



Overview of New EPA Superfund Groundwater Guidance and Tools

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Presentation Topics

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



Groundwater Background

- Since the 1980s, EPA has advocated for protection of groundwater as a Natural Resource
- Protection of water, including groundwater, is one of EPA Administrator McCarthy's 7 priorities
- EPA spends on average ~\$30-50 million/year on the operation of long-term response actions for the first 10 years of restoration actions at Fund-lead sites

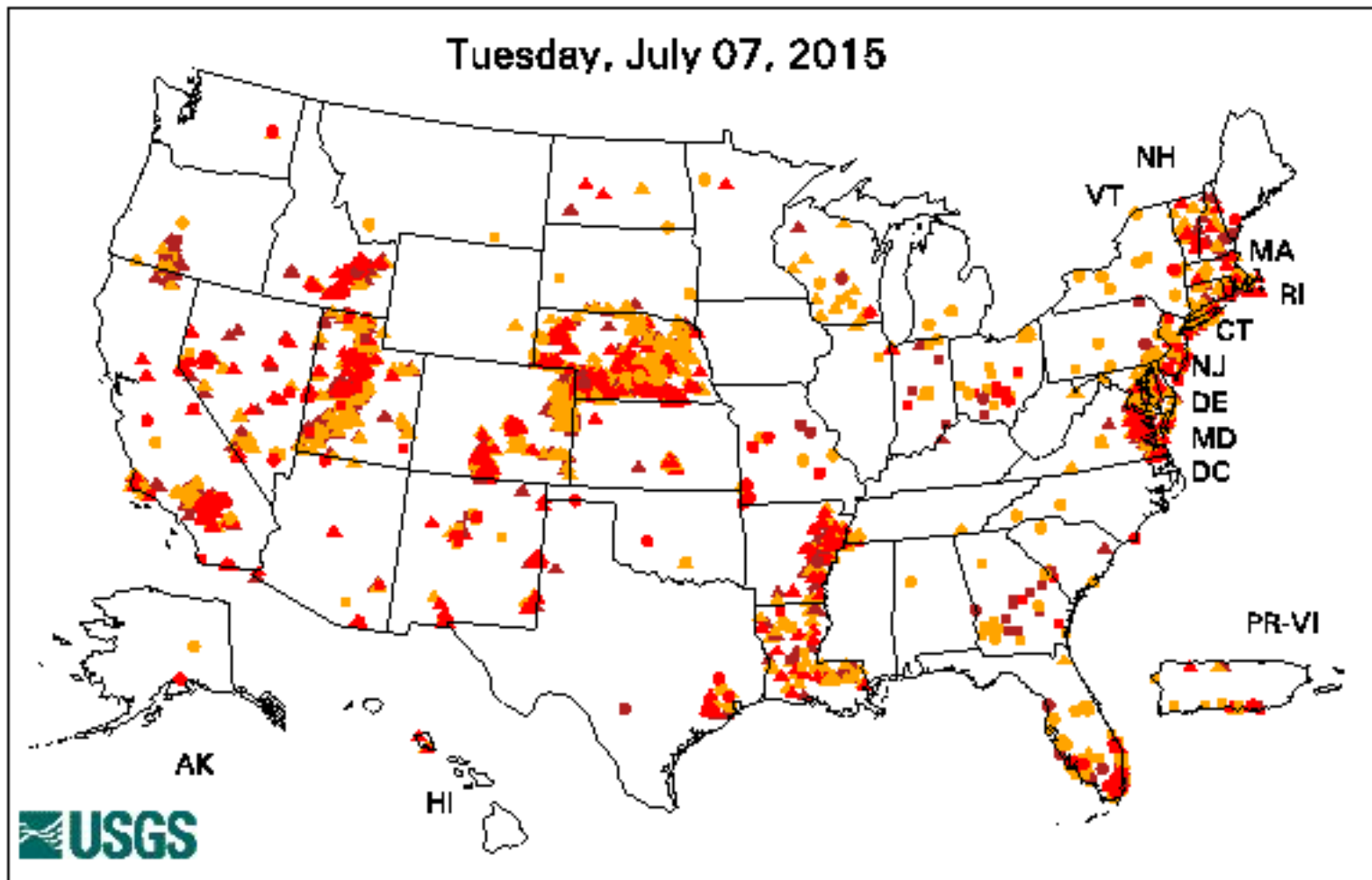


Importance of Groundwater

- According to the National Groundwater Association approximately 44% of US residents depend on groundwater as a source of drinking water and over 13 M households have a private well
- Some states rely very heavily on groundwater for drinking water. e.g., 90% of Florida drinking water comes from groundwater
- Essential for municipal water supplies, agriculture, industry, recreation, etc.
- Recharges streams, lakes, estuaries and wetlands

