Optimizing In Situ Remediation Performance and Injection Strategies

ALEXANDER MACDONALD
ITRC/RWQCB-CVR
What is ITRC?

► ITRC is a state-led coalition working to advance the use of innovative environmental technologies and approaches. ITRC’s work translates good science into better decision making.

► At 24-years old, ITRC has grown into a national organization representing 50 states, D.C., and Puerto Rico.
ITRC (www.itrcweb.org) – Shaping the Future of Regulatory Acceptance

- Host organization
- Network
  - State regulators
    - All 50 states, PR, DC
  - Federal partners
- ITRC Industry Affiliates Program
- Academia
- Community stakeholders
- Follow ITRC

- Disclaimer
  - Partially funded by the U.S. government
  - ITRC nor US government warranty material
  - ITRC nor US government endorse specific products

- ITRC materials available for your use – see usage policy
- Available from www.itrcweb.org
  - Technical and regulatory guidance documents
  - Online and classroom training schedule
  - More…

DOE  DOD  EPA

IAP
How We Achieve Our Mission

1. Select Projects
2. Form Team
3. Develop Documents, Training, and Other Tools
4. Conduct Training and Outreach
5. Implement Solutions
Optimization Team

- 200+ In situ remediation experts from all sectors: academics, stakeholders; state and local; federal; industry and consulting

- Producing concise technical resources for project managers – regulators, consultants, responsible parties, and stakeholders

- Why: State and federal environmental regulators and others need easily accessible information to aid them in optimizing in situ remedies in a more efficient, cost effective and timely manner
Technical and Regulatory Guidance Document

Optimizing Injection Strategies and *In Situ* Remediation Performance
Issues

- Implementation of in situ injection remedies at many sites have less than expected performance
- Varying levels of practical experience and limited available guidance
- Need to anticipate iterative refinement of the remedy design and regulatory approvals
Issues - Continued

- Traditional remedy and regulatory approaches are linear
- Okay for excavation-type remedies
- Does not work as well for in situ remedies
- In situ remedies generally require several iterative steps
- Optimization needed in both the remedy and regulatory processes
Traditional Linear Design Construct

How many times does this happen without modifications?
The iterative process in \textit{in situ} remedies needs to be accounted for.
ITRC Integrated DNAPL Site Strategy
- 2011 Document
- Not just for DNAPL

ITRC Optimization
- 2020 Document
- Focus on In-Situ Injection Remedies Iterative Process
Traditional Regulatory Process
Adaptive Regulatory Process

1. Preliminary Assessment/Site Investigation
2. Remedial Investigation/Feasibility Study
3. Remedial Action Decision
4. Remedial Design/Remedial Action
5. Remedial Action Operation and Monitoring
6. Are Objectives Met?
7. Is Progress Acceptable?
8. Closure

- Regulatory Adaptive Management
  1. Identify Uncertainty
  2. Contingency Planning
  3. Regulatory Flexibility

- Re-Evaluate Remedy Basis
  - Is Contingency Remedy Available?
    - Yes
    - No
  - Is Progress Acceptable?
    - Yes
    - No
Document Organization

- Chapter 2: Remedial Design Characterization
- Chapter 3: Amendment, Delivery and Dose
- Chapter 4: Implementation and Feedback Monitoring Optimization
- Chapter 5: Regulatory Considerations
- Chapter 6: Stakeholder Considerations
Chapter Objectives

- **Chapter 2: Remedial Design Characterization**
  - Obtain sufficient geologic, hydrogeologic, geochemical and microbial information to allow design and implementation of the remedy to have the greatest chance for success

- **Chapter 3: Amendment, Delivery and Dose**
  - Design and Amendment Selection Considerations
  - Conducting bench and pilot scale studies
  - Design Wheel and the Iterative Process

- **Chapter 4: Implementation and Feedback Monitoring Optimization**
  - Monitoring, implementation optimization, transition and contingency planning

- **Chapter 5: Regulatory Considerations – Optimizing regulatory documents**

- **Chapter 6: Stakeholder Considerations – identifying stakeholder concerns and communications**
Schedule

On-line document available: March 2020

On-line training: First class currently scheduled for May 2020

Look on ITRC website: www.itrcweb.org

Other soon to be released document: PFAS
Thank You!

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Questions?