

Applying Lean to optimize site reviews for project strategy alignment and sustainable remedial approaches

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Agenda

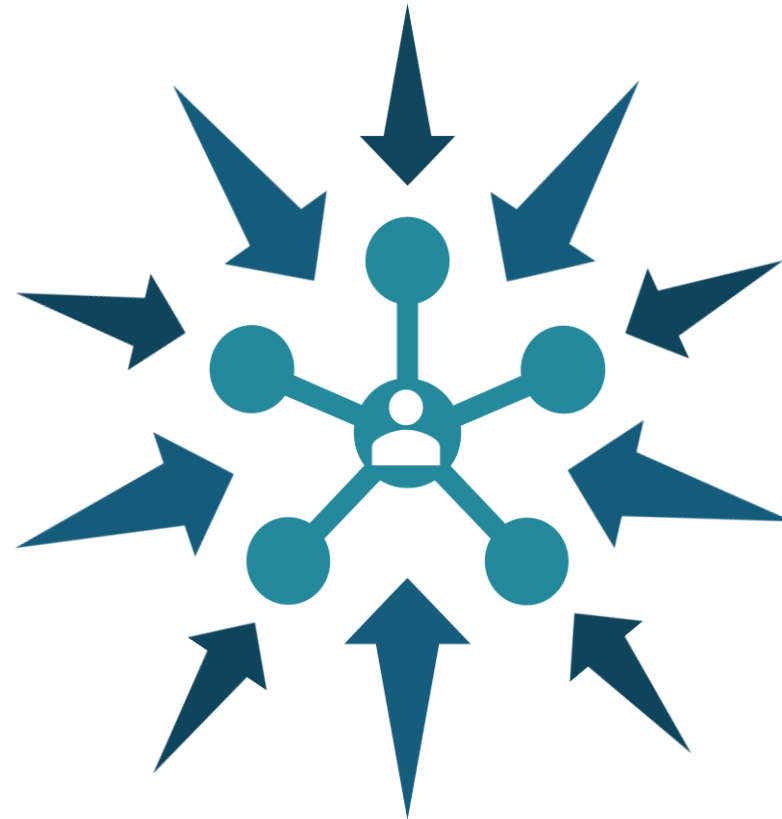
- 1 Traditional peer reviews
- 2 Challenge
- 3 Desired outcomes
- 4 Improved approach
- 5 Project examples & results



Introduction – Peer reviews

Peer reviews are routinely conducted across our industry for a variety of reasons


- Strategy identification/review
- Milestone achievement or project shift
- Technical optimization
- Spend optimization
- Acquisitions/divestitures



Traditional peer reviews

Typical features	Associated problems
Purpose and goals of the review are not shared	<ul style="list-style-type: none">• Lack of shared understanding• Seen as punitive by consultant – “we must be doing something wrong”
Review is conducted by a 3 rd party <ul style="list-style-type: none">• 3rd party reviewer given a ‘library’ to review & write a report on findings• 3rd party reviewer has limited time to present their findings	<ul style="list-style-type: none">• 3rd party only has partial information• No engagement with client and consultant - done in a bubble• Turns into a marketing exercise
Findings are documented in a traditional “thick” report	<ul style="list-style-type: none">• No clarity on outcome• Minimal improvement to site management & strategy after a cursory review• Metrics not tracked post-review

Traditional peer reviews

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Review <ul style="list-style-type: none"> 3rd re 3rd pr 	<div style="background-color: #00968f; color: white; padding: 20px; border-radius: 15px; display: flex; justify-content: space-between; align-items: center;"> <div> <h2>Outcomes of traditional reviews often ‘die on the vine’</h2> </div> <div>  </div> </div>
Findings are documented in a traditional “thick” report	<ul style="list-style-type: none"> No clarity on outcome Minimal improvement to site management & strategy after a cursory review Metrics not tracked post-review

Challenge

- 2013: major acquisition led to 2-3x increase in environmental reserves
 - Non-remediation activities (e.g., PM)
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 - Technically appropriate remediation measures implemented
 - Financially responsible implementation of remedies

