

2022 ITRC Final Proposal Template

Proposed Project Title

PFAS Team Extension: Collection, Evaluation, and Distribution of the Emerging Science of PFAS

Abstract

The current ITRC PFAS Technical and Regulatory Guidance Document has become the essential resource for states and the broader environmental community to have direct access to the state of the knowledge on how to understand and manage PFAS contamination. The extension of the PFAS Team will facilitate the review and dissemination of newer research regarding not only the replacement PFAS, but also the increased understanding of many issues either addressed in an introductory manner in the current guidance document or only recently identified as a potential area of concern. Some example areas to be covered include fluorinated HDPE storage containers (use and leaching of PFAS), newly identified sources (dry cleaning groundwater screening), irrigation and migration up the food chain, soil leaching testing procedures and modeling, partitioning to air, use of chemical libraries and non-target analysis, and biosolids application and migration through soils. The current PFAS Team is engaged and communicating about relevant topics to be reviewed and evaluated for inclusion in updates to the current PFAS document. The items mentioned are a small example of the large number of potential issues that require the team's work.

Problem Statement and Highlight of the Importance to the States and to the Broader Environmental Community

Per- and polyfluoroalkyl substances (PFAS) have been found to be present in a wide range of environmental media; some PFAS are persistent and have been shown to have varying levels of toxicity, where that information is available. As the level of concern rises for some PFAS, there are other PFAS with various structures that are brought in to replace them. The scientific community is currently engaged in researching many areas critical to the understanding of PFAS, and they are also attempting to address many other issues unique to PFAS.

PFAS are a large family of chemicals that vary substantially in their physical, chemical, and toxicological properties. They are useful chemicals with unique chemical properties that impart heat, stain, and water resistance, they are chemically and thermally stable, and they can reduce friction in a range of products. They have been used in many industries, including automotive, electronics and many consumer products, including carpets, clothing, furniture, and food packaging. It is these properties that make these chemicals so widely used, but it is also these properties that make these chemicals so persistent and difficult to address once released to the environment.

The family of PFAS continue to challenge site remediation professionals, as well researchers and public health officials. The ITRC PFAS Team has provided clear and detailed information on the aspects of PFAS that are well understood. These products have included fact sheets, a web based Technical and Regulatory Guidance Document, supporting tables, and training for environmental professionals that include online training, videos, in-person training, and roundtable events that allow all public and private officials to ask questions that are of a concern to them. These products and events have been essential for

many professionals and have provided essential, go-to resources that support efforts to address problems with PFAS across the country. However, there are many areas that have yet to be addressed.

The occurrence, fate, and transport through the environment of those PFAS that have historically been used and dispersed is beginning to be understood. However, there remain significant challenges in characterizing the many PFAS that could be present in a variety of environmental conditions. Site managers and responsible parties are struggling to understand how releases have migrated over time, which receptors are impacted, and how to remove the chemicals from impacted environmental media. In addition, toxicologists, and other health professionals, are only beginning to understand the potential health implications of some of these chemical compounds, with new research contributing to the body of knowledge at a fast pace.

An additional complexity occurs when specific PFAS are identified as problematic, for reasons related to human or ecological health, and the chemical manufacturers then create replacement PFAS or identify alternative, less-understood PFAS, to play the role of the chemical that is being removed from use. This creates challenges for site managers and others, where PFAS that are less understood are put into use and have the same potential to be released to the environment.

As the current ITRC PFAS Team has moved through the document updates of the past year, they have continued to identify subject areas that the existing published documents and current training tools do not adequately address. Some of these issues require more information and some subject matter will be new material that has not yet been covered. The following section provides a snapshot of some of the items that the experienced professionals of the ITRC PFAS Team have identified as being useful to explore, investigate, and compile fact-based information that will help address critical problems that still exist with PFAS in the environment.

Specific technical and regulatory barriers that will be addressed in updates.

The PFAS Team will develop detailed, useful content that builds on the subject matter areas that have already been put in place. The well-established team composed of highly experienced members are organized in 10 writing subgroups that address key areas including Fate and Transport, Site Characterization, Laboratory Analytical Methods, Regulations, Human and Ecological Health Effects, Treatment Technologies, and Aqueous Film-forming Foam (AFFF). The members have expressed interest in addressing emerging concerns, some of which are summarized below.

- (1) ***History, Use and Environmental Sources.*** The team will continue to provide additional information on the uses and sources of PFAS as they emerge. There have been significant concerns expressed over the discovery of potential new sources, such as PFAS detections in pesticides and other agricultural materials. These detections have been initially associated with the use of fluorinated HDPE containers leaching the PFAS into the product, but this information needs to be evaluated by the team. Other sources that will be investigated include road salt, mining, and dry-cleaning facilities. Additional information for Aqueous Film-Forming Foams (AFFF) and transitioning existing systems to fluorine free foams is becoming available and will be summarized and incorporated into the document.
- (2) ***Nomenclature Overview and Physical and Chemical Properties.*** This very complex family of compounds has been organized into an extremely useful family tree that will require constant attention as PFAS are identified and categorized. The nomenclature will have to follow the discovery of the physical and chemical properties of newer PFAS or those PFAS that are being more fully researched that may relate the properties of the various chemical compounds. In addition, there have been over 170 “new” PFAS that were just added to the Toxics Release Inventory, for which there is very little information

publicly available for environmental professionals to evaluate this eventual occurrence data release. The team could address this by answering the following questions:

- a. Why were these chosen?
- b. What might the implications be?
- c. Can these break down to compounds of concern?
- d. Do we have any environmental-media occurrence data?
- e. Are there appropriate analytical methods to quantify?

