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We Protect Hoosiers and Our Environment.

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House Enrolled Act 1162

Interim Implementation Document

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During the 2009 legislative session, House Enrolled Act 1162 (HEA 1162)¹ amended several statutes regulating environmental remediation projects in Indiana. The amended statutes became effective on July 1, 2009. The IDEM staff will use this document on an interim basis together with the 2001 *RISC Technical Resource Guidance Document (Tech Guide)* as guidelines in evaluating risk-based remediation proposals.

IDEM intends for this *Interim Implementation Document (IID)* to be a bridge between the 2001 *Tech Guide* and a future revision. Work on a revised *Tech Guide* is already underway but will take some time. We look forward to continuing to partner with stakeholders on that project. We anticipate that portions of the *IID* will be refined and incorporated, following normal public input processes, into a revised *Tech Guide* and become Non-Rule Policy.

IDEM hopes that this document confirms and reinforces Indiana's commitment to risk-based environmental decision making.

Questions regarding the application of this document to a particular remediation project may be directed to the corresponding IDEM project manager. General questions about this document may be directed to Risk Services at (317) 232-3215.

¹ HEA 1162 is now referenced as Public Law 78-2009 (P.L. 78-2009) on the Indiana General Assembly website. It is available by clicking on the Acts of 2009 link here: http://www.in.gov/legislative/ic_iac/. Updated versions of all statutes are available through the Indiana Code link on this same webpage.

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HEA 1162 Amendments to IC 13-25-5-8.5

Section 8.5 of the VRP statute is cited frequently in this document and is provided here for convenient reference. The highlighted text was added or amended by HEA 1162.

Note that this statute is also applied by reference to the following remediation programs: RCRA (IC 13-22), USTs (IC 13-23), and state cleanup (IC 13-25-4 & IC 13-24). See IC 13-12-3-2. This document will be used as interim guidance in all of these programs.

IC 13-25-5-8.5

Voluntary remediation work plan objectives; additional action to protect human health and the environment not necessary under certain circumstances; risk based remediation objectives and proposals

Sec. 8.5. (a) A voluntary remediation work plan must specify the remediation objectives for the site. Subsections (b) through (e) apply to a site regardless of whether the site was entered into the voluntary remediation program before July 1, 2009, or after June 30, 2009.

(b) The remediation objectives for each hazardous substance and any petroleum on the site shall be based on:

- (1) background levels of hazardous substances and petroleum that occur naturally on the site; or
- (2) an assessment of the risks pursuant to subsection (d) posed by the hazardous substance or petroleum presently found on the site taking into consideration the following:
 - (A) Expected future use of the site.
 - (B) Measurable risks to human health, natural resources, or the environment based on the:
 - (i) activities that take place; and
 - (ii) environmental impact;on the site.

(c) If the:

- (1) nature and extent of the hazardous substance or petroleum is adequately characterized under the voluntary remediation work plan, **considering the remediation objectives developed under this section;** and
- (2) the level of the hazardous substance or petroleum is demonstrated to be below:
 - (A) background levels of the hazardous substances and petroleum that occur naturally on the site; or
 - (B) the risk based levels developed under subsection (d);additional action is not necessary to protect human health or the environment.

(d) Risk based remediation objectives shall be based on one (1) of the following:

- (1) Levels of hazardous substances and petroleum calculated by the department using standard equations and default values for particular hazardous substances or petroleum.
- (2) Levels of hazardous substances and petroleum calculated using site specific data for the default values in the department's standard equations.
- (3) Levels of hazardous substances and petroleum developed based on site specific risk assessments that take into account site specific factors, **including remedial measures, restrictive covenants, and environmental restrictive ordinances that:**

- (A) manage risk; and
- (B) control completed or potential exposure pathways.

(e) The department shall consider and give effect to restrictive covenants and environmental restrictive ordinances in evaluating risk based remediation proposals.

As added by P.L.59-1997, SEC.20. Amended by P.L.78-2009, SEC.18.

Introduction

HEA 1162 changes the remediation objectives that IDEM must consider in evaluating proposed remedies. IC 13-25-5-8.5 (d)(3) now requires IDEM, when evaluating remediation proposals, to consider risk-based remediation objectives for hazardous substances and petroleum that (A) manage risk and (B) control completed or potential exposure pathways. IDEM interprets (A) and (B) above to mean that the Agency must consider remedies that manage risk or control exposure pathways as valid approaches to site closure.

The law directs IDEM to assess the protection of human health and the environment through appropriate risk-based *levels*. These “levels” cannot be calculated without identifying acceptable target risk levels and systematic hazard levels as determined through the *risk* range for contaminants with carcinogenic effects and the *hazard* quotient for contaminants with systemic effects. The risk range and hazard quotient are numeric criteria that are estimated through appropriately conservative calculation. IDEM’s closure levels are also numeric criteria that are estimated through conservative calculation.

However, closure levels are specific estimates of risk and hazard that can vary widely due to the broad range of the exposure assumptions used in their calculation. The risk range and hazard quotient do not vary – the risk range is set at 10^{-4} to 10^{-6} per the NCP and USEPA (10^{-5} per the IDEM default) while the hazard quotient is set at unity (1). The risk and hazard descriptors represent a health goal that is relatively static and universal to every possible exposure scenario, while the closure levels are more refined descriptors that represent a health goal for only one specific exposure scenario out of thousands possible.

The objective of IDEM’s risk policy is to assure that all sites are mitigated through *risk assessment* procedures to assure no unacceptable risk or hazard to human health or the environment, or through *risk management* measures to assure no unacceptable exposures. Anytime a risk assessment is utilized, all closure level calculations should be performed in a manner that assures there will be no unacceptable risk or hazard for relevant (identified) exposure scenarios.

FAQs: Investigation

Q. Does the responsible party have to delineate soil outside an area of exposure control to residential closure levels?

A. *Yes, unless the responsible party demonstrates that doing so is not necessary to protect human health and the environment. See page 9.*

Q. Does the responsible party have to delineate a groundwater plume that extends beyond the boundaries of an area of exposure control to residential closure levels?

