U.S. EPA Superfund Optimization: Progress and Outcomes

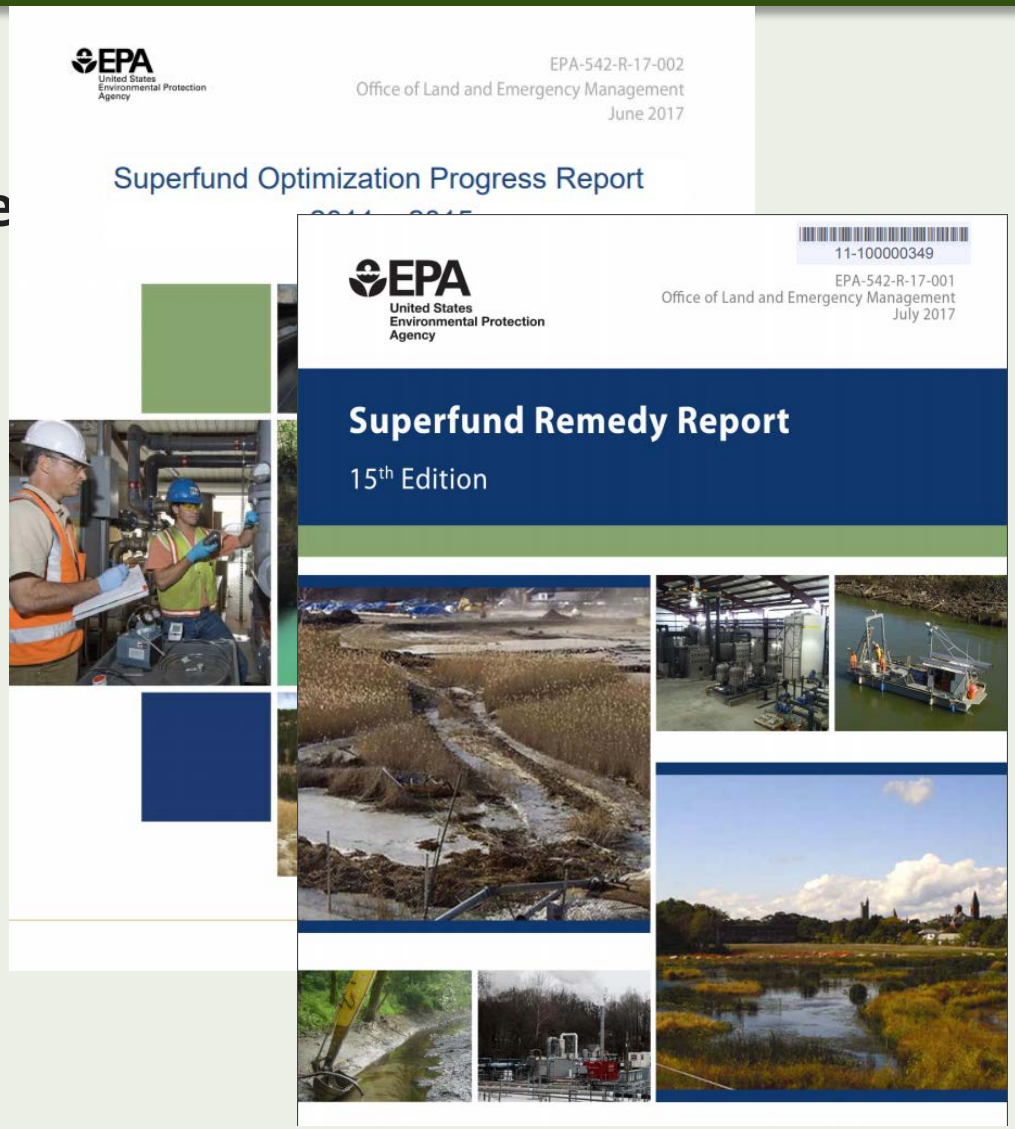
Federal Remediation Technologies Roundtable
May 9, 2018

