November 2020 Remediation Cost Guidelines Appendix

November 18, 2020

The Underground Storage Tank Cleanup Fund (Fund) has completed this Remediation Cost Guidelines Appendix to the Fund Cost Guidelines to include generalized remediation costs. The goals of this Appendix are to allow the Fund to:

- provide claimants and consultants with a starting reference point for remediation costs,
- help claimants and consultants identify when additional justifications are necessary,
- identify remediation costs that fall within typical boundaries for ideal conditions for streamlined approval,
- identify remediation costs that need a more detailed review,
- increase review capacity,
- reimburse remediation costs without delays, and
- encourage efficient remedial corrective action implementation.

The Fund Cost Guidelines is a guideline only, it does not establish reimbursement limits for listed items and activities, or guarantee reimbursement of any specific amounts. Costs are evaluated for reimbursement based on specific site conditions for each claim. The goals of this Appendix are NOT to:

- establish remediation cost thresholds which cannot be exceeded,
- deny reasonable remediation costs, and/or
- delay payments while additional justification is sought.

Costs in the Remediation Cost Guidelines Appendix were developed by a team of Fund Water Resource Control Engineers and Engineering Geologists using the following:

- remediation technology and phase parameters found in the California Leaking Underground Fuel Tank Guidance Manual (September 2012 LUFT Manual-Updated December 2015),
- decades of collective experience reviewing remediation costs statewide,
- years of historical and recent experience assessing and remediating sites in the field,
- comments received from Fund stakeholders, and
- Remedial Action Cost Engineering Requirements (RACER) System - A computer-based tool for preparing cost estimates for environmental remediation. RACER provides location-specific estimates based on annually updated multi-agency pricing data and is suited for estimating full life-cycle costs for Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act hazardous waste sites. RACER was modified for use on petroleum UST sites.

Fund staff will continue to carefully consider parameters and costs, including those not contained in or that fall outside of the Fund Cost Guidelines, in determining the eligibility

of costs for reimbursement. These parameters include but are not limited to unforeseen or challenging site conditions, regional specific water quality objectives, era of lifecycle regulatory requirements, regional billing rates, unplanned delays, and health and safety considerations.

Claimants are encouraged to submit justifications for costs that fall outside of these guidelines for Fund consideration. Such justifications will aid the Fund in making cost eligibility determinations more efficiently.

November 2020 Remediation Cost Guidelines			
Remediation Technology & Phase	**Costs**		**Parameters**
Excavation			
Prepare CAP	Low	$7,000	The CAP would typically include the following: -Assessment of contamination in soil and groundwater -Current CSM -Remedial action cleanup goals -FS evaluation/screening -Selection of remedy -Identify life-cycle expectations for remedial action schedule and objectives Note: Pilot test costs are not included
	Medium	$10,000	
	High	$14,000	
Prepare RAP	Low	$8,000	The RAP would typically include the following: -Selected remedial technology -Basis of design -Remedial action schedule and objectives -Implementation schedule -Excavation layout -Grading and erosion control -Stormwater pollution prevention -Soil transport and disposal -Traffic control -Air monitoring and dust control -Confirmation sampling -Backfill compaction and geotechnical requirements
	Medium	$11,000	
	High	$15,000	
Design drawings/specifications	Low	$8,000	< 100 tons of soil; minimal design drawings required by local agencies. Assumes shoring or dewatering is not required.
	Medium	$11,000	>100 tons < 1,000 tons of soil; moderate design drawings required by local agencies. Assumes shoring or dewatering is not required.
	High	$15,000	>1,000 tons < 3,500 tons of soil; extensive design drawing required by local agencies. Assumes shoring or dewatering is not required.
Permits	Varies	Varies	Permits, as needed (e.g. encroachment, building, grading, SWPPP, air permits, traffic control plan, discharge, and planning permits). Cost may vary based on local permitting agency requirements. Permit fees, bond premiums, and labor to obtain permits and bonds may be submitted for reimbursement.
Excavation activities	Low	$150/ton	< 100 tons of soil; cost is all-inclusive of time, materials, and contractor labor for the excavation preparation, mobilization/demobilization, equipment, excavation, loading, transportation, disposal (Class III landfill 50 miles from site), laboratory analytical, and limited resurfacing for an excavation.