A. *Yes, unless the responsible party demonstrates that doing so is not necessary to protect human health and the environment. See page 12.*

Q. Does the responsible party have to characterize the site even if it is planning to manage the risk?

A. *Yes. Site characterization is still important, as it is the only way to understand the risks and determine whether the proposed remedy will be protective of human health and the environment. See page 9.*

FAQs: Environmental Restrictive Ordinances (EROs)

Q. Can a responsible party propose an environmental restrictive ordinance (ERO) to control risk?

A. *Yes, although IDEM will have to evaluate whether the proposed ERO will be an effective (protective) remedy before deciding whether to grant closure.*

Q. Who will enforce ERO conditions?

A. *The local unit of government that adopted the ordinance has the authority to enforce it. However, IDEM may require a responsible party to take further action if closure was based on an ERO that was not enforced and wells are utilized or installed in violation of the ordinance. See page 27.*

FAQs: Environmental Restrictive Covenants (ERCs)

Q. Does a responsible party need an ERC if soil or groundwater exceeds residential closure levels on site?

A. *Yes, IDEM will require an ERC to be recorded if there is soil contamination remaining on site above residential closure levels. If there is groundwater contamination exceeding residential closure levels, then IDEM will consider an ERO as well as an ERC.*

Q. Does a responsible party need to obtain an ERC on off-site property if soil and/or groundwater contamination on that property exceeds residential closure levels?

A. *Yes, in most cases an ERC will be necessary to limit property use to eliminate unacceptable exposure where soil and/or groundwater contamination on that property exceeds residential closure levels. An ERC may not be necessary in an area of groundwater contamination where an ERO eliminates that exposure pathway. See page 22.*

Q. Can IDEM still approve ERCs?

A. *Not in their entirety. IDEM can no longer specify a required form for the ERC. IDEM's approval authority is limited to the activity and use restrictions of the ERC, because IDEM still has to decide whether it's appropriate to grant closure based on those restrictions. See page 25.*

FAQs: Remedy Selection

- Q. Are risk management and exposure pathway control approaches valid remedial options?
- A. *In the past, IDEM generally required removal of contaminants to closure levels based on the particular land use, to the extent practicable, as a precondition to remedy approval. HEA 1162 added new language to IC 13-25-5-8.5 (c)(1) and (d)(3) that:*
- *Requires the remediation objectives proposed for a site be considered when determining the nature and extent of the hazardous substance or petroleum contamination;*
 - *Allows the risk based remediation objectives to include risk management and control of completed or potential exposure pathways; and*
 - *Requires restrictive covenants and environmental restrictive ordinances be considered if proposed as mechanisms for controlling exposure and managing risk when evaluating the remediation proposals.*

IDEM interprets the above to mean that the Agency must consider risk management and exposure pathway control remedies as valid risk management approaches to site closure. Rather than requiring that contaminants be removed as a precondition for remedy approval, IDEM must also consider a risk management approach. Proposed risk management remedies should be evaluated carefully, especially where federal programmatic requirements might be implicated.

- Q. How do we deal with an expanding plume?
- A. *The responsible party may choose to*
- *Remediate affected soil and groundwater to achieve closure levels*
 - *Remediate the source, demonstrate plume stability, and close with an ERO or an ERC restricting groundwater use.*
 - *Show that an alternative remedy will effectively control risk and be protective of human health and the environment.*

FAQs: Closure

Q. A responsible party proposes to close with an active engineered remediation system in place and operating. Can IDEM grant closure?

A. *Yes, though it may only be appropriate to do so after the system has been installed and proven to control all exposure pathways. This will generally occur at the operation and maintenance phase. Financial assurance may be necessary to ensure that the system continues to operate. See page 31.*

Q. How can IDEM ensure that an active engineered remedy used to close a site will continue to operate effectively?

A. *IDEM may include conditions in any covenant not to sue or certificate of completion. Conditions might include specific operation and maintenance tasks, status reports, or other measures appropriate to the site. In some cases, IDEM may require financial assurance to ensure that the remedy continues to operate properly. See page 30.*

Q. Can a No Further Action (NFA) letter contain similar conditions for closure?

A. *There is no explicit authority created by HEA 1162 to do so, but it is a reasonable interpretation that we can since a No Further Action letter is really a letter stating that IDEM agrees to not require further action (or not initiate an enforcement action) based on current information and usually conditioned on certain items.*

Q. Is a financial assurance mechanism warranted for every site that closes with an engineered system?

A. *No. It may only be appropriate at some sites. See page 31.*

Q. Can free product be left in place?

A. *Possibly, but IDEM will need to review any proposals to do so on a case-by-case basis. See page 24.*

Investigation: Soil

In the past, IDEM has asked that responsible parties delineate the extent of contamination to default residential closure levels, even when contamination is unlikely to extend beyond the boundaries of a commercial/industrial property. The HEA 1162 amendment to IC 13-25-5-8.5(c)(1) now allows for proposed remediation objectives to be considered in evaluating the adequacy of nature and extent investigations.

Here are some general procedures to follow when investigating soil contamination:

1. Delineate the on-site vertical and horizontal extents of contamination to land-use specific closure levels (commercial/industrial, residential, recreational, etc.) based on potential exposure routes and migration pathways identified in the conceptual site model (CSM), *AND*
2. Demonstrate, through sampling or after consideration of the factors listed in the bullet points below, that contamination doesn't leave the ***area of exposure control***² exceeding residential closure levels. *IF* contamination exceeding residential levels extends beyond the area of exposure control, *THEN*
3. Delineate any off-site contamination to residential closure levels, *OR* demonstrate to IDEM why this is not necessary.

Depending on site-specific circumstances, industrial/commercial sites may not need to delineate on-site contamination to residential closure levels. Factors to consider when determining whether on-site delineation to residential closure levels is necessary include:

- Distance from the delineated area to the boundary of exposure control
- Current and likely future use of the property
- Size of the source area
- Possible preferential pathways
- Contaminant concentrations relative to their closure levels (that is, will an unacceptable risk or hazard to human health or the environment result from the contaminants that are present above the closure levels?)
- Relative magnitudes of residential and industrial closure levels
- Presence of residential and/or ecological receptors in the vicinity.

² An ***area of exposure control*** means an area over which a remedy controls exposure. Examples include a property or set of properties subject to an environmental restrictive covenant that restricts certain uses or activities likely to lead to exposure, or an area subject to an environmental restrictive ordinance that likewise limits the use of groundwater for drinking water or other uses that would result in ingestion. Area of exposure control can be, but often is not, the same as an area of property control; it may involve multiple properties under multiple owners.

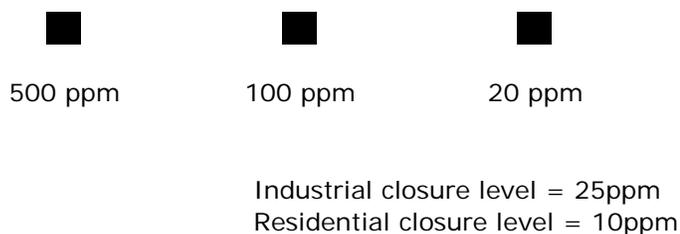
This will be a site-specific decision based on multiple lines of evidence and the technical judgment of IDEM staff. The highly simplified two-dimensional diagrams on the next page illustrate two examples where on-site delineation to residential may not be necessary.

