

Human Health Risk Assessment Process Overview



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What is a Human Health Risk Assessment (HHRA)?

- An estimate of the potential for health risk for a group of people
 - Focused on protection
- For cleanups (corrective action):
 - People contacting contamination and the possible negative health outcomes (e.g., cancer)
 - Intended to be protective of people with the greatest contact and/or those most sensitive to the possible health effects
 - May be overly protective for many people

What a HHRA is NOT

- Estimating risk is **NOT** the same as measuring health outcomes (i.e., disease).
 - **Is not** a health study
 - **Does not** identify specific individuals who are exposed to a chemical
 - **Does not** compare chemical levels in individuals or groups of people to health outcomes
 - **Does not** provide medical diagnoses

Typical Uses of HHRA for Cleanups

- Michigan DEQ
 - Develop generic cleanup criteria
 - Determine need for and develop site-specific cleanup criteria
- U.S. EPA CERCLA/RCRA Programs
 - Baseline HHRA to evaluate need for remediation/corrective action
 - Use for developing preliminary and final remediation/corrective action goals

Steps of an HHRA

- Identify concerns = **hazard identification**
 - What chemicals and what levels?
 - Where are they?
- Determine potential for contact with contamination = **exposure assessment**
- Potential for health effects from contamination = **toxicity assessment**
 - How much (dose)?
- Potential risk = **risk characterization**
 - Combine information on exposure and toxicity to determine risk

Identify Potential Concerns

- What are the potential contaminants?
 - Evaluate chemicals used, manufactured, by-products and breakdown products for facility
- Where are they?
 - Environmental media (soils, sediments, groundwater, surface water, fish, etc.)
 - Location of contaminants (coordinates/depth)
 - Contaminant concentrations

Dow's Proposed HHRA Process

- Identify contaminants of potential concern (COPCs)
 - Evaluation of list of chemicals of record manufactured/used/disposed by Midland Plant
 - Considered chemical/physical properties
 - Evaluated ability to measure
 - Did not have information on quantities
 - Ongoing process
 - Collect concentration data in various media based on list
 - Screen against MDEQ/U.S. EPA cleanup levels

Identifying COPCs

- Subset of Upper Tittabawassee River soils and sediment samples have been selected for extended chemical analyses
 - First set of data by end of May
- Dow's consultants are evaluating the ability to measure potential contaminants in fish and wild game

Exposure Assessment

- Who has potential for exposure to contamination?
 - Residents, fishermen, hunters, farmers, etc.
- What ways could they be exposed?
 - Playing on contaminated soil, eating fish, eating game, eating farm products, etc.
- When/how often could they be exposed?
 - Every day, once a week, etc.
- How much of the contaminant could get into people?



Dow's Proposed HHRA Process

- Exposure assessment
 - Evaluate many pathways (eating fish, eating game, soil contact, etc.), receptors (residents, farmers, fishermen, etc.) and land uses (residential, agricultural, recreational, etc.)
 - Use U of M Dioxin Exposure Study Data as much as possible
 - Collect additional concentration data (fish, game, etc.)
 - Collect additional human activity data

Examples of Exposure Assessment Issues

- Population of concern
 - Only those people with potential exposure (location or behavior based)
 - Everyone in the area (population-based e.g., Midland/Saginaw County residents)
- Reasonable Maximum Exposure (RME)
 - Example - people who eat a lot of contaminated fish, game, etc.
 - RME vs. average exposure (may not eat any local fish)

Examples of Exposure Assessment Issues (Cont'd.)

- Determine relative importance of inputs into the exposure assessment = sensitivity analysis
- Additional data collection
 - Fish, game, possibly agricultural dust, etc.
 - Human activity survey
- Dietary exposure not related to local contamination
- Breast milk exposure to infants
- Percent of the contaminant contacted that is absorbed into the body = bioavailability

Toxicity Assessment

- What are the potential health effects?
 - Human data
 - Animal data
- Weight of evidence
- Dose evaluation
 - Cancer
 - Noncancer effects
 - Human dose equivalent

Dow's Proposed HHRA Process

- Toxicity assessment
 - Develop cancer value – dioxins/furans
 - Develop noncancer value – dioxins/furans
 - Reevaluate toxic equivalency factors (TEFs) - dioxins/furans
 - Use probabilistic techniques

Risk Characterization

- Standard risk assessments
 - Generic cleanup criteria
 - Site-specific cleanup criteria
 - Similar to generic process
 - Baseline risk assessment
 - Multi-pathway and multi-contaminant risk assessment

Dow's Proposed HHRA Process

- Risk characterization
 - Develop site-specific direct contact criteria
 - dioxins/furans
 - Screening level risk assessment
 - Eliminate pathways and contaminants that don't contribute significantly to estimated risk
 - Probabilistic risk assessment
 - Determine pathways with unacceptable risk

Dow's Proposed HHRA Peer Review Process

- Independent Science Advisory Panel
 - For select topics/issues of controversy
 - Site-specific soil direct contact criteria
 - Final probabilistic risk assessment
 - Other site-specific criteria?
 - Not a decision-making body – advisory

Summary and Questions



Thank You

