



Performance Measures and Environmental Indicators

Federal Facilities Restoration and Reuse Office
Environmental Protection Agency

August 8, 2024

Group Poll

What type of performance measures are important to your agency at your federal facility site?

Overview

- ❑ Performance Measures
- ❑ Environmental Indicators
 - Human Exposure (HE)
 - Migration of Contaminated Groundwater (GM)
- ❑ Other Superfund Components



[Click here for the Updated 2022 EI Guidance!](#)

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PERFORMANCE MEASURES



Government Performance and Results Act (GPRA) & GPRA Modernization Act of 2010

- ❑ Originated via 1993 GPRA Statute
- ❑ Addresses all Federal agencies
- ❑ Reform program performance by “setting program goals, measuring program performance against those goals, and reporting publicly on their progress”

Role of GPRA

- ❑ [2010 GPRMA update](#) requires each agency to develop and publish a Strategic Plan
- ❑ [EPA's Strategic Plan](#) sets the foundation of agency's planning and budgeting process and established quantifiable goals and objectives over a five-year time horizon
 - Current EPA strategic plan covers FY 2022-2026
 - Communicates the roadmap for accomplishing EPA's environmental priorities over the next four years

Superfund Performance Measures

- ❑ The Superfund Remedial program tracks [six performance measures](#) to demonstrate progress in accomplishing specific environmental results

- ❑ In EPA's annual [Congressional Justification](#), the Superfund program commits to accomplishing certain targets for these three measures:
 - ❑ Site Wide Ready for Anticipated Use (SWRAU)
 - ❑ Human Exposure Under Control (HEUC)
 - ❑ Remedial Action (RA) Project Completion



Completion of Superfund Performance Measures

| | |
|---|---|
| Remedial Site Assessments Completed (RSAC) | When there is an approved Preliminary Assessment Report. |
| Human Exposures Under Control (HEUC) | When there are no unacceptable complete exposure pathways sitewide. May be controlled with engineered barriers and/or institutional controls. |
| Sitewide Ready for Anticipated Use (SWRAU) | When all cleanup goals have been achieved so that there are no unacceptable risks. |
| Remedial Action Project Completion (RAPC) | When construction activities and final inspection are complete, and a Remedial Action Completion Report is approved. |
| Migration of Contaminated Groundwater Under Control (GMUC) | When all groundwater plumes have been delineated with ongoing monitoring, migration of contaminated groundwater is stable, and there are no unacceptable discharges to surface water. |
| Construction Completion (CC) | When all remedies sitewide documented in site decision documents have completed physical construction, have had a pre-final inspection and a Preliminary Close Out Report. |

EPA Tracking of Performance Measures

- ❑ EPA planning information and targets are tracked in the Superfund Enterprise Management System (SEMS)
 - Source of Superfund site activity data, records and support documentation for the agency
 - Program staff and managers plan and track program activities and resource planning information
 - Regional and Headquarters staff monitor progress each region is making towards achieving annual performance goals described in the Strategic Plan



Superfund Human Exposure Dashboard

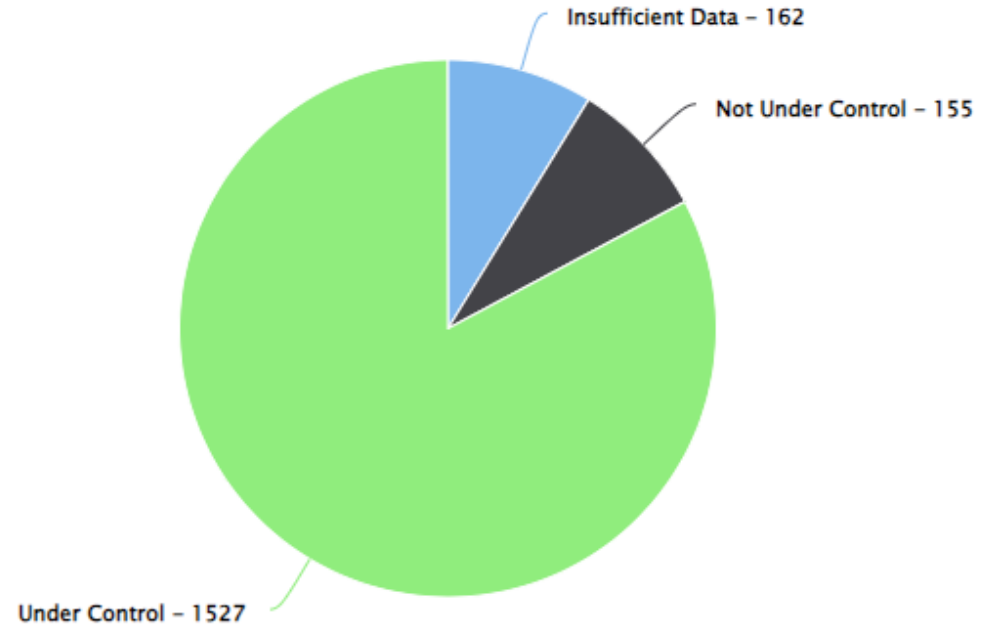
-
Provides public
access to risk
information

<https://www.epa.gov/superfund/superfund-human-exposure-dashboard>

National Overview

For final and deleted National Priorities List sites as well as Superfund Alternative Approach sites

Human Exposure Environmental Indicator Status



| Under Control | Insufficient Data | Not Under Control |
|---------------|-------------------|-------------------|
| 1,527 | 162 | 155 |

Notes:

Pie chart data exclude 4 sites where EPA is working to make a Human Exposure status determination.

Pie chart data exclude 34 Proposed, 5 Final, and 9 Deleted sites that are not in the Environmental Indicator baseline.

Data as of 08-06-2024 09:00.

Site-Specific Status Reports

Filter table by:

Dashboard filter features allow users to focus on items of interest

- Types of HE status
- Federal Facility versus Private Sites
- EPA Region

Human exposure status

[Select all / Unselect all](#)

- Under control
- Not under control
- Insufficient data
- Not yet designated

Federal Facility status

- Non-Federal
- Federal

Region

[Select all / Unselect all](#)

- Region 1
- Region 2
- Region 3
- Region 4
- Region 5
- Region 6
- Region 7
- Region 8
- Region 9
- Region 10

Human Exposure Status Table

| Site Name | Region | City | State | Federal Facility Status | NPL Status | Human Exposure Status |
|--|--------|----------------|-------------|-------------------------|-------------------|-----------------------------------|
| ATLANTIC FLEET WEAPONS TRAINING AREA | 2 | VIEQUES | Puerto Rico | Federal | Final | Not under control |
| MCGUIRE AIR FORCE BASE #1 | 2 | WRIGHTSTOWN | New Jersey | Federal | Final | Insufficient data |
| FORT DETRICK AREA B GROUND WATER | 3 | FORT DETRICK | Maryland | Federal | Final | Insufficient data |
| CURTIS BAY COAST GUARD YARD | 3 | BALTIMORE | Maryland | Federal | Final | Insufficient data |
| NASA WALLOPS FLIGHT FACILITY | 3 | WALLOPS ISLAND | Virginia | Federal | Non-NPL; SAA Site | Insufficient data |

| | | | | | | |
|---|---|-------------|------------|---------|-------|-----------------------------------|
| MCGUIRE AIR FORCE BASE #1 | 2 | WRIGHTSTOWN | New Jersey | Federal | Final | Insufficient data |
|---|---|-------------|------------|---------|-------|-----------------------------------|

Human Exposure Status Description

As of April 2022, there is insufficient information to determine the site-wide Human Exposure status at the McGuire Air Force Base Superfund Site. Currently, the Air Force is performing nine Remedial Investigations at 37 sites across the base, to identify the nature and extent of contamination. The media of concern are soil, groundwater, surface water and sediment. Contaminants detected in samples collected at the sites include VOCs, SVOCs, PCBs and inorganics. Emerging contaminants include PFAS compounds and 1,4-dioxane. The potential pathways of concern are associated with incidental inhalation and dermal contact with contaminated soil to a potential future resident and/or recreationalist. McGuire AFB, however, is an active federal facility, and as such, the Air Force maintains security and restricts access throughout the base.

