



**NARPM Presents....**  
**Performance Measures and**  
**Environmental Indicators**

Office of Superfund Remediation and Technology Innovation  
Federal Facilities Restoration and Reuse Office  
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# Overview

- ❑ Performance Measures and Targets
- ❑ Environmental Indicators
  - Human Exposure
  - Groundwater Migration
- ❑ Other CERCLA Components
- ❑ Guidance and Tools



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# Performance Measures and Targets

- ❑ National Program Guidance (NPG) Measures
  - ❑ Formerly "ACS" or GPRA measures
  
- ❑ Planning Targets and Measures in SEMS
  
- ❑ Superfund Environmental Indicators





# 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 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
  - The current EPA strategic plan covers FY 2018-2022
  - The Superfund program supports Goal 1, Objective 1.3: "Revitalize Land and Prevent Contamination"



## Superfund Performance Measures

- The Superfund Remedial program tracks six performance measures to demonstrate progress in accomplishing specific environmental results
- Measures are reported to Congress
- Each year, through EPA's Congressional Justification, the Superfund program commits to accomplishing these measures



# Superfund Performance Measures

<b>Remedial Site Assessments Completed</b>	A site assessment is considered complete when EPA approves the Preliminary Assessment Report.
<b>Human Exposures Under Control (HEUC)</b>	Current human exposure is considered to be under control when assessments for human exposure indicate there are no unacceptable complete exposure pathways sitewide. Exposure pathways may be controlled with engineered barriers and/or institutional controls.
<b>Sitewide Ready for Anticipated Use (SWRAU)</b>	This is achieved when all cleanup goals in the Record(s) of Decision or other remedy decision document(s) have been achieved for media that may affect current and reasonably anticipated future land uses of the site, so that there are no unacceptable risks.
<b>Remedial Action Project Completion</b>	A Remedial Action (RA) project is complete when the construction activities and final inspection are complete, and a RA Completion Report is approved.
<b>Groundwater Migration Under Control (GMUC)</b>	Contaminated Groundwater Migration is considered to be under control 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.
<b>Construction Completion (CC)</b>	A Construction Completion (CC) is achieved 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 has been approved by EPA.



## Authoritative Data Source - SEMS

- ❑ 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 Task Force (SFTF)

- ❑ Established in May 2017 to develop recommendations to expedite cleanup and remediation, among other goals
- ❑ [July 2017 SFTF Report](#) Recommendation 1:
  - “Target NPL Sites That Are Not Showing Sufficient Progress Towards Site Cleanup and Completion,”
  - “Determine any site where human exposure is not under control and prioritize effecting control.”



# Addressing Human Exposure Task Force Recommendation 1

Fall 2017

- Identified sites with human exposures not under control and actions to bring sites under control

Jan. 2018

- Launched the public EI Human Exposure Dashboard

April 2018

- Created an EI Best Management Practices document

July 2018

- Reviewed sites estimated to become under control between FY19 - FY23 to determine what can be done to accelerate timelines



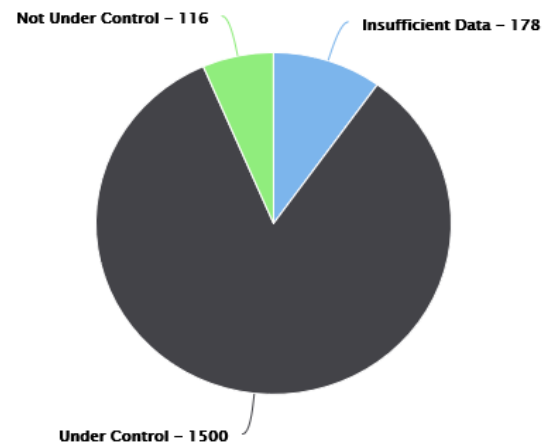
# Superfund Human Exposure Dashboard

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## 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
1,500	178	116

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



# Superfund Human Exposure Dashboard

Showing 1 to 5 of 1,794 entries Search:

### Human Exposure Status Table

Site Name	Region	City	State	Federal Facility Status	NPL Status	Human Exposure Status
<a href="#">BJAT LLC</a>	1	FRANKLIN	MA	Non-Federal	Final	<a href="#">Insufficient data</a>
<a href="#">KEDDY MILL</a>	1	WINDHAM	ME	Non-Federal	Final	<a href="#">Insufficient data</a>

**Human Exposure Status Description**  
As of January 2018, there is insufficient information available to make a site-wide Human Exposure Control determination for the Keddy Mill Superfund site. The Keddy Mill Superfund site was added to the National Priorities List (NPL) in May 2014. EPA initiated Remedial Investigation

Dashboard shows current Human Exposure status and a brief description for sites designated Not Under Control or where there is Insufficient Data to make a determination

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



## Environmental Indicators (EIs)

- Designed to communicate the tangible progress made in protecting human health and the environment
- Focus on bringing human exposure and contaminated groundwater migration under control
- Both EIs are sitewide measures



## Human Exposure Determinations

- ❑ Current Human Exposure is under control (HEUC) when:
  - Sufficient information exists to make a determination
  - There are currently no unacceptable complete exposure pathways
  
- ❑ Consideration of new information
  - New information on exposure pathways or contaminant sources may change a status from “under control” to “not under control”



## 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 eligible for SWRAU	

See Table 4-1 of EI Guidance  
([EI Guidance Human Exposure Revisions](#))



# Insufficient Data to Determine Human Exposure (HEID)

- ❑ Site lacks enough information to determine whether people have the potential to be 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
  
- ❑ Important to identify a date when sufficient data will be collected to make a determination



## Apply Your Understanding

- ❑ Soil and groundwater samples have been collected at **Superfund Site X** as part of the remedial investigation. Data suggests there are no existing pathways for human exposure.
  - What is your Human Exposure status determination?
  
- ❑ More recent data suggests that vapor intrusion may be occurring in onsite buildings.
  - 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 OUs, a single OU can keep the site's 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. 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 implemented.
  - Is Human Exposure Under Control?





## Current Human Exposure Under Control (HEUC)

- Assessments indicate there are currently no unacceptable complete human exposure pathways
- Site is under control for current conditions sitewide
- Site has not yet attained Construction Completion status since cleanup levels have yet to be achieved



# 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, systems are operating as intended, and institutional controls are in place and effective.



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

- Data indicate that there are no unacceptable complete human exposure pathways and site is under control sitewide
- All physical construction is complete and institutional controls are in place and effective.
- There are no on-going soil, groundwater or surface water restoration remedies and the site has achieved soil, groundwater and surface water restoration levels.



# Migration of Contaminated Ground Water 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

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- **Superfund Site Z** has contaminated groundwater above acceptable risk levels. A pump-and-treat remedy has been selected and treatment is ongoing.
- 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 ground water or site conditions did not warrant investigation or remediation of groundwater contamination in the past
GMID	Insufficient Data to determine contaminated ground water migration control status
GMNC	Contaminated Ground Water Migration Not Under Control
GMUC	Contaminated Ground Water Migration Under Control

See Section 5.1 of EI Guidance  
([EI Guidance Human Exposure Revisions](#))

# 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





## EI Best Management Practices

- Periodic Management Focus on EIs
- Consideration of Human Exposure Status in the Prioritization of Site Work
- Regular Review and Management Attention to the HENC/HEID Paragraphs
- Increased Information Sharing & Coordination Via Tools, Educational Resources, & Training
- Increased Situational Awareness of Linkages between EI, SWRAU, & FYR Protectiveness Determinations
- Continued Focus on Quality EI Data in SEMS



## Other CERCLA Components

- A change in an EI status can impact other CERCLA determinations and vice versa as they are interrelated
  - Five-Year Reviews (FYRs)
  - Sitewide Ready for Anticipated Use (SWRAU)
  - Risk Determinations





## 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



## Sitewide Ready for Anticipated Reuse

☐ SWRAU must meet one of the following conditions:

- Current human exposure under control and protective remedy or remedies in place (HHPR)
- Current human exposure under control and long-term human health protection achieved (HHPA)



## Sitewide Ready for Anticipated Reuse

- ❑ 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 exposure pathway, thus a site's EI changes from HEUC to HENC, also impacting its SWRAU determination.





