10/5/2021 that stated the following:

> Ascend Performance Materials has requested a variance for the Reserve to accept the initial certification requirements performed as late one month after the project start date, rather than in advance of the January 20th, 2021 start date. Specifically, they are requesting the Reserve to accept the results of the following:
>
> • 7-day calibration error test of the inlet N2O analyzer conducted 01/15/2021 – 01/21/2021.
>
> • 7-day calibration error test of the TRU inlet flow meter conducted 02/16/2021 – 02/22/2021.
>
> • 7-day calibration error test of SCR inlet flow meter conducted 02/16/2021 – 02/22/2021.
>
> • Cycle time test of the TRU Exit N2O analyzer conducted 02/02/2021.
>
> • Cycle time test of the inlet N2O analyzer conducted 02/04/2021.
>
> • Linearity check of the inlet N2O analyzer conducted 02/04/2021.
>
> The Reserve grants this variance pursuant to the following conditions:
>
> • The verifier confirms the 7-day calibration error tests, cycle time tests, and linearity checks were conducted on the dates listed above
>
> • The verifier confirms the RATAs and bias tests for the inlet and outlet CEMS were conducted and passed in advance of the project start date
>
> • The verifier confirms the CEMS installation and certification met the other requirements per the protocol and 40 CFR

TÜV SÜD verified that the Project met the variance conditions listed above.

TRU 2:

The 7-day calibration error test was conducted for the new Rosemount flow meter (model 3051S), Kurz flow meter (model K-BAR-2000B-HT) and Thermo Fisher Scientific analyzer (model EM-46i-ALNPCA) in May-June 2023 and July 2023 respectively. TÜV SÜD reviewed the results of the 7-day calibration error tests performed for the TRU 2 inlet flow meter (5/31 – 6/6/2023), TRU 2 outlet flow meter (7/22 – 7/28/2023), and TRU 2 outlet analyzer (7/22 – 7/28/2023). The percent calibration errors were within the allowable range. The tests for this equipment were after TRU 2 came online. However, Part 75 states that:

"(b) In accordance with § 75.20, the owner or operator of each new affected unit shall ensure that all monitoring systems required under this part for monitoring of SO2, NOX, CO2, opacity, and volumetric flow are installed and all certification tests are completed on or before the later of the following dates:

(1) January 1, 1995, except that for a gas-fired unit or oil-fired unit located in an ozone nonattainment area or the ozone transport region, the date for installation and completion of all certification tests for NOX and CO2 monitoring systems shall be July 1, 1995 and for a gas-fired unit or an oil-fired unit not located in an ozone nonattainment area or the ozone transport region, the date for installation and completion of all certification tests for NOX and CO2 monitoring systems shall be January 1, 1996; or

(2) 180 calendar days after the date the unit commences commercial operation, notice of which date shall be provided under subpart G of this part."

Because the initial certification took place within 180 days after the date of unit commencement and because the Protocol does not specify when the initial certification should take place when adding new equipment for Project activities after the initial reporting period, TÜV SÜD agrees that the part 75 requirements have been met. Additionally, all of the new equipment RATAs took place in August 2023 and all equipment was found to be measuring parameters accurately.

Linearity Check:

TRU 1:

Linearity checks were performed for the inlet analyzer on 2/4/2021 and outlet analyzer on 11/24/2020. TÜV SÜD verified that the error was either less than five percent or less than 5 ppm as specified in Part 75. The linearity check for the inlet analyzer occurred after the start of the reporting period. TÜV SÜD verified that the Project met the variance conditions.

TRU 2:

A linearity check was performed for the TRU 2 outlet analyzer on 5/18/2023. TÜV SÜD verified that the error was either less than five percent or less than 5 ppm as specified in Part 75. See the explanation above regarding Part 75 timing requirements for equipment installation.