EPA ensures community participation throughout the remedial process by participating in quarterly Restoration Advisory Board meetings with residents and affected stakeholders, issuing public notices and updating fact sheets. A site profile has been established on the EPA website to keep the community informed of recent progress at the site. Additionally, an EPA Community Involvement Coordinator is assigned to the site and can address specific community concerns as they arise.

Human Exposure Status for “Not Under Control” and “Insufficient Data” includes a status description



ENVIRONMENTAL INDICATORS - HUMAN EXPOSURE (HE) EVALUATIONS

Human Exposure Determination Categories

| | |
|--|---|
| HEID | Insufficient data to determine human exposure control status |
| HENC | Current human exposure not under control |
| HEUC | Current human exposure under control |
| HEPR* | Current human exposure under control and protective remedy or remedies in place |
| HHPA* | Current human exposure under control and long-term human health protection achieved |
| *needs to be met to be sufficient for Sitewide Ready for Anticipated Use (SWRAU) | |

See Table 2 in [2022 EI Guidance](#)

Insufficient Data to Determine Human Exposure (HEID)

- Site lacks enough information to determine whether people are exposed to contamination
 - Typically, all potential exposure pathways are not yet identified
- May also apply to sites where new information calls into question a potential new exposure pathway or the effectiveness of the remedy
- Important to identify a date when sufficient data will be collected to make a determination

Human Exposure Under Control (HEUC)

- ❑ HEUC is both a status and an EPA performance measure
 - Bringing a site's status to "under control" counts towards the HEUC performance measure
- ❑ For a site to be considered "HEUC":
 - Sufficient data/information are available to support the evaluation,
 - There are *currently* no completed or reasonably anticipated human exposure pathways, and...
 - Any existing pathways do not pose an unacceptable exposure based on site-specific risk criteria.
- ❑ Site may not yet have a Construction Completion status or achieved all human exposure related cleanup goals.

Apply Your Understanding – Scenario 1

- ❑ Soil and groundwater samples have been collected at **Superfund Site X** as part of the remedial investigation. The baseline human health risk assessment has been completed, and there are currently no unacceptable human exposure pathways.

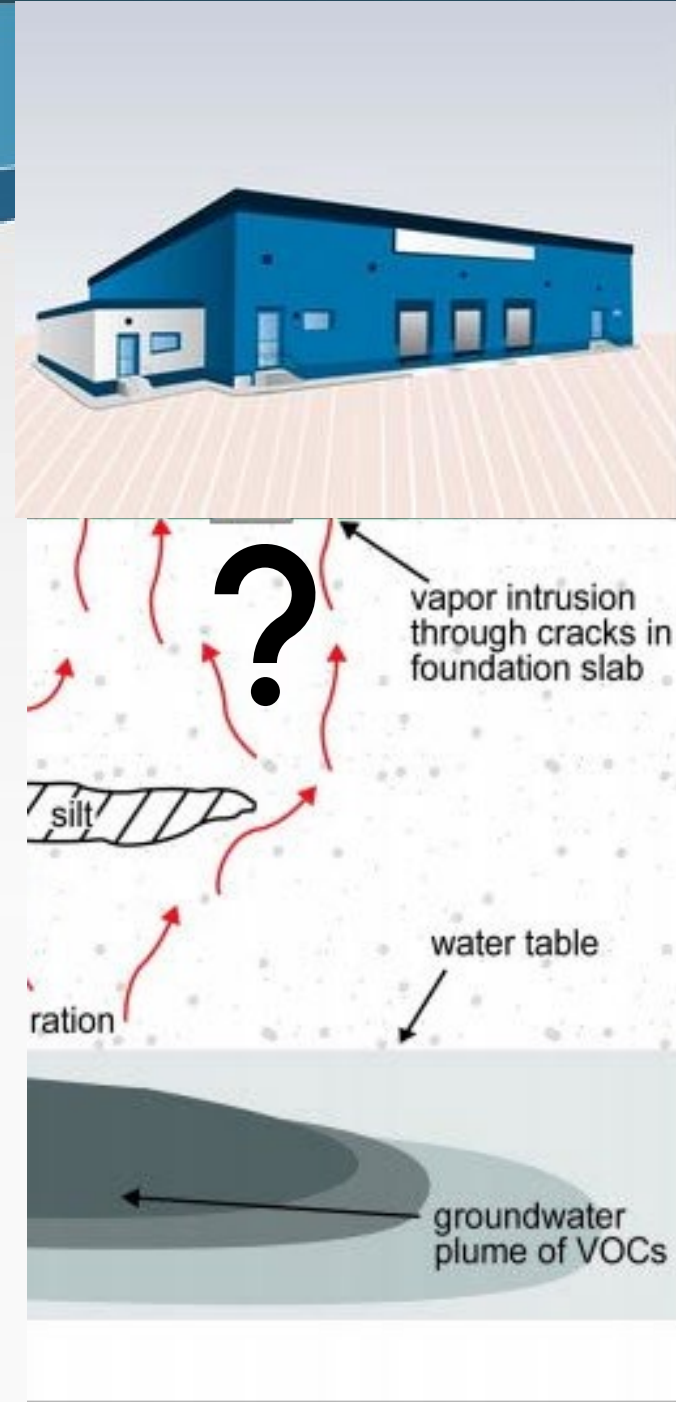
1. What is your Human Exposure status determination?



Apply Your Understanding – Scenario 2

More recent data suggests that vapor intrusion may be occurring in onsite buildings, but it is unclear if contaminant concentrations will result in unacceptable human exposures. There is not yet data on concentrations of contamination through vapor intrusion.

2. What is your updated Human Exposure status?



Current Human Exposure Not Under Control (HENC)

- ❑ Site data indicates that unacceptable exposure pathways are present and have not yet been controlled, mitigated or eliminated
 - Typically includes sites where response actions are underway but are not yet complete.
- ❑ At a site with multiple operable units (OUs), a single pathway can keep the site-wide status as “not under control”
- ❑ Important to identify a date when human exposures will be brought under control

Apply Your Understanding

- ❑ **Superfund Site Y** was determined to have unacceptable levels of groundwater contamination, impacting the local drinking water supply. In response, bottled water is being provided to all impacted residents. No other exposure pathways have been identified. A groundwater remedy has not yet been selected or implemented.