Kirby Biggs,
Carlos Pachon
Ed Gilbert, Matt Jefferson

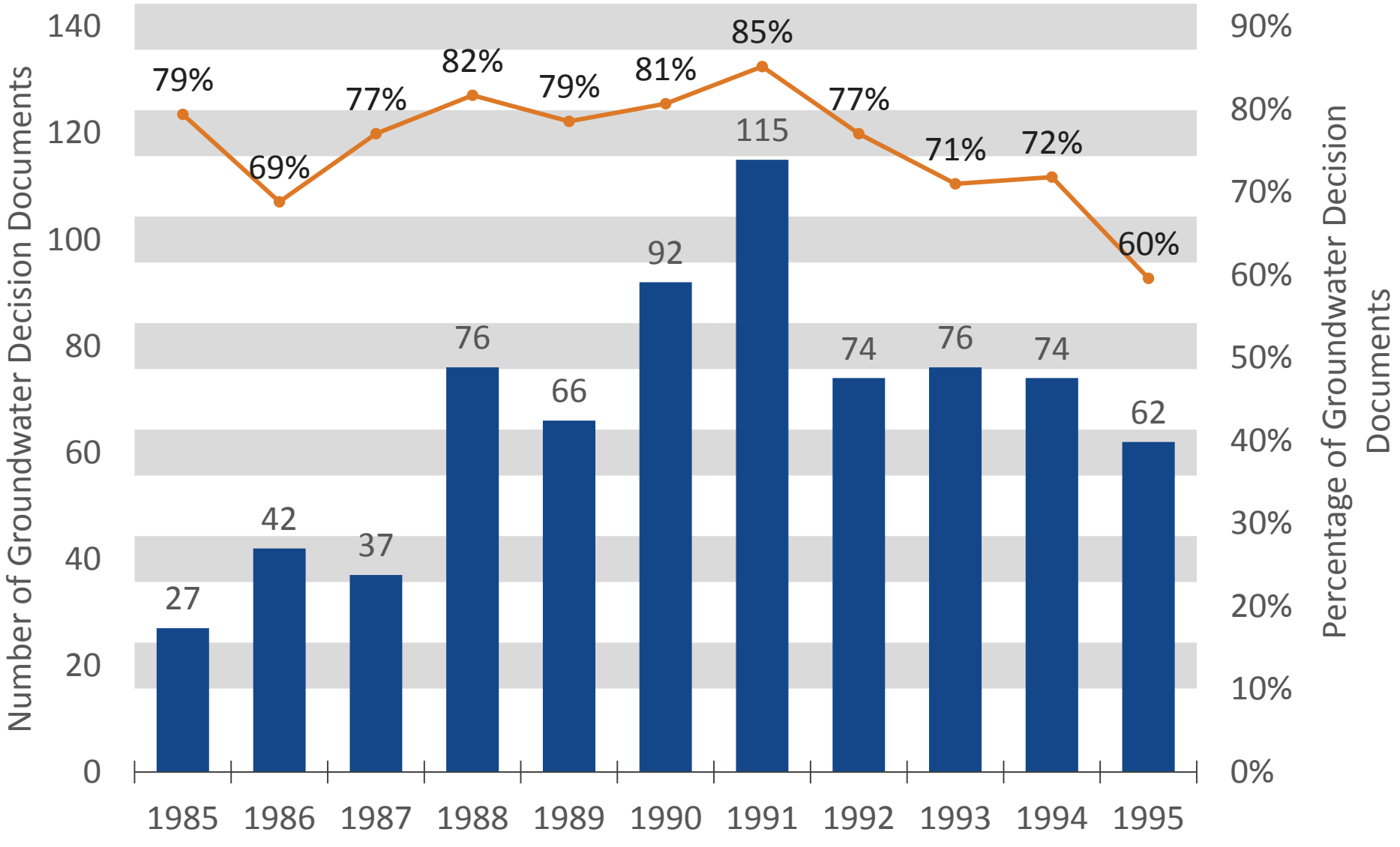
Office of Superfund Remediation & Technology Innovation
U.S. EPA

Agenda

- The nature of Superfund Remedies: Updates from the 2017 Superfund Remedy Report
- Key Elements of the Superfund Optimization Program
- Findings from the 2017 Superfund Optimization Report
- Conclusions



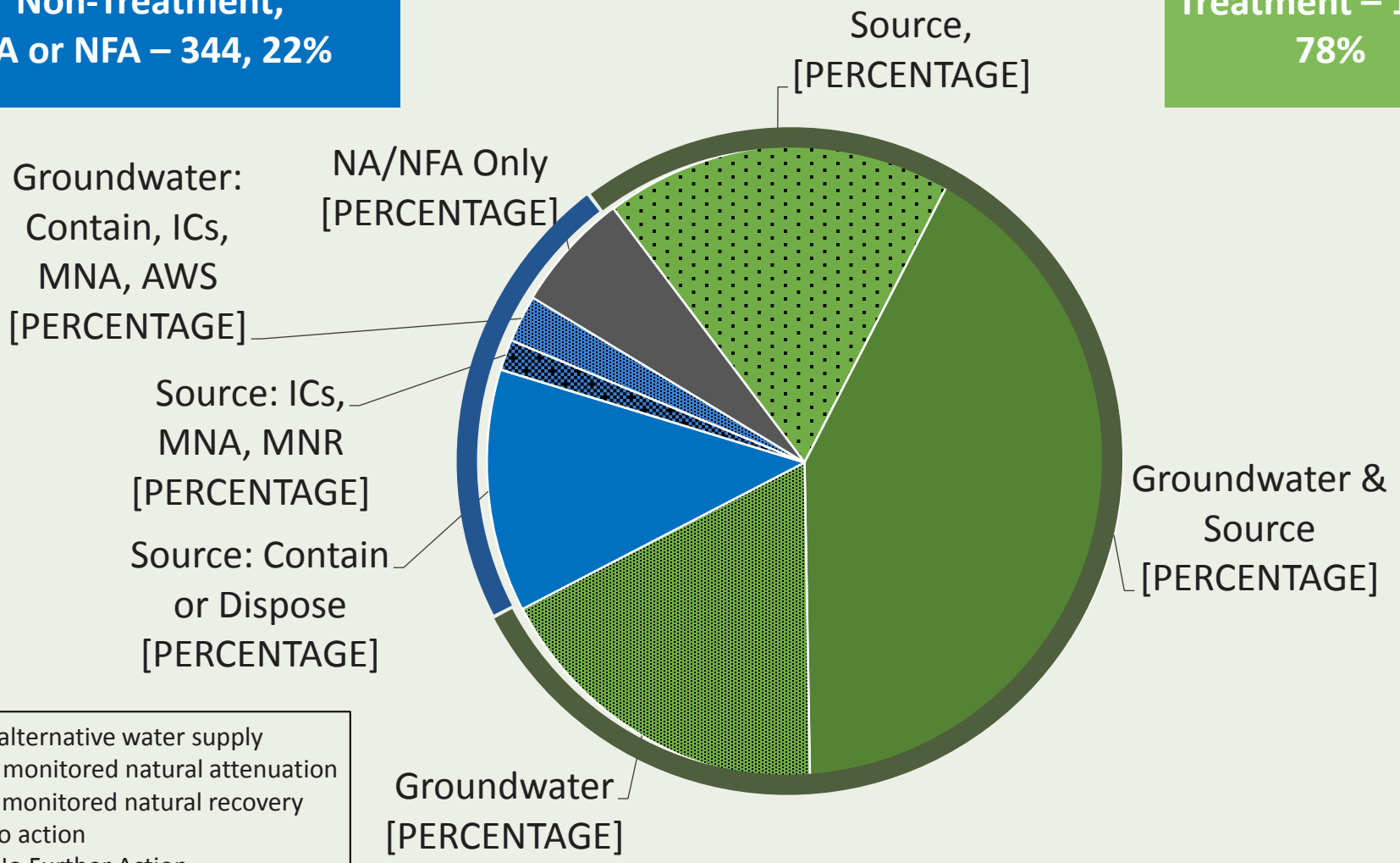
P&T Selection for Decision Documents with Groundwater Remedies (FY 1985-1995)