Today: One H&A client's Lean journey to improve their peer review program

Challenge

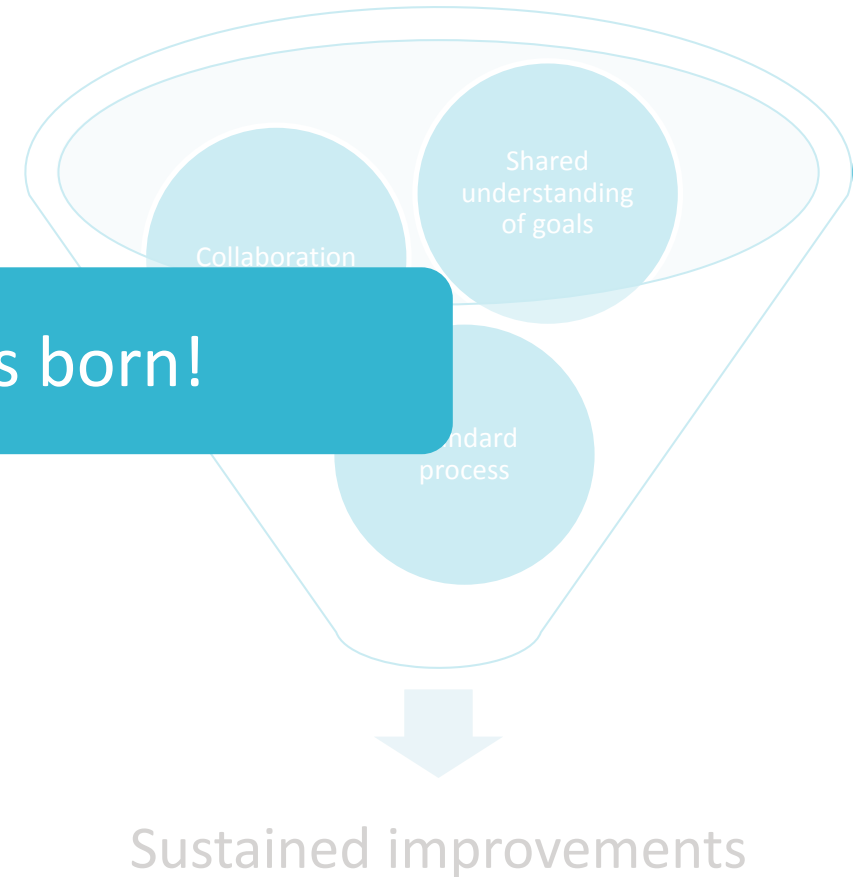
- 2013: major acquisition led to 2-3x increase in environmental reserves
 - New sites, new consultants, new PMs
- Management wanted to establish internal program to ensure large sites/reserves managed effectively
 - Technically appropriate remediation measures implemented
 - Financially responsible implementation of remedies



Desired outcomes of improved program

- Collaborative team approach
 - Harness team institutional knowledge
 - Ensure inclusion of subject matter experts (SMEs)
 - Improve
- Systematic site selection
- Standard approach & tools
- Site spend/effort/time aligned with site risk

The “Gatekeeper” program was born!



Why a Lean-based approach?

- Alignment with customer values and goals
- Collaboration
- Standardized processes
- Simple, visual documentation