What is the Human Exposure status?



Current Human Exposure Under Control and All Protective Remedy(ies) in Place (HEPR)

- ❑ Data indicate that there are currently no unacceptable complete human exposure pathways and site is under control sitewide
- ❑ All physical construction is complete (CC), systems are operating as intended, and institutional controls are in place and effective.

Sufficient
for
SWRAU

Current Human Exposure Under Control and Long-term Human Health Protection Achieved (HHPA)

- ❑ All physical construction is complete (CC) and institutional controls are in place and effective.
- ❑ All human-exposure related cleanups goals have been achieved here are no on-going
 - ❑ Ex., soil, groundwater or surface water restoration remedies have achieved restoration levels.

Sufficient
for
SWRAU

Examples of Each Human Exposure Status

HEUC

Supply drinking water to people impacted by contaminated groundwater



HHPR

Construct an effective drinking water treatment system



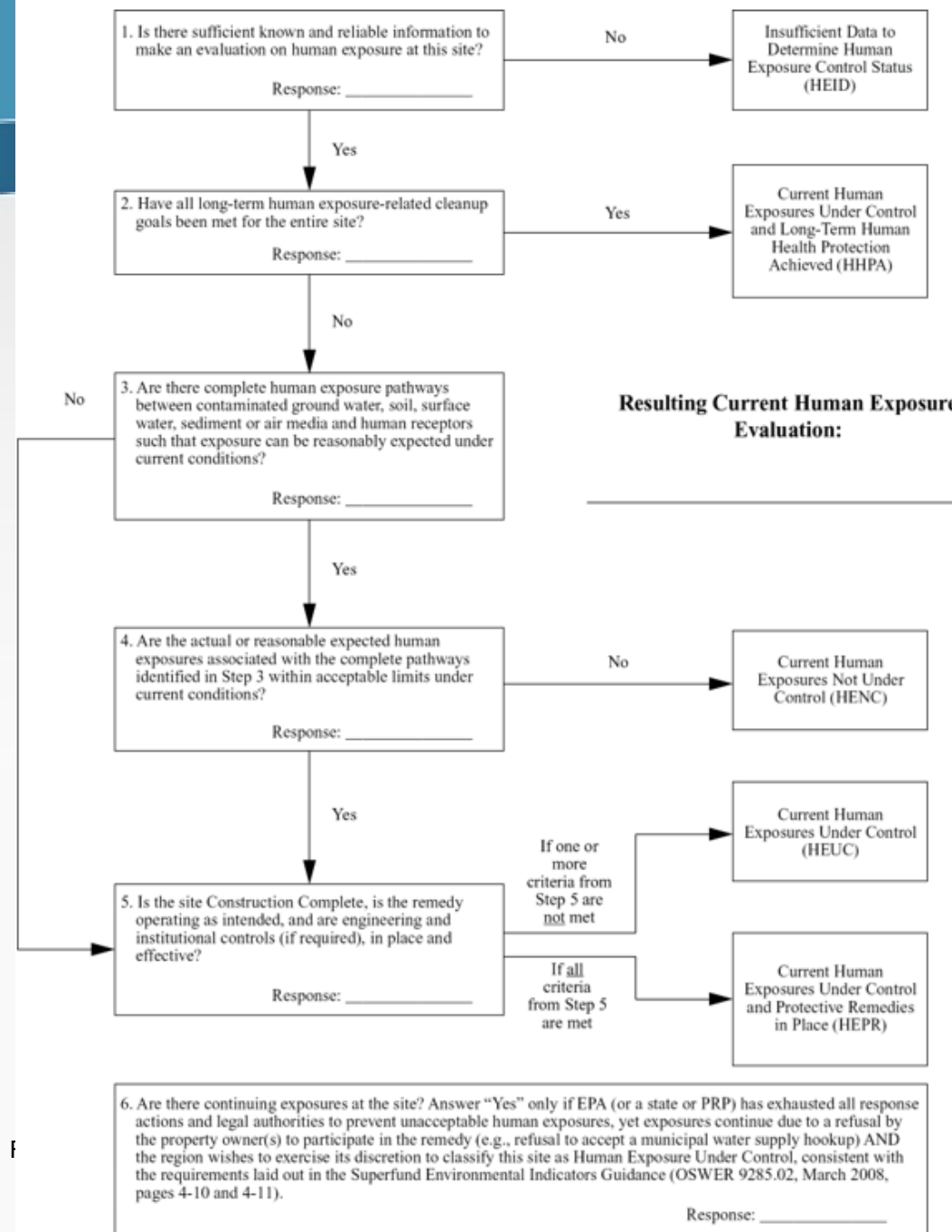
HHPA

All contaminated groundwater restoration levels met



Superfund Human Exposure Under Control Worksheet

Exhibit 1: Superfund Human Exposure Evaluation Flowchart

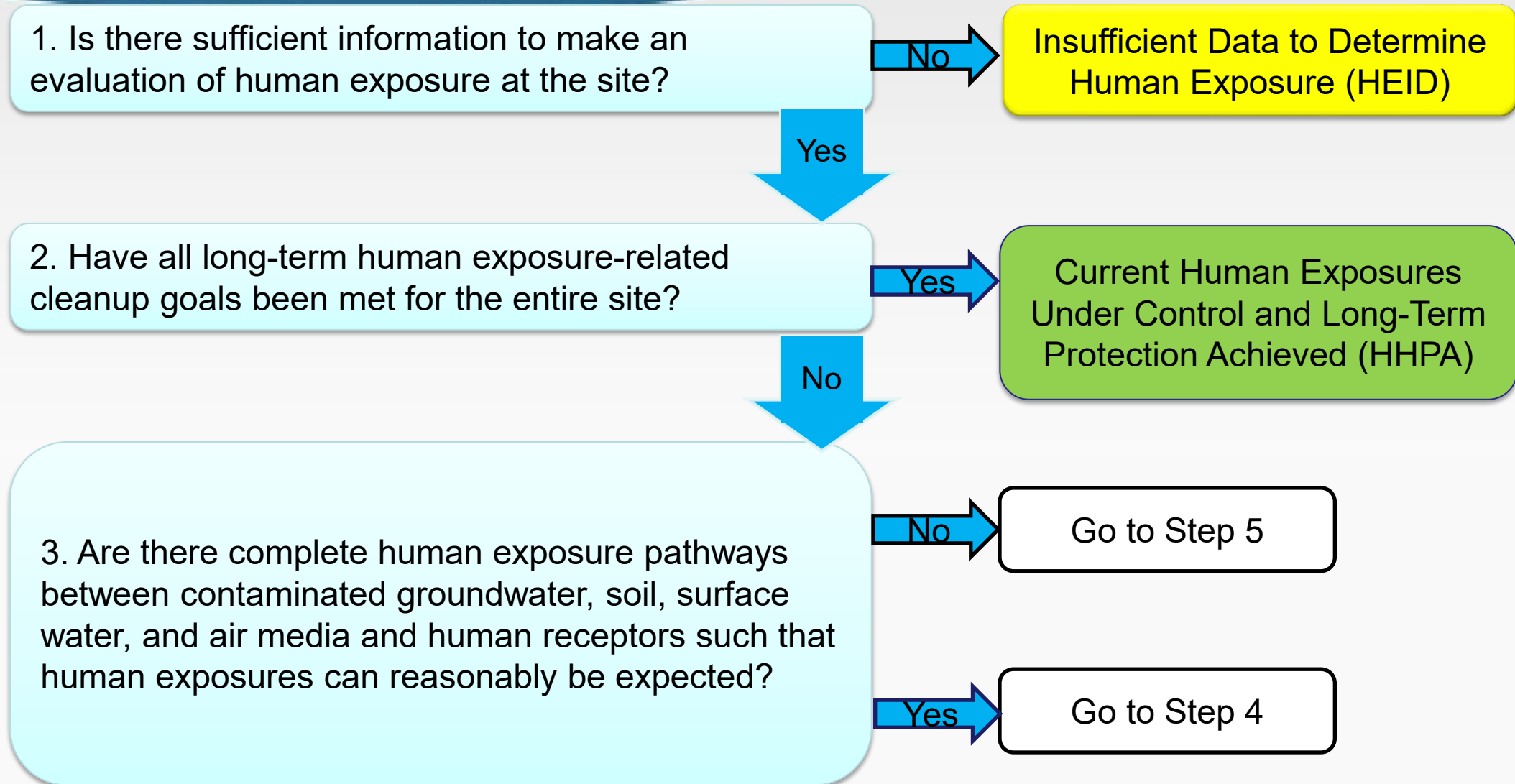


Human Exposure Documentation List

| Question | Documentation |
|-------------------------------|--|
| Is there sufficient data? | <ul style="list-style-type: none"> • Human Health Risk Assessment(s) • RI/FS reports • Removal Action Memoranda • Site Assessment Reports • Site Investigation reports (Federal Facility (FF) sites) • Expanded Site Investigations (FF sites) |
| All long-term goals met? | <ul style="list-style-type: none"> • Final Close-Out Reports (FCORs) Decision documents: <ul style="list-style-type: none"> ○ Records of Decision (RODs) ○ ROD Amendments ○ Explanation of Significant Differences (ESDs) ○ Early RODs ○ Interim RODs ○ Removal Action Memoranda • RA Reports • Ground/surface water monitoring reports • Deletion Notices • Five-Year Reviews (FYRs) |