Treatment at Superfund Sites (FY 1982-2014)
Number of Sites = 1,540

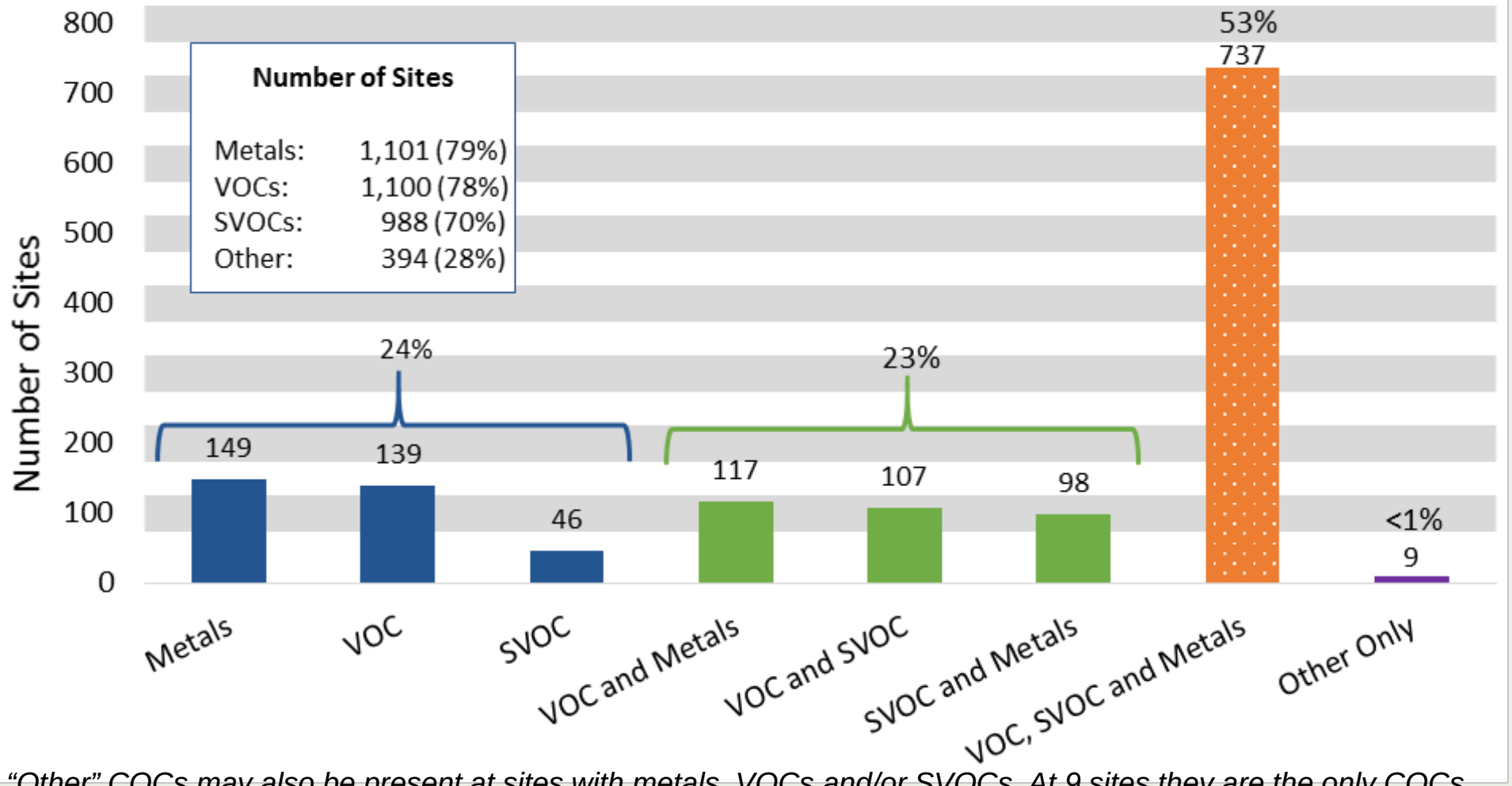
Non-Treatment, NA or NFA – 344, 22%

Treatment – 1,196 78%



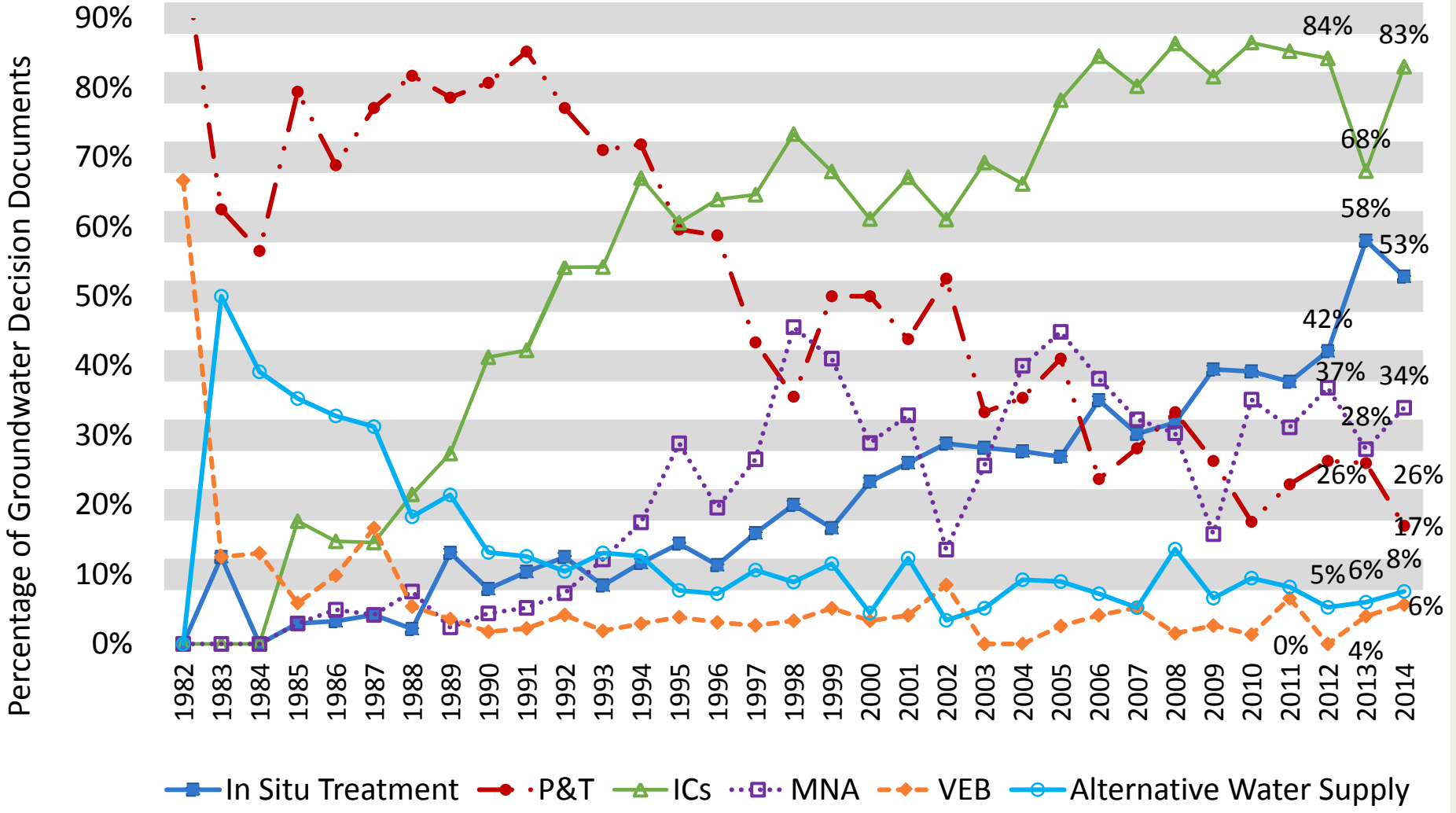
AWS = alternative water supply
MNA = monitored natural attenuation
MNR = monitored natural recovery
NA = No action
NFA = No Further Action

COCs at Superfund Sites (FY 1982-2014)



