Naval Facilities Engineering Systems Command

EXWC Engineering and Expeditionary Warfare Center

NAVFAC OER2 Revised Interim General Guidelines for PFAS Remedial Investigations

December 13, 2023

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Distribution A (unlimited distribution)

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OER2 Webinar Series

- **Why Attend?**
  - Obtain and hear about the latest DOD and DON's policies/guidance, tools, technologies and practices to improve the ERP's efficiency
  - Promote innovation and share lessons learned
  - FEEDBACK to the ERP Leadership
- **Who Should Attend?**
  - ERP Community Members: RPMs, RTMs, Contractors, and other remediation practitioners who support and execute the ERP
  - Voluntary participation
- **Schedule and Registration:**
  - Offered quarterly
  - Registration link for each topic (announced via ER T2 email)
- **Topics and Presenters:**
  - ERP community members to submit topics (non-marketing and DON ERP-relevant) to POCs (Kim Brown at *kim.p.brown4.civ@us.navy.mil* or *EXWC.T2@us.navy.mil*)
  - Selected topic will be assigned Champion to work with presenter

REVISED INTERIM GENERAL GUIDELINES FOR PFAS REMEDIAL INVESTIGATIONS

Kendra Clubb, NAVFAC NW
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Presented: December 13, 2023

Acronyms

ASD – Assistant Secretary of Defense
BERA – Baseline Ecological Risk Assessment
BRAC – Base Realignment and Closure
BCM – Base Closure Management
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CSM – Conceptual Site Model
DOD – Department of Defense
DQO – data quality objective
DON - Department of the Navy
EXWC – Engineering Expeditionary Warfare Center
EDQW – Environmental Data Quality Workgroup
ER – Environmental Restoration
ERP – Environmental Restoration Program
ERN (ER,N) – Environmental Restoration, Navy
ELAP – Environmental Laboratory Accreditation Program
EPA – Environmental Protection Agency
ESV – Ecological Screening Values
F&T – Fate and Transport
HFPO-DA – Hexafluoropropylene oxide-dimer acid(s)
HHRA – Human Health Risk Assessment
HQ – headquarters
IDW – Investigative Derived Waste
LANT – NAVFAC Atlantic
NAVFAC – Naval Facilities Engineering Systems Command
NW – Northwest
OER2 – Open Environmental Restoration Resource
OSD – Office of the Secretary of Defense
PAL – Project Action Limit
PFAS – per and polyfluoroalkyl substances
PFBA – Perfluorobutanoic acid
PFHxA – Perfluorohexanoic acid
PFHxS – Perfluorohexane sulfonate
PFNA – Perfluorononanoic acid
PFOA – Perfluorooctanoic acid
PFOS – Perfluorooctane sulfonic acid
PMO – Project Management Office
ppt – part per trillion
QA – Quality Assurance
RI - Remedial Investigation
RPM – Remedial Project Manager
RSL – Regional Screening Level
RTM – Remedial Technical Manager
SLERA – Screening Level Ecological Risk Assessment
SME – Subject Matter Expert
SRA – Screening Level (Human Health) Risk Assessment
T2 – Technology Transfer
TRV – Toxicity Reference Values
WASH – Washington
WCSD – Watershed Contamination Source Document

PURPOSE

- Provide general guidelines for per- and polyfluoroalkyl substances (PFAS) Remedial Investigations (RIs).
- This document is not intended to be prescriptive or binding in nature. There may be site-specific topics that are not comprehensively covered in the document.
- All RPMs should continue to review other documentation to support RIs, such as the DON Environmental Restoration Program Manual (2018), Navy and DoD PFAS guidance or policies (links below), and EPA guidance on RIs.