| Are there completed pathways? | <ul style="list-style-type: none"> • Human Health Risk Assessment(s) <ul style="list-style-type: none"> ○ Conceptual Site Model (CSM) • RI/FS reports |
| Are exposures acceptable? | <ul style="list-style-type: none"> • Human Health Risk Assessment(s) • POLREPS • RA Project Reports |
| Is the site CC, etc.? | <ul style="list-style-type: none"> • Close-out reports (preliminary or final) • Five-Year Reviews (FYRs) |

Table 3: Appropriate Data/Information Sources from 2022 EI Guidance

Human Exposure Worksheet Summary



Human Exposure Worksheet Summary

4. Are there actual or reasonably anticipated human exposures associated with the complete pathways identified in Step 3 within acceptable limits under current conditions?

No

Human Exposures Not Under Control (HENC)

Yes

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

If one or more of Step 5 criteria are not met

No

Current Human Exposures Under Control (HEUC)

Yes

If all Step 5 criteria are met

Current Human Exposures Under Control and Protective Remedies in Place (HEPR)

6. Are there continuing exposures at the site? Answer "Yes" only if all response actions have been exhausted and exposures continue due to refusal by property owners AND the EPA Region wants to classify site as Human Exposure Under Control.

Current Human Exposures Under Control (HEUC)

CASE STUDY – PART 1

Emerging Contaminant Exercise: Group Poll

Which of the following emerging contaminant situations have you dealt with at a site?

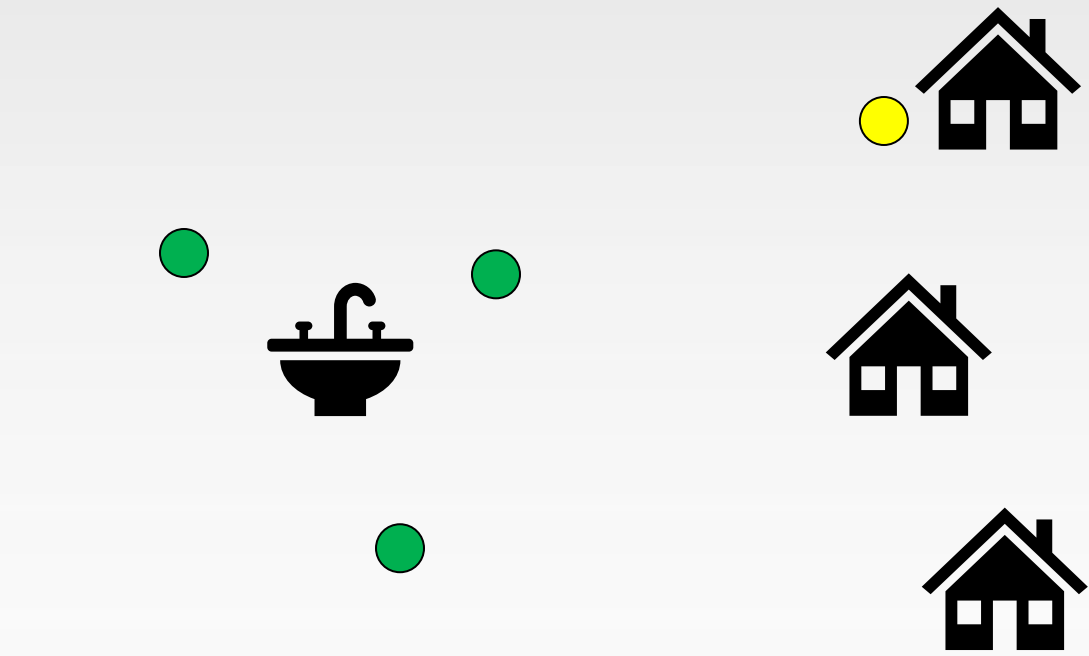
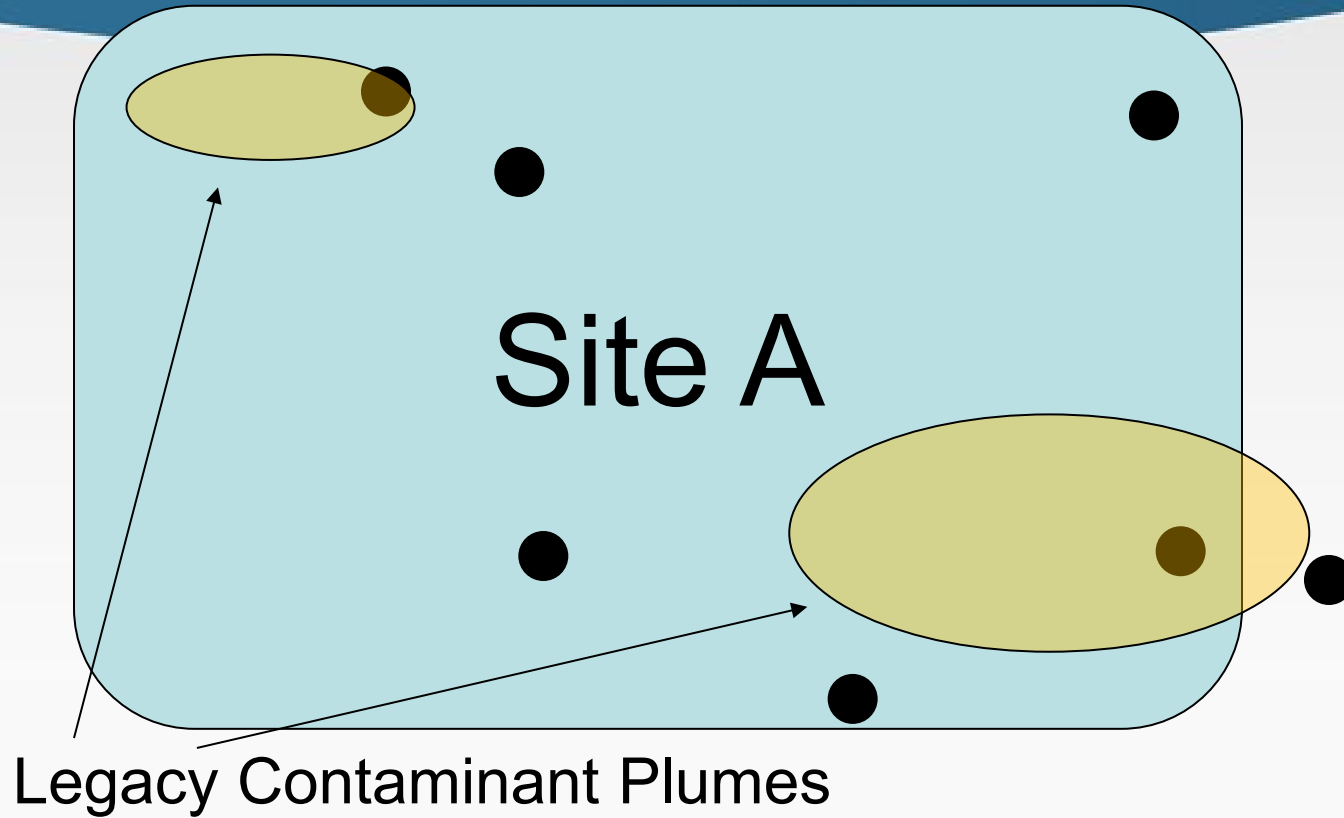
- A. Situation is unknown as the emerging contaminant has never been included in sampling.
- B. The emerging contaminant is in monitoring wells but not sure if it has reached surface water or drinking water
- C. The emerging contaminant is in drinking water wells or reaching surface water
- D. None of the above