Cycle Time Test:

TRU 1:

TÜV SÜD reviewed the results of the cycle time tests conducted for the TRU/SCR inlet analyzer (2/4/2021) and the TRU outlet analyzer (2/2/2021) which ensure that the monitoring system is capable of completing at least one cycle of sampling, analyzing, and data recording every 15 minutes. Both analyzers passed the test. TÜV SÜD verified that the Project met the variance conditions.

TRU 2:

TÜV SÜD reviewed the results of the cycle time tests conducted for the TRU 2 outlet analyzer (5/18/2023) which ensure that the monitoring system is capable of completing at least one cycle of sampling, analyzing, and data recording every 15 minutes. The analyzer passed the test. See the explanation above regarding Part 75 timing requirements for equipment installation.

RATA and bias tests:

TRU 1:

TÜV SÜD reviewed the results of the RATAs conducted on December 5-6, 2020 and January 14, 2021 for

the three flow meters and both analyzers. Montrose Air Quality Services conducted all RATAs using test methods in accordance with 40 CFR, Part 75, Appendix A and U.S. EPA test method 320. The relative accuracy (RA) for all flow meters and analyzers were within the allowable range (below 10%) and below 7.5 percent. As a result all equipment meets the requirement for annual RATAs.

TÜV SÜD verified that the Project met all Protocol requirements for CEMS installation and certification or that the Project was approved to apply methods outlined in the variance determination dated October 5, 2021.

TRU 2:

TÜV SÜD reviewed the results of the RATAs conducted on August 3rd and 9th, 2023 for the two flow meters and analyzer. Montrose Air Quality Services conducted all RATAs using test methods in accordance with 40 CFR, Part 75, Appendix A and U.S. EPA test method 320. The relative accuracy (RA) for the flow meters and analyzer were within the allowable range (below 10%) and below 7.5 percent. As a result all equipment meets the requirement for annual RATAs. See the explanation above regarding Part 75 timing requirements for equipment installation.

Conclusion:

TÜV SÜD verified that the Project met all Protocol requirements for CEMS installation and certification or that the Project was approved to apply methods outlined in the variance determination dated October 5, 2021.

3.7 Ongoing CEMS QA/QC Program

TÜV SÜD reviewed evidence for the ongoing CEMS QA/QC requirements throughout the reporting period.

3.7.1 Daily Requirements

TÜV SÜD reviewed evidence that the daily calibration error tests were performed for the N_2O analyzers and the TRU outlet flow meters. The analyzers and flow meters perform automatic daily calibration error tests, and the CEMS records the results of the checks. The limit for being out of control/failed is set to 5% for the analyzers and 6% for the TRU outlet stack flow meters. If the error is less than 2.5% for N_2O analyzers or 3% for the thermal mass flow meter, no action is required. If the error is between 2.5% and 5% for the N_2O analyzers or 3% and 6% for the thermal mass flow meter for two consecutive days, a recalibration occurs. If the error is greater than 5% for the N_2O analyzers or 6% for the thermal mass flow meter, a re-calibration occurs immediately. If the recalibration fails, the system sends a maintenance alarm to operations and does not record concentration or flow until there is a successful calibration.

Ascend and ClimeCo requested and were granted a variance, dated May 19, 2021, for use of a method other than the daily calibration error test as described in the Protocol and Part 75 for the TRU/SCR 1 inlet flow meter and SCR 2 inlet flow meter. This variance applies for the Project's entire crediting period or until Ascend discontinues operation or use of the Smart Transmitter. The variance did not mention a limitation on how many flow meters these conditions apply to.

The new TRU 2 inlet flow meter uses the same method listed in the original variance to confirm daily calibrations. Ascend uses Rosemount 3051S Smart Transmitters Loop Integrity, Process Intelligence, and Plugged Impulse Line Advanced Diagnostics features in lieu of daily calibration checks for these flow meters (including the new flow meter measuring inlet flow on TRU 2) to satisfy ongoing meter monitoring and QA/QC requirements. The diagnostics flag deviations in normal operation and provide assurance that each meter is functioning correctly. The Reserve granted the variance on May 19, 2021.

