

# Dual-phase Extraction (DPE) Contracting Services

## Accelerate Site Clean-up



## Benefits

- Increase in groundwater recovery rates, compared to conventional pumping practices in equivalent settings (EPA, 1997b)
- Increases in radius of influence of individual groundwater recovery wells (EPA, 1997)
- Recovery of shallow layer of floating, free product (EPA, 1996)
- Remediation of the capillary fringe and smear zone (EPA, 1997b; EPA, 1997; EPA, 1997c)
- Remediation of volatile, residual phase contaminants located above and below the water table (EPA, 1996; EPA, 1997c)
- Can be applied at sites with free floating product, and can be combined with other technologies such as air sparging and bioremediation
- Simultaneous remediation of soil and groundwater
- Proven performance over a wide range of conditions
- Requires no downhole pumps, but is flexible enough to allow their use if necessary
- Minimal disturbance to site operations; can be used under buildings without excavation
- Substantially increases groundwater extraction rates
- Can be used under buildings and other locations that cannot be excavated
- Can reduce the cost of groundwater treatment through air stripping within the vacuum extractions tube.
- Most cost effective (lowest \$ /lb. HC removed)
- Low capital or maintenance cost outlays
- No shutdown of station for trenching
- Dramatic reduction in total emissions released into atmosphere during project
- Low noise for 24-hour operation in neighborhoods
- Occupies less space at station

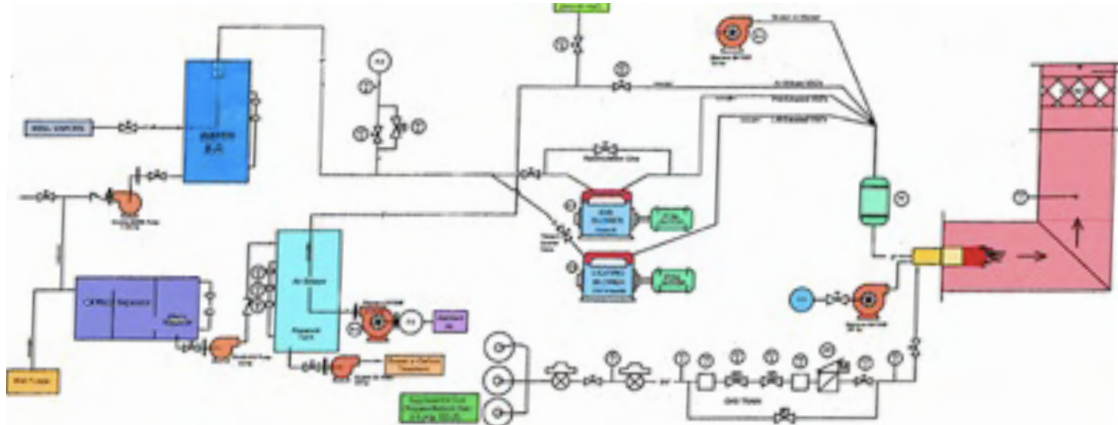
## What is dual-phase extraction?

Dual-phase extraction (DPE) also known as multi-phase extraction, is a technology that uses a high vacuum system to remove both contaminated groundwater and soil vapor. In DPE systems a high vacuum extraction well is installed with its screened section in the zone of contaminated soils and groundwater. Fluid/vapor extraction systems depress the water table and water flows faster to the extraction well. DPE removes contaminants from above and below the water table, As the water table around the well is lowered from pumping, unsaturated soil is exposed. This area called the capillary fringe, is often highly contaminated, as it holds undissolved chemicals, chemicals that are lighter than water, and vapors that have escaped from the dissolved groundwater below. Contaminants in the newly exposed zone can be removed by vapor extraction. Once above ground, the extracted vapors and liquid-phase organics and groundwater are separated and treated. Use of dual-phase extraction with these technologies such as soil vapor extraction and if needed groundwater pump & treat can shorten the cleanup time at a site significantly, as the capillary fringe is often the most contaminated area.



# Service Features & Benefits

## Save Costs & Reduce Downtime



## Technical Specifications

- Enclosed truck body mounting of equipment (8' x 25' footprint)
- Model 2002 Thermal treatment system
  - thermal operation: no catalyst (operates at 1400+F)
  - catalytic operation: install VOC catalyst (600 - 1250F)
- Moisture Separator (99% removal water knockout pot)
- Inline filter element (Solberg)
- Flame arrestor (Enardo)
- Electrical Controls:
  - Main Power Disconnect (230VAC, 3-phase, 150A)
  - Temperature controller (Honeywell UDC 1200)
  - Overtemp controller (Honeywell UDC 1200)
  - Eclipse Veri-Flame & UV flame sensor (5605-32)
  - Temperature recorder (Honeywell EZTrend, 4-channel, color)
  - Pressure switches (lo/hi gas train & air press. switch)
- Extraction Blower (DVT VMAX 453 oil-sealed liquid ring, 20 hp)
- Cooling blower, regenerative type with 0.67 hp TEFC motor (Siemens BF1300)
- Pressure side dilution air blower (Siemens regenerative blower, BF1500)
- Caterpillar 40kW propane generator (230VAC, 3-phase, 150A)
- -QED Model 2.4P Air Stripper with Siemens regenerative blower, BF1500
- HydroQuip 15 gpm oil-water-separator
- FM-approved style natural gas or propane gas train
- Air filters
- Air dilution valve & Gas Vapor valve



## Options

Westmark's mobile DPE unit has three operational modes:

- Mode 1 ⇨ Dual Phase Extraction
- Mode 2 ⇨ Groundwater Extraction
- Mode 3 ⇨ Soil Vapor Extraction

By simply flipping a switch and turning a valve, Westmark can quickly convert the operational mode of our mobile DPE unit, this means no downtime for you.



### OTHER SERVICES AVAILABLE

Site Assessments  
Treatability Studies  
Waste Minimization  
Pollution Prevention  
Site Closure Activities  
Remedial Investigation  
UST Management Services  
Oil, Chemical, Spill Response  
Air Quality (Dust/Mold) Inspection  
Asbestos/Lead/PCB Management

### APPLICABILITY

DPE addresses contamination in both the saturated and vadose zones, removing dissolved, vapor, residual, and non-aqueous phases of contamination. DPE affects mass removal by volatilization, dissolution, and advective transport. DPE removes volatile organic compounds (VOCs), semi-volatile organic compounds (SVOC) and fuels from groundwater and soil.

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