Contracts, Regulations, and Decisions: Striking a Balance – Are We Solving the Problem(s) or Just Playing the Game?

Investigate

Remediate

Operate

Get to Closure?

David Herwig, PMP, Mindy Vanderford, PhD, Douglas Sutton, PE, LEED<sup>AP</sup>
Ground rules and objectives

**Ground Rules:**

• Work within the inherent framework of the CERCLA process
• Provide remedies that protect human health and environment

**Objectives:**

• Identify problems; design pragmatic solutions; construct/operator facilities
• Effect sound remediation at reasonable cost
• Improve processes to implement better solutions at lower cost
• Reduce time to attain project remedial goals
• Focus on elements we can impact/control
The Current Paradigm

• Contracts detail **scope** (what is to be done), **schedule** (how long it will take), and **budget** (how much it will cost)

• Regulations define the end goal(s) and limits on pathways

• Decisions are based on best available information by those involved at any given moment in time; not always well documented or communicated

• Processes are regimented – PA/SI, RI/FS, RD, RA, LTRA/LTM

• Multiple stakeholders bring varying interests and objectives

• The **Process** constrains adapting to unforeseen/changed conditions

• Multiple, overlapping layers of bureaucracy impact timely decisions

• PDTs scramble when the 5-Year Reviews come due
So, what’s the problem?

- Contract frameworks often limit flexibility
- Current system(s) may not be well suited to address future needs
- Decisions have been/are made to satisfy short-term needs
- Lack of communication and data management prevents smooth, informed transitions and retaining institutional knowledge
- Limited to technology choices based on available historic data and associated assumptions
- Technical transfer of lessons learned is limited to the activities of a few Government Agencies and conferences
- History will continue to repeat itself
Risk Factors

• Remedy performance – how well will it work
• Cost control – what is it going to cost – today, and tomorrow
• Regulatory – is it demonstrably protective of human health and the environment
• Staff continuity – changes in regulator, client, and stakeholder personnel
• Contract transitions – new contractor(s) starting from scratch
• Design – Under- or over-designed (assumptions)
• Construction – not party to history; build to the specs
• LTRA – historic assumptions become operational realities, challenges, and limitations
Risk Area – RD, RA, and LTRA

• Uncertainties include location of contaminant mass; amount of the mass; scale of the problem
• Risks include selecting/building the wrong/inappropriate technology; wrong location; wrong size

Solutions

• Use new data to update the CSM; compare remedy to expected results; manage, share, communicate, and maintain data effectively
• Encourage participation – use the CSM as a management tool
• Manage data gaps to identify areas of uncertainty
• Document decision logic and assumptions so future contractors understand how you got to where you are
Risk Area – Economics

• Uncertainties include appropriateness of design and design parameters; estimate of operation duration; sensitivity to energy costs; estimated time to closure

• Risks include cost of remedy re-design; scope changes; schedule delays; materials and energy cost; long-term operations

Solutions

• Data gaps – must have access to historical data to identify data gaps that could affect the remedy; close data gaps pre-construction

• Decision logic – determine courses of action (and consequences) for various outcomes ahead of time

• Diverse team – consider alternate technologies as part of the backup plan
Risk Area – Regulatory

• Risks and uncertainties include emerging contaminants; changes to the regulatory environment; changes to cleanup goals; changes in regulator personnel

Solutions

• Use the CSM and decision logic to consider the consequences on design(s) if emerging contaminants are later identified

• Diverse team – consider the potential for emerging contaminants to be present and address them in the design
Risk Area – Environmental

• Risks and uncertainties include weather and climate extremes (rainfall and temperature); geological stability (seismic activity, bank stability); changes in nearby supply wells pumping (changing site conditions)

Solutions

• Continually incorporate new data; update and use the CSM as a management tool

• Diverse team – consider new technologies and new perspectives given the revised CSM
Optimization Strategies