## Risk Determinations

- EIs are not intended to measure risk in the way a baseline risk assessment does
- May be possible to have EIs under control before a remedy is fully implemented
- Human Exposure EI does not consider ecological risk



## Tracking & Coordinating EI, SWRAU, & FYRs

- Each region has a different process for how EI forms/data are collected and entered into SEMS. Contact your regional EI coordinator for more information on the timing and process used in your region
- For FYRs or SWRAU, contact your regional coordinator
- Regions must also submit a hard-copy checklist for all SWRAU sites to Headquarters

Region	EI Coordinator	SWRAU Coordinator	FYR Coordinator
1	Meghan Cassidy	Robert Ciancurulo (acting)	Patti Ludwig, Meghan Cassidy
2	Kristin Giacalone	Kristen Giacalone	Chloe Metz
3	Chris Corbett	Chris Corbett	Chris Corbett
4	Nestor Young	Shelby Johnston, Scott Miller, Charlotte Whitley	Yvonne Jones
5	Bonnie Eleder	Bonnie Eleder	Bonnie Eleder
6	Carlos Sanchez	Casey Lockett	Steve Tzhone
7	Michelle Quick	Michelle Quick	Diana Engeman, Michelle Quick (IMC)
8	Fran Costanzi	Fran Costanzi	Fran Costanzi, Pat Smith (FF Sites)
9	Harold Ball	Grace Ma	Cynthia Wetmore, Harold Ball (FF Sites)
10	Doug Zamastil	Allison Hiltner	Allison Hiltner
HQ	Jenee Sharon (OSRTI); Emy Laija (FFRRO)	Melissa Friedland, Erica Weyer, Frank Avvisato	Jennifer Edwards (OSRTI); Monica McEaddy (FFRRO)



## EI Guidance and Tools

- [2004 Superfund Environmental Indicators Guidance Manual](#)
- [2008 Superfund Environmental Indicators Guidance Human Exposure Revisions](#)
- [Superfund Program Implementation Manual](#) (Chapter VIII: Remedial Program, Part V on Environmental Indicators)
- [Human Exposure Dashboard \(Public\)](#)
- [SEMS Human Exposure Dashboard \(EPA Internal\)](#)
- EI Best Management Practices (BMPs) (Internal to EPA attachment)
- HE Memo (Internal to EPA attachment)
- FAQs for EIs (*coming soon!*)
- Questions? Contact your regional EI coordinator!

# EI Guidance, 2008

**Table 4-1 – Description of Progress Categories for the Site-Wide Human Exposure Superfund Environmental Indicators**

Category	Description	General Site Types
Insufficient data to determine human exposure control status	Due to uncertainty regarding exposures, one cannot draw conclusions as to whether human exposures are controlled. Sites are typically assigned to this category when responses have not been initiated or response actions have been initiated but have not yet generated reliable information to make an evaluation for this indicator - <i>i.e.</i> , there is not sufficient information to determine whether there are any current, complete unacceptable human exposure pathways at the site, therefore no evaluation is possible.	This category would apply primarily to sites that are in the initial phases of remedial investigation (e.g., recently proposed or listed NPL sites), or sites at which an investigation is underway to assess a potential exposure pathway not previously analyzed (e.g., vapor intrusion), but sufficient information has not been developed to make an evaluation about the human exposure risk. It may also apply to any site at which new information calls into question the nature of the human exposure pathways.
Current human exposures not under control	Sites are assigned to this category when data indicate that there are complete human exposure pathways that present unacceptable exposures to humans, and actions have yet to be completed to address these human exposure pathways for the entire site.	Sites typically in this category include those sites with human exposure data indicating unacceptable exposure pathways are present and exposure pathways have not been controlled, mitigated or eliminated. This will typically include sites where response actions are underway but are not yet complete.
Current human exposures under control	Sites are assigned to this category when assessments for human exposures indicate there are no unacceptable human exposure pathways and the Region has determined the site is <u>under control for current conditions site-wide</u> . However, there is additional physical construction required which may include system shake-down, and/or institutional controls need to be implemented to address long-term human health exposures.	Sites in this category would usually include those sites where human exposures are acceptable and under control for current conditions ( <i>i.e.</i> , there are no unacceptable human exposures). However in this instance sites have yet to attain <i>Construction Completion</i> status. This category also would include <i>Construction Completion</i> sites where cleanup levels have yet to be achieved, ground water treatment systems are undergoing shake-down to demonstrate that they are operating as intended, and/or institutional controls are required but are not in place to prevent current exposure above acceptable levels.