"Other" COCs may also be present at sites with metals, VOCs and/or SVOCs. At 9 sites they are the only COCs. Examples include cyanide, nitrate, sulfate and asbestos.

Selection Trends for Decision Documents with Groundwater Remedies (FY 1986-2014)
Groundwater Decision Documents = 2,357

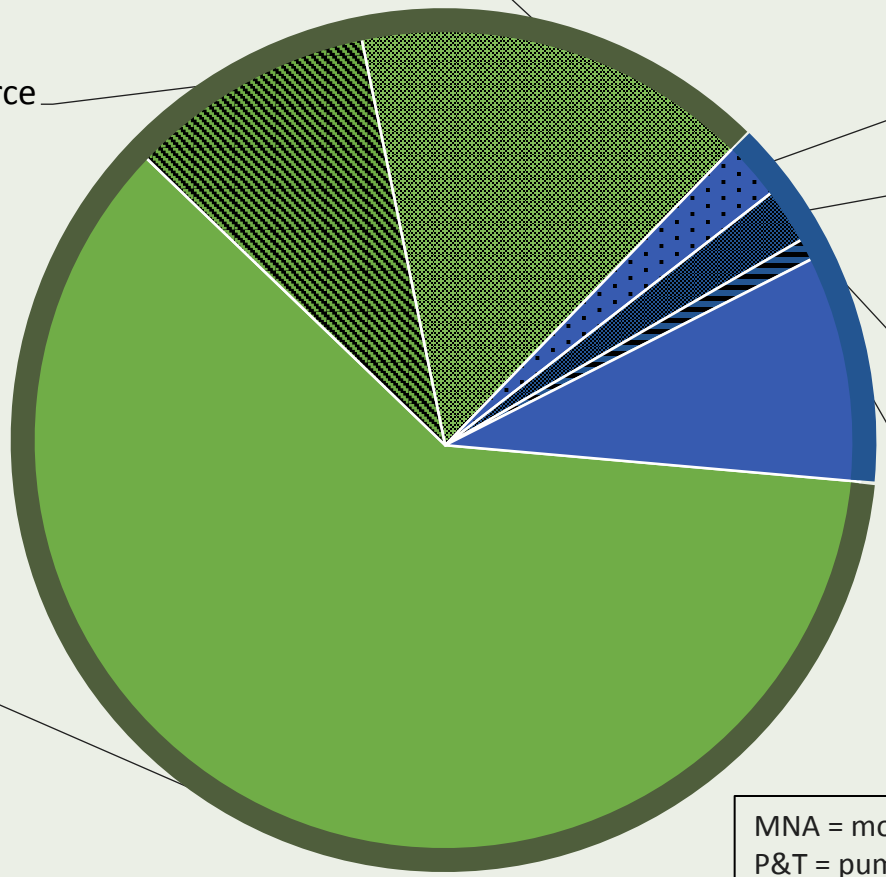


Summary of Selected Groundwater P&T Remedies (FY 1982-2014)

P&T Sites = 834

P&T with Source Control – 716 (86%)

P&T with no Source Control – 118 (14%)



