Former Nebraska Ordnance Plant Load Line 2 Pilot Study

Jason L'Ecuyer – US Army Corps of Engineers-

John Hesemann – Burns & McDonnell

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Pilot Study – What is it?

- A pilot study is a field test of treatment technologies and methods to determine effectiveness under site conditions
- We will be field testing *in-situ* groundwater treatment technologies
- *In-situ* technologies treat groundwater in place and do not remove water from the ground for transport and treatment at a treatment plant

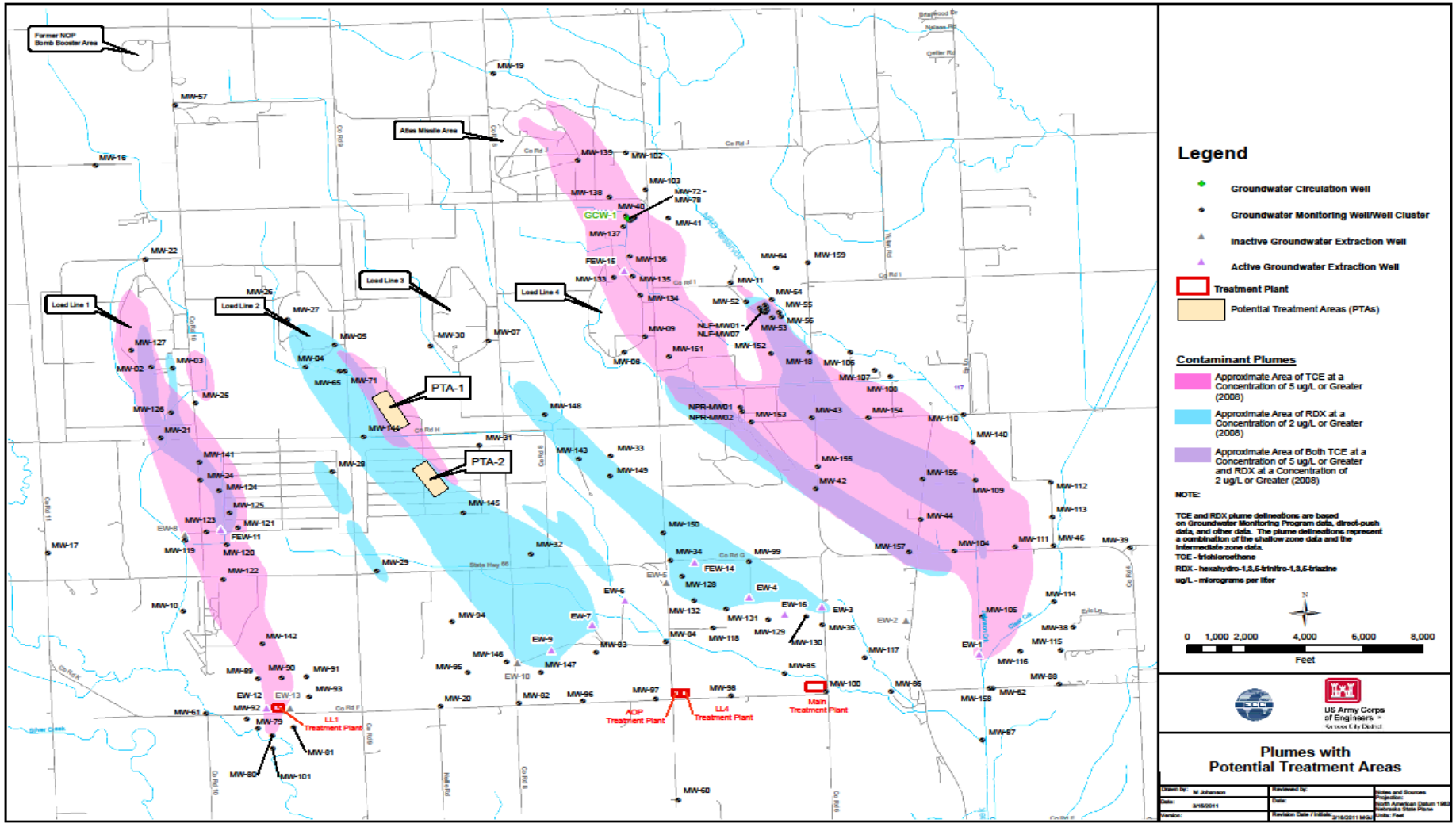
Pilot Study – Why do it?

