



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.


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The presentation attached was given at the Office of Land Quality's Consultant's Day on December 9, 2009. This presentation is based on IDEM's *House Enrolled Act 1162 Interim Implementation Document (HEA 1162 IID)*, dated December 7, 2009. The *HEA 1162 IID* is available on the IDEM RISC website at http://www.in.gov/idem/files/risc_head_1162_20091207.pdf.




Land

HEA 1162

Interim Implementation Document

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Presentation Overview

- Part 1 – Review of IID
 - Panelists reviewing each section.
- Part 2 – Site Scenarios – Application of IID
 - Hypothetical site scenarios – analysis & discussion

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HEA 1162 IID

- Today's presentation references the Dec 7 version.
- This version incorporates changes in response to comments received from MSECA and the ISBA.
- We anticipate one more round of minor revisions based on some additional comments and minor corrections we've already received.
- We're taking notes today and will consider additional revisions based on your feedback.

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Cover Page

- House Enrolled Act 1162 amended several statutes which govern Indiana's environmental remediation programs.
- The amendments became effective on July 1, 2009.

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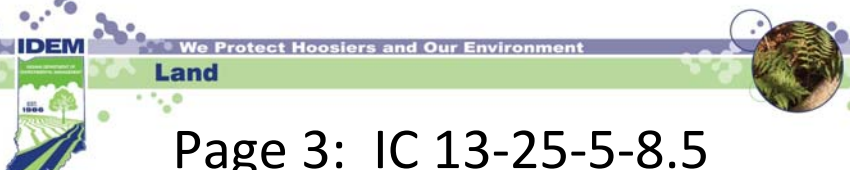


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Cover page

- Document will be used on an interim basis together with the *RISC Technical Guide* to evaluate risk-based remediation proposals.
- Document is a bridge to revised *RISC Tech Guide*.
- Portions of document will be refined and incorporated into a revised *Tech Guide*, following normal public input processes, and become non-rule policy.

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Page 3: IC 13-25-5-8.5

- VRP statute on risk based remediation objectives. Defines basis for closure.
- IC 13-12-3-2 applies this statute to the following remediation programs: RCRA (IC 13-22), USTs (IC 13-23), and state cleanup (IC 13-25-4 & IC 13-24).
 - These programs have been using IDEM's Risk Integrated System of Closure (RISC) policy since its approval in February 2001 so there isn't really a change in which remediation programs are using risk-based policy.

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Page 3: IC 13-25-5-8.5

- Key Amendments
 - Amendment to subsection (a) makes the statute retroactive. Existing sites may use remediation objectives allowed under the amended statute.
 - Amendment to subsection (c)(1) directs us to consider the risk-based remediation objectives when evaluating the adequacy of site sampling activities which characterize the nature and extent of contamination.
 - This topic is covered in the Investigation: Soil and Investigation: Groundwater sections of the IID.

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Page 3: IC 13-25-5-8.5

- Key Amendments (cont.)
 - Amendment to subsection (d)(3) clarifies that site-specific risk assessments may include: consideration of remedial measures, ERCs and EROs that manage risk, and control completed or potential exposure pathways.
 - Addition of subsection (e) directs us to consider and give effect to ERCs and EROs in evaluating risk-based remediation proposals.

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Page 3: IC 13-25-5-8.5

- Standards for closure defined:
 - Subsection (b) - remediation objectives are to be based on “background levels” or “an assessment of the risks.”
 - Subsection (c) – sites are to be adequately characterized; and additional actions are not necessary when the site characterization shows that levels of hazardous substances and petroleum are below background or risk based levels.

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Page 3: IC 13-25-5-8.5

- Standards for closure defined (cont.)
 - Subsection (d) – risk-based remediation objectives are to be based on:
 - (1) default values = RISC Default Closure Levels
 - (2) site specific values in standard equations = RISC nondefault closure levels
 - (3) site-specific risk assessment = conventional risk assessment (e.g. RAGS); or other nondefault approaches - including those involving risk management components.

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Page 3: IC 13-25-5-8.5

- Standards for closure defined (cont.)
 - Subsection (e) – we must consider and give effect to ERCs and EROs
 - More on this in the Conditional closure: ERCs and Conditional closure: EROs sections.

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Page 3: Introduction

- Pg 3 main points:
 - Statute applies to VRP, RCRA, LUST/ELTF, SCP, Brownfields.
 - Statute gives 3 general options for closure:
 - A demonstration that contaminants are consistent with background levels
 - A site investigation that shows there is no unacceptable risk
 - A remedy which achieves no unacceptable risk.

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Page 4: Introduction

- We must consider remedies that manage risk and control completed or potential exposure pathways as valid approaches to site closure.
- We will approve remedies that are effective in mitigating risks.
- Understanding the underlying policy & science basis for the three statutory options for risk-based remediation objectives is important to sound decision-making.

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Page 4: Introduction

- Acceptable risk is defined in RISC policy - which follows the NCP & USEPA:
 - The risk range for carcinogens is set at 10^{-6} to 10^{-4} (10^{-5} for RISC DCLs)
 - The hazard quotient for systemic (noncancer) effects is set at unity (1) for each critical effect category.

