Superfund Environmental Indicators Guidance
Human Exposure Revisions

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U.S. Environmental Protection Agency
Washington, D.C. 20460

March 2008

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1.0 INTRODUCTION

This document is primarily intended to provide guidance regarding Superfund Environmental Indicators (EIs) for U.S. Environmental Protection Agency's (EPA's) Superfund personnel, including Remedial Project Managers (RPMs). This document may also be a useful resource for those interested in how Superfund EI data are collected and how to interpret Superfund EI reporting. This guidance document provides an overview of the Superfund EIs, including definitions, data elements/parameters/points, and descriptions of how Superfund EI data are used to communicate the progress of cleanups at Superfund sites. The Appendices to this manual explain the recommended process of entering, extracting, and using Superfund EI data from CERCLIS to monitor the results of cleanup actions and to communicate incremental progress to the public.

This document does not provide guidance on removal or response actions or remedy selection. It is not a regulation and has no binding effect on EPA, States, the regulated community or any other persons. The categorization of a particular site using environmental indicators does not affect the Agency's authorities and actions under CERCLA, the NCP, and existing Superfund guidance, or under any other Agency authority, and does not create any rights, obligations or defenses to liability.

In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), to clean up abandoned or uncontrolled hazardous waste sites. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). EPA's primary response authority is found in Section 104(a) of CERCLA which gives EPA the authority to respond to the release or threat of release of a hazardous substance, or to a pollutant or contaminant which may present a substantial risk to human health or the environment. EPA began developing EIs for the Superfund Program in the early 1990s to measure the progress in protecting human health and the environment that has occurred as a result of cleanup activities under CERCLA across the Nation.

2.0 ENVIRONMENTAL INDICATORS OVERVIEW

2.1 BACKGROUND

EPA developed three initial program-based environmental indicators to document and communicate environmental progress towards cleaning up Superfund sites. The three original Superfund EIs were: Populations Protected; Progress Towards Permanent Cleanup; and Cleanup Technologies Applied. Currently, two of these three program-based indicators, Populations Protected and Cleanup Volumes (formerly Cleanup Technologies Applied), are in place. Progress Toward Permanent Cleanup was functionally replaced by the development of the construction completion category. In 2001, two additional indicators, Human Exposure Under Control (HE) and Migration of Contaminated Ground Water Under Control (GM), were developed to measure the interim progress in meeting the Superfund goal to protect human health and the expectation to return usable ground waters to their beneficial use. The Site-Wide Human Exposure (HE) EI was developed in 2004 to further refine the progress categories and extend the focus of the HE EI beyond current conditions to measure progress in achieving long-term human health protection.

These Superfund EIs are discussed more fully in Sections 3.0 through 5.0 of this document.

All of Superfund's Environmental Indicators are designed to communicate the tangible progress made in protecting human health and the environment through site cleanup activities. In the past, OSRTI has used Superfund EI data in Congressional testimony for Superfund reauthorization, Government Performance and Results Act (GPRA) reporting, and budget requests to the Chief Financial Officer. The Agency consistently requests Superfund EI data from the Regions because the data are effective in reporting:

- The number of people protected from immediate and long-term threats through the provision of alternate water supplies, relocation of the affected population, and the implementation of site security and institutional controls;
- The amount of contaminated media that has been treated, stabilized, or removed through the use of treatment or containment technologies;
- The number of sites at which current human exposure to contamination is under control;
- The number of sites at which long-term human health protection is achieved; and
- The number of sites where the migration of contaminated ground water has been contained within the existing area of contamination.

Subsections 2.2 - 2.5 below provide an overview of EI reporting policies, definitions, and indicator relational diagrams. Sections 3.0 - 7.0 provide indicator-specific guidance including data elements/parameters/points, instructions for data reporting, and guidelines

used to make EI evaluations. This guidance is intended to provide Superfund personnel with information to capture the most current, complete EI data available.

2.2 RELATIONSHIP OF INTERIM EIS TO FINAL REMEDIES

The HE and GM Superfund EIs are designed to document interim progress in reaching final cleanup goals at NPL sites. However, the fundamental goal of the program has not changed. The goal of Superfund remedies is still to protect human health and the environment, maintain protection over time, and to minimize untreated waste (see, e.g., NCP, Section 300.430(a)(1)(I)). The CERCLA program often realizes this goal at NPL sites by implementing final remedies to achieve cleanup goals specified in Records of Decision.

The focus of the HE and GM indicators on interim progress in no way is intended to change the goal of the remedial process to provide remedies that are protective of human health, maintain protection over time, and minimize untreated waste. Achieving an interim category for the HE EI or a "ground water migration under control" evaluation for the GM Superfund EI should not substitute for meeting final remedy requirements, expectations associated with sources of contamination, and the need to restore, wherever practicable, contaminated ground water to beneficial use. In addition, achieving the final category for the Site-Wide Human Exposure indicator should not substitute for meeting final remedy requirements that are driven by ecological risks.

2.3 COORDINATION WITH THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PROGRAM

OSRTI developed the HE and GM Superfund indicators to be as consistent as possible with the comparable HE and GM indicators developed by EPA's Office of Solid Waste for the RCRA Corrective Action program. The Superfund indicators incorporate the specific provisions of the Superfund program and take advantage of its unique data sources.

The Site-Wide Human Exposure indicator expanded on the earlier Human Exposure Under Control indicator which it incorporates as its third progress category, "current human exposures controlled." Current human exposure control is a prerequisite for achieving higher progress categories under the Site-Wide Human Exposure measure.

Where both RCRA and CERCLA authorities are being used to address different areas of the same site, it is very important for the CERCLA and RCRA program managers to work together to make a consistent evaluation <u>for the site</u>, since both of these indicators apply site-wide. If a "current human exposures under control" evaluation cannot be made under the RCRA program, a "current human exposures controlled" evaluation generally cannot be made for the HE indicator. Similarly, GM EI evaluations should be consistent when both programs are addressing the same site.

2.4 UPDATING EI INFORMATION

In FY 1992, EPA Regions began recording environmental progress information directly in CERCLIS to make data collection more efficient and timely and to standardize reporting cycles. In FY 1995, evaluations for the initial three program-based EIs were first reported. Evaluations for the prior HE and GM Superfund EIs were first reported in FY 2001. The Site-Wide Human Exposure EI was reported beginning in mid-year FY 2005. Section 2.5 summarizes Environmental Indicator Reports available through CERCLIS.

Many Environmental Indicator data points have been incorporated into the Superfund Comprehensive Accomplishment Plan (SCAP). For further information, see the most recent version of Appendix B of the Superfund /Oil Program Implementation Manual (SPIM).

At a minimum, Regional personnel should update Cleanup Volume and Populations Protected data in CERCLIS by the 10th working day in October for end-of-year reporting purposes. Sections 4.2 and 5.3 provide specific guidance for updating the Human Exposure and Groundwater Migration indicators. As data collection and analysis or response actions occur or environmental conditions change, it is expected that Regions will update these evaluations and update CERCLIS to reflect changes in status. This should generally occur within 10 days of a known change. It is expected that Regions will review the status of all Human Exposure and Groundwater Migration evaluations at a minimum annually and confirm that each site has an updated and accurate HE evaluation by the 5th working day in October.

2.5 ENVIRONMENTAL INDICATOR REPORTS

Environmental Indicator Reports were developed to assist the Regions with data entry to facilitate National and site-specific report viewing. OSRTI refines the EI reporting system by noting any defects and enhancements that appear in the CERCLIS User Request System, as well as through contact with EPA Headquarters and Regional personnel. The following tools are currently available in CERCLIS to facilitate data entry and viewing:

- **PGMT-08 Environmental Indicators Audit Report**
  The EI Audit Report displays sites where there are incomplete or missing Environmental Indicators data. It displays discrepancies in EI data at the national, regional, state, or site-specific levels. For example, an error code and description will be generated in the report if a Populations Protected-specific action has been selected, but is not accompanied by the number of people affected by that particular action.

  A universe of EI Legacy sites has been identified to prevent the PGMT-08 EI Audit Report from identifying errors under the Populations Protected and Cleanup Volumes EIs. For the purposes of this policy, EI Legacy sites are defined as sites listed prior to 1995 (i.e., prior to implementation of the Populations Protected and Cleanup Volumes EIs) where no pipeline actions are ongoing or planned. EI Legacy sites are excluded from PGMT-08 audit reporting for the Populations Protected and Cleanup Volumes EIs. Missing data for EI Legacy Sites are reported in the PGMT-12 report for the HE or GM Superfund EIs (see below).

- **PGMT-09 Data Compilation Report**
  The Data Compilation Report is a summary of site data that can be used in conjunction with the PGMT-08 report to ensure that all data for a site are entered completely and accurately. This report displays the most recent information entered into CERCLIS and is useful for the review of start and completion dates.

- **PGMT-10 Site Turnaround Report**
  The Site Turnaround Report lists key progress information for a specific site or for all sites managed by a selected RPM or OSC. Progress information that populates this report includes: Cleanup Volume Data, Populations Protected Data, technology selected for each media, action start and complete dates by operable unit and lead type, site contact information, and the program priorities associated with the site. The report is intended to serve as a data summary for RPMs, and as an effective quality assurance record for confirming that EI data are entered accurately into the system.

- **PGMT-11 Environmental Indicators HE/GM Report**
  The EI HE/GM Report is a site-wide summary detail and Regional summary count of HE and GM evaluations and last Regional and Headquarters review dates. This report is intended to be a quick reference guide for use by both Headquarters and the Regions.

- **PGMT-12 Environmental Indicators HE/GM Error Report**
  The HE/GM Error Report displays a site summary of data gaps and potential reporting errors for the HE and GM EIs. Errors are reported for sites missing an HE or GM evaluation.

- **PGMT-13 Environmental Indicators Summary Report**
  The PMGT-13 is a quick reference cumulative summary of all EI data. This report includes NPL and non-NPL totals of solid waste (hazardous soil, solid waste, and sediment) and liquid waste (hazardous liquid waste, ground water, and surface water), the number of people provided alternative drinking water, and the number of people either temporarily or permanently relocated and the number of people returned. In addition, the report provides HE and GM totals by evaluation type.

3.0 POPULATIONS PROTECTED AND CLEANUP VOLUMES INDICATORS

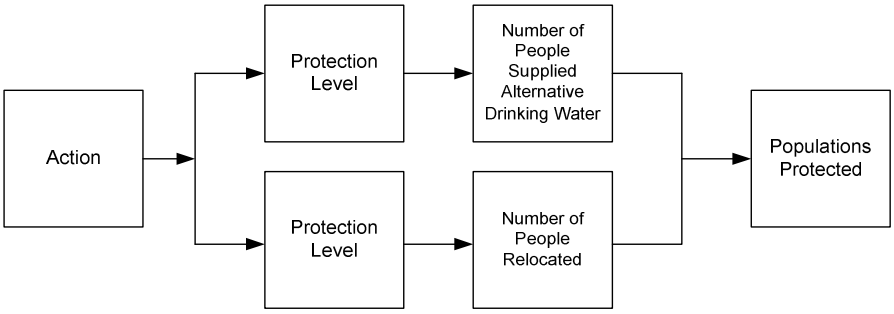
3.1 OVERVIEW

The Populations Protected EI measures the progress made in protecting individuals living at or near Superfund sites from immediate threats of exposure to contaminated media. It measures the number of individuals protected through the provision of alternate drinking water supplies or relocation in response to contamination. The Cleanup Volumes EI documents the amount of contaminated media that has been treated, stabilized, contained, or removed through the use of risk management technologies, engineering techniques, or institutional controls at NPL and non-NPL sites.

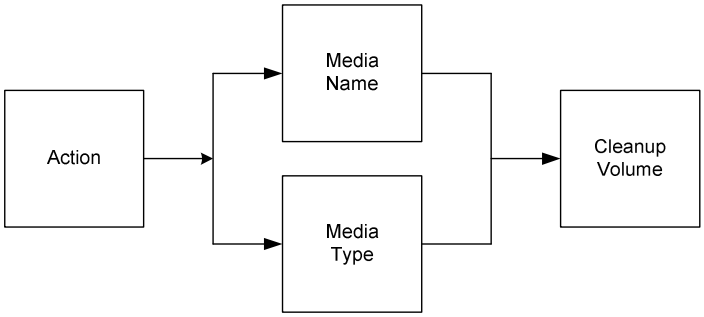
The Populations Protected indicator is reported at the action level, while the Cleanup Volumes indicator is reported on an action and medium-specific basis. Exhibit 1 shows the relationships among CERCLIS Populations Protected EI, Cleanup Volumes EI, and remedial and removal actions, and contaminated media data.

Exhibit 1: Recommended Crosswalk of Environmental Indicators to Reported Progress Information
Sites with Removal or Remedial Actions1

Populations Protected



Cleanup Volumes



[1] Removal and Remedial actions that should/may involve EI reporting include: Removals (RV); PRP Removals (BB); FF Removals (LV); PRP Emergency Removals (PJ); Remedial Actions (RA); PRP RAs (BF); Federal Facility RAs (LY); and Initial Remedial Measures (IP).

3.2 POPULATIONS PROTECTED INDICATOR

The Populations Protected Superfund EI was developed to measure the progress made in protecting individuals living at or near Superfund sites from immediate threats of exposure to contaminated media. Specifically, this EI is designed to measure the number of individuals protected through the provision of alternate drinking water supplies or relocation in response to contamination.

3.2.1 DATA REPORTING

Certain removal and remedial actions may generate Populations Protected EI data. The Populations Protected EI is designed to provide a means for describing the types of actions used to protect people living at or near Superfund sites.

3.2.2 ACTION TYPES

In general, Populations Protected EI data should be reported by the Regions when a removal or remedial action provides for:

- Alternate sources of drinking water, either temporarily or permanently;
- Reinstatement of drinking water supply following provision of temporary supply;
- Relocation, either permanently or temporarily; or
- Return of population following temporary relocation.

When a removal or remedial action is conducted, the action and the following details describing the action should be reported:

- The date the population was either relocated or provided alternative drinking water;
- The level at which the population was relocated or provided alternative drinking water (temporarily, permanently, or returned/reinstated); and
- The number of people relocated or provided alternative drinking water.

To obtain the most accurate description of site activity, Regions should designate as many actions as necessary to characterize how people were protected from immediate and long-term threats posed by site contamination. Data related to this indicator can typically be found by reviewing RODs, Action Memoranda, pollution reports (POLREPS), Remedial Action Reports, and Close Out Reports.

3.2.3 POPULATIONS AFFECTED (NUMBER OF PEOPLE PROTECTED)

Regions should report the number of people who were provided alternate water supply or were relocated either temporarily or permanently. In addition, the population whose water supply has been reinstated or a population who has been returned from relocation should also be recorded. If the population in the site records is listed as number of homes or residences and not the actual number of people relocated, Regions should use Census statistics (http://www.census.gov/) for county-level data on average number of people per household and multiply by the number of households to obtain a good estimate of the number of people protected. For a quick estimate, the Year 2000 US Census estimates that there were an average of 2.69 people per owner-occupied household and 2.40 people per renter-occupied household. Finally, Regions should round the estimate to the nearest whole number, as there are no fractions of people.

See Appendix B for a more detailed discussion of data entry.

3.3 CLEANUP VOLUMES INDICATOR

The Cleanup Volumes Indicator was developed to measure the amount of contaminated media that has been treated, stabilized, contained, or removed through the use of risk management technologies, engineering techniques, or institutional controls.

3.3.1 DATA REPORTING

For this indicator, Regions should report the following information:

- Date that the quantity of contaminated media were addressed;
- Media addressed by a removal or remedial action; and
- Quantity of contaminated media addressed by each removal or remedial action reported in CERCLIS.

Often, a single medium may be addressed by multiple actions. If that is the case, multiple entries may exist for a single medium. To assist in data entry and reporting, media associated with different actions can be named accordingly in the SCAP or Remedy Selection screens (e.g., Soil 01 and Soil 02). Data associated with this indicator can be found in RODs, Action Memoranda, POLREPS, Interim RA Reports, Final RA Reports, and Close Out Reports.

