

**Strategic Environmental Research and Development Program  
(SERDP)**

**FY 2021 STATEMENT OF NEED**

**Weapons Systems and Platforms (WP) Program Area**

**CONVERSION OF AMMONIUM NITRATE SOLUTIONS TO USEFUL  
PRODUCTS**

**1. Objective of Proposed Work**

The objective of this Statement of Need (SON) is to develop processes to convert ammonium nitrate solution (ANSOL) generated from energetic materials production into high value products with additional applications. Processes that convert ANSOL to a useful chemical solution are preferred; however, processes that convert ANSOL into a useful energy source would also be considered. Proposers should consider the following issues when developing their proposal.

- Proposed technologies should be capable of processing ANSOL with variable chemical compositions, including concentrations of metals and solids.
- Proposers should work towards developing technologies capable of application at current production rates, considering that ANSOL is often generated at a scale of hundreds of L/min.
- Proposers must be explicit about the potential processing rate of the proposed technology and how it is envisioned it would ultimately be implemented at full scale.

Proposals should include a task to conduct a Sustainability Analysis of appropriate proportion to the proposed research. Proposals should establish a lifecycle framework that can mature as the technology or process advances through the acquisition process. This tiered approach aims to develop and document a minimum data set at each stage of research that can be used to make informed decisions and streamline transition to an acquisition program. The Sustainability Analysis may include varying depths of data and information that can inform the goal and scope of an analysis, the identity and quantity of relevant inputs and outputs to the system, and the estimation of life cycle impacts and costs.

**2. Expected Benefits of Proposed Work**

Program Managers, installations, and warfighters across all services would benefit from technologies that convert a costly waste stream into a valuable product. This would minimize hazardous waste management, while potentially providing a domestic, reliable source of useful materials.

**3. Background**

ANSOL is a mixed waste stream byproduct from the production of energetic materials. The final product varies depending on production operation; however, the typical composition is

approximately 65% ammonium nitrate (but could vary significantly), 20% amine nitrates, 12% water and 3% nitramine explosives (RDX, HMX) and their decomposition products, as well as trace contaminants such as chromium. Holston Army Ammunition Plant (HSAAP) is the primary ANSOL producer at rates up to 10 million pounds per year. HSAAP ANSOL regularly fails the toxicity characteristic leaching procedure (TCLP) for chromium.

ANSOL must be treated as hazardous waste due to explosive content and toxic metals per the Resource Conservation and Recovery Act (RCRA), which requires limited time frames for storage of hazardous waste. Large production rates also lead to rapid build up of material for disposal. Historically, ANSOL has been marketed to the mining industry for use in blasting explosives; however, that has been an inconsistent demand.

#### **4. Cost and Duration of Proposed Work**

The cost and time to meet the requirements of this SON are at the discretion of the proposer. Two options are available:

Standard Proposals: These proposals describe a complete research effort. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run from two to five years in length and vary considerably in cost consistent with the scope of the effort. It is expected that most proposals will fall into this category.

Limited Scope Proposals: Proposers with innovative approaches to the SON that entail high technical risk or have minimal supporting data may submit a Limited Scope Proposal for funding up to \$250,000 and approximately one year in duration. Such proposals may be eligible for follow-on funding if they result in a successful initial project. The objective of these proposals should be to acquire the data necessary to demonstrate proof-of-concept or reduction of risk that will lead to development of a future Standard Proposal. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation instructions and deadlines.

#### **5. Point of Contact**

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the [SERDP website](#).