

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

FY 2020 STATEMENT OF NEED

Environmental Restoration (ER) Program Area

ECOTOXICITY OF FLUORINE-FREE SURFACTANT FORMULATIONS

1. Objective of Proposed Work

SERDP is currently funding research aimed at developing fluorine-free surfactant formulations for use in class B fire-suppression operations. In addition, commercially available fluorine-free foams are being tested under ESTCP to determine whether any of these formulations can meet the current DoD performance requirements defined in MIL-F-24385F. It is expected that several of the current efforts will identify formulations of fluorine-free surfactants that will meet the DoD performance requirements. The objective of this SON is to determine the relative environmental toxicity of these candidate aqueous film-forming foam (AFFF)-alternatives.

Because these foams contain novel chemistries with potentially many complex mixtures of chemicals, experiments should be conducted to compare the nominal toxicities of whole-foam formulations relative to the short-chain AFFF formulations currently in use by the DoD. Chronic exposure experiments are required with environmentally-relevant receptors (e.g., fish, mammals, inverts, plants) and endpoints (e.g., reproduction) using bioassays consistent with good laboratory practice. Degradation products and the bioconcentration potential of individual chemicals within the foams also should be considered as practicable. Results should yield a rank order of the relative toxicity of each foam formulation.

Proposers should provide the rationale and justification for the species and endpoints selected for study and should describe how the proposed effort builds on and complements previous research. SERDP will identify the suggested formulations for evaluation, but for costing purposes, proposers should assume testing of 3 to 5 new formulations.

2. Expected Benefits of Proposed Work

The knowledge of the potential environmental risk of fluorine-free surfactant formulations will assist in the final selection of new formulations and mitigate potential exposures and/or future environmental cleanup.

3. Background

Since 2006, use of AFFF containing PFOS and PFOA has generally been replaced by foams that have fluorosurfactants of 6 carbons or fewer. These newer foams are thought to be less toxic and bioaccumulative; however, there are data gaps regarding environmental toxicity, particularly with regard to chronic toxicity.

A number of alternative fluorine-free surfactant formulations are currently under development by SERDP, and commercially-available fluorine-free foams are being tested under ESTCP to evaluate their ability to meet current DoD performance requirements. Additional information from these studies can be found at the web sites listed below.

<https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Contaminated-Groundwater-SONs/Fluorine-Free-AFFF-2017>

<https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Contaminated-Groundwater-SONs/Innovative-Approaches-to-Fluorine-Free-AFFF-2018>

<https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Contaminated-Groundwater-SONs/Demonstration-and-Validation-of-Fluorine-Free-AFFF>

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 four years in length and vary considerably in cost consistent with the scope of the effort.

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 \$200,000 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 this SERDP Supplemental Solicitation instructions and deadlines.

5. Point of Contact

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