3.3.2 MEDIA TYPES

Media types are carried over to the Add/Edit EI screen from other areas in CERCLIS, such as the Remedy Selection or SCAP-Selected Remedy Screens. If a medium is not present for a volume to be entered, Regions should add that medium on the Add/Edit Media screen via the SCAP or Remedy selection screens as mentioned in Sections 3.2.1 and 3.3.1. Once the medium has been entered, it should be available on the Cleanup Volume tab in the Add/Edit EI module for entry along with its corresponding volume. Regions should use the following descriptions as a guide to assist in reporting the types of contaminated media that have been addressed:

- **Air**: Gases from processes such as landfilling or thermal treatment.
- **Debris**: Large solid waste, such as machinery, buildings, and tanks.
- **Ground water**: Water in the ground, both shallow and deep aquifers.
- **Leachate**: Rainwater, surface water, or ground water filtered through a landfill.
- **Liquid waste**: Waste such as acid contained in tanks, drums, lagoons, or ponds.
- **Residuals**: Waste remaining after treatment, such as incinerator ash.
- **Sediment**: Solids settled out of surface water or dredged material.
- **Sludge**: Solids settled out of a liquid, for example following wastewater treatment.
- **Soil**: Soil not distinguished as surface or subsurface.
- **Solid waste**: Discarded material such as garbage, refuse, tars, and contained gaseous materials but excluding for CERCLIS purposes debris, liquid waste, and sludge.
- **Subsurface soil**: Generally, soil below surface soil and at a depth of 2 feet and below.
- **Surface soil**: Generally, the top 2 feet of soil, but may be deeper depending on site-specific conditions and exposures.
- **Surface water**: Water open to the air, such as wetlands, lakes, streams, ponds, and overland surface flow.

3.3.3 CLEANUP VOLUMES

Regions should record in CERCLIS the volumes of contaminated media that have been addressed. The current Add/Edit EI screen allows for the entry of incremental volumetric data. It is important to add a new cleanup date and corresponding volume each time a new volume of waste has been addressed. For example, if 200 cubic yards (cu yd) of solid waste were reported as previously treated, and an additional 100 cu yd are currently being treated, a new separate entry of 100 cu yd of solid waste should be created along with the cleanup date. Cumulative totals by media can be viewed on the Add/Edit EI Summary tab.

Cleanup volumes can be entered for non-standard units available in the drop-down list (cubic feet, drums, liters, tons, pounds, cubic meters, tanks, cylinders, and battery casings). Once selected, these non-standard units will convert to standard units of gallons for liquid-based waste and cubic yards for solid-based waste. Appendix B provides a more detailed discussion of data entry for Cleanup Volumes.

4.0 SITE-WIDE HUMAN EXPOSURE ENVIRONMENTAL INDICATOR

4.1 INTRODUCTION

The Site-Wide Human Exposure[2] (HE) environmental indicator is designed to document long-term human health protection on a **site-wide basis** by measuring the incremental progress achieved in controlling unacceptable human exposures at a Superfund site. These evaluations currently apply to final and deleted Superfund National Priorities List (NPL) sites, and beginning in fiscal year (FY) 2008 to proposed NPL sites and to Superfund Alternative (SA) Sites.[3]

In making the evaluation on human exposure, Regions should have knowledge or information regarding the following factors:

- A site's physical setting and how that contributes to human exposure;
- Potential or actual exposed populations;
- Potential or actual exposed pathways;
- Estimates of exposure concentrations;
- Estimates of chemical intakes; and
- Evaluation of Uncertainty regarding the above factors.

Complete certainty regarding the above factors is not a necessary condition to make a human exposure determination at a site. In characterizing a site as "current human

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[2] "Exposure is defined as the contact of an organism (humans in the case of health risk assessment) with a chemical or physical agent. The magnitude of the exposure is determined by measuring or estimating the amount of an agent available at the exchange of boundaries (i.e., the lungs, gut, skin) during a specified time period. Exposure assessment is the determination or estimation (qualitative or quantitative) of the magnitude, frequency, duration and route of exposure. Exposure assessments may consider past, present and future exposures using varying assessment techniques for each phase. Estimates of current exposures can be based on measurements or models of existing conditions, those of future exposures can be based on models of future conditions, and those of past exposures, can be based on measured or modeled past concentrations or measured chemical concentrations in tissues. Generally, Superfund exposure assessments are concerned with current and future exposures." For more information see RAGS - Part A - Chapter 6 at http://www.epa.gov/oswer/riskassessment/ragsa/index.htm.

[3] Prior to the publication of this guidance, HE evaluations were made only for Superfund final and deleted National Priorities List (NPL) sites. Beginning in fiscal year (FY) 2008, Regions should expand their evaluations to include proposed NPL sites and Superfund Alternative (SA) Sites. Results for these site categories will be reported separately. Regions should enter human exposure evaluations into CERCLIS before the end of FY 2008, and update these evaluations thereafter consistent with this guidance. For SA Sites, the HE evaluation should apply only to those sites that are actively using the Superfund Alternative approach. These are non-NPL sites with a signed, enforceable agreement for RI/FS, RD, RA or NTCRA finalized after June 2002 where: (a) the agreement contains the SA provisions or has prior written approval to omit the provisions, or (b) the agreement is consistent with EPA SA guidance. For more information regarding SA evaluations, consult "Revised Response Selection and Settlement Approach for Superfund Alternative Sites (OSWER 9208.0-18, June 2004).

exposures not under control", a region is making a determination that: 1) there are currently completed human exposure pathways and 2) that those exposure pathways pose an unacceptable risk to humans based on the magnitude, frequency, duration and route(s) of exposure relative to the exposure concentrations and chemical intakes. Where a region lacks sufficient information to make such a determination on whether there are completed pathways or whether a completed pathway poses an unacceptable risk, a site should be classified as "insufficient data to determine human exposure control status". A site is placed in one of the three "under control" categories when a Region has determined that there are not currently completed human exposure pathways or that exposure(s) that may be occurring do not pose an unacceptable risk to humans based on the magnitude, frequency, duration and route(s) of exposure relative to the exposure concentrations and chemical intakes.

"Unacceptable human exposures," for purposes of this policy, are defined as actual or reasonably expected exposures of an individual to hazardous substances, pollutants, or contaminants at levels that present an "unacceptable risk," where unacceptable risks are determined on a site-specific basis relative to EPA policy (e.g., risks in excess of the cancer risk range). Unacceptable human exposures generally can be controlled by:

- Reducing the level of contamination.[4] For purposes of this policy, "contamination" generally refers to media containing contaminants in concentrations above appropriate protective risk-based levels associated with complete exposure pathways to the point where the exposure is no longer "unacceptable;" and/or
- Controlling or eliminating contaminant migration to human receptors; and/or
- Preventing human receptors from contacting contaminants in-place, and/or;
- Controlling human receptor activity patterns (e.g., by reducing the potential frequency or duration of exposure).

(As always, where EPA determines that a situation may present an imminent and substantial endangerment to human health or the environment, the Agency has broad response and enforcement authority to take appropriate action. This authority is not extinguished (i.e., the finding of imminent and substantial endangerment may still apply to the site) by the EPA's environmental indicator categorization. It is anticipated that final remedies will address future human exposure scenarios, future land and groundwater uses, and ecological receptors, whenever appropriate.)

Five categories have been created to describe the level of human health protection achieved at a site:

[4] For purposes of this policy, "contamination" generally refers to media containing contaminants in concentrations above appropriate protective risk-based levels.

1) Insufficient data to determine human exposure control status;
2) Current human exposures not under control;
3) Current human exposures under control;
4) Current human exposures under control and protective remedy or remedies in place; and
5) Current human exposures under control and long-term human health protection achieved.

The categories describe the status of human exposure control and provide a measure of EPA's assessment of the progress in controlling site-wide human exposure. For the purposes of reporting EPA's Government Performance and Results Act accomplishments, the latter three categories are combined into a single category reported as "Human Exposure Under Control." The last two categories above apply to sites where site-wide current human exposures are under control and track the progress in achieving more permanent, long-term control and protection at these sites.

The category "Current human exposures under control and long-term human health protection achieved" is typically achieved when all current and reasonably anticipated future human exposures have been addressed using treatment technologies, engineering controls, and/or institutional controls, and human exposure-related cleanup goals have been met for the entire site. The title of this category recognizes that once all human exposure-related cleanup goals have been met, additional progress has occurred beyond "human exposure control." Most Superfund remedies include a combination of components that "control" or "mitigate" human exposures (e.g., engineering or institutional controls designed to control contact with waste left in place) and components that "eliminate," human exposures (e.g., excavation and treatment remedies). The term "long-term human health protection" generally describes the condition achieved when all human exposure-related cleanup goals have been met and encompasses the broad range of Superfund remedies.

Please refer to Appendix B for detailed instructions on entering this evaluation in CERCLIS.

Table 4-1 below provides a recommended description of each progress category and the typical site to which each category may apply.

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.e.*, 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.e., there are no unacceptable human exposures). However in this instance sites have yet to attain *Construction Completion* status. This category also would include *Construction Completion* 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.

Table 4-1 – Description of Progress Categories for the Site-Wide Human Exposure Superfund Environmental Indicators		
Category	**Description**	**General Site Types**
Current human exposures under control and all protective remedy(ies) in place	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 under control for current conditions site-wide. 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.	This category includes *Construction Completion* sites where long-term remedial actions (LTRAs) or O&M activities (only) are underway to achieve cleanup levels and **all institutional controls required to prevent unacceptable human exposures are in place**. In addition to LTRAs, this category includes *Construction Completion* sites requiring O&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.
Current human exposures under control and long-term human health protection achieved	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 under control for current conditions site-wide. 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.	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.

4.2 EVALUATING THE SITE-WIDE HUMAN EXPOSURE (HE) ENVIRONMENTAL INDICATOR

The following guidelines should be observed when making the HE evaluation:

- The evaluation should be made on a site-wide basis;
- All response actions across all media should be considered;
- The evaluation should be made with "reasonable certainty" (*i.e.*, based on the most current data for the site)[5];
- The evaluation is intended to be a realistic, risk-based evaluation based on actual and reasonably anticipated land, surface water and groundwater use; and
- The evaluation can and should be revised as new information becomes available.

[5] Documents such as risk assessments, RODs, Action Memoranda, POLREPS, RA Reports, Close-out Reports, Five-year Reviews, NPL Deletion/Partial Deletion Notices are known reliable sources of data and often provide the information necessary for making an evaluation with reasonable certainty.

For national consistency, EPA Regions should use the recommended step-by-step process listed on the following pages to make an evaluation of the appropriate HE site progress category. These steps were developed in cooperation with representatives from all ten Regional Superfund programs, and are designed to assist Regional project managers in making accurate HE evaluations.

Please refer to Appendix A and B of this guidance for more detailed instructions regarding CERCLIS data entry. When making evaluations regarding the human exposure status at any site, Regional personnel should document the sources of information used to make the evaluation in the "List site reference document" fields in CERCLIS and/or a "note to the file" kept for that particular site.

In making a HE evaluation, the following five steps should be followed:

(Step 1) Determine whether there is sufficient known and reliable information to make an evaluation.

- If information is not sufficient, the site should be assigned category of "Insufficient data to determine human exposure control status."
- If information is sufficient, proceed to Step 2.

Considerations for evaluating a site at this step:

- The purpose of this step generally is to identify and screen those sites for which information (i.e., human exposure and risk data) is insufficient to make an evaluation for this indicator. If an RPM is unable to make a definitive evaluation on the nature of human exposure other than "insufficient information," a site would be classified in this category.
- Review and consider information that is pertinent to the evaluation of human exposure. Consider all available sources, even if you decide to base the indicator evaluation on one source or a subset of sources.
- Documents such as RI/FS reports, Baseline Risk Assessments, RODs, Action Memoranda, POLREPS, RA Reports, Close Out Reports, Five-Year Reviews, etc. are known and reliable sources of information. Document the sources of information used to make the evaluation in the "List site reference document" fields in CERCLIS and/or a "note to the file" kept for that particular site.

(Step 2) Where there is sufficient known and reliable information to make an evaluation, evaluate whether all long-term human exposure-related cleanup goals been met for the entire site.

- If the goals have not been met, proceed to Step 3.
- If the goals have been met, site should be assigned a category of "Current human exposures under control and long-term human health protection achieved."

Considerations for evaluating a site at this step:

- The purpose of this step is to identify those sites where all **human exposure-related** cleanup goals at all operable units (OUs) for the site have been met and long-term human health protection has been achieved. This would include attainment of contaminant-specific cleanup levels and implementation of engineering and institutional controls related to human exposures that are functioning as intended.
- Regions should review the ROD(s), action memo(s) and other appropriate decision documents to determine the cleanup goals established for a site. Cleanup goals are designed to provide a general description of what the cleanup will accomplish, form the basis for design of remedies that will be protective of human health and the environment, and may include (but are not limited to) contaminant-specific numeric cleanup goals, as well as current and reasonably anticipated land use.
- This measure documents the status of human exposure and **does not consider ecological risk**, even though cleanup goals for any given site may include those related to protection of the environment as well as human health. Thus, human exposure can be considered to be under control even if cleanup goals that are not related to human exposure (i.e., cleanup goals focused solely on ecological risks) have yet to be achieved.
- Refer to RA Close-Out Report, if available, or site Deletion Notices for documentation of whether the remedial action (RA) achieved the cleanup goals to reduce human health risks from the site.

(Step 3) Determine whether there are 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.

- If there are not complete pathways, proceed ahead to Step 5.
- If there are complete pathways, proceed to Step 4.

Considerations for this step:

- The purpose of this step is to identify whether there are any complete human exposure pathways between human receptors and "contaminated" media under current land and ground water use conditions.
- Media should be considered "contaminated" for this EI if they are known or reasonably suspected to be contaminated above appropriately protective human health risk-based levels from known contaminants. Appropriate human health risk-based levels would include, among other things, ARARs and/or risk-based levels documented in the ROD.
- All contaminants of potential concern present at the site above human health risk-based screening levels as discussed in the risk assessment should be considered for sites without a ROD. In such cases it is important to document the sources of information used to make the evaluation in the "List site reference document" fields in CERCLIS and/or a "note to the file" kept for that particular site. For sites with a ROD, Regions should consider contaminants of concern identified in the ROD.
- To facilitate its evaluation, Regions should use the table below and modify as needed to identify potential human exposure pathways (under current conditions). Regions should consider indirect and direct exposure pathways, including indoor air (vapor intrusion pathway) or exposure to contaminated food (e.g., fish, shellfish, dairy, edible plants, etc.).
- Regions should consider the exposure scenarios being evaluated for risk management decisions for the site. Note that some exposure pathways identified as complete in the baseline risk assessment may be identified as incomplete in this EI evaluation if the pathway was eliminated under current conditions using institutional or engineering controls.
- Regions should consider not only the presence of controls intended to eliminate exposure potential but also their effectiveness. Regions should consider the toxicity of the contamination, frequency, and duration of exposure to decide whether exposure is likely to occur at unacceptable levels. Anecdotal or random evidence (e.g., a cut fence) would not necessarily result in a evaluation of "not under control" unless conditions are such that exposure at unacceptable levels is reasonably expected to occur.

Sample Exposure Pathway Evaluation Table

	Potential Human Receptors (Under Current Conditions)						
Contaminated Media	Residents	Workers	Day Care	Construction	Trespassers	Recreation	Food
Ground Water	____	____	____	____			____
Air (indoors)	____	____	____	____	____	____	
Soil (surface e.g., < 2 ft)	____	____	____	____	____	____	____
Surface Water	____	____			____	____	____
Sediment	____	____			____	____	____
Soil (subsurface e.g., > 2 ft)				____			____

Note: In order to focus the evaluation on the most probable combinations, some potential "Contaminated" Media - Human Receptor combinations (pathways) do not have spaces for check marks. While these combinations are not likely in most situations, they may be appropriate in some settings and should be added as necessary.

(Step 4) Determine whether the actual or reasonably expected human exposures associated with the complete pathways identified in Step 3 are within acceptable limits under current conditions.

- If the exposures are not within acceptable limits, current human exposures are not under control.
- If the exposures are within acceptable limits, proceed ahead to Step 5.

Considerations for this step:

- The purpose of this step is to identify whether the complete exposure pathways identified in Step 3 could result in unacceptable human exposures under current conditions.
- Determine "acceptable limits" by considering the cancer risk range, the Hazard Index, or other appropriate information (e.g., blood lead data).
- A positive evaluation could be made for this step if the frequency and/or duration of exposure associated with complete pathways is such that the risk is acceptable (e.g., for a utility worker) and the cleanup goals that have yet to be met (Step 2) address reasonably anticipated future exposures.

- Information regarding current exposures should be derived from risk assessments and/or RODs. Note that if the exposures driving the remedy are based on future use only, and future use conditions are different than current, it may be necessary to review the risk assessment (not just the ROD) to obtain data on current risks.

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

- If at least one of these criteria is not met, site should be assigned a category of "Current human exposures under control."
- If all of these criteria are met, site should be assigned a category of "Current human exposures under control and protective remedy or remedies in place."

