

Remediation Management of Complex Sites: Tools and Approaches to Reduce Uncertainty

*Federal Remediation Technologies
Roundtable (FRTR)*

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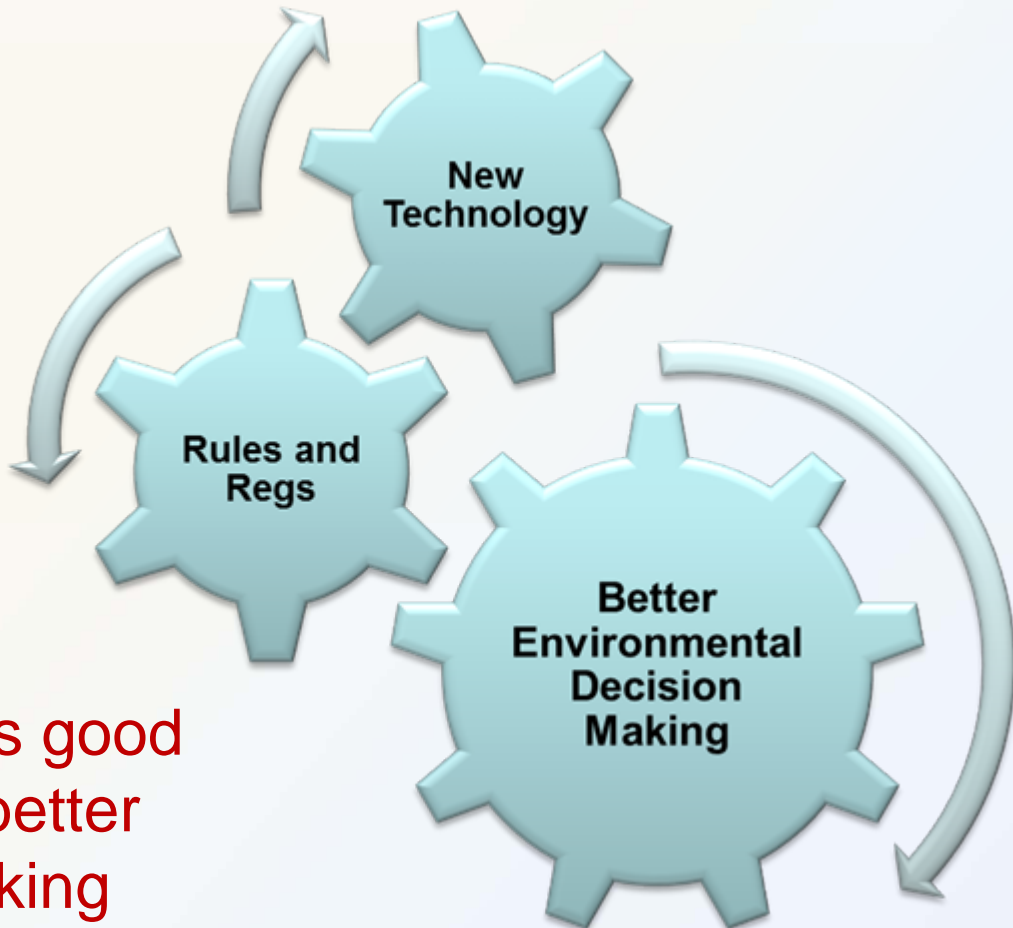


ECOS

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What is ITRC?

ITRC is a state-led coalition working to advance the use of innovative environmental technologies and approaches



ITRC translates good science into better decision making

Challenges to Decision Making at Complex Sites

- Risk assessment vs. risk management and risk reduction
- The latter require professional judgment – depends on risk tolerances and varying opinions on the future value of resources, e.g. remediation vs. point of use treatment
- ➔ No consistent determination of “maximum extent practicable” “technical impracticability” “site closure” or “beneficial reuse” – definitions become a policy determination made by a regulatory agency