- Tests groundwater treatment methods before installing them on larger, more costly scales
- Leads to larger treatment systems
- Has the potential to accelerate plume treatment and reduce pumping timeframes

Load Line 2
Pilot Study Overview

- ***OBJECTIVE**: To Supplement or Enhance the Current LL2 Groundwater Treatment System*
- Activities Completed to Date:
  - Conducted a Pre-Pilot Study Investigation
  - Conducted a Bench-Scale Treatability Study
  - Selected Remedial Alternatives for Pilot Study Design and Implementation
- Two Treatment Areas Identified
  - PTA-1: a TCE focused treatment area
  - PTA-2: a RDX focused treatment area

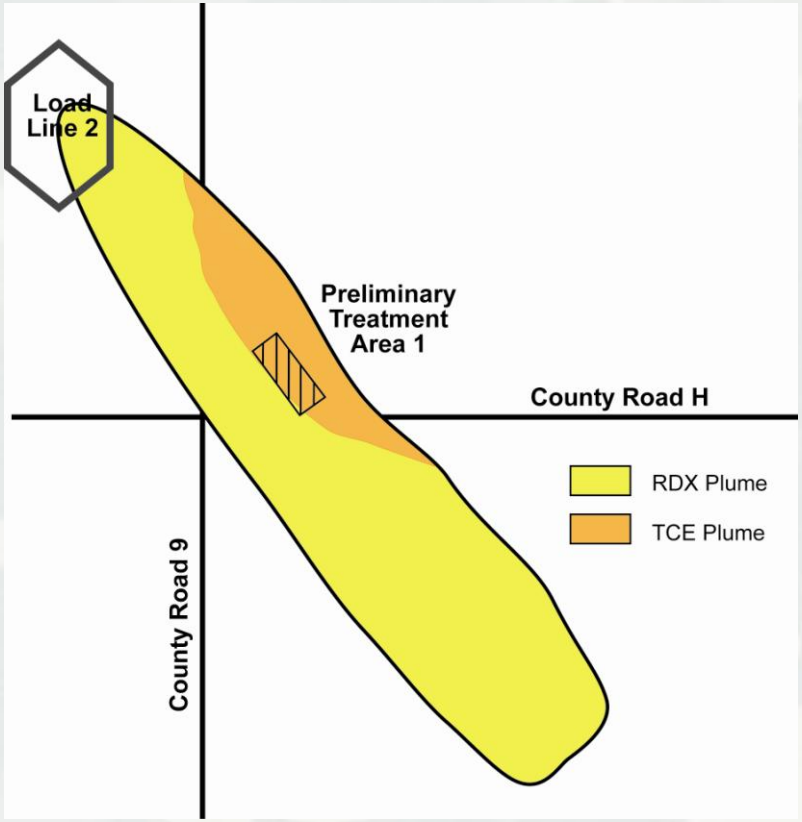
Location of the Pilot Study



Preliminary Treatment Area 1 (PTA-1) TCE Focused Pilot Study Approaches

- LL2 TCE Reactive Barrier
  - utilizing Zero Valent Iron (ZVI)
- LL2 Enhanced Biodegradation of TCE
  - utilizing Sodium Lactate

PTA-1 (TCE Plume)