Examples of other challenges addressed using Lean principles and approach

Reserves mgmt, tracking & reporting

Standardize financial management & documents

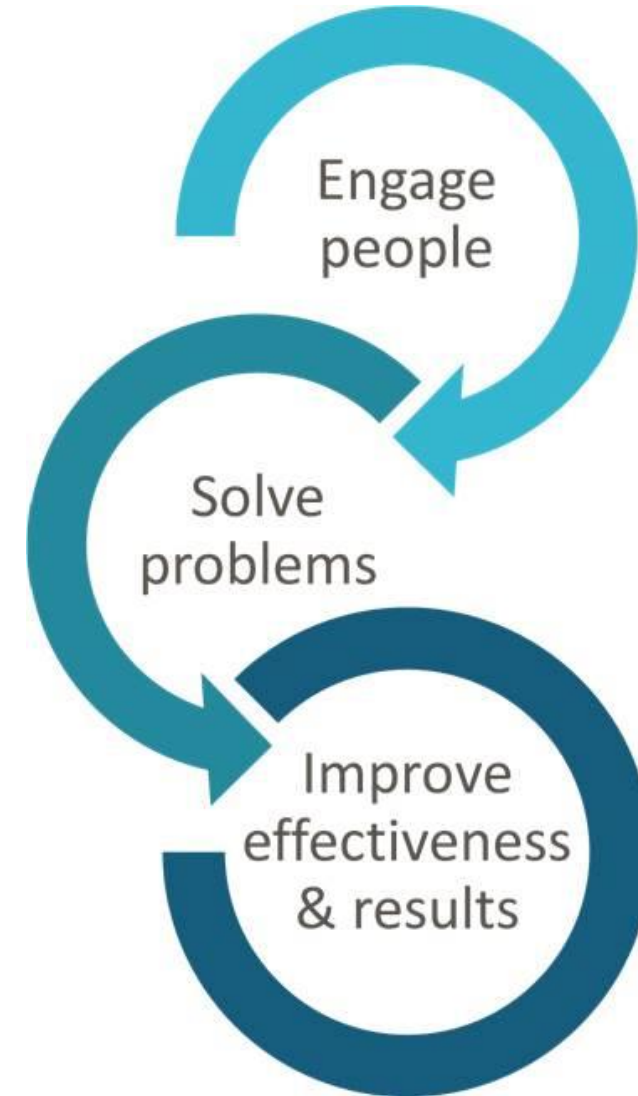
Spill response & remedial planning

Remedial system O&M optimization

Site closure strategies

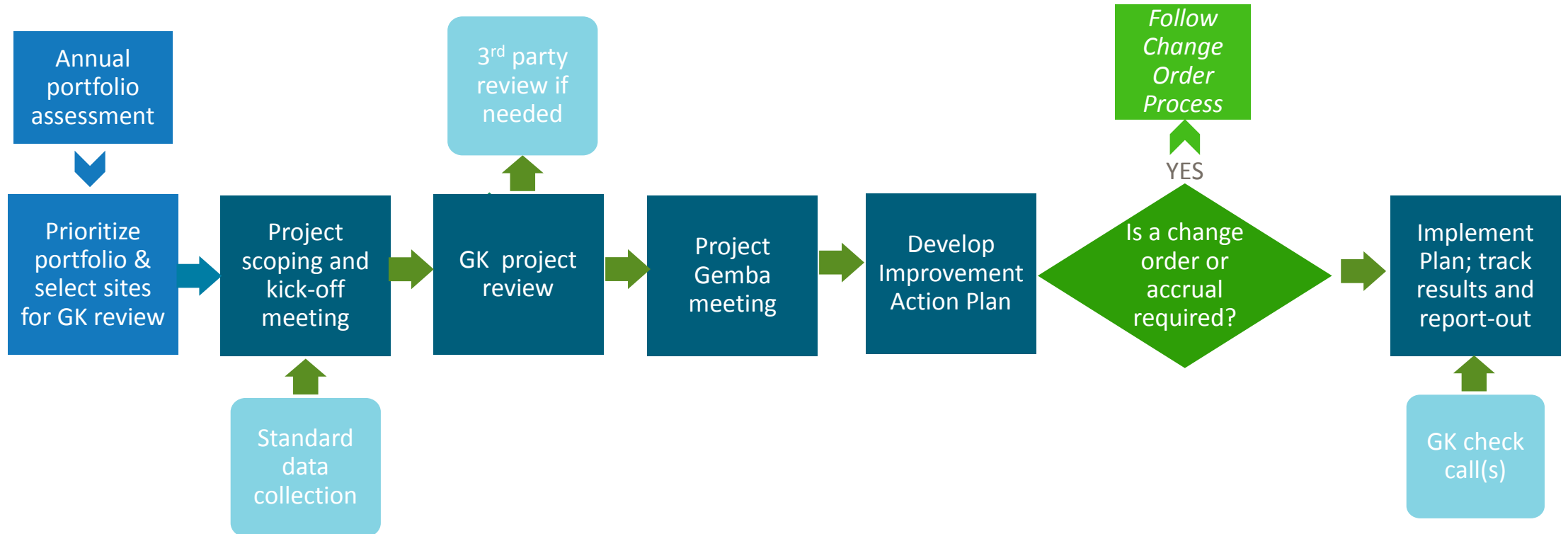
What is Lean?