https://www.secnav.navy.mil/eie/Pages/DON-PFAS-POLICIES-AND-GUIDANCE.aspx)

https://www.acq.osd.mil/eie/eer/ecc/pfas/tf/policies.html

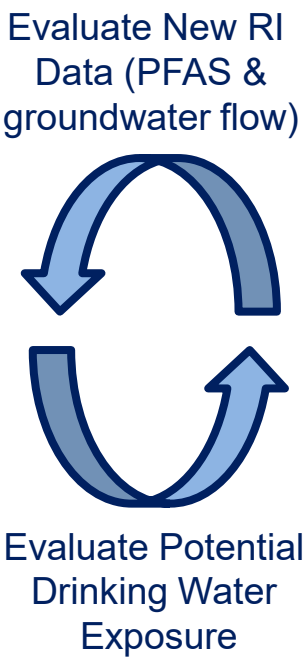
https://exwc.navfac.navy.mil/Products-and-Services/Environmental-Security/NAVFAC-Environmental-Restoration-and-BRAC/Focus-Areas/emerging-contaminants/

AGENDA

- Off-Base Drinking Water
- RI Planning
- Site Characterization
- Risk Assessments
- Fate and Transport
- Background or Non-Navy PFAS Sources
- Investigative Derived Waste
- Wrap-up

OFF-BASE DRINKING WATER

- **Potential drinking water exposure is the number one priority.**
- **Evaluation of on-base groundwater and potential impacts to on-base and/or off-base drinking water is a continual process.**
- **Review new or refined PFAS and groundwater flow data as the result of an RI, and/or new areas of concern.**
- **Contact management, LANT or BRAC PMO BCM, & HQ immediately, if drinking water investigation may be warranted**



FUNDING/PLANNING RIs

- Prioritize RIs based on risk
- Comprehensive investigation (refine conceptual site model)
- Iterative process (site-specific)
- Abiotic sampling prior to biotic sampling, where necessary
- Consider non-Navy PFAS sources
- Consider if off-base delineation is needed
- Consider latest screening values based on latest toxicity information, as approved by DoD and posted on OSD's website (https://www.acq.osd.mil/eie/eer/ecc/pfas/tf/policies.html)

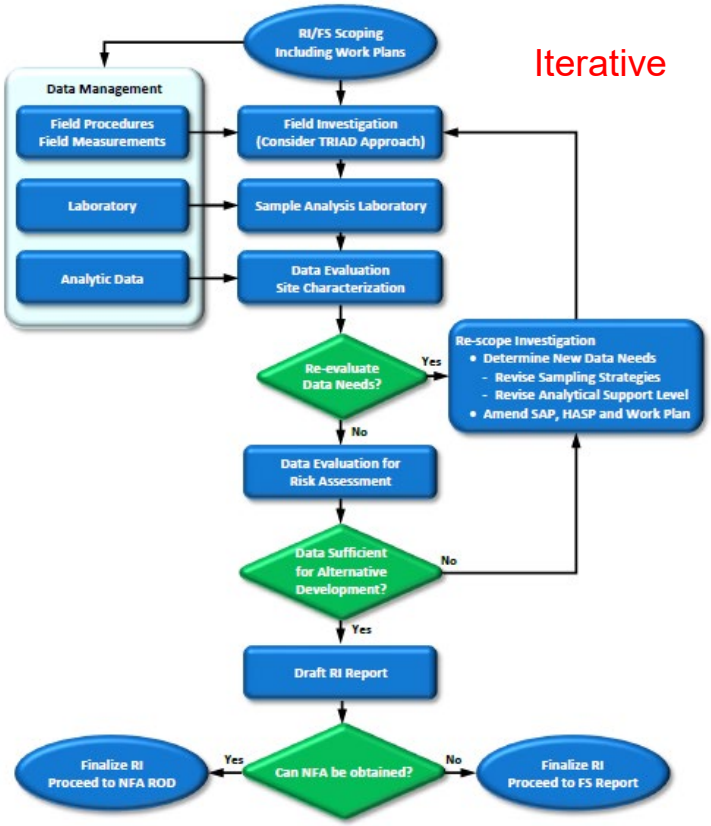


Figure 8-2 Remedial Investigation Process

Reference: Department of Navy Environmental Restoration Program Manual (DON ERP Manual, 2018)