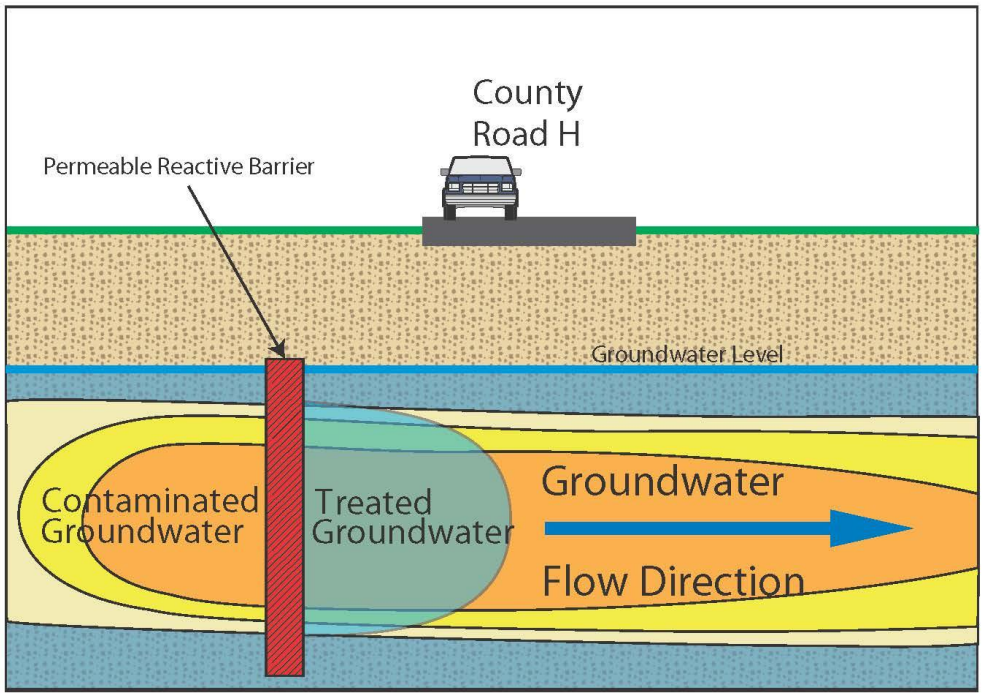


TCE = trichloroethene
RDX = hexadydo-1,3,5-trinitro-1,3,5-triazine

PTA-1 (TCE Plume) Pilot Study

- Pilot Study #1

  Permeable Reactive Barrier Using Zero-Valent Iron

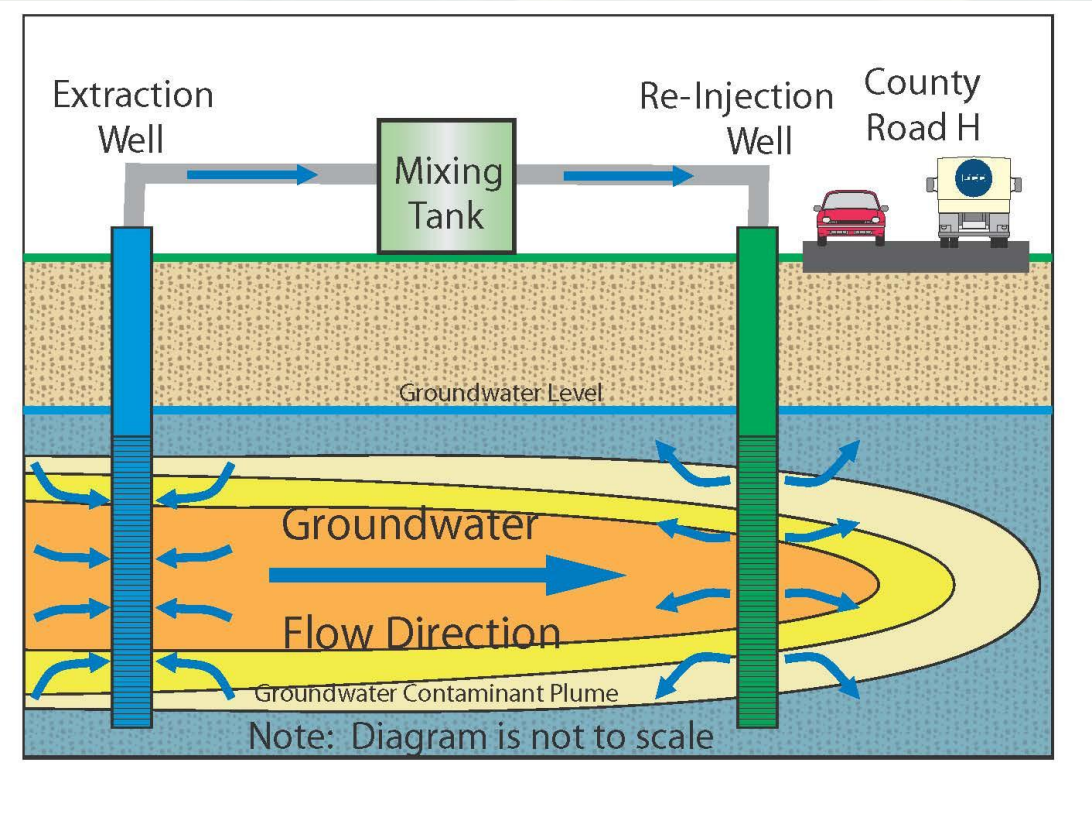


Note: Diagram is not to scale

PTA-1 (TCE Plume) Pilot Study

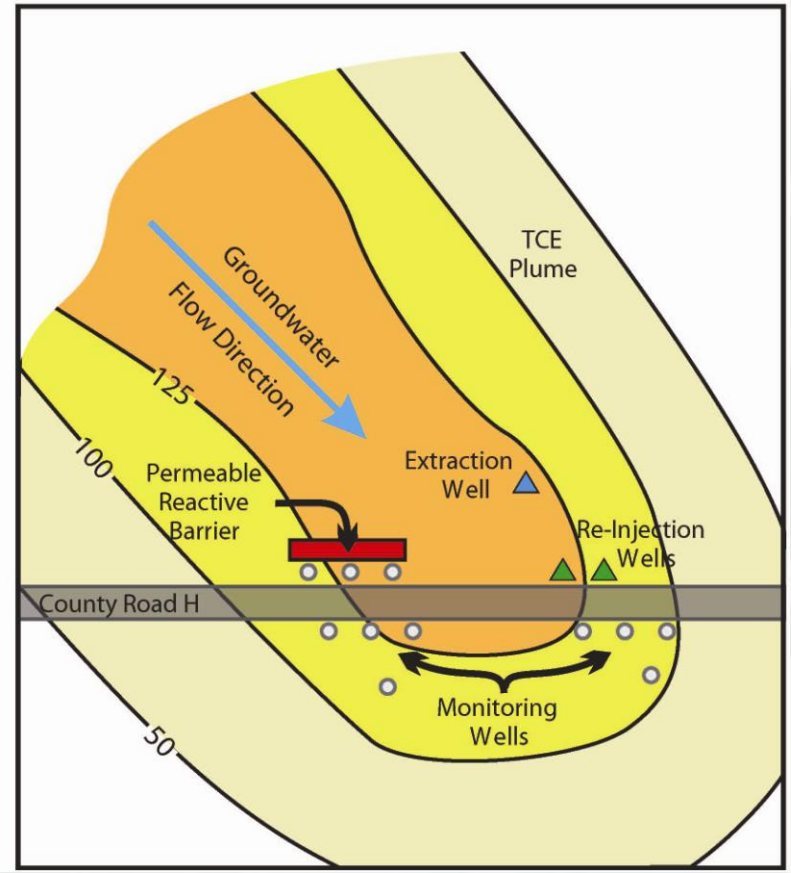
- Pilot Study #2

  Enhanced Biodegradation using Sodium Lactate