Exercise: Emerging Contaminants

- ❑ A remedial action to address soil and groundwater contamination at ***Superfund Site A*** has been implemented.
 - COCs: include hexavalent chromium and TCE
 - Remedy: soil removal, pump-and-treat (air stripping) of groundwater plumes contaminated over risk-based levels
 - Last EI determination was Human Exposures Under Control

- ❑ It was recently determined that there was historical use of PFAS in metal plating at the site
 - Monitoring wells were sampled and PFAS was detected
 - Public water system was sampled and PFAS was not detected

Exercise: Emerging Contaminants




Groundwater Flow

- Monitoring Well
- Public Drinking Water Supply Well
- Private Drinking Water Well

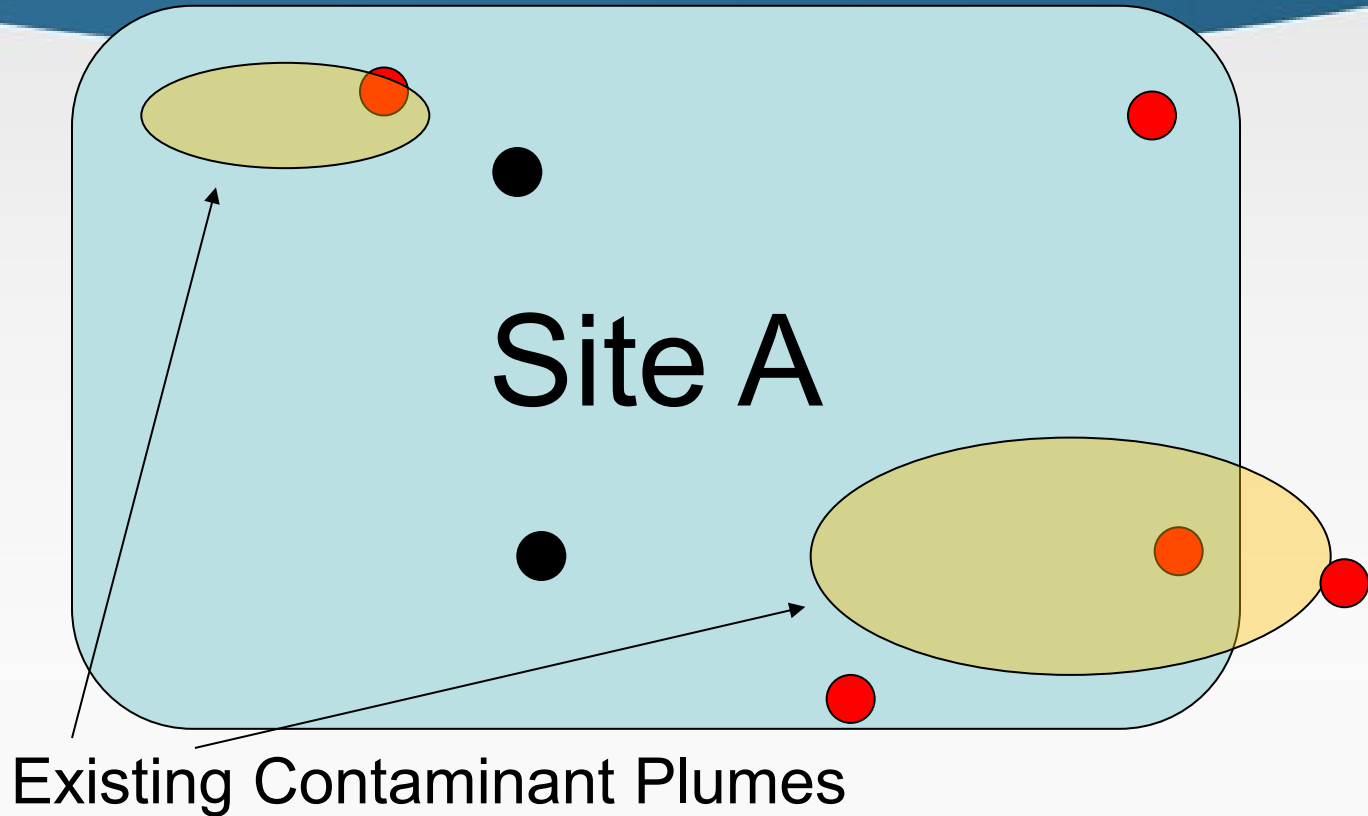
What Human Exposure EI Determination applies in this example?

