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Nitric Acid Production Protocol Version 3.0

Public Comment Webinar

May 13, 2025

Housekeeping

- All attendees are in listen-only mode – Please submit your comments and questions in the Zoom question box and we'll try to address them at the end, time permitting.
- We will follow up via email to answer any questions not addressed during the meeting
- The slides and a recording of the presentation will be posted online

Protocol Development

Reserve Staff

- Holly Davison, Associate Director of Programs
- Rachel Mooney, Manager
- Kristen Gorguinpour, VP of Programs

Technical Support

- Update was developed with partial technical support from ClimeCo Corporation

AGENDA

- Climate Action Reserve
- U.S. Nitric Acid Production Protocol Version 3.0 Update
 - Protocol Background
 - Rationale for Revisions
 - Major Updates
 - Addition of combined secondary and tertiary projects
 - Start-up testing
 - Verification site visit schedule
 - Minor Revisions
- Next Steps
 - Submit comments by 5pm PST on May 29



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Mission: to develop, promote and support innovative, credible market-based climate change solutions that benefit economies, ecosystems and society

- ✓ **Develop high-quality, standardized carbon offset project protocols** internationally, stakeholder-driven, across North America and Latin America and the Caribbean, and China
- ✓ **Accredited Offset Project Registry for compliance and voluntary carbon markets** (California cap-and-trade program, Washington cap-and-invest program)
- ✓ **Reputation for integrity and experience** in providing best-in-class registry services for GHG emissions offsets markets



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Background

Protocol Background

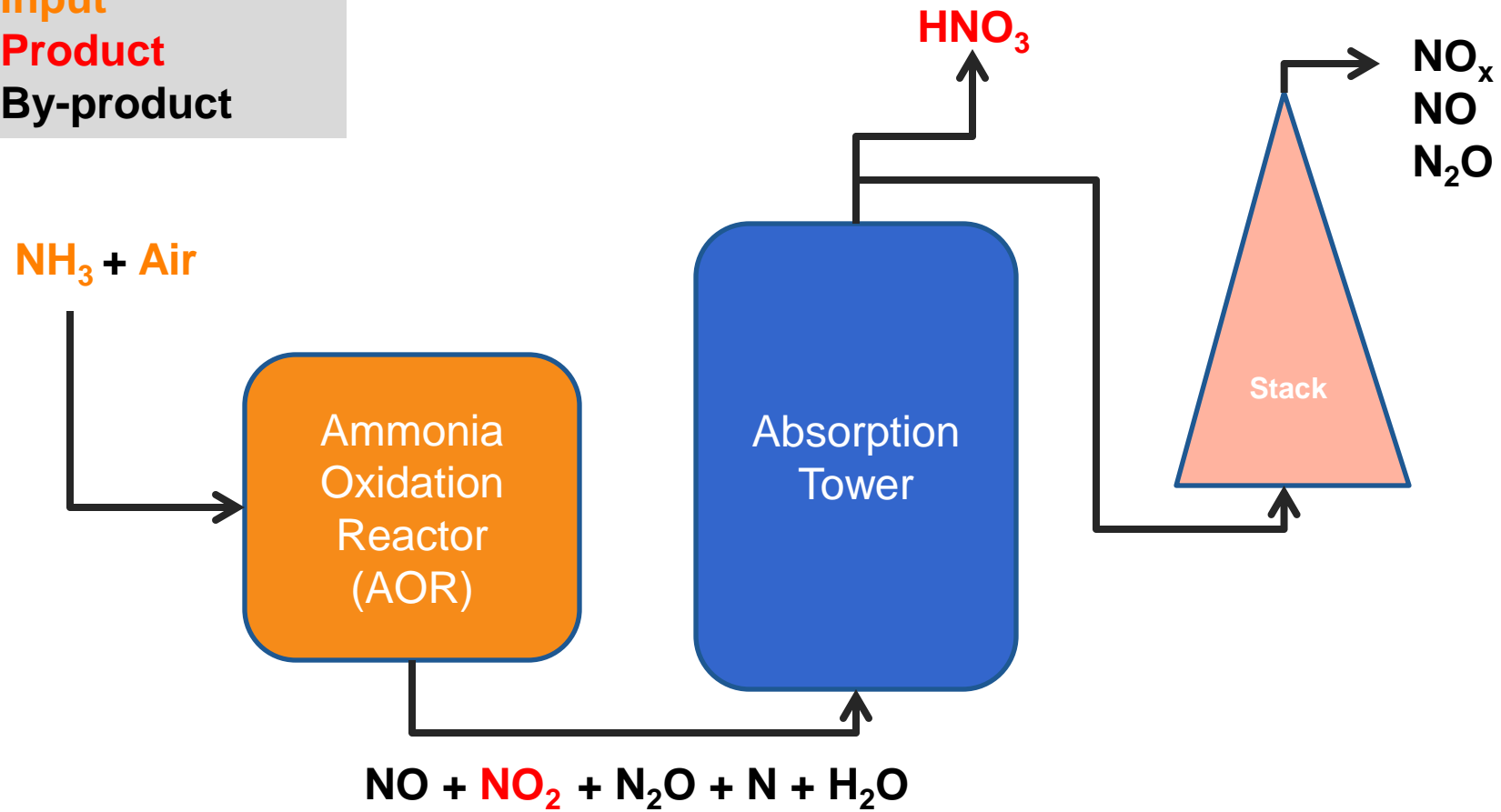
- N₂O emissions from nitric acid production in the US are significant (~20 MMTCO₂e/yr)
 - EPA estimates there are 45 facilities in the United States
 - 8 Reserve projects at 6 different facilities
 - Issued nearly 21 million CRTs historically to these projects
- N₂O abatement technologies are readily available
- N₂O emissions are not widely regulated in the U.S.
- N₂O abatement is not common practice