PTA-1 (TCE Plume) Pilot Studies

- Permeable Reactive Barrier and
- Enhanced Biodegradation Using Sodium Lactate



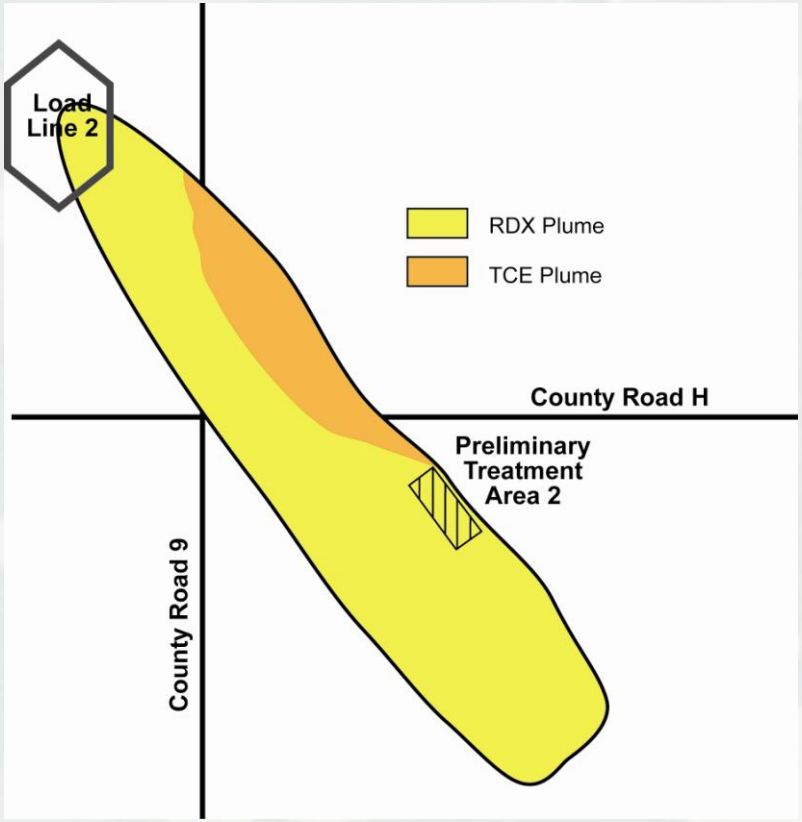
PTA-1 Implementation and Monitoring

- Pilot Study 1
  - ►Permeable Reactive Barrier Construction Quality Control
  - ►Performance Monitoring (12 months)
- Pilot Study 2
  - ►6 Monthly Sodium Lactate Injection Events
  - ►Performance Monitoring (12 months)

Preliminary Treatment Area 2 (PTA-2) RDX Focused Pilot Study Approaches