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Page 4 – Introduction Excess Cancer Risk

- What do the excess cancer risk numbers 10^{-6} to 10^{-4} mean?
 - Baseline cancer risk in the United States is approximately 40,000 out of 100,000. That is 40,000 of 100,000 people will develop a cancer in their lifetime. This risk can be expressed numerically as 4×10^{-1} or 0.4 or 40,000/100,000.
 - The target risk we use in assessing risks and setting remediation objectives for carcinogens is an additional risk on top of the baseline risk. It is set at a range of risk levels that is considered to represent negligible risk: 1×10^{-6} to 1×10^{-4} (often shortened to 10^{-6} to 10^{-4}).
 - $1 \times 10^{-6} = 0.000001 = 1/1,000,000$
 - $1 \times 10^{-5} = 0.00001 = 1/100,000$ (RISC defaults calculated at this risk level.)
 - $1 \times 10^{-4} = 0.0001 = 1/10,000$

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Page 4: Introduction Excess Cancer Risk (cont.)

- Are risks in this range negligible?
 - If a population of 100,000 people were exposed to a chemical consistent with the exposure assumptions used in calculating our default closure levels (which is very unlikely!), their cancer risk is theoretically increased by one case of cancer in that population or from 0.4 to 0.40001.
 - Risks in the range of 10^{-6} to 10^{-4} are negligible – they cannot be distinguished from the baseline risk.

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Page 4: Introduction Excess Cancer Risk (cont.)

- Key points for carcinogens:
 - Closure levels are not bright lines. Professional judgment is important in risk assessment and risk management.
 - The risks are not realized unless there is actual sustained exposure consistent with the exposure scenarios used in assessing the risks. (Risk assessors generally bias the assessment conservatively, so this is unlikely.)
 - RISC allows use of the upper end of the risk range (10^{-4}) but only if uncertainty in the risk assessment is significantly reduced by thorough site characterization and appropriately conservative risk assessment.

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Page 4: Introduction: Noncancer Hazard Quotient

- What does the noncancer hazard quotient mean?
 - Closure levels are calculated based on a “reference dose” (RfD) which represents a daily dose that is considered safe over a lifetime.
 - Exposure to a single COC at the reference dose equates to a hazard quotient of 1 for the corresponding critical effect category.


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Page 4: Introduction Noncancer Hazard Quotient (cont.)

- Is a HQ of 1 safe? / Is a HQ minimally above 1 unsafe?
 - The HQ and resulting closure levels for noncarcinogens are not bright lines. Professional judgment is important in risk assessment and risk management.
 - The RfDs are conservatively derived to provide a high degree of confidence of no appreciable risk of deleterious effects. For example, uncertainty factors are used to adjust the RfD downward to account for uncertainty in the toxicological studies.
 - A HQ above 1 does not necessarily imply that a toxic effect will occur, but rather as the HQ increases our confidence that there is no appreciable risk decreases. In these cases it is appropriate to consider the site-specific circumstances & seek more information about the uncertainty in the RfD to make an informed judgment.

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Page 4: Introduction Default Exposure Scenarios

- The default closure levels utilize conservative exposure assumptions. For soil closure levels, we assume that exposure occurs through incidental ingestion, inhalation of particulates and volatiles, and dermal contact.
- Selected parameters for the default soil direct contact exposure scenario:

	Residential	Industrial	Construction
Exposure Frequency (days/year)	250	250	45
Exposure Duration (years)	30*	25	1
Body Weight (kg)	15 (child) 70 (adult)	70	70
Soil Ingestion Rate (mg/day)	200 (child) 100 (adult)	50	480
Inhalation Rate (m ³ /day)	10 (child) 20 (adult)	20	20
Skin Surface Area (cm ²)	2000 (child) 5000 (adult)	3160	3160

*assumes 6 years as a child and 24 years as an adult

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Page 4: Introduction

Default Exposure Scenarios (cont.)

- For groundwater closure levels, we assume that exposure occurs through ingestion and inhalation of volatiles (residential only)
- Selected parameters for the default groundwater exposure scenario:

	Residential	Industrial
Exposure Frequency (days/year)	350	250
Exposure Duration (years)	30	25
Body Weight (kg)	70	70
Drinking Water Ingestion Rate (L/day)	2	1
Inhalation Rate (m ³ /day)	15	--
Indoor Air Volatilization Factor (unitless)	0.5	--

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Page 4: Introduction

- Our default closure levels are calculated based on acceptable risk levels, using conservative exposure scenarios corresponding to the land use.
- Risk-based remediation objectives are not fixed, bright-line standards. Site-specific conditions lead to thousands of possible scenarios.
- Risk is evaluated and estimated using technical and scientific techniques that require the risk assessor and risk manager to understand the limitations and uncertainties inherent in a risk assessment and the conservatism built into default closure levels and to make professional judgments accordingly.

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Page 4: Introduction

- Risk Assessment/Risk Assessor
 - Develop & interpret CSM to understand & characterize risks.
 - Science Services Branch
- Risk Management/Risk Manager
 - Apply risk assessment/risk characterization to site in light of all considerations and make risk management decisions regarding remedies.
 - Remediation Services Branch

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Pages 5-8: FAQs

- Provided as a quick reference.
- Additional details are provided in the main body of the IID.
- We're not reviewing the FAQs during this presentation.

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Page 9: Investigation: Soil

- Prior to HEA 1162 we generally expected nature and extent delineation out to default residential closure levels in most cases.
- The HEA 1162 amendment to subsection (c)(1) of the VRP statute directs us to consider the remediation objectives when evaluating the adequacy of a nature and extent investigation.