SITE CHARACTERIZATION

- **Analytical Methods:**
  - **Groundwater, surface water, soil, sediment, and biota: Draft Method 1633 per *ASD 7Aug2023 memorandum***
  - **Air: no DoD ELAP certified analytical method at this time**
- **Human Health Screening Values**
  - **EPA-vetted and DoD-endorsed toxicity values per *ASD 24Aug2023 memorandum***
    - Re-evaluate throughout the RI - Check for updates on OSD website (https://www.acq.osd.mil/eie/eer/ecc/pfas/tf/policies.html)
- **Ecological Screening Values (ESVs)**
  - **Emerging Contaminant Workgroup Interim Final Issue Paper ESVs**
    - Re-evaluate throughout the RI – Check with Navy SMEs for ESV updates
- **State Screening Levels or Promulgated Cleanup Levels**
  - **RPMs should attempt to establish project detection limits that are low enough to compare site data to state levels**

OFF-BASE DELINEATION

- Legal counsel and management approval is required for off-base delineation BEFORE proceeding.
- There are two possible paths for securing off-base agreements:
  - Real estate access agreements or a CERCLA 104 (e) Administrative Order.
  - The process for these agreements can take considerable time (>12 months)
  - Real estate actions may require program funding.
- Contact ER manager or BRAC PMO BCM about current Controlled Unclassified Information guidance.
- For transferred sites, consider existing land agreements with property owners.

Human Health Risk Assessments

- RPMs should use EPA-vetted and DoD-endorsed toxicity values to select Project Action Limits to determine if further evaluation is warranted at their sites.
- Given the evolving nature of toxicity information related to PFAS, it is important review screening values during preparation of the HHRA to determine whether there are updated toxicity values.
- Consult HHRA SMEs early and often RI planning/execution.