Protocol Versions

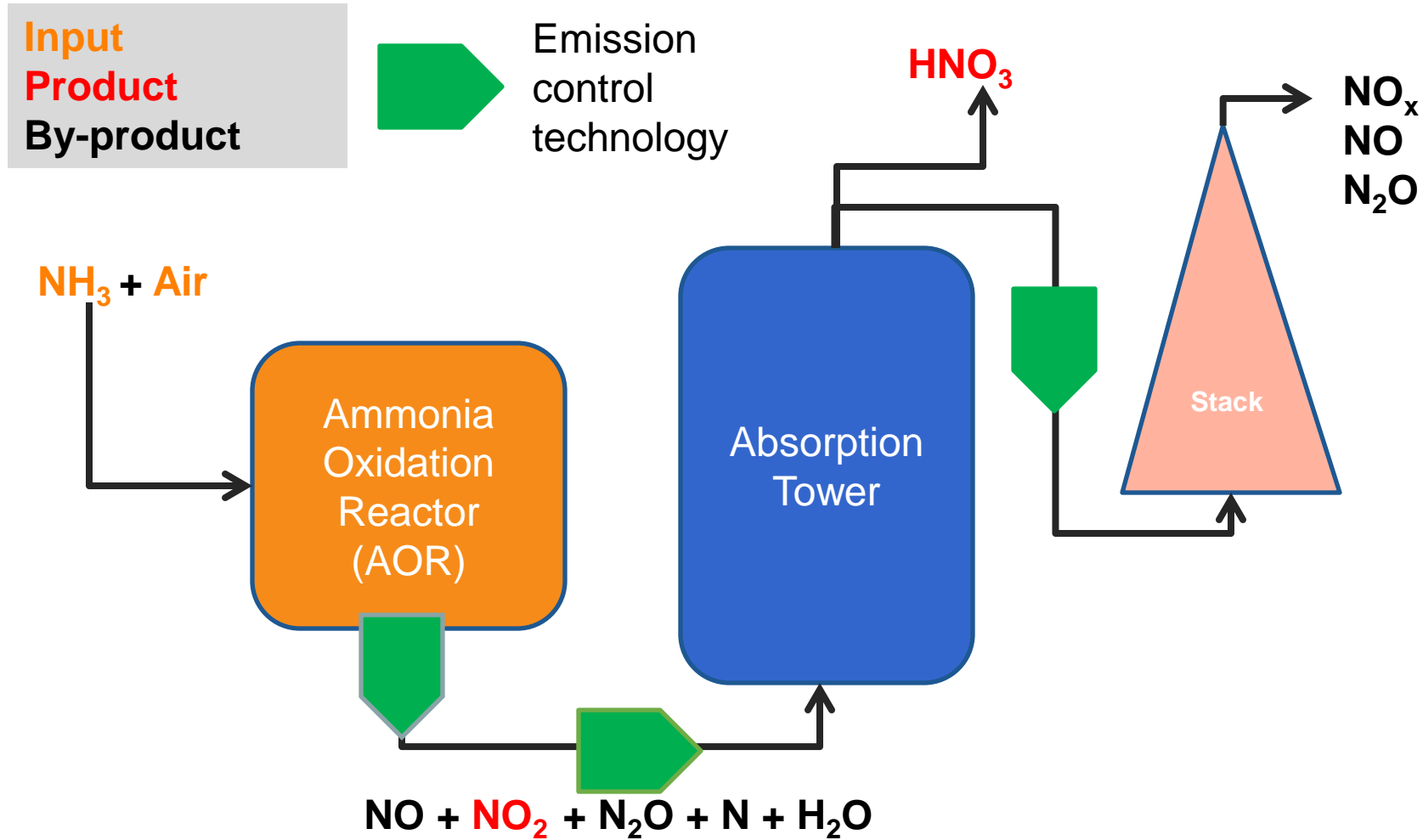
- Current Version: 2.2 (April 18, 2019)
- Previous Versions:
 - 2.1 (April 21, 2016)
 - 2.0 (September 28, 2011)
 - 1.0 (December 2, 2009)

