APPENDIX E. PUMP & TREAT OPTIMIZATION STATE SURVEY

Background

The Pump & Treat Optimization Team's State Survey was designed to gauge state agencies' degree of familiarity and working experience with Pump and Treat sites, helping the team identify any potential knowledge gaps and areas of focus within this document. 60 responses were gathered in total, ranging across 35 different states with varying degrees of experience and involvement with Pump & Treat systems.

General Information

The purpose of this survey is to collect and document state agency work and participation within Pump & Treat Systems. This survey will be foundational to the state technical and regulatory guidance products under development by providing insight into what key topics and questions should be addressed and emphasized in ITRC's forthcoming Pump & Treat Optimization document.

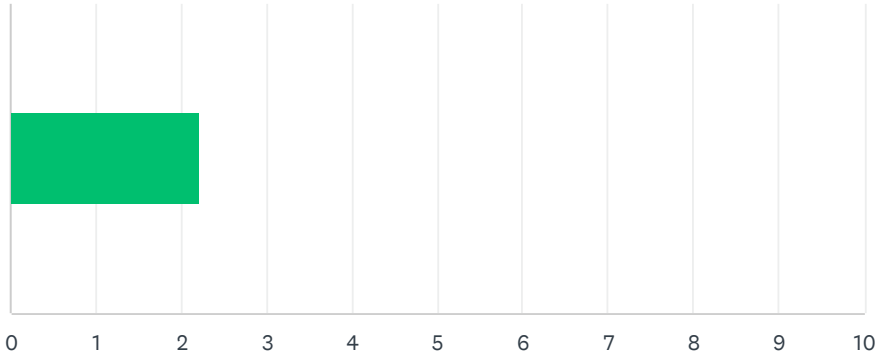
Q1 Please provide your contact information. (Mandatory Field)

Answered: 60 Skipped: 0

ANSWER CHOICES	RESPONSES	
Name:	100.00%	60
State:	100.00%	60
Agency:	98.33%	59
Email:	98.33%	59

Q2 What degree of experience do you have with optimization?

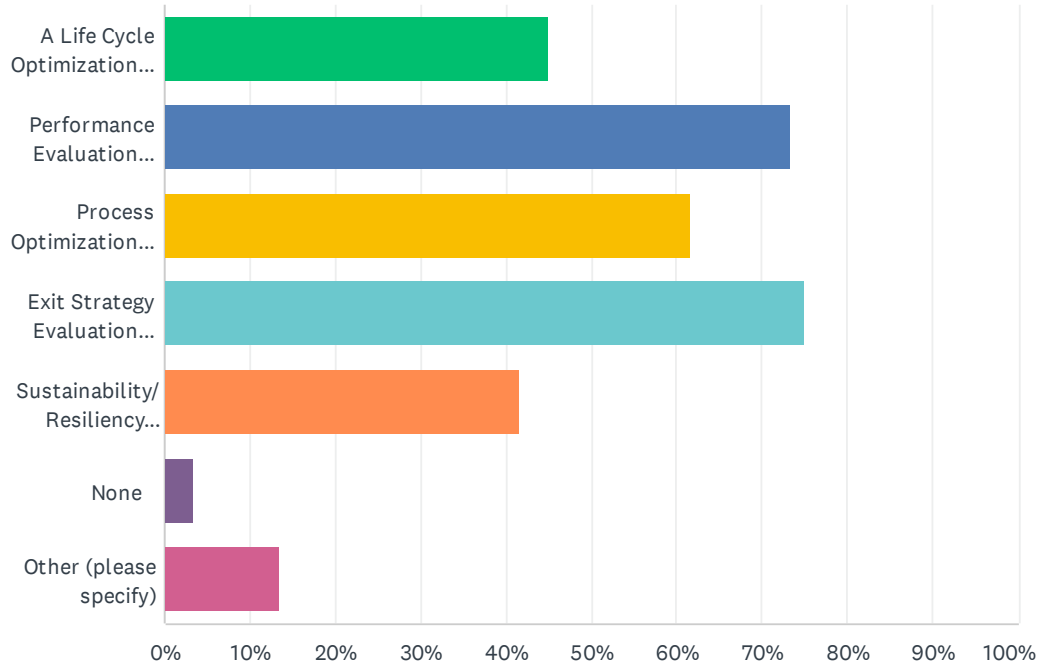
Answered: 58 Skipped: 2



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	2	129	58
Total Respondents: 58			

Q3 What is your agency's primary needs with Pump & Treat guidance? (Check all that apply)