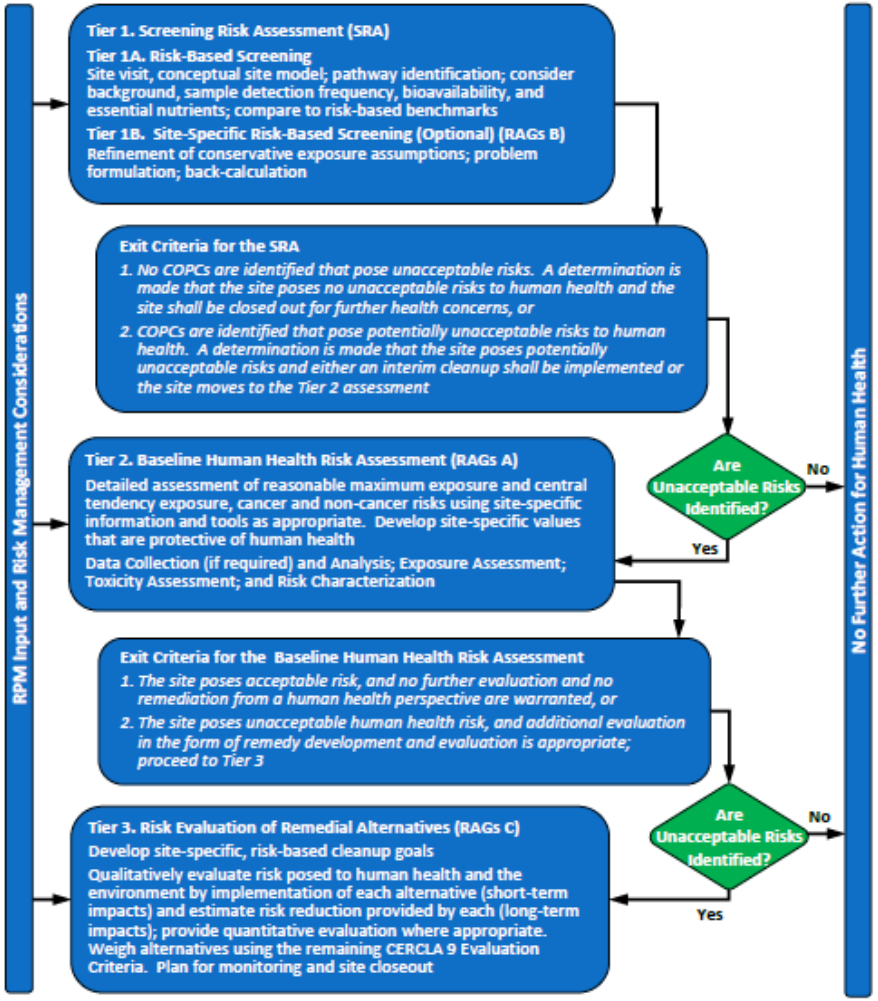
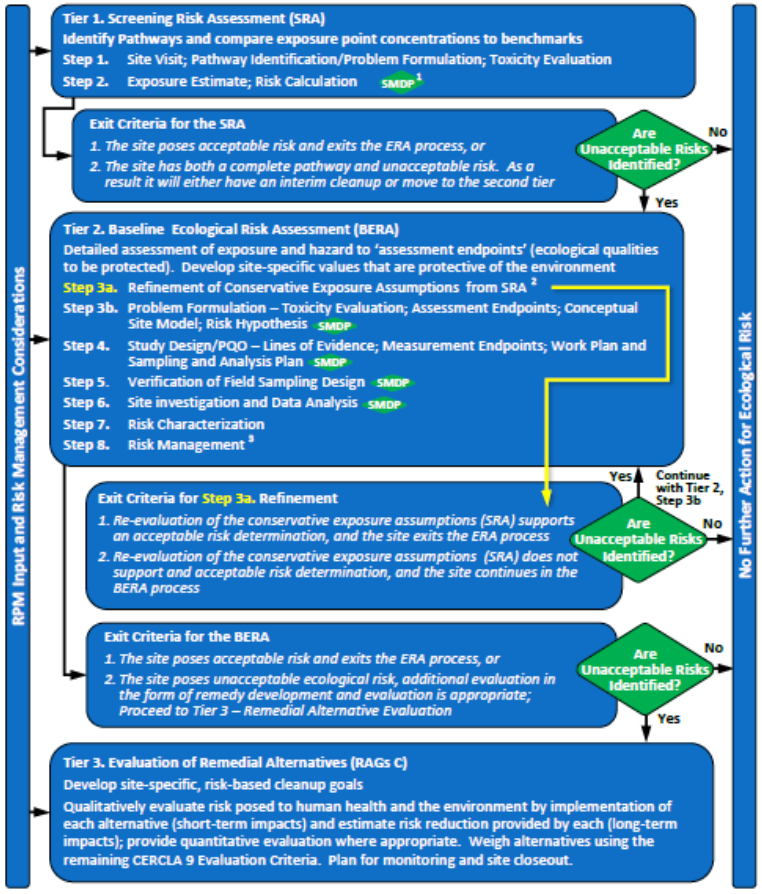


Figure 8-3 DON Human Health Risk Assessment Tiered Approach

Reference: DON ERP Manual, 2018

Ecological Risk Assessments

- Planning for and completing a screening-level ecological risk assessments (SLERA or SRA) and Baseline ERA (BERA) should be considered evolving.
- There are currently ESVs available for use in SLERAs but the toxicity reference values (TRVs) and thus ESVs are subject to change as more studies are completed and data gaps are filled based on the most recent peer-reviewed literature.
- Consult ERA SMEs early and often RI planning/execution.



[1] See EPA's 8 Step ERA Process for requirements for each Scientific Management Decision Point (SMDP)
[2] Refinement includes but is not limited to background, bioavailability, detection frequency, etc.
[3] Risk Management is incorporated throughout the tiered approach

Figure 8-4 DON Ecological Risk Assessment Tiered Approach

Reference: DON ERP Manual, 2018

FATE AND TRANSPORT (F&T)

This section provides highlights of recommendations to consider when planning and scoping PFAS RIs.

