

Using Time More Effectively in The Cleanup Process

- Rapid or Accelerated Site Assessment
- Imposing Time Frames for Cleanup
- Monitoring/Verifying Remedial Progress
- Incentives and Disincentives

Rapid or Accelerated Site Assessment

- Rapid sampling techniques
- Field-generated analytical data (lab validation)
- On-site interpretation and evaluation:
 - field interpretation of data as it is collected
 - use data interactively to guide further characterization
- Use field data to locate permanent monitoring points if needed
- On-site personnel must be qualified and authorized to make decisions in the field guiding the characterization.

Tools for Rapid Site Assessment

- EPA Guidance
- ASTM Guidance
- Triad Approach

Imposing Time Frames for Cleanup

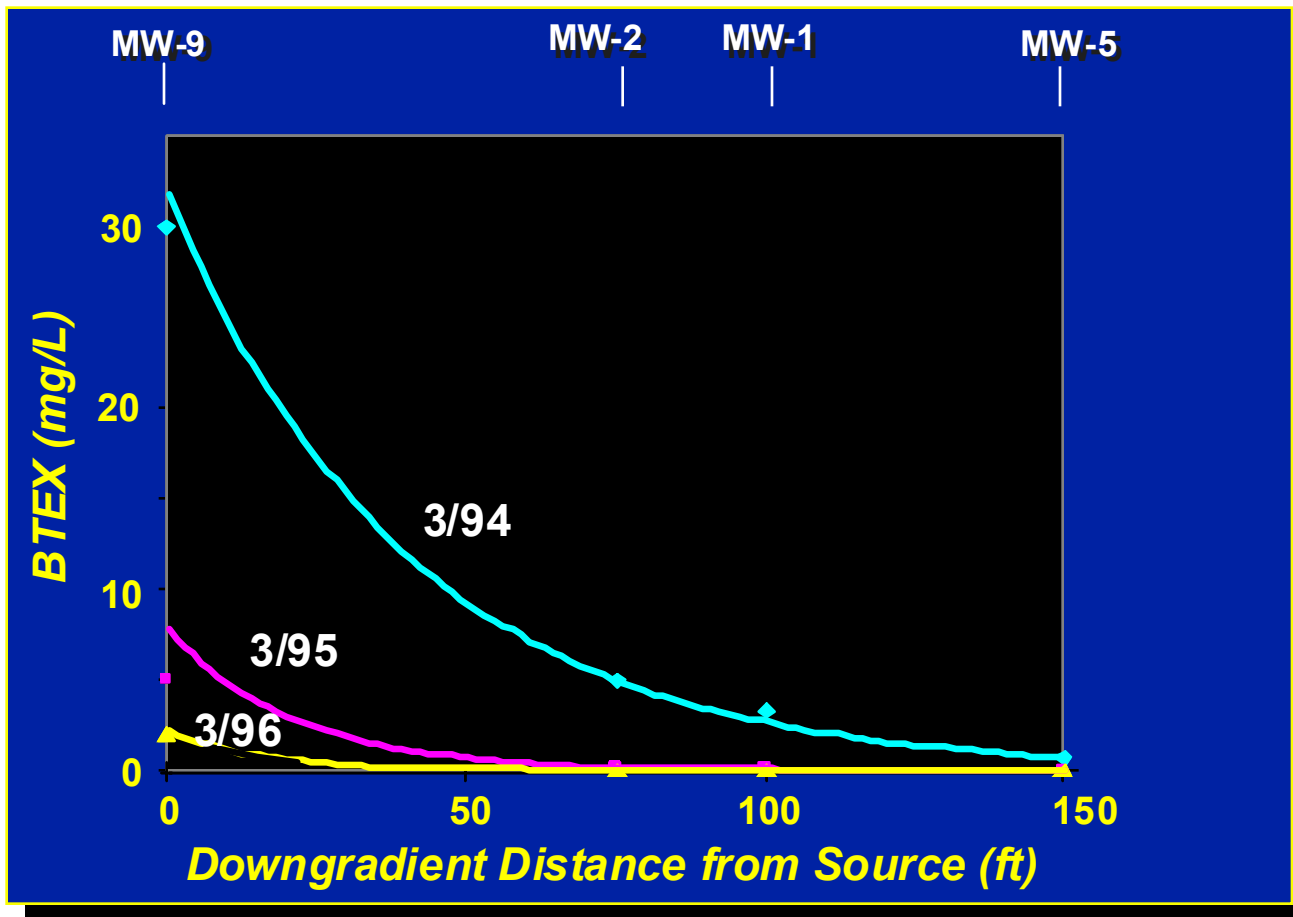
- Set a clear road map for remediation
- Determine screening levels and/or cleanup goals as soon as possible
 - Sources, pathways, receptors
 - Risk-based decision making
 - Site-specific cleanup goals if appropriate
- Identify options for institutional and engineering controls as soon as possible

