Overview of New EPA Superfund Groundwater Guidance and Tools

November 4, 2014

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Presentation Topics

• Background/Context
• Groundwater Remedy Completion Strategy
• Technical Impracticability (TI) Waivers
• Contacts and Information Sources
• Upcoming Webinar
Importance of Groundwater

- Protection of water, including groundwater, is one of EPA Administrator McCarthy’s 7 priorities
- Collectively hundreds of millions of dollars are spent annually to address groundwater contamination
- EPA spends ~$30-50 million/year on the operation of long-term response actions for the first 10 years of restoration actions at Fund-lead sites
Nearly 90 percent of Current Superfund National Priority List (NPL) Sites have Groundwater Remedies*

*Includes 1,137 NPL sites with at least one decision document. CERCLIS data as of December 2012. Deleted sites and some FY12 decision documents not included. From: EPA 2013, Superfund Remedy Report.
Superfund Groundwater Cleanup Expectations*

- Restore to beneficial use wherever practicable
- Define and contain the plume
- Early actions as soon as possible
- Institutional controls should not be the only response
- If restoration not technically practicable – Technical Impracticability Waiver

Progress in Groundwater Cleanups

- Many Superfund groundwater remedies have met remedial action objectives (RAOs)
- At many sites, where RAOs have not been achieved, significant progress has been made
- Technologies and strategies have evolved over time
- Upcoming EPA report will provide examples

(Source: EPA, Internal Draft. Examples of Achievement and Progress Toward Remedial Action Objectives at NPL Sites.)
Groundwater Cleanup Trends

- Decrease in sites selecting groundwater pump & treat
- Increase in sites selecting in situ treatment
- Multiple cleanup technologies
- In situ treatment and monitored natural attenuation more often used together
- Institutional controls

Selection Trends for Groundwater Pump and Treat and In Situ Remedies (FY 1986 – 2011)

Challenges at Groundwater Cleanups

- Making progress on many groundwater remedies but can take decades to complete
- Technical challenges
  - Fractured bedrock
  - Matrix diffusion
  - DNAPL
  - Climate change impacts
- Accuracy or completeness of conceptual site models
- Costly to build and operate long-term remediation systems
Challenges at Groundwater Cleanups (cont.)

- Remedy objectives may not be clearly defined
- Evaluation of progress difficult without interim milestones
- Remedies may have reached technical limitations based on subsurface characteristics
- Lack of consensus among site team and/or stakeholders, at some sites
Challenges at Site Deletion – Groundwater

• May not be clear groundwater remedial action objectives in the decision document

• Groundwater well monitoring discontinued and wells pulled before data supported attainment of groundwater cleanup levels

• Data issues
  – Intra/Inter-well averaging
  – Completion determination not supported by sufficient data and/or analysis
Superfund Groundwater Policy Gaps

- Groundwater Road Map – issued July 2011
  - Recommended process for restoring contaminated groundwater
  - Compiles key relevant highlights of previous Superfund law, regulation, policy and guidance
- Identified two areas where additional guidance was needed (circled in red)
Why the new suite of guidance documents?

• Focus resources on making site decisions
• Identify criteria for determining progress & attainment of remedial action objectives and cleanup levels
• Address policy gaps identified in the implementation/completion of groundwater restoration actions
• Address how to fill groundwater data gaps and issues identified during HQ review and concurrence on NPL deletions
New Suite of Groundwater Guidance

- *Groundwater Remedy Completion Strategy* (May 2014)
- *Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions* (Nov. 2013)
- Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well (August 2014)
- *Groundwater Statistics Tool* (August 2014)
Groundwater Remedy Completion Strategy
(May 2014, OSWER 9200.2-144)

• Recommends a step-wise planning and decision-making processes for evaluating groundwater remedy operation and progress toward achieving groundwater remedial action objectives and associated cleanup levels

• Process to focus resources toward the effective and efficient completion of groundwater remedies
Strategy Elements

- Understand current site conditions
- Design site-specific remedy evaluations
- Develop performance metrics and collect monitoring data
- Conduct remedy evaluations using site-specific metrics
- Make management decisions
What is a performance metric?