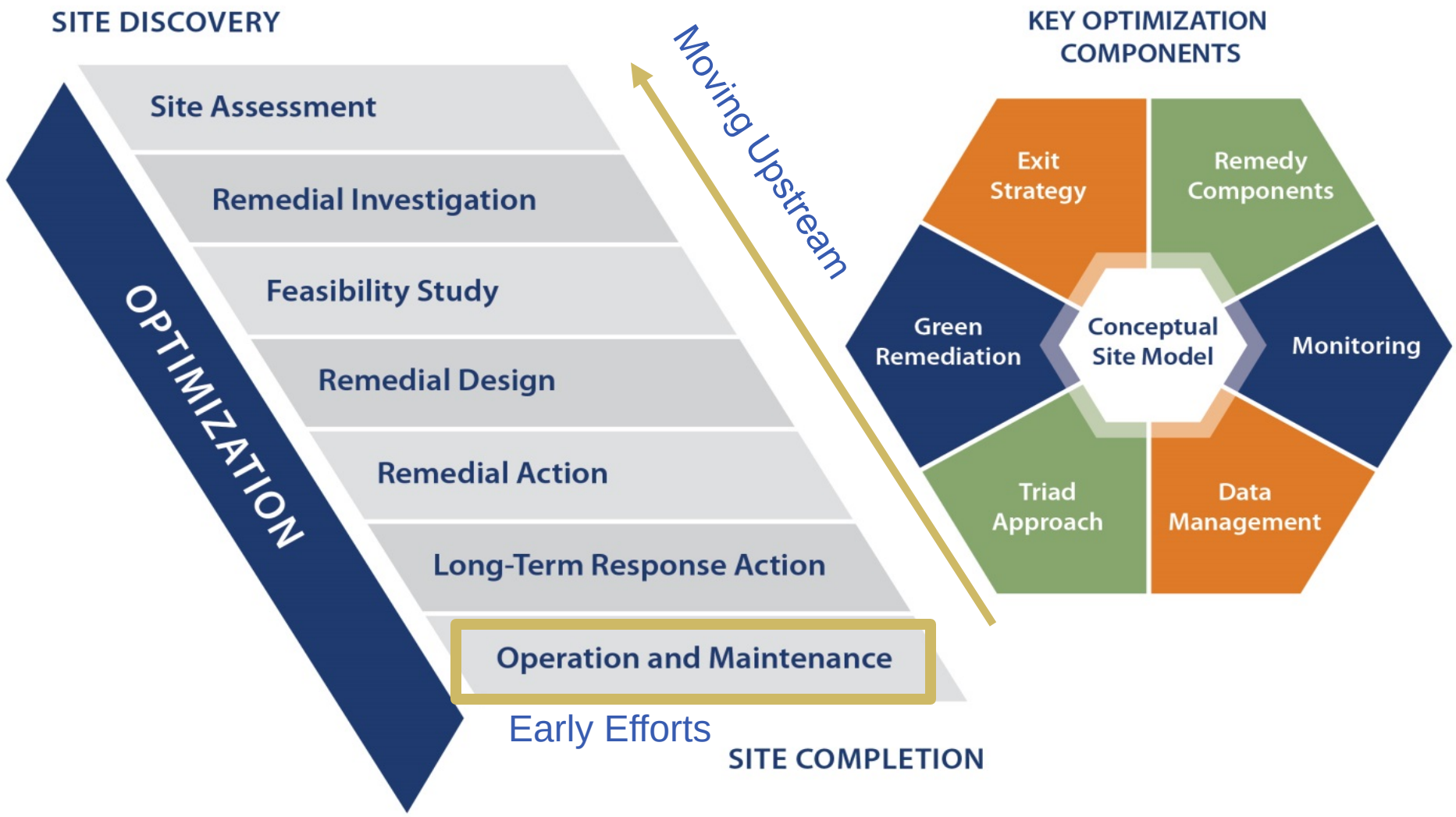
MNA = monitored natural attenuation
P&T = pump and treat

EPA's Working Definition of Optimization

Systematic site review by a team of independent technical experts, at any phase of a cleanup process, to identify opportunities to improve remedy protectiveness, effectiveness and cost efficiency, and to facilitate progress toward site completion.

EPA's National Optimization Program revolves around third-party evaluations

Key Optimization Components and Superfund Pipeline Activities



Optimization Evaluations – Accomplishments to Date

Region	Events/Region			Total Events 1997 to Date	% per Region
	1997-2010	2011-2017	2018 to Date		
1	10	20	0	30	11%
2	12	15	0	27	10%
3	18	9	2	29	11%
4	11	4	0	15	6%
5	12	5	2	19	7%
6	5	16	0	21	8%
7	6	17	0	23	9%
8	4	25	2	31	12%
9	6	25	1	32	12%
10	10	19	5	34	13%
Total	94	155	12	261	100%

Superfund Optimization Work

- **2012 National Optimization Strategy:**
  - Defined engagement process
  - Identified priority areas to tackle at sites
  - Four main components:
- **2018: Action 7 of the Administrators' Superfund Task Force Recommendations seeks to** "Promote Use of Third-Party Optimization Throughout the Remediation Process and Focus Optimization on Complex Sites or Sites of Significant Public Interest".