TÜV SÜD verified that the Project and Project Developer met all conditions defined in the variance determination except for the new flow meter which did not record daily conditions starting on the first day of the reporting period. The Reserve issued a variance on December 26, 2023, allowing the new Smart Transmitter to adhere to the requirements in CFR Part 75, which describes the procedures and timing for initial certification for meters, in lieu of the conditions in the variance granted on May 19, 2021. As stated in the variance, TÜV SÜD confirmed that the initial certification for the Smart Transmitter for the TRU 2 was completed within 180 days after the first hour of operation. Specifically, the first status alerts reviewed were on August 8, 2023, which was within 180 days of when the meters started recording data on May 3, 2023.

TÜV SÜD confirmed via an audit trail for the new flow meter that the diagnostics gathered by the Smart Transmitter sufficiently indicated any calibration issues, blockages in tubing, flow leakage or any other relevant issues with the flow meter. TÜV SÜD reviewed the audit trail report for the new flow meters and confirmed that there were no issues with the flow meter that would affect the quality of the data recorded. TÜV SÜD confirmed that the diagnostics gathered by the Smart Transmitter sufficiently tracked if there were any calibration issues, that appropriate measures were taken if any issues occurred, and that manufacturer-recommended maintenance and calibrations were performed.

TÜV SÜD reviewed the raw data and results of daily calibrations and confirmed that the plant performs calibration adjustments as necessary, validates data daily, continuously monitors and records data every hour, and performs QA checks.

There were some instances during the reporting period where the results of the automatic calibration error test for the N_2O outlet and inlet analyzer "failed". Each time, the analyzers were checked again and passed the check, or the instrument was considered out of control and data substitution was applied for the data parameter.

3.7.2 Quarterly Requirements

TÜV SÜD verified that the following quarterly assessments were performed according to Protocol requirements:

Linearity Checks:

Linearity checks are required in quarters for which there is no RATA. There were no linearity checks completed for TRU1 as a RATA was completed in first quarter of 2024 on February 29, 2024. For TRU2, a linearity check was performed in the first quarter of 2024 on January 12, 2024 and the analyzer passed.

Leak Check:

The variance determination dated May 19, 2021, and described above for daily calibration error tests, also includes leak checks related to the TRU/SCR 1 inlet, SCR 2 inlet and TRU 2 inlet differential pressure flow meters. See Section 3.7.1 regarding requirements for these three flow meters. The TRU 1 and 2 outlet flow meters are thermal mass flow meters and do not require leak checks.

Flow-to-Load or Heat Rate Evaluations:

The Errata and Clarifications to the Protocol state that units not producing electrical output or thermal output are exempted from the flow-to-load ratio test requirements. The Project meets this exemption and is therefore not required to perform this quarterly assessment.

Data Validation

TÜV SÜD confirmed that the results of all QA/QC checks were within the ranges required by the Protocol and 40 CFR Part 75 Appendix B requirements.

3.7.3 Annual and Semi-Annual Assessments

TÜV SÜD reviewed the results of the most recent RATAs conducted on February 29, 2024 for the TRU/SCR 1 inlet and TRU 1 outlet stack flow meters and both analyzers and on July 25, 2023 for the SCR II inlet flow meter. The initial RATAs for the new TRU 2 CEMs monitoring equipment took place on August 3, 2023, for the outlet flow meter and analyzer and on August 9, 2023 for the inlet flow meter. Montrose Air Quality Services conducted all RATAs using test methods in accordance with 40 CFR, Part 75, Appendix A and U.S. EPA test method 320.

The results are shown in Table 3.