Answered: 60 Skipped: 0

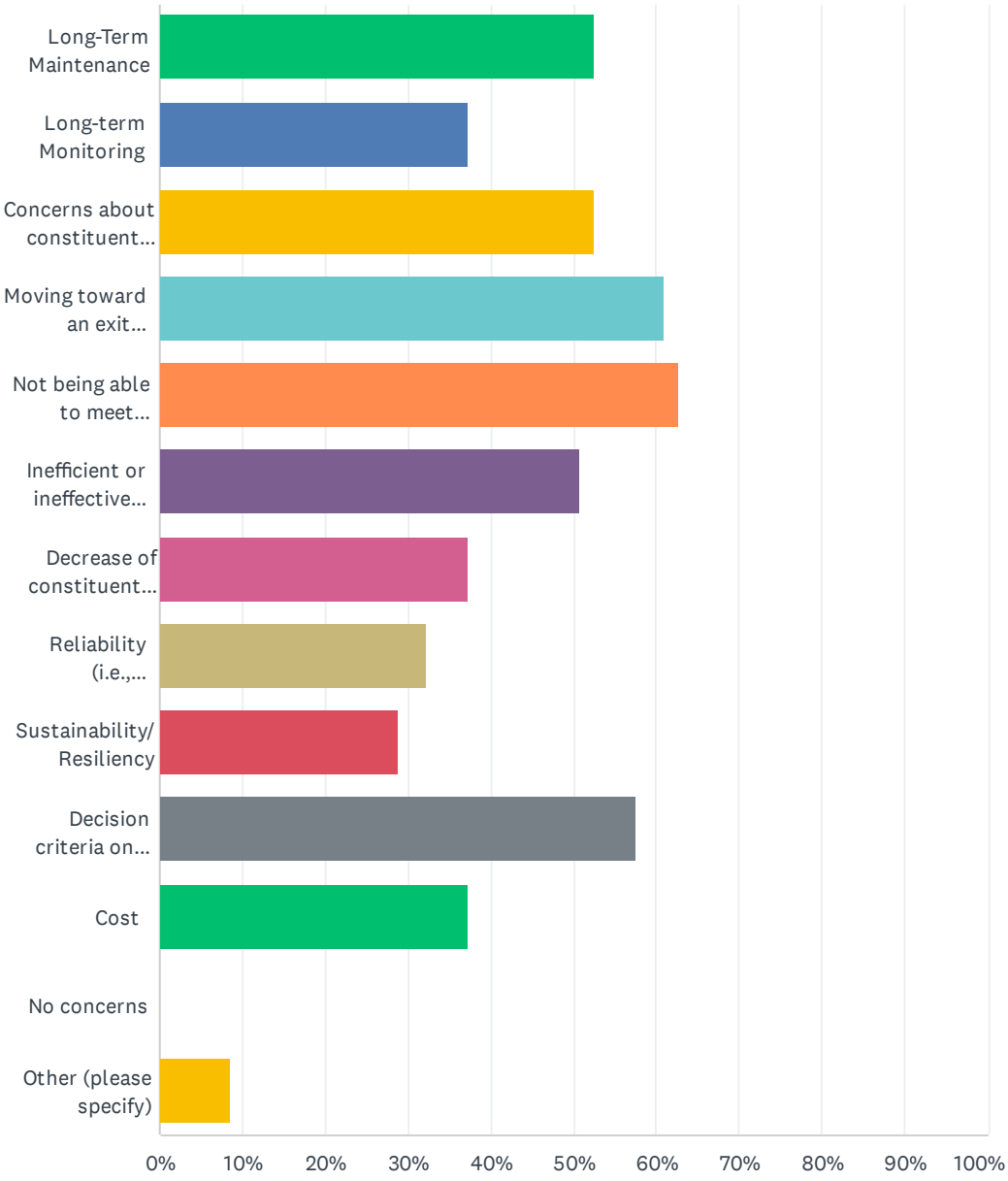


ANSWER CHOICES	RESPONSES	
A Life Cycle Optimization Framework	45.00%	27
Performance Evaluation Guidance	73.33%	44
Process Optimization Guidance	61.67%	37
Exit Strategy Evaluation Guidance	75.00%	45
Sustainability/Resiliency Recommendations and or Guidance	41.67%	25
None	3.33%	2
Other (please specify)	13.33%	8
Total Respondents: 60		

Other (please specify)
Modeling to estimate remediation timeframe at start and during the remediation life cycle.
System Design
All of the above sound helpful, but our agency is not currently regulating any pump & treat systems
Overcoming resistance of responsible parties to implement
Not sure
We do not use pump and treat (or any other remediation) as an agency since all work in our state is done by consultants
Designing a P&T system for source containment as part of a treatment train for the site's life
Have a privatized program (Licensed Environmental Professionals), so having guidance that we can point to would be our greatest need.