# EI Guidance, 2008

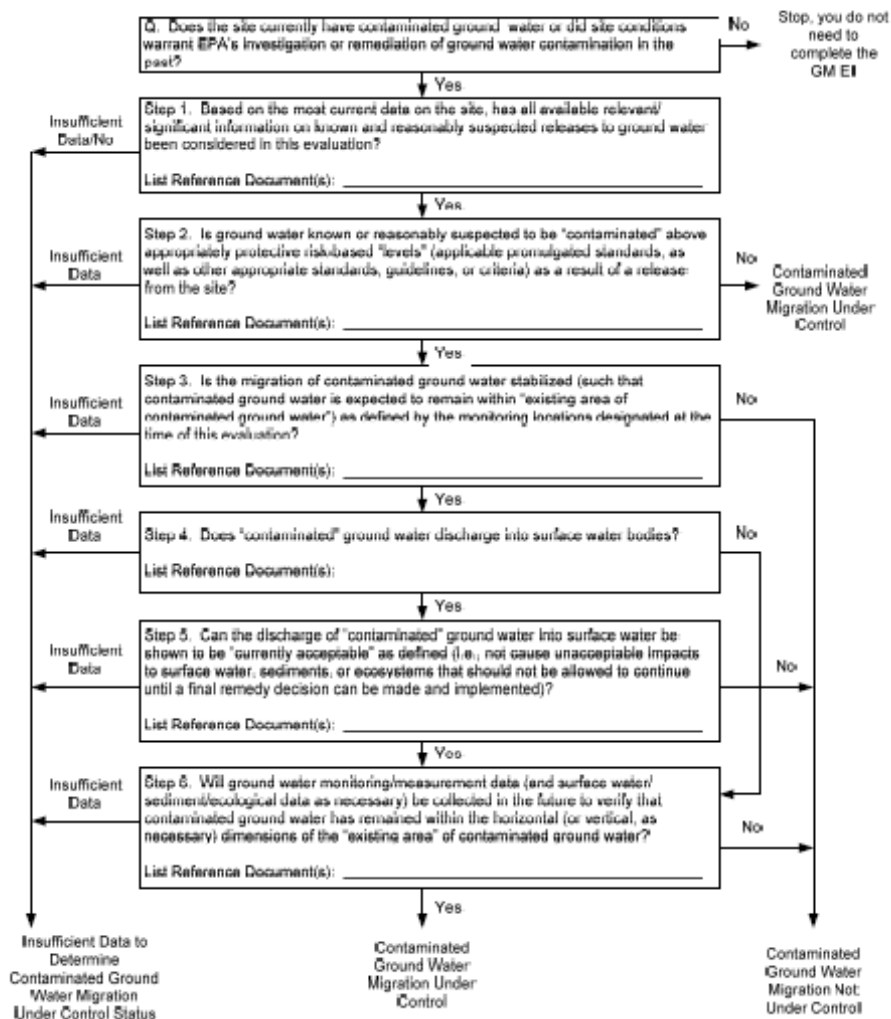
**Table 4-1 – Description of Progress Categories for the Site-Wide Human Exposure Superfund Environmental Indicators**