• Quantitative measurement to support milestone evaluation

• Used to determine if improvement has taken place and if interim milestones or RAOs have been or will be met

• Examples:
  – Contaminant concentrations trends in a well
  – Effluent discharge concentrations
  – Diagnostic parameter value (*e.g.*, dissolved oxygen)
Example Groundwater Remedy Completion Strategy

**Assumes a current CSM for the site**

- **Define Evaluation Questions**
  - Is groundwater extraction rate adequate?
  - Are contaminant concentrations decreasing?
  - Has cleanup level been achieved?

- **Define Metrics And Monitor**
  - Extraction Rate
  - Capture Zone
  - Contaminant Concentration Trends
  - Contaminant Concentrations

- **Conduct Remedy Evaluations**
  - Are remedy operation and progress adequate?
  - Have RAOs and cleanup levels been attained?

- **Make Management Decisions**
The recommended strategy does NOT...

• Alter the Agency approach for setting remedial action objectives or cleanup levels

• Change existing guidance or policy on remedy selection

• Address groundwater classifications or use designations

• Request that states/tribes alter existing groundwater classification or use designations
Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions
(November 2013, OSWER 9355.0-129)

- Recommends evaluating contaminant of concern (COC) concentration levels on a well-by-well basis
- Well-specific conclusions used with conceptual site model to demonstrate that:
  - The groundwater has met and
  - Will continue to meet cleanup levels for all COCs in the future.
Recommended Approach for Evaluating Groundwater Restoration Remedial Actions  
(August 2014, OSWER 9283.1-44)

• Optional groundwater statistical tool

• Recommended methodology
  – Monitoring Phases
    • Remediation
    • Attainment
  – Data set considerations
Statistical Tool
(August 2014)

• Supports EPA’s recommended approach for evaluating groundwater restoration actions

• Tool uses statistics to evaluate completion of a groundwater remediation action at a specific well (for a specific contaminant)
  – Remediation Monitoring Phase and
  – Attainment Monitoring Phase calculations
Technical Impracticability (TI) Waivers

- Superfund law allows for waivers of applicable or relevant and appropriate requirements (ARARs) in limited circumstances
- TI just one of six waivers - most used
- TI waiver may be appropriate when compliance with an ARAR “is technically impracticable from an engineering perspective” (40 CFR 300.430(f)(2)(ii)(C)(3))
- Remedy must still be protective of human health and the environment
TI Waivers (cont.)

• 100+ TI waivers granted to date

• Most TI waivers are for groundwater (a few for surface water)

• Waivers typically based on:
  – Inability to treat, remove or contain contaminants:
    • Contaminant chemical and physical properties
    • Complex subsurface geology/hydrogeology
    • Ineffective remedial technologies
  – Long remedial timeframe
Summary

• EPA has identified need for additional guidance
• Superfund striving to focus resources on the information and decisions needed to effectively complete groundwater remedies
• New Superfund documents provide strategy for
  – Step-wise planning and decision-making process to complete groundwater cleanups
  – An approach for evaluating completion of groundwater restoration actions
Some EPA Resources

- Key EPA Superfund Groundwater Policies: http://www.epa.gov/superfund/health/conmedia/gwdocs/

- Superfund Remedies Report: http://www.epa.gov/superfund/remedytech/srr/

- Remedy optimization: http://www.cluin.org/optimization/

- Groundwater Remedial Action Completion Guidance(s): http://epa.gov/superfund/health/conmedia/gwdocs/remedial.htm

- TI Waiver Data Requirements and Evaluation Guidances: http://www.epa.gov/superfund/health/conmedia/gwdocs/techimp.htm
Next in EPA Webinar Series:

**Evaluating Completion of Groundwater Restoration Remedial Actions**

- Will help with understanding how groundwater data and site-specific conditions may be evaluated to assess if restoration is complete
- Focuses on recent guidance and demonstration of Groundwater Statistical Tool
- **Wednesday, November 12, 2014, 1 p.m. to 3 p.m. EST**
- Register at: http://www.clu-in.org/training/#upcoming
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QUESTIONS?