Q4 What are your primary issues/concerns with P&T systems? (Check all that apply)

Answered: 59 Skipped: 1

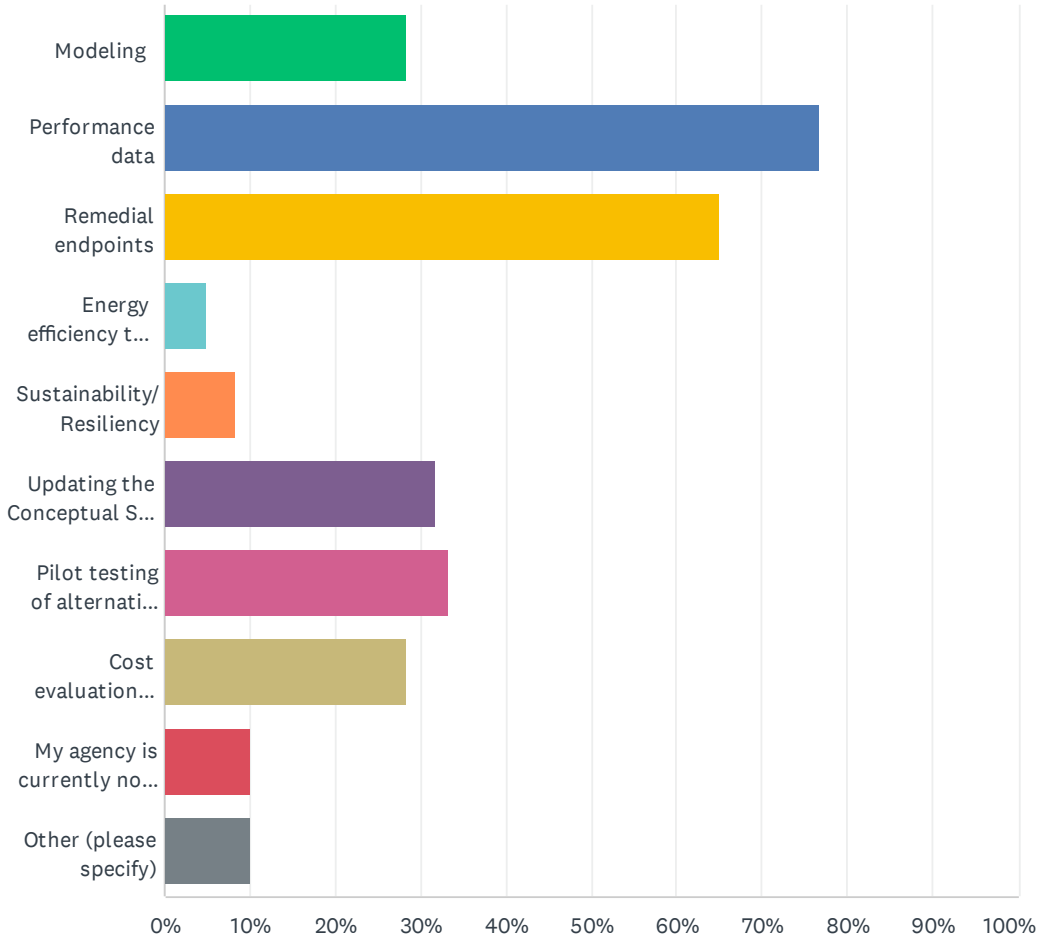


ANSWER CHOICES	RESPONSES	
Long-Term Maintenance	52.54%	31
Long-term Monitoring	37.29%	22
Concerns about constituent rebound, potential or experienced, after system shut down	52.54%	31
Moving toward an exit strategy	61.02%	36
Not being able to meet regulatory end points in a reasonable timeframe	62.71%	37
Inefficient or ineffective design	50.85%	30
Decrease of constituent recovery	37.29%	22
Reliability (i.e., biofouling, etc.)	32.20%	19
Sustainability/Resiliency	28.81%	17
Decision criteria on transitioning from Pump and Treat to a different remedy	57.63%	34
Cost	37.29%	22
No concerns	0.00%	0
Other (please specify)	8.47%	5
Total Respondents: 59		