- **Fate: How a chemical persists or changes form in the environment (chem./phys./bio.)**

- **Transport: How a chemical migrates within and between environmental media.**

KEY POINT!

Each PFAS compound can have unique F&T characteristics in the same environment!

Want to know more?

ITRC Reference https://pfas-1.itrcweb.org/5-environmental-fate-and-transport-processes/

F&T – Partitioning and Complexity

KEY POINT!

Consider how PFAS partitions in site media. These influence F&T and can vary for different compounds.

PFAS RIs may need to consider how a compound:

- **Sticks to soils/soil particles (mass storage)**
- **Varying solubility in water**
- **Electrostatic effects and polar molecules and media particles (e.g. clays)**
- **Air-water interface behavior**
  - The **micelle** (foaming/surface tension/colloidal effects)
- **Transformation in environment and inside receptors**
- **Organic carbon sequestration (humic media)**
- **Plant uptake and storage**

These factors affect the <u>how far away</u> and <u>how far below</u> PFAS will migrate in media.

Migration pathways for PFAS can be tricky…

F&T – PFAS Differences

KEY POINT!

Different PFAS migrate at variable rates - Sampling locations & groundwater well networks should reflect likely different plume extents.

When planning and scoping your RI, consider these differences between PFAS compounds:

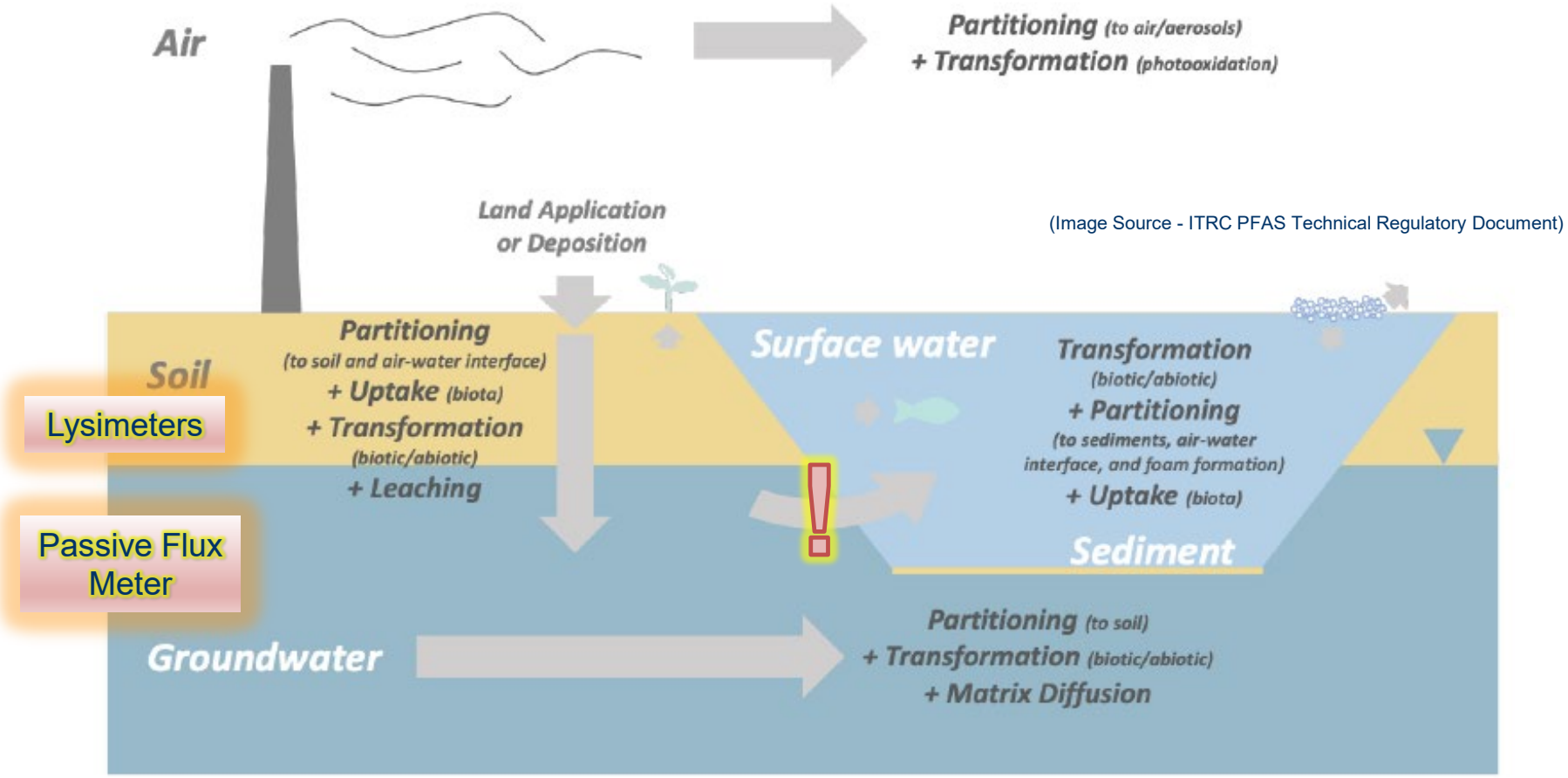
- **Carbon partitioning & "stickiness":** **Sulfonate** PFAS tend to "stick" to organic carbon (i.e., PFOS). **Carboxylate** PFAS are less "sticky" (i.e., PFOA). Longer chain PFAS (e.g., *C8* PFAS- PFOS), preferentially bind and retain within humic media more than shorter chain PFAS (e.g., *C3* PFAS- Gen-X).