Below Normal Groundwater Levels

Tuesday, July 07, 2015



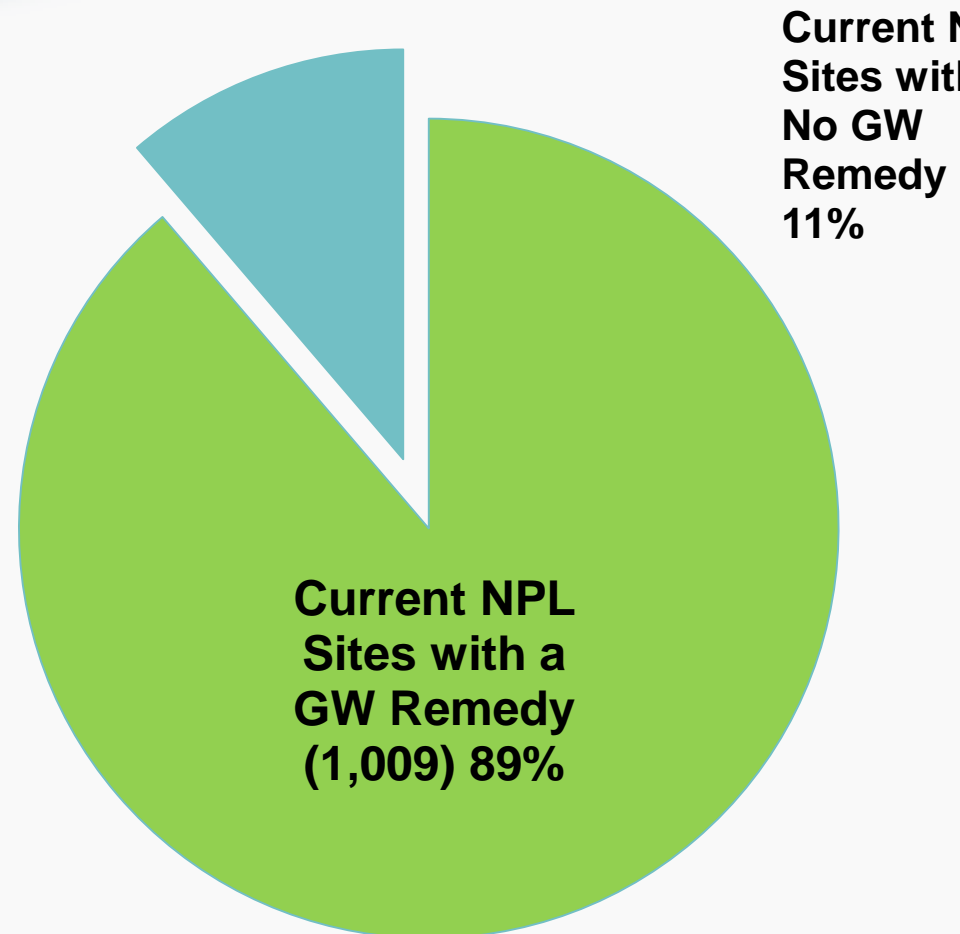
Explanation - Percentile classes (symbol color based on most recent measurement)								○ Real Time	□ Continuous	△ Periodic Measurements
●	●	●	●	●	●	●	●			
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked			
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal					

Below Normal Groundwater Levels Well Count: 4373



Nearly 90 percent of current Superfund National Priorities List (NPL) sites have groundwater remedies*

*Includes 1,137 NPL sites with at least one decision document. CERCLIS data as of December 2012



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

* Summarized in EPA, 2009, *Key Existing EPA CERCLA Policies for Groundwater Restoration* (OSWER Directive 9283.1-33).