Table 3 – RATA Results

Equipment (Meter ID)	7/25/2023	8/3/2023	8/9/2023	2/29/2024
TRU 1/SCR 1 Inlet Flow Meter (331FI103-1)	N/A	N/A	N/A	4.5%
SCR 2 Inlet Flow Meter (463FC11)	1.74%	N/A	N/A	N/A
TRU 1 Outlet Stack Flow Meter (331FI104)	N/A	N/A	N/A	2.6%
N_2O TRU 1/ SCR Inlet Analyzer (463AI185B)	N/A	N/A	N/A	5.6%
N_2O TRU 1 Outlet Analyzer (331AI1022)	N/A	N/A	N/A	7.4 ppm
TRU 2 Inlet Flow Meter (328FI001B)	N/A	N/A	1.4%	N/A
TRU 2 Outlet Stack Flow Meter (328FI2022)	N/A	6.4%	N/A	N/A
N_2O TRU 2 Outlet Analyzer (331AI2003)	N/A	2.27 ppmvd*	N/A	N/A

*Differences within 12 ppm are acceptable for low emitters (<250 ppm N_2O) according to Part 75 requirements

The results of the RATAs for all instruments showed the relative accuracy to be within the acceptable range (below 10%) and below 7.5 percent. As a result, all equipment meets the requirement for annual RATAs.

As a result of the bias tests, the TRU/SCR 1 inlet flow meter, SCR 2 inlet flow meter, and TRU 2 outlet flow meter were the only equipment that required a Bias Adjustment Factor (BAF) during the reporting period. TÜV SÜD verified the BAF and that it was applied correctly to the raw flow data.

Table 4 - Bias Adjustment Factors

Equipment (Meter ID)	01/01/2024 – 03/31/2024
TRU/SCR 1 Inlet Flow Meter (331FI103-1)	1.038
SCR 2 Inlet Flow Meter (463FC11)	1.014
TRU Outlet Stack Flow Meter (331FI104)	None
N_2O TRU/SCR Inlet Analyzer (463AI185B)	None
N_2O TRU Outlet Analyzer (331AI1022)	None
TRU 2 Inlet Flow Meter (328FI001B)	None
TRU 2 Outlet Stack Flow Meter (328FI2022)	1.039
N_2O TRU 2 Outlet Analyzer (331AI2003)	None

3.7.4 Missing Data Substitution

During the reporting period Ascend applied missing data substitution methods for a total of 0 hours for the TRU NOX Flow, 0 hours for the SCR NOX Flow, 0 hours for the TRU 1 MASS Flow, 15 hours for the ADIPIC OFFGAS N_2O, 27 hours for the TRU N_2O outlet analyzer, 0 hours for the TRU 2 NOX Flow, 0 hours for the TRU 2 ADIPIC Offgas N_2O, and 0 hours for the TRU 2 N_2O outlet analyzer. The DAS is programmed to automatically calculate the substitute values based on the guidance in the Protocol and Part 75 Section 75.33. TÜV SÜD confirmed that the values were appropriately substituted.

3.8 Assessment of GHG Emissions Reductions Calculations

The emission reduction calculations assessment included a review of the baseline and project assumptions, data inputs, data management, and the accuracy of calculations. TÜV SÜD assessed the information generated from the baseline lookback period and Project reporting period in order to evaluate the completeness of the data and how it is transferred from Ascend's DAS to ClimeCo's GHG calculation database.

The Protocol requires a series of data analyses and calculation steps to quantify the GHG emission reductions. ClimeCo managed the data in Microsoft Access database files using various queries of the raw data and provided the data to TÜV SÜD in an MS Excel spreadsheet. TÜV SÜD reviewed the queries/formulas and data outputs for compliance with the Protocol.

TÜV SÜD confirmed that all data was normalized to 0°C and 101.325 kPa in the calculation database/spreadsheets. ClimeCo also performed unit conversions for some monitoring parameters, and TÜV SÜD confirmed that the conversions were performed correctly and that the raw data was converted to the units required by the Protocol for all parameters.