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Page 9: Investigation: Soil

- Delineate the on-site vertical and horizontal extents of contamination to land-use specific closure levels identified in the conceptual site model (CSM), *AND*

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Page 9: Investigation: Soil

- Demonstrate, by sampling or after considering the factors listed below, that contamination doesn't go beyond the ***area of exposure control*** in excess of residential closure levels.

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Page 9: Investigation: Soil

- *IF* contamination exceeds residential levels and extends beyond the area of exposure control, *THEN*

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Page 9: Investigation: Soil

- Either delineate off-site contamination to residential closure levels, *OR* demonstrate to IDEM why it is not necessary to do so.

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Sidebar: Saturated Soils

- Delineation of saturated soils is not necessary for evaluating the soil migration to groundwater pathway (i.e. not for comparison to soil migration to groundwater closure levels).
- Delineation of saturated soils may be necessary to evaluate the soil direct contact pathways when groundwater is near the ground surface.

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Sidebar: Saturated Soils (cont.)

- Possible reasons for examining saturated soils:
 - Develop conceptual site model to understand risks.
 - Describe the material for a boring log.
 - Determine best placement for well screens.
 - Design remediation systems where necessary.

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Page 9: Investigation: Soil

- Factors to consider if on-site delineation for industrial/commercial sites to residential closure levels is necessary include:
 - Physical boundaries and characteristics
 - Chemical behaviors and demographics

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Page 9: Investigation: Soil

- Factors to consider (cont.)
 - Distance from the delineated area to the boundary of exposure control
 - Size of the source area
 - Possible preferential pathways (vertical and horizontal)
 - Presence of residential and/or ecological receptors in the vicinity.

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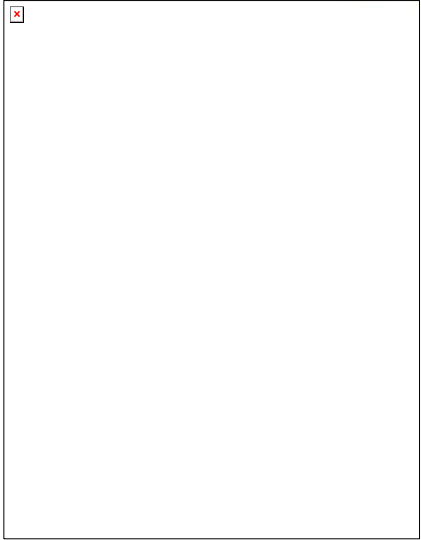
Page 9: Investigation: Soil

- Factors to consider (cont.)
 - Contaminant concentrations relative to their closure levels (will an unacceptable risk or hazard to human health or the environment result from contamination above the closure levels?)
 - Relative magnitudes of residential and industrial closure levels
 - Current and likely future use of the property



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Page 9: Investigation: Soil






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Page 11: Investigation: Soil

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

		
500 ppm	100 ppm	20 ppm

Industrial closure level = 25ppm
Residential closure level = 10ppm

Area of Exposure Control Boundary

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Page 11: Investigation: Soil

Delineate to industrial, demonstrate residential at or near boundary

200 ppm 100 ppm <10 ppm

Industrial closure level = 100ppm
Residential closure level = 10ppm

Area of Exposure Control Boundary

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Investigation: Soil

www.environment-agency.gov.uk (R&D Publication 133)

soil borings
(Unsaturated Zone)

Weathered
Unweathered

Fractured

Vertical delineation leads to horizontal delineation

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Investigation: Soil

www.environment-agency.gov.uk (R&D Publication 133)

Contamination in (a) unsaturated and (b) saturated porous media

Water
Air
Contaminant
Soil grain

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Page 12: Investigation: GW

- Objectives of the groundwater INVESTIGATION
- HEA 1162
- **DO THE OBJECTIVES CHANGE???**

Hypothesis → Sample → Decision → Action → Result → Hypothesis

IDEM LTMO Training, January, 2007, Groundwater Services, Inc.


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Page 12: Investigation: GW

- Prior to HEA 1162 we generally expected nature and extent delineation out to default residential closure levels in most cases.
- The HEA 1162 amendment to subsection (c)(1) of the VRP statute directs us to consider the remediation objectives when evaluating the adequacy of a nature and extent investigation.


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Page 12: Investigation: GW

1. Delineate the on-site vertical and horizontal extents of groundwater contamination to levels based on reasonable exposure scenarios, *AND*


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Page 12: Investigation: GW

2. Demonstrate or provide lines of evidence to show that contamination doesn't leave the area of exposure control exceeding residential closure levels (considering factors provided in IID). *IF* contamination exceeding residential levels extends beyond the area of exposure control, *THEN*

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Page 12: Investigation: GW

3. Delineate that groundwater contamination to residential closure levels, OR provide lines of evidence to show IDEM why this is not necessary.

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Page 12: Investigation: GW

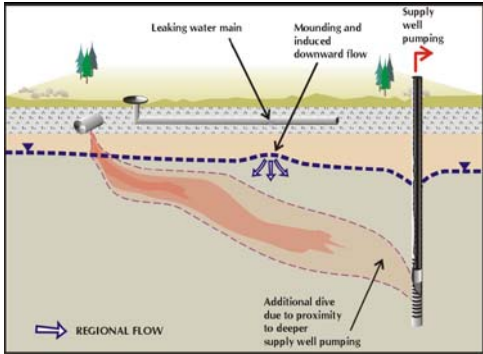
- **Point of Exposure Control**
 - Size, distance to boundary, use, and relationship of the contaminant levels
 - Petroleum plumes example.

