

**EPA Superfund Program – RPM Bulletin 2025-01**  
***PFAS Considerations When Updating Environmental Indicators***  
April 14, 2025

**Purpose**

The purpose of this document is to assist the U.S. Environmental Protection Agency (EPA) Remedial Project Managers (RPMs) with updating Superfund Environmental Indicators (EIs) worksheets for Long-Term Human Health Protection and Migration of Contaminated Groundwater for per- and polyfluoroalkyl substances (PFAS). This is important to ensure Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) progress is being measured and reported for protection of human health and the environment during cleanup activities. This Bulletin provides recommendations that are consistent with existing guidance and identifies best practices based on a review of how PFAS is being addressed at sites across the country, including U.S. territories.

**Existing Guidance**

[EPA, 2022. Superfund Environmental Indicators Guidance. October.](#)

**Summary**

As state and federal promulgated standards and EPA [Regional Screening Levels \(RSLs\)](#) for PFAS (or other contaminants) are released, EPA should ensure these criteria are utilized during the annual EI updates, in accordance with existing EPA guidance, as data collection and analysis or response actions occur, or as environmental conditions change. Protectiveness statements in Five-year Reviews can also prompt a review of EIs.

**Background**

EPA employs six performance measures that it employs to accomplish specific environmental results [i.e., Remedial Site Assessment Completions, Construction Completions, Remedial Action Project Completions, two EIs (Human Exposure Under Control and Groundwater Migration Under Control), and Sitewide Ready for Anticipated Use (SWRAU)]. EIs are annual measures of program performance used to communicate tangible progress made in protecting human health and the environment through site cleanup activities. They include: 1) the number of sites at which current human exposure to contamination is under control or falls within the levels specified as safe by EPA; and 2) the number of sites where contaminated groundwater migration has been controlled to prevent further spread of contaminants and prevent unacceptable discharge levels to surface water, sediments or ecosystem.

The Human Exposure and Groundwater Migration EIs were developed to measure interim progress of protecting human health from contaminant exposure pathways and restoring groundwater to beneficial use. Site EI worksheets (i.e., Superfund Long-Term Human Health Protection Worksheet and Superfund Migration of Contaminated Groundwater Under Control

Worksheet) are updated annually through the RPM's Regional EI Coordinator. Note that the Human Exposure and Groundwater Migration EIs are site-wide determinations, so that a single operable unit (OU) or set of OUs that are identified as not under control would result in a determination for the entire site.

### **Expectations and Considerations**

While uncertainties remain regarding the inclusion of emerging contaminants, such as PFAS, in EIs, the following recommendations should be considered when evaluating EI status at sites where PFAS contamination has been confirmed, or is suspected to be present, at concentrations exceeding state and/or federal standards or EPA RSLs.

#### ***Superfund Long-Term Human Health Protection Worksheet***

The information below should be used as a supplemental resource when filling out the annual EI worksheets for a sitewide EI determination.

**Step 1:** Is there sufficient known and reliable information to make an evaluation on human exposure at this site?

RPMs should take into consideration site-specific PFAS data collected in accordance with regulator-approved Uniform Federal Policy Quality Assurance Project Plans (UFP-QAPPs) and Field Sampling Plans (FSPs), and data collected under the Unregulated Contaminant Monitoring Rule (UCMR) (<https://www.epa.gov/dwucmr>).

**Step 2:** Have all long-term human exposure-related cleanup goals been met for the entire site?

As specified in the above-referenced Superfund Environmental Indicators Guidance, "For emerging contaminants with a Regional Screening Level (RSL), the RSL is the starting point for determining cumulative risk from the full list of contaminants present at your OU [Operable Unit]/site. PFAS and other emerging contaminants should be added with other contaminants for the Hazard Index (HI) sum. PFAS that are carcinogenic should be considered cumulatively. In the absence of RSLs, a qualitative approach should be carefully considered based on site-specific circumstances. When assessing drinking water exposure pathways there may be additional criteria, such as Maximum Contaminant Levels (MCLs), that would identify an unacceptable risk to humans."

Following issuance of Superfund EI Guidance in 2022, EPA has established legally enforceable standards for six PFAS in drinking water. Specifically, individual MCLs were established for perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA). For PFAS mixtures containing at least two or more of PFHxS, PFNA, HFPO-DA, and perfluorobutanesulfonic acid (PFBS), a

Hazard Index<sup>1</sup> MCL should be calculated to account for the combined and co-occurring levels of these PFAS in drinking water (see <https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas>). These PFAS MCLs should be considered when updating EIs.