Considerations for this step:

- The purpose of this step is to categorize sites where current human exposures are under control but long-term human health protection has yet to be attained.
- This step should be used to distinguish between sites where current human exposures are under control and a "protective remedy" is or is not in place. For the purposes of this EI, sites that are construction complete should also be "operating as intended" (an Operational & Functional (O&F) evaluation pursuant to the National Contingency Plan has been made for ground water or surface water restoration remedies) and institutional controls, where required, should be in place in order to answer "yes" to this question.
- Sites with a "protective remedy in place" typically would include construction completion sites where long-term remedial actions (LTRAs) or O&M activities are underway to achieve cleanup levels and institutional controls to prevent unacceptable human exposures are in place. In addition to LTRAs, this could include construction completion sites requiring O&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.

Accounting for sites where property owners have refused to participate in the remedy response

At some sites, EPA and/or a state agency, a PRP or another Federal Agency may have exhausted all response actions and legal authorities to

prevent unacceptable human exposures, yet some exposures may continue based on a decision by a property owner not participate in the remedy. This guidance now provides Regions the discretion to categorize a site as Human Exposure Under Control in certain of these situations where the effect of property owners' decision is limited to the owner and/or their property. For example, at some sites, property owners have chosen to drink potentially-contaminated well water instead of freely-provided bottled water. In contrast, a site would be categorized as not under control where an owner does not allow access to remediate his/her yard, and contaminated dust from that owner's property contaminates adjoining properties above health based levels. Regions should not exercise this discretion in the case of rental properties, where tenants may not have the power to make such decisions.

Where such situations are encountered, and a Region decides to classify such site in one of the "Under Control" categories, a Region should document, track, and review each of these sites as outlined below:

1. Document in the site files all steps taken to inform property owner and occupants of the potential or known contamination and the exposure risk that may result from their decision to refuse access or assistance. The property owner/resident's response should be included in such documentation.

2. Include a set schedule for frequent periodic review of the site so that: 1) property owners/occupants are reminded that exposures have still not been addressed and that they are given periodic opportunities to allow access or accept a remedy, and 2) the Region can ensure that the EI status is still current.

3. Draft a concise explanation of the exposure conditions at the site, describing the actions taken to address exposures at the site as well as the nature of any continuing exposures. This explanation will be placed on the Superfund Site Profile Internet site to provide the public with a succinct and clear description of why a site is so listed.

4. Prior to making the Human Exposure category change in CERCLIS, consult with the OSRTI Headquarters Environmental Indicator lead to discuss the documentation, periodic review process, and exposure explanation listed above.

4.1 4.2 INFORMATION UPDATE AND REPORTING REQUIREMENTS

The HE evaluation reflects current, site-wide conditions. For sites that have been categorized as "current human exposures under control and long-term human health protection achieved," it also reflects reasonably anticipated future, site-wide conditions. As data collection and analysis or response actions occur or environmental conditions change, it is expected that Regions will update HE evaluations and update CERCLIS to reflect changes in status. This should generally occur within 10 days of a known change. It is expected that Regions will review the status of all HE evaluations at a minimum annually and confirm that each site has an updated and accurate HE evaluation.

Changes in EI Status
Update CERCLIS within 10 days of determining that the HE status has changed.

No Change in EI Status
If there is no change in the status of the site, update the "Last Review Date" in CERCLIS on the HE tab in the Environmental Indicators module within 10 days of the review.

Data entry for CERCLIS is discussed in more detail in Appendix B.

4.3 FREQUENTLY ASKED QUESTIONS – HUMAN EXPOSURE ENVIRONMENTAL INDICATOR

Step 1: Is sufficient known and reliable information available to make an evaluation?		
Question		**Answer**
1-1	What are the best sources of information for me to consider for this EI evaluation?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, RA Reports, Close Out Reports, Five-Year Reviews, Deletion Notices, etc. are known and reliable sources of information. (Regions should document the sources of information used to make the evaluation in the "List site reference document" fields in CERCLIS and/or a "note to the file" kept for that particular site.)
1-2	There may be several different sources of information (*e.g.*, State, EPA, Federal facility or PRP). Do I need to be familiar with all of this information to answer this question?	Regions should be familiar with that information that is: 1) pertinent to evaluation of human exposure; and 2) available. If the information from other sources is both pertinent and available, consider the contents of this information when making this evaluation.
1-3	What if a PRP has drawn different conclusions than EPA regarding the status of human exposures associated with the site? Do I need to consider the PRP's data?	Yes. However, a Region can decide what weight to place on the PRP's data when determining whether it will be useful for identifying contaminated media and evaluating human exposures for this EI. A Region is expected to be able to explain the basis of its evaluation.

Step 1: Is sufficient known and reliable information available to make an evaluation?		
1-4	What if I am aware of information that another Agency or a PRP has collected but cannot obtain a copy of it?	If after making a good faith effort to obtain the information, it is not available for review, a RPM should document in the site's Administrative Record his/her attempt and indicate that it was not used.
1-5	We have yet to start the RI, and there is little information available regarding exposure pathways. How should I answer this question?	If data are unavailable or insufficient to make the HE EI evaluation, answer "no" and select "Insufficient data to determine human exposure control status" in CERCLIS.

Step 2: Where there is sufficient known and reliable information to make an evaluation, have all long-term human exposure-related cleanup goals been met for the entire site?		
Question		**Answer**
2-1	Where can I find the information to answer this question?	RODs outline the cleanup goals established for a site. Documents such as POLREPS, RA Reports, Close Out Reports, Five-Year Reviews, Deletion Notices, etc., are good sources of information to determine whether cleanup goals have been met at a site.
2-2	Cleanup goals have been met for the contaminated medium of primary concern (*e.g.*, ground water). Can I answer "yes" to this question (*i.e.*, cleanup goals have been met)?	If this is the only medium to be addressed for the site, generally answer "yes." This EI reflects a site-wide evaluation. If cleanup goals have been or will be established for other media, generally answer "no."
2-3	Activities to date have focused on the most significant OU and have achieved the cleanup goals established for this OU. There is a possibility that further actions will be required to address human health risks associated with another OU. How should I consider the possibility of future actions when answering this question?	In the absence of remedy evaluation and selection for all possible OUs, you should use your best judgment. If there is a reasonable possibility that there will be another investigation to assess human health risks for the site, a Region should answer "no" and proceed through the remaining steps to determine whether all current human exposures are under control for the site.
2-4	The only cleanup goals that have yet to be met for the site address ecological risks. How should I answer this question?	Generally, answer yes. This EI is designed to measure progress in attaining long-term human health protection through human exposure control. **It does not measure progress in addressing ecological risks.**
2-5	If a site is *Construction Complete*, can I assume that the answer to this question is "yes" (and long-term human health protection has been achieved)?	Generally, no. *Construction Completion* status can be achieved at some sites where all cleanup goals have yet to be met. This may include sites where long-term ground water or surface water restoration remedies are in place and operating, but cleanup levels have yet to be achieved. This may also include sites where institutional controls necessary to meet cleanup goals have yet to be implemented.

Step 2: Where there is sufficient known and reliable information to make an evaluation, have all long-term human exposure-related cleanup goals been met for the entire site?		
2-6	If a site has achieved the *Site Completion* milestone, can I assume that the answer to this question is "yes" (and long-term human health protection has been achieved)?	Generally, yes. *Site Completion* status generally signifies that all cleanup goals specified in all RODs have been met, institutional controls are in place, the site is protective of human health (and the environment), and the only remaining activities, if any, consist of O&M by the state, Federal facility, or responsible parties.

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?		
Question		**Answer**
3-1	Where can I find the information to answer this question?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, Five-Year Reviews, etc., are known and reliable sources of information. (Document the sources of information used to make the evaluation in the "List site reference document" fields in CERCLIS and/or a "note to the file" kept for that particular site.)
3-2	Do I need to consider all media at the site when answering this question?	One should consider those media that are known or reasonably suspected to be contaminated above appropriately protective risk-based levels. Appropriate human health risk-based levels include ARARs and/or risk-based levels documented in the ROD or other decision document. Regions should consider indoor air and food chain organisms, such as fish, shellfish, and other edible plants and animals, as possible contaminated "media" in making this evaluation.
3-3	What contaminants should I consider when identifying whether a medium is "contaminated?"	For pre-ROD sites, consider all contaminants of potential concern present at the site above risk-based screening levels. For sites with a ROD, consider the contaminants of concern identified in the Risk Assessment.
3-4	Does a single "hit" of contamination mean that I should consider a medium "contaminated," or should I use the average Upper Confidence Limit (UCL), or something else to identify "contaminated" media for this question?	Use the approach being used for risk-based decisions at the site. If a Region is in the early stages of the investigation, with limited data, a single positive sample may be enough to consider a medium "contaminated" if multiple lines of evidence corroborate this conclusion. If a Region is at a later stage and the UCL is being used as the exposure point concentration, a Region may use this to identify "contaminated" media.
3-5	How do I answer this question if the only complete exposure pathways exist for media in which none of the contaminants exist above appropriately protective risk-based levels?	In most cases you should answer "no." Only those media identified as "contaminated" above appropriately protective risk-based levels should be considered in this step.

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?		
3-6	Actions have been taken to eliminate exposure to the contaminated medium of primary concern (*e.g.*, ground water) based on current conditions. Should I answer "no" to this question (*i.e.*, human exposures are not reasonably expected under current conditions)?	If this is the only medium in which contaminants exist above appropriately protective risk-based levels, answer "no." If complete exposure pathways exist for other media that are contaminated above risk-based levels, answer "yes." This EI reflects a site-wide evaluation. .
3-7	Activities to date have focused on the most significantly contaminated medium (*e.g.*, soil) and have eliminated all previously unacceptable human exposures associated with this medium based on current conditions. There is a possibility that another contaminated medium (*e.g.*, sediment) poses a risk. Should I include this in the evaluation?	In the absence of a complete exposure assessment, you should use your best judgment. If the conceptual site model indicates that there is a reasonable expectation of exposure to a medium for which an exposure assessment has yet to be completed (*e.g.*, sediment), a Region should answer "yes" and proceed through subsequent steps.
3-8	Should I consider the indoor air inhalation pathway (associated with vapor intrusion) and food chain exposure pathway when answering this question?	Consider all exposure pathways of concern identified across the site. If indoor air and food chain pathways are pathways of concern, they should be considered in your answer. In cases where an exposure assessment has yet to be completed, a Region should use your best judgment and make your evaluation with reasonable certainty. An evaluation of insufficient data may be appropriate.
3-9	If the only complete exposure pathway for the entire site (all media) is for the "trespasser" scenario, should I still answer "yes" to this question?	If exposure to a contaminated medium (*i.e.*, medium contaminated above risk-based levels) can be reasonably expected under any current exposure scenario, you should answer "yes" to this question and continue the worksheet. Generally, anecdotal evidence of trespassing does not necessarily result in an evaluation of "not under control." Regions should consider the frequency and/or duration of likely exposure along with the nature and extent of contamination to decide whether it is reasonably expected that people will be exposed to contamination that would result in unacceptable exposures. Sites with relatively low levels of contaminants and infrequent trespassing would be generally considered under control for current conditions. However, sites would generally be considered not under control where there is evidence of frequent trespassing and contaminant levels on site are such that they could cause harm.

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?		
3-10	At present, no drinking water wells have been affected by contaminated ground water, but the wells could be affected in the near future. Should we answer "no" now and change our response to "yes" if and when the plume reaches the wells?	In general this is the correct evaluation, as the measure documents current exposure. Regions should determine, for example, that well permits are in place and valid, and use professional judgment to make the evaluation. Regions should take appropriate response actions to prevent exposure if the contamination threatens drinking water supplies (e.g., control contaminated plume migration or provide alternative water supply).
3-11	The exposure scenarios driving the remedy, as presented in the ROD, are based on future land or ground water use conditions that are different than current use conditions. Should I base the response to this step on current use scenarios that are not driving the remedy?	Generally, yes. Use the exposure scenarios that consider current use, as developed in the baseline risk assessment, to make this evaluation.
3-12	A fish consumption advisory is in place to eliminate/mitigate exposure to contaminated fish. What should I consider when making the HE evaluation based on this exposure scenario?	This is a site-specific judgment. Consider not only the presence of controls intended to eliminate or mitigate exposure potential, but also their effectiveness. If evidence suggests that some people are catching and eating fish despite the advisory, this remains a pathway of concern. However, the likely frequency and duration of exposure are critical when making a judgment as to whether it could reasonably be expected that people are exposed to contamination at unacceptable levels. Mere anecdotal evidence of an occasional violation (or recreational "catch and release" fishing) might not rise to the level of concern that would result in a "not under control" evaluation. However, knowledge that the area is used for subsistence fishing at levels that may result in unacceptable exposures remains a valid justification for a "not under control" evaluation.
3-13	What should I do if, after completing the HE EI for a site, new complete exposure pathways are identified or complete exposure pathways are eliminated due to response actions or a better understanding of the site?	If exposure pathway information changes based on new data, a Region should consider whether the change would affect the HE EI evaluation for the site. If so, a Region should update the EI evaluation to reflect the new information.

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?		
3-14	How do I handle vapor intrusion concerns, particularly at sites where cleanup has progressed significantly?	In general, if a Region has an approved workplan to conduct vapor intrusion investigation(s) at a site, the Region should consider the site "insufficient data" until such time a definitive evaluation can be made. Site managers, however, should use their best professional judgment when considering this exposure scenario, and evaluate this pathway as they would any other, using the worksheet and guidance provided in this document.
3-15	The site has a groundwater plume contaminated above health-based levels, the plume is migrating, and the Region can not guarantee that someone has not installed (or will not install) a well in an aquifer affected by the plume. Except for this concern, the site conditions are otherwise HE under control. What is the HE evaluation?	In these situations the site should generally be considered under control. HE evaluations are made by deciding: 1) whether there are complete human exposure pathways to contaminated media (in this case the migrating groundwater plume) such that exposures can be reasonably expected under current conditions and 2) whether the exposures are within acceptable limits. The human exposure evaluation is made for <u>current site conditions</u> and does not take into account "potential" for exposure. That a Region cannot rule out the possibility of an exposure is different than suggesting that exposure would be reasonably expected in this situation. In this example, the Region has no information to suggest that unacceptable human exposures are occurring; therefore an evaluation of under control is appropriate. If, in the future, information becomes available that indicates people are using wells in the contaminated area and may be exposed at unacceptable levels, it would be appropriate to change the evaluation to insufficient data or not under control.
3-16	How do I make the HE evaluation when the only pathway of concern is the on-site worker scenario?	Generally, if this pathway is of concern, site risk assessment documents will delineate it, and the cleanup goals will take it into account. In general, this pathway should be evaluated similarly to any other when making the HE evaluation. Should this scenario result in exposures at levels that could cause harm, a “not under control” evaluation is generally warranted.

Step 4: Are the actual or reasonably expected human exposures associated with complete pathways identified under Step 3 within acceptable limits under current conditions?		
Question		**Answer**
4-1	Where can I find the information to answer this question?	A RPM should review documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, Five-Year Reviews, etc.
4-2	How could risks be within acceptable limits if cleanup goals have yet to be met and there are complete exposure pathways between contaminated media and human receptors (*i.e.*, how could the answer to this question be "yes" if the answers to Steps 2 and Step 3 were "no" and "yes," respectively?)	In most cases, the response to this Step will be "no." However, there could be situations where cleanup goals have yet to be met and there are complete pathways, but the frequency or duration associated with those pathways are such that the exposures are not unacceptable. (An example is a site where subsurface soil is contaminated above ARARs and there is potential exposure to a utility worker under current conditions, but likely exposures are infrequent enough that the exposure (current conditions) is acceptable for the specific contaminants of concern.)
4-3	Actions have been taken to reduce exposures to the contaminated medium of primary concern (*e.g.*, ground water) to within acceptable limits under current conditions. Should I answer "yes" to this question (*i.e.*, exposures are within acceptable limits)?	Generally you should answer "yes" if this is the only medium for which exposures above acceptable limits exist. The indicator reflects a site-wide evaluation, so exposures via all media should be within acceptable limits to answer "yes."
4-4	Activities to date have focused on the most significantly contaminated medium (*e.g.*, soil) and have reduced previously unacceptable exposures associated with this medium to within acceptable limits based on current conditions. There is a possibility that another contaminated medium (*e.g.*, sediment) poses a risk. Should I include this in the evaluation?	In the absence of a completed risk assessment, you should use your best judgment. If the conceptual site model indicates that potential exposures to a contaminated medium for which risk has yet to be characterized (*e.g.*, sediment) could represent an unacceptable risk, a Region should answer "no" (which would result in a "not under control" evaluation) or return to Step 1 and answer "no" (which would result in an "insufficient data" evaluation).
4-5	We have yet to complete a baseline risk assessment for the site; however, some contaminant concentrations exceed appropriately protective risk-based levels in media for which complete pathways are reasonably expected under current conditions. Can I answer this question without a risk assessment?	In the absence of a completed risk assessment, base your evaluation on the best available information. If the medium is contaminated above the risk-based levels that have been identified at this stage of the assessment and complete exposure pathways are reasonably expected, a Region could answer "no" (which would result in a "not under control" evaluation) or return to Step 1 and answer "no" (which would result in an "insufficient data" evaluation), based on its knowledge of the site and the RPM's best judgment.