Other (please specify)
Additional topics we suggest for the team: 1) low producing aquifers (other than in drought, as covered in point 4 of the P&T Annotated Outline), and systems in non-typical aquifers such as artesian systems. 2) Re: Point 3 of outline: Monitoring for groundwater contaminants downstream of extraction point. 3) RE: Point 3, Monitoring of the well network in between the extraction and re-injection points. 4) Point 3: Language regarding recirculation of treated water. 5) Point 4 & 7: Mention of the need for adaptability of treatment systems in response to emerging contaminants treatment technologies. 6) •Recirculation Vs. discharge of treated waters and appropriate permitting for discharge. 7) With regard to discharge of treated waters, some systems produce treated water that is not reused or re-injected but is just discharged. In this case, permitting is needed along with confirmatory sampling at regular intervals. In addition to acquiring the necessary permits, the sampling could require: sampling and analysis plans, quality assurance plans, laboratory procurement, data management and verification/validation of lab packages, and resources to accomplish the tasks.
The lack of a plan for transitioning to a different remedy/phase
Design, pump size selection, pump rates
cost vs. benefit decisions
P&T have a place in remediation, but they typically don't get sites to all RGs in a reasonable time frame

Q5 How is your agency currently evaluating your Pump & Treat System? (Check all that apply)

Answered: 60 Skipped: 0

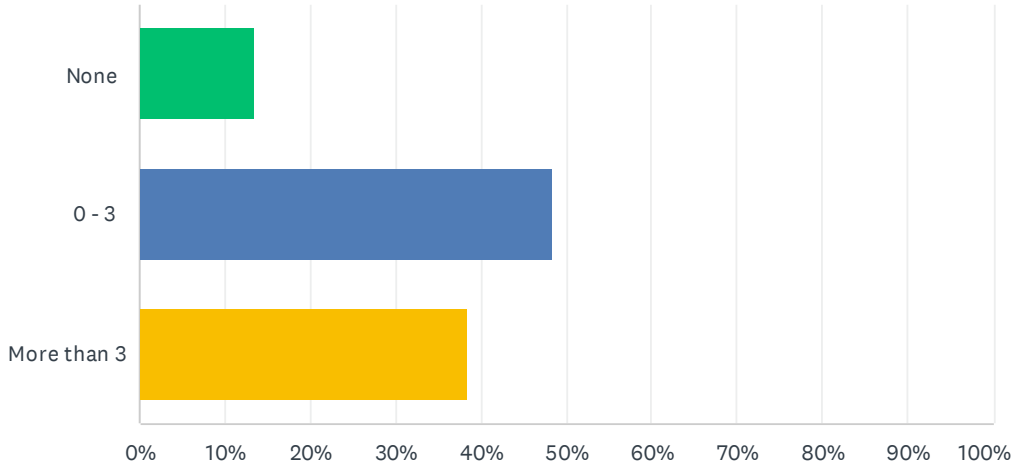


ANSWER CHOICES	RESPONSES	
Modeling	28.33%	17
Performance data	76.67%	46
Remedial endpoints	65.00%	39
Energy efficiency to reduce emissions/costs	5.00%	3
Sustainability/Resiliency	8.33%	5
Updating the Conceptual Site Model	31.67%	19
Pilot testing of alternative or enhanced remedy	33.33%	20
Cost evaluation (e.g. Dollars per gallon of water treated or constituent removed)	28.33%	17
My agency is currently not evaluating Pump & Treat systems	10.00%	6
Other (please specify)	10.00%	6
Total Respondents: 60		

Other (please specify)
I don't think I know enough of current events in typical remediation (solvents, petroleum) to answer this question. My current work is focused on NPDES discharges and not with what is highlighted on the fact sheet.
Note that there is variation between how our reclamation programs and Office of Environmental Remediation would answer this question.
Meeting our DERBCAP guidance standards.
not applicable - state regulatory agency
Not sure
We do not currently have any under state authority, though EPA does some.

Q6 How many active mechanical remedial systems do you have in process at any given time?