- A. Keep HEUC (under control) status until data is collected
- B. Select HEID (Insufficient data)
- C. Select HENC (human exposure not under control)

Exercise: Emerging Contaminants Continued

- One year later, you are making your annual EI determination.
- Sampling data shows PFAS levels are increasing in some monitoring wells
- One public well has detected PFAS, but it PFAS has not been detected in the public water supply
- No data yet from private drinking water wells

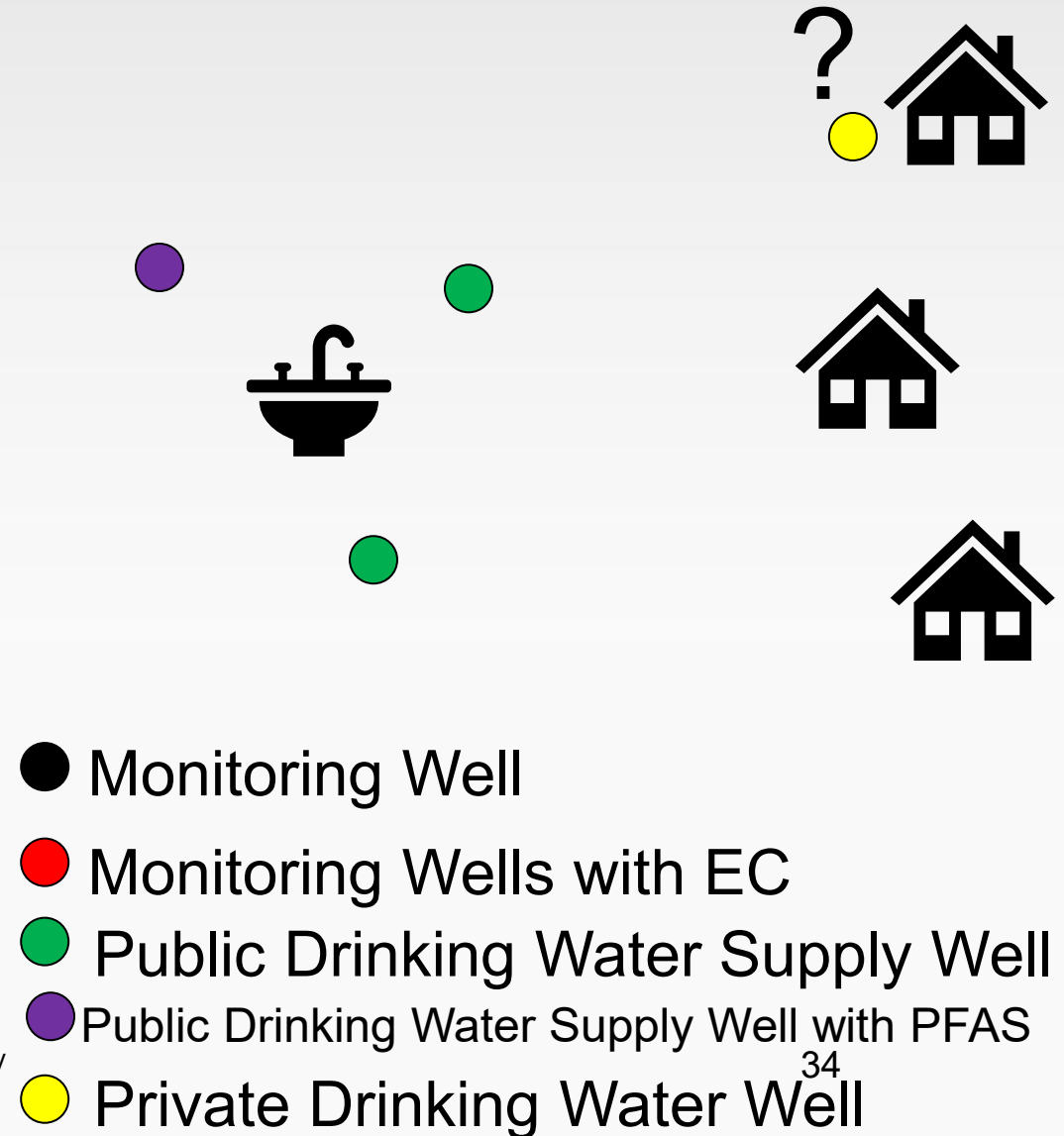
Exercise: Emerging Contaminants



Existing Contaminant Plumes



Groundwater Flow



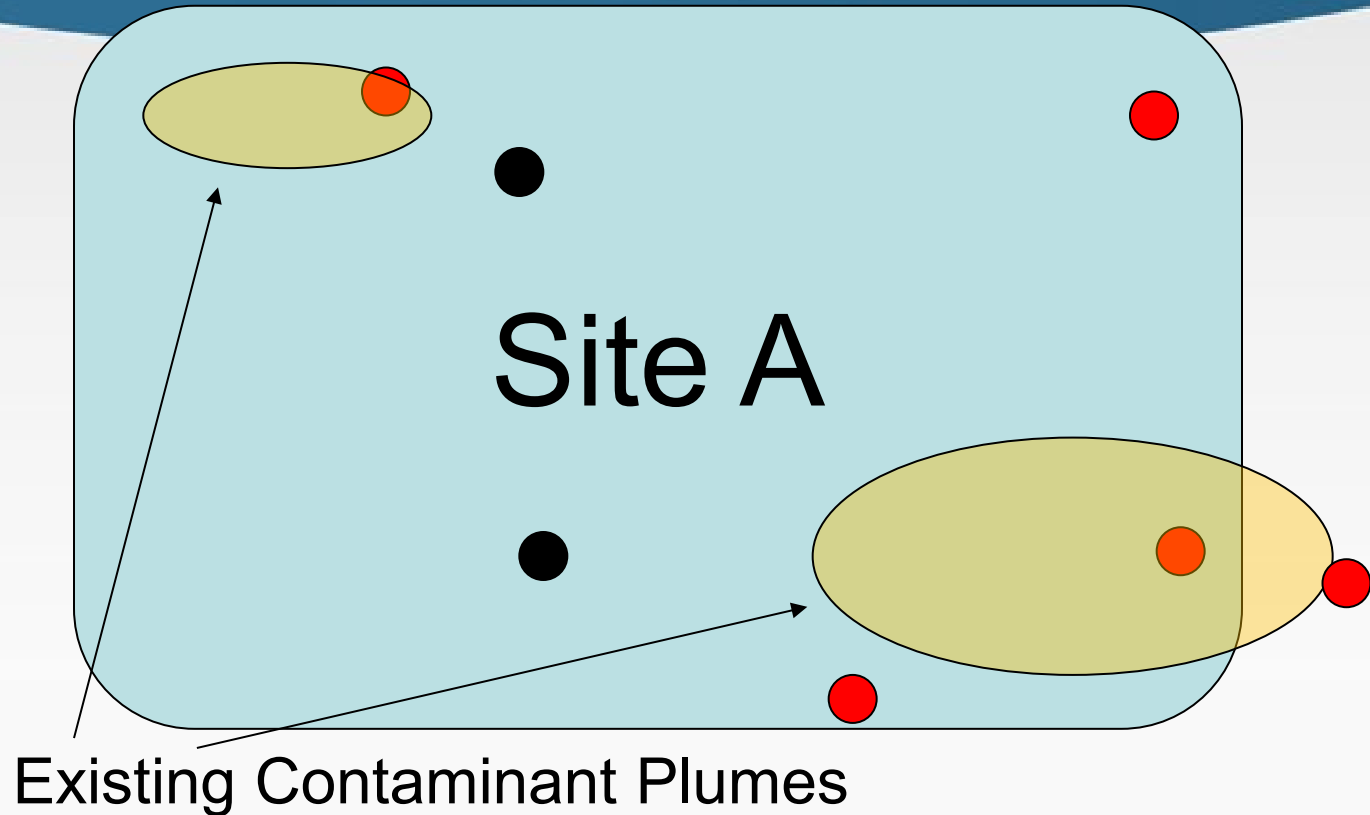
What Human Exposure EI Determination applies in this example?