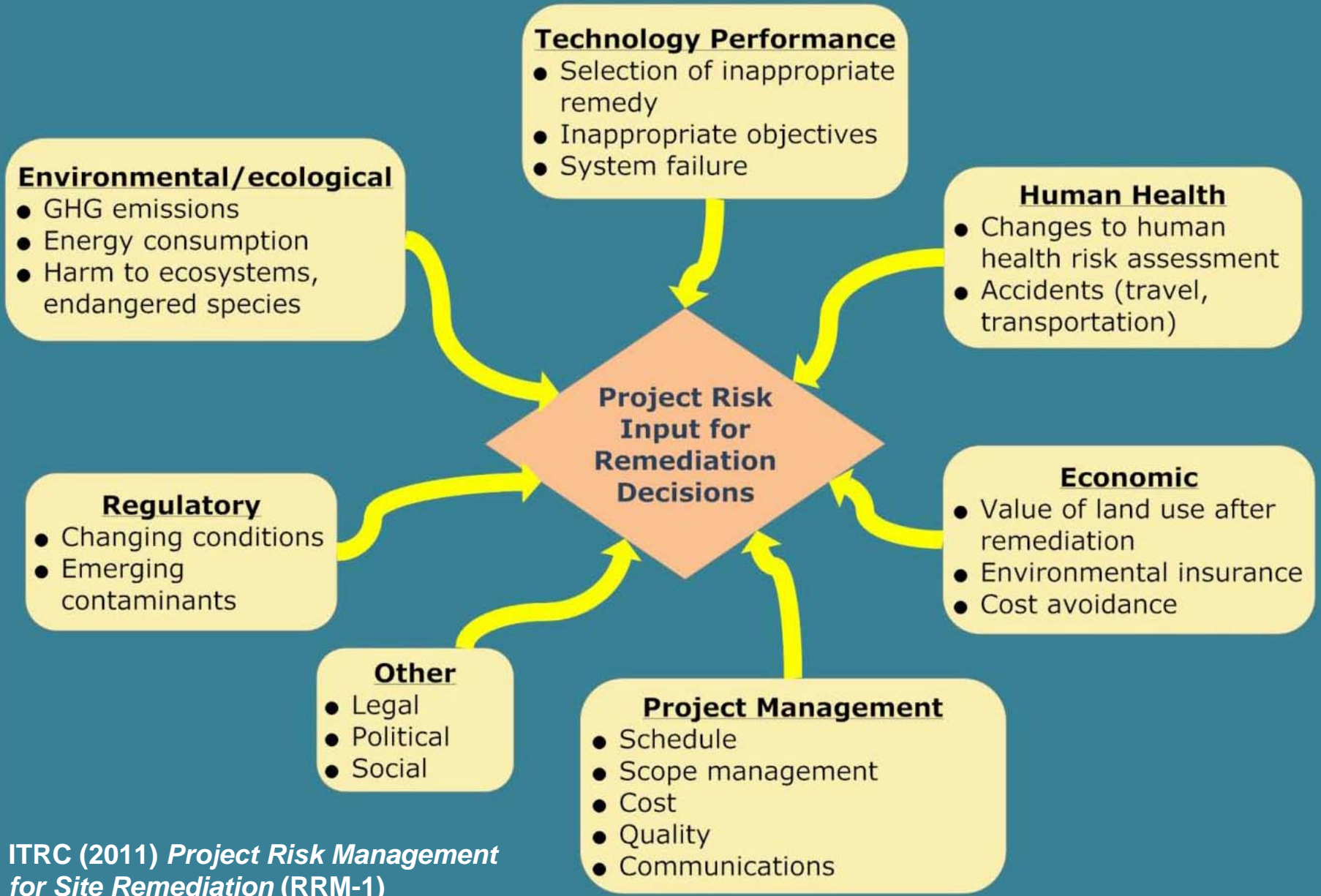
Related ITRC Projects

- Remediation risk management
- Integrated DNAPL site strategy - discusses setting functional remediation goals with a 20 year performance period
- Risk assessment – aligning state approaches for site-specific risk assessments and their use in risk management
- New complex sites project seeks to better define a complex site and provide agreed upon approaches for management

Remediation Risk Management

- **Remediation risk management (RRM) is a forward looking management approach which considers all risks related to the remediation process lifecycle**
- **Risks are holistically addressed in order to minimize decision uncertainties during the cleanup process**

Examples of Project Risks



Actions to Mitigate Risk

Risk Analysis and Prioritization

- Combine probability and severity to determine high, medium, and low

Likelihood	e	M	M	H	H	H
	d	L	M	M	H	H
	c	L	L	M	M	H
	b	L	L	L	M	M
	a	L	L	L	L	M
		a	b	c	d	e
		Consequence				

- Prioritize the risks and create a watch list
- Define risk indicators (metrics)

What if Remedial Objectives are Not Met?