	Medium	$75/ton	> 100 tons < 1,000 tons of soil; cost is all-inclusive of time, materials, and contractor labor for the excavation preparation, mobilization/demobilization, equipment, excavation, loading, transportation, disposal (Class III landfill 50 miles from site), laboratory analytical, and limited resurfacing for an excavation.
	High	$65/ton	> 1,000 tons < 3,700 tons of soil; cost is all-inclusive of time, materials, and contractor labor for the excavation preparation, mobilization/demobilization, equipment, excavation, loading, transportation, disposal (Class III landfill 50 miles from site), laboratory analytical, and limited resurfacing for an excavation.
Coordination, oversight, and management by consultant	Low	$18,000	Excavation duration approximately two weeks; includes nominal site supervision, and project management.
	Medium	$34,000	Excavation duration approximately three weeks; includes nominal to moderate site supervision, and project management.
	High	$60,000	Excavation duration approximately four weeks; includes moderate site supervision, and project management.
Excavation report	Low	$5,000	Summary of excavation activities including waste manifests, post remedial analytical results, and figure showing excavation and dimensions.
	Medium	$7,000	
	High	$9,000	
Soil Vapor Extraction (fixed system, not used in conjunction with other technologies)			
Prepare CAP	Low	$8,500	The CAP would typically include the following: -Assessment of contamination in soil and groundwater -Current CSM -Remedial action cleanup goals -FS evaluation/screening -Selection of remedy -Identify life-cycle expectations for remedial action schedule and objectives Note: Pilot test costs are not included
	Medium	$10,500	
	High	$15,000	
Prepare RAP	Low	$7,500	The RAP would typically include the following: -Selected remedial technology -Basis of design -Remedial action schedule and objectives -Implementation schedule -Draft O&M Plan
	Medium	$9,500	
	High	$12,500	
Pilot testing	Low	$18,000	One day (24 hours) pilot test with one newly installed SVE well (cost for SVE well captured below) and pre-existing observation wells.

	Medium	$25,000	Two-day (48 hours) pilot test with two SVE wells (cost for SVE wells captured below) and pre-existing observation wells.
	High	$32,000	Three-day (72 hours) pilot test with three SVE wells (cost for SVE wells captured below) and pre-existing observation wells.
Design drawings/specifications	Low	$6,000	Basic design drawings and specifications for two SVE wells with typical 100 scfm blower and vapor treatment using two 2,000 lb carbon canisters.
	Medium	$8,000	Basic design drawings and specifications for four SVE wells with typical 250 scfm blower and vapor treatment using thermal oxidizer.
	High	$12,000	Basic design drawings and specifications for eight SVE wells with typical 500 scfm blower and vapor treatment using thermal oxidizer.
Permits	Varies	Varies	Permits, as needed (e.g. encroachment, building, air permits, traffic control plan, discharge, and planning permits). Cost may vary based on local permitting agency requirements. Permit fees, bond premiums, and labor to obtain permits and bonds may be submitted for reimbursement.
Remediation well installation	Low	$14,000	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs.
	Medium	$22,000	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs.
	High	$32,000	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs.
Remediation equipment (Cost to rent versus purchase of equipment must be justified with cost/benefit evaluation)	Low	$22,000	New turn-key skid-mounted SVE system with a typical 100 scfm blower and vapor treatment with two 2,000 lb carbon canisters.
	Medium	$65,000	New turn-key skid-mounted SVE system with 250 scfm blower with thermal oxidizer for vapor treatment.
	High	$90,000	New turn-key skid-mounted SVE system with 500 scfm blower with thermal oxidizer for vapor treatment.
System Installation	Low	$40,000	A fixed system with approximately 200 square foot remediation compound, with approximately 150 linear feet of trenching for SVE conveyance piping, system manifold, electrical drop, and fencing.
	Medium	$50,000	A fixed system with approximately 200 square foot remediation compound, with approximately 250 linear feet of trenching for SVE conveyance piping, system manifold, electrical drop, and fencing.
	High	$65,000	A fixed system with approximately 400 square foot remediation compound, with approximately 350 linear feet of trenching for SVE conveyance piping, system manifold, electrical drop, and fencing.