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Page 12: Investigation: GW

- **Existing Uncertainty**
 - Pathways & contaminant characteristics



Leaking water main Mounding and induced downward flow Supply well pumping

REGIONAL FLOW

Additional dive due to proximity to deeper supply well pumping

API SOIL AND GROUNDWATER TECHNICAL TASK FORCE BULLETIN 24, APRIL 2006

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Page 12: Investigation: GW

- Evaluate the potential for changes in the conceptual site model(e.g. flow direction, magnitude)

API SOIL AND GROUNDWATER TECHNICAL TASK FORCE
BULLETIN 24, APRIL 2006

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Page 13: Investigation: GW

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

- Size, distance to boundary, use, and relationship of the contaminant levels
- Contaminant characteristics (mobility, toxicity, volatility, and persistence)
- Potential for changes in the conceptual site model

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Page 13: Investigation: GW

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

The diagram illustrates groundwater flow from left to right. On the left side, there are four monitoring points with contaminant levels: 100 ppb (top-left), 80 ppb (top-center), 75 ppb (bottom-center), and 60 ppb (right-center). An arrow labeled 'Groundwater flow direction' points to the right. On the right side, there are two monitoring points, both with levels < 5 ppb. A vertical line on the far right is labeled 'Area of Exposure Control Boundary'. Below the diagram, it states: Industrial closure level = 50 ppb, Residential closure level = 5 ppb.

- Size, distance to boundary, use, and relationship of the contaminant levels
- Contaminant characteristics (mobility, toxicity, volatility, and persistence)
- Potential for changes in the conceptual site model

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Page 13: Investigation: GW

Delineate to residential

The diagram illustrates groundwater flow from left to right. On the left side, there are four monitoring points with contaminant levels: 100 ppb (top-left), 80 ppb (top-center), 75 ppb (bottom-center), and 60 ppb (right-center). An arrow labeled 'Groundwater flow direction' points to the right. On the right side, there are three monitoring points with levels: 30 ppb (top-left), 18 ppb (top-center), and < 5 ppb (right-center). A vertical line on the far right is labeled 'Area of Exposure Control Boundary'. Below the diagram, it states: Industrial closure level = 50 ppb, Residential closure level = 5 ppb.

- Size, distance to boundary, use, and relationship of the contaminant levels
- Contaminant characteristics (mobility, toxicity, volatility, and persistence)
- Potential for changes in the conceptual site model

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Page 14: Unconditional Closure

- Not necessarily default residential closure levels.
- Nondefault residential closure levels may be calculated and used as remediation objectives.
- Site-specific risk assessments may demonstrate that there is no unacceptable risk or hazard with unrestricted residential use. (e.g. individual sample locations or discrete areas may exceed closure levels, but a risk assessment may show that exposure will not occur at levels creating an unacceptable risk.)

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Page 15: Process Chart

- Illustrates paths to unconditional closure or closure with ongoing obligations.
- Either way, investigation data is necessary to inform choices of remedial options and prove effectiveness of remedy.

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Page 16: Remedy Selection

- This section lists documentation that is generally necessary to facilitate an evaluation of risks and selection of a remedy.
- The documentation necessary will vary from site to site based on the remedial objectives proposed for the site. (IC 13-25-5-8.5(c)(1))
- The topics listed are typical of the content in a conceptual site model (CSM).
- The CSM should include all relevant exposure pathways.

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Page 17: Remedy Evaluation

- Soil
 - Remedy should address all relevant exposure pathways.
 - Remedies which involve contamination left in place in excess of risk-based levels (not necessarily default closure levels) must demonstrate effectiveness in preventing exposure.
 - ERCs are often necessary and in most cases will restrict residential or other specified uses of the property (or portions thereof).

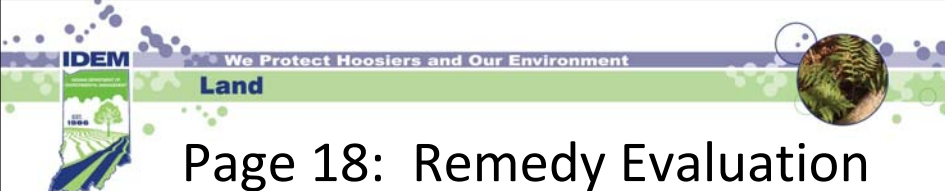
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Page 17: Remedy Evaluation

- Soil (cont.)
 - Required engineered controls are to be inspected and maintained for the duration of the risk, and enforceable by a legal instrument.
 - O&M plans or financial assurance may be necessary in some cases.
 - More on “conditions subsequent” later.

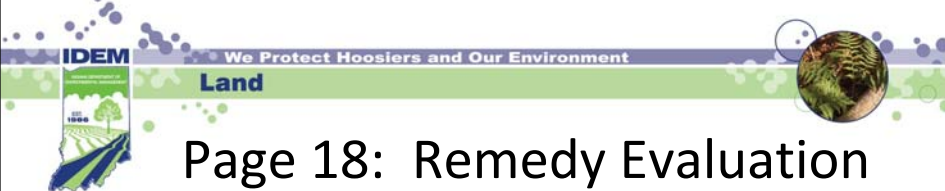
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Page 18: Remedy Evaluation

- Groundwater
 - Confirm there is no current exposure to GW.
 - Demonstrate ability to control access to plume.
 - Ability to predict with confidence how far the plume will migrate.
 - Appropriate ICs to control exposure where necessary.
 - Evaluate vapor intrusion for volatiles.