- LL2 Enhanced Biodegradation of RDX
  - Utilizes Sodium Acetate
  - Conducted in Two Phases
    - Phase 1 – will be to test the method under site conditions
    - Phase 2 – if applicable will expand treatment potentially transecting the majority of the LL2 RDX plume

PTA-2 (RDX Plume)



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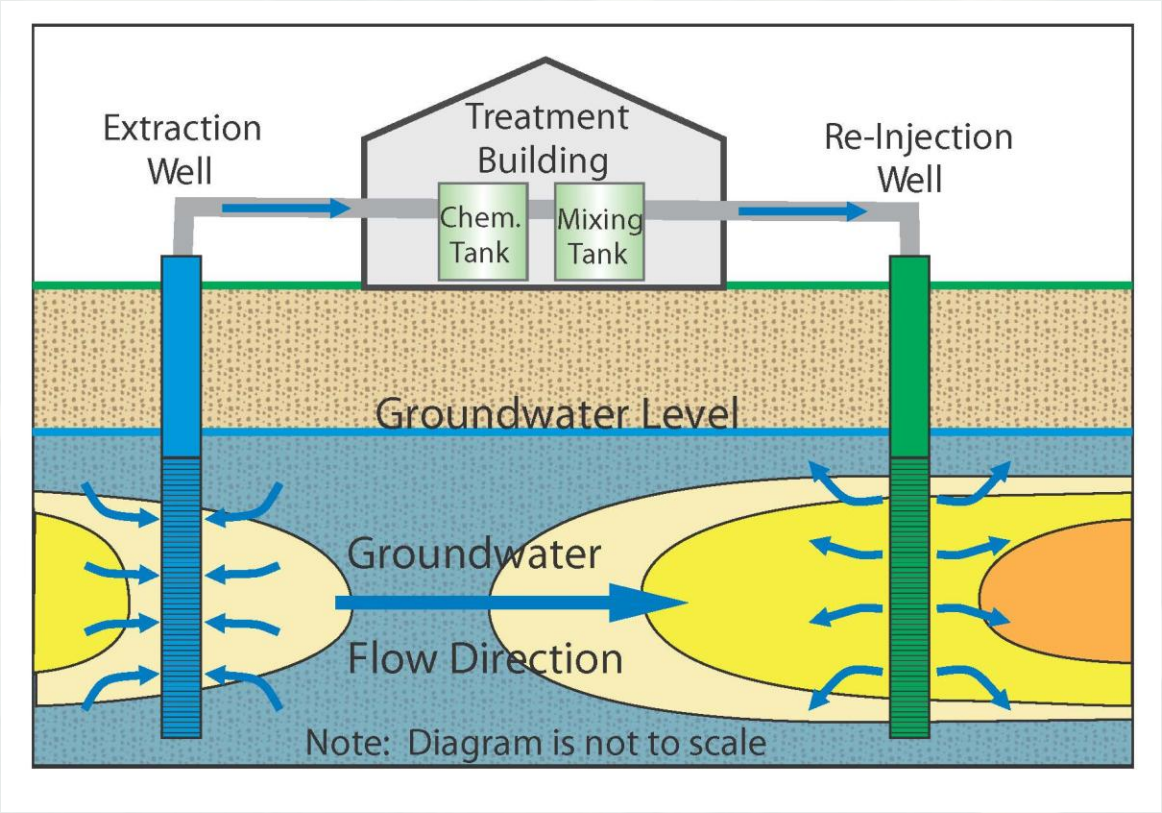
PTA-2 (RDX Plume) Pilot Study

