# New Jersey DEP
# Site Remediation Program

## Technical Guidance Committees

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Lead - DEP/SRP Technical Guidance Development

# Technical Guidance Committees

- Composed of 5 DEP Staff and 7 Stakeholders
- Topics Selected via meetings w/ DEP & Stakeholders (Fall 2010 / Summer 2012) or requested by Stakeholders/DEP
- Internal/External review of Final Draft
- Avg. 24 months to complete a document
- Final documents posted on SRP Website at http://www.nj.gov/dep/srp/guidance/

# Round-1
# 15 Tech Guidance Committees

**Kicked off work Summer 2010**

1. Vapor Intrusion
2. LNAPL
3. Receptor Evaluation
4. Presumptive Remedies
5. IEC (Immed. Env. Concern)
6. Clean/Alternative Fill
7. Ground Water SI/RI/RA
8. Soil (4 docs; PA, SI/RI/RA, UST & Landfill)
9. Historic Fill
10. Technical Impracticability
11. MNA (Monitored Nat. Atten)
12. Conceptual Site Model
13. Analytical Methods
14. Eco Investigation
15. Attainment

# Round-2
# 8 Tech Guidance Committees

**Kicked off Work September 2012**

1. Off-Site Source
2. Co-Mingled Plumes
3. Historic Pesticide Use
4. Capping
5. Performance Monitoring of In-situ GW Remedial Actions
6. Evaluation of GW discharges to SW
7. Child Care Centers (added spring 2013)
8. Catastrophic Events: Planning & Response at SRP sites (added January 2014)


# NJDEP Training
# Technical Impracticability

February 19, 2014


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# LSRP Continuing Education Requirements

36 Continuing Education Credits (CECs) over 3 year LSRP license renewal period:

Minimum no. of CECs must be satisfied in these categories:

- 3 CECs Ethics
- 10 CECs Regulatory
- 14 CECs Technical

+9 CECs Discretionary

Board can require “CORE” courses

# Continuing Ed. Credits (CECs)

- One CEC is equivalent to 1 hour of instruction from university, college, DEP, LSRPA & other professional organizations
- Conferences, Conventions, Workshops count 1hr = ½CEC
  - Up to 8 CECs allowed within 3 year renewal cycle
  - Changes to this policy are up to discretion of LSRP Board
- Webinar and On-Line Courses:
  - CEC is 1:1 but exam is required
- CECs available for presentations, publications but not 1:1 credit

# Dates/Events to Remember

- **Feb 27** Members-Only Breakfast
  - Bordentown - Mastoris
- **Mar 19** Ethics Class
  - Montclair State University
- **Mar 19** LSRP Exam


NJ LICENSED SITE REMEDIATION
LSRPA
PROFESSIONALS ASSOCIATION

# Thank You

# Technical Impracticability Guidance for Ground Water

February 19, 2014

# Welcome and Introductions

- Correct the announcement
- Our perspectives
- Your input is important

# The Committee

- Tom O'Neill - NJDEP
- Robert Lux - NJDEP
- Joel Fradel - NJDEP
- Jim Barish - Phoenix Environmental Management
- Mark Foley - WSP Environment & Energy
- David Robinson - Synergy Environmental
- B.V. Rao - EG&R Environmental Services
- Ted Toskos - AMEC E&I

# Presentation Outline

- Overview
- TI determination procedures
- Documenting a TI determination
- Questions
- Post TI determination management
- Case studies
- Questions
- Contacts

# Overview

- Purpose of the guidance document
  - To assist investigator in identifying when the remediation of ground water to the applicable remediation standard is not feasible
  - How to apply to the Department for a TI determination
    - Timing of the request
    - The type and scope of data needed
  - How to develop a post-determination management program
    - How to demonstrate post-determination protectiveness
    - When to reevaluate the TI determination

# Definitions

- TI Definition from Guidance
  - Technical Impracticability (TI) is a condition where remediation of ground water to the applicable standards is not feasible from an engineering perspective because of the limitations in the currently available ground water remediation system engineering methods or technologies at the time the remedy is being designed.