Examples of scenarios where it may not be necessary to delineate contamination to residential closure levels beyond the area of exposure control are more difficult to conceive, but IDEM will evaluate such proposals on their merits.

Scenario 1:

Delineation sampling shows that on-site contaminant concentration levels are below commercial/industrial closure levels, but still exceed residential closure levels. However, the boundary of the area of exposure control is far enough away that an off-site exceedance of residential closure levels is unlikely.

Delineate to industrial, infer residential closure levels met at boundary using multiple lines of evidence

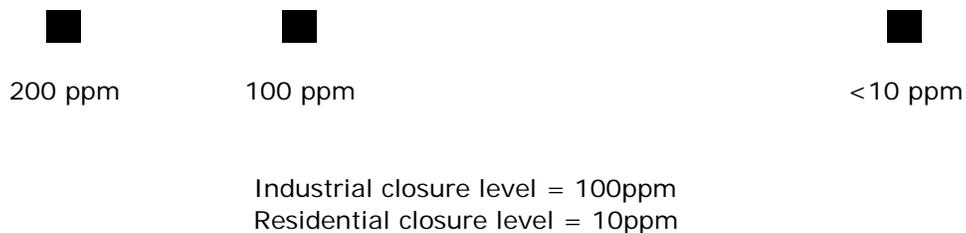


Area of Exposure Control Boundary

Scenario 2:

The latest round of sampling adequately delineates contamination to commercial/industrial levels on-site, and additional sampling shows that contaminant concentrations are below residential closure levels along the boundary of exposure control.

Delineate to industrial, demonstrate residential at or near boundary



Area of Exposure Control Boundary

Investigation: Groundwater

In the past, we have asked responsible parties to delineate the nature and extent of groundwater contamination to residential closure levels, regardless of the property use. While it is still important to show that contamination above residential closure levels does not extend beyond a commercial/industrial area of exposure control, it is not necessary to delineate areas to residential levels if they will not be closing at residential levels. However, investigative work needs to be sufficient to allow IDEM to evaluate risks posed by the contamination and the effectiveness of the proposed remedy.

When investigating groundwater contamination, responsible parties should:

1. Delineate the on-site horizontal and vertical extents of groundwater contamination to levels based on reasonable exposure scenarios, *AND*
2. Demonstrate or provide lines of evidence to show that contamination doesn't leave the area of exposure control exceeding residential closure levels (see bullet point criteria below). *IF* contamination exceeding residential levels extends beyond the area of exposure control, *THEN*
3. Delineate that groundwater contamination to residential closure levels, *OR* provide lines of evidence to show IDEM why this is not necessary.

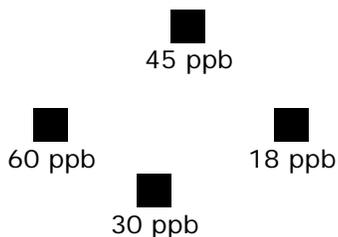
Depending on site-specific circumstances, industrial/commercial sites may not need to delineate contamination within the area of exposure control to residential closure levels if it can reasonably be inferred that contaminants will not migrate beyond the area of exposure control at concentrations exceeding residential closure levels *and the groundwater is not used for potable purposes*. This requires the ability to predict or infer how far and at what concentrations the plume will migrate. Factors to consider when inferring whether delineation to residential closure levels is necessary include:

- Distance from the delineated area to the boundary of exposure control
- Current and likely future use of the groundwater
- Size of the source area
- Possible preferential pathways
- Contaminant characteristics (e.g., mobility, toxicity, volatility, persistence)
- Potential for changes in groundwater flow direction (e.g., start up or shut down existing or planned wells)
- Contaminant concentrations relative to their closure levels (that is, will an unacceptable risk or hazard to human health or the environment result from the contaminants that are present above the closure levels?)
- The relative magnitudes of residential and industrial closure levels
- Presence of residential and/or ecological receptors in the vicinity

The following page illustrates (in simple, two-dimensional form) some potential scenarios.

Scenario 1:

Delineate to industrial, infer residential closure levels met at boundary of exposure control area using multiple lines of evidence

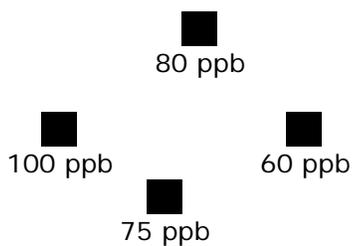


Industrial closure level = 50 ppb
Residential closure level = 5 ppb

Area of Exposure Control Boundary

Scenario 2:

Delineate to industrial, demonstrate residential at or boundary of area of exposure control



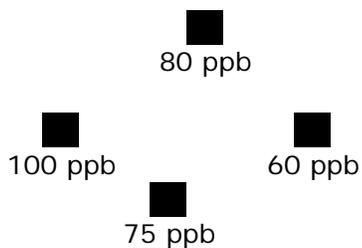
Industrial closure level = 50 ppb
Residential closure level = 5 ppb



Area of Exposure Control Boundary

Scenario 3:

Delineate to residential



Industrial closure level = 50 ppb
Residential closure level = 5 ppb

Area of Exposure Control Boundary



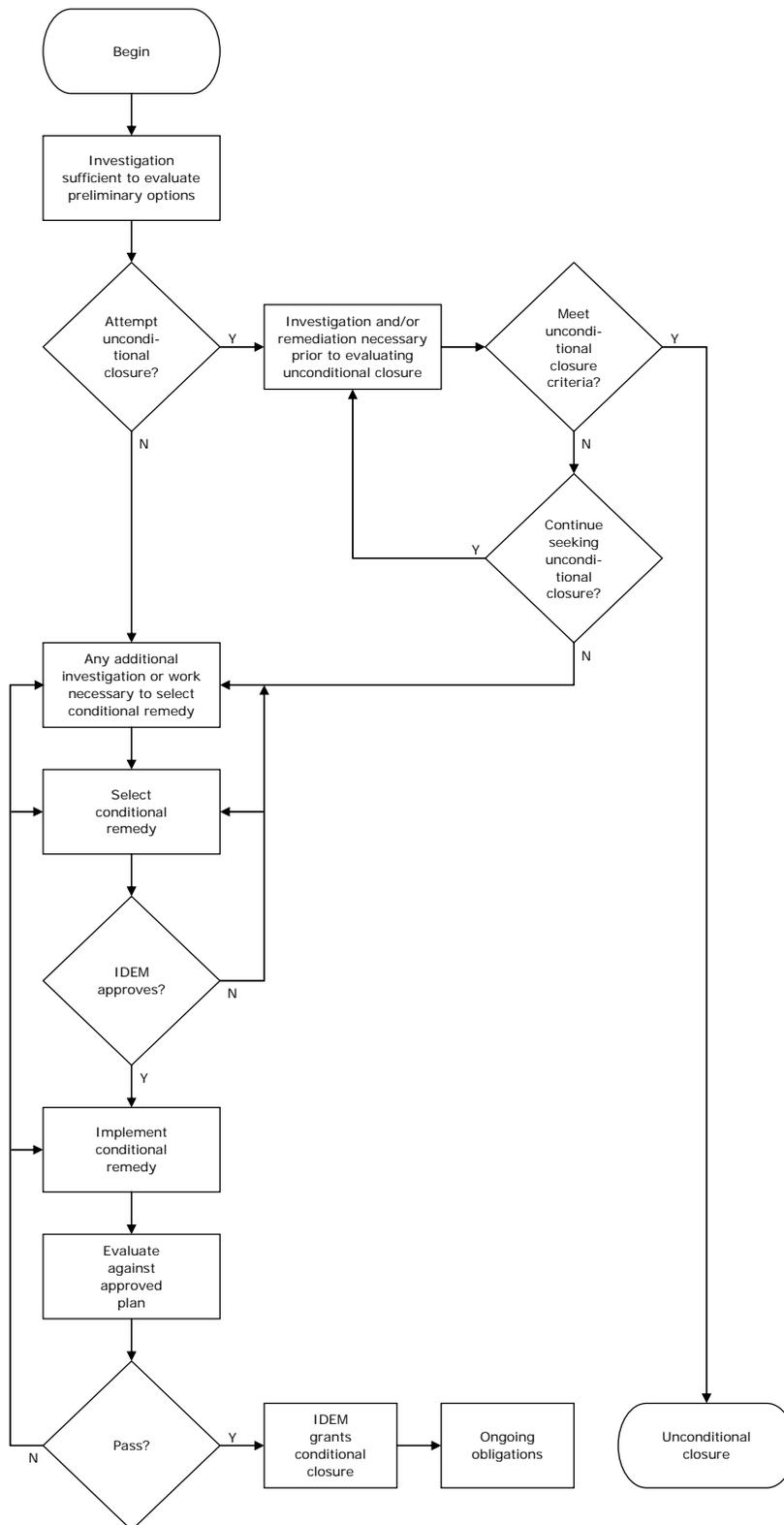
Closure: Unconditional Closure

A site is generally eligible for unconditional closure when it meets residential closure levels in all media. This is because contaminated areas that do not exceed residential closure levels are suitable for unlimited exposure and unrestricted use. All other forms of closure require some type of land use restriction and/or continuing obligation. Examples include environmental restrictive covenants (ERCs), environmental restrictive ordinances (EROs), engineering controls, remedy operation and maintenance, and long-term monitoring.

Unconditional closure means that:

- Contaminant levels are low enough that it is unnecessary to restrict any use of the site
- The site does not require an ERC, ERO or other institutional control
- The site does not require ongoing monitoring, remediation, or reporting.

Conditional versus Unconditional Closure



Remedy Selection: Soil & Groundwater

As before, sites with contamination above residential closure levels will need a remedy. HEA 1162 allows additional options besides permanent remedies. Acceptable remedies may vary widely, and range from a simple ERC all the way up to a complex active engineered system or a combination of remedies. IDEM will evaluate all remedies based on site-specific factors.

IDEM can't anticipate every type of remedy proposal that responsible parties are likely to submit, nor is it possible to construct a matrix of the information needed to evaluate every type of remedy. However, the agency will likely need certain kinds of information at most sites:

Soil

- Type(s) and characteristic(s) (sand, silt, clay, bedrock type(s)) (fractured, discontinuous, interbedded, tills, lacustrine, etc.)
- Features (hill, valley, caves, other land forms)
- Contaminant(s) type(s) (metals, chlorinated hydrocarbons, petroleum, coal tar, etc.)
- Contaminant characteristics (liquids, solids, vapors)
- Concentration and distribution of contaminant(s)
- Evaluation of potential for direct contact (at or near surface)
- Mobility (how much does it move over a given time period)
- Evaluation of potential for vapor intrusion
- Preferential pathways (utilities, fractures, more permeable zones; depths and directions)
- Migration to groundwater (adsorption and desorption, soil types, retarding and accelerating factors e.g.(high carbon content with organics, battery acid with metals)
- Fate and Transport (contaminant adsorption and desorption, breakdown products, concentration gradients)

Groundwater

- Well survey to determine the existence of receptors (DNR database, utility records, mailers, door-to-door survey)
- Fate and transport (contaminant adsorption and desorption, breakdown products, concentration gradients, flow direction, seasonal variation, flow rate)
- Contaminant(s) type(s) (metals, chlorinated hydrocarbons, petroleum, coal tar, etc.)
- Concentration and distribution of contaminant(s)
- Contaminant characteristics (phase, solubility, persistence)
- Evaluation of potential for vapor intrusion
- Preferential pathways (utilities, fractures, more permeable zones; depths and directions)
- Hydrogeologic characteristics (hydraulic conductivity, transmissivity)

Remedy Evaluation: Soil & Groundwater

IDEM will evaluate proposed remedies for effectiveness. This section provides some general guidelines for evaluating the effectiveness of proposed remedies. (The following references also contain criteria that may be of assistance when evaluating remedy effectiveness: (1) 40 CFR §300.430(e)(9)(iii); (2) ASTM E 2091-05, *Standard Guide for Use of Activity and Use Limitations, Including Institutional and Engineering Controls.*)

Soil

- **Confirm that there is no current exposure to impacted soil (direct contact)**

Where appropriate (such as after a documented surface spill), responsible parties should conduct adequate surface sampling to determine if the potential for an adverse health effect exists from direct exposure to contaminated soil at or near the surface. Evaluations should consider contaminant concentrations, types (metals, chlorinated hydrocarbons, petroleum, coal tar), and characteristics (liquids, solids, vapors).

- **Evaluate the potential for vapor intrusion if constituents are volatile**

Although vapor intrusion is normally associated with impacted groundwater, adverse effects can result from volatile organic compound (VOC)-impacted soil. Responsible parties should evaluate this potential pathway using IDEM's most current vapor intrusion guidance (currently the *Draft Vapor Intrusion Pilot Program Guidance* dated April 26, 2006), or propose an alternative approach. If a complete vapor pathway exists, responsible parties should take prompt action to address the risk. Responsible parties that address the source of contamination may be able to reduce the length of vapor mitigation system operation, monitoring, and other continuing obligations, or eliminate the need for a system. If no structures currently exist on the impacted property, an ERC may be necessary that requires additional evaluation, and if necessary, active or passive vapor mitigation for future buildings.