- A. Keep HEUC (under control) status until data is collected
- B. Select HEID (Insufficient data)
- C. Select HENC (human exposure not under control)

Exercise: Emerging Contaminants Continued

- Another year later, you are making your annual EI determination.
- Sampling data shows emerging contaminants above the maximum contaminant level (MCL) in some public drinking water supply wells
- No sampling has been conducted to date at the private well
- It seems there is likely an unacceptable risk for human exposures based on the contaminants present

Exercise: Emerging Contaminants



Drinking Water Wells with EC above MCL



- Monitoring Well
- Monitoring Wells with EC
- Public Drinking Water Supply Well
- Private Drinking Water Well
- Drinking Water Wells with EC above MCLs

Groundwater Flow

What EI Determination Applies in this example?

- A. Keep HEUC (under control) status until data is collected
- B. Select HEID (Insufficient data)
- C. Select HENC (human exposure not under control)

CASE STUDY – PART 2



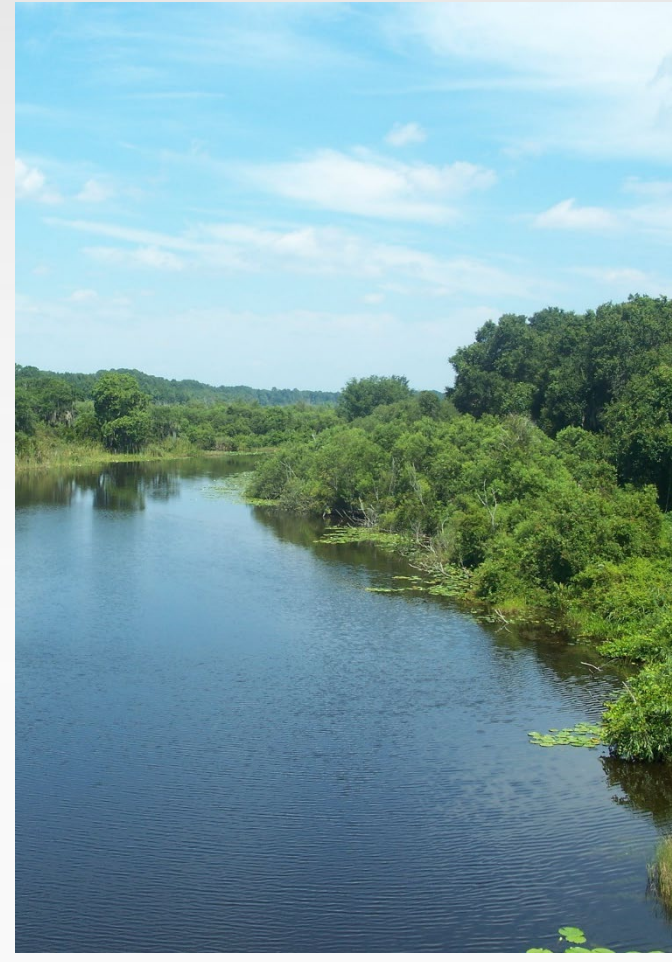
ENVIRONMENTAL INDICATORS GROUNDWATER MIGRATION DETERMINATIONS

Migration of Contaminated Ground Water Under Control Environmental Indicator

- Typically documents whether ground water contamination is below protective, risk-based levels, or, if not, whether the migration of contaminated ground water is **stabilized** and there is **no unacceptable discharge to surface water** and monitoring will be conducted to confirm that affected ground water remains in the original area of contamination.

Apply Your Understanding

- ❑ **Superfund Site Z** has contaminated groundwater above acceptable risk levels. A pump-and-treat remedy has been selected and treatment is ongoing. The remedy has been effective to date.
- ❑ Institutional controls are in place and effective. Recent data confirms no surface discharge to impacted water bodies is occurring.
 - Is Groundwater Migration Under Control?



Groundwater Migration Determination Categories

| | |
|------|--|
| GMNA | Site currently does not have contaminated groundwater or site conditions did not warrant investigation or remediation of groundwater contamination in the past |
| GMID | Insufficient Data to determine contaminated groundwater migration control status |
| GMNC | Contaminated Groundwater Migration Not Under Control |
| GMUC | Contaminated Groundwater Migration Under Control |

See Section 4.1 of 2022 EI Guidance

Groundwater Migration Under Control

- Sufficient information exists to make a determination (all plumes are delineated)
- Plumes are not expanding
- There are no unacceptable groundwater discharges to surface water