• Engage the PDT to focus on the “vision to closure”
• Consider “change management” when deciding on contract type
• Update, review, and refer to the CSM on a regular basis
• Identify and resolve data gaps and sources of uncertainties
• Improve data management and information flow from SI through LTRA
• Encourage participation and allow dissenting opinions
• Develop a culture of Optimization (top-down and bottom-up)
• Outline decision logic and assumptions to better inform future contractors and stakeholders
• Encourage team diversity, third-party perspectives, and new ideas
Project Example 1

• Based on investigation assumptions and resulting data, a GWTP and EW network was constructed to treat VOCs in GW

• Assumptions in PA/Sl, RI/FS, and RD led to system over-design and less-than-optimal placement of EWs
  • GWTP included metals removal systems – but no iron in GW
  • EWs not ideally situated to capture/contain the contaminant plume

• Decision logic and assumptions not brought forward; LTRA contractor left to “justify” system performance issues

• Result – mothball/bypass treatment system components; continually chase the contaminant plume
Project Example 2

- During GWTP construction, the contractor questioned historic removal actions
- Lack of documentation of the removal activities
- PM Rule 1 – If it’s not in writing, it doesn’t exist.
- Field sampling identified contaminated soils in the construction area
- Changed condition to excavate XX,000 tons contaminated soils required additional funding, additional field crews, and modified sequencing of GWTP construction
- PM Rule 5 – Don’t be afraid to ask questions
- PM Rule 21 – Don’t believe everything everyone tells you
Project Example 3

- Chlorinated solvent plume near public supply wells
- SVE/AS and Pump-and-Treat remedies were selected and implemented 10 years later …
  - Ongoing source with significant plume mass remains
  - Insufficient monitoring network to evaluate remedy performance
  - Changes in supply well pumping have altered the plume configuration
  - Changes in land ownership restricts/limits access
  - Potential receptors are still present
  - Additional technologies were attempted but without adequate planning or performance monitoring
  - Poor document and data maintenance results in little documentation of updates to the CSM, especially important given changing site conditions
Project Example 4

• ROD required flushing As-contaminated source soils, expected to take 43 years, combined with pump-and-treat of the underlying GW plume

• Contractor pitched an innovative technology to treat source soils – EPA accepted the innovative approach and documented via ESD

• Contractor conducted treatability studies (30% RD) and third-party peer review (50% RD) to prove/disprove the technology

• System was designed and constructed in 2 years; operated 4 years, treated 400,000 tons of source soils and sediments, and saved $75M

• PDT’s willingness to think “outside the box”, embrace an alternate innovative approach, and communicate effectively led to project success
How do we change the paradigm?

• PM Rule 17 – Change is the only constant – plan for it
  • Expect and accept the project Team will change
  • Expect and accept site conditions will change
  • Expect and accept the need for “Plan B”

• Be willing to look and think outside of the box; incorporate flexibility when possible

• Continually ask “What’s our plan to closure?”

• Seek additional technical perspectives and don’t rely on a one lead-environmental professional to make multi-million dollar, multi-decade remedy decisions in a vacuum

• Capture, document, and manage data effectively
How do we change the paradigm?

• Convey the project “Vision” to all participants
• Document, distribute, and use lessons learned for process improvement
• Do away with “fear of the known and/or unknown”
• Streamline bureaucratic processes to facilitate timely decisions
• Obtain needed/relevant information in a timely and cost-effective manner to support timely decision making
• Don’t be afraid to ask questions
• Encourage dissenting opinions
At the end of the day, you don’t want to be like Fry …

• “Why did I listen to THAT guy?”
• “I can’t believe I didn’t see THAT coming.”
• “Where the heck is ALL my data?”
• “How was I supposed to know THAT?”
• “Why didn’t I get another opinion 10 years and $15M ago?”
PM Rule 6 – Our job is to apply yesterday’s experiences to today’s issues and solve tomorrow’s problems.