Increases **Value**
Reduces **Waste**
Respects **People**



An improved approach – standard process

GATEKEEPER PROGRAM



An improved approach – team collaboration

- Client Project Manager
- ‘Gatekeeper’
- Project consultant team
 - Field, OM&M staff (imperative)
 - Technical leads
 - Consultant PM
- Lean facilitator
- 3rd party subject matter experts (if needed)



An improved approach

1. Project Scoping via Improvement Profile:

- Identify goals and objectives of Gatekeeper review
- Identify challenges/data gaps
- Key considerations (risk, logistics, etc.)
- Identify review team

Team Name: Example		Improvement Profile		HALEY ALDRICH	
Date: 7/27/16					
<p>Event Description: This site has recently been transitioned to new management (C-PM & T-PM) and there have been recent site condition changes. The team needs to complete a deep dive to understand together what needs to be done to complete the site CSM. This work will include identifying the # of data gaps (currently unknown) and get the right questions asked to identify challenges and ideas and to begin to make, and communicate in an A3, strategic decisions to meet long term site remediation goals.</p>		<p>Workshop Dates, Time and Location:</p> <p>Aug 15 & 16 – AK (Full day Mon, 2/3 day Tues)</p>			
<p>Current Situation and Problems:</p> <div style="display: flex; justify-content: space-between;"> <div style="background-color: #e0f0e0; padding: 5px;"> <p>Contributing Forces (supporting goals):</p> <ul style="list-style-type: none"> • Former consultant participating (wealth of background knowledge and good database of information (historical, logs, etc.)) • interaction with Terminal staff is good (due to recent storm drain work) mgr – is supportive, flexible and knowledgeable • Reasonable regulator – expecting us to stay on top of storm drain • Not in a reactive state – we have time to collect the data we need to understand the site. • New ideas at the table – good timing to step back together and readjust. </div> <div style="background-color: #ffe0e0; padding: 5px;"> <p>Restricting Forces (impeding goals):</p> <ul style="list-style-type: none"> • No comprehensive CSM (data exists in different places) • Spatial limitations (active site) • Don't know who owns (portions of) the property • Limited field season (May to Oct – typically) • GAP: Benzene getting through sparge system (either missed tip of the plume or it's going through?) • NPDS issues from drain (we think we've resolved that – but need monitoring time this summer) • Nearby sources (military base upgradient); Horizon adjacent – don't want us on the property • Data gaps exist but are not holistically understood (not a lot done previously at site) • Conduits under tank farm – limit activity, create flow paths • Unknown competence of sewer system (but had an engineer contribute to design) • Sparge System and point design potentially insufficient (clay is a restricting factor re: point depth) </div> </div>		<p>Objectives and Desired Outcomes (Including Specific Targets):</p> <p>The team will flesh out the overall strategy for the site and an implementation plan to get there with a goal of identifying data gaps in our Gatekeeper meeting and addressing them in the 2017 field season in order to be able to complete the site CSM and then make strategic remedial decisions in Winter 2017/2018. (GK support again once ready to shift into remedy selection (Fall 2017).)</p> <p>Develop an A3 plan for the next steps at the site and the long term plan.</p> <p>Confirm, flesh out and prioritize data gap focus areas to work on – may include:</p> <ul style="list-style-type: none"> • Complicated flow paths – vertical gaps – where benzene coming from • Downgradient gaps due to Horizon access limitations • Funky flow paths – sheet flow over clay <p>Go to gemba – see sparge system (~10 feet deep, 10-12 ft spacing), storm drain configuration, lay of the land (~2 hours – including tour w/Dave – terminal manager).</p> <p>Develop a better understanding of how to prevent off-site impacts for long term management of plume. (Dissolved phase migration control is current long term plan. Long term goal is to identify the most effective, efficient remedial approach to prevent off-site migration.)</p> <p>Help the team see that all options are on the table with respect to remedial approach.</p>			
<p>Site Info:</p> <ul style="list-style-type: none"> • Small, active terminal located in active Port (historic spills around train track) • Clay with fill on top – clay has a lot of preferential pathways ("funnels") due to infrastructure. • Historical Impacts. Shallow gw. Free phase in 1 well. • Storm drain recently re-routed – monitoring impacts (prelim – looks below levels). Potential new wells to include in SAP. Potential future changes to storm drains w/whole site re-route. 					
<p>Customers and Other Stakeholders – What do they Value?</p> <p>Tesoro-PM) – solid SCM, smart long term strategy, maintaining good regulatory and terminal relationships</p> <p>Terminal Mgr – communication, operations uninterrupted</p> <p>Regulator – stay on top of the storm sewer, ensure nothing gets worse</p> <p>Consultant – understand what Kyle wants, good plan moving forward</p> <p>Stakeholders: neighbors? TSO Corp?</p>					
<p>• Customers: People, groups or organizations that pay for and/or dictate what services are needed</p> <p>• Stakeholders: People, groups or organizations and all customers that have an interest or role in quality, pace or cost of services</p>				<p>People:</p> <p>Gatekeeper, co-facilitator</p> <p>H&A – facilitator</p> <p>Tesoro-PM)</p> <p>Former Consultant</p> <p>Current Consultant Team</p>	
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Example Improvement Profile (a common Lean tool)