Step 4: Are the actual or reasonably expected human exposures associated with complete pathways identified under Step 3 within acceptable limits under current conditions?		
4-6	What risk "limits" should be used to make this evaluation? Should we use 10^{-6} or 10^{-4} excess lifetime cancer risk?	Base your evaluation on the risk limits being used for risk-based decisions at the site. For sites with a ROD, generally use the risk value used to establish cleanup levels. If a ROD has not been signed, generally use the protocol typically applied in the Region for pre-ROD sites (*e.g.*, use state ARARs, NCP risk range, etc.). If the appropriate risk limit is uncertain, return to Step 1 and answer "no" (which would result in an "insufficient data" evaluation).
4-7	How do I answer this question if the human health risks from exposure to some contaminants are above acceptable limits and others are within acceptable limits?	If the potential exposures to any contaminant represent an unacceptable human health risk, a Region should answer "no" to this question (which would result in a "not under control" evaluation).
4-8	The exposures to individual contaminants are within acceptable limits under current conditions; however, cumulative risks under current conditions are above acceptable limits. Should I use single contaminant or cumulative risk as the basis for this evaluation?	Generally base your evaluation on the approach being used for risk-based decisions at the site. For example, if remedial actions to address current exposures are being driven by an assessment of cumulative risk, a Region should base its evaluation on the cumulative effects of exposure to multiple stressors.
4-9	The risks vary depending on the exposure assumptions and the approach used to estimate the exposure point concentrations. What approach should be used to assess the risk from potential exposures to evaluate this EI?	A RPM may use the same exposure assumptions and approach to determining exposure point concentrations as are used in the risk assessment for the site – a Region does not need to create new information.
4-10	If the only unacceptable exposures for the entire site (all media) are associated with the "trespasser" scenario, should I still answer "no" to this question?	If exposures are not within acceptable limits for any scenario, based on current conditions you should answer "no."
4-11	At present, contamination in drinking water wells does not present an unacceptable risk, but contaminant concentrations could be rising. What is the correct evaluation?	In general, a Region would answer "yes" now and change the response to "no" if and when the contaminant concentrations reach a level such that exposure would represent an unacceptable risk. Regions should take appropriate response actions to prevent exposure if the rising contaminant concentrations threaten drinking water supplies (e.g., provide alternative water supply).
4-12	The exposure scenarios driving the remedy, as presented in the ROD, are based on future land or ground water use conditions that are different than current use conditions. Should I base the response to this step on current use scenarios that are not driving the remedy?	Yes. Use exposure scenarios that consider current use, as developed in the baseline risk assessment, to make this evaluation.
4-13	What should I do if, after completing the HE EI for a site, the degree of risk based on current conditions is reevaluated as we gain a better understanding of the site?	If the degree of risk is reevaluated based on new data, consider whether the change would effect the HE EI evaluation for the site. If so, update the EI evaluation to reflect the new information.

Step 4: Are the actual or reasonably expected human exposures associated with complete pathways identified under Step 3 within acceptable limits under current conditions?		
4-14	What should I do if the cleanup standards used to make the HE EI evaluation for my site change (e.g. the promulgated maximum contaminant level for groundwater is changed).	In these cases review the revised standard and re-assess the HE evaluation to decide whether the contaminants are within acceptable limits for current conditions. The HE evaluation should be consistent with the new standard and should be revised as appropriate if the revised standard changes your evaluation of protectiveness.
4-15	How do I determine whether human exposures associated with complete pathways are within acceptable limits if the nature of the exposure differs from that evaluated in the baseline risk assessment? For example, recent information indicates that trespassing is a problem at my site, but the exposure pathways evaluated in the baseline risk assessment assume a 30-year residential use scenario.	In cases such as these, a Region should ensure that the contaminant levels of concern are appropriate for the specific exposure scenario that affects your Human Exposure evaluation. For example, the concentration levels of concern for a 30-year residential use scenario will generally be lower than those that would pose an unacceptable risk for trespassing. In such situations infrequent trespassing would generally not result in an evaluation of human exposure not under control. However, where evidence suggests that trespassing is frequent or where it results in exposure pathways that were not identified in the risk assessment documents for the site (e.g., the risk data deal with dermal exposure but not inhalation) a Region should consult a risk assessor and work to identify contaminant levels of concern specific to the pathway in question.

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?		
Question		**Answer**
5-1	Where can I find the information to answer this question?	Documents such as RODs, Action Memoranda, POLREPS, RA Reports, Close Out Reports, Five-Year Reviews, etc., are known and reliable sources of information.
5-2	A PCOR has been signed for a ground water site, and it has been listed on the Construction Completions List (CCL). An operational and functional (O&F) evaluation for the pump and treat system is expected within a year. How should I answer this question?	For the purposes of this EI, remedies at *Construction Completion* sites should be "operating as intended" to achieve credit for a "protective remedy in place." Until an O&F evaluation is documented (*i.e.*, in an approved Interim RA Report), generally answer "no" to this question.
5-3	An in-situ soil vapor extraction (SVE) system has been installed and is operating as intended. Studies indicate that the system will achieve cleanup goals within the next 2-3 years. This is the last action required for cleanup, and the site is *Construction Complete*. How should I answer this question?	Assuming the institutional controls required for the remedy to remain protective are in place and effective, generally you should answer "yes." The remedy has yet to achieve cleanup goals site-wide, but the site is *Construction Complete* and the remedy is operating as intended.
5-4	What should I do if, after completing the HE EI for a *Construction Completion* site, an O&F evaluation is made or it is documented that institutional controls are in place and effective?	If the new information documents that the remedy is operating as intended and institutional controls are in place and effective, you should update the EI evaluation to reflect this information.

4.4 ENTERING EXPOSURE DESCRIPTIONS IN THE JUSTIFICATION FIELD IN CERCLIS

EPA has committed to providing current human exposure evaluations to the public via its Superfund Site Profiles available on the internet. As part of this effort, the Agency will provide descriptions of situations where a site is categorized as "Insufficient Data" or "Not Under Control." This information will be derived from CERCLIS. Consequently, it is critical Regions maintain the quality of the "justification" descriptions in the CERCLIS data base.

When making a Human Exposure Not Under Control or Insufficient Data evaluation in CERCLIS, Regions must record exposure descriptions in the "Justification" field in order to save the evaluation as draft. The purpose of this approach is to provide the public with a succinct and clear description of why a site is so listed, along with information about the steps EPA plans to take to address the exposures. Upon OSRTI review and approval of the justification text, the human exposure evaluation will be saved in CERCLIS as final.

To help standardize the descriptions entered into CERCLIS, and to assure that similar exposure scenarios are described consistently across Regions, the templates below should be used when populating the "Justification" field. The information entered in this field will appear on the publicly available Superfund Site Progress Profiles Webpage, so it should be accurate, updated when necessary, and contain the information outlined below.

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

The [insert site name] Superfund site is considered "Current Human Exposure Not Under Control" because [insert a detailed description of the current completed human exposure pathway(s) not under control; include the contaminants of concern and media].

As of _____ (date) the planned activities to address this pathway are [_____].

[As appropriate, add:

In addition, EPA (or state, or PRP or Federal Agency as appropriate) is currently [insert summary descriptions of actions underway to address human exposures. (Include any temporary controls that have been put in place to address this exposure scenario e.g., fish advisory, fencing, signs)]

Example:

The *Site X* Superfund site is considered "Current Human Exposure Not Under Control" because residents and recreational users of the creek can be exposed through direct contact to arsenic and lead contaminated soils and sediments.

As of July 2007, the planned activities to address this pathway are continuation of ongoing removal of arsenic and lead contaminated soils.

EPA has already begun cleaning up the contaminated soil. Removal actions started in April 2007. Temporary fences to prevent access to the site were installed in May 2007. Warning signs identifying the area as a Superfund site were posted in June 2007.

General Template for New Sites with an HE Evaluation of Insufficient Data:

As of [insert date] there is insufficient information to determine the site-wide Human Exposure Control status at [insert site name] Superfund Site.

[Provide general context for why there is insufficient data at the site. An example:

[Insert site name] was [proposed/finalized] for the NPL on MM/DD/YY, and there has been no evaluation of the human health exposure indication yet. This does not necessarily mean that unacceptable exposures are occurring.]

As of _____ (date) the planned activities to collect sufficient information to make a human exposure evaluation are [_____].

[As appropriate add the following:

In addition, EPA (or state, or PRP or Federal Agency as appropriate) is currently [insert descriptions of actions underway to address human exposures. (Include any temporary controls that have been put in place to address this exposure scenario e.g., fish advisory, fencing, signs)]

General Template for Longer Term Cleanups with a Newly Identified Exposure Pathway and/or Contaminant(s):

As of [insert date] there is not sufficient information available to determine the site-wide Human Exposure Control status at X Superfund Site because of a newly identified potential 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 activities planned to make the HE evaluation include [_____] (list whatever activity is necessary to make the evaluation: e.g., data needed, conduct sampling, monitor basements for vapor intrusion, complete risk assessment, and conduct well surveys).

[As appropriate, add the following:

In addition, EPA (or state, or PRP or Federal Agency as appropriate) is currently [insert summary of actions underway to address human exposures. (Include any temporary controls that have been put in place to address this exposure scenario e.g., fish advisory, fencing, signs)]

4.5 RELATIONSHIP OF THE HUMAN EXPOSURE MEASURE TO CROSS PROGRAM REVITALIZATION MEASURES

The new Cross Program Revitalization Measures (CPRM) for Superfund and federal facilities include two performance measures: Protective for People Under Current Conditions (PFP), and Ready for Anticipated Use (RAU). Regions will use Human Exposure Under Control criteria in order to make the evaluation that a site or operable unit (OU) is PFP and inform whether the site or operable unit is also RAU.

The PFP measure reports sites and acres at which there is no complete pathway for human exposures to unacceptable levels of contamination, based on current site conditions. In order to do this, Regions should apply the Human Exposure Under Control criteria on an OU basis at all sites included in the CPRM Universe. Therefore, there will be sites with acres meeting the PFP performance measure that are not Human Exposure Under Control at the entire site, because the PFP performance measure is measured on an OU basis.

A site or OU will achieve the PFP performance measure when it can be determined that the entire site or OU meets any one of the three possible designations for Human Exposure Under Control:

- Current Human Exposures Under Control; or
- Current Human Exposures Under Control and protective Remedy or Remedies in Place; or
- Current Human Exposures Under Control and Long-Term Human Health Protection Achieved.

In order for a site or OU to meet the Ready for Anticipated Use (RAU) measure, it must be PFP (and therefore meets the Human Exposure Under Control criteria on either an OU or site-wide basis) in addition to meeting the following criteria:

- All cleanup goals are achieved for media that may affect current and reasonably anticipated future land uses, or have documented uncontaminated areas, so that there are no unacceptable risks; and
- All institutional or other controls, identified as part of the response action as necessary for the site's long-term protection, are properly in place.

For more information, please refer to the Superfund and Federal facilities CPRM guidance, *Guidance for Documenting and Reporting Performance in Achieving Land Revitalization*, OSWER 9200.1-74.

4.6 RELATIONSHIP OF THE HUMAN EXPOSURE MEASURE TO FIVE-YEAR REVIEWS

Consistent with CERCLA and the National Contingency Plan (NCP), remedial actions that allow contaminants to remain on site above levels that allow for unlimited use and unrestricted exposure undergo review at least every five years to determine whether the remedy is or will be protective of human health and the environment. Among other things, these reviews assure that the remedy is functioning as intended, that the exposure assumptions, toxicity data, and cleanup goals are still valid, and assess whether any new information has been discovered that could call into question the protectiveness of the remedy.

Many of the activities required to make a five-year review protectiveness evaluation (e.g., addressing newly promulgated standards, confirming current and expected land use, identifying new contamination or contaminant sources) are useful in confirming the human exposure status.

Upon completion of any five-year review, Regions should confirm that the information evaluated in the review is consistent with the current site-wide human exposure evaluation. If necessary, Regions should revise human exposure evaluations in CERCLIS to be consistent with the information evaluated during the five-year review.

Note that human exposure evaluations describe risks to human health under current conditions, and do not address potential/future human health risks or ecological risks. Five-year reviews do not always address the entire site, may consider potential/future risks, and may also address ecological risks. Because of this, five-year review protectiveness statements and human exposure evaluations are not direct corollaries.

For assuring consistency between five-year reviews and human exposure evaluations, the information used to develop protectiveness statements is generally more useful than the protectiveness category itself.

For a detailed explanation of and guidance on conducting five-year reviews, please see "Comprehensive Five-Year Review Guidance" (OSWER 9355.7-03B-P, June 2001).

5.0 MIGRATION OF CONTAMINATED GROUND WATER UNDER CONTROL EI

The GM EI typically documents whether 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. This indicator normally is limited to sites with known ground water contamination[6].

A conclusion of "migration of contaminated ground water under control" generally indicates that all information on known and reasonably expected ground water contamination has been reviewed and the above conditions are met.

5.1 EVALUATING THE MIGRATION OF CONTAMINATED GROUND WATER UNDER CONTROL

Regions should consider the following recommended guidelines when evaluating the GM environmental indicator:

- Sites with past or present ground water contamination should be evaluated. Data for sites where ground water was previously contaminated but has been cleaned up should be evaluated to ensure that the indicator accurately records program progress.
- This evaluation should be made on a site-wide basis, looking at distinct plumes across the entire site.
- The evaluation should be made with "reasonable certainty" (i.e., based on the most current data for the site). Documents such as RODs, Action Memoranda, POLREPS, Five-year Reviews, periodic ground water and surface water monitoring reports, and Close Out Reports are good sources of data and often provide sufficient information. As new data become available, the evaluation can be revised.

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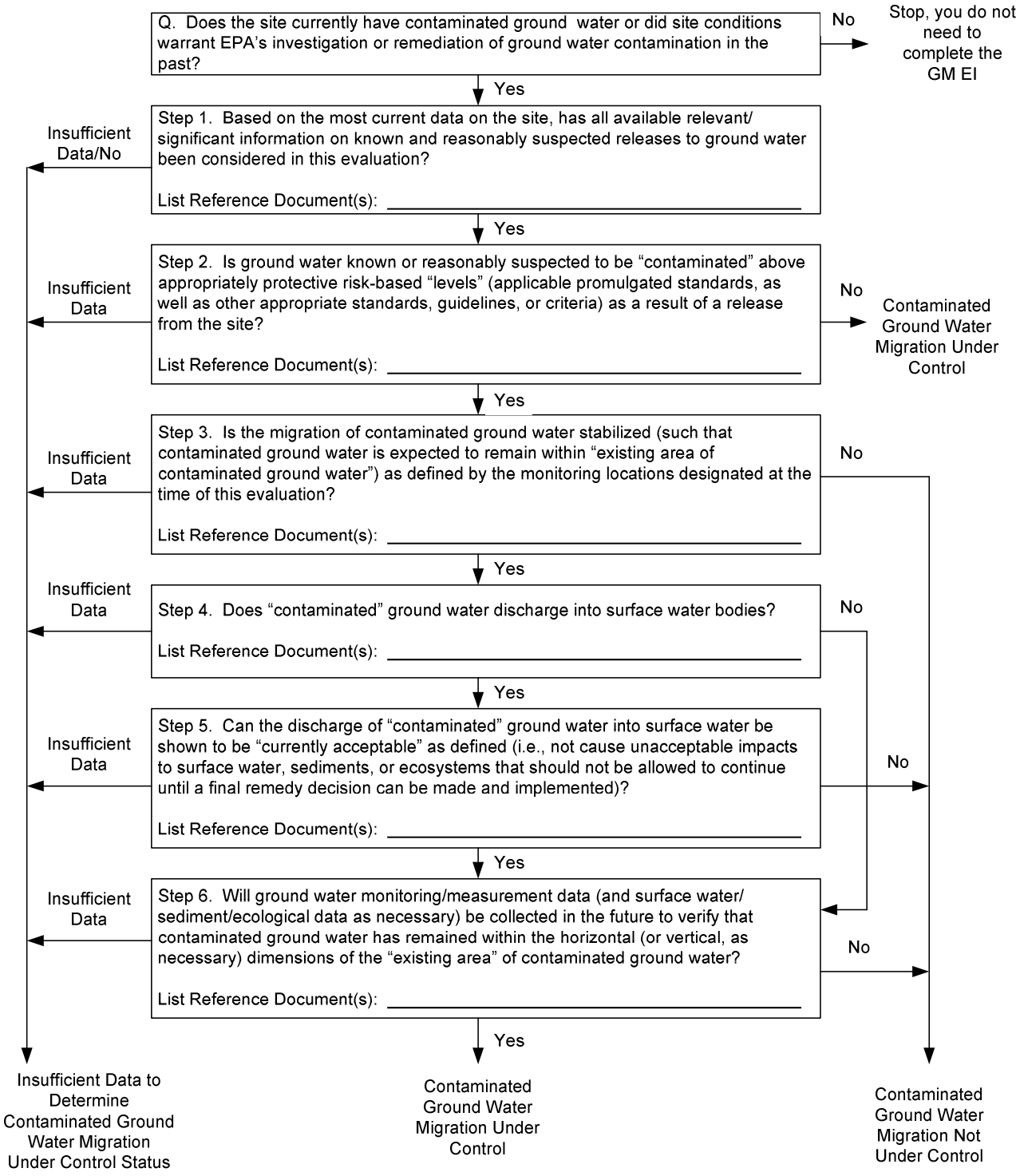
[6] Prior to the publication of this guidance, GM determinations were made only for Superfund final and deleted National Priorities List (NPL) sites. Beginning in fiscal year (FY) 2008, Regions should expand their determinations to include proposed NPL sites and Superfund Alternative (SA) Sites. Results for these site categories will be reported separately. Regions should enter groundwater determinations into CERCLIS before the end of FY 2008, and update these determinations thereafter consistent with this guidance. For SA Sites, the GM determination should apply only to those sites that are actively using the Superfund Alternative approach. These are non-NPL sites with a signed, enforceable agreement for RI/FS, RD, RA or NTCRA finalized after June 2002 where: (a) the agreement contains the SA provisions or has prior written approval to omit the provisions, or (b) the agreement is consistent with EPA SA guidance. For more information regarding SA determinations, consult "Revised Response Selection and Settlement Approach for Superfund Alternative Sites (OSWER 9208.0-18, June 2004).