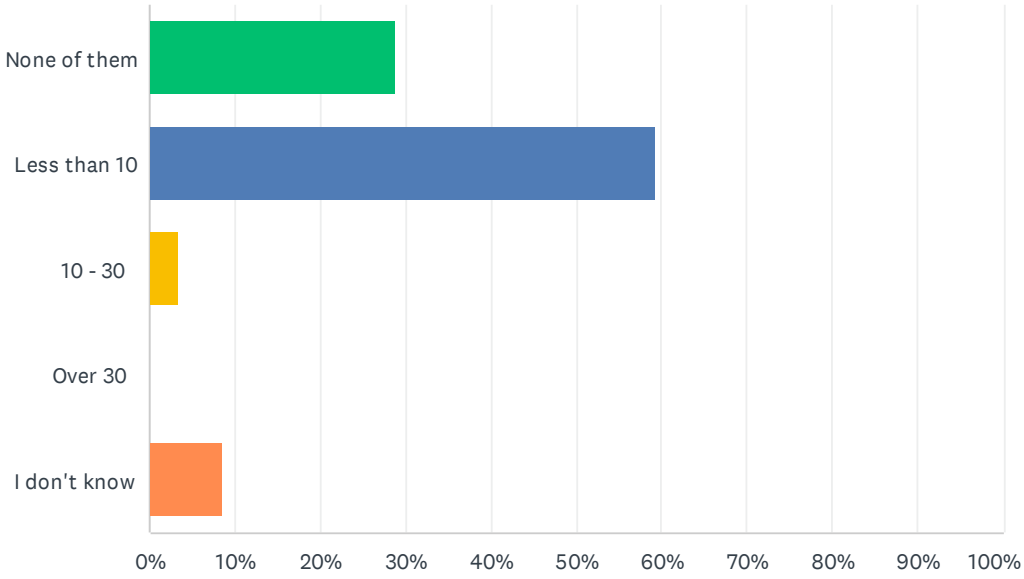
Answered: 60 Skipped: 0



ANSWER CHOICES	RESPONSES	
None	13.33%	8
0 - 3	48.33%	29
More than 3	38.33%	23
TOTAL		60

Q7 How many of your sites (your own personal sites, not program or agency), if any, have experience with optimization?

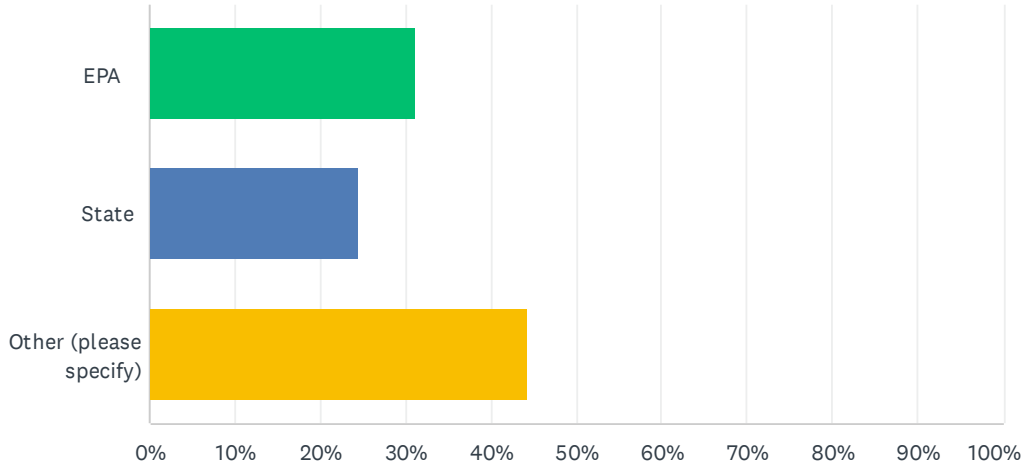
Answered: 59 Skipped: 1



ANSWER CHOICES	RESPONSES	
None of them	28.81%	17
Less than 10	59.32%	35
10 - 30	3.39%	2
Over 30	0.00%	0
I don't know	8.47%	5
TOTAL		59

Q8 If you have sites that have experience with optimization, was the optimization action conducted by EPA's optimization program or your state program?

Answered: 45 Skipped: 15



ANSWER CHOICES	RESPONSES	
EPA	31.11%	14
State	24.44%	11
Other (please specify)	44.44%	20
TOTAL		45

Other (please specify)
None
Responsible Party
N/A
PRP/USACE
both
Action conducted by Responsible Party with oversight from EPA and State.
RP Group
Responsible Parties and/or Work Settling Defendants
N/A
Consultant
Both
Responsible Party-Lead sites.
Personal Optimization Experience, as well as trial & error
Not sure
Both EPA and State
performed by qualified environmental professional
Not sure I understand the question, but a permitted facility and a facility under Consent Order Agreement conducted optimizations (if I understand optimization correctly) themselves
Facility (owner), with oversight by state
Optimization would be conducted by a Licensed Environmental Professional
Consultant

Q9 When did the optimization action occur?