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Page 18: Remedy Evaluation

- Groundwater
 - Evaluate preferential pathways.
 - Evaluate susceptible areas.
 - Consider need for financial assurance or conditions subsequent.


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Pg 20: Conditional Closure: Soil

- Risk Management/Risk Assessment
- Soil Conc. Exceeds Acceptable Residential Risk
 - Either, ERC
 - Limit exposure
 - Affirmative obligations
 - Prohibit certain activities
 - OR,
 - Or, Demonstration why ERC not necessary

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Pg 20: Conditional Closure: Soil (cont.)

- Soil Conc. Exceeds Acceptable Residential Risk
 - Direct Contact vs Migration to Groundwater
 - Mass Matters (judgment)
 - Size vs Concentration (“Hot Spot”)
 - Depth Matters (judgment)
 - Direct Contact < 15 feet

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Page 22: Conditional Closure: Groundwater

- Gdwtr Conc. Exceed Acceptable Risk
 - ERC or ERO
 - Control Exposure Pathways/Routes (no wells)
 - groundwater behavior understood
 - Or, Risk Evaluation Demonstrating ERC/ERO Not Necessary
 - Judgment (“multiple lines of evidence”)
 - Railroad ROW, public road, aquifer viability, mass considerations, geologic considerations, etc


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**Page 24: Conditional Closure:
Free Product (NAPL)**

- Risk-based approach required for NAPL's
 - Evaluate potential to affect human health and environment through exposure pathways
- No longer a pre-condition to remedy approval
 - LUST rule conflict w/ 1162??

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**Page 24: Conditional Closure:
Free Product (NAPL) – cont.**

Four risk-based criteria for conditional closure of NAPL:

1. Potential for acutely hazardous condition
2. Ongoing source of contamination to potential groundwater/surface water receptors
3. Potential for completed direct contact pathway
4. Potential for completed vapor intrusion pathway

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Page 25: Conditional Closure: ERC Definition Amended

- Requires ERCs to contain language that:
 - Grants IDEM access to the property;
 - Requires notice to transferees of the ERC existence;
 - Specifies the location of IDEM files related to the property.

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Page 25: Conditional Closure: ERC Definition Amended

- Old criteria still apply; Requires ERCs to contain language that:
 - Lists land use activity restrictions, obligations, and engineering controls;
 - Explains how the ERC may be modified or terminated;
 - States that the ERC 'runs with the land' and is binding on successor owners.
- ERCs must be recorded in the county recorder's office


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Pg 25: ERC – Approval Authority

- IDEM does not approve entire ERC
- IDEM retains approval authority for:
 - Restriction language
 - Review to ensure ERC statutory definition met
 - Identity, quantity, and location of COCs (Hazardous Substances, CERCLIS under 13-25-4-24)
 - Verifying site ownership and correct parcel identification


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**Page 25: Conditional Closure:
ERCs – Misc.**

- ERC templates may still be provided as a convenience, but no obligation for RP to use
- Copies of recorded ERCs must be provided to IDEM
- Maps optional; may be requested for some engineering controls and when ERC applies to portion of property

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Page 27: Conditional Closure: Environmental Restrictive Ordinances

- Cities, towns, and counties enact ordinances for use as local law
- Like ERCs, ordinances may be used as an Institutional Control to prevent exposure to contamination

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Page 27: Conditional Closure: Environmental Restrictive Ordinances

- HEA 1162 added new definition; EROs are defined as any ordinance that:
 - Is adopted by a municipal corporation; and
 - Limits, regulates, or prohibits one (1) or more of the following with respect to groundwater:
 - (A) Withdrawal.
 - (B) Human consumption.
 - (C) Any other use.

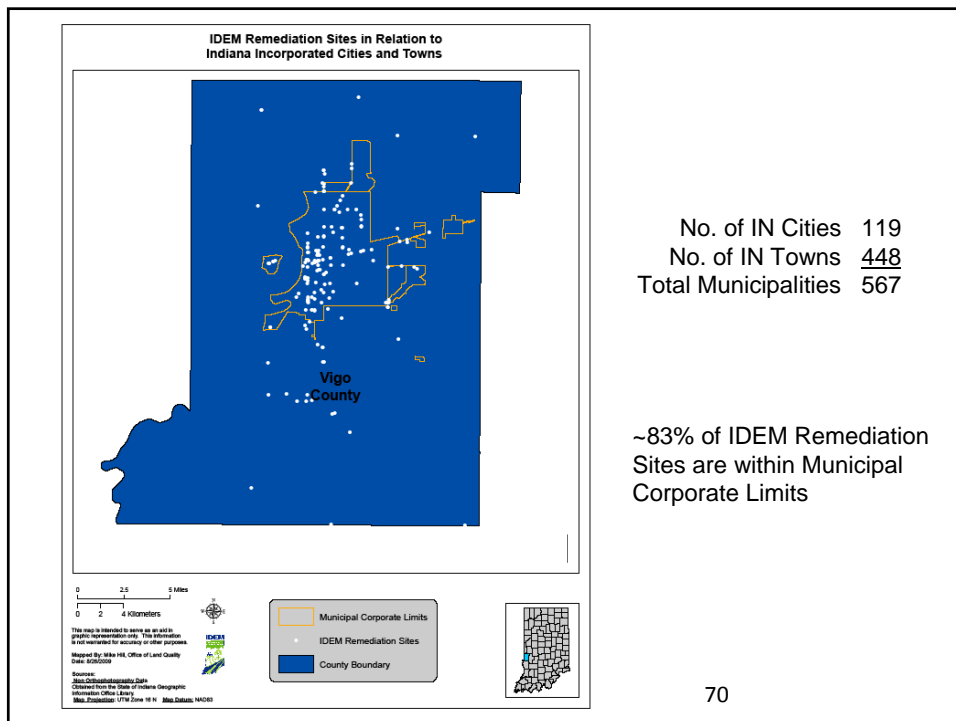
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Page 27: Conditional Closure: Environmental Restrictive Ordinances