At this time, more than a dozen states have promulgated standards that may constitute Applicable or Relevant and Appropriate Requirements (ARARs), and as such should be considered when updating EIs. A useful list of state promulgated levels is maintained by Interstate Technology and Regulatory Council (ITRC) (see [PFAS Water and Soil Values Table Excel file](#)). RPMs should consult with their site teams, including their site-assigned attorney or Office of Regional Counsel and State counterpart, when making any ARAR determination or rendering a decision regarding the inclusion of State standards in updated EIs.

**Step 3:** Are there complete human exposure pathways between contaminated groundwater, soil, surface water, sediment, or air media and human receptors such that exposures can be reasonably expected under current conditions?

RPMs should consider the results of PFAS screening efforts at their sites (e.g., Preliminary Assessments (PAs), Site Inspections (SIs), and/or Expanded/Supplemental SIs, Due Diligence Reports) to determine if all potential sources have been sufficiently identified to assess if exposures can be reasonably expected under current conditions.

As with all contaminants of concern (COCs), RPMs should consider whether PFAS are reasonably expected based upon site-specific current condition. For example, consideration should be taken if land use controls (LUCs) are already in place for legacy contaminants and likely to be adequate to prevent exposure to PFAS.

RPMs should also consider if sufficient PFAS sampling and analysis has been conducted to date. Examples include but are not limited to:

- Does PFAS data exist for on-installation public water systems (e.g., UCMR, Assistant Secretary of Defense's July 2023 [Memorandum for Sampling for Per- and Polyfluoroalkyl Substances in DoD-Owned Drinking Water System](#))?
- Have borrow soils on existing landfill caps been considered for potential PFAS presence to determine if complete human exposure pathways exist?
- Have biosolids been used as part of any component of the remedy (e.g., landfill cover)?
- Have off-installation private residential drinking water wells been sampled for PFAS (e.g., [Requirements of Section 345\(b\) of the FY2022 National Defense Authorization Act](#))?

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<sup>1</sup> Note that the MCL Hazard Index is made up of a sum of fractions. It is not the same Hazard Index calculated during a Superfund Human Health Risk Assessment.

- Have off-installation public water systems (PWSs) been sampled for PFAS (e.g., UCMR3, UCMR5)?
- Has surface water (e.g., seeps) been sampled?
- Has the potential for off-site migration of PFAS from the site been considered (e.g., to wetlands)?
- Has National Pollutant Discharge Elimination System (NPDES) effluent been sampled for PFAS?
- Has effluent discharged to a publicly owned treatment works (POTW) been sampled for PFAS?
- Have air strippers' emissions and stormwater from facilities with air strippers been sampled for PFAS?
- Has influent, effluent and treatment media [i.e., granular activated carbon (GAC)] associated with existing pump-and-treat groundwater remedies been sampled for PFAS?

**Step 4:** Are the actual or reasonably expected human exposures associated with the complete pathways identified in Step 3 within acceptable limits under current conditions?

RPMs should compare available data to RSLs, MCLs, state promulgated levels, and/or any associated risk-based remediation goals (RBRGs).

RPMs should ensure that available data was collected and analyzed in accordance with existing PFAS sample collection protocol and analytical methods/procedures (i.e., laboratory detection limits are below applicable RSLs and MCLs).

**Step 5:** Is the site Construction Complete, is the remedy operating as intended, and are engineering and institutional controls (if required), in place and effective?

RPMs should consider if existing CERCLA remedies are sufficient to address commingled PFAS contaminants in groundwater or other media. Examples include but are not limited to:

- Are existing LUCs adequate to prevent use of groundwater or exposure to PFAS in all media?
- Are existing remedies [e.g., GAC, reverse osmosis (RO)] effective in treating/removing comingled PFAS contaminants?
- Are modifications to existing remedies necessary to effectively treat/remove PFAS [e.g., air strippers]?

**Step 6:** Are there continuing exposures at the site?

RPMs should consider any additional information not already included under Steps 1 through 5 above.

## ***Superfund Migration of Contaminated Groundwater Under Control Worksheet***

**Step 1:** Based on the most current data on the site, has all available relevant/significant information on known and reasonably suspected releases to groundwater been considered in this EI determination?