Baseline Emissions

Ascend and ClimeCo chose the Static Baseline Approach for calculating the average N_2O abatement efficiency. This approach requires historical N_2O destruction data for at least the five most recent calendar years of operation prior to the project start date. The project start date is in 2021 so Ascend used annual baseline data from 2015 – 2020 to quantify the abatement efficiency (according to section 5.1.1 of the Protocol).

Baseline abatement efficiency is calculated by dividing N_2O destroyed by N_2O generated by the adipic reactions and present in the off gas prior to emissions control. In order to control NO_x emissions, off gas is sent to the TRU (control unit), SCR (non-control unit), or in some instances both the TRU and SCR. The plant rarely has any downtime. Because of these unique properties, ClimeCo developed a method for eliminating outliers using the methods stipulated in Section 5.1.1. The Protocol defines operating hours as any time period where there is production of adipic acid and/or N_2O. There are almost no time periods during the baseline lookback period where neither of these conditions existed.

Because of the nature of the plant, ClimeCo instead applied the statistical valuation to 16 data sets in order to accurately reflect the N_2O produced and destroyed:

1. Standalone off gas flow to the TRU
2. N2O concentration for when off gas flow is only directed to the TRU
3. Standalone off gas flow to the TRU2
4. N2O concentration for when off gas flow is only directed to the TRU2
5. Standalone off gas flow to the SCR
6. N2O concentration for when off gas flow is only directed to the SCR
7. Split off gas flow to TRU for when off gas flow is split between the TRU and either SCR or TRU2

8. Split off gas flow to TRU2 for when off gas flow is split between the TRU2 and either SCR or TRU
9. Split off gas flow to SCR for when off gas flow is split between the SCR and either TRU or TRU2
10. N2O concentration for when off gas flow is split between the TRU and either SCR or TRU2
11. N2O concentration for when off gas flow is split between the **TRU2** and either SCR or TRU
12. N2O concentration for when off gas flow is split between the **SCR** and TRU or TRU2
13. Split off gas flow to TRU for when off gas flow is split between all three control units
14. Split off gas flow to TRU2 for when off gas flow is split between all three control units
15. Split off gas flow to SCR for when off gas flow is split between all three control units
16. N2O concentration for when off gas flow is split between all three control units

The Reserve approved this method for calculating averages for each baseline calendar year.

ClimeCo multiplied the total measured N_2O emissions in the off gas prior to any abatement during the reporting period (using the same statistical method described above) by the fraction of off gas that was unabated during the baseline look-back period. The total was added to the N_2O emissions from HNO_3 production as calculated from Equation 5.6 and 5.2.

The Project facility is not part of a corporate group that controls more than one AAP facility. TÜV SÜD confirmed this by reviewing all of Ascend's commercial locations. The facility in Cantonment, FL is the only facility that produces adipic acid. In this situation, the Protocol allows the Project Developer to either propose a method for determining that leakage is a low risk, follow the same test as if they did own multiple AAPs or to demonstrate that AA production did not exceed Title V production levels as of the Project start date. TÜV SÜD confirmed that as of the project start date the plant had not exceeded the maximum permitted production volume for adipic acid.

Project Emissions

Project emissions include N_2O emissions in the off gas from the SCR, TRU 1 and TRU 2 stacks and CO_2 emissions from increased external energy use including fossil fuel combustion and electricity use by project equipment.

The largest source of project emissions is N_2O in the off gas directed to the SCR when this occurs. None of the N_2O in the off gas to the SCR is abated, and this usually makes up the majority of project emissions. During the reporting period, there were 29.66 operating hours by the SCR in a standalone operating condition, and 20.19 operating hours by the SCR in a parallel operating condition. TÜV SÜD reviewed this data in detail as it is considered a high-risk category because any off gas directed to the SCR will increase Project Emissions. Ascend and ClimeCo performed the same statistical analysis that was used in the baseline to calculate N_2O emissions from off gas directed to the SCR and the off gas exiting the TRU stack.

