1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to develop improved analytical and environmental sampling techniques for per- and polyfluoroalkyl substances (PFASs). Specific research needs are as follows:

- Development of sampling techniques to evaluate soil and water columns, including consideration of potential biases associated with sampling supplies and equipment, and decontamination procedures for use at both minimally and highly contaminated sites.
- Evaluation of potential media to be used for passive samplers and their performance.
- Assessment of subsampling techniques to determine the process by which the subsample provides results that are most representative of the entire sample collected.
- Development of procedures to assess the total organofluorine in environmental waters, soil and sediment.
- Development of rapid field screening procedures for PFASs.
- Development of extraction techniques to produce the most accurate and precise quantitation.
- Evaluation of techniques to eliminate matrix interference.
- Evaluation of techniques to achieve the lowest limit of quantitation possible when analyzing AFFF formulations and samples containing high concentrations of PFASs while achieving the required precision and accuracy.
- Evaluation of techniques that could be used to ensure precision and accuracy of total PFAS analytical procedures.

Sampling and analysis of 24 PFASs (USEPA, 2017) and total PFASs are of interest in the following matrices:

- Environmental waters including groundwater, surface water, storm water run-off
- Aqueous film forming form (AFFF) products
- Soils and sediments
- Biological tissues
- Vegetation media
Proposers are not required to address all of the needs listed in any individual proposal.

To provide strategic guidance for future research and demonstrations on management and remediation of AFFF-impacted sites, SERDP and ESTCP conducted a workshop on May 2-3, 2017 in Washington, D.C. Proposers are strongly encouraged to view the Workshop Report summarizing the research, demonstration, and technology transfer needs prior to submitting their proposal.

2. Expected Benefits of Proposed Work

Addressing the research needs described above will meet a critical need for better sampling and analysis of PFASs at Department of Defense (DoD) sites. This will in turn lead to improved management of PFAS sites by facilitating more accurate and precise assessments of the extent of PFAS contamination.

3. Background

AFFF formulations have been used by DoD since the 1970s to suppress fires, and there are hundreds of sites with associated PFAS contamination. The DoD used AFFF mixtures containing significant quantities of perfluoroctane sulfonate (PFOS) and related perfluoroalkyl sulfonates such as PFHxS until 2002, when production stopped, although the DoD continued to use PFOS-containing AFFF stocks for some time after. Although the DoD’s legacy use of AFFF included various fluorotelomer-based formulations, the vast majority of DoD’s environmental liability likely results from the use of PFOS-based AFFF. Additional research on PFASs is timely given the USEPA’s recent drinking water health advisories for two common PFASs, perfluorooctanoic acid (PFOA) and PFOS, as well as the numerous states that are beginning to promulgate drinking water standards. SERDP has been funding research on AFFF contamination for several years to improve PFAS analysis, to develop tools for assessing the fate of PFASs in the subsurface, and to evaluate the potential for in situ remediation.

Although sampling guidance documents are publicly available, they contain limited information, and often include limitations on applicable sampling supplies and equipment that are not based on scientific evidence and may complicate field sampling plans and increase sampling costs. Further, existing guidance does not reflect the fact that more precautions may be needed when sampling certain media (e.g., drinking water) or when concentrations of interest are expected to be lower than in other instances (e.g., when working in a contaminated plume).

In addition, there are currently no EPA published procedures for PFAS analyses in media other than drinking water. Commercial laboratories offer analysis of these media using in-house developed methods that are based on EPA Method 537.

Development of procedures to assess the total organofluorine in environmental waters and soil and sediment are needed to help assess transformation and distribution of PFASs, as well as to assess various aspects of PFAS remediation techniques. Currently there is no standardized total organofluorine analytical procedure readily available that has been fully validated and the limitations of such procedures are yet to be determined.
Workshop participants identified a number of research needs associated with sampling and analysis of environmental matrices containing PFASs. Proposers are strongly encouraged to view the Workshop Report to obtain additional detail concerning these discussions.

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 $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 the SERDP Core Solicitation instructions and deadlines.

5. Point of Contact

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