- **Contaminant fate and transport**

Responsible parties should evaluate the mobility of soil contamination, including the possibility for surface run-off, fugitive dust, and migration to groundwater. Evaluations should consider soil types (e.g., geology, carbon content), contaminant physical characteristics (e.g., adsorption and desorption), possible breakdown products, and possible preferential pathways.

- **Demonstrate ability to prevent exposure to contamination**

If the proposed remedy leaves contamination in place above risk-based levels, the remedy should demonstrate an ability to control exposure to contaminated soil. ERCs are often appropriate for this purpose and in most cases will restrict residential or

other specified uses of the property (or portions of the property). Other measures may also be suitable. Any required engineering controls (e.g., cap, pump and treat system) are to be inspected and maintained for the duration of the potential exposure to contaminants, and enforceable by a legal instrument (ERC, permit, etc.).

- **Financial Assurance**

If a proposed remedy has long-term obligations to ensure protection of human health or the environment, consider financial assurance. See page 31 for additional discussion of financial assurance.

Groundwater

- **Confirm that there is no current exposure to impacted groundwater**

Responsible parties should conduct surveys or well searches, both on-site and off-site as appropriate, to confirm that there are no existing wells that could result in exposure. DNR well records are important but should not be the sole source of information for this purpose because they are not comprehensive. Local water utility records may be helpful to confirm that a water hook-up is complete. If necessary, responsible parties may need to use mailings or conduct a door-to-door survey to verify the absence of wells. Responsible parties need to notify IDEM and the local health department about any wells with exposure potential, and inform residents of the potential for adverse health effects from using impacted water.

- **Demonstrate ability to control access to the plume**

Closure based on use of a groundwater exposure-prevention remedy requires a demonstration that constituents of concern will not leave the area of exposure control at concentrations exceeding residential closure levels. There are two key components to this demonstration: 1) the ability to predict with confidence how far the plume will migrate and at what concentrations (i.e., fate and transport)³; and 2) appropriate institutional controls to prevent exposure where concentrations exceed health protective levels (currently or in the future). Fate and transport considerations might include aquifer characteristics (hydraulic conductivity, transmissivity), contaminant physical characteristics, such as adsorption and desorption, the possibility of commingled plumes, breakdown products, concentration gradients, flow direction, and flow rate. Responsible parties may propose statistical analysis (such as Mann-Kendall) or other IDEM-approved methods, such as a predictive model. Continued groundwater monitoring may be required to make this demonstration. Institutional controls to prevent exposure may include an Environmental Restrictive Covenant or a local ordinance. See pages 25-29 for additional guidance on appropriate ERCs and EROs.

³ Not necessarily through a plume stability demonstration.

- **Evaluate the potential for vapor intrusion if constituents are volatile**

Responsible parties should evaluate the potential for vapor intrusion using IDEM's most current vapor intrusion guidance (currently the *Draft Vapor Intrusion Pilot Program Guidance* dated April 26, 2006), or propose an alternative approach. If a complete vapor pathway exists, the responsible party may need to take prompt action to address the risk. Responsible parties that address the source of contamination may be able to reduce the length of vapor mitigation system operation, monitoring, and other continuing obligations, or eliminate the need for a system altogether. If no structures exist on the impacted property the ERC may need to require active or passive vapor mitigation for future buildings.

- **Evaluate preferential pathways**

Responsible parties should evaluate any utility corridors, fractures, and more permeable zones to determine their effects on groundwater, vapor, and free product migration.

- **Susceptible Area Evaluations**

Pay attention to susceptible areas, such as geologically susceptible areas, wellhead protection areas, or ecologically susceptible areas (including surface waters).

- **Financial Assurance**

If a proposed remedy has long-term obligations to ensure protection of human health or the environment, consider financial assurance. See page 31 for additional discussion of financial assurance.

Conditional Closure: Soil

Closures when soil contaminant concentrations exceed residential remediation objectives are conditional. That is, our approval of closure for a site is conditioned upon one or more activities or restrictions that reduce exposures to levels acceptable for a particular land use. Examples include (but are not limited to) restrictions on residential use, construction and maintenance of a physical barrier, or installation and operation of an active system.⁴

The important thing is to select one or more measures that together prevent unacceptable exposure. Active remediation is not always necessary, though IDEM expects that active remediation will, in many cases, reduce the number and/or scale of necessary future activities or restrictions.

Conditional soil closures will require an ERC that contains affirmative obligations or prohibits certain activities on the affected property to prevent exposure, *or* a demonstration that shows why an ERC is unnecessary (e.g., the contamination extends under a roadway). If closure is based on the recordation of an ERC on a property and the property owner⁵ fails to comply with the terms of the ERC after IDEM issues a closure document, then IDEM may seek to enforce the ERC against the property owner or pursue legal action against the responsible party.

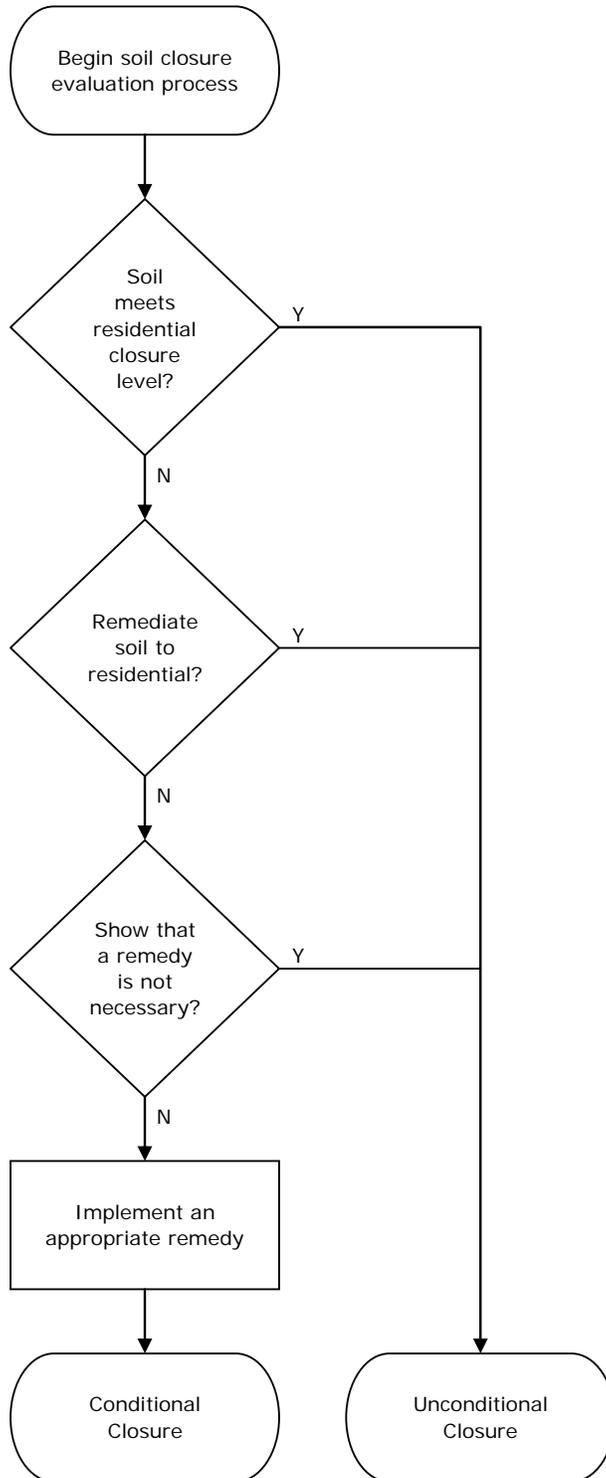
If soil contamination does not exceed residential closure levels, site soils are eligible for closure without an ERC (unconditional closure).