Tools for Imposing Time Frames

- Cleanup goals
- Cleanup funds
- Cleanup orders
- Enforcement

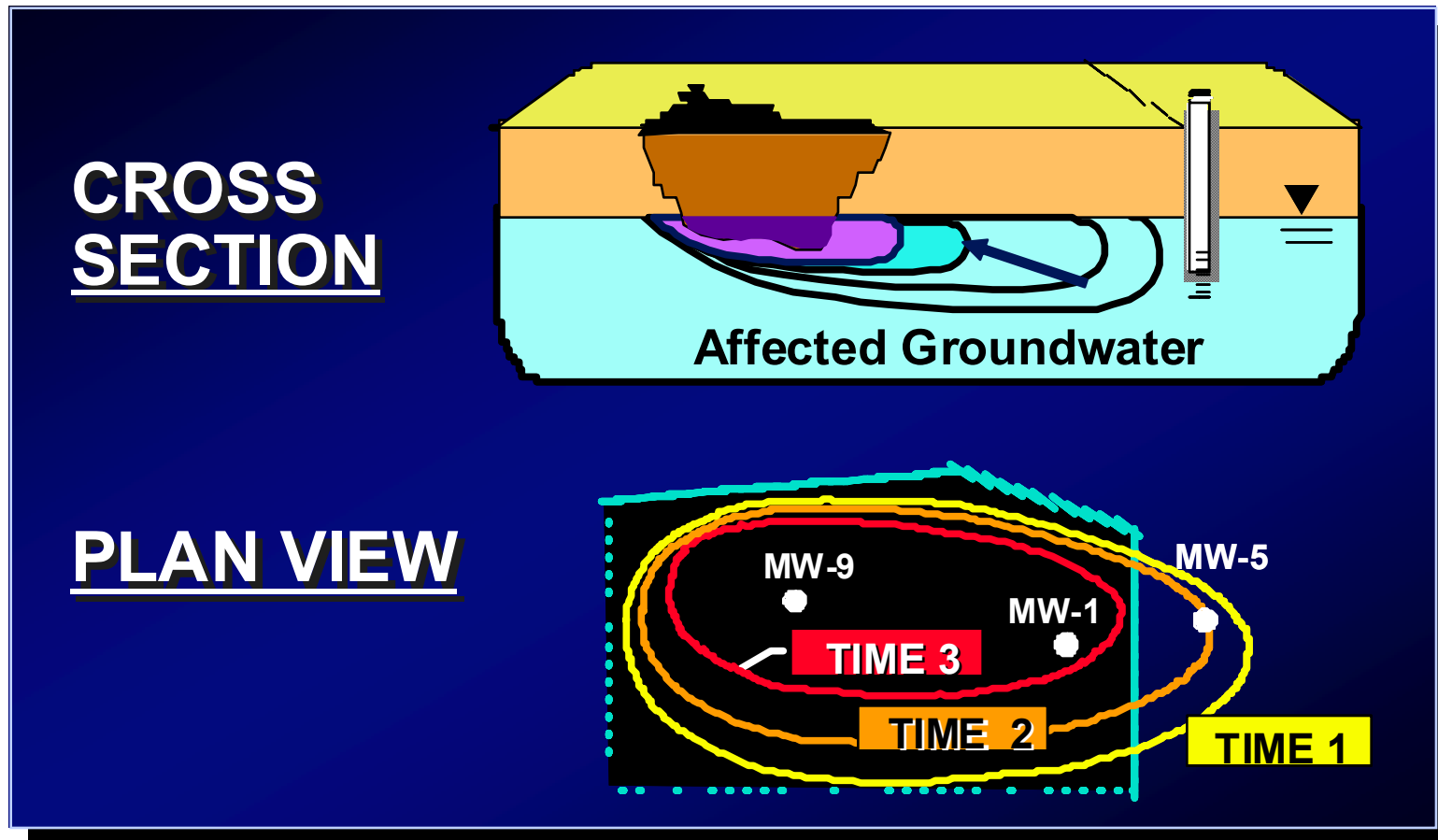
Monitoring/Verifying Remedial Progress

- Concentration versus distance over time



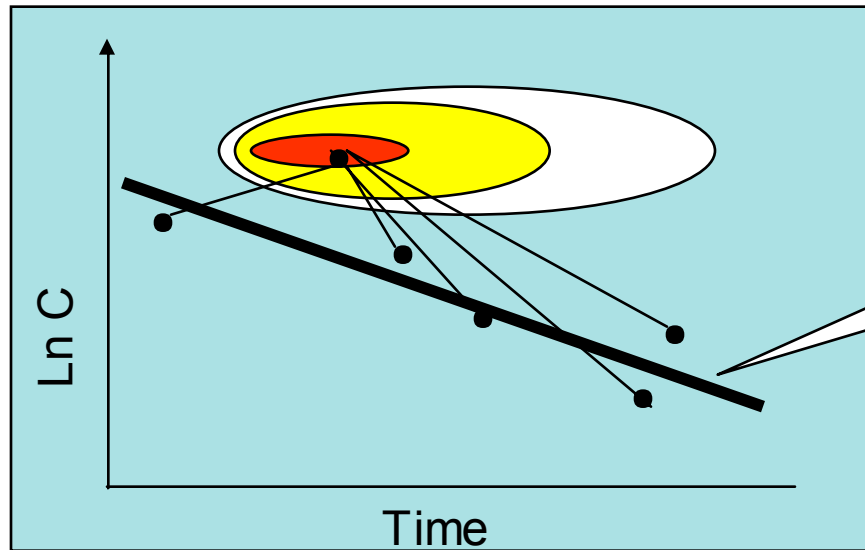
Monitoring/Verifying Remedial Progress

- Concentration trends over time and space



Monitoring/Verifying Remedial Progress

- Concentration over time at a point (statistical evaluation)



$$K_{\text{point}} = \text{SLOPE} = \frac{\ln C}{t}$$

$$t_{\text{Cleanup}} = \frac{-\ln \left[\frac{C_{\text{goal}}}{C_{\text{start}}} \right]}{K_{\text{point}}}$$

Monitoring/Verifying Remedial Progress

Technology	Monitoring/Verification Ideas
Soil Vapor Ext.	Concentration trends, pressure drawdown, sampling
Air Sparging	Flow rates/pressures, DO.
Pump/Treat	Capture zone analysis, concentration trends.
Excavation	Field analysis, lab verification
Natural Atten. Enhanced Bio.	DO, pH, CO ₂ , EC, etc. Statistical trend analysis

Tools for Monitoring/Verifying Remedial Progress

- "How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers" (EPA 510-B-95-007).
- Concentration trends
- Statistical methods for trend evaluation
 - Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies, EPA/540/S02/500
 - Washington State spreadsheet program
- Experience in your state
- Telemetry
- Bonuses and penalties for system up-time

Incentives

- Owners and operators
 - Property transfer
 - Meet regulatory goals
 - Avoid enforcement
- Consultants
 - Complete the job/contract
 - Doing the job
- Regulators
 - Meet goals
 - Doing the job

Disincentives

- The dollars drive everything
- Owners and operators
 - Time value of money
 - Limited budgets
- Consultants
 - Site closure stops the flow of money
- Regulators
 - Site closure slowly works regulators out of a job

Tools for Changing Incentives/Disincentives

- Cleanup funds
- Performance based contracts
- Data evaluation (embarrassment factor)
- Contractor certification and qualification
- Site lists

Conclusions

- Accelerate site assessment and move quickly to remedial process
- Monitor and verify remedial progress
- Impose time frames on cleanup
- Create incentives, address disincentives

Tools Available Online

- www.epa.gov/oust
- <http://www.epa.gov/oust/cat/index.htm>
- <http://www.epa.gov/tio/triad/>
- www.clu-in.org
- www.epa.gov/athens
- www.astm.org
- www.api.org/groundwater
- http://www.ecy.wa.gov/programs/tcp/policies/pol_main.html