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.)

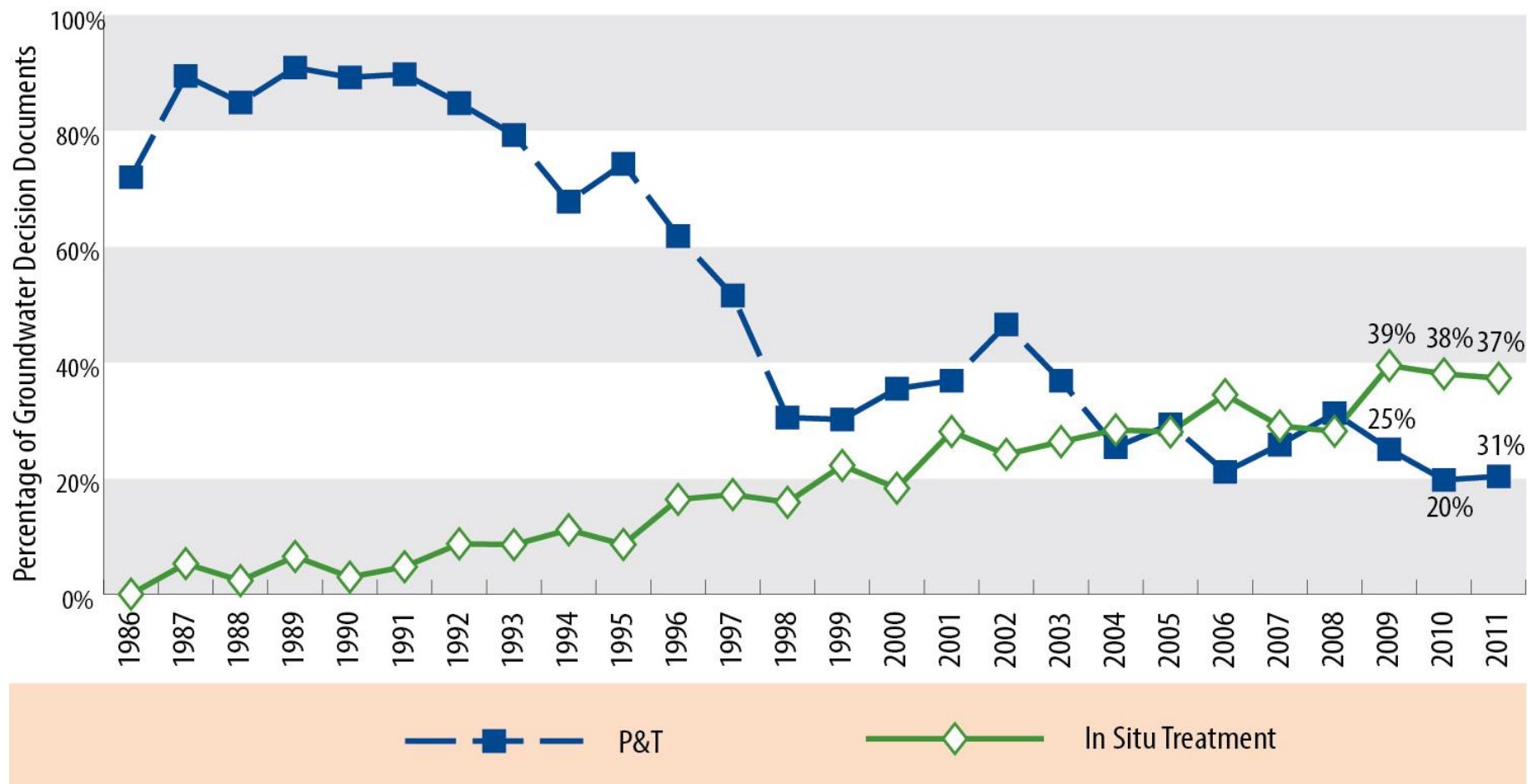


Groundwater Cleanup Trends

- 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

(Source: EPA, 2013. Superfund Remedy Report, 14th Ed.
<http://www.epa.gov/superfund/remedytech/srr/>)

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
- Some remedies may have reached technical limitations
- Accuracy or completeness of conceptual site models
- Costly to build and operate long-term remediation systems
- Evaluation of progress difficult without interim milestones



Challenges at Groundwater Sites (cont.)