- The evaluation should be based on the existing plume boundary (not property boundary or projected exposure point).
- Ongoing monitoring should consider both stabilization of migration and impacts to surface water by contamination.
- Limited migration may be consistent with a conclusion that "contaminated ground water migration is under control" if the contaminant migration is associated with a formal natural attenuation remedy.

Regions should use the step-by-step process and worksheet on the following pages to evaluate the GM EI.

Superfund Migration of Contaminated Ground Water Under Control Worksheet

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



Recommendations for completing the worksheet and entering/selecting responses enter into CERCLIS are as follows:

(Step 1) Evaluate whether, based on the most current site data, all available relevant/significant information on known and reasonably suspected releases to the ground water has been considered in this EI evaluation.

- If all available relevant/significant information has not been considered, reevaluate existing data.
- If data are unavailable or are insufficient for this evaluation, select "Insufficient Data" in CERCLIS.
- If all available relevant/significant information has been considered and is sufficient, proceed to Step 2.

Tips for completing rationale:

- "Current data for the site" should be those that describe conditions that are known or suspected at the time the EI evaluation is conducted.
- Review and consider information that is pertinent to the evaluation of contaminated ground water migration. Consider all available sources, even if you decide to base the indicator evaluation on one source or a subset of sources.

(Step 2) Evaluate whether ground water is 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).

- If ground water is not known or reasonably suspected of being contaminated above appropriately protective risk-based levels, site meets definition of "contaminated ground water migration under control." Select "No" in CERCLIS.
- If ground water is known or reasonably suspected of being contaminated above appropriately protective risk-based levels, proceed to Step 3.
- If insufficient data are available, select "Insufficient Data" in CERCLIS.

Tips for completing rationale:

- "Contaminated" refers to concentrations of contaminants that exceed appropriately protective risk-based levels such as chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) or health-based levels developed in a risk assessment or Record of Decision.
- All contaminants of potential concern present at the site above risk-based screening levels should be considered for sites without a ROD. For sites with a ROD, Regions should consider contaminants of concern identified in the Risk Assessment.

(Step 3) Evaluate whether the migration of contaminated ground water is stabilized (such that contaminated ground water is expected to remain within "existing area of contaminated ground water") as defined by the monitoring locations designated at the time of this evaluation.

- If contaminated ground water migration is not stabilized, site does not meet definition of "contaminated ground water migration under control." Select "No" in CERCLIS.
- If contaminated ground water migration is stabilized, proceed to Step 4.
- If insufficient data are available, select "Insufficient Data" in CERCLIS.

Tips for completing rationale:

- The "existing area of contamination" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant ground water contamination associated with this evaluation, and is defined by designated locations proximate to the outer perimeter of "contamination" that can and will be monitored in the future to physically verify that all "contaminated" ground water remains within this area.
- Evaluation of plume stability is based on expectations that the plume will remain in the "existing area of contaminated ground water" and should consider all available data. For Pump and Treat (P&T) remedies, the evaluation should be based on multiple lines of evidence for ground water capture (see Elements for Effective Management of Operating Pump and Treat Systems (Publication 9355.4-27FS-A, December, 2002).
- If monitored natural attenuation (MNA) is the selected remedy for the site, it can be concluded that "contaminated ground water migration is under control" if post-selection monitoring results are consistent with the assumptions used to support the MNA remedy selection (see Section 5.2).

(Step 4) Evaluate whether "contaminated" ground water discharges into surface water bodies.

- If contaminated ground water does not discharge into surface water, proceed to Step 6.
- If contaminated ground water does discharge into surface water, proceed to Step 5.
- If insufficient data are available, select "Insufficient Data" in CERCLIS.

Tips for completing rationale:

- "Surface water bodies" include lakes, rivers, estuaries, etc., and related sediment and ecosystems.
- Regions should base their answers for this step on hydraulic information, considering contaminant information only to the extent that it demonstrates with reasonable certainty that there is no hydraulic connection between the contaminated ground water and surface water.
- Regions should consider both constant and intermittent (e.g., seasonal) discharges – any expected discharge, constant or intermittent, should result in a conclusion for the purposes of completing this EI that ground water discharges to surface water.

(Step 5) Evaluate whether the discharge of "contaminated" ground water into surface water can 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).

- If the discharge is not "currently acceptable," the site does not meet definition of "contaminated ground water migration under control." Select "No" in CERCLIS.
- If the discharge is "currently acceptable, proceed to Step 6.
- If insufficient data are available, select "Insufficient Data" in CERCLIS.

Tips for completing rationale:

- Regions should consider surface water, sediments, and ecosystems to determine whether unacceptable impacts exist at the site.
- Assessment and measurement endpoints should be the same as those being used to make risk management decisions for the site.
- Aquifer contaminant levels identified or developed specifically for the protection of surface water may be used for this evaluation.

(Step 6) Identify whether ground water monitoring/measurement data (and surface water/sediment/ecological data, as necessary) will be collected in the future to verify that contaminated ground water has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated ground water."

- If monitoring/measurement data will not be collected, site does not meet definition of "contaminated ground water migration under control." Select "No" in CERCLIS.
- If monitoring/measurement data will be collected, site meets definition of "contaminated ground water migration under control." Select "Yes" in CERCLIS.
- If insufficient data are available, select "Insufficient Data" in CERCLIS.

Tips for completing rationale:

- Regions should review ground water and surface water monitoring reports on a regular basis (i.e., at the same frequency as monitoring - e.g., quarterly, annually, etc.) and compare to historical data to evaluate the status of the EI evaluation.
- To conclude that "contaminated ground water migration is under control," monitoring should be required to verify that the ground water contamination remains within the "existing area of contaminated ground water" and ensure that surface water impacts remain acceptable, if applicable.
- This question is focused on the future. Regions should consider whether there are plans for monitoring, not whether monitoring has been completed in the past. "Plans for monitoring" will usually be documented in the remedy decision (e.g., ROD), remedial design, Interim RA, PCOR, or similar document.

Data entry instructions for assigning a value to the GM indicator in CERCLIS are discussed in Appendix B.

5.2 CONSIDERING MONITORED NATURAL ATTENUATION REMEDIES

A conclusion that "contaminated ground water migration is under control" is possible for sites where Monitored Natural Attenuation (MNA) is the selected remedy for contaminated ground water. Decisions to employ MNA as the sole remedy or a component of the remedy should be thoroughly and adequately supported with site-specific characterization and analysis. MNA should not be used when it would result in plume migration or unacceptable impacts to environmental resources.

EPA recognizes that a plume boundary may be more realistically defined by a zone rather than a line. Fluctuations within this zone are likely to occur due to a number of factors (e.g., analytical, spatial, or seasonal variability), which may or may not be indicative of a trend in plume migration. Limited plume migration can be acceptable as part of the MNA remedy and, if it is determined that such migration does not indicate a trend, it can be concluded that "contaminated ground water migration is under control" where other conditions for this conclusion are met. However, if post-selection monitoring results suggest that the contamination is not attenuating as expected, the remedy decision may need to be reviewed; a conclusion that "contaminated ground water migration is under control" may not be possible.

5.3 INFORMATION UPDATE AND REPORTING REQUIREMENTS

Regions should complete a copy of the recommended GM EI worksheet in CERCLIS after a site is first listed as Final on the NPL (data can first be entered when the site is Proposed), and update the GM EI as soon as a change in the evaluation is appropriate. At a minimum, data updates should occur by the 5th working day in October of each year.

Changes in EI Status
Update CERCLIS within 30 days of knowing that the EI status has changed.

No Change in EI Status
If there is no change in the status of the GM EI, Regions should update "Last Review Date" in CERCLIS for appropriate indicator on the Site Characterization Screen.

New Listings on the NPL
For sites that are placed on the NPL, update CERCLIS within one year of NPL site listing as Final.

5.4 FREQUENTLY ASKED QUESTIONS – MIGRATION OF CONTAMINATED GROUND WATER UNDER CONTROL

Step 1: Based on the most current site data, has all available relevant/significant information on known and reasonably suspected releases to the ground water been considered in this EI evaluation?		
Question		**Answer**
1-1	What are the best sources of information for me to consider for this EI evaluation?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, annual or periodic ground water and surface water monitoring reports, Five-Year Reviews, etc., are good sources of information.
1-2	No known ground water contamination exists at the site. Do I need to evaluate this EI?	Do not consider this EI if no known *or suspected* ground water contamination exists or has existed in the past at the site. If ground water contamination is known or suspected or if contamination once was present but has since been cleaned up, you should complete all appropriate steps for this evaluation.
1-3	There may be several different sources of information (*e.g.*, State, EPA, PRP). Do I need to be familiar with all of this information to answer this question?	You should be familiar with that information that is: 1) pertinent to evaluation of migration of contaminated ground water; and 2) available to you. If the information from other sources is both relevant and available to you, generally you should consider the contents of this information for this evaluation.
1-4	What if a PRP has drawn different conclusions than EPA regarding the status of contaminated ground water migration? Do I need to consider the PRP's data?	Generally, yes. However, you can decide what weight to place on the PRP's data when determining whether they will be useful for evaluating migration of contaminated ground water for this EI.
1-5	What if I am aware of information that another Agency or a PRP has collected but cannot obtain a copy of it?	If the information is <u>not</u> available for your review, you should <u>not</u> consider this information in evaluating the sufficiency of available information to respond to this EI.
1-6	The site investigation is in the early stages and it is unknown whether the plume is naturally attenuating (*i.e.*, contained). How should I answer this question?	If data are unavailable or insufficient to evaluate the GM EI, you should answer "data incomplete" and select "Insufficient Data" in CERCLIS.
1-7	The pump and treat remedy has been operating for only a short time, and it is unknown whether the plume has been captured. How should I answer this question?	If data are unavailable or insufficient to evaluate the GM EI, answer "data incomplete" and select "Insufficient Data" in CERCLIS.
1-8	How is a "no" answer for Step 1 recorded in CERCLIS?	You should answer either "yes" or "insufficient data" in Step 1. If you answer "no," you should reevaluate the available data to complete an evaluation for this EI.

Step 2: Is ground water known or reasonably suspected to be "contaminated" above appropriately protective risk-based levels as a result of a release from the site?		
Question		**Answer**
2-1	Where can I find the information to answer this question?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, annual or periodic ground water and surface water monitoring reports, Five-Year Reviews, etc., are good sources of information.
2-2	What risk-levels should I use to evaluate this step?	Generally you should use risk levels that are consistent with the most recent stage of the response action. Risk-based levels such as chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) or health-based levels developed in a risk assessment or Record of Decision are appropriate.
2-3	How should I interpret whether ground water is "reasonably suspected" to be contaminated if my sampling data are limited?	In the absence of extensive sampling and analytical data, you should use your best judgment. If evidence–even limited evidence–indicates that there is a reasonable possibility of ground water contamination, you should answer either "yes" or "insufficient data." The EI requires that you make your evaluation with "reasonable certainty."
2-4	How do I answer this question if some ground water contaminant levels are below their respective risk-based levels and others are above?	If the concentration of any contaminant in ground water exceeds its appropriately protective risk-based level, you should answer "yes" to this question.
2-5	Does a single "hit" of contamination mean that I should answer "yes" to this question?	Generally you should base your evaluation on the information and approach being used for risk-based decisions at the site. If you are in the early stages of the investigation, with limited data, a single hit may be enough to draw a "yes" conclusion if multiple lines of evidence corroborate this conclusion. Generally you should use professional judgment to evaluate this question with reasonable certainty. If data do not allow you to make a judgment with reasonable certainty, you should answer "insufficient data" to this question.
2-6	Should I use average, UCL on the mean, or another type of concentration when answering this question?	Generally you should base your evaluation on the information and approach being used for risk-based decisions at the site. If you are at a later stage in the cleanup process and the UCL is being used as the exposure point concentration, you should use this to answer this question.
2-7	How should I answer this question if the contaminant levels are above Preliminary Remediation Goals (PRGs) but below final cleanup levels?	Generally you should use the risk-based levels that are consistent with the most recent stage of the response action. If final cleanup levels are the most recent risk-based numbers, you should base your answer on final cleanup levels. If PRGs are the most recent risk-based levels, you should base your answer on PRGs.

Step 2: Is ground water known or reasonably suspected to be "contaminated" above appropriately protective risk-based levels as a result of a release from the site?		
2-8	If more than one distinct contaminated plume exists at a site, should I make the evaluation based on only one plume or multiple plumes?	If more than one distinct plume exists at a site and only one plume contains contaminants above risk-based levels, generally you should answer "yes" to this question and continue with step 3. Ultimately, if you determine migration of contaminated ground water plume is under control for one plume but not another, the site does not meet the definition of "contaminated ground water migration under control." Generally you should answer "no" in CERCLIS if any plume does not meet the definition as defined in steps 2-6.
2-9	If multiple distinct plumes exist at the site, do I consider each plume separately?	Generally you should evaluate each plume separately, to the extent that the plumes can be separately identified. If you answer "yes" for a ground water plume in this step, you should continue to step 3 (and subsequent steps, if applicable) for that plume. If you answer "no" for a plume in this step, this plume can be dropped from further consideration under this EI. Ultimately, if you determine migration of contaminated ground water plume is under control for one plume but not another, the site does not meet the definition of "contaminated ground water migration under control."
2-10	What should I do if the risk-based levels that I used to answer this question change as we learn more about the site?	If risk-based levels change, you should consider whether the change would effect the GM EI evaluation for the site. If so, you should update the EI evaluation to reflect the new information.
2-11	What should I do if the Contaminants of Concern (COCs) in ground water change or contaminant concentrations are reevaluated as we learn more about the site?	If COCs in ground water change or contaminant concentrations are reevaluated based on new data, generally you should consider whether the change would effect the EI evaluation for the site. If so, you should update the EI evaluation to reflect the new information.

Step 3: Is the migration of contaminated ground water stabilized as defined by the monitoring locations designated at the time of the evaluation?		
Question		**Answer**
3-1	Where should I find information to answer this question?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, annual or periodic ground water and surface water monitoring reports, Five-Year Reviews, etc., are good sources of information.