Answered: 43 Skipped: 17

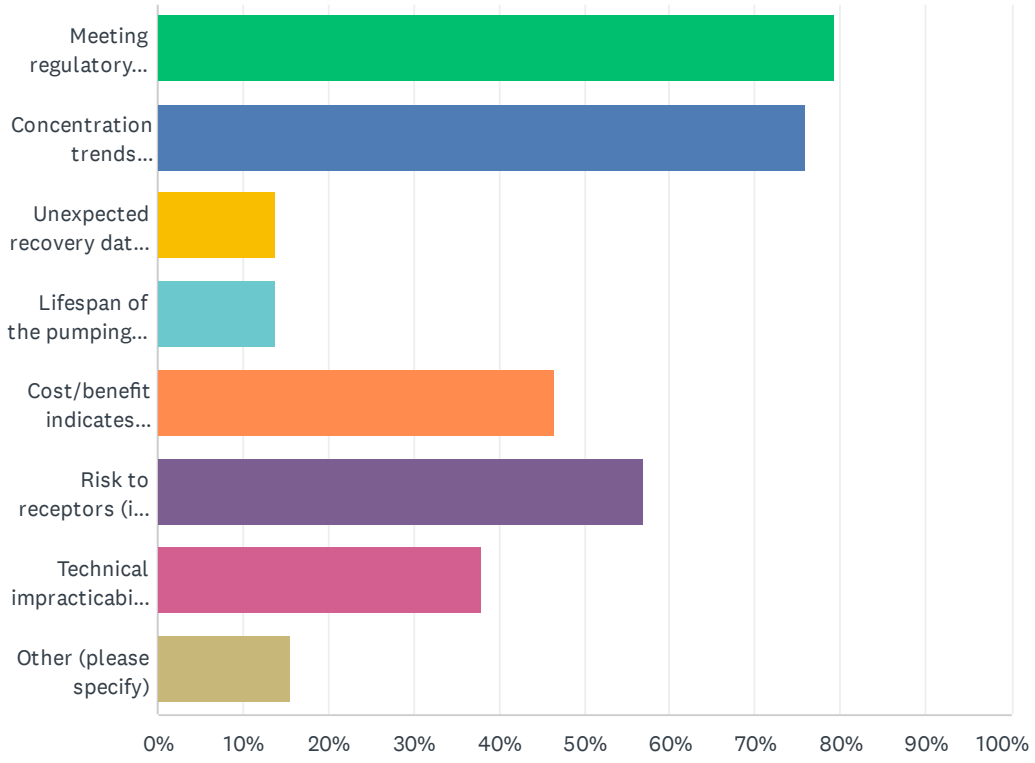
Open-Ended Response
For Superfund, after remedy implementation in response to issues with the remedy. The State will ask for an optimization review during LTRA (not after) if there are issues with the remedy
It took place near the beginning during pilot testing, and for one of my sites is about to become an annual evaluation criteria from a sustainability perspective.
Spring 2020
3 sites most recently in 2012
N/A
During the remedial phase of the project.
2017
2013-2014
Continuously, throughout the lifecycle of the project.
2010-2012
Last Year
2015 - 2017
2019
Began 2019 and is ongoing.
2016
2019/2020
N/A
2017
2008-2015
Many instances of optimization between ~1990 and present day
ongoing
Throughout the last 10 years
UNK
N/A
2020 - US Navy on an FFA site
It occurred during a remediation plan involving funding versus free product removal at a site.
System and site dependent. Usually 10 plus years
Two optimizations (two separate projects): From 2014 to 2015 & from 2017 to 2018.
~ 5 years ago
Site specific
Ongoing
Currently ongoing with a horizontal well P&T system
Not sure. I do not have any at sites I am involve with.
2019-2020
N/A
After the systems had been in operation for a period of time.
When P&T has obviously gone asymptotic
During cleanup
3 years ago
Within the last six months for both sites
Approximately 20 years ago, 2 facilities
Not sure - would not require Department Approval to optimize.
During active remediation period

Q10 How does your state approach the prospect of taking over P&T responsibility at Superfund sites after long-term response action is completed?