Other project emissions include additional energy use to operate the Project, the largest of which was use of additional fossil fuel to operate the TRU 1 and 2 beyond what would have been used in the baseline. Per Equation 5.12 in the Protocol to calculate emissions from increased external energy use, the Project has emissions from the net increase in CO_2 emissions from fossil fuel combustion and electricity use. There are no project emissions from steam export. ClimeCo performed detailed calculations averaging natural gas use in the TRU 1 in the baseline lookback period. The average use in the baseline lookback period was compared to the natural gas usage during the reporting period and there was a small net increase of natural gas combustion due to Project activities.

There is also a small amount of electricity consumption for the high-pressure water absorption process that recycles NO_x to nitric acid. Ascend appropriately subtracted project emissions from the generation of

the additional electricity required to operate the project equipment.

TÜV SÜD determined that the emission reduction calculations followed the Protocol and found no material misstatements in the final Project GHG reductions calculations and results.

4.0 Verification Results

Ascend and ClimeCo provided sufficient evidence and documentation of their emission reductions, data collection procedures, monitoring, and quality control procedures. The verification process focused on verifying the baseline and project emissions as well as source data used by Ascend and ClimeCo to quantify the emission reductions in accordance with the Protocol.

TÜV SÜD issued corrective action requests, non-material findings, additional documentation requests and clarification requests, as necessary, during the verification. All findings were sufficiently closed out and are provided as a private document to the client and the Reserve.

The Project reported emission reductions of 1,253,154 metric tons of CO_2 equivalents as per the information provided in the calculation summary spreadsheets. During the final review, TÜV SÜD identified no material misstatements in the data or emission reduction calculations. Table 5 defines the emission reductions verified for this reporting period.

5.0 Verification Opinion

TÜV SÜD conducted the verification of CAR1480 Phlogiston Phase 1 according to the requirements found in ISO 14064-3:2019, 14065:2020, & 17029:2019. The objective of this verification was to ensure that the GHG statement is materially correct and conforms to all relevant criteria. The GHG statement is the responsibility of Ascend Performance Materials LLC. A summary of the GHG statement is as follows:

- GHG-related activity: N_2O destruction at Ascend Performance Materials LLC
- GHG statement: January 1, 2024 – March 31, 2024
- Criteria:
    - Reserve Offset Program Manual Version 9.2 (April 2024)
    - Reserve Verification Program Manual (February 3, 2021)
    - Climate Action Reserve Adipic Acid Production Project Protocol Version 1.0 (September 30, 2020)
    - Errata and Clarifications Adipic Acid Production Project Protocol Version 1.0 (July 27, 2021)
    - Policy Memo: Use of Global Warming Potential Values for All Offset Protocols (July 13, 2022)

The data and information supporting the GHG statement were historical in nature.

TÜV SÜD has ensured Ascend Performance Materials Operations LLC's effective use of controls related to the GHG statement. TÜV SÜD concludes that there is sufficient and appropriate evidence to support Ascend Performance Materials Operations LLC's GHG statement and is issuing an Unmodified Opinion.

RCE confirms that the GHG statement has been prepared:

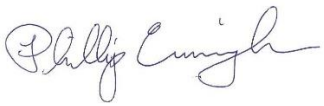
- Without material discrepancy,
- In accordance with all applicable criteria, and
- Verified to a reasonable level of assurance.

In compliance with the requirements of ISO 14065:2020, the client may reproduce and distribute RCE's verification opinion without RCE's prior authorization, as long as the verification opinion is reproduced in its entirety, including the date.

Table 5 - Emission Reductions Verified January 1, 2024 – March 31, 2024

Vintage	Baseline Emissions CO_2e (metric tons)	Project Emissions CO_2e (metric tons)	Emission Reductions CO_2e (metric tons)
2024	1,355,565	102,411	1,253,154

Lead Verifier



Phillip Cunningham

Senior Internal Reviewer

Zach Eyler