Coordination, oversight, and management by consultant	Low	$8,000	60 hours of technician and/or engineer time.
	Medium	$14,000	100 hours of technician and/or engineer time.
	High	$22,000	160 hours of technician and/or engineer time.
Startup/Shakedown	Low	$8,000	Two technicians over two days with engineering support.
	Medium	$14,000	Two technicians over four days with engineering support.
	High	$20,000	Two technicians over six days with engineering support.
O&M	Low	$6,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to six samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
	Medium	$10,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to eight samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
	High	$12,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to ten samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
System installation report (Includes well installation report)	Low	$5,000	Final O&M plan with start-up procedures, as-builts, and well installation report with EDD.
	Medium	$7,000	
	High	$9,000	
Well destruction by over drilling	Low	$3,000	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs. Assumes over drill of well to 25 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	Medium	$5,000	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs. Assumes over drill of well to 25 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	High	$8,000	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs. Assumes over drill of well to 25 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
Well destruction by pressure grouting	Low	$1,600	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs; Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.

	Medium	$2,800	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs; Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	High	$5,100	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs; Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
System decommission and site restoration	Low	$7,000	Remove system, manifold, and all appurtenances (entire remediation system) from the site; disconnect and cap the piping in-place.
	Medium	$15,000	Includes all parameters in the low cost and removal of compound, grout, and cap piping in-place, and minimal resurfacing of areas altered by remediation system.
	High	$45,000	Includes all parameters of the medium cost and removal of piping, and moderate resurfacing of areas altered by remediation system.
Soil Vapor Extraction (mobile system)			
Daily rates	Low	$1,400	Includes costs for SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment, mobilization, materials, fuel, and task appropriate field labor balanced with electronic monitoring devices.
	Medium	$1,750	Includes costs for SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment, mobilization, materials, fuel, and task appropriate field labor balanced with electronic monitoring devices.
	High	$2,100	Includes costs for SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment, mobilization, materials, fuel, and task appropriate field labor balanced with electronic monitoring devices.
Weekly rates	Low	$4,800	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	Medium	$6,000	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	High	$7,300	SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment.
Monthly rates	Low	$19,000	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	Medium	$24,000	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	High	$29,500	SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment.
Air Sparge & Soil Vapor Extraction (fixed system)			