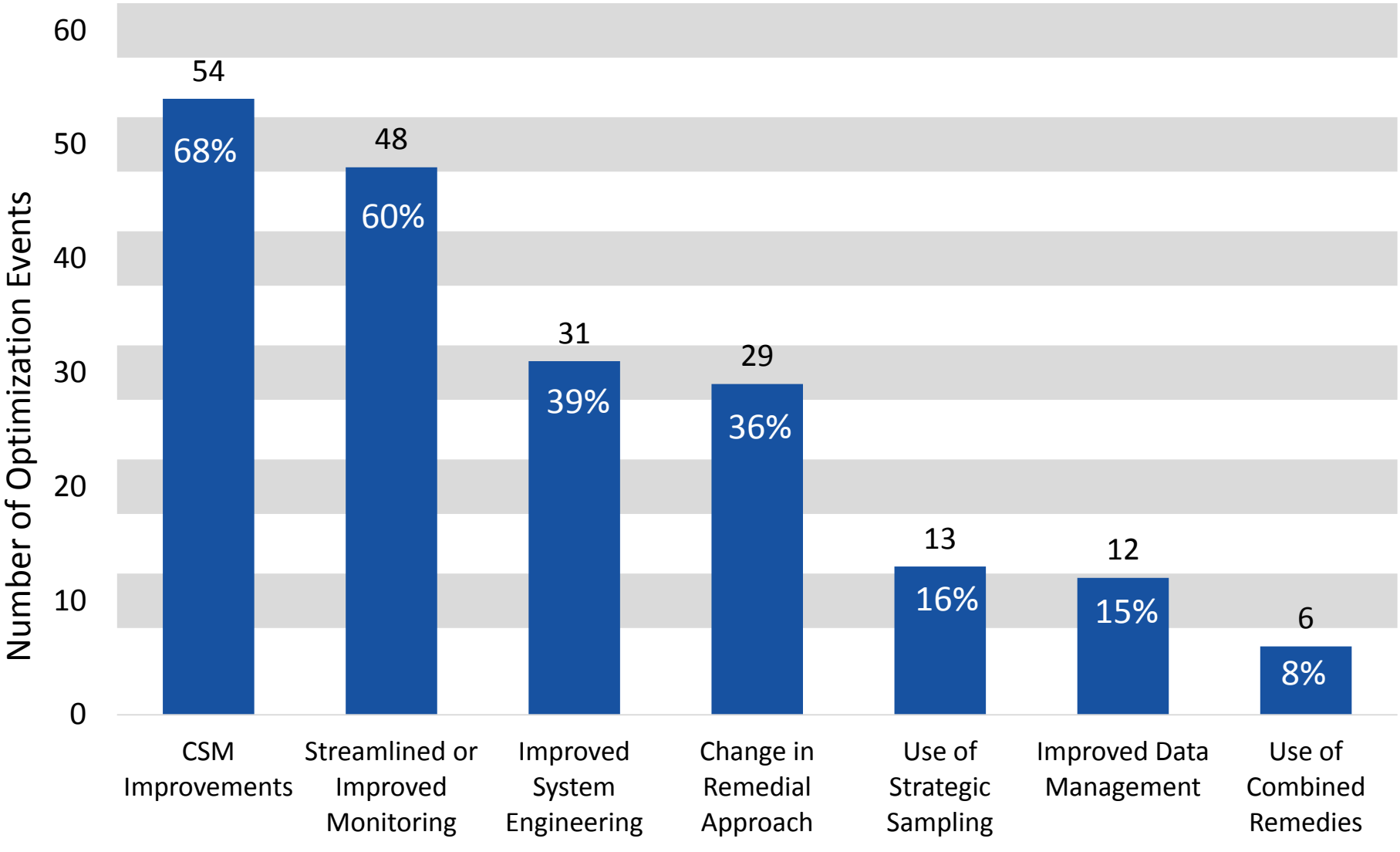
FY2017 Optimization Evaluations and Optimization Related Technical Support Efforts	
Status	**Total**
Carryover projects from FY16	36
New Projects Started in FY17	35
Completed in FY17	25
Carryover projects to FY18	46
Total Active Projects in FY17	71

Optimization Reviews

- **Optimization reviews result in site-specific reports with recommendations that fall within one of six standard recommendation categories:**
  - remedy effectiveness
  - cost reduction
  - technical improvement
  - site closure
  - green remediation
  - redevelopment potential
- **There are three prevalent optimization concepts applied during third-party optimization of sites regardless of the remedial stage**
  - Adaptive site management
  - CSM development/revision
  - Alternative technologies/approaches