(3) ***Fate and Transport.*** Remediation professionals and other site managers currently have limited information to properly characterize and manage PFAS-contaminated sites. Some key areas that the Fate and Transport writing subgroup will cover in additional updates include migration through soils and leaching to groundwater, partitioning to air, and agricultural activities such as biosolid application that may impact groundwater quality or migration to vegetation. There are also many partitioning coefficients and environmental modeling efforts that could use further investigation and could potentially be covered as a case study.

(4) ***Site Characterization Tools, Sampling Techniques, and Laboratory Analytical Methods.*** Laboratory analytical methods that properly quantify PFAS in environmental media in the US and globally continue to evolve. This is a critical element of any project because there are currently limited standardized laboratory analytical methods in the US for soil, water, biota or other environmental media, but this is expected to change over the period of this project and the team is well positioned to provide this information in the ITRC documents and training. The group will also discuss options for sampling that include the status of passive sampling for PFAS. Additional site characterization tools will build on the forensic methods addressed in the newer content as knowledge of branched and linear isomers and other physical and chemical characteristics of precursor and terminal PFAS are presented. Analytical tools that have the potential to quantify unidentified PFAS, using non-target analysis and spectral libraries, will be further investigated, and detailed in the updates.

(5) ***Treatment Technologies and Methods.*** The current remediation and exposure mitigation methods, such as chemical and biological degradation (including intermediate and final degradation products), carbon and resin adsorption, and other potential methods, under in-situ, ex-situ, and point-of-use applications have been described in the current document. However, newer technologies are coming online, and the technology is improving and addressing new issues at a fast pace.

(6) ***Regulatory Summary and Human and Ecological Health Effects.*** Cleanup criteria and health advisories are being seriously investigated and implemented at the State and Federal levels and internationally. The team expects to continue to review the efforts of these governments and to present key subjects that allow interested parties to understand these new regulatory values and initiatives. Additional information is being generated for human and ecological health effects at a rapid pace and the team will continue to provide review and dissemination of this information.

(7) ***Surface Water.*** The newest writing subgroup has provided the essential basis for surface water concerns as they relate to PFAS and can now continue to provide a deeper understanding of how various PFAS partition in the water column, including formation of foams on surface water, (and how that may impact sampling efforts and the uptake in biota) and how effluent limitation guidelines might be used to mitigate releases of PFAS to surface water. There is the opportunity for a case study presentation that include issues related to PFAS contaminated surface waters.

(8) ***Waste Characterization, Destruction and Disposal.*** In December 2020, the EPA issued the “Interim Guidance on the Destruction and Disposal of PFAS and Materials Containing PFAS”. Waste characterization, management, destruction, and disposal have been and continue to be a challenge. The team has summarized this EPA document in the current ITRC documents but anticipates substantial advancements per EPA’s recommendations for near- and longer-term research objectives. There is

opportunity to update the status of research and development in this area and directly correlate to impacts and opportunities for active projects.

(9) ***Aqueous Film-forming Foam.*** With the National Defense Authorization Act (NDAA) prohibiting use of fire fighting foam containing PFAS after October 2024 and the Federal Aviation Administration (FAA) not requiring use of AFFF by October 2021, a significant amount of research and development is going on around best management practices for transitioning, from the process for decontamination, to destruction and disposal of spent AFFF, firewater, and contaminated rinse water. There is opportunity for additional case studies, revisions to best management practices, and updates to the foam characteristics table.

(716885224) ***Stakeholders and Risk Communication.*** The PFAS Team has had an active community of stakeholders who continue to bring the issues and concerns around PFAS into the discussion and work of the team. In addition, risk communication professionals have developed tools and information to support the challenging tasks around communicating about PFAS site investigation and cleanup. These areas continue to evolve as the scientific information for PFAS becomes available. There is opportunity for additional case studies that include risk communication and stakeholder concerns related to PFAS contamination.

Project Deliverables

The new team would begin in January of 2022 and run through December 2023. The established writing subgroups will produce the following items:

- Updates to the December 2021 document, with an estimated publication date of June 2023.
- Updated video and in-person training content. The current content will be revised based on the 2021 and 2023 document updates and will be rolled out in training sessions during 2022 and 2023. This content would consider new expert roundtable sessions on the materials prepared in the 2021 and 2023 updates.
- Updates to the Regulatory Guidance and Values and the new Programs spreadsheet.
- Newer case studies and short fact sheets covering emerging issues.