- **Electrostatic storage and retardation:** Cationic and zwitterionic PFAS have more affinity to sorb to charged clay or even mildly charged soil particles. This can lead to long-term retention and storage of PFAS contaminant mass.

F&T – Migration & Storage

KEY POINT!

Work with your SMEs to make sure your PQOs are clear in your SAP. Obtain team agreement on how data will be used.



(Image Source - ITRC PFAS Technical Regulatory Document)

F&T – Other PFAS and their Fate

KEY POINT!

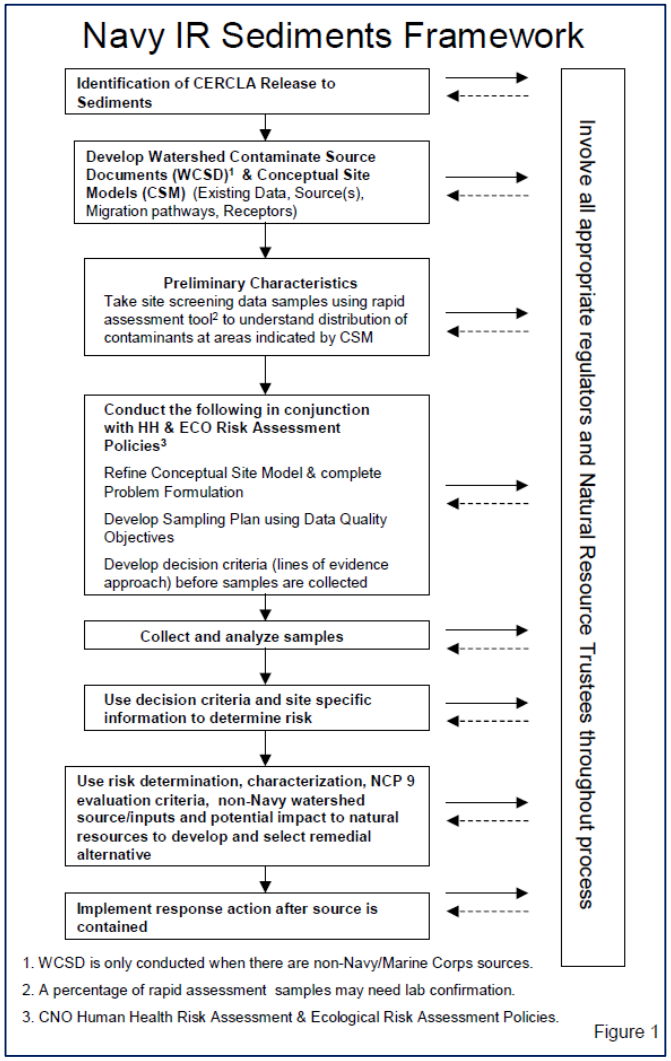
Consider all site analytical data collected prior to scoping your PFAS RI, not just data for PFAS with RSLs.