An improved approach

2. Full team kick-off
 - Intro to program and purpose
3. Standard data collection (by consultants) & Gatekeeper review
 - Standard docs: Conceptual Site Model (CSM), recent reports

Business Plan Trigger Event Description (see attachments for detailed information):	Activity on-site driven by potential for impacts to downgradient municipal wells and potentially commercial properties. Risk rating high due to pervasive product in soil/gw on and off-site and bc site under clean-up and abatement order w/high oversight fees. Activity justified to remain within abatement order and potential for well impacts, to keep major plume stable/shrinking and managed.
Planned Site Actions / Accrual Strategy: (summarized by lifecycle - mark complete if lifecycle completed or NA if not applicable/inestimable for a site)	921 - 924 - complete 925 - 4 current systems in operation (O2 injection on southern Target property - conversion to Fenton's recently completed; Model 4 Flame-Ox unit on-site; trailer-mounted Vapor Extract/Prod Recovery system) Planned system install: Expand VE system to incorporate 17 new wells/conveyance network to connect to Model 2/Model 4. Model 2 Flame-Ox to be installed to increase vapor treatment capacity by 2-fold. Air sparge proposed re-start/expansion of existing system once Model 2 Flame-Ox. 926 - active remediation expected to take 15 years - MNA expected for several years after that
Gatekeeper Review and Status: Required? Y/N <u>Yes</u> Current Status: <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved <i>See Gatekeeper Report for Current Action Items/Recommendations and Due Dates.</i>	
Back-Up Documents Attached (as applicable/available):	
<input type="checkbox"/> Standard C.O. Template (for accrual mgmt.) <input checked="" type="checkbox"/> SST Input Ratings <input type="checkbox"/> OREs <input type="checkbox"/> EFW (for reserve mgmt. or OBL request) <input type="checkbox"/> Gatekeeper Report <input checked="" type="checkbox"/> Monte Carlo <input checked="" type="checkbox"/> Workplans <input checked="" type="checkbox"/> Third Party Review <input checked="" type="checkbox"/> TERRA Reports and Defender <input checked="" type="checkbox"/> Quarterly Reports <input checked="" type="checkbox"/> CSM <input checked="" type="checkbox"/> Other	
CAO & Pwpt presentation from recent project reviews; consider call with T-PM & C-PM for tech review	

Standard GK Document Request

An improved approach

4. 'Gemba' Meeting - 1.5 days, on-site

DAY 1

- "Gatekeeper" team on site
- Gatekeeper review goals
- Assess what is going well and where challenges lie
- Site Gemba walk

DAY 2

- Assess data gaps/problems/ideas
- Brainstorm and prioritize improvements
- Develop improvement action plan

General Gemba Meeting Agenda

An improved approach

5. Gatekeeper follow-up

- Team call ~1 month after Gatekeeper review
- Review Improvement Action Plan
 - Ensure all improvements are on track; adjust where needed
- Track metrics for report out to management & customers on results
 - Standard format (shown in results)

Item #	Description of Problem or Condition to be Improved	Improvement Action	Accountable Person	Responsible Person (s)	Due Date	% Complete
1	property boundary & ownership / lease information not known	Figure this out - reach out to adjacent property owners	AP	RP	9/1/2016	100%
2	XX wells not in program & current survey is based on old data	Re-survey and add XX wells to program	AP	RP	9/15/2016	85%
3	- Potential source areas at east end of terminal - Rack impacts - nature & extent unknown	- Historic data review - Develop work plan to fill gaps - Borehole colloidal scope	AP	RP	12/10/2016	25%
4	Limited options to investigate & fill CSM data gaps	<u>CSM To Do:</u> 1. Complete a thorough review of existing data 2. Develop/amend site cross-sections E to W, N to S (3 D model) 3. Identify existing data gaps (use flux measure where possible when AS sys down (see #3 & #5)) 4. Prep a work plan to complete data gaps and to support a remedial alternatives evaluation & implement (2017 Field Season) 5. Complete a remedial alternatives evaluation based on the complete data set (cost/benefit) 6. Select a preferred alternative (2017/2018)	AP	RP	12/10/2016 (through step 3) Step 4 - for 2017 field season Step 5 & 6 - Fall/Winter 2017/2018	15%
5	We don't know if Air Sparge is the "right" remediation technology	<u>Complete the following:</u> - Pilot test AS shut off for 6-12 months - Link flux measure data w/AS shut down - Measure DO across area & create contour map - Collect MNA data including Bio traps & geochem data <u>AS System Shut Down Plan:</u> 1. Evaluate GW qual & MNA/bio data (for baseline) 2. Turn off AS to see steady state conditions 3. Monitor GW monthly (spring/fall) 5. At least 1 round of MNA/bio w/GW to show shut down state 4. 6 or 12 month AS pilot monitoring report (possible 6 month extension if system off shows no impact) 5. Final AS report with O&M recommendations	AP	RP	Work Plan 2/2016 Implement Shut Down 5/2017-11/2017 or 5/2018	20%