Project Risk Management for Site Remediation (RRM-1), ITRC, March 2011

- RRM question: What if remedial objectives are not achieved in the designated timeframe?
- ITRC conducted a survey in 2008-2009 to learn how this issue is addressed by state environmental agencies (31 states responded)
- Results of survey published in RRM-1
- Results inspired RRM-2: Using Remediation Risk Management to Address Groundwater Cleanup Challenges at Complex Sites, Jan. 2012

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What options are considered if the selected remedy is not on track to meet remedial objectives?

- Land use/institutional controls (17 responses)
- Long term monitoring (17 responses)
- Monitored natural attenuation (17 responses)
- Alternative cleanup limits (9 responses)
- Additional modeling (9 responses)
- Technical impracticability (TI) waivers (9 responses)
- Other (8 responses) – Mixing zones, combinations, move compliance point, extend time to completion, reassess site risks



Does your state follow a protocol for TI waivers or alternative end points or equivalent if selected remedy is not on track to meet remedial objectives?

- Yes (14), No (13), Case-by-case (3)
- Comments:
 - We follow EPA guidelines for TI
 - We have never had or requested for a TI waiver
 - We do not allow or consider TI waivers
 - We use alternative clean up levels
 - It is up to the state PM, not a formal process
 - Application for LUCs requires public comment
 - Internal process for TI, no promulgated regulations
 - Under our program, there is no requirement to remediate groundwater if it is not used or if it can be treated (at point of use)...a risk management pathway is considered just as acceptable as complete removal

Would a document on how to do a technical assessment of whether any remedy will meet remedial objectives be useful?

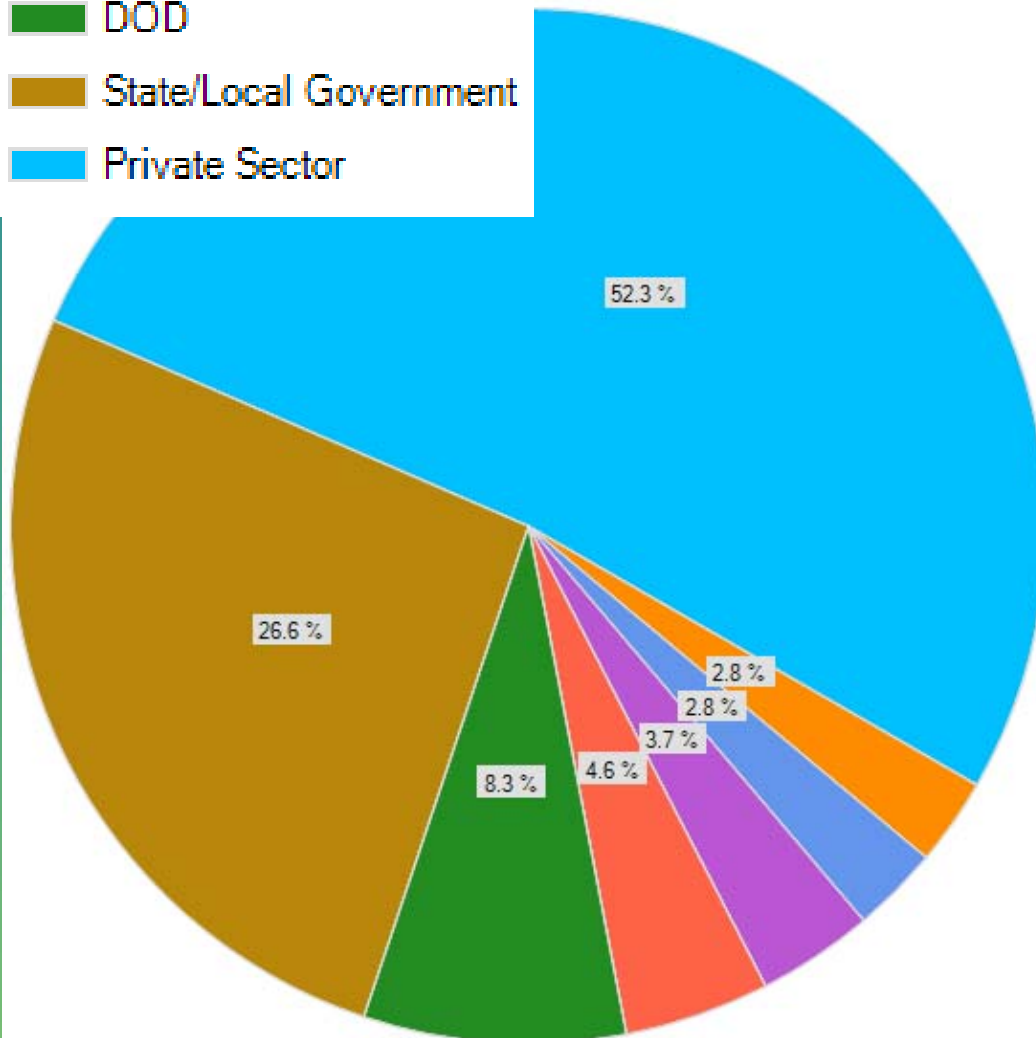
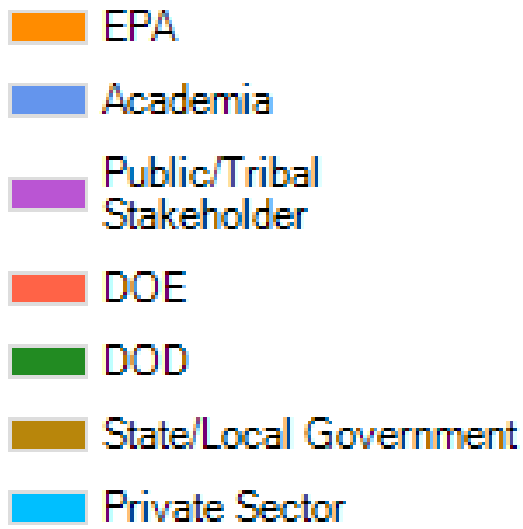
- Yes (29 of 31 responses)
- No (1)
- Maybe (1)

