

P&T Optimization

DOD Installation 2
Type of Site: DOD Landfill
1999–2018
Regulatory Framework:
CERCLA

P&T Objectives: TCE, DCE,
VC to MCLS




Risk Scenario—Protection of
supply wells in deep aquifer
off site

Past disposal to a landfill has generated the contaminant plume. Source treatment has included in-situ thermal remediation and bioremediation in addition to P&T. Three separate P&T systems use air stripping for treatment. Treated water is discharged to either recharge galleries or is used for HVAC at various buildings. There is no off-gas treatment from the air strippers. One system is meant to contain discharge from the source, another system is meant to contain the shallow plume at the installation boundary, and the third system addresses contamination in the deeper aquifer.

The DOD requested evaluation of the co-metabolic and abiotic attenuation of the chlorinated compounds and a treatment targeting the source rather than downgradient to reduce contaminant discharge.

Lines of evidence used to support the changes:

1. Questions raised regarding capture of the discharge from the source area and the discharge to recharge galleries near the source.
2. There were electrical and biofouling issues for the shallow extraction system at the boundary. There was a potential for loss of plume capture on one end of this system.
3. Wells used for cooling water at a nearby building may affect capture of the shallow plume by drawing the plume laterally. Contaminant concentrations remain above the cleanup goals downgradient of the shallow extraction system beyond the installation boundary, likely due to low groundwater velocities in this area.
4. Air discharge from the air stripper used to treat the deeper aquifer may result in unacceptable inhalation risk, but the discharge vent on the air stripper had an odd configuration. There were also some motor failures.
5. There is some question about a few piezometric measurements that determine groundwater flow direction in the deeper aquifer, and these would affect the verification of capture.

 Initial Condition
 Optimization Review
 Outcome

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Optimization Recommendations:

- Conduct additional sampling of two surface water bodies to assess exposure risks.
- Increase certainty of capture through strategic treated water injection near the shallow boundary extraction system.
- Verify select piezometric measurements for the deeper aquifer and reassess the adequacy of capture.
- Reconfigure air stripper discharge for the air stripper for the deeper aquifer system to allow better atmospheric mixing to reduce risks to nearby residents.
- Reconsider contract labor costs based on high degree of automation at the systems.
- Update calibration of site groundwater model.
- Improvements to the systems to include variable-frequency drive controls for pumps, upgrade electrical system, add surge tanks for the shallow aquifer boundary system, and implement well rehabilitation at select wells.
- Intercept shallow plume prior to discharge through gaps in the underlying aquitard to speed restoration of the deeper plume.
- Add extraction wells near the source area to improve capture of contaminant discharge.

P&T Actions Conclusion

P&T system optimized for risk reduction and energy efficiency.

Remedy effectiveness and/or risk reduction improvement: Targeting the source rather than allowing the plume to spread reduces the necessary capture zone and reduces potential exposure pathways.

Current plume dimensions are 12,000 feet long in the upper aquifer, 15,000 feet long in the deeper aquifer, and 200 feet thick)

General Conclusions/Observations: Optimization identified new potential exposure pathways, reduced exposures associated with air stripper discharge, and evaluated the efficiency of pumps, wells, and electrical system for the installed P&T system.