Number of Implemented Tools and Techniques

Total Number of Optimization Events = 80



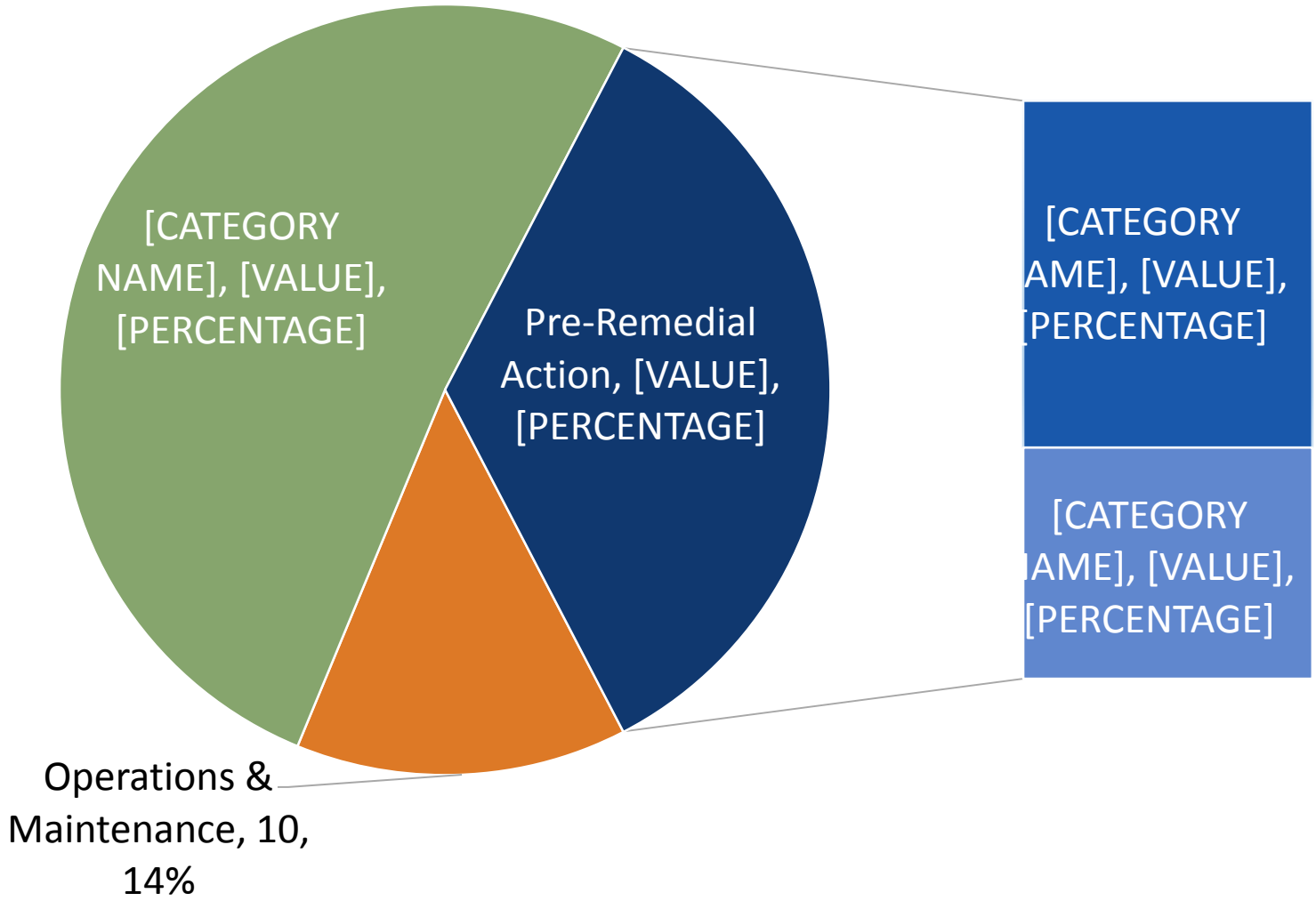
Summary of Outcomes from Remedy Optimization Efforts

2011-2015 – 645 Recommendations

- **Remedy effectiveness** **273**
- **Cost reduction** **152**
- **Technical improvement** **158**
- **Site closure** **107**
- **Green remediation** **32**
- **Total (some rec in +1 group)** **722**

Superfund Phase of Optimization Events

Number of Superfund Optimization Reviews and Technical Support Events = 72



Going Forward: Optimization in the Superfund Remedial Acquisition Framework (RAF)

National Superfund Contracts Under RAF:

- Design and Engineering Services (DES)
- Remediation Environmental Services Contract (RES)
- Environmental Services and Operations (ESO)

Similar Optimization Requirements in RES & DES Contracts

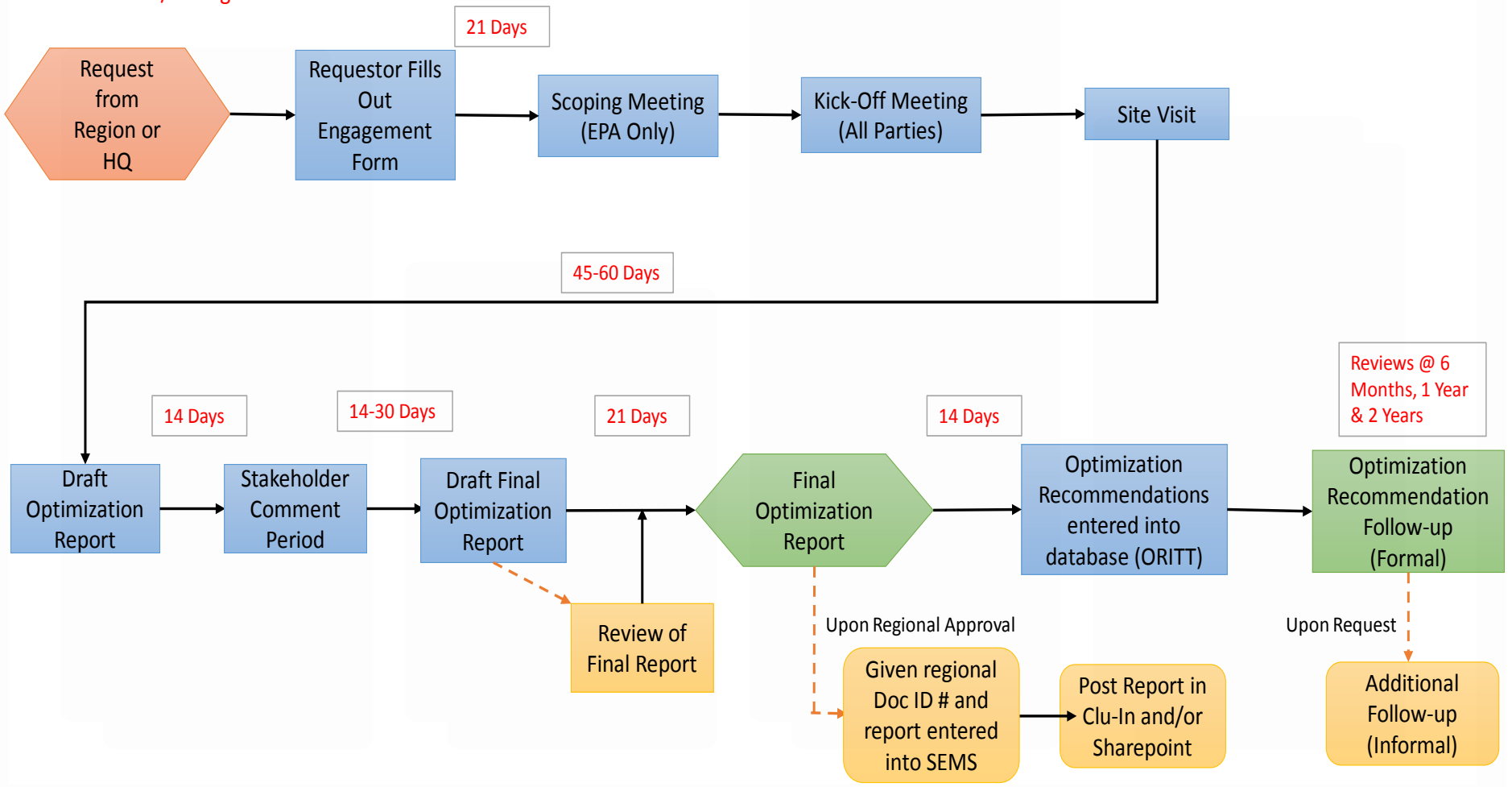
» The contractor shall consider and, to the extent requested by EPA, apply optimization activities for all contract activities. Optimization is defined ….