RPMs should take into consideration site-specific PFAS data collected under stakeholder-approved UFP-QAPPs.

**Step 2:** Is groundwater known or reasonably suspected to be contaminated above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, or criteria) anywhere at or from the site?

The PFAS MCLs should be considered when updating EIs.

Similarly, state promulgated levels should also be considered when updating EI status (see [PFAS Water and Soil Values Table Excel file](#)).

Contribution from background should also be considered.

**Step 3:** Is the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within “the existing area of contaminated groundwater”) as defined by the monitoring locations designated at the time of this evaluation?

RPMs should consider:

- Has the nature and extent of groundwater PFAS contamination been sufficiently characterized and delineated?
- Are existing system(s) effectively controlling migration?

**Step 4:** Does “contaminated” groundwater discharge into surface water bodies?

RPMs should consider:

- Has the nature and extent of groundwater PFAS contamination been sufficiently characterized to determine if groundwater is discharging into surface water bodies?
- Are surface water bodies always gaining, always losing, or are there seasonal fluctuations in groundwater-surface water interactions?
- Has sufficient surface water sampling been conducted?
- Has NPDES effluent been sampled for PFAS?
- Has sufficient porewater sampling been conducted?

- Has outfall sampling been conducted?
- Do other preferential pathways for contaminant migration exist?
- Is there known discharge of non-PFAS contamination to surface water bodies?
- Is overland transport of PFAS contamination a potential concern?

**Step 5:** Can the discharge of “contaminated” groundwater into the surface water be shown to be “currently acceptable” (i.e., not cause unacceptable impacts to surface water, sediments or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented)?

RPMs should consider:

- Has sufficient surface water sampling been conducted?
- Has NPDES effluent been sampled for PFAS?
- Has sufficient porewater sampling been conducted?

**Step 6:** Will groundwater monitoring/measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that the contaminated groundwater has remained with the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater”?

RPMs should consider any additional information not already included under Steps 1 through 5 above.

## Examples

At Wright Patterson Air Force Base, located in Dayton, Ohio, EI assessments through time indicated the following statuses for each worksheet:

EI Worksheet	2005	2012	2023	2024
Long-Term Human Health Protection	Current Human Exposures Controlled (HEUC)	Current Human Exposures Controlled and Protective Remedy in Place (HEUC-HEPR)	Current Human Exposures Controlled and Protective Remedy in Place (HEUC-HEPR)	Current Human Exposures Not Controlled (HENC)
Migration of Contaminated Groundwater Under Control	Contaminated Groundwater Migration Under Control (GMUC)	Contaminated Groundwater Migration Under Control (GMUC)	Contaminated Groundwater Migration Under Control (GMUC)	Contaminated Groundwater Migration Not Under Control (GMNC)

The Long-Term Human Health Protection changed in 2024 to Current Human Exposures Not

Controlled (HENC). The justification is that data collected under the UCMR5 from on-base PWSs have PFAS detections above MCLs.

**Step 1:** Is there sufficient known and reliable information to make an evaluation on human exposure at this site? **Yes.**

**Step 2:** Have all long-term human exposure-related cleanup goals been met for the entire site? **No.**

**Step 3:** Are there complete human exposure pathways between contaminated groundwater, soil, surface water, sediment, or air media and human receptors such that exposures can be reasonably expected under current conditions? **Yes.**

**Step 4:** Are the actual or reasonably expected human exposures associated with the complete pathways identified in Step 4 within acceptable limits under current conditions? **No.**

The Ground Water Under Control also changed in 2024 to Contaminated Groundwater Migration Not Under Control (GMNC). The justification is that the migration of contaminated groundwater was not stabilized (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”) as defined by the currently designated monitoring locations. Based on site documents, groundwater concentrations at several monitoring wells, located beyond the Wright Patterson Air Force Base boundary, are above the MCLs for PFAS and volatile organic compounds.

**Step 1:** Based on the most current data on the site, has all available relevant/significant information on known and reasonably suspected releases to groundwater been considered in this EI determination? **Yes.**

**Step 2:** Is groundwater known or reasonably suspected to be contaminated above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, or criteria) anywhere at or from the site? **Yes.**

**Step 3:** Is the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within “the existing area of contaminated groundwater”) as defined by the monitoring locations designated at the time of this evaluation? **No.**

#### **Actions and Options for EPA Reviewers**

If RPMs have additional questions/concerns, please consult with regional EI coordinators or Headquarters program staff.