- Risk based remediation objectives may include EROs that (IC 13-25-5-8.5(d)(3))
 - a) **“Manage risk”;**
 - b) **“Control completed or potential exposure pathways.”**
- Local government units required to notify IDEM if ERO is passed, amended, or repealed (IC 36-2-4-8(c)(2); IC 36-3-4-14(g); IC 36-5-2-10(e)) .

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Pages 27-29: EROs - General Policy Statements

- These 14 policy statements provide guidelines for evaluating EROs as a part of a risk-based remediation.
- Professional judgment will come into play.
- Highlights
 - Each ERO will be reviewed independently
 - Need to engage municipalities
 - Other pathways must be addressed
 - Sufficient groundwater data to assess exposure control

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EROs - Evaluation

- What area is covered by ordinance?
 - Municipality-wide or smaller area?
 - Need specific area of coverage information
- What is extent of contaminant plume?
 - Take into account site-specific factors (stability, gw flow velocity, etc.)

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EROs - Evaluation

- What is the influence of nearby water withdrawals?
- Is there evidence of groundwater wells used for potable purposes in ordinance area?
 - DNR Database incomplete record of existing wells
 - New – DNR Website will soon have some well abandonment info
 - Municipality utilities and health department may have info on well use

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EROs – Evaluation (cont.)


- Does local government require well permits?
If so, will local government agree to not permit new wells in ERO area?

Counties that require Well Permits

- Boone
- Carroll
- Delaware
- Hamilton
- Hendricks
- Howard
- Jasper
- Kosciusko
- Marion
- Porter
- Pulaski
- St. Joseph
- Steuben

- Health Dept (or permit issuing agency) should be copied on correspondence for sites using EROs

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Land

EROs – Evaluation (cont.)

ERO Wording Evaluated

- Stronger ERO wording example:
 - Purpose clause- ERO due to contamination (historic knowledge)
 - Prohibition on groundwater for potable purposes
 - Abandonment of existing drinking water wells
- Not so Good: “...the installation of any private water well intended for potable human consumption... which is located within 300 feet from any existing and available water line...is hereby prohibited”.
 - How many properties are not within 300’ of water lines?
 - Are there existing wells?

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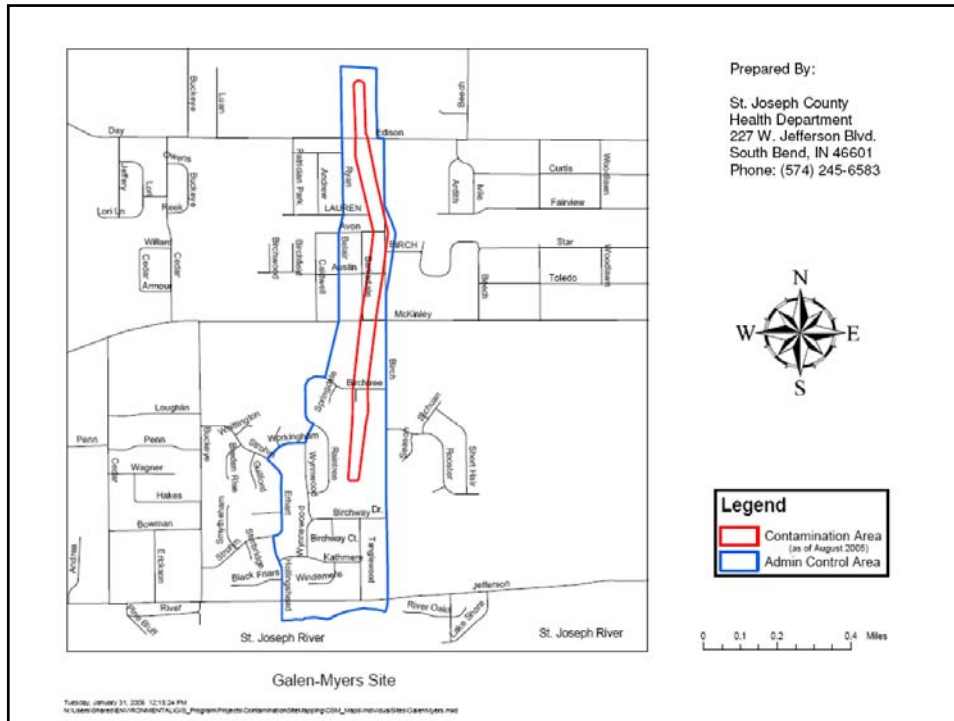