If soil contamination exceeds residential closure levels, the responsible party will need to implement a remedy that limits exposures to acceptable levels. Appropriate remedies will typically include an ERC, and *may* include other measures as necessary to limit exposures to acceptable levels.

⁴ RCRA rules for closure of regulated units require the removal of hazardous waste and hazardous waste residues. This may result in additional requirements related to soils contaminated with hazardous waste or hazardous constituents (e.g. RCRA: 40 CFR 264 & 265).

⁵ Property owners may not always be the responsible party.

Conditional Closure: Soil



Conditional Closure: Groundwater

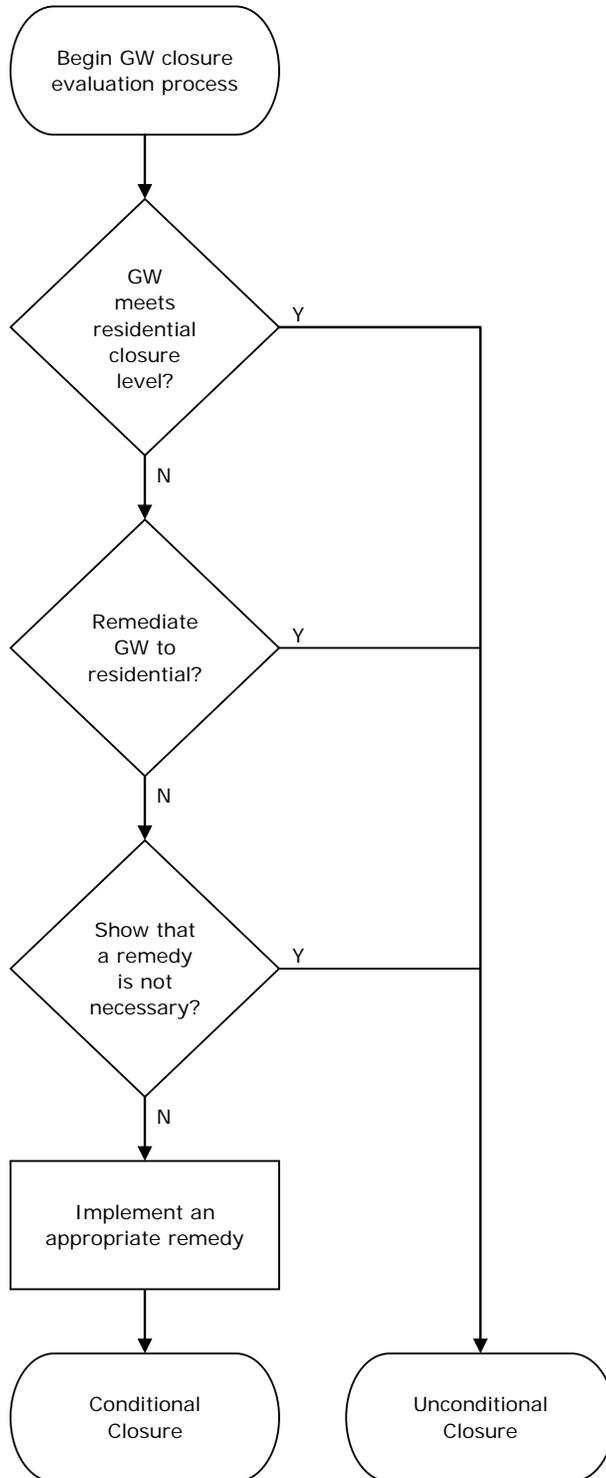
If groundwater will remain at concentrations exceeding residential levels, implement a remedy that controls exposure routes and pathways.

This will require one of the following:

- a) An ERC or ERO restricting groundwater use on the affected property(s), *OR*
- b) A risk evaluation on the affected property(s) that shows why an ERO/ERC is not necessary (perhaps because the affected property is in a right-of-way). This evaluation may include the collection of additional data, including delineation to residential closure levels.

The nature of an acceptable remedy will vary from site to site, and may depend upon whether the contamination is on site or off. It may be as simple as an exposure prevention remedy like an ERC or ERO that forbids use of groundwater, or it could be a complex engineered system. IDEM expects that many remedies will have multiple components. However, an ERC or ERO will typically be an integral part of any remedy that leaves groundwater contamination in place at concentrations above residential closure levels.

Conditional Closure: Groundwater



Conditional Closure: Free Product

In the past, IDEM required removal or control of free product to the extent practicable as a precondition to remedy approval. IDEM required free product recovery to address acute hazards and limit the migration of hazardous substances and petroleum in the environment.

HEA 1162 allows responsible parties to propose remediation objectives that (A) manage risk, and (B) control completed or potential exposure pathways. This means that responsible parties will not need to remove free product to the extent practicable in all cases⁶ and IDEM must consider a risk-based approach when evaluating free product. A key consideration in this risk-based approach is a careful assessment of site conditions to evaluate migration of the free product that would potentially impact receptors. As with any subsurface investigation of contaminants, this includes consideration of preferential transport pathways.

Staff should consider the following issues when evaluating free product for unacceptable risk:

- Does the free product create or have the potential to create an acutely hazardous condition?
- Is the free product acting as an ongoing source of groundwater contamination that may result in unacceptable risk to potential groundwater or surface water receptors?
- Is there potential for direct contact to free product through excavation, utility work, or other means?
- Are there potential vapor intrusion issues related to the presence of free product?