ITRC's Remediation Management of Complex Sites Team

- Technical and regulatory guidance document
 - Provide understand of what is a complex site
 - Compile and synthesize existing guidance
 - Summarize barriers and challenges
 - Compile case studies
 - Provide a consensus on strategies to meet cleanup goals at complex sites
- Team is large and diverse
- Initial Team survey – March 2014

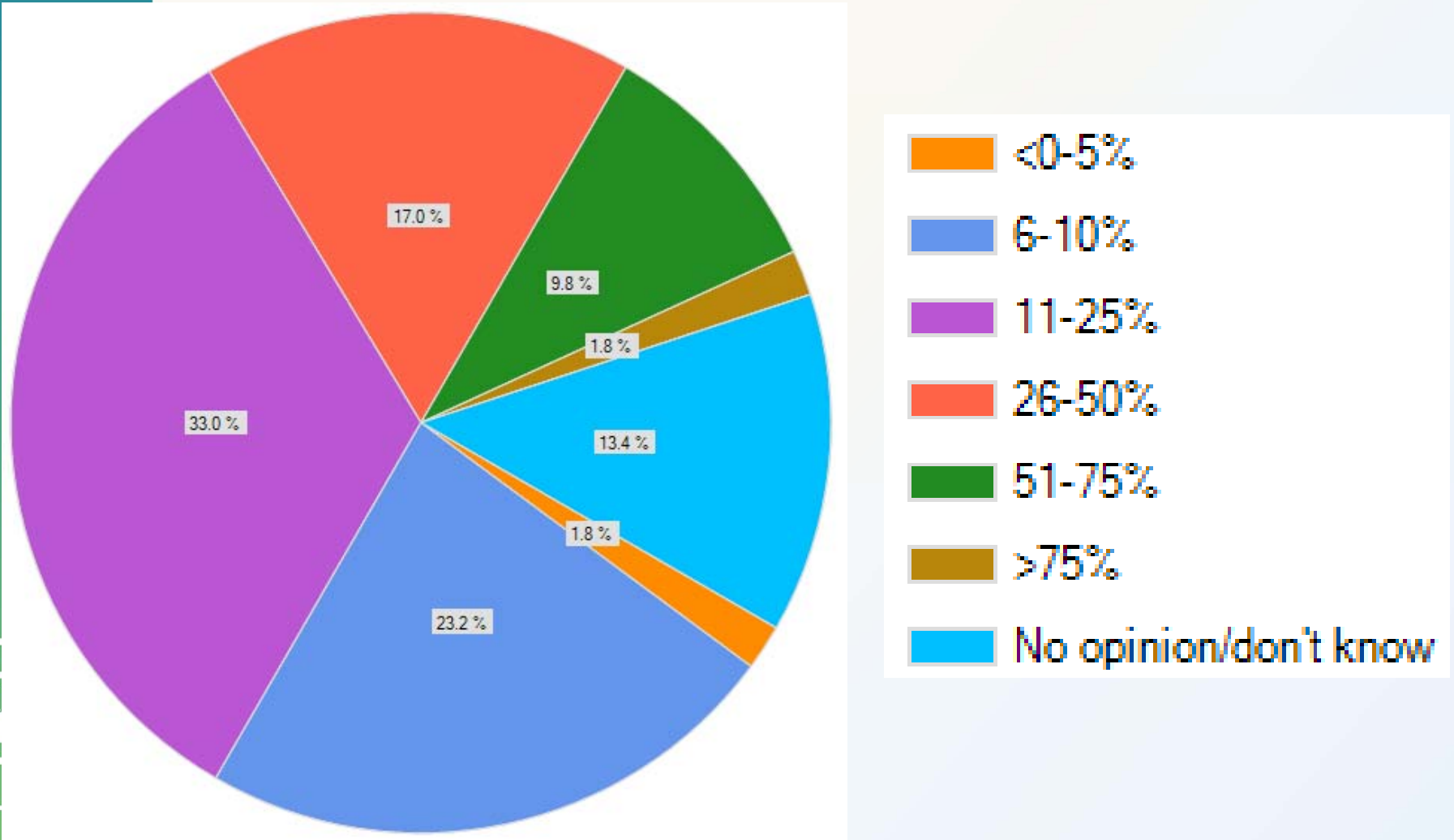


Who do you represent?



- 55% have direct experience with 6 or more complex sites
- 46% have 15+ years of experience working on complex sites

Q9. Percentage of remediation sites that are complex



What Makes a Site Complex?

- Complex geology, geographically large, deep and shallow contamination, NAPLs, metals/rads, continual source, multiple contaminants
- # of OU/CAU/AOCs etc does not make a site complex
- Cost alone does not make a site complex, but 90% indicated high cost to be a non-technical complexity
- Site can be complex with just one contaminant class
- Clean up timeframe does not determine if a site is complex (47%) OR clean up timeframe of 30+ years is complex (30%)
- Complexity is not defined by a specific regulatory mechanism (e.g. ARAR waiver)

#1 *Transition Assessment*

- Matrix of states and possible language/guidance that has been used by each state (survey ITRC POCs)
- How does transition assessment fit into various regulatory programs
- Expanded checklist for CSM to guide a transition assessment
- Tools, methodologies, ranking system, flowchart to support for transition assessment
- Transition assessment outcomes – no transition, active long term management, passive long term management, low risk conditional closure, etc.
- Customize for complex sites

#2 Compile Case Studies

- Remediation management case studies
- Focus on demonstrated approaches where the regulatory and stakeholder community have accepted the proposed path to site closure
- Define elements to include in case studies
 - What were complexities?
 - How were they overcome?
 - What were the tools (technical and regulatory)
- Broad spectrum of case studies
 - Include states that have guidance and those that don't
 - Varied complexities

#3 *Tech Reg Focus*

- Problem Statement/Objective: develop a guidance document for management of complex sites that meets needs of stakeholders, regulators and responsible parties
- History of topic – sites were managed for years without reaching cleanup goals
- What needs to be done to validate that a site matches the attributes of complex site
- What are management objectives of complex sites?
- What tools are available to meet management objectives of complex sites
- Concept of low threat closure



ITRC Represents

Increasing knowledge

Decreasing approval time

Reducing environmental costs

Streamlining regulatory processes

Harmonizing approaches



Conclusion

Since 1995, we've been expediting quality regulatory decision making, while protecting human health and the environment.

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