Open-Ended Response
The state starts working with EPA in the year prior to transfer of identity to a state contractor and have EPA and TCEQ project teams conduct joint field events to work on the transition. The state will ask for an optimization review during LTRA (not after) if there are issues with the remedy.
No examples of this scenario in Wyoming.
Other than cost share with EPA, our agency does not take over P&T responsibility.
WVDEP works to ensure that appropriate remedy alternatives have been evaluated and that data demonstrates the effectiveness of a P&T remedy. The state has a fund established by the legislation to pay for O&M responsibilities when the 10 year operation period is complete. The fund is insufficient to cover all projected O&M requirements to come, so WV will seek to have EPA perform optimization studies as early as possible at sites to help reduce cost when we take over.
With dread
Do not have experience with Superfund program.
Under the RCRA program.
To my knowledge, we don't have any P&T.
This is not ideal and the State does not, typically, do this.
typically contracting a consultant to manage the system
Seek alternate processes that minimize cost and meet remedial objectives/standards.
I don't work in Superfund
Move toward transitioning away from P&T as soon as possible.
unknown by me
Transition from P&T to MNA No change in plans; continue to operate P&T
N/A
Only work on PRP financed sites
With concern.
UST Division does not manage Superfund sites.
differs at each site
Evaluate for end point Remedial goals, timeframe to reach goals, COC's recovery %, consistently evaluate for P&T shutdown for alt method treatment
State Superfund Contract with EPA
UNK
unsure
At that time, it's usually time for an optimization or at least upgrading the system. It's a very expensive take over.
Until action levels are within 100 ppm.
Generally we try to complete a Remedial System Optimization before taking over system
This depends on whether there is appropriate financial assurance available.
Upfront communication with EPA on O&M costs and lifecycle analysis, as well as State availability to meet cost share and O&M responsibilities.
N/A (RP-Lead sites)
I'm not in the Superfund Branch. I'll have to follow-up on this one.
Not sure. There are so many units within our agency who deal with hazardous waste remediation. Our unit is only one of them.
With great anxiety....
I don't know
Work with EPA on this issue.
With trepidation
It's regulated by DEC staff in consultation with qualified environmental professionals
Systems for Acid mine drainage will brankrupt the state and we cannot transition to state takeover. The state is looking for more remedial technologies that clean up quicker with less need for constant attention from operators.
I have no experience with this
Facility/owner is responsible until P&T or other active remediation is complete. Financial assurance mechanisms guarantee that P&T will continue in the event that the state assumes responsibility.
Not Applicable (has not occurred)

Q11 What criteria is used by your agency to determine if your project is approaching an exit window to complete the remedy or transition to a new remedial approach? (Check all that apply)

Answered: 58 Skipped: 2

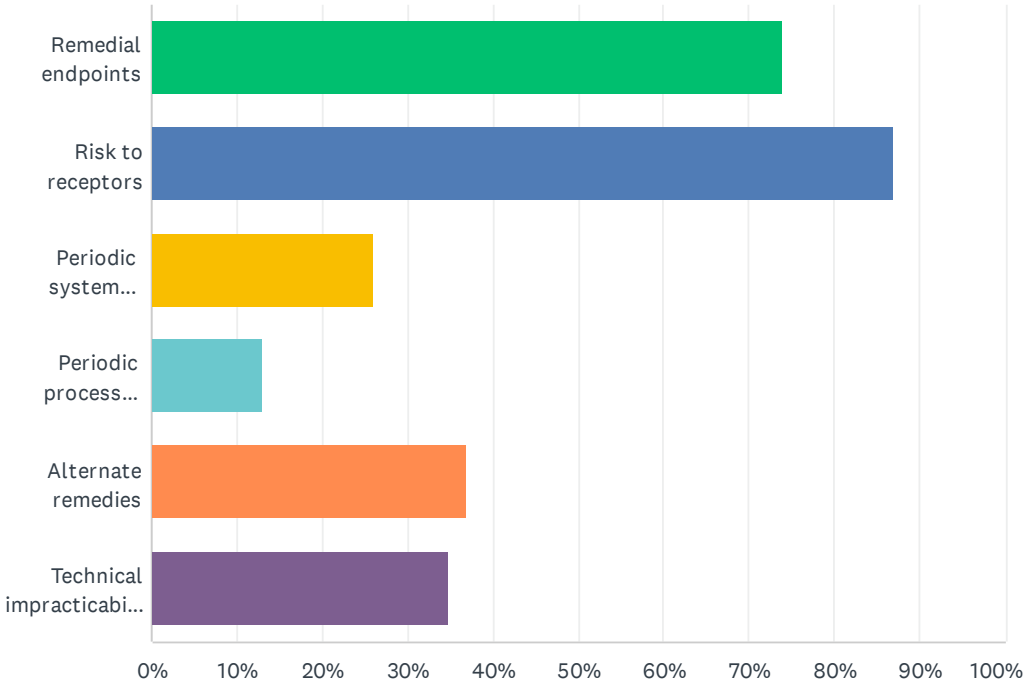


ANSWER CHOICES	RESPONSES	
Meeting regulatory endpoints	79.31%	46
Concentration trends (asymptotic recovery, etc.)	75.86%	44
Unexpected recovery data (volume, concentrations, etc.)	13.79%	8
Lifespan of the pumping system	13.79%	8
Cost/benefit indicates remaining contamination can be addressed by MNA	46.55%	27
Risk to receptors (i.e. lack of receptors or additional receptors)	56.90%	33
Technical impracticability of meeting endpoints	37.93%	22
Other (please specify)	15.52%	9
Total Respondents: 58		