Prepare CAP	Low	$9,000	The CAP would typically include the following: -Assessment of contamination in soil and groundwater -Current CSM -Remedial action cleanup goals -FS evaluation/screening -Selection of remedy -Identify life-cycle expectations for remedial action schedule and objectives Note: Pilot test costs are not included
	Medium	$11,000	
	High	$15,000	
Prepare RAP	Low	$9,000	The RAP would typically include the following: -Selected remedial technology -Basis of design -Remedial action schedule and objectives -Implementation schedule -Draft O&M Plan
	Medium	$11,000	
	High	$15,000	
Pilot testing	Low	$20,000	One day (24 hours) pilot test with one SVE well and two air sparge wells (cost for remediation wells captured below), and pre-existing observation wells.
	Medium	$27,000	Two-day (48 hours) pilot test with two SVE wells and two air sparge wells (cost for remediation wells captured below), and pre-existing observation wells.
	High	$34,000	Three-day (72 hours) pilot test with three SVE wells and four air sparge wells (cost for remediation wells captured below), and pre-existing observation wells.
Design drawings/specifications	Low	$9,000	Design drawings for an AS/SVE system with four AS wells and two SVE wells. Minimal design drawings and specifications as required by local agencies.
	Medium	$12,500	Design drawings for an AS/SVE system with eight AS wells and four SVE wells. Moderate design drawings and specifications as required by local agencies.
	High	$15,000	Design drawings for an AS/SVE system with sixteen AS wells and eight SVE wells. Extensive design drawings and specifications as required by local agencies.
Permits	Varies	Varies	Permits, as needed (e.g. encroachment, building, air permits, traffic control plan, discharge, and planning permits). Costs may vary based on local permitting agency requirements. Permit fees, bond premiums, and labor to obtain permits and bonds may be submitted for reimbursement.
Remediation well installation	Low	$30,000	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs; four AS wells (two-inch diameter) to a depth of 35 ft bgs.
	Medium	$50,000	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs; eight AS wells (two-inch diameter) to a depth of 35 ft bgs.

	High	$100,000	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs surface; sixteen AS wells (two-inch diameter) to a depth of 35 ft bgs.
Remediation equipment (Cost to rent versus purchase of equipment must be justified with cost/benefit evaluation)	Low	$45,000	New turn-key skid-mounted SVE system with a 100 scfm blower and vapor abatement of two-1,000 lb carbon canisters. Turn-key skid mounted air sparge system capable of sparging up to four sparge wells at flow rates and pressures based on pilot test results.
	Medium	$85,000	New turn-key skid-mounted SVE system with a 250 scfm blower with thermal oxidizer for vapor treatment. Turn-key skid mounted air sparge system capable of sparging up to eight sparge wells at flow rates and pressures based on pilot test results.
	High	$115,000	New turn-key skid-mounted SVE system with a 500 scfm blower and thermal oxidizer for vapor treatment. Turn-key skid mounted air sparge system capable of sparging up to 16 sparge wells at flow rates and pressures based on pilot test results.
System installation	Low	$56,000	Approximately 200 square foot remediation compound, with approximately 150 linear feet of trenching for the AS/SVE conveyance piping, system manifold, electrical drop, and fencing.
	Medium	$65,000	Approximately 200 square foot remediation compound, with approximately 250 linear feet of trenching for the AS/SVE conveyance piping system manifold, electrical drop, and fencing.
	High	$95,000	Approximately 400 square foot remediation compound, with approximately 350 linear feet of trenching for the AS/SVE conveyance piping, system manifold, electrical drop, and fencing.
Coordination, oversight, and management by consultant	Low	$8,000	60 hours of technician and/or engineer time.
	Medium	$14,000	100 hours of technician and/or engineer time.
	High	$22,000	160 hours of technician and/or engineer time.
Startup/Shakedown	Low	$8,000	Two technicians over two days with engineering support.
	Medium	$14,000	Two technicians over four days with engineering support.
	High	$20,000	Two technicians over six days with engineering support.
O&M	Low	$6,500/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to six samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.

	Medium	$7,500/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to eight samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
	High	$8,500/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to ten samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
System installation report (Includes well installation report)	Low	$6,000	Final O&M plan with start-up procedures and as-builts, and well installation report with EDD.
	Medium	$8,000	
	High	$10,000	
Well destruction by over drilling	Low	$7,000	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs; four AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	Medium	$13,000	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs; eight AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	High	$25,000	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs; sixteen AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
Well destruction by pressure grouting	Low	$3,800	Two SVE wells (two-inch diameter) to a depth of 25 ft bgs; four AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	Medium	$7,200	Four SVE wells (two-inch diameter) to a depth of 25 ft bgs; eight AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	High	$11,000	Eight SVE wells (two-inch diameter) to a depth of 25 ft bgs; sixteen AS wells (two-inch diameter) to a depth of 35 ft bgs. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.