Category	Description	General Site Types
<p>Current human exposures under control and all protective remedy(ies) in place</p>	<p>Sites are assigned to this category when assessments for human exposures indicate there are no unacceptable human exposure pathways and the Region has determined the site is <u>under control for current conditions site-wide</u>. In addition, all physical construction is complete, systems are operating as intended, and institutional controls are in place and effective. However, one or more of the human exposure-related cleanup goals for the site have yet to be met.</p>	<p>This category includes <i>Construction Completion</i> sites where long-term remedial actions (LTRAs) or O&amp;M activities (only) are underway to achieve cleanup levels and <b>all institutional controls required to prevent unacceptable human exposures are in place</b>. In addition to LTRAs, this category includes <i>Construction Completion</i> sites requiring O&amp;M after the LTRA period, involving a ground water or surface water remedy with the primary purpose to provide drinking water supply, or involving in-situ SVE or bioremediation where cleanup levels have yet to be met.</p>
<p>Current human exposures under control and long-term human health protection achieved</p>	<p>Sites are assigned to this category when assessments for human exposures indicate there are no unacceptable human exposure pathways and the Region has determined the site is <u>under control for current conditions site-wide</u>. In addition, all physical construction is complete, systems are operating as intended, and institutional controls are in place and effective. Finally all human exposure-related cleanup goals for the site have been achieved.</p>	<p>This category would typically include: (1) Construction Completion sites that do not involve long-term soil, groundwater or surface water restoration remedies and all institutional controls are in place, (2) Construction Completion sites that have achieved long-term soil, groundwater and surface water restoration cleanup levels and all institutional controls are in place, (3) sites that have attained Site Completion status, and (4) Deleted NPL sites.</p>