Improvement Action Plan (partial)

Project examples & results

7 significant data gaps identified & action plan developed

Reduce 1 FTE via optimized product management

\$5M - \$7M – cost avoidance via improved municipal well contingency plan

Optimized groundwater monitoring program – ROI within 3 years

Additional time and cost savings (2 years; ~ \$4M) from improved remedial plan for dissolved phase



“Force Field Analyses” – to understand the “whole system”



Observations of remedial system O&M

Project examples & results

Identified old culvert with suspect integrity under ASTs

Reduction of 1 lifecycle year via optimized remedial actions \$120K

Elimination of planned remedial system expansion \$500K

Shutdown of active system due to diminishing returns

Additional cost savings from optimization of vapor control system



Development of an improvement action plan



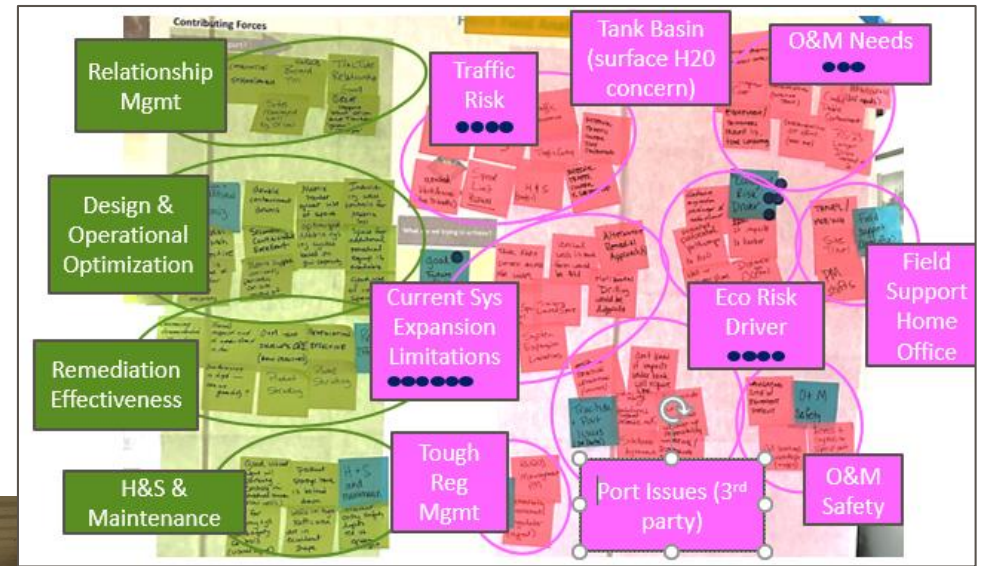
Gemba Walk to understand the site

Project examples & results

Purchase vs. rental of remedial system will result in cost savings in thousands/year

Despite strong eye for safety, opportunities to improve safety measures

Remedial strategy to achieve closure by 2022

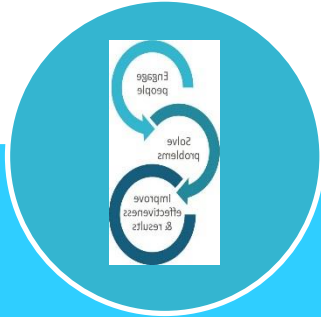


Lean based assessment of site activity



Observations of remedial system O&M

Conclusions



Lean-based approaches to peer reviews improve project and team performance



Investment in effort more than pays off – both in short & long term



Project team collaboration is critical to support strategic thinking AND provide sustainable results



Contact us!

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