Land

St. Joseph County – Administrative Control Areas

- Ordinance enacted due to sole source aquifer status
- Public notice requirements
 - Newspaper Notice
 - Mail or deliver information to property owners
- Provides maps to the EPA and IDEM
- Conduct annual inspections of the properties over the gw contamination
- Deny well permit applications within ACA
- Require abandonment of ALL wells that may be impacted by or impact the plume
- Prepare annual report of actions taken and issues of concern

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IDEM We Protect Hoosiers and Our Environment

Land

Page 30: Conditional Closure: VRP Covenants

- HEA 1162 amends the Voluntary Remediation Program statute to explicitly allow IDEM to include conditions that must be performed or maintained after issuance of Certificates of Completion and Covenants not to Sue.

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We Protect Hoosiers and Our Environment

Page 30: Conditional Closure: VRP Covenants (cont.)

- VRP will consider closure for sites with remedies that require active ongoing obligations on a case-by-case basis. The applicant must demonstrate the effectiveness of the remedy.
- When closure is granted, the Certificate of Completion and Covenant not to Sue will contain conditions designed to assure the effectiveness of the remedy.
- If the conditions are not performed or maintained, the CNTS would no longer bar an action by IDEM against the recipient.
- We would not have to take action to void, rescind or reopen the CNTS.

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Page 8: FAQ on Conditions Subsequent

Q: Can a NFA letter contain similar conditions for closure?

A: *There is no explicit authority in 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.*

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Page 31: Conditional Closure: Financial Assurance

- Some conditional closures may rely on remedies that involve substantial ongoing cost for operation, maintenance and eventual replacement or refurbishment of a control.
- Factors to consider:
 - Complexity of the site.
 - O&M expense of an engineering control.
 - Consequences of remedy failure – risk to human health and the environment.

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Page 31: Conditional Closure: Financial Assurance

- Conditions that may require FA
 - Active engineering controls on materials that pose a significant risk upon exposure.
 - Continued groundwater monitoring.
 - High cost/limited life passive engineering controls.


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**Page 31: Conditional Closure:
Financial Assurance**

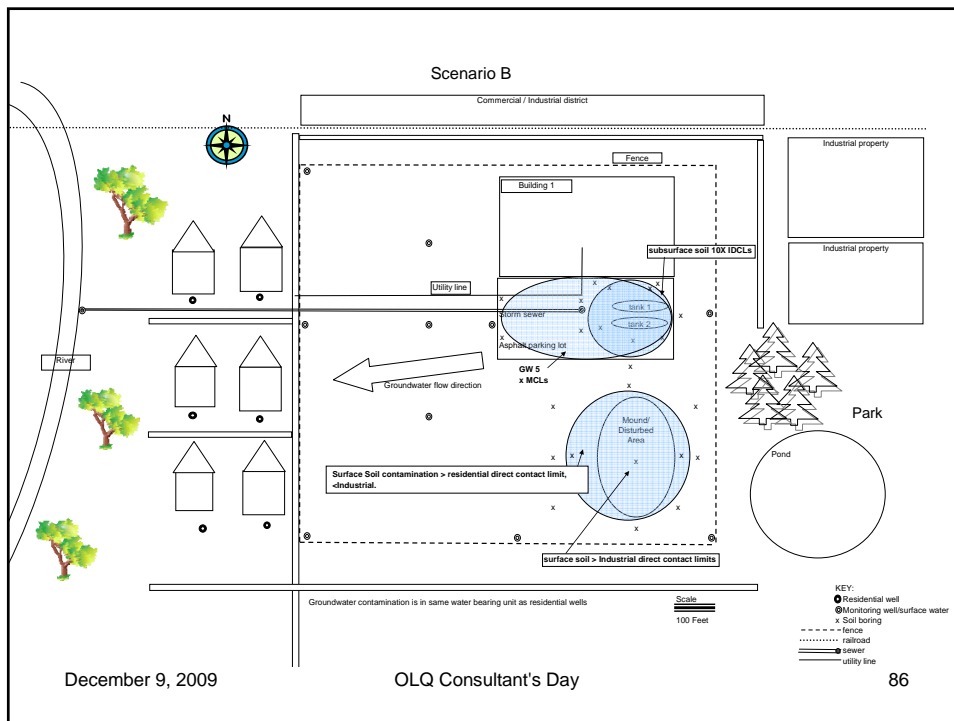
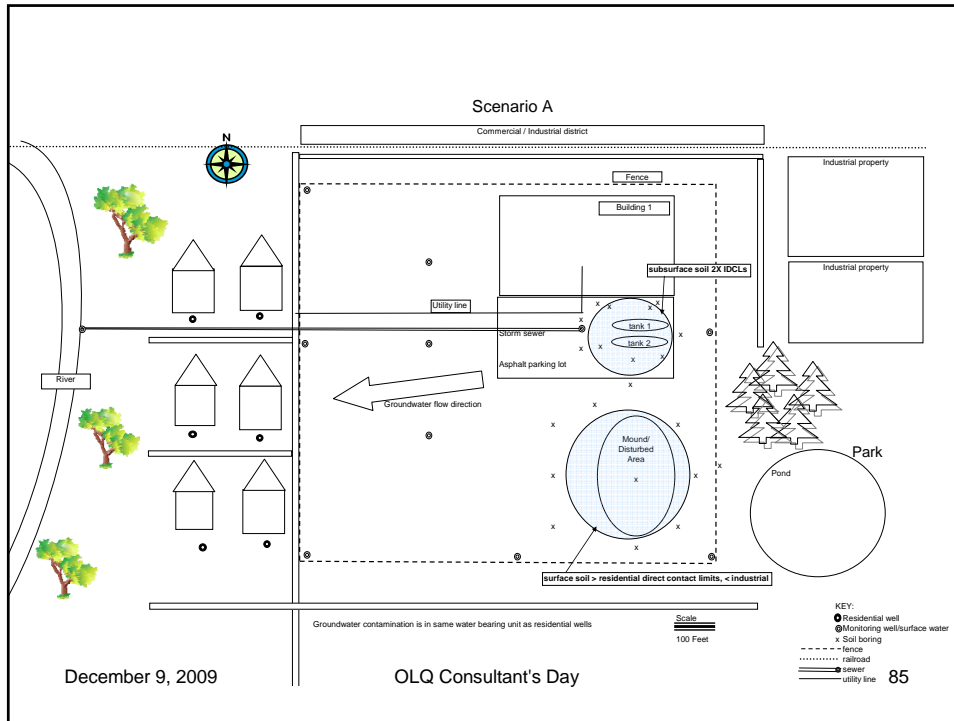
- Conditions that generally wouldn't require FA:
 - Active engineering controls on source materials that present a relatively low risk.
 - Passive engineering controls, such as a parking lot cap.
 - Administrative controls.