» Upon request, the contractor shall present optimization options or recommendations for independent review during systematic project planning meetings, provide a cost analysis or cost estimate for these activities, maintain records of optimization related activities, and participate in any third party optimization activities on projects they are executing, as requested by EPA.

OSRTI OPTIMIZATION PROCESS

Final – 07/01/2015

Milestones/Timing listed in RED



Progress Towards Institutional Practice in Waste Programs

- **Standardized processes applied to**
  - COI, site engagement and kickoff
  - Onsite visits and interviews
  - Report format and development/review/QC process
  - Optimization Report Inventory and Tracking Tool (ORITT) – tool for tracking metrics
  - Optimization Project Log (OPL) – tool for program/project management
- **Identifying and applying process improvements to reduce cost and time**
  - Streamlined standardized optimization report template
  - "Portfolios": multiple reviews conducted during singular travel events

- Regional management involved in optimization
  - Increased number of sites and level of interest
  - Staffing realities, leveraging program expertise
- Other programs adapting
  - Office of Underground Storage Tanks: 7 Tribal Sites
  - RCRA-LEAN RFI
  - Region-lead Optimization
- Provide access to broad network of optimization support
  - Superfund HQ Mission Support Contractors
  - Regional Remedial Action Contractors
  - Support from other Agencies: USACE

Federal Agency Optimization Policies: Many Federal Partners have embraced both Optimization and Green Remediation

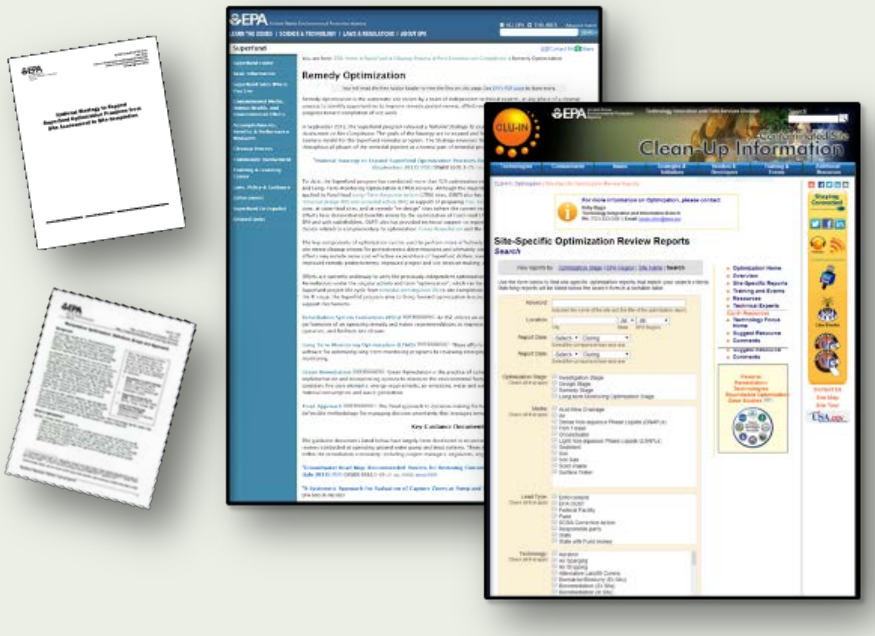
Agency	Optimization Policy (Y/N),	Remedial Phases	Comments
DOD	Y	Post and including Remedy Selection	General requirement to optimize – no specific requirements
Army	Y	Same as DOD	
USACE	Y	Same as DOD, also RA-O	Required optimizations on existing FUDS remedial systems with annual O&M costs>$100,000
Navy	Y	All	Optimization across all remedial phases
Air Force	Y	All	Performance-based contracting (PBC) requires optimization approaches with major focus of achieving accelerated site completion
DOE	N	unknown	Anecdotal suggests some localized efforts
EPA	Y	All	Formal program, selected third party optimizations, also recognizes processes typically used by project team e.g. CSM, TRIAD, GR, as included in optimization

Conclusions

- Optimization is a mature effort (20 years) and fully integrated in the Superfund program across regions and project lifecycles
- We're acting on the findings: 64% of the recommendations at optimized projects are already implemented, in progress or planned
- Seeing benefits in five main areas: Remedy effectiveness, Cost reduction, Technical improvement, Site closure, Green remediation
- Going forward, we see continuing support and integration, as evidenced by Superfund Task Force Recommendation and the Superfund Remedial Action Framework

EPA Optimization Resources Available on EPA Web Page: www.cluin.org/optimization

- ***Remediation Optimization: Definition, Scope and Approach***
- **Optimization Review Guides**
  - » Investigation-Stage
  - » Design-Stage
  - » Remedy-Stage
  - » LTM-Stage
- **Site-specific reports**
- **Summary Reports on Implementation Progress**



Thank you!

www.cluin.org/srr

www.epa.gov/superfund

Kirby Biggs

biggs.kirby@epa.gov

703-823-3081