(TECHNICAL IMPRACTICABILITY GUIDANCE FOR GROUND WATER, Version 1.0, December 3, 2013)

# Definition - Key Concepts

- Technical Impracticability is just that, **TECHNICAL**
  - Cost is a secondary consideration
- From the dictionary: impracticability means impossible
  - Legal definitions include relief from a regulatory obligation
- Ground water only at this time

# Key Concept

**TI ≠ No Action**

# Regulatory Obligations

- A Remedial Action Permit (RAP) is required (per to N.J.A.C. 7:26C-7) when the TI determination involves the use of
  - An engineering control such as a ground water pumping system
  - An institutional control such as a classification exception area (CEA)

# Regulatory Obligations Cont'd

- RA permit requirements
  - A remedial action permit must be obtained
  - The effectiveness of the remedial action must be monitored
  - When the remedial action includes the use of an engineering or institutional control
    - Biennial certifications of the continued protectiveness of a remedial action must be submitted
    - Financial assurance must be posted when an engineering control is used

# Regulatory and Mandatory Timeframes

- An application for a TI determination may be submitted at any time during the remediation process
- The responsible person must comply with all applicable regulatory and mandatory timeframes that apply to the site
- A TI determination has no regulatory or mandatory timeframes and does not, by itself alter timeframes
- Request a timeframe extension if the TI determination would cause a regulatory or mandatory timeframe to be exceeded

# When might a TI determination be appropriate?

- When hydrogeologic conditions are:
  - complex (e.g., highly heterogeneous) sedimentary deposits
  - low permeability strata
  - fractured bedrock
- When contaminants may include:
  - non-aqueous phase liquids (NAPLs), particularly dense non-aqueous phase liquids (DNAPLs)
- Remedial technology limitations

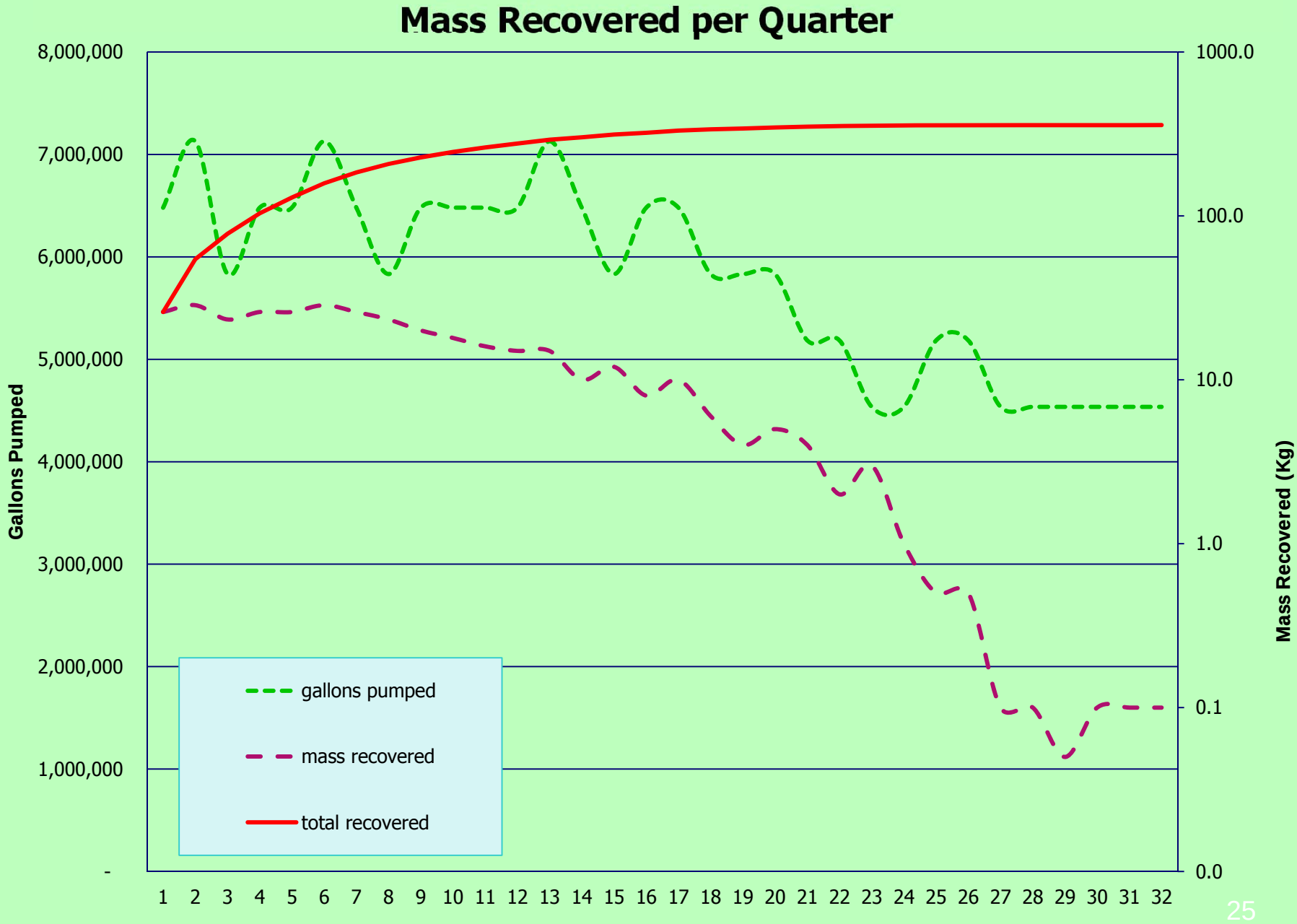
# What affects the ability to achieve or approach remediation standards?

