Blue text provides additional guidance and should be deleted before submission.

Applicants submit the **technical volume** that clearly

* Addresses the four key areas defined in the review criteria and technical volume template.
* Provides previous testing or production data reports, meant to demonstrate the novelty and technical readiness in the strongest format and detail able.
* Provides proof (or credible plan) to be able to operate a prototype version of the proposed technology capable of recovering 50 kg of gallium from a metal processing stream in a single, successful 14-day campaign of continuous operations.

The Technical Volume can be maximum of ten (10) pages including graphics and figures, when printed using standard 8.5" by 11" paper with 1- inch margins (top, bottom, left, and right) single-spaced with a font not smaller than 11 points (except in figures or tables, which may be 10-point font). The technical volume should include relevant supplemental information (e.g., data tables, patent claims, flowsheets, preliminary economic analysis studies) as part of the submission with figure labels.

The technical volume should be submitted as a pdf with the naming convention “LeadOrganizationName\_TV”.

**TRACE-Ga – [NAME OF PROJECT] – Technical Volume**

***Technical Volume Summary***

*As part of the Technical Volume Summary section the applicant should summarize key information to set the stage for the remainder of the document.*

***Key area 1: Project Approach and Workplan***

*As part of the Project Approach and Workplan section the applicant should:*

1. Describe the approach and major tasks to develop a prototype that is capable of producing at least one metric ton per annum of 4N (99.99%) gallium with an actual metal industry processing stream from an industrial partner.
   1. The approach should be split into two phases as described in the “Objective” section. A major milestone of phase 1 is the *Phase 1 prototype* that produces at least 100 grams of Ga, at any purity level, recovered from the actual (non-simulated) metal processing stream. A major milestone of Phase 2 is the *Phase 2 prototype* that recovers at least 50 kilograms of 4N Ga from a single, successful 14-day campaign of continuous operation with the actual (non-simulated) metal industry process stream.
2. Describe the proposed timeline, with respect to clearly defined milestones for process development and Ga recovery efficiency, and describe comprehensively the potential technical risks (e.g., interference from other elements, material corrosion) and possible mitigation strategies.
3. Describe measures to ensure cost baselines, process flow diagrams, and cash flow projections align with an AACE International Class 3 estimate at the end of Phase 2.
4. The approach and proposed timeline should align with the **project workplan**.
   1. The project workplan describes the major tasks to be performed by the project team throughout the course of the project, including expected milestones for each month, duration, and budget for each task.
   2. Milestones should demonstrate a technical achievement (e.g., major outcome or deliverable) rather than simply completing a task and each milestone should be SMART ( Specific, Measurable, Achievable, Relevant, and Timely).
   3. One milestone per quarter (one every three months) should be identified as a major project milestone.

***Key area 2: Technology Description, Innovation, and Readiness***

*As part of the Technology Description, Innovation, and Readiness section the applicant should:*

1. Describe the proposed recovery technology and its current application. Compare the proposed recovery technology to commercially-used gallium extraction and processing. Describe specific innovations and comparative advantages of the proposed recovery technology.
2. Provide evidence of success for recovering gallium from feedstock representative of the proposed metal industry process stream. Ensure to detail the scale and duration of testing, as well as the approximate purity of material recovered.
3. Describe the gallium feedstock (i.e. the metal processing stream), including the feedstock composition and quantity. Describe the existing metal processing circuit and the technologies currently employed within it. Estimate the mass (in kilograms) and grade of the recovered gallium from a single, successful 14-day continuous operations campaign with the metal processing stream.
4. Describe the proposed recovery technology and the methods specifically implemented for extracting gallium from the metal processing stream(s), and outline the associated challenges and considerations pertinent to this recovery process.
5. New technologies can incorporate materials reasonable for bench scale testing, but become cost/lifecycle/process prohibitive at larger scales. Identify if the recovery process is or is not dependent on materials that are challenging to integrate at scale. If so, describe the research questions in this project to mitigate this challenge or plans to integrate new materials during the lifecycle of this project.

***Key area 3: Technology integration, Market Opportunity and Commercialization potential***

*As part of the Technology Integration, Market Opportunity and Commercialization potential section the applicant should:*

1. Describe your target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration.
2. Describe your scale-up with the initial metal industry processing stream and the market adoption beyond the initial industry partner.
3. Describe the business model for the commercialization of the technology in the U.S.
4. Describe the current financing support for your proposed recovery technology.
5. Describe the waste management, emissions control and worker safety plans to integrate the proposed technology with the existing metal processing feedstock and current processing plant configuration. Describe how environmental, health, and safety (EHS) factors impact performance of the technology in recovering Ga, present mitigation plans to manage EHS compliance and systems performance, and/or any R&D needed to optimize and improve technology performance or EHS compliance. Describe key risks associated with proposed activities and identify associated mitigation strategies for each.

***Key area 4: Team Qualifications and Resource Availability***

*As part of the Team Qualifications and Resource Availability section the applicant should:*

In the table below:

1. In the table below, identify key personnel participating in the project and describe their capabilities, expertise, responsibilities, and relevant resources (e.g., equipment, facilities, downstream processing) being leveraged. Organization descriptions should reflect diversity of expertise within the project team. Report cost share at the organization level.

If required beyond the table, use narrative to:

1. Describe the project team’s composition and experience. Describe how the team composition supports successful execution of the proposed work and future development and commercialization of the Ga recovery technology.
2. Describe the responsibilities of the industrial partner in the project.
3. Describe the analytical capabilities and resources, highly specialized equipment (e.g., for analytical characterization of Ga content and purity), and facilities available to support this work. Provide examples that illustrate the team's proficiency in both gallium chemistry and industrial process stream analysis.

Resumes for key personnel will be submitted as a single pdf file as part of the application with the naming convention LeadOrganizationName\_Resume.

* Only the first two pages of each resume will be reviewed. The number of resumes should correspond with number of key personnel. Please note resumes do not count towards your page count.

|  |
| --- |
| **Organization:** Name  *Describe organizational capabilities, expertise, and resources*  **Responsibilities:** *Identify major activities led by this organization*  **Cost share commitment: Phase 1: $x / X% of total phase cost**  **Cost share Commitment: Phase 2: $X / X% of total phase cost**  **Staff:** *Identify only key personnel that would work on this project with brief description of bio/capabilities)* |
| **Key Person:** Name  **Organization or project title:**  **Responsibilities:** *Identify major activities led by this key person* |
| **Key Personnel:** Name  **Organization or project title:**  **Responsibilities:** *Identify major activities led by this key person* |
| Note: add additional rows as necessary |