For Example: Transformation of PFAS precursors (e.g. flourotelomers & poly-fluorinated compounds)

- **Some PFAS precursors transform physically in-situ, or may transform when present in animal/plant tissue.**
  - **Precursor breakdown products may create PFAS concentrations (e.g. PFOS & PFOA) that are higher in downgradient areas than physical/chemical retardation and mass-storage would predict.**
- **Many precursors are in the current Draft Method 1633 analytical list of 40 compounds**
- **Precursors may be key in characterizing your source area release and anticipated F&T behavior at a site.**

BACKGROUND/NON-NAVY PFAS SOURCE

- All investigations must be linked to a Navy release to be ERN or BRAC eligible.
- Urban waterways or other water systems that receive other PFAS sources may require a Watershed Contaminate Source Document (WCSD).
- Background analysis may be necessary to demonstrate that areas of a site are NOT impacted by the Navy's PFAS release.
- Consult management and legal counsel if you suspect an area is impacted by a non-Navy source.



Reference: DON Policy on Sediment Site Investigation and Response Action, 2002

F&T - Background Sources

KEY POINT!

Include upgradient/upstream reference samples in sampling strategy. Consider a basewide background study and/or WCSD.

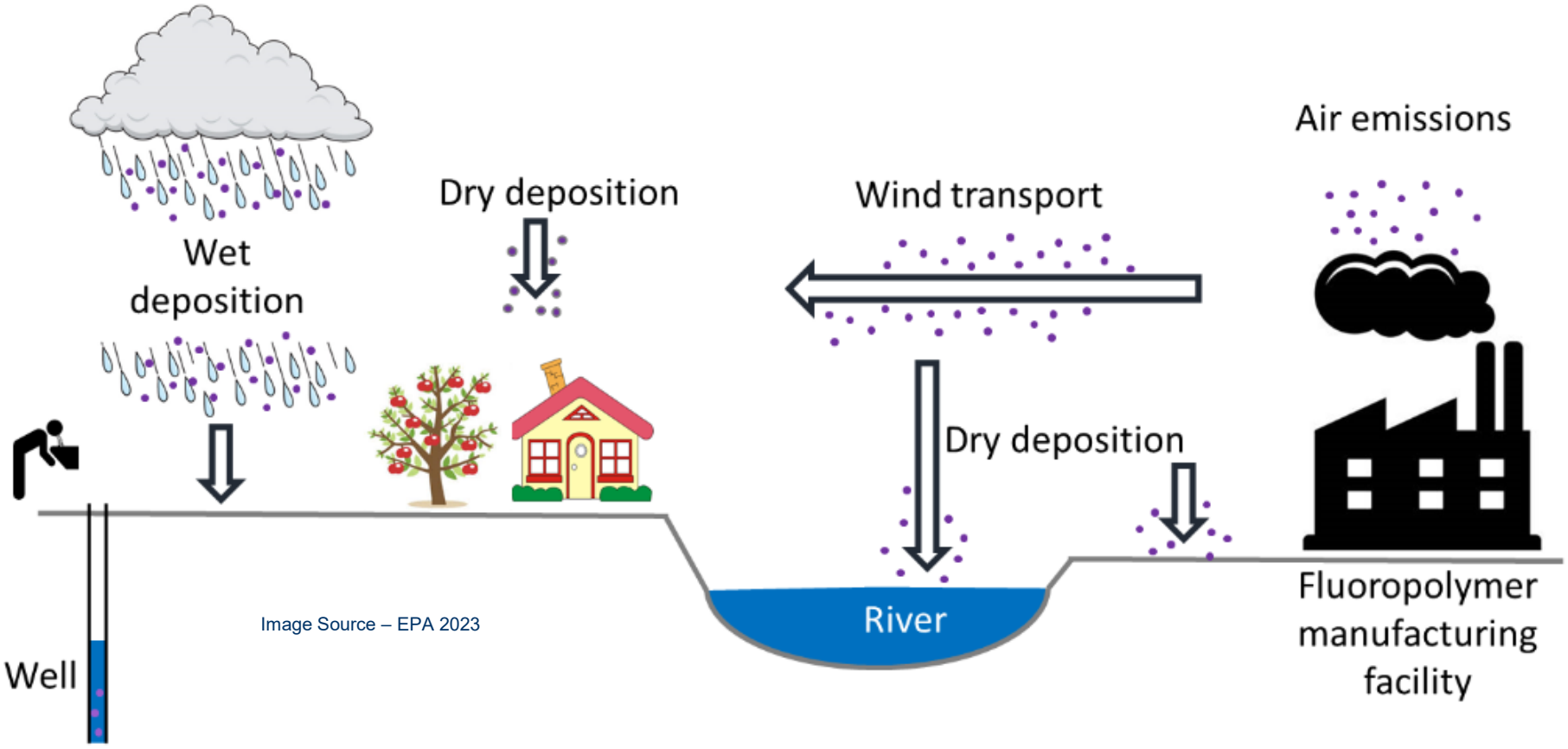


Image Source – EPA 2023

INVESTIGATIVE DERIVED WASTE

- All IDW generated from PFAS investigations must be analyzed for PFAS
- Evaluate approved IDW treatment and disposal options in accordance with *ASD 11 JULY 2023 Memorandum* or most recent guidance
- Best management practices:
  - Consider duration of storage as it pertains to type of storage technology required and secondary containment.