Step 3: Is the migration of contaminated ground water stabilized as defined by the monitoring locations designated at the time of the evaluation?		
3-2	If monitored natural attenuation has been selected as the remedy for a site, can I answer "yes" to this question?	Monitored natural attenuation does not preclude you from answering "yes" to this question. If the selected remedy is monitored natural attenuation and the plume meets conditions set forth in steps 1-3, you should answer "yes" to this question and proceed to step 4.
3-3	If one monitoring location shows a single "hit" of a contaminant of concern, should I answer "no" to this question?	Generally, the evaluation that migration has stabilized will require consideration of site characteristics and multiple rounds of sampling to assess any trends. A single "hit" should be considered in the context of these other data. If the data are limited, you should use your best professional judgment to answer the question with reasonable certainty. If uncertainty persists, you should answer "insufficient data."
3-4	How is the "existing area of contamination" determined?	The existing area of contamination is defined by designated locations proximate to the outer perimeter of contamination that can and will be monitored in the future to physically verify that all contamination remains in this area. Note that monitoring wells used to make this evaluation should be located inside the area of contamination (they do not have to be "clean" wells). You do not need to continue to monitor wells that show consistently low levels of contamination solely for the purposes of this EI. Generally you should use the data that you would normally collect to monitor site conditions when evaluating this EI.
3-5	I have very limited data on which to judge the stability of the plume. Can I answer "insufficient data" to this question? What is "sufficient?"	Generally, yes, you should answer "insufficient data" in such an instance. Each site is unique, so there is no common definition of "sufficiency." You should use your best professional judgment and determine your answers based on "reasonable certainty."
3-6	Evidence indicates contamination beyond the existing area, but the contamination is below risk-based levels. How would this question be answered for this scenario?	Contamination levels outside of the area of contamination need not exceed risk-based levels to show migration of the plume. If contamination has been identified outside of the existing area of contamination, you should consider all of the information available, including capture zone analyses (for P&T remedies) and use your best judgment to assess whether migration of the plume is stabilized.

Step 3: Is the migration of contaminated ground water stabilized as defined by the monitoring locations designated at the time of the evaluation?		
3-7	Only some contaminants (Contaminants of Potential Concern (COPC) or non-COPCs) associated with a site were detected outside the area of existing contamination. Should I consider the plume not stable?	Any contaminant–COPC or non-COPC– associated with the ground water plume that has migrated beyond the area of existing contamination could be an indication that the plume is not stabilized. Generally you should consider all available analytical and hydraulic information and use your best judgment to assess whether migration of the plume is stabilized.
3-8	Multiple plumes exist at a site. At least one is stabilized. How do I record this for this EI step?	The EI evaluation should be made on a site-wide basis. If any plume for which you answered "yes" in step 2 is not stable, the site does not meet the definition of "contaminated ground water migration under control." Generally you should answer "no" to this question.
3-9	What should I do if the COCs in ground water change or contaminant concentrations are reevaluated as we learn more about the site?	If COCs in ground water change or contaminant concentrations are reevaluated based on new data, you should consider whether the change would effect the EI evaluation for the site. If so, you should update the EI evaluation to reflect the new information.
3-10	What if monitoring locations change in the future?	If monitoring locations for the existing area of contamination change, you need not update this EI unless contamination is found outside of the area of contamination as determined by those monitoring locations. If so, you should update the EI evaluation to reflect the new information.

Step 4: Does contaminated ground water discharge into surface water bodies?		
Question		**Answer**
4-1	Where can I find the information to answer this question?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, annual or periodic ground water and surface water monitoring reports, Five-Year Reviews, etc., are good sources of information.
4-2	If surface water data are limited (*e.g.*, no surface water samples have been collected), how should I evaluate this question?	In the absence of a complete characterization of the ground water to surface water pathway, you should use your best judgment. Ground water and hydrological investigations collected during the RI may provide enough information to evaluate this question with "reasonable certainty." You could also consult the Conceptual Site Model (CSM) to determine whether it would be reasonable to assume ground water discharge. If no information is available, you should answer either "no" or "insufficient data."
4-3	Ground water to surface water discharge is not constant or is very sporadic. Should I answer "yes" to this question?	If ground water has been documented to discharge to surface water at any time, you should answer "yes" to this question.
4-4	Ground water to surface water discharge has been documented; however, sampling did not show contamination in the surface water at the discharge point. Therefore, I cannot assume "contaminated" ground water is discharging at this point. Should I answer "no" to this question?	You should base your answer on "reasonable certainty." If you are reasonably certain no contaminated ground water is discharging to surface water, you should answer "no" to this question. However, if you are unsure or your professional judgment leads you to think contaminated ground water is discharging to surface water (*e.g.*, contamination exists at the ground water table just upgradient of the surface water body), you should answer "insufficient data" or "yes" based on your level of certainty.
4-5	Multiple plumes exist at the site. Only one plume discharges contamination into a surface water body. How do I answer this question?	The EI evaluation is made on a site-wide basis. If contaminated ground water associated with a plume for which you answered "yes" in step 3 discharges into surface water, you should answer "yes" to this question and answer question 5 for this plume.
4-6	Should future/past discharges be considered when evaluating this question?	Because ground water levels and discharge to surface water can fluctuate throughout the year, future or past discharges should be considered when answering this question. If there is evidence of past discharges, or likelihood of future discharges, you should answer "yes" to this question regardless of current conditions. If conditions change, preventing future discharge you should answer "no" to this question. (See question 4-7).

Step 4: Does contaminated ground water discharge into surface water bodies?		
4-7	What if conditions change and a remedy prevents future discharges?	Generally you should reevaluate the answer to this question if conditions change. If a remedy addresses contaminated ground water discharge into surface water so that surface water is unlikely to receive future ground water discharge, you should answer "no" to this question.

Step 5: Can the discharge of contaminated ground water into surface water be shown to be currently acceptable as defined (*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)?		
Question		**Answer**
5-1	Where can I find the information to answer this question?	Documents such as RI/FS reports, RODs, Action Memoranda, POLREPS, Close Out Reports, annual or periodic ground water and surface water monitoring reports, Five-Year Reviews, etc., are good sources of information.
5-2	Should I use ground water contaminant levels (identified in step 2) to determine if discharge of contaminated ground water to surface water is within currently acceptable limits?	Generally, no. You should base your decision on contaminant levels identified or developed specifically for the protection of surface water (*e.g.*, Ambient Water Quality Criteria (AWQC)). Generally you should use those surface water standards or other contaminant levels being used for risk-based decisions for the site.
5-3	What if surface water contaminant levels are above one standard, but below another? How should I answer this question?	Generally you should base your answer on the standards being used for risk based decisions for the site. If contaminant levels are above a standard that has been deemed the "acceptable" level for a site, you should answer "no" to this question.
5-4	Water quality standards (*e.g.*, TMDLs, AWQC) have not been developed for any contaminants at the site. How should I evaluate this question?	In the absence of water quality standards, you should base your evaluation on the best available information. If evidence suggests that ground water discharge has resulted in unacceptable impacts on surface water (*e.g.*, if remedial actions are planned for the surface water pathway), you should answer "no" to this question.
5-5	At present, discharge of contaminated ground water to surface water is acceptable. Should I answer "yes" now and change the response to "no" if and when the surface water contaminant concentrations reach a level such that the surface water, sediment, or ecosystems are negatively impacted?	Generally you should use your professional judgment or consult the risk assessment for aid in making this decision with reasonably certainty. You should answer "no" only if future impacts to surface water are imminent (*i.e.*, are expected to occur before remedial actions can be implemented).

Step 5: Can the discharge of contaminated ground water into surface water be shown to be currently acceptable as defined (*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)?		
5-6	The only contaminants detected in the surface water are not present in the ground water plume. If these contaminants are above acceptable levels, but might not be related to the ground water plume, should I answer "yes?"	Generally you should use your professional judgment and consider all aspects of the site, including the extent of sampling conducted at the time of evaluation, in order to determine the answer. If the contaminants are clearly not related to ground water, you should answer "yes" to this question and continue with the worksheet.
5-7	Some contaminants in surface water are at acceptable levels, others are not. How should I answer this question?	If any contaminant associated with the discharge of ground water is found in surface water above acceptable limits, you should answer "no" to this question.
5-8	Contaminants associated with ground water discharge were found in sediment samples at unacceptable levels, but not in surface water samples. Is it appropriate to answer "no" to this question if only sediment contamination is found?	Generally, yes. Sediments should be considered when evaluating this question. Past releases could be "trapped" in sediments after surface water contamination has been cleared. Because of this, sediment contaminant levels may not correlate directly with surface water contaminant levels. It is conceivable that sediment contamination may be measured even if surface water contamination is not detected. Therefore, assuming the contamination can be associated with present or past ground water discharge (see questions 4-6 and 4-7), you should answer "no" to this question.
5-9	How do I answer this question if contaminant levels in surface water/sediment/ecosystems have decreased to acceptable limits?	If ground water discharge continues, yet surface water contaminant levels are within currently acceptable limits, you should answer "yes" to this question and continue to step 6.

Step 6: Will ground water monitoring/measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated ground water has remained within the horizontal (or vertical, as necessary) dimensions of the existing area of contaminated ground water?		
Question		**Answer**
6-1	Where can I find the information to answer this question?	Documents such as RODs, Action Memoranda, POLREPS, Close Out Reports, Five-Year Reviews, etc., are good sources of information.
6-2	How should the existing area of contaminated ground water be defined?	Generally you should define the existing area of contaminated ground water consistent with step 3.
6-3	What if future monitoring shows migration of the ground water plume?	Your answer to this step should be based only on whether or not monitoring is planned for the future. If the plume characteristics change in the future, the EI should be reevaluated.

Step 6: Will ground water monitoring/measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated ground water has remained within the horizontal (or vertical, as necessary) dimensions of the existing area of contaminated ground water?		
6-4	Contaminated ground water discharges to surface water at the site. However, adverse surface water impacts have not been shown from discharging contaminated ground water. No future monitoring is planned. Should I answer "no" to this question, even if future impacts to surface water are possible?	The decision not to monitor surface water suggests that future impacts are unlikely; therefore, there is no need to consider whether surface water monitoring is planned when answering this question. However, if future ground water monitoring suggests changing conditions that could result in surface water impacts, the EI evaluation should be reconsidered.
6-5	No vertical dimensions have been estimated for the plume. Does the future monitoring need to consider vertical dimension?	If vertical dimensions have not been established for the existing area of contamination, future monitoring does not need to consider vertical dimensions in order for you to answer "yes" to this step.
6-6	The ground water contamination has been cleaned up and monitoring efforts are ceasing. Should I answer "no" to this question if EPA ceases monitoring in the future?	If the site has been cleaned-up or otherwise addressed, ground water will likely be below protective risk-based levels. If this is the case, you should answer "no" to step 2 and the site should meet the definition of "migration of contaminated ground water under control."
6-7	Monitoring efforts are being halted (by outside agency, state, etc.); however, contamination still exists at the site. How do I answer this question if site conditions are thus changed?	If site conditions do not allow you to answer "no" to step 2, you should continue with worksheet. In step 6, you need to evaluate your answer based on current known decisions. If monitoring is being ceased in the future, you should answer "no" to this question.

Superfund Environmental Indicators Guidance
Human Exposure Revisions

APPENDICES - DATA VIEWING AND ENTRY

Office of Superfund Remediation and Technology Innovation
U.S. Environmental Protection Agency
Washington, D.C. 20460

March 2008

Appendix A – DATA VIEWING

The purpose of the data viewing section is to describe the methods used to view current Environmental Indicator data in CERCLIS, and to identify and define each of the data elements displayed on each screen. These data will serve as an effective tool to help the Regions monitor their cleanup progress, support Government Performance and Results Act (GPRA) reporting, and construct accurate fact sheets. Covered in Appendix A is the step-by-step process to view the data reported for the following Environmental Indicators:

POPULATIONS PROTECTED—The Populations Protected Superfund EI was developed to measure the progress made in protecting individuals living at or near Superfund sites from immediate threats of exposure to contaminated media. Specifically, this EI measures the number of individuals protected through the provision of alternate drinking water and the number of individuals temporary or permanently relocated in response to contamination.

CLEANUP VOLUMES—The Cleanup Volumes indicator reports the amount of contaminated materials that have been treated, stabilized, or disposed of at Superfund sites through the use of risk management, engineering technologies, and institutional controls.

SITE-WIDE HUMAN EXPOSURE (HE)—The HE indicator documents long-term human health protection on a site-wide basis by measuring the incremental progress achieved in controlling unacceptable current human exposures at a Superfund site

MIGRATION OF CONTAMINATED GROUND WATER UNDER CONTROL (GM)—The GM indicator describes whether contamination is below protective, risk-based levels or, if not, whether the following conditions are met:

- migration of contaminated ground water is stabilized;.
- there is no unacceptable discharge to surface water; and
- monitoring will be conducted to confirm that affected groundwater remains in the original area of contamination.

APPENDIX A – DATA VIEWING

A.1. VIEWING EI SCREENS IN CERCLIS

The EI data entry and viewing module currently resides in the Program Management portion of CERCLIS. EI data should be reviewed quarterly to ensure the most updated information is available for reporting. End of year EI data entry and review must be completed by October 5th of each year.

A.2. ACCESSING CLEANUP VOLUMES AND POPULATIONS PROTECTED DATA IN CERCLIS

From the Views menu, select Program Management, then **Environmental Indicators**.

-OR-

From the Removal or Remedial Schedule, the **Add/Edit EI icon** can be selected when one of the following actions are highlighted on the schedule: Removal; PRP Removal; FF Removal; Remedial Action; PRP RA; FF RA; PRP Emergency

APPENDIX A – DATA VIEWING

WasteLAN (Version 3.19) TEST DATABASE - TEST DATA ONLY - [Remedial Schedule SALEM ACRES/0100727]

File Views Utilities Options Window Help

Site List | Reports | Add Action | Add Sub Actio | Delete | Reorder | Worksheet | Detail | Financial | SCAP | Add/Edit El | Help Index | Exit

Project Segment: Remedial Pipeline (RP2M)

Operable Unit: * Entire Site

Project Schedule | Cascade | Comment | Action Relationship | Compare

S	C	OU	Action Name	Sq	Ld	Planned Start	FYQ	Planned Complete	FYQ	Actual Start	Actual Complete	H	Qual	Takeover Phased	SCAP Note
		00	PROPOSAL TO NPL	1	F	00/00/0000		00/00/0000		00/00/0000	10/15/1984				49 FR 40320
		00	FINAL LISTING ON NPL	1	F			00/00/0000			06/10/1986				51 FR 21054
		00	DELETION FROM NPL	1	F	07/23/2001	2001/4	07/23/2001	2001/4	00/00/0000	07/23/2001				Deletion from NPL
		00	REMOVAL NEGOTIATIONS	1	FE	00/00/0000		00/00/0000		08/10/1987	11/02/1987				FAILED
	C	00	REMOVAL	1	F	00/00/0000		00/00/0000		04/10/1987	04/08/1988		S		UNANTICIPATED; HIGH
		00	Approval Of Action Memo	1	F			00/00/0000			04/15/1987				
		00	ADMINISTRATIVE RECORDS	1	FE	00/00/0000		00/00/0000		11/13/1990	00/00/0000		V		
	C	00	REMOVAL	2	F	00/00/0000		00/00/0000		09/11/1990	10/11/1990		S		FENCE
		00	Approval Of Action Memo	2	F			00/00/0000			09/11/1990				
		00	ADMINISTRATIVE RECORDS	2	FE	00/00/0000		00/00/0000		06/11/1991	00/00/0000		V		
		00	Public Notice Published	1	FE			00/00/0000			06/10/1991				
		00	REMOVAL ASSESSMENT	2	F	00/00/0000		00/00/0000		06/28/1990	09/11/1990				RV REQ DONE 9/27/90
		00	REMOVAL ASSESSMENT	1	F	00/00/0000		00/00/0000		00/00/0000	10/15/1992				NO IMMEDIATE THREAT
		00	REMOVAL ASSESSMENT	4	F	00/00/0000		00/00/0000		04/12/1993	04/12/1993				REMOVAL
		00	REMOVAL ASSESSMENT	3	F	00/00/0000		00/00/0000		06/29/1993	06/29/1993				
		00	NPL RP SEARCH	1	FE	00/00/0000		00/00/0000		00/00/0000	05/15/1985				
		00	RI/FS NEGOTIATIONS	1	FE	00/00/0000		00/00/0000		10/01/1986	06/15/1987				104/122 AOC
		00	ADMIN ORDER ON CONSENT	1	FE			00/00/0000			06/15/1987				
		00	Effective Date	4	FE			00/00/0000			06/15/1987				
		01	RISK/HEALTH ASSESSMENT	1	RP	00/00/0000		00/00/0000		00/00/0000	05/29/1992				
		01	PRP RI/FS	1	RP	06/30/1987	1987/3	03/31/1993	1993/2	06/15/1987	03/25/1993				
		01	Start Of Public Comment	1	RP			12/31/1992	1993/1		06/25/1992				
		01	COMMUNITY INVOLVEMENT	1	FE	06/30/1987	1987/3	03/31/1993	1993/2	04/15/1986	03/25/1993				
		01	STATE SUPPORT AGENCY COO	1	S	03/31/1987	1987/2	09/30/2001	2001/4	03/26/1987	03/22/2001				Compl=Final COR
		01	TECHNICAL ASSISTANCE	1	F	09/30/1990	1990/4	03/31/1993	1993/2	09/28/1990	03/25/1993				PNRS
		01	ECOLOGICAL RISK ASSESSME	1	RP	00/00/0000		00/00/0000		00/00/0000	05/29/1992		H		
		01	ADMINISTRATIVE RECORDS	3	FE	09/30/1989	1989/4	03/31/1993	1993/2	09/15/1989	03/25/1993			E	