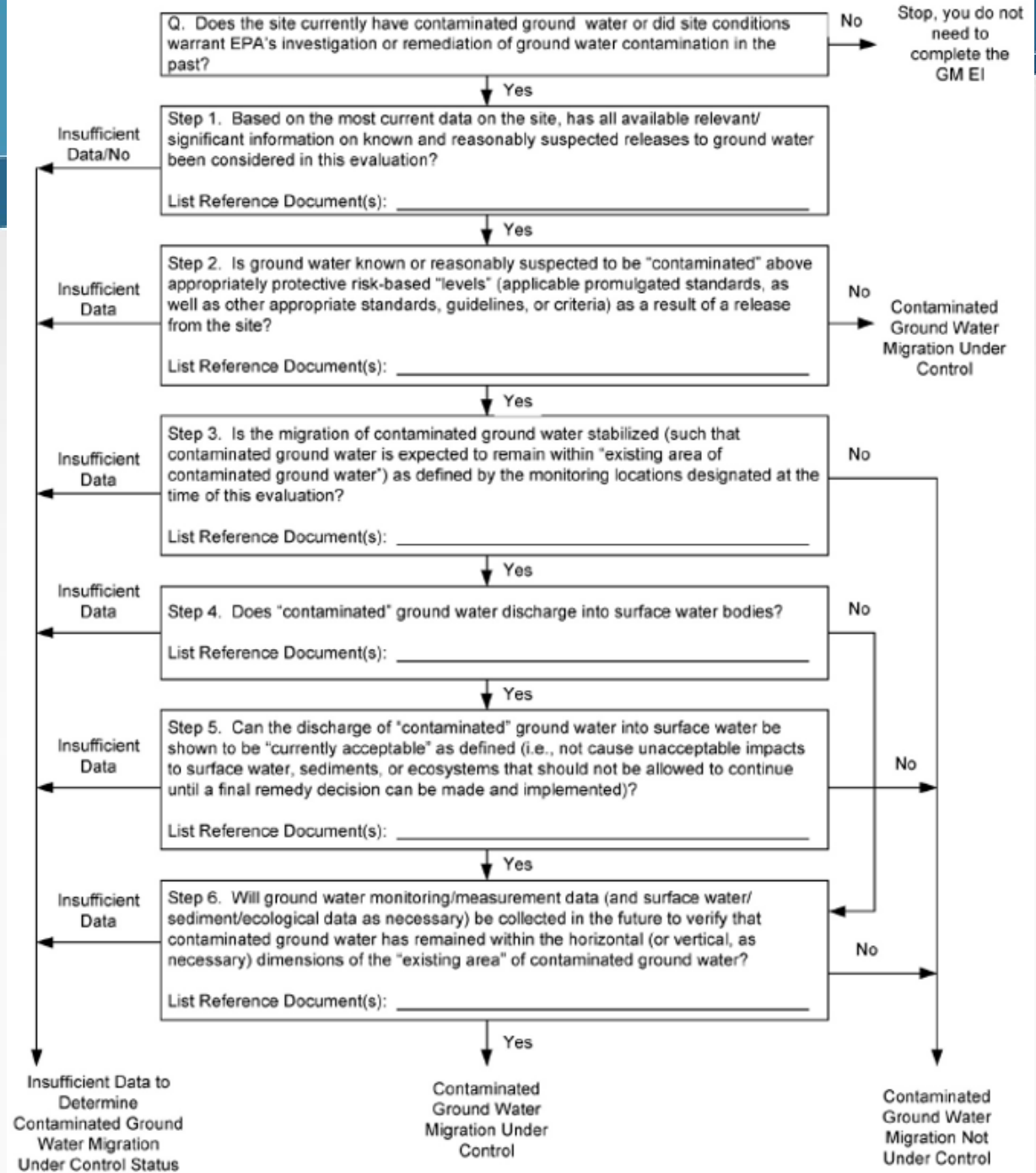
Groundwater Migration Evaluation



- Evaluate sitewide, looking at distinct plumes
- Based on existing plume boundaries, not facility boundaries
- Monitored Natural Attenuation may be used to verify that contaminated groundwater migration is under control
- Evaluate groundwater discharge to surface water

Superfund Groundwater Migration Worksheet

Exhibit 4. Migration of Contaminated Groundwater Worksheet



OTHER SUPERFUND COMPONENTS

Other Superfund Components

- ❑ A change in an EI status can impact other determinations and vice versa as they are interrelated
 - Five-Year Reviews (FYRs)
 - Risks to Human Health
 - Sitewide Ready for Anticipated Use (SWRAU)



Five-Year Reviews

- ❑ New information can be discovered during the five-year review process
 - New exposure pathway(s)
 - New source(s) of contamination
 - Emerging contaminant(s)
 - Evidence (or uncertainty) of groundwater plume migration
- ❑ This can affect whether the remedy is functioning as intended and any protectiveness determinations



Evaluating Risks to Human Health

- May be possible to have EIs under control before a remedy is fully implemented
- Human Exposure does not consider ecological risk
- Deleted NPL sites must continue to be evaluated for EIs



SITE-WIDE READY FOR ANTICIPATED USE (SWRAU) Requirements

SWRAU sites are final and deleted NPL sites and SAA sites where the **entire site** meets these conditions:

- Site is **Construction Complete (CC)**
- **All institutional or other engineering controls** required in the ROD or other remedy decision document(s) have been put **in place**
- **Human Exposure Under Control Environmental Indicators** of Current Human Exposures Controlled and Protective Remedy in Place (**HEPR**) or Long-Term Human Health Protection Achieved (**HHPA**)

Human Exposure Status Sufficient for SWRAU

- ❑ SWRAU must meet one of the following conditions:
 - Current human exposure under control and protective remedy or remedies in place (HEPR)
 - Current human exposure under control and long-term human health protection achieved (HHPA)

| Human Exposure Status Required to Achieve SWRAU | |
|---|--------------------------|
| HEID HENC HEUC | Not sufficient for SWRAU |
| HEPR HHPA | Sufficient for SWRAU |

Retraction of SWRAU Status

- ❑ A SWRAU designation may be retracted if site conditions change, or if new or additional information is discovered regarding the contamination or the protectiveness of the remedy at the site.
 - For example, a Five-Year Review finds a new complete exposure pathway which changes the site's EI status from HEUC to HENC, also impacting it's SWRAU determination.



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Summary

- ❑ EIs are designed to communicate the tangible progress made in protecting human health and the environment
- ❑ Remember that a change in EI status can impact other program measures (e.g., SWRAU) and that other program components may impact EIs (FYRs)
- ❑ The HEUC, SWRAU, and RAPC measures are reported to Congress, but the Superfund program [tracks six performance measures on its website](#)
- ❑ Use the tools and resources available when determining EIs for your sites and work with your project teams and EI coordinator



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Questions

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BACK UP SLIDES

General Template for Sites with an HE Evaluation of Not Under Control

- “As of [*month*] [*year*], the [*insert site name*] Superfund site is considered “Current Human Exposure Not Under Control” (HENC). [*Insert a detailed description of all pathways and contaminants of concern, which media and/or OUs are impacted, and whether there are known exposures occurring or if they can be reasonably anticipated instead*]. This exposure pathway is considered unacceptable based on EPA risk-based criteria because [*as appropriate, insert concentration level, cancer-risk range details, and/or other data used to make the HENC evaluation as well as information sources used*]”.
- “Currently, the planned activities to address this pathway are [*detail the actions planned but not taken to control human exposure, including any planned removal actions and the remedy as outlined in the ROD, if available*]. If you are impacted by risks inherent at this site, [*insert ways in which individuals can reduce their exposure risk, coordinate with the Community Involvement Coordinator for details*]. EPA (*or state, or PRP or Federal Agency as appropriate*) currently anticipates that human exposure will be under control by [*HEUC date in SEMS from last regional review date*] because [*provide reasoning for planned HEUC date in SEMS*]”.

General Template for Longer Term Cleanups with a HE Evaluation of Insufficient Data Due to a Newly Identified Exposure Pathway and/or Contaminant(s):

- “As of [*month*] [*year*], the [*insert site name*] Superfund site is considered “Insufficient Data to make a Human Exposure evaluation” (HEID) because of a newly identified exposure pathway and/or contaminant(s) [*insert a detailed description of the human exposure pathway of concern, include the contaminants of concern and media*]. The site was previously categorized as [*HENC, HEUC, spell out acronym, discuss the remedy and its protectiveness and whether the new pathway impacts that remedy (if site was HEUC), or, if site was HENC, what new information calls into question the evaluation and how that information relates to the previously defined risks*].
- “EPA uses this Human Exposure status when there is a lack of evidence to suggest that actual or reasonably anticipated human exposures are occurring, and that those exposures are above acceptable risk-based levels. The planned activities to collect sufficient information to evaluate this new exposure pathway and/or contaminants(s) are [*insert a detailed summary of what data will be collected and how, whether through a Human Health Risk Assessment (HHRA) or information about the human interactions with contaminated media. Discuss Operable Units and/or media that samples will be collected on, and exposure pathways to be investigated*]. EPA (*or state, or PRP or Federal Agency as appropriate*) currently anticipates that there will be sufficient data to make a Human Exposure evaluation by [*SDD date in SEMS from last regional review date*] because [*provide reasoning for planned SDD date in SEMS*]”.