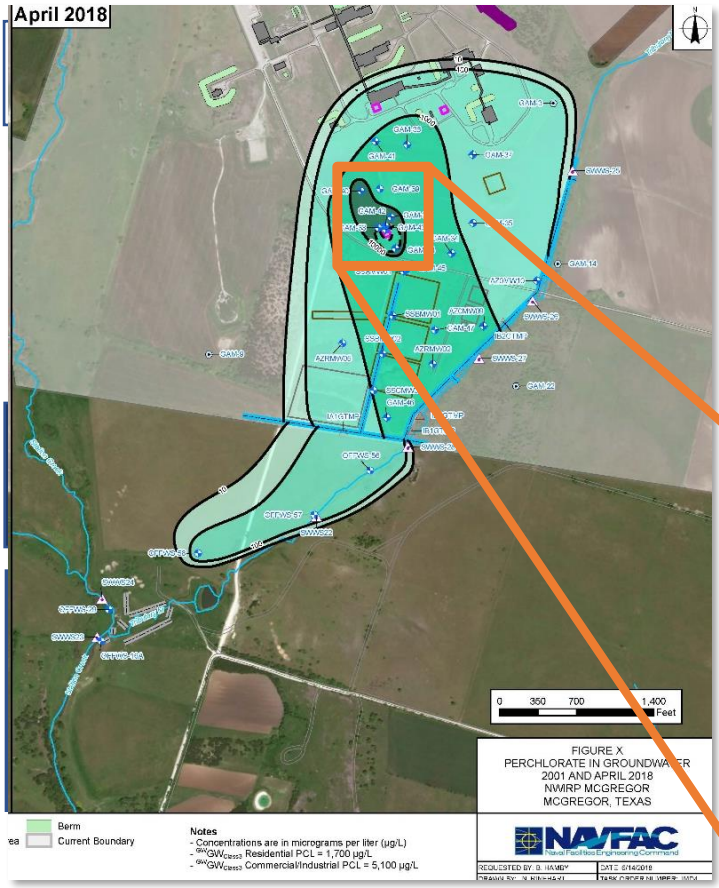
P&T Transition to ISB

Former Naval Weapons Industrial Reserve Plant (NWIRP) McGregor – Area M
McGregor, Texas
Perchlorate Plume
Transition start – 2017
RCRA Program

P&T objective to minimize off-site migration of perchlorate.



Focused treatment on remaining perchlorate hot spot

Source: NAVFAC 2017

Performance evaluation summary: Starting in 2002, the P&T system included extraction trenches and an aboveground fluidized bed reactor to remove perchlorate. Treated groundwater was discharged to a permitted outfall. Initially, the treatment system lacked automation resulting in a high level of operator attention and high cost. In 2004-05, performance optimization resulted in the addition of automation to reduce cost and improve reliability. Starting in 2017, operation of the P&T system was discontinued to allow for a monitoring study to evaluate perchlorate concentrations in downgradient surface water. The study demonstrated that perchlorate levels decreased to point where it was determined that hydraulic containment was no longer required to contain the plume and that in situ bio-barriers could achieve migration control.

Lines of evidence used to support transition:
1. Reduction in plume footprint (e.g., spatial footprint analysis, time series plots)
2. Perchlorate source reduction efforts successful (soil treatment)
3. Natural attenuation shown to be effective in controlling plume down-gradient of collection trenches
4. Pilot test demonstrated that in situ bio-barriers are effective for treatment of remaining perchlorate
5. Groundwater reclassified for non-potable use, resulting in higher cleanup standard

In late 2016, Navy requested Texas Commission on Environmental Quality (TCEQ) to allow suspension of P&T operations to allow for transition assessment to an in situ remedy. Following a successful study of downgradient surface water quality, Navy completed a remedial alternatives evaluation in 2019 and selected in situ bio-barriers to treat and contain the remaining perchlorate hot spot.

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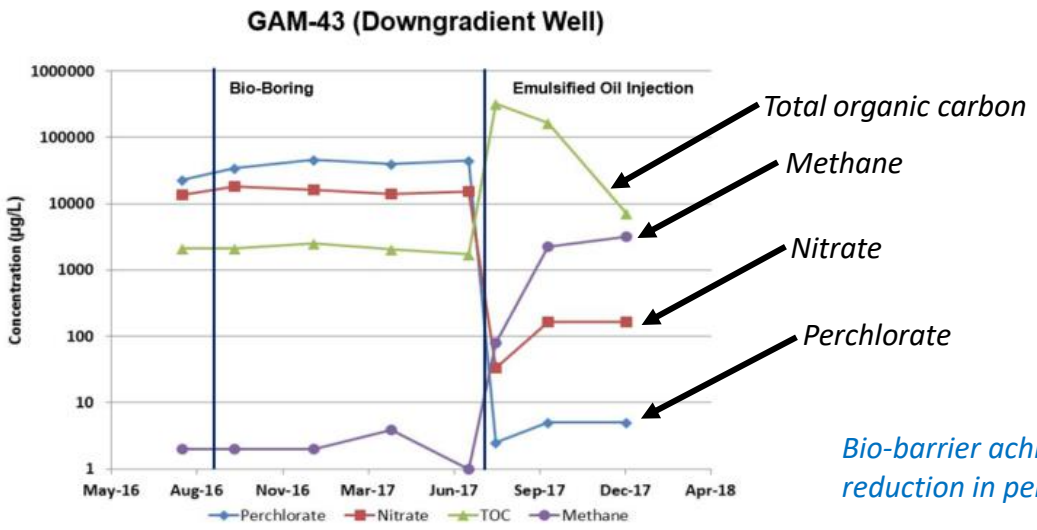
Initial Condition
Optimization Review
Outcome

Fluidized bed reactor used for biological treatment of perchlorate (NAVFAC 2017)

P&T optimization and transition made in a phased manner:

- Optimized P&T system to reduce operating cost and improve system performance and reliability (enhanced automation with telemetry, variable speed pumps, etc.)
- Implemented perchlorate source reduction efforts successful (soil treatment)
- Documented reduction in plume footprint over time using spatial footprint analysis, time series plots
- Applied plume management zone with deed restrictions for areas exceeding state regulatory levels and obtained groundwater re-classification based on low aquifer specific yield
- Demonstrated that natural attenuation is effective for controlling downgradient plume (considered interactions and ecological risk at groundwater/surface water interface)
- Demonstrated bio-barrier is effective for treatment or remaining perchlorate hot spot
- Plan to permanently decommission pump and treat system and transition to in situ bio-barrier system.



Bio-barrier achieved rapid reduction in perchlorate

Source: NAVFAC SE 2017

TCEQ allowed the Navy to discontinue P&T operations in late 2016/2017 and to conduct a surface water study and transition assessment to evaluate options to replace hydraulic containment with a passive, in situ remediation technology. In 2019, Navy completed a Remedial Alternatives Evaluation and selected in situ bio-barrier as to treat the remaining perchlorate hot spot.

P&T Transition Conclusion:
Transition from P&T to bio-barriers reduces annual O&M cost, energy consumption & greenhouse gas emissions and improves long-term resilience thereby reducing risk. Transition began in 2017.