Save Options | Display Modified Actions | OK | Cancel

Removal/Remedial Schedule

APPENDIX A – DATA VIEWING

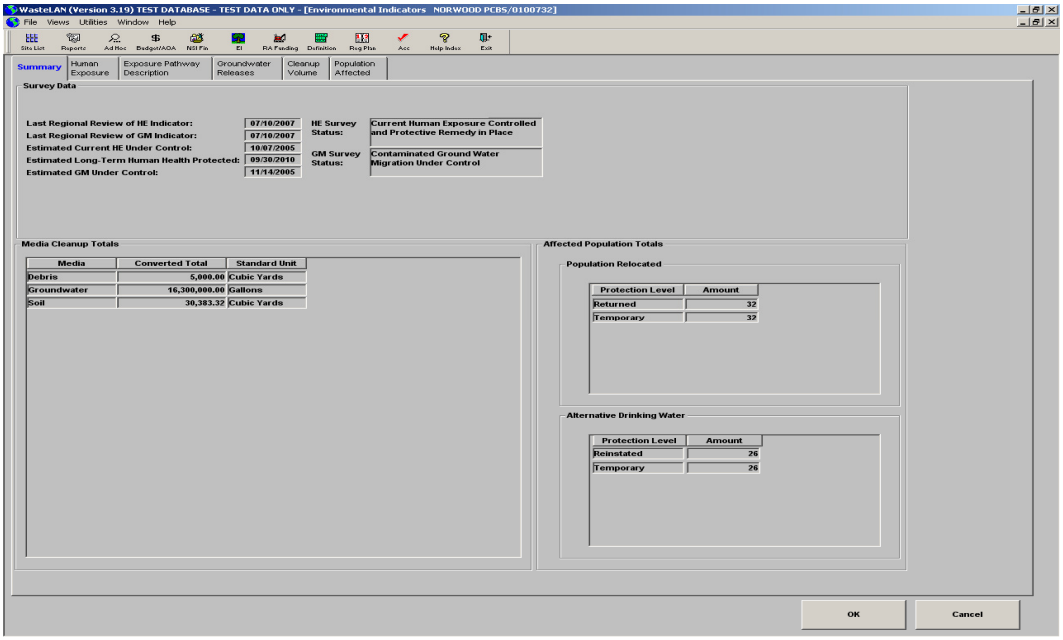
A.3. VIEWING THE ENVIRONMENTAL INDICATORS SUMMARY DATA

The Summary tab is the first tab that appears when entering the EI module. The Summary displays a roll-up of the data entered for each indicator on the subsequent tabs. Data are summarized under the following headings:

1. HE and GM Survey Summary – displays HE and GM evaluations, last Regional review dates, and in cases where either HE or GM is not controlled, estimated control dates.

2. Media Cleanup Totals – displays total cleanup volume at the site by media.

3. Affected Population Totals – displays the number of people protected, and the level of protection provided (permanent, temporary, or returned/reinstated) to individuals relocated from their homes or distributed an alternate source of drinking water.



Summary tab

A.4. VIEWING THE HUMAN EXPOSURE TAB

The HE tab displays the human exposure survey questions and responses, the documentation supporting survey responses, and projected dates for achieving human exposure control and long-term human health protection. The table below lists each of the data fields displayed on the HE tab and their definition.

Data Fields	Definition
Final and Draft Radio Button	Indicates whether the HE survey is saved as draft or saved as final.
HE Survey Status	Displays current HE evaluation based on HE survey results. This field is automatically generated.
Justification Date	Date the Justification Text field was populated. This field is automatically generated
Justification Type	Shows most recent change in HE status. Displays prior HE status followed by current HE status.
Justification Text	Explanation of the rationale for the change in HE evaluation. Required field when a site moves from an HE Status of Under Control to a Status of Not Controlled or Insufficient Data.
Estimated Current HE Control Date	Estimated date site conditions will warrant a evaluation of at least Human Exposure Under Control.
Estimated Long-Term Human Heath Protected Date	Estimated date site conditions will warrant an evaluation of Long-Term Human Health Protection Achieved.
RPM Certified Checkbox	Flag indicating that HE survey has been reviewed by the RPM.
Step 1 – Step 5	Series of questions that generate a site-wide Human Exposure evaluation.
SDMS Control Number	SDMS document number associated with documented listed in the site reference document data field.
List Site Reference Document	Reference document that supports rationale for the Yes/No response to each Step in the HE survey

APPENDIX A – DATA VIEWING

Note: Full screen shot is not provided below, as a portion of the screen is currently under undergoing modification.

WasteLAN (Version 3.19) TEST DATABASE - TEST DATA ONLY - [Environmental Indicators NORWOOD PCBS/0100732]

File Views Utilities Window Help

Site List Reports Ad Hoc Budget/AOA NSI Fin EI RA Funding Definition Prog Plan Acc Help Index Exit

Summary | Human Exposure | Exposure Pathway Description | Groundwater Releases | Cleanup Volume | Population Affected

Final Draft

HE Survey Status: Current Human Exposure Controlled and Protective Remedy in Place

Justification Date: 10/07/2005

Justification Type: HEUC-HEPR

Estimated Current HE Under Control Date: 10/07/2005

Estimated Long-Term Human Health Protected Date: 09/30/2010

RPM Certified

Justification Text:

Current ICs are in place and effective. Pending decision on groundwater RA, may be able to change status again to Long Term Protected.

Step 1: Is enough information available to evaluate the status of human exposure control using this indicator?

Step 1: Yes

SDMS/Control Number:

List site reference document: 5 Year Review, 2005

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

Step 2: No

SDMS/Control Number:

List site reference document: ESD

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?

Step 3: No

SDMS/Control Number:

List site reference document: 5 Year

Step 4: Are the potential human exposures associated with complete pathways within acceptable limits under current conditions?

Step 4: (Blank)

SDMS/Control Number:

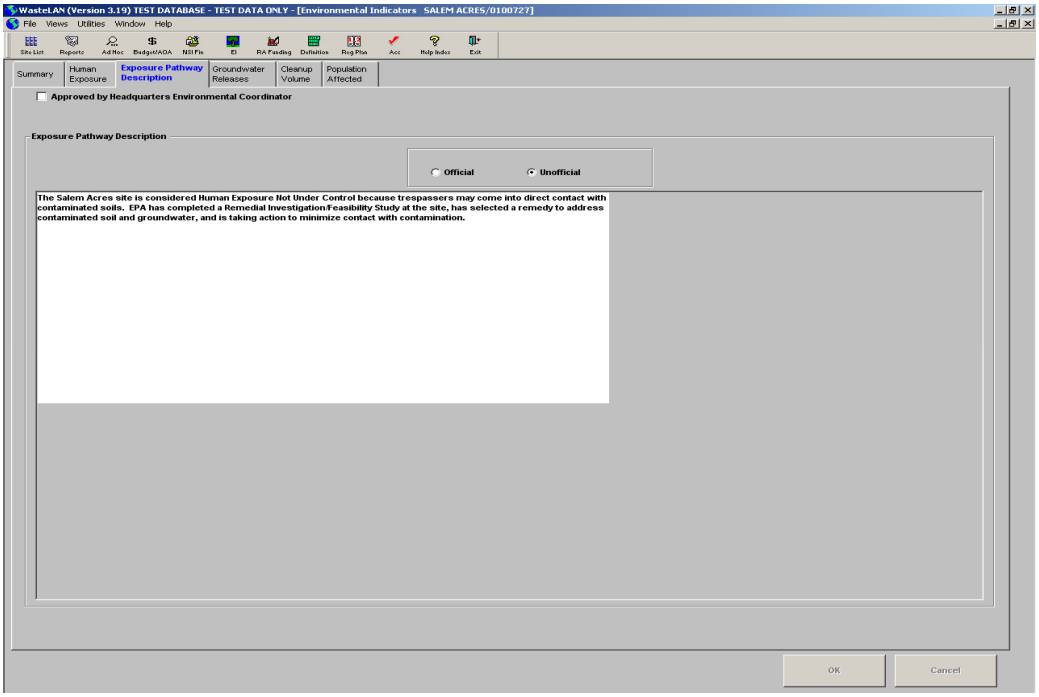
List site reference document:

Human Exposure tab

A.5. VIEWING THE EXPOSURE PATHWAY DESCRIPTION TAB

The Exposure Pathway Description tab displays a textual summary of the rationale explaining why a site has not achieved a human exposure status of "Under Control" or greater. This rational is only required for sites with a human exposure status of "Not Controlled" or "Insufficient Data."

The summary will be marked as "unofficial" until it is approved by the Headquarters EI Coordinator which is noted by a checkbox at the top of the screen.



Exposure Pathway Description tab

A.6. VIEWING THE MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL TAB

The GM tab displays the migration of contaminated groundwater survey questions and responses, the documentation supporting survey responses, and projected dates for achieving groundwater migration control. The table below lists each of the data fields displayed on the GM tab and their definition.

Data Fields	Definition
Final and Draft Radio Button	Indicates whether the GM survey is saved as draft or saved as final.
GM Survey Status	Displays current GM evaluation based on GM survey results. This field is automatically generated.
Justification Date	Date the Justification Text field was populated. This field is automatically generated
Justification Type	Shows most recent change in GM status. Displays prior GM status followed by current status.
Justification Text	Explanation of the rationale for the change in GM evaluation. Required field when a site moves from a GM Status of "Under Control" to a Status of "Not Controlled" or "Insufficient Data."
Estimated GM Control Date	Estimated date site conditions will warrant a status of "Groundwater Migration Under Control." Required field for sites with a GM status of "Not Controlled" or "Insufficient Data."
RPM Certified Checkbox	Flag indicating that GM survey has been reviewed by the RPM.
Step 1 – Step 5	Series of questions that generate a site-wide Migration of Contaminated Under Control evaluation.
SDMS Control Number	SDMS document number associated with documented listed in the site reference document data field.
List Site Reference Document	Reference document that supports rationale for the Yes/No response to each Step in the HE survey

APPENDIX A – DATA VIEWING

WasteLAN (Version 3.19) TEST DATABASE - TEST DATA ONLY - [Environmental Indicators NORWOOD PCBS/0100732]

File Views Utilities Window Help

Site List Reports Ad Hoc Budget/AOA NSI Fin EI RA Funding Definition Reg Plan Acc Help Index Exit

Summary | Human Exposure | Exposure Pathway Description | **Groundwater Releases** | Cleanup Volume | Population Affected

(•) Final ( ) Draft

GM Survey Status: Contaminated Ground Water Migration Under Control

Justification Date: 00/00/0000 Justification Type:

Estimated Under Control Date: 11/14/2005 Justification Text:

[x] RPM Certified

Q: Does the site currently have contaminated groundwater or did site conditions warrant EPA's investigation or remediation of groundwater contamination in the past?

A: Yes

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

Step 1: Yes SDMS/Control Number: List site reference document:

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, guidance, or criteria) anywhere at or from the site?

Step 2: Yes SDMS/Control Number: List site reference document:

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 determination?

Step 3: Yes SDMS/Control Number: List site reference document:

Step 4. Does "contaminated" groundwater discharge into surface water bodies? If yes, please proceed to Step 5. If no, please scroll below to Step 6.

Step 4: No SDMS/Control Number: List site reference document:

Step 5. Can the discharge of "contaminated" groundwater into 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)?

Step 5: (Blank) SDMS/Control Number: List site reference document:

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 within the horizontal (or vertical, as necessary) dimensions of the "existing

OK Cancel

Groundwater Releases tab

A.7. VIEWING THE CLEANUP VOLUME TAB

The Cleanup Volumes tab displays, and allows for entry of cleanup data at the action and media level. These data are then rolled up on the Summary tab as a cumulative number by media. Volumetric data can be sorted by action via the Action drop-down box. The table below lists each of the data fields displayed on the Cleanup Volumes tab and their definition.

Data Fields	Definition
Action	Displays removal and remedial actions that have taken place at the site. The materials removed, treated, or disposed of should be associated with an action from the drop-down.
Cleanup Date	Date the material was removed, treated, or disposed.
Media Name	The name describing the contaminated media addressed. The media name is pulled in from the data entered on the add/edit media screen for the site.
Original Amount	Volume of material that was removed, treated, or disposed of.
Original Unit	Volumetric unit associated with the material addressed.
Converted Amount	Volume converted into standard units of gallons or cubic yards. This field is automatically generated.
Converted Unit	Unit of gallons or cubic yards. This field is automatically generated.

WasteLAN (Version 3.19) TEST DATABASE - TEST DATA ONLY - [Environmental Indicators NORWOOD PCBS/0100732]

File Views Utilities Window Help

Site List Reports Ad Hoc Budget/AOA NSI Fin EI RA Funding Definition Reg Plan Acc Help Index Exit

Summary | Human Exposure | Exposure Pathway Description | Groundwater Releases | Cleanup Volume | Population Affected

Action: All

Cleanup Date	Media Name	Original Amount	Original Unit	Converted Amount	Converted Unit
06/02/1999	Grant Gear Bldg	5,000.	Cubic Yards	5,000.	Cubic Yards
09/26/2001	GROUNDWATER 01	16,300,000.	Gallons	16,300,000.	Gallons
06/02/1999	Soil/sediment	20,000.	Cubic Yards	20,000.	Cubic Yards
08/18/1999	Soil 01	10,000.	Cubic Yards	10,000.	Cubic Yards
08/03/1983	SOIL 01 MATRL	383.32	Cubic Yards	383.32	Cubic Yards

Add Row Delete Row

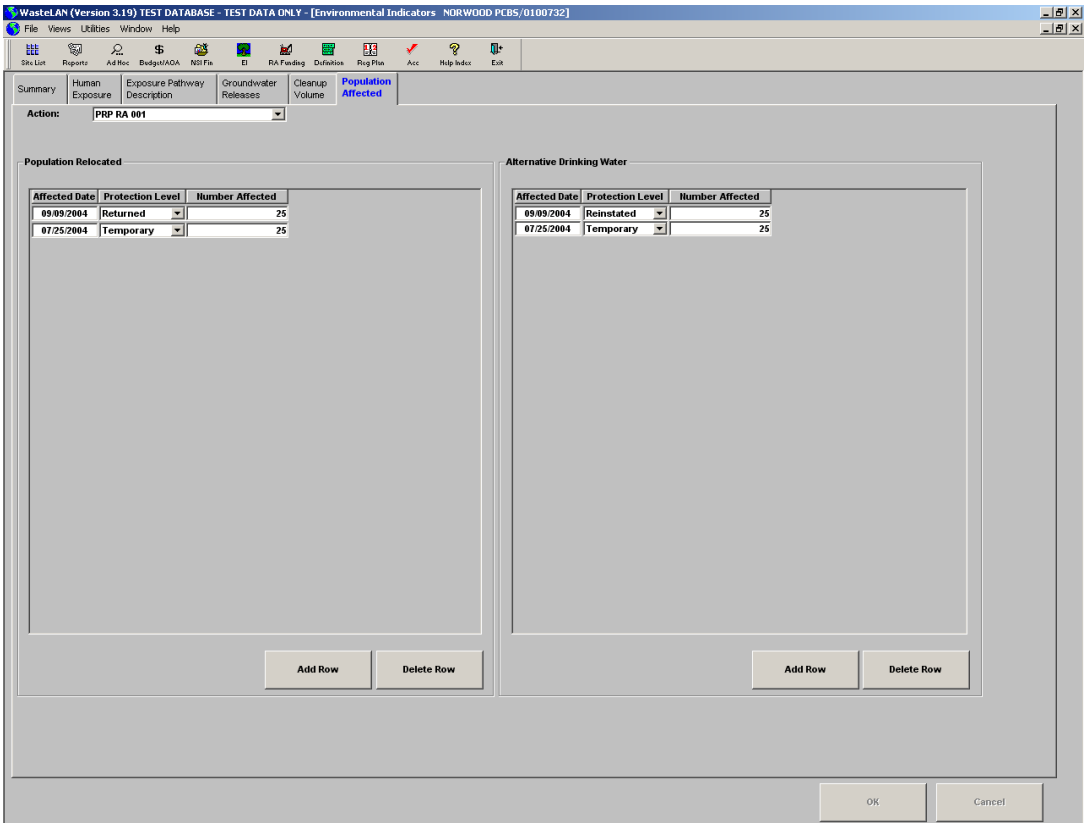
OK Cancel

Cleanup Volumes tab

A.8. VIEWING THE POPULATIONS PROTECTED TAB

The Populations Protected tab on the Add/Edit EI screen displays by action, the number of people supplied alternative drinking water, the level of protection they received (temporary, permanent, reinstated) and the date the protection was put in place. Similarly, the Populations Protected tab displays the number people relocated either (temporarily, permanently, or returned), and the date on which the relocation or return occurred. Population Protected data can be sorted by action via the Action drop-down box. The table below lists each of the data fields displayed on the Cleanup Volumes tab and their definition.