  - Consider drilling methods to minimize solid and aqueous IDW (e.g. sonic drilling results in less decontamination contact water and lack of mud-flushing waste generation).
  - Consider previous PFAS data site data collected for segregation
  - Consider potential for co-contamination with other COCs
  - Consider low-flow groundwater sampling methods to reduce volume
  - Consider on-site treatment prior to discharge or disposal for large volumes of water waste
  - Consider applicable local or state waste disposal requirements

INVESTIGATIVE DERIVED WASTE

KEY POINT!

Consider PFAS IDW costs and challenges when scoping and planning your RI!

Current ASD 2023 Interim IDW Guidance Options:

- Carbon reactivation units with environmental permits (for used granular activated carbon only).
- Hazardous waste landfills with environmental permits.
- Solid waste landfills with environmental permits that have composite liners, and gas and leachate collection and treatment systems.
- **Once DoD moratorium lifted**: Hazardous waste incinerators with environmental permits

QUESTIONS

Presentation Points of Contact

Presenters:

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Navy Subject Matter Experts:

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- Jennifer Corack – Human Health Risk (jennifer.m.corack.civ@us.navy.mil)
- Jason Speicher – Ecological Risk (jason.a.speicher2.civ@us.navy.mil)
- Laura Cook – F&T (laura.j.cook2.civ@us.navy.mil)
- Ramona Iery – IDW/Treatment Technology (ramona.iery.civ@us.navy.mil)

Other questions?
Email:
EXWC.T2@us.navy.mil

Wrap Up

A short Survey Monkey will be emailed to webinar registrants and participants

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Thank you for participating!