



Post Active Remediation Monitoring (PARM), No Further Action Proposal (NFAP), Pilot Tests and Remedial Action Plans (RAPs)

James Treadwell

Division of Waste Management/Petroleum Restoration Program
Florida Department of Environmental Protection
Tallahassee, Florida | April 15-17, 2025



Post Active Remediation Monitoring (PARM)

PARM, NFAP, Pilot Tests, RAPs



POST ACTIVE REMEDIATION MONITORING

Underground Injection Control (UIC)

- Before beginning PARM, ensure that active remediation is no longer occurring.
- While this is simple for a mechanical system, chemical injections are not as straightforward.
- After injections are completed, the injected material may be active for some time.
- Do baseline sampling before injections and monitor UIC parameters for return to Cleanup Target Levels (CTLs) or baseline levels.



POST ACTIVE REMEDIATION MONITORING

Review Historical Data

- Before beginning PARM, review data for soil contamination that needs to be resolved, and for Monitoring Wells and parameters that need to be resampled.
- Be sure to look at historical records for exceedances that may not be in recent tables, especially for contaminants like lead, Ethylene Dibromide (EDB), etc.
- It is not recommended to wait until the end of PARM or Well Abandonment to do data review.



POST ACTIVE REMEDIATION MONITORING

Review Historical Data

- To be considered valid, lab samples must meet the appropriate CTL or approved Practical Quantitation Limit (PQL).
- For example, a soil sample yielding 0.05 U mg/kg (non-detect) for benzene is inconclusive and cannot be used without resolution, because the Soil Cleanup Target Level (SCTL) for benzene is 0.007 mg/kg.



POST ACTIVE REMEDIATION MONITORING

Confirmation Sampling

- Historical soil contamination must be resolved and documented.
- Contaminated soil may have been excavated.
- Replacement soil borings may be required. Soil sampling may include Synthetic Precipitation Leaching Procedure (SPLP) and/or Total Recoverable Petroleum Hydrocarbon (TRPH) speciation.



POST ACTIVE REMEDIATION MONITORING

Confirmation Sampling

- Replacement soil borings must take into account the location and depth of previous contamination and consider Organic Vapor Analyzer (OVA) readings as applicable.
- Replacement borings are usually taken at the same location and depth as the previous samples.
- Other locations may be necessary on a site-specific basis.



POST ACTIVE REMEDIATION MONITORING

Confirmation Sampling

- Some professional judgement or lines of evidence may be required, especially if previous locations are inaccessible.
- Communicate with DEP to assure agreement with the judgement or lines of evidence.
- If contamination cannot be resolved, conditional closure may be the only option.



POST ACTIVE REMEDIATION MONITORING

Groundwater Sampling

- Chapter 62-780, Florida Administrative Code (F.A.C.), generally requires a minimum of four quarters of PARM groundwater sampling, with the last two quarters meeting No Further Action (NFA) criteria in **representative** locations, including following excavations.
- For **interim** source removals, at least two sampling events meeting NFA criteria are required.
- If groundwater contamination did not exist prior to remediation, a minimum of one groundwater sampling event is required.



NO FURTHER ACTION PROPOSAL (NFAP)

PARM, NFAP, PILOT TESTS, RAPS



NO FURTHER ACTION PROPOSAL

Requirements

- A recommendation for NFA must include how NFA criteria are met for all media, including groundwater and soil leachability and direct exposure, with all applicable tables and maps.
- The NFA or No Further Action with Conditions (NFAC) proposal must be sealed by a Florida registered professional.



NO FURTHER ACTION PROPOSAL

Requirements

- For conditional closure, the NFA package must include soil and groundwater plume maps.
- The groundwater plume must be demonstrated to be stable or shrinking with at least one year of monitoring.
- Soil contamination may require an Engineering Control (EC), such as two feet of clean soil or an impervious surface to prevent rainwater infiltration.
- Site maps should show contaminant plumes in relation to the restricted areas, and groundwater plumes typically require an exclusion buffer.



NO FURTHER ACTION PROPOSAL

Unsaturated Zone

- Per DEP guidance for closure decisions, the depth to water at the final sampling event will generally define the unsaturated zone.
- Soil above the water table at this time must meet SCTLs. Please include depth to water tables in the closure review package.
- Neither smear zone nor capillary fringe appear in Chapter 62-780, F.A.C. so exercise caution when discussing these in closure decisions.



PILOT TESTS

PARM, NFAP, PILOT TESTS, RAPS



PILOT TESTS

Pilot Test Guidance — Bureau of Petroleum Storage Systems (BPSS) 12

- Guidance is located under “Remediation Guidance” link on Petroleum Restoration Program (PRP) website.
- Pilot tests are used to determine design parameters for the Remedial Action Plan (RAP).



PILOT TESTS

Pilot Test Guidance – BPSS 12

- Scaled site diagrams are required.
- Figures include “horizontal and vertical delineation of the plumes for each impacted medium and any other pertinent features”.
- Figures include location of test wells, such as air sparge wells, vapor extraction wells and observation wells.



PILOT TESTS

Pilot Test Guidance – BPSS 12

- Pilot test wells should be in the area(s) of highest contamination levels.
- Multiple test wells in different locations or depths could be appropriate, depending on lithology and contamination extent.
- Pilot test wells should be used in the full-scale design.



PILOT TESTS

Pilot Test Guidance — BPSS 12

- Pilot test plans must include a monitoring plan for parameters to determine effectiveness and radius of influence.
- Specifications for pilot test equipment, such as the air sparge compressor, are required.
- Off-gas treatment design may be required.



PILOT TESTS

Chemical Injection Pilot Test — BPSS 10

- Pilot tests may be performed for chemical injection.
- In addition to pilot test guidelines, injections must follow Underground Injection Control (UIC) guidance.
- A formal UIC order is required for a chemical injection pilot test.
- Sampling for UIC parameters is required, including baseline.



REMEDIAL ACTION PLANS (RAP)

PARM, NFAP, PILOT TESTS, RAPS



REMEDIAL ACTION PLANS

Initiate Remedial Action Plans (RAPs)

- Move from Natural Attenuation Monitoring to remediation where contamination is accessible.
- Note receptors and hindrances and notify/discuss with DEP, such as schools, surface water bodies, etc.



REMEDIAL ACTION PLANS

Remedial Action Plan (RAP) Scopes

- Must be scoped for all contaminated media.
- Plans must address all applicable petroleum contaminants, including lead/metals.
- Designs must be appropriate for the type of closure desired or achievable.
- Remediation to an endpoint must be addressed, even if the cost is > the bid threshold.



REMEDIAL ACTION PLANS

Remedial Action Plans (RAPs) and UIC

- Include Underground Injection Control parameters and active remediation monitoring parameters for injections.
- Monitor these parameters for return to standards or background.
- Exceedances of these parameters will typically result in conditional closure.



REMEDIAL ACTION PLANS

Remedial Action Plans (RAPs) and Site Development

- It may be possible to coordinate remediation with site construction.
- Excavations may be timed in conjunction with building demolition.
- Well installation and trenching may be done before resurfacing.
- These cases could be exceptions to designs for complete remediation, taking advantage of site accessibility.



THANK YOU

James Treadwell

Division of Waste Management/Petroleum
Restoration Program
Florida Department of Environmental Protection

Contact Information:

850-245-8862

James.Treadwell@FloridaDEP.gov