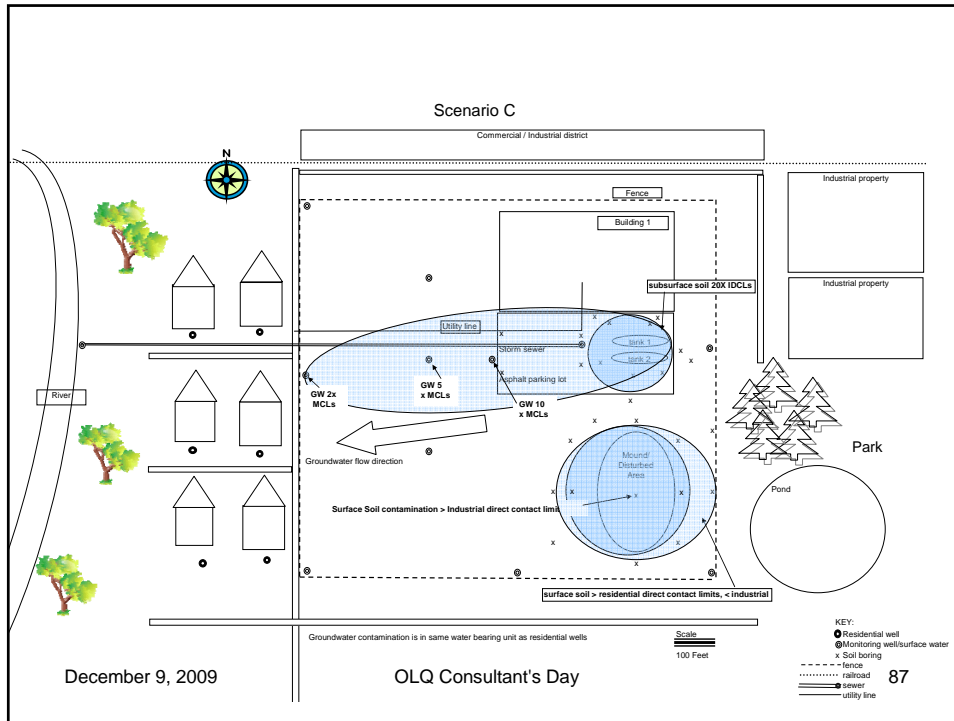
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Site Scenarios: Application of IID

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Proposed Remedy Scenario A:

- Parking lot to remain and serve as an engineering control
- Industrial use ERC on property

Proposed Remedy Scenario B

- Grading of mounded area,
- Asphalt cover over entire property with elimination of storm drain to river, drainage redirected to city storm sewer,
- Parking lot and building to remain and serve as an engineering control
- Industrial use ERC on site property

Proposed Remedy Scenario C

- Grading of mounded area,
- Asphalt cover over entire property with elimination of storm drain to river, drainage redirected to city storm sewer,
- Parking lot and building to remain and serve as an engineering control
- Connect residential neighborhood to city water
- Industrial use ERC on site property and groundwater use restriction ERC on neighboring property

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Some Key Questions-

- **Groundwater**
 - Is the plume expanding?
 - What is the likely future use of neighboring property?
 - Any vapor issues?
 - What is the likely long-term fate of the contamination? (i.e., will it degrade?)
 - Are the exceedances "close enough"?
- **Free Product**
 - Is the material moving or likely to move in the future?
 - Is the material a source of groundwater contamination or vapor intrusion?
 - Likely lifetime of material and long-term management issues?
 - Likely future use of the property?
- **Conditional Closure**
 - Is there current or likely future exposure?
 - Effectiveness of condition(s) in reducing exposure to acceptable levels?
 - What is likely long-term contaminant fate?
 - Lifespan of contaminant versus lifespan of conditions?
 - Consequences of failure?
 - Need for financial assurance?

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