Nitric Acid Production

Input
Product
By-product



Nitric Acid Production



NO_x Abatement: Baseline Emission Control

- Non-selective catalytic reduction (NSCR)
 - Installed until late-1970s
 - Controls NO_x and **controls N₂O** up to ~80%
 - Requires high temperature and energy inputs
 - Some U.S. nitric acid plants still using NSCR to control NO_x
- Selective catalytic reduction (SCR)
 - Employed in most U.S. nitric acid plants today
 - Controls only NO_x, **does not control N₂O**
 - Lower cost of operation, lower temperature requirements

Potential N₂O Abatement Measures

Measure	Point of Application
Primary abatement	Prevents N ₂ O formation in the ammonia burner by modification of (i.e. optimizing) the ammonia oxidation process and/or primary catalysts.
Secondary abatement	Removes N ₂ O from the gases between the ammonia oxidation reactor (AOR) and the absorption tower. Usually this will mean intervening at the highest temperature, immediately downstream of the primary catalyst and catalytically reducing the N ₂ O once it has been formed in the AOR.
Tertiary abatement	Treats the tail-gas leaving the absorption tower to destroy N ₂ O. N ₂ O abatement can be placed upstream or downstream of the tail-gas expansion turbine. These abatement measures may include catalytic decomposition or NSCR.

Campaigns

- Unique to Nitric Acid Production projects
- Defined by when production commences following installation of a new charge of primary catalyst gauze and ends when production stops to replace or recharge primary catalyst gauze
- Variable length, depending on how long the primary catalyst gauze lasts before it needs to be replaced or recharged

Rationale for Revision

- During the public comment period for V1.0 Nitric Acid Production Protocol in 2009, multiple stakeholders requested the Reserve consider combined secondary and tertiary projects
 - The Reserve responded we may consider this option in the future
- More recent request to re-evaluate our position on combined projects
- Technical support provided by ClimeCo Corporation



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Proposed Changes

Overview of Major Updates

- Section 2: The GHG Reduction Project
 - Added combined secondary and tertiary catalyst projects as a third project type
- Section 3: Eligibility Rules
 - Added option for start-up testing
- Section 5: Quantifying GHG Emission Reductions
 - Added two methodologies for quantifying emissions for combined secondary and tertiary catalyst projects
- Section 7. Reporting Parameters
 - Updated verification site visit schedule requirements to provide additional flexibility

Combined Secondary and Tertiary Projects

- Added combined secondary and tertiary catalyst projects as a third project type
- Current protocol allows for projects to upgrade from secondary to tertiary abatement technology
 - Required to decommission the secondary equipment first
- V3.0 provides the option to install a smaller, less complex tertiary unit without decommissioning the secondary equipment
- This options allows for the abatement efficiency of tertiary projects (99%), and decreased cost to achieve it

Combined Project Quantification

- Two approaches to quantifying emission reductions, depending on how the facility is set-up:
 - Approach 1: secondary N₂O abatement catalysts are situated within the AOR
 - Installing monitoring equipment between secondary and tertiary abatement catalysts is costly
 - Approach 2: N₂O analyzer installed immediately upstream of the tertiary abatement system
 - Directly monitors the secondary output / tertiary input conditions

Start-up Testing

- Added start-up testing option for new projects
- Draft V3.0 proposes allowing project developers to test equipment for the first campaign as needed
- Start date could correspond to the start of the second campaign

Increased flexibility for site visits

- Site visit frequency
 - V3.0: Initial verification and then every 24 months of data, providing additional flexibility for the PD
 - V2.2: One site visit is required per verification or per year, whichever is less frequent
- Site visit options
 - V3.0 proposes a virtual site visit option, which would meet the requirement to conduct a site visit every 24 months of data (in-person still required for initial verification and if the verification body did not conduct the previous site visit)

Minor Changes

- Section 3: Eligibility Rules
 - Added flexibility to allow projects to apply for a third crediting period
 - Added social and environmental safeguards requirements
- Section 6: Project Monitoring
 - Clarified procedures for recertification for equipment replacement
- Section 7. Reporting Parameters
 - Added section on project data report requirement
 - Added section to clarify reporting period and verification period definitions



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Questions?



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Next Steps

Next Steps

- Comments must be submitted no later than **5pm PST on May 29, 2025**
 - Submit comments to hdavison@climateactionreserve.org
 - Word or PDF format
 - Please organize by protocol section
 - All comments will be responded to and published online
 - Targeting adoption by Board October 2025

Contact Information

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THANK YOU!