System decommission and site restoration	Low	$15,000	Remove system, manifold, and all appurtenances (entire remediation system) from the site; disconnect and cap the piping in-place.
	Medium	$25,000	Includes all parameters in the low cost and removal of compound, grout, and cap piping in-place, and minimal resurfacing of areas altered by remediation system.
	High	$50,000	Includes all parameters of the medium cost and removal of piping, and moderate resurfacing of areas altered by remediation system.
Air Sparge and Soil Vapor Extraction (mobile system) - Typical duration 3 to 6 months			
Daily rates	Low	$1,700	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	Medium	$1,800	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	High	$2,200	SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment.
Weekly rates	Low	$5,500	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	Medium	$6,100	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	High	$7,500	SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment.
Monthly rates	Low	$22,400	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	Medium	$24,400	SVE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment.
	High	$29,900	SVE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment.
Multi-Phase Extraction (fixed system) - Typical duration 18 to 24 months			
Prepare CAP	Low	$9,000	The CAP would typically include the following: -Assessment of contamination in soil and groundwater -Current CSM -Remedial action cleanup goals -FS evaluation/screening -Selection of remedy -Identify life-cycle expectations for remedial action schedule and objectives Note: Pilot test costs are not included
	Medium	$11,000	
	High	$15,000	
Prepare RAP	Low	$10,000	The RAP would typically include the following: -Selected remedial technology -Basis of design -Remedial action schedule and objectives -Implementation schedule -Draft O&M Plan
	Medium	$12,000	
	High	$16,000	

Pilot testing	Low	$24,000	One day (24 hours) pilot test measuring one MPE well and three to four observation wells. Cost includes pilot test summary report. Well installations are not included.
	Medium	$30,000	Two-day (48 hours) pilot test measuring two MPE wells and four to five observation wells. Cost includes pilot test summary report. Well installations are not included.
	High	$40,000	Three-day (72 hours) pilot test measuring with three MPE wells and five to six observation wells. Cost includes pilot test summary report. Well installations are not included.
Design drawings/specifications	Low	$12,000	Minimal design drawings and specifications with two MPE wells.
	Medium	$15,000	Moderate design drawings and specifications with four MPE wells.
	High	$18,000	Extensive design drawings and specifications with eight MPE wells.
Permits	Varies	Varies	Permits, as needed (e.g. encroachment, building, air permits, traffic control plan, discharge, and planning permits). Cost may vary based on local permitting agency requirements. Permit fees, bond premiums, and labor to obtain permits and bonds may be submitted for reimbursement.
Remediation well installation	Low	$15,000	Two MPE wells (four-inch diameter) to a depth of 35 feet below ground surface.
	Medium	$25,000	Four MPE wells (four-inch diameter) to a depth of 35 feet below ground surface.
	High	$40,000	Eight MPE wells (four-inch diameter) to a depth of 35 feet below ground surface.
Remediation equipment (Cost to rent versus purchase of equipment must be justified with cost/benefit evaluation)	Low	$70,000	New turn-key skid-mounted MPE system with a typical 100 scfm blower and vapor treatment with two 2,000 lb carbon canisters. Two groundwater extraction submersible pumps with two 2,000 lb carbon canisters.
	Medium	$110,000	New turn-key skid-mounted MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Four groundwater extraction submersible pumps with two 2,000 lb carbon canisters.
	High	$150,000	New turn-key skid-mounted MPE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment. Eight groundwater extraction submersible pumps with two 2,090 lb carbon canisters.
System installation	Low	$65,000	Approximately 200 square foot remediation compound, with approximately 150 linear feet of trenching for the AS/SVE conveyance piping, system manifold, electrical drop, and fencing.

