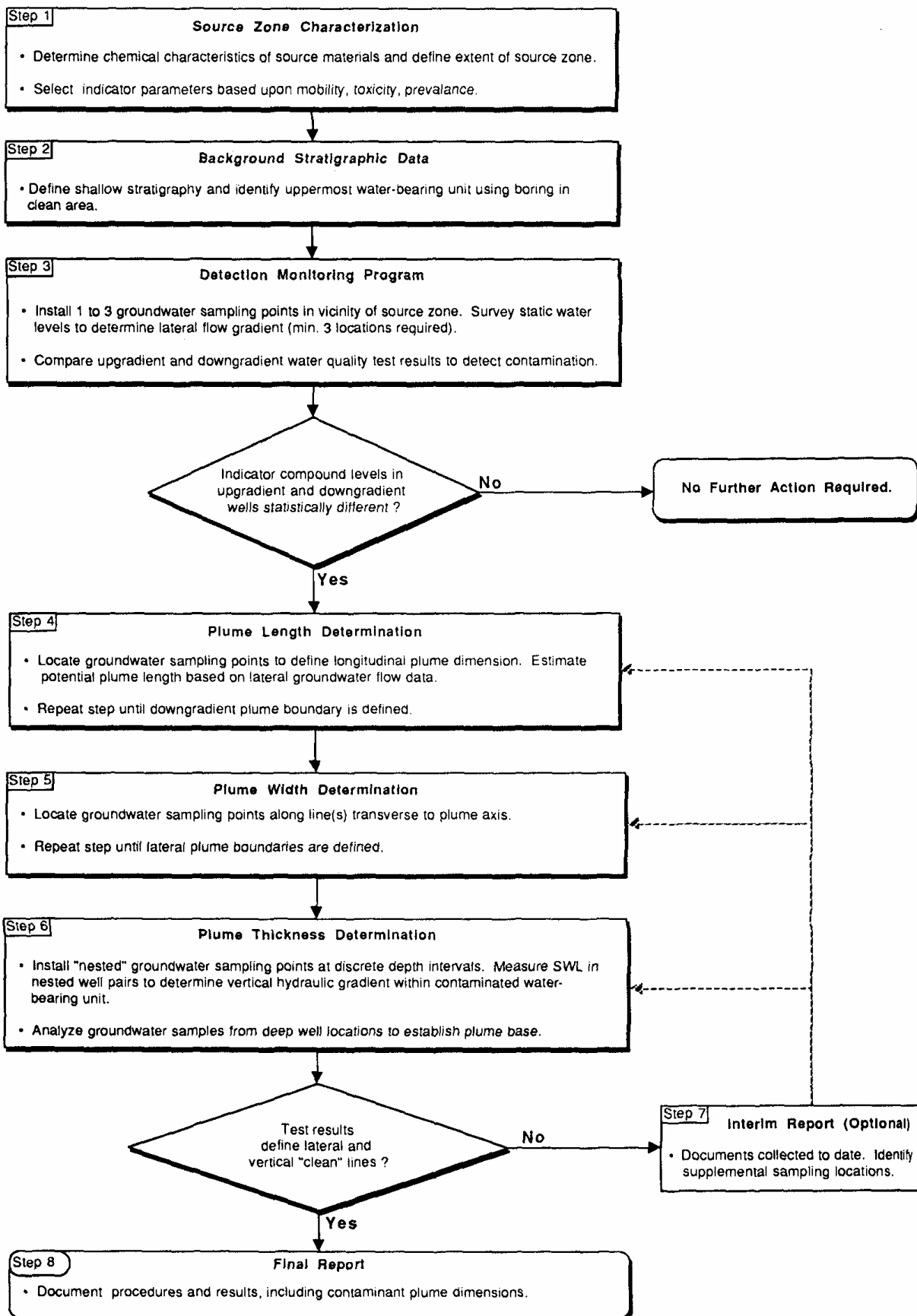
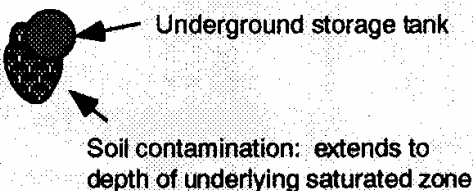
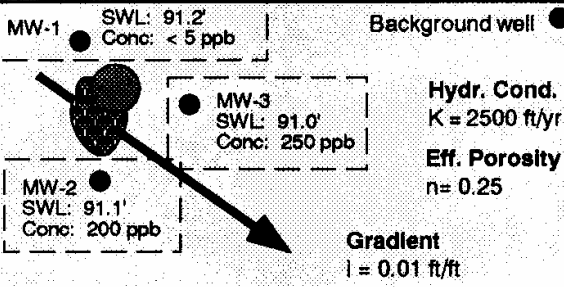
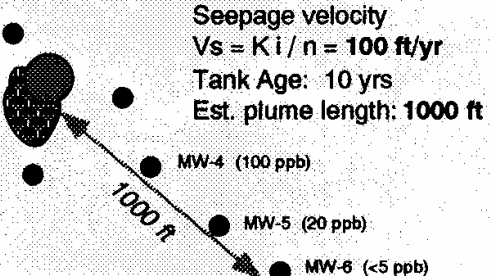