- Remedy objectives may not be clearly defined 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



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

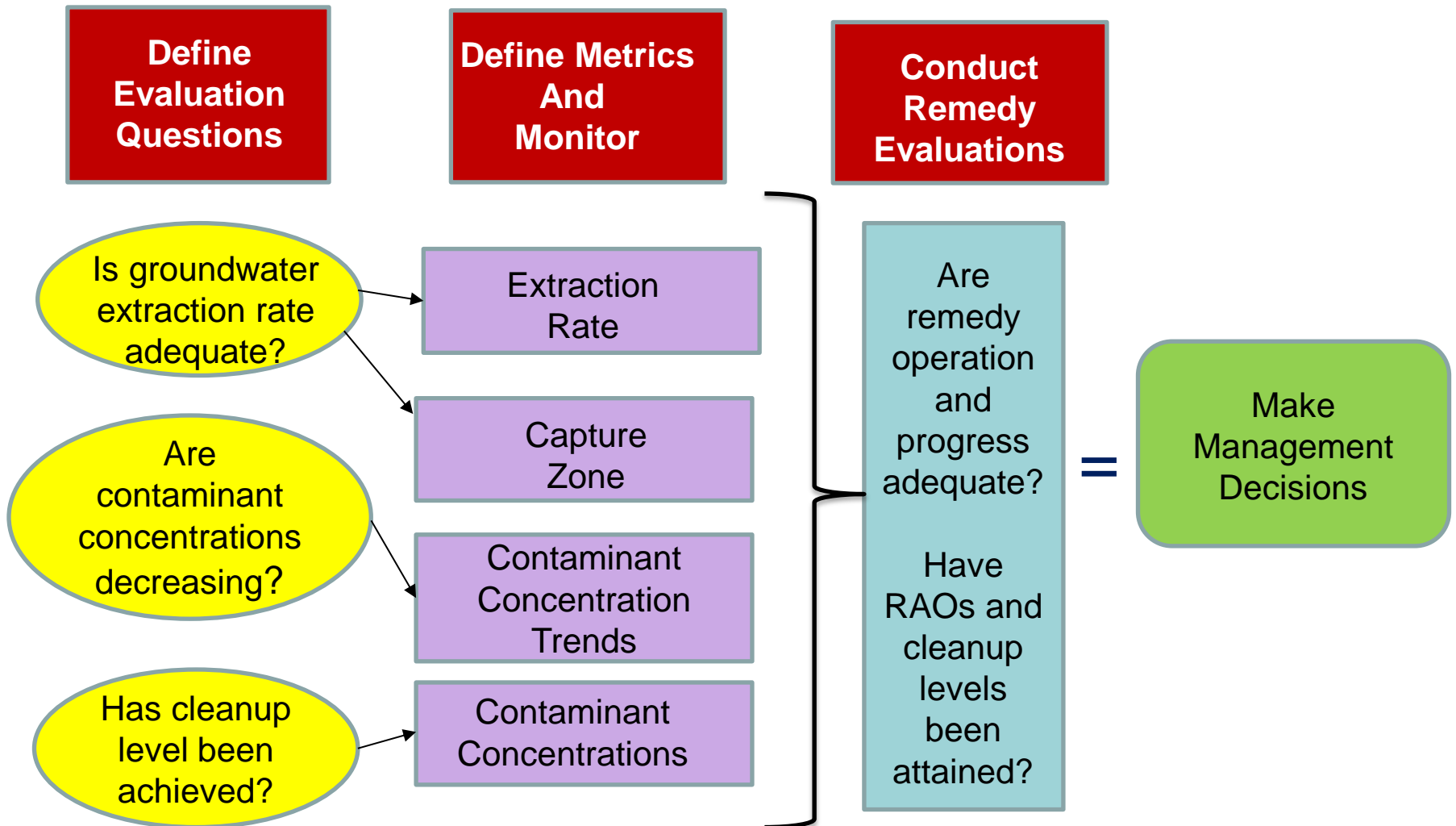


What is a performance metric?