	Medium	$85,000	Approximately 200 square foot remediation compound, with approximately 250 linear feet of trenching for the AS/SVE conveyance piping system manifold, electrical drop, and fencing.
	High	$110,000	Approximately 400 square foot remediation compound, with approximately 350 linear feet of trenching for the AS/SVE conveyance piping, system manifold, electrical drop, and fencing.
Coordination, oversight, and management by consultant	Low	$8,000	60 hours of technician and/or engineer time.
	Medium	$14,000	100 hours of technician and/or engineer time.
	High	$22,000	160 hours of technician and/or engineer time.
Startup/Shakedown	Low	$8,000	Two technicians over two days with engineering support.
	Medium	$14,000	Two technicians over four days with engineering support.
	High	$20,000	Two technicians over six days with engineering support.
O&M	Low	$8,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to six samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
	Medium	$10,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to eight samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
	High	$12,000/month	Includes bi-weekly visits, materials and equipment, analytical costs (up to ten samples), utilities (electrical), and monthly vapor monitoring reports, and quarterly remediation system operations report.
System installation report (Includes well installation report)	Low	$6,000	Final O&M plan with start-up procedures and as-builts, and well installation report with EDD.
	Medium	$8,000	
	High	$10,000	
Well destruction by over drilling	Low	$4,000	Two MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	Medium	$7,000	Four MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.

	High	$11,000	Eight MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 35 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
Well destruction by pressure grouting	Low	$2,200	Two MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	Medium	$3,500	Four MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
	High	$5,000	Eight MPE wells (four-inch diameter) to a depth of 35 feet below ground surface. Assumes over drill of well to 5 ft bgs, consultant oversight, mob/demob, sealing material, backfill to surface, and surface patch at grade.
System decommission and site restoration	Low	$15,000	Remove system, manifold, and all appurtenances (entire remediation system) from the site; disconnect and cap the piping in-place.
	Medium	$25,000	Includes all parameters in the low cost and removal of compound, grout, and cap piping in-place, and minimal resurfacing of areas altered by remediation system.
	High	$50,000	Includes all parameters of the medium cost and removal of piping, and moderate resurfacing of areas altered by remediation system.
Multi-Phase Extraction (mobile system) - Typical duration 18 to 24 months			
Daily rates	Low	$1,900	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Two groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Daily rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	Medium	$2,100	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Four groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Daily rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	High	$2,500	MPE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment. Eight groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Daily rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.

Weekly rates	Low	$6,700	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Two groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Weekly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	Medium	$7,500	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Four groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Weekly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	High	$8,600	MPE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment. Eight groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Weekly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
Monthly rates	Low	$26,000	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Two groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Monthly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	Medium	$29,500	MPE system with a typical 250 scfm blower and thermal oxidizer for vapor treatment. Four groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Monthly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.
	High	$34,250	MPE system with a typical 500 scfm blower and thermal oxidizer for vapor treatment. Eight groundwater extraction submersible pumps with two 2,000 lb carbon canisters. Monthly rates for mobile remediation events include costs for equipment, mobilization, materials, fuel, and field labor.

Key	
AS = Air Sparge	IDW = Investigative Derived Waste
bgs = below ground surface	lb = pound
CAP = Corrective Action Plan	LTCP = Low-Threat Underground Storage Tank Case Closure Policy (Policy)
CSM = Conceptual Site Model	LUST = Leaking Underground Storage Tank
EDD = GeoTracker Survey_XYZ electronic data deliverable	MPE = Multi-Phase Extraction
FCG = Fund Cost Guidelines	NA = Not Applicable
ft bgs = feet below ground surface	O&M = Operation and Maintenance
FS = Feasibility Study	RAP = Remedial Action Plan
HSA = Hollow Stem Auger	ROI = Radius of Influence
	SA = Site Assessment
	scfm = standard cubic feet per minute
	SVE = Soil Vapor Extraction
	SWPPP = Stormwater Pollution Prevention Plan
	TD = Total Depth
	UST = Underground Storage Tank
	WQO = Water Quality Objectives