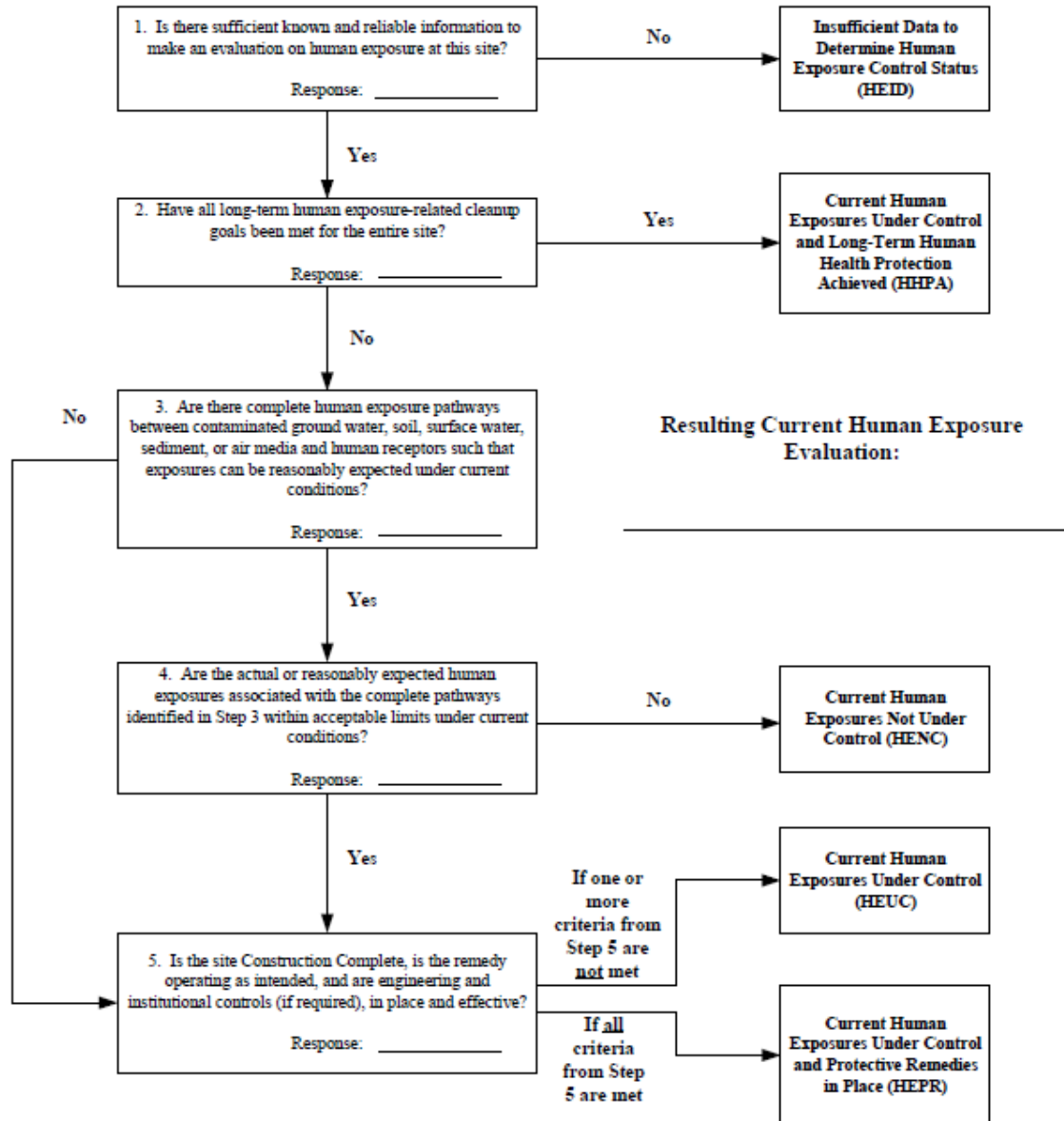
# GMUC Flowchart - EI Guidance, 2008

## Superfund Migration of Contaminated Ground Water Under Control Worksheet

Definition: Is the migration of contaminated ground water being controlled through engineered or natural processes?









# Human Exposure Flowchart



# Human Exposure Flowchart – Screenshot from SEMS Site Management

Human Exposure Survey: RPM Certified:

Step/Questions	Response	Associate Document	Reference Document
Step 1. Is there sufficient known and reliable information to make an evaluation on human exposure at this site?	<input type="button" value="Yes"/> ▾	 <a href="#">Search for Site Documentation</a>	
Step 2. Have all long-term human exposure-related cleanup goals been met for the entire site?	<input type="button" value="No"/> ▾	 <a href="#">Search for Site Documentation</a>	
Step 3. Are there complete human exposure pathways between contaminated ground water, soil, surface water, sediment, or air media and human receptors such that exposures can be reasonably expected under current conditions?	<input type="button" value="Yes"/> ▾	 <a href="#">Search for Site Documentation</a>	
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?	<input type="button" value="No"/> ▾	 <a href="#">Search for Site Documentation</a>	
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?	<input type="button" value=""/> ▾	 <a href="#">Search for Site Documentation</a>	
Step 6. Are there continuing exposures at the site? Answer "Yes" only if EPA (or a state or PRP) has exhausted all response actions and legal authorities to prevent unacceptable human exposures, yet exposures continue due to a refusal by the property owner(s) to participate in the remedy (e.g, refusal to accept a municipal water supply hookup) AND the region wishes to exercise its discretion to classify the site as Human Exposure Under Control, consistent with the requirement laid out in the Superfund Environmental indicators Guidance (OSWER 9285.02. March 2008, Pages 4-10 and 4-11).	<input type="button" value=""/> ▾	 <a href="#">Search for Site Documentation</a>	

Save Survey as Final or Draft:  Final  Draft





## Summary

- ❑ EIs are designed to communicate the tangible progress made in protecting human health and the environment
- ❑ The Human Exposure and Groundwater Migration EIs are reported to Congress
- ❑ Use the tools and resources available when determining EIs for your sites and work with your EI coordinator in your region
- ❑ Remember that a change in EI status can impact other program measures (e.g., SWRAU) and that other program components may impact EIs (FYRs)



# Questions and Panel Discussion



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