- 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*





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)

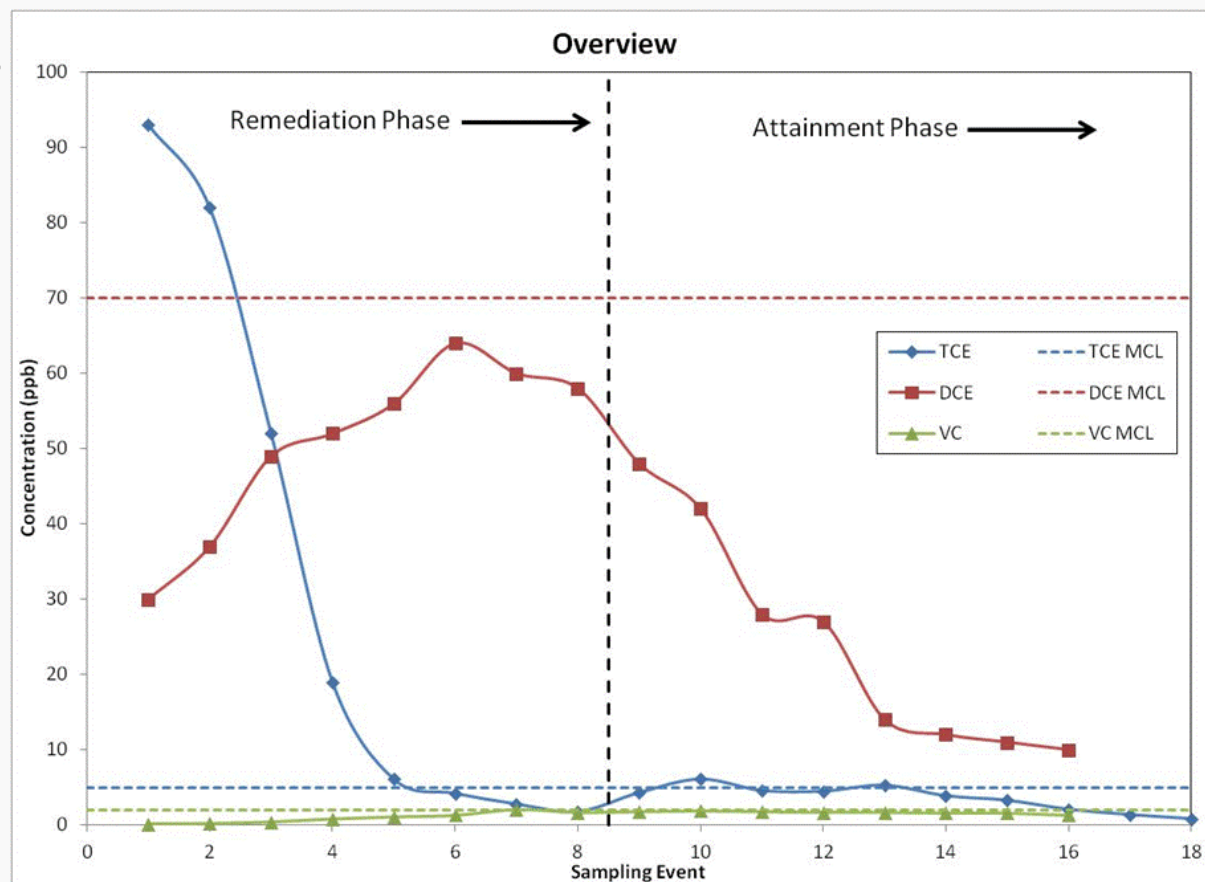
- Recommends evaluating contaminant of concern (COC) concentration levels on a well-by-well basis
- Well-specific conclusions used with conceptual site model to demonstrate that:
 - The groundwater has met and
 - Will continue to meet cleanup levels for all COCs in the future.