Enhanced Biodegradation using Sodium Acetate

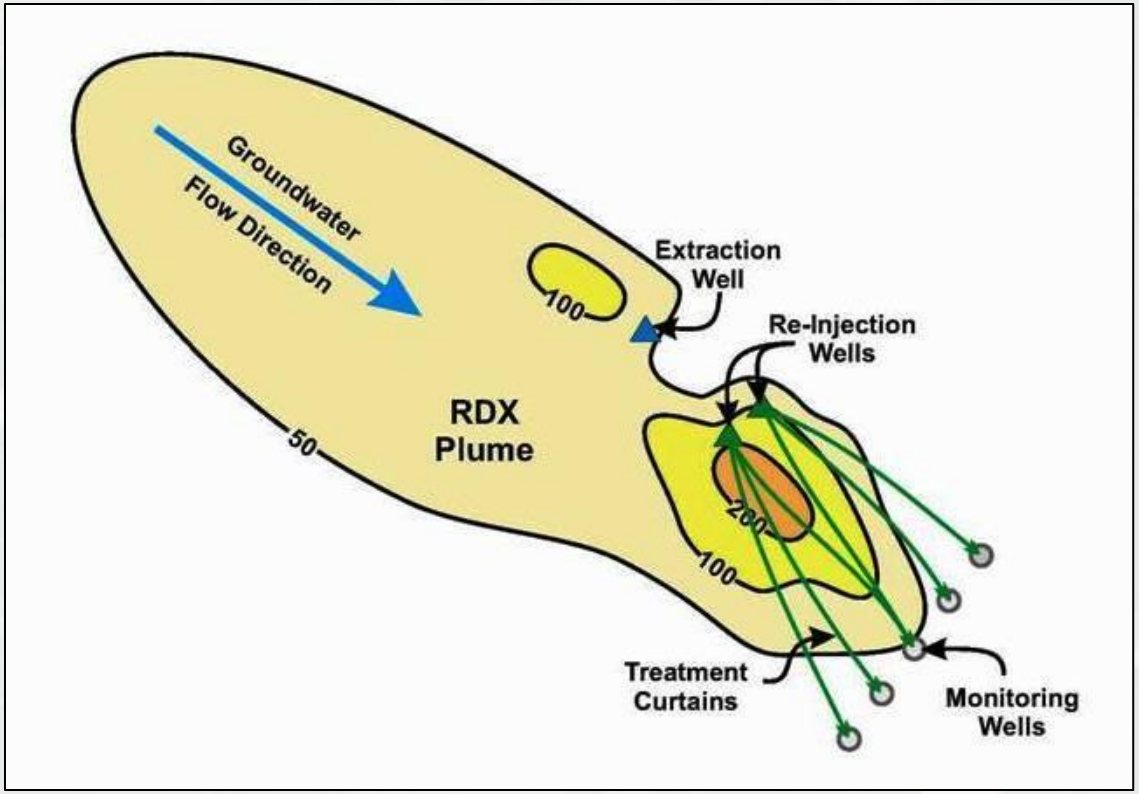
Phase #1 – Test Cell



PTA-2 (RDX Plume) Pilot Study

Enhanced Biodegradation Using Sodium Acetate

Phase #1 – Test Cell



PTA-2 Implementation and Monitoring

- Phase I
  - ►Installation
  - ►Performance monitoring (14 months)
- Phase II
  - ►Planning and Design
  - ►Installation
- Ongoing Operations, Maintenance and Monitoring

Questions