⁶ The Leaking UST Program (LUST, ELTF) may have additional requirements related to free product due to federal requirements and related state statutes and rules that implement these requirements (e.g. UST: 40 CFR 280.64). RCRA rules for closure of regulated units require the removal of hazardous waste and hazardous waste residues. This may result in additional requirements related to free product or soils contaminated with hazardous waste or hazardous constituents (e.g. RCRA: 40 CFR 264 & 265).

Conditional Closure: Environmental Restrictive Covenants

HEA 1162 made changes to Environmental Restrictive Covenants (ERCs) and IDEM's authority with respect to them. The changes can be summarized in two main areas:

1. Revised Definition: The definition of Restrictive Covenant (IC 13-11-2-193.5) was amended and now contains additional criteria that ERCs must meet. These new criteria state that ERCs must:
 - a. Grant IDEM access to the land;
 - b. Require notice to a transferee of the land or an interest in it of the existence of the ERC; and
 - c. Identify how relevant files at IDEM may be located.

The old criteria under the previous definition must still be met; specifically ERCs must:

- d. Limit the use of, or an activity on, the land or require maintenance of an engineering control;
 - e. Specify that the ERC must run with the land and be binding on successor owners;
 - f. Be recorded in the applicable county recorder's office;
 - g. Explain how it may be modified or terminated.
2. IDEM's Approval Authority Limited. After June 30, 2009, ERCs are no longer subject to IDEM's approval in their entirety. IDEM retains the following authority:
 - a. IDEM has the authority to approve (or disapprove) the use or activity restrictions in ERCs (prohibiting residential use of property, prohibiting groundwater use, etc.).
 - b. IDEM has the authority to review ERCs to determine if they meet the statutory definition of a restrictive covenant. This means that ERCs must meet the criteria in item 1, listed above.
 - c. For properties that are (i) the site of existing or former hazardous waste facilities (RCRA), or (ii) on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list, IDEM retains the authority to require an owner to record an ERC on the property if the commissioner determines one is necessary to protect human health and the environment. IDEM may also require the property owner to include in the ERC a description of the identity, quantity, and location of hazardous substances remaining on the property (IC 13-25-4-24(c)) (this information could be provided in table or narrative format). IDEM may also require the property owner to include in the ERC provisions ensuring engineering controls are not disturbed and are effectively maintained.

Additional ERC Information:

- IDEM will still provide ERC templates as a convenience; as before, there is no obligation for a responsible party to utilize any IDEM template
- Copies of recorded ERCs must be provided to IDEM if the responsible party wishes to rely on it to obtain site closure. IDEM staff need to determine if the ERC meets the statutory definition of a restrictive covenant, including the criterion that the ERC be recorded. Staff should still encourage responsible parties to submit drafts to IDEM in order to avoid the possibility of having to re-record the ERC if IDEM determines the already-recorded ERC does not contain appropriate use restrictions or does not meet the definition of an ERC in the statute.
- IDEM may still request a copy of the most recent deed for the property.
- IDEM cannot require maps for the entire property; although they (GPS coordinates and/or legal surveys) may be requested for certain engineering controls and where restrictions are applicable to only a portion of the property.
- IDEM cannot require that tables of contaminant concentrations be attached to ERCs, unless the site is a RCRA or CERCLIS site (note: RCRA or CERCLIS sites may use tables or describe contaminant concentration information in a narrative format).
- HEA 1162 did not make it clear whether IDEM may require that a proposed restriction be modified. However, IDEM may suggest modifications, and if the party proposing the ERC does not accept the suggestion or provide alternate language, IDEM will have to evaluate whether the land use restrictions proposed are sufficiently protective to warrant closure.

Conditional Closure: Environmental Restrictive Ordinances

Summary

HEA 1162 defines Environmental Restrictive Ordinances (EROs) as any ordinance that 1) is adopted by a municipal corporation; and 2) limits, regulates, or prohibits any of the following with respect to groundwater: a) withdrawal, b) human consumption, and c) any other use. HEA 1162 further states that IDEM must “consider” and “give effect” to EROs “in evaluating risk based remediation proposals” [IC 13-25-5-8.5(e)].

IDEM has the responsibility to ensure that remedial decisions are protective of human health. There are documented limitations with the use of local groundwater ordinances as institutional controls (ICs): 1) the reliability hinges on public acceptance and awareness of those persons whose property is affected by the ordinance,⁷ 2) fiscal constraints may influence the local government unit’s ability to monitor and enforce the ordinance, 3) existing wells in use may be difficult to locate and property owners may refuse to hook up to municipal water supplies, and 4) an ERO may prohibit installation of new wells, but may not prohibit the use of existing wells.

IDEM will continue to develop and disseminate information on how it will evaluate EROs proposed as part of a risk-based remediation. In the interim, the following general policy statements apply.

A. General Policy Statements

1. Each proposed ERO will be reviewed individually for effectiveness as an IC at the site upon which the risk based remediation proposal is based. ICs need to be protective of human health by eliminating exposure pathways to contamination. The EROs will need to prohibit use of groundwater for ingestion, and, depending on the contaminant(s) of concern, the remaining concentrations, and the plume dynamics, may need to prohibit the use of groundwater for other purposes as well (such as irrigation, cooling water, etc.) The most effective ICs are layered with other levels of controls and combined with treatment of the residual wastes on site.⁸
2. IDEM does not encourage or discourage local government units to adopt an ERO to serve as an IC. It is up to the community to decide if adopting the ordinance is appropriate, taking into account current and future planned use of water resources.

⁷ Unlike other Region 5 states that utilize ordinances as Institutional Controls, this limitation is exacerbated since Indiana has no state-wide requirement for well permits. Well logs do have to be submitted *after* installation, but only a handful of counties/cities require permits prior to well installation. Unless there is public awareness of the existence of EROs, there is the possibility that wells may be unintentionally installed in ERO areas.