Other (please specify)
If an RP makes the case to transition to an alternative remedy, we would evaluate it and make a determination whether the agency agrees to an alternative remedy. In the case where we do agree, we have the flexibility to modify existing Remedial Decisions at voluntary cleanup sites.
No specific guidance or criteria that is used state wide, just site specifically in part noted above with the selections tagged.
Meeting site specefic target levels.
Legacy corrective action sites which approved P&T only for hydraulic control without objectives to meet regulatory endpoints in a reasonable time frame must now consider transition to a new remedial approach.
Public exposure to groundwater contamination is significantly reduced (institutional controls, AULs, etc.))
To my knowledge none of our site managers currently have any pump & treat projects
Still learning/evaluating this
Not sure
After system shut down groundwater is monitored and if concentrations exceed one half of the regulatory standard then action is take which can range from increasing the frequency of monitoring to reactivating pump and treat system.

Q12 Does your state have regulations for any of the following concepts that apply to Pump and Treat Systems? (Check all that apply)

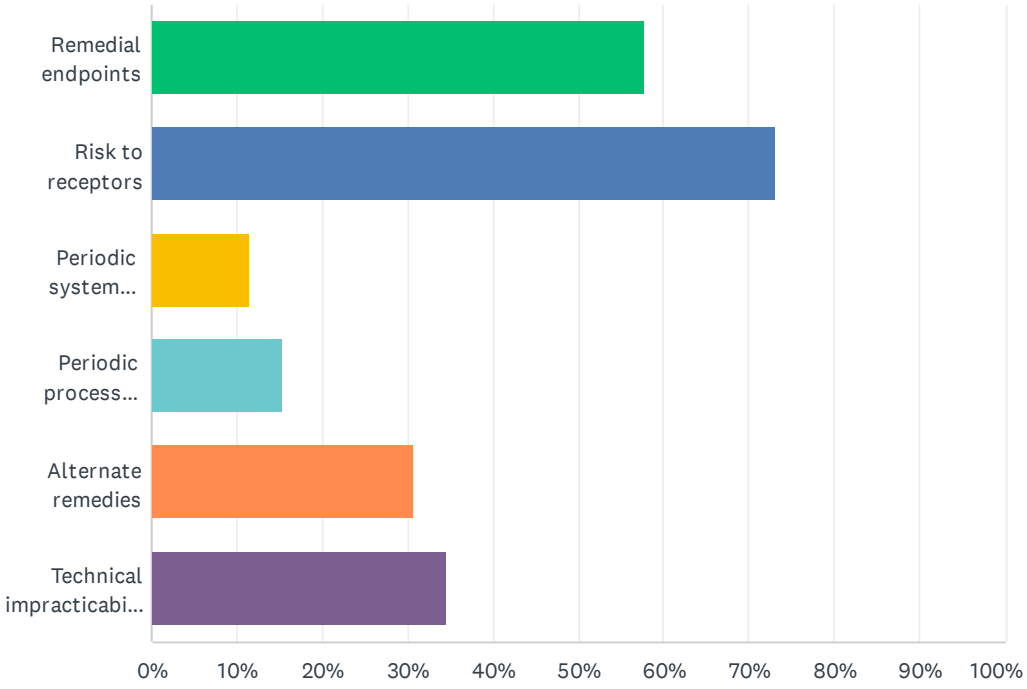
Answered: 46 Skipped: 14



ANSWER CHOICES	RESPONSES	
Remedial endpoints	73.91%	34
Risk to receptors	86.96%	40
Periodic system evaluations	26.09%	12
Periodic process optimization	13.04%	6
Alternate remedies	36.96%	17
Technical impracticability	34.78%	16
Total Respondents: 46		

Q13 Does your state have guidance materials for any of the following concepts that apply to Pump and Treat Systems ? (Check all that apply)

Answered: 26 Skipped: 34



ANSWER CHOICES	RESPONSES	
Remedial endpoints	57.69%	15
Risk to receptors	73.08%	19
Periodic system evaluations	11.54%	3
Periodic process optimization	15.38%	4
Alternate remedies	30.77%	8
Technical impracticability	34.62%	9
Total Respondents: 26		