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

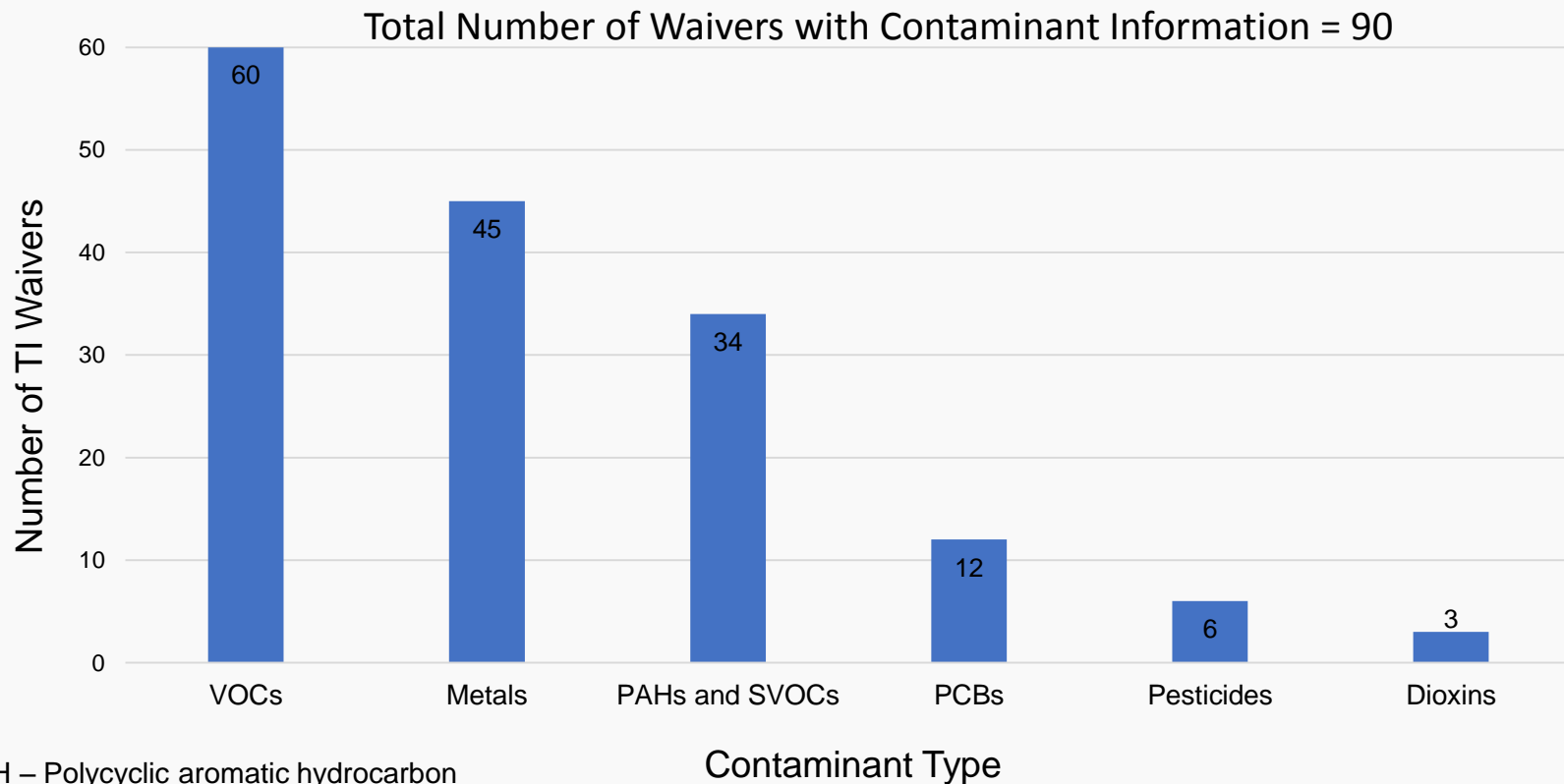


TI Waivers (cont.)

- 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



Types of Contaminants Addressed by TI Waivers (FY 1988-2011)



PAH – Polycyclic aromatic hydrocarbon
PCB – Polychlorinated biphenyl
SVOC – Semi-volatile organic compound
VOC – Volatile organic compound

Source: EPA, 2011, Summary of TI Waivers at NPL Sites



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>



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