⁸ 40 CFR 300.430 (a)(1)(iii)(C); 40 CFR 300.430 (a)(1)(iii)(D); *Institutional Controls: A Site Manager’s Guide to Identifying Evaluating and Selecting ICs at Superfund and RCRA Corrective Action Cleanups* (EPA 540-F-00-005)

3. Proposed EROs should be evaluated in consultation with the municipality that will eventually adopt the ERO as its ordinance. Because IDEM must evaluate the effectiveness of the ERO and rely on local governments to enforce them, the municipality's involvement throughout the review process will allow IDEM to determine how effective and protective the proposed ERO will be.
4. IDEM's initial review of an ERO does not constitute acceptance of the ERO as part of a final remedy; final acceptance by IDEM will depend on the content of the ERO, actual adoption of the ERO by the local unit of government, and the effectiveness of the ERO at preventing exposure to groundwater from the site in question. Due to the time involved to conduct any necessary research and an adequate review, and for local government units to adopt and codify ordinances, the ERO review process should begin early in corrective action planning.
5. Other remedial measures may be necessary at the site to prevent human exposure to the contaminants via exposure pathways (such as vapor intrusion) not addressed by the ERO.
6. EROs *may* be found to be unacceptable as ICs for the following areas where exposure pathways are likely to be completed:
 - a. Where plumes encroach or fall within the five-year time of travel of a delineated wellhead protection area (WHPA) or a 3000 foot fixed radius WHPA for a community water system⁹;
 - b. In areas where water wells are in use for potable purposes, unless those wells are properly abandoned and municipal water is supplied to the residence/building previously served by the water well.
7. There should be sufficient understanding of the contaminant mass flux within a groundwater plume to demonstrate that the contaminant plume will not migrate beyond the boundaries established in the ERO at levels that would not be protective of human health. This may be accomplished by:
 - a. Identifying characteristics of the site and the contaminant plume that provide a level of confidence that the plume is near its maximum extent and concentration;
 - b. Demonstrating that the contaminant plume is stable or shrinking, prior to acceptance of an ERO as an IC at a particular site; or
 - c. Long term monitoring that demonstrates that the contaminant plume does not extend beyond the boundaries established in the ERO.
8. Depending on site-specific factors (persistence of contaminants, extent of groundwater plume, contaminant toxicity, incomplete demonstration of plume stability) some form of continuing obligation *may* be required of the party seeking closure and included in site closure documentation. Continuing obligations may include:

⁹ In accordance with IC 5-14-3-4(b)(19)(H), locations of approved WHPAs are not available on-line. For information regarding WHPAs consult the IDEM web page <http://www.in.gov/idem/4289.htm#proxdet> or contact IDEM via phone at (317) 232-8603.

- a. Establishing adequate controls when variance or special use requests are granted by the local authority, or ordinance changes could result in exposure to groundwater;
 - b. Groundwater monitoring to ensure the plume does not extend beyond the established boundaries of the ERO;
 - c. Site-specific obligations.
9. EROs that allow for special use exceptions or variances do not preclude the potential for future exposure to the contaminants. If the ERO allows variances or special use exceptions, IDEM will expect the local government unit to engage technically qualified entities (e.g., a professional engineer or consulting firm) to conduct reviews to ensure that exposure to the contaminant will not occur if the variance or exception is granted.
 10. IDEM will verify receipt of certification from an authorized official that the approved ERO is complete, accurate, and in effect¹⁰ before issuing closure documentation.
 11. Approval of an ERO does not ensure that other entities with contaminated sites within the boundaries of the ERO will automatically be granted closure based on that same ERO. Use of an ERO as a proposed remedy will be evaluated on a case by case basis and evaluated according to the facts at each site.
 12. IDEM will draft site closure documents so that closure decisions may be revisited if IDEM receives or becomes aware of new information. Examples of circumstances where this is likely to happen include: 1) the ERO is subsequently amended in a manner that allows contaminant plume migration beyond the established ERO control area or would allow exposure to contaminated groundwater, 2) the ERO is repealed, 3) variances/exceptions are granted that could allow for exposure to contaminated groundwater, or 4) there is evidence that exposure to contaminated groundwater is occurring within an ERO approved as an IC.
 13. IDEM will enter all EROs utilized as ICs for sites in an IDEM remedial program into IDEM's Institutional Controls Registry.
 14. Notification from the local government unit to IDEM regarding ERO enactment, amendments, and repeals (IC 36-2-4-8, IC 36-1-6-11) should be sent to:

IDEM, Office of Land Quality
Remediation Services Branch
Attn: Branch Chief
IGCN-Suite 1101
100 N. Senate Ave.
Indianapolis, IN 46204-2251

¹⁰ The ERO copy should be certified [signed by the local authority and attested by the clerk-treasurer i.a.w. IC 36-5-10.2 (towns); IC 36-4-6-17 (cities)].

Conditional Closure: Voluntary Remediation Program (VRP) Covenants

HEA 1162 added provisions to the VRP statute that allow the commissioner to include in a certificate of completion or a covenant not to sue conditions that must be performed or maintained after issuance of the certificate or covenant.

The VRP does not currently grant closure to applicants where the remedy at a site involves “active” ongoing obligations, such as an active treatment system. In light of these new provisions, IDEM will consider whether it is appropriate to approve closure at sites with active, ongoing obligations on a case-by-case basis. If the applicant has not demonstrated that the proposed remedy (active treatment system) is an effective remedy for a particular site, IDEM will not grant closure. If closure is approved, the Certificate of Completion and Covenant not to Sue (CNTS) will contain conditions tailored to the specifics of each site to ensure that the active, ongoing obligations continue to be met and the remedy continues to be effective. If the conditions do not continue to be performed or maintained, then the covenant would no longer bar an action by IDEM against the recipient of the CNTS. IDEM would not have to take action to void, rescind, or reopen the CNTS – the shield from liability would simply not exist any longer.

Conditional Closure: Financial Assurance

As previously explained, HEA 1162 allows for closures with conditions that must be maintained or performed to effectively control exposure to any remaining contaminants. This means closures may have continuing obligations designed to ensure that administrative and/or engineering controls remain effective. Examples may include maintaining a parking lot “cap”, ensuring that a slurry wall remains an effective barrier, or requiring ongoing groundwater monitoring. Some requirements may be costly, and in special cases it may be reasonable to request financial assurance that responsible parties will be able to operate and maintain such controls for the duration of the risk. Such decisions will be made above the project manager level. Where IDEM thinks financial assurance is critical to ensuring the long-term protectiveness of a remedy, IDEM would consider financial assurance in the form of a trust fund, a letter of credit from a bank, a surety bond, or post-closure insurance.

IDEM management will consider the following factors when determining when to require, and what would be an appropriate amount of, financial assurance:

- The complexity of the site or
- The operation and maintenance expense of an engineering control; and
- The risk to human health or the environment in event of a failure of the control.

Conditions that may require financial assurance

- Active engineering controls (such as groundwater pumping, vapor extraction, in-situ chemical treatment, etc.) on materials (such as free product, mobile source materials, or highly toxic source material) that would present a significant risk to human health or the environment should exposure occur.
- Continued groundwater monitoring (because this would be a fairly expensive liability for anyone else to have to assume)
- High cost/limited life passive engineering controls (e.g., slurry wall, sheet piling, etc.)

Conditions that will generally not require financial assurance

- Active engineering controls on source materials that would present only a low risk in the event of a release.
- Passive engineering controls, such as a parking lot “cap” or other physical barriers.
- Administrative controls (though IDEM may require further remedial action if the control fails).