- Type(s) of contamination present
- Concentration and/or quantity of contamination present
- Volume of the effected media
- Available remediation technologies
- Cost factors, projected and actual

# What is an asymptotic concentration level?

- **From a practical standpoint**
  - when continued operation of a remediation system no longer produces a substantive result
- **From a mathematic standpoint**
  - when the curve describing system performance flattens out and becomes essentially parallel to the time axis

# What is an asymptotic concentration level?



# What is Remediation Process Optimization (RPO)?

- Evaluate current remediation system
  - Modify to improve the amount of product recovery or treatment efficiency
- Ensure that poor performance is not the result of an insufficiently developed Conceptual Site Model (CSM) or inadequate engineering

# Threshold Criteria for TI

Has the person responsible …

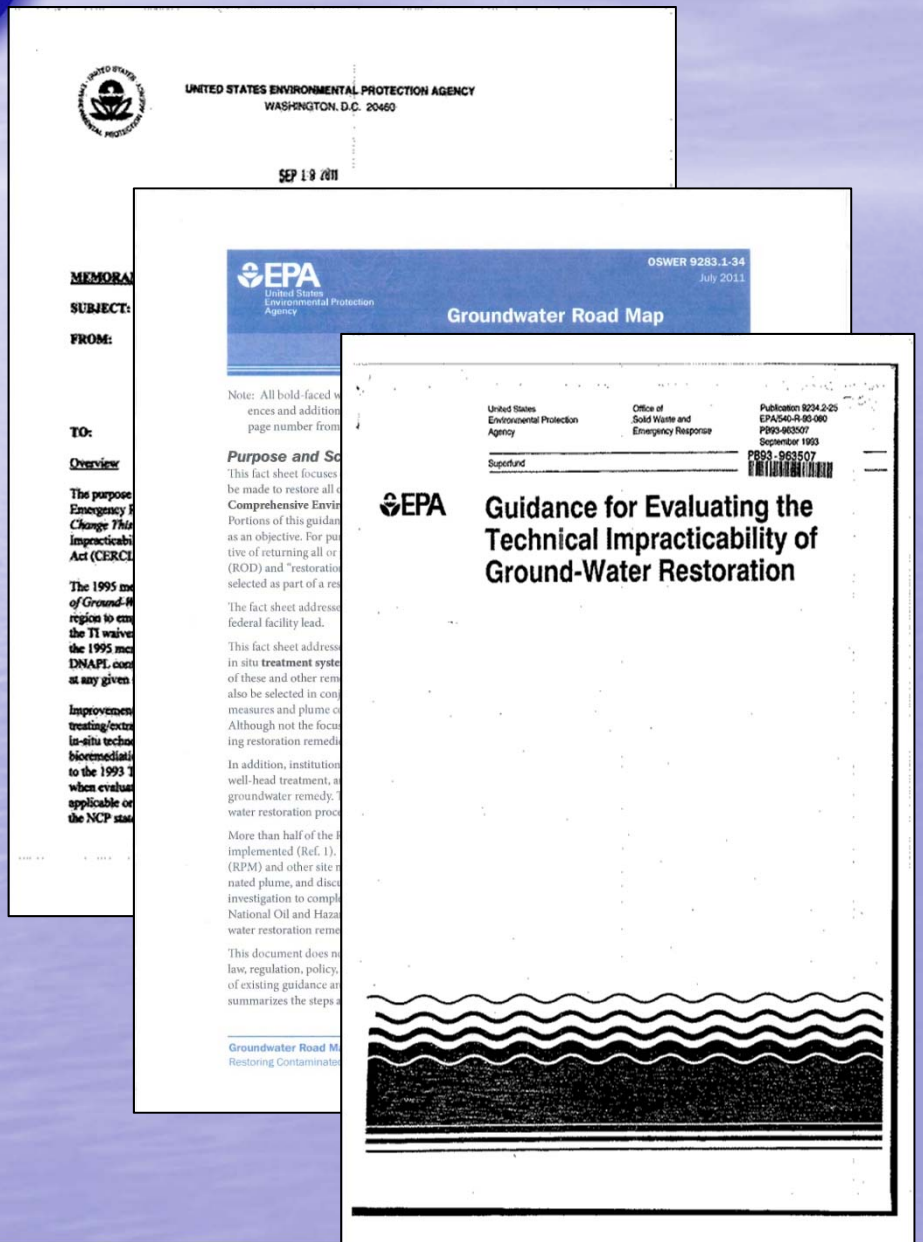
- Appropriately managed the site so that remaining contaminants do not pose a threat to public health, safety and the environment?
- Prepared a CSM that accurately characterizes and integrates site-specific chemical, physical, migration pathway and receptor information?

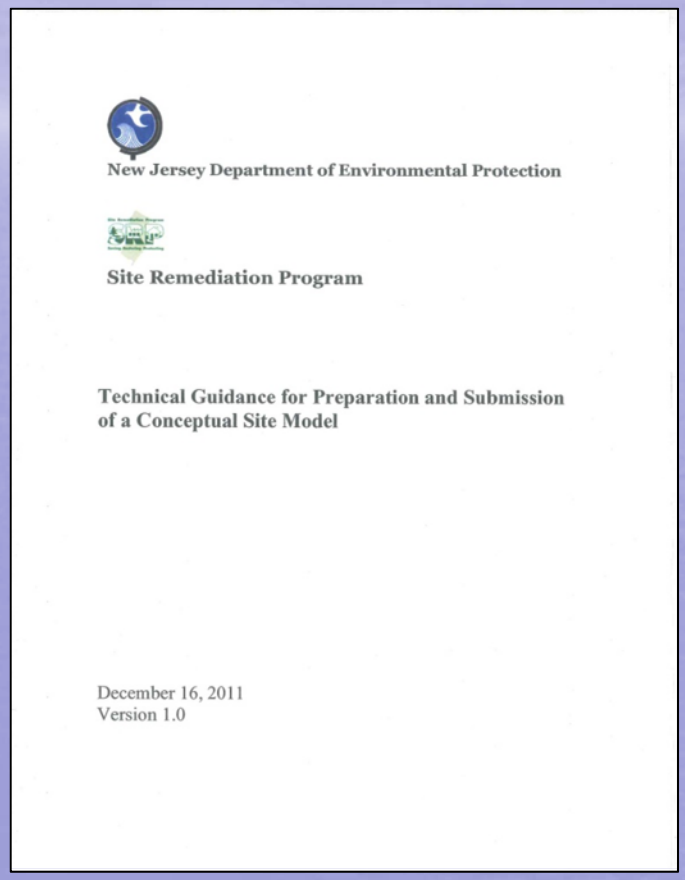
# Technical Impracticability Determination Evidence

Technical factors

- Evaluate remedial alternatives using
  - Site characterization, and
  - Remedy performance data
- Is the information already gathered to make the determination?
- Does additional data need to be gathered?
- Tailor the data collection needed to support the TI determination

# Additional Resources



# Technical Impracticability Determination Evidence

Process based on EPA Policy & Guidance

- Remedial investigation
- Remedial design
- Remedial action
- Operate and collect data
- Monitor performance - consider optimization
- Evaluate remediation potential
- Modify cleanup objectives
- Document TI evaluation
- Select a new remedy or modify existing remedy

# Technical Impracticability Determination Process

- Use the guidance
- Collaborative process with investigator and NJDEP-SRP
  - Request a Technical Consultation to consult with experienced DEP staff to ask site specific technical questions
  - http://www.state.nj.us/dep/srp/srra/technical_consultation/
- This is a service not an approval

# QUESTIONS?

# How to assess whether a proposed remedial action is technically impracticable

- Ground water remediation standards still apply
- Spatial extent where the TI determination will apply
- An up to date CSM that describes
  - Site geology
  - Hydrogeology
  - GW contaminant sources
  - Fate and transport of the contaminants
  - Receptors and
  - Any adverse impacts of the actual or proposed remedial action on receptors or infrastructure

# How to assess whether a proposed remedial action is technically impracticable

- Evaluate the remediation potential
  - Data and analyses that support that achieving the remediation standards are not achievable from an engineering perspective:
    - All contaminant sources have been identified and have or will be treated, removed etc.
    - Analysis of performance data
    - Estimate time to attain applicable standards
    - Demonstrate no other technologies could attain the standards in a reasonable timeframe
    - Bench and pilot scale testing

# How to assess whether a proposed remedial action is technically impracticable

- Estimated cost of the existing or proposed remedy options, including construction, and O&M
- Any additional information to support the TI evaluation

# TI Determination Application and the Remedial Action Permit (RAP) for Ground Water

A TI determination is submitted with either a

- Remedial Investigation Report (RIR)
- Remedial Action Workplan (RAW)

The Department typically establishes a CEA before the RAP is issued

The Department highly recommends at least one Technical Consultation to discuss the components of the TI Determination. If discussing the Ground Water monitoring then a representative of Bureau of Remedial Action Permitting should be requested to attend.

# Additions to the RAP Application & RA Protectiveness/Biennial Certification Form

- The Remedial Action Permit Application Form for Ground Water page 2
  - Section G. Monitoring, maintenance and evaluation information
  - Include TI information in Question 2

- TI information questions will be added to the RA Protectiveness/Biennial Certification Form soon

# Ground Water Monitoring & the RAP

- The ground water monitoring associated with a TI determination must ensure the protection all potential receptors per the Technical Rules, N.J.A.C. 7:26E-5
- The monitoring schedule must be included in the RA Permit application by the LSRP in the **Ground Water Monitoring Plan Spreadsheet**
- The Department will include ground water monitoring requirements in the Remedial Action Permit

# Re-evaluating the TI Determination

**TI Determination**:

- **NOT** a permanent ground water remedy
- Should be re-evaluated using the **RA Protectiveness/Biennial Certification Form**
- Should periodically assess whether new advances in technology will allow ground water standards to be met

# Post TI Determination Management

- Conduct review of remedial action at least every 5 years or as stipulated in the RAP
- The Department will require the TI determination be re-evaluated if:
  - Permittee fails to comply with RAP
  - TI determination is found to be incorrect through fraud, material misrepresentation, or failure to provide material information
  - Changes in one or more components of the CSM indicate the potential for adverse impacts to receptors

# Post TI Determination Review

- Sufficient operation to evaluate performance
- Review the monitoring program
- Tracking contaminant concentration trends
- Document O&M effectiveness
- Report on system performance
- Evaluate the effectiveness of all modifications or enhancements to the RA

# Termination of TI Determination

- A TI determination may no longer be appropriate when:
  - GWQS(s) have been met within the TI area
  - New technology or other remedial actions have been identified that can address the contaminants
  - Site conditions now allow for implementation of a remedial action, including monitored natural attenuation
- The RAP should be terminated or modified as appropriate

# Case Studies

Two case studies

1. Early in the remedial process, before remedial action implementation

2. Post Pump & Treat implementation, post-RPO (classic TI determination)

# Pre-construction Case Study
## USEPA Lead - NPL Site

- Setting
  - North Jersey site, fractured bedrock
  - Contaminants include DNAPL, PAHs, and benzene
  - Residential and central business district impacted
- Conditions that allowed a TI determination (waiver, EPA)
  - Full remedial investigation, feasibility study, and design
    - Plume and soils contamination fully delineated
  - Source areas remediated, numerous homes demolished for source area removals
  - Remedy, with TI would not impact human or ecological receptors

# Case Study - Basis for TI Determination

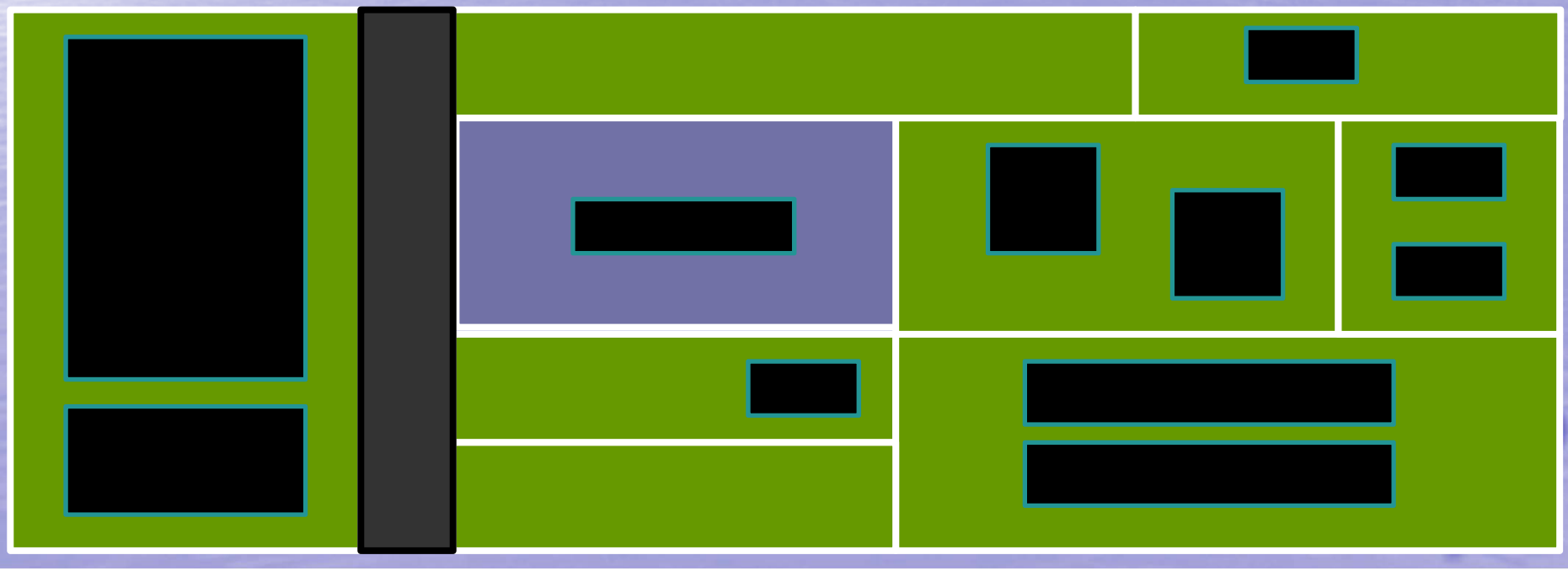
- DNAPL persisted in fractured bedrock
- Standards cannot be met for "foreseeable future" with currently available technologies
- More extensive disruption of the residential and central business district with other alternatives

# Case Study - Post TI Management

- Deed notices, some finalized, others in the works
- CEA has been established
- 5-year Review Process

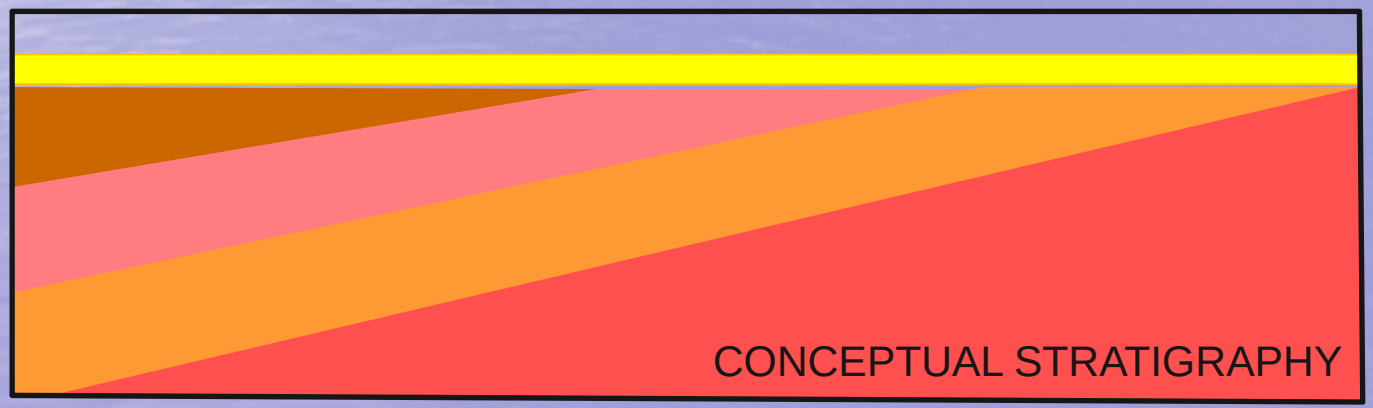
# Case Study - Post RA implementation

- Central/North Jersey Site
- Urban - commercial land use
- Commercial buildings on/around site
- Residential land use some distance from site
- Former chemical production site



# Case Study - Post RA Implementation

- Historic fill veneer
- Main water bearing zone is bedrock
- Flow occurs mostly in bedding parallel fractures
- Poorly yielding system



# Case Study
## Post Remedial Action Implementation

- Mostly non-chlorinated SVOCs
- Plume is on-site
- All source areas remediated (excavation)
- Multiple groundwater treatment events by ZVI and ISCO
- MNA was implemented for GW under building
- Contaminant levels stable above GWQS in wells downgradient of building
- Behavior suggests rock under building acting a back-diffusion source

# Case Study
## Post Remedial Action Implementation

- No ecological receptors
- VI investigated on-site and off-site
- No VI impacts, on-site building has additional controls
- ZVI and ISCO implementation showed poor propagation
- Logging at site wells shows poor fracture development
- Building cannot be demolished or evacuated
- FS- and vendor-proposal level evaluation of alternatives

# Case Study
## Post Remedial Action Implementation

- Rock fracturing to enhance interconnection may affect the existing building
- Aggressive contaminant mobilization to enhance recover may result in VI or other impacts because there is no control within building footprint
- Cost of additional action to address bedrock under the building is in the millions range, with ***uncertain*** efficacy and potential for ***damage*** or ***exacerbated*** conditions

# Summary – Key Concepts

- TI ≠ No Action
- TI's are limited in time and area
- A TI determination may be made at any point in the remedial process
  - When a deed notice, CEA, or engineering control are used a RAP is required
    - The TI documentation must be included in the RAP application

# Acronyms

| | |
|---|---|
| AOC | Area of Concern |
| ARRCS | Administrative Requirements for the Remediation of Contaminated Sites |
| CEA | Classification Exception Area |
| CID | Case Inventory Document |
| CSM | Conceptual site model |
| DNAPL | Dense Non-aqueous Phase Liquid |
| GWQS | Ground Water Quality Standards |
| ISCO | In Situ Chemical Oxidation |
| ITRC | Interstate Technology and Regulatory Council |
| LSRP | Licensed Site Remediation Professional |
| MLE | Multiple lines of evidence |
| NAPL | Non-aqueous phase liquid |

# More Acronyms

| | |
|---|---|
| N.J.A.C. | New Jersey Administrative Code |
| NJDEP | New Jersey Department of Environmental Protection |
| N.J.S.A. | New Jersey Statutes Annotated |
| OSWER | USEPA's Office of Solid Waste and Emergency Response |
| RAO | Response Action Outcome |
| RAP | Remedial Action Permit |
| RAW | Remedial Action Workplan |
| RPO | Remediation Process Optimization |
| RSE | Remediation System Evaluation |
| SRP | Site Remediation Program |
| TI | Technical impracticability |
| USEPA | United States Environmental Protection Agency |
| VI | Vapor Intrusion |
| ZVI | Zero Valent Iron |

# Links to Additional Resources

These are selected references, the technical guidance has many more references:

http://www.epa.gov/superfund/health/conmedia/gwdocs/techimp.htm

U.S. Environmental Protection Agency – Technical Impracticability: Guidance for Evaluating Technical Impracticability of Ground-Water Restoration, September, 1993. USEPA OSWER Directive 9234.2-25

http://www.epa.gov/superfund/health/conmedia/gwdocs/pdfs/642756.pdf

Technical Impracticability: Clarification of OSWER's 1995 Technical Impracticability Waiver Policy, September, 2011. USEPA OSWER Directive 9355.5-32

# Links to Additional Resources

http://www.epa.gov/superfund/health/conmedia/gwdocs/pdfs/TI_waiver_report%2009Aug2012.pdf

Summary of Technical Impracticability Waivers at National Priorities List Sites, USEPA OSWER Directive 9230.2-24, August, 2012

http://www.frtr.gov/optimization.htm

Federal Remediation Technologies Roundtable, Case studies, conference materials and more, compiled by an inter-agency workgroup

# Links to Additional Resources

- A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems (EPA 600-R-08-003; January 2008)
- Cost-Effective Design of Pump and Treat Systems (OSWER 9283.1-20FS / EPA 542-R-05-008; April 2005)
- Elements for Effective Management of Operating Pump and Treat Systems (OSWER 9355.4- 27FS-A; November 2002)
- Groundwater Road Map: Recommended Process for Restoring Contaminated Groundwater at Superfund Site (EPA Policy Memorandum, July 20, 2011)
- Implementation of RSE Recommendations: Technical Assistance Resources Available to RPMs (EPA, January 2002)
- Improving Environmental Site Remediation Through Performance-based Environmental Management (ITRC RPO-7, November 2007)
- Remediation Process Optimization: Identifying Opportunities for Enhanced and More Efficient Site Remediation (ITRC RPO-1, September 2004)
- Using Remediation Risk Management to Address Groundwater Cleanup Challenges at Complex Site (ITRC RRM-2, January 2012)

# Questions?

# Contacts

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