Data Fields	**Definition**
Action	Displays removal and remedial actions that have taken place at the site. The alternate water supplied and/or relocation measures should be associated with an action from the drop-down.
Affected Date	Date that alternate water was provided and/or people relocated.
Protection Level	The level of protection associated with the alternate water or relocation measure, i.e. permanent, temporary, or restored.
Number Affected	Volume of material that was removed, treated, or disposed of.



Populations Affected tab

Appendix B – DATA ENTRY

The purpose of the data entry section is to provide instructions for entering data in support of the EI Program. The methods used to report EI data at important milestones of cleanup are detailed below. The frequency of data entry should, at a minimum, be once a year. However, by entering data at more frequent intervals, the EI module will serve as a better tool for the Regions to monitor their progress. Detailed guidance on the frequency for EI data and the events that trigger the need to enter new date or update existing data is provided in Sections 3 through 5 of this document.

B.1. ENTERING SITE-WIDE HUMAN EXPOSURE DATA

1. In CERCLIS use the following path to access the Human Exposures tab within the EI Module:
   Views menu>Program Management>Environmental Indicators>Human Exposures tab. Or, alternatively, **Views>Site Information>Site Status and Description/Operable Units>Environmental Indicators Survey button>Human Exposures tab**.

2. Enter a response to Step 1 of the Human Exposure survey. Based on your response you will continue to the next step or the survey will be complete. A pop-up box will provide notification when enough information has been entered to generate a HE status and that the survey is complete. **Note**: Depending on your response to a survey question, the subsequent question may not be applicable. If this is the case the response field will be greyed out, and you will need to move on to the next question (the next applicable question will have a drop-down box that is editable). Continue on with the survey until a pop-up box is generated notifying you that the survey is complete.

3. Provide documentation of your response in the **Reference Document** fields. Documents such as RODs, Action Memoranda, POLREPS, and Close Out Reports often provide necessary background information. If you know the SDMS document number associated with the reference document, please enter it in the **SDMS Document ID** field.

4. Once all survey responses have been entered, a text box will be generated notifying the user that the survey has been completed. The results of the responses will be displayed in the **HE Survey Status** box on the top of the tab.

5. Once all data have been entered, and the survey has been certified by the appropriate person(s), click on the **RPM Certified** checkbox.

6. Select either the **"Final" or "Draft" radio button**. Please note: The "Draft" option is not meant to be a substitute for cases when insufficient data are available at a site. It is included in the survey with the intention of functioning as a short-term placeholder for cases where the user has not completed the survey and wishes to save without losing information. Once a survey is saved as "Draft," the survey will display the evaluation of "Online Worksheet Saved as Draft". Once the user is able to complete the survey, the "Final" radio button should be selected.

7. Exit out of the HE survey. If the survey status at the top of the screen does not result in either "Human Exposure Under Control" or "Long-Term Human Health Protection Achieved," upon exiting the module, you will be required to enter **estimated dates** for which Human Exposure and Long-Term Human Health Protection are expected to be achieved.

   Additionally, if the survey status at the top of the screen is either "Insufficient Data" or "Human Exposure Not Controlled," you will be prompted to enter a summary explaining the rationale as to why the site is not yet considered "Human Exposure Under Control." Enter this summary in the Exposure Pathway Description text box at the top of the screen. Please see Section 4.4 for guidance on the information that should be included in the justification summary.

   Finally, you will be prompted as to whether you wish to update the Regional HE Review Date. If you are entering data for the first time, are making an update to the survey, or if you reviewed each survey response but no changes were required, select "Yes." If you are entering data in another module and haven't reviewed the HE survey, select "No." You will then be prompted as to whether you wish to update the Regional GM Review Date. If you have reviewed or made

changes to the data on the GM tab select "Yes," if not, select "No." You will then be prompted as to whether or not you wish to save your data. Select "Yes."

B.2. ENTERING MIGRATION OF CONTAMINATED GROUND WATER UNDER CONTROL

1. In CERCLIS use the following path to access the Groundwater Releases tab within the EI Module:
   Views menu>Program Management>Environmental Indicators>Groundwater Releases tab. Or, alternatively, **Views>Site Information>Site Status and Description/Operable Units>Environmental Indicators Survey button>Groundwater Releases tab**.

2. Enter a response to Step 1 of the GM survey. Based on your response you will continue to the next step or the survey will be complete. A pop-up box will provide notification when enough information has been entered to generate a HE status and that the survey is complete. **Note**: Depending on your response to a survey question, the subsequent question may not be applicable. If this is the case the response field will be greyed out, and you will need to move on to the next question (the next applicable question will have a drop-down box that is not greyed out). Continue on with the survey until a pop-up box is generated notifying you that the survey is complete.

3. Provide documentation of your response in the **Reference Document** fields. Documents such as RODs, Action Memoranda, POLREPS, and Close Out Reports often provide necessary background information. If you know the SDMS document number associated with the reference document, please enter it in the **SDMS Document ID** field.

4. Once the survey is completed, the survey evaluation will be displayed in the Survey Status box on the Ground Water Releases and Summary tab.

5. Once all data have been entered, and the survey has been certified by the appropriate person(s), click on the **RPM Certified** checkbox.

6. Select either the **"Final"** or **"Draft"** radio button. Please note: The "Draft" save option is not meant to be a substitute for cases where insufficient data are available at a site. It is included in the survey with the intention of functioning as a short-term placeholder for instances where the user has not completed the survey and wishes to save without losing data. Once a survey is saved as "Draft," the survey

7. Exit out of the GM survey. If the survey status at the top of the screen does not result in "Groundwater Migration Under Control," upon exiting the module, you will be required to enter an **estimated date** for which control of the migration of contaminated groundwater is expected to be achieved.

   Additionally, if the survey status at the top of the screen is either "Insufficient Data" or "Groundwater Migration Not Controlled," you will be prompted to enter a summary explaining the rationale as to why the site is not yet considered "Contaminated Groundwater Migration Under Control." Enter this summary in the **Justification** text box at the top of the screen.

   Finally, you will be prompted as to whether you wish to update the Regional HE Review Date. If you have reviewed or made changes to the data on the HE tab select "Yes," if not, select "No." You will then be prompted as to whether you wish to update the Regional GM Review Date. If you are entering data for the first time, are making an update to the survey, or if you reviewed each survey response but no changes were required, select "Yes." If you are entering data in another module and haven't reviewed the GM survey, select "No." You will then be prompted as to whether or not you wish to save your data. Select "Yes."

B.3. ENTERING CLEANUP VOLUME EI DATA

1. In CERCLIS use the following path to access the Cleanup Volumes tab within the EI Module:
   Views menu>Program Management>Environmental Indicators>Cleanup Volumes tab. Or, alternatively, **Views>Site Information>Site Status and Description/Operable Units>Environmental Indicators Survey button>Cleanup Volumes tab**.

2. To enter a cleanup volume, select the action from the **Action drop-down menu** for which the cleanup volume you wish to enter has been applied. (Note: Selecting "All" from the Action Drop-down will display all actions and corresponding media at a site).

3. Once you have selected the appropriate action or have chosen to view all actions, enter the date the volume was cleaned up in the **Cleanup Date field**.

4. Select the **Media Name drop-down menu** and select the appropriate **Media Name** and **Media Type** for the particular action for which you wish to enter a volume. (Note: if the media name for which the cleanup volume was applied is not available for the particular action you selected, it must be entered on the Add/Edit Media screen via the SCAP or Remedy screens. Once entered, it will then be available on the Media Name drop-down menu).

5. Enter the **Original Cleanup Amount** and **Original Unit**. Units can be entered as "non-standard" units as they are automatically converted to standard units of gallons or cubic yards in the **Converted Amount** and **Converted Unit** fields. (Note: Non-standard units available from the "Original Unit" drop-down include: (Cubic Feet; Drums; Liters; Tons; Pounds; Cubic Meters; Tanks; Cylinders; and Battery Casings).

6. To save a new entry, select the "Summary" tab and click on the "OK" button. Cumulative volumetric totals can then be viewed on the "Summary" tab. Exit out of the EI module and you will be prompted to save changes.

B.4. ENTERING POPULATIONS PROTECTED EI DATA

1. In CERCLIS use the following path to access the Populations Protected tab within the EI Module:
   Views menu>Program Management>Environmental Indicators>Populations Affected tab. Or, alternatively, **Views>Site Information>Site Status and Description/Operable Units>Environmental Indicators Survey button>Populations Affected tab**.

2. Data entry fields for Population Relocated and Alternative Drinking Water Supplied are both displayed on the Populations Affected tab. First, select the action from the **Action drop-down** menu for which the Population Relocated or Alternate Drinking Water Supplied response was applied. (**Note:** Unlike on the Cleanup Volume tab, data entry is not permitted when "All" is displayed on the **Action drop-down** box. This is due to the fact that on the Cleanup Volume tab you are still required to select an action associated to a medium on the Media Name drop-down-box. Because Population Protected data are not associated with a Medium, you are required to select a specific action (rather than "All") to which either population relocated or alternate drinking water supplied data is associated).

3. Select the **Add Row button**. (Note: You may receive a data warning message stating "No Populations Relocated Response Actions Currently Exist for this Site or No Alternative Drinking Water Response Actions Currently Exist for this Site". If this message appears, you will still be permitted to enter data, however for data quality purposes, the applicable population relocated and/or alternate water supplied response action should be entered on the Add/Edit Response Actions screen via the SCAP or Remedy Screens.).

4. Enter the **Affected Date** the population was either relocated or provided alternative drinking water.

5. Enter the **Protection Level** (either Permanent, Temporary or Returned/Reinstated) applied toward the population.

6. Enter the number of individuals relocated or receiving alternative drinking water in the **Number Affected** field. Once all data have been entered, and the survey has been certified by the appropriate person(s), click on the **RPM Certified** checkbox

7. To save a new entry, select the **Summary tab** and click on the **OK button**. Cumulative Population Relocation and Alternative Drinking Water Supplied data can be viewed on the "Summary" tab. Exit out of the EI module and you will be prompted to save changes.

B.5. ENVIRONMENTAL INDICATOR REPORTS

As described in Section 2.5 of the Guidance, a number of EI Reports are available at both the Regional and National levels.

These include:

PGMT-08 Environmental Indicators Audit Report
Displays sites were there is incomplete Cleanup Volume data. This report can be used to identify discrepancies in Cleanup Volume data at the National, Regional, State, or site-specific levels.

PGMT-09 Data Compilation Report
Summary of site Population Protected and Cleanup Volume data. This report can be used to ensure that all data for a site are entered completely and accurately.

PGMT-10 Site Turnaround Report
Summary of site Population Protected and Cleanup Volume data. This report was designed to be used in conjunction with the PGMT-09 as a data entry guide.

PGMT-11 Environmental Indicators HE/GM Report
Site summary detail and Regional summary count of HE and GM evaluations and last Regional and Headquarters review dates.

PGMT-12 Environmental Indicators HE/GM Error Report
Displays a site summary of data gaps and potential reporting errors for the Human Exposure and Migration of Contaminated Ground Water Under Control EI's.

PGMT-13 Environmental Indicators Summary Report
Quick reference cumulative summary of all EI data–Populations Protected, Cleanup Volumes, Human Exposure Under Control, and Migration of Contaminated Ground Water Under Control.

SCAP-15 GPRA Report
Tracks GPRA goals and performance measures in support of the Superfund and Federal Facilities Response Program. Displays current HE and GM category counts, accomplishments, and changes in HE or GM status at the Regional and National level.

B.6. ACCESSING ENVIRONMENTAL INDICATOR REPORTS

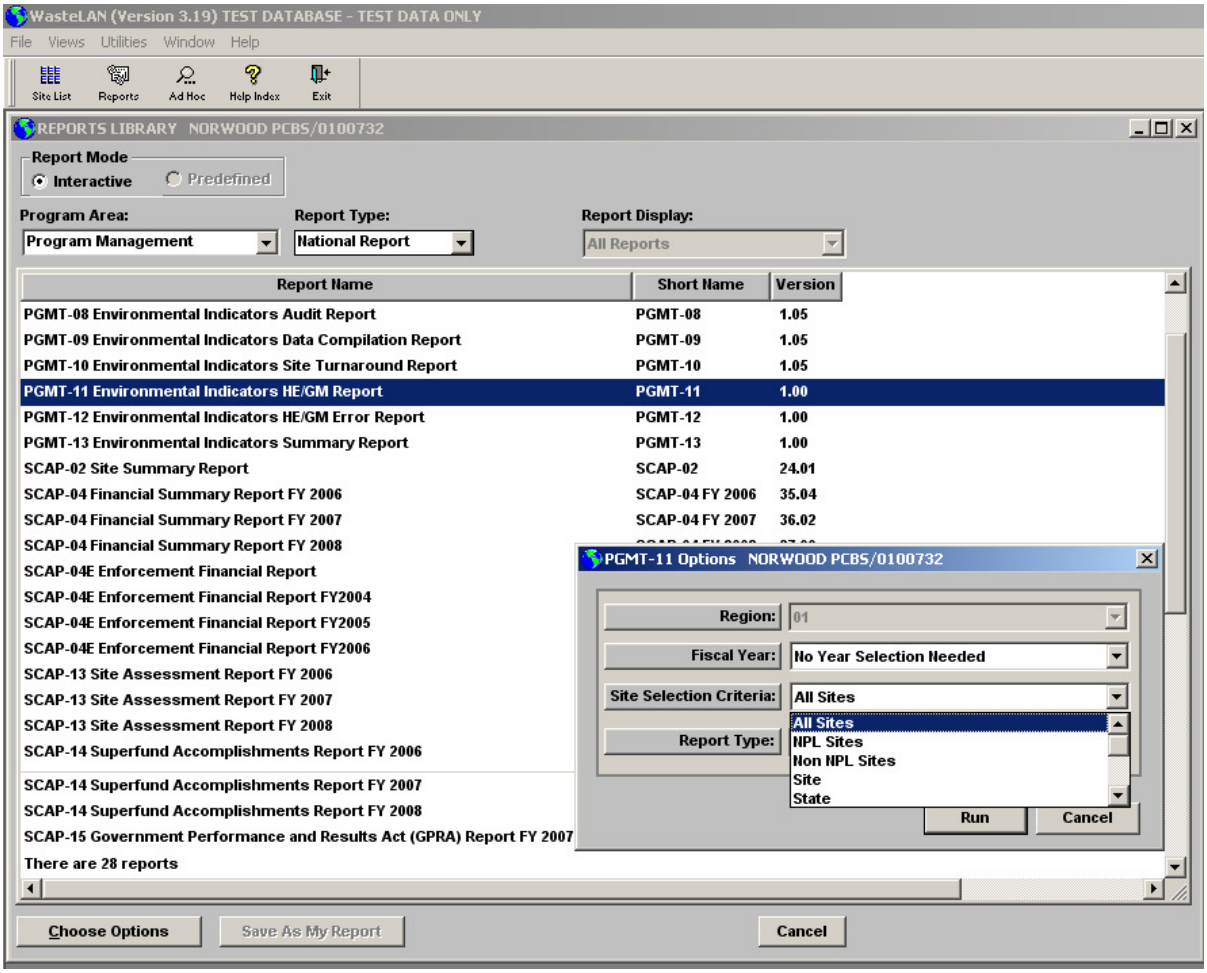
1. Select the **Reports** icon located on the CERCLIS toolbar.

2. After the "Reports Library" screen is displayed, select "Program Management" in the Program Area filter. This will display the list of reports associated with "Program Management".

3. By highlighting and selecting any of the PGMT reports described above, the "Options" menu will appear.

4. Select applicable **Region**, **fiscal year**, **selection criteria**, and **report type** (summary or detail).

5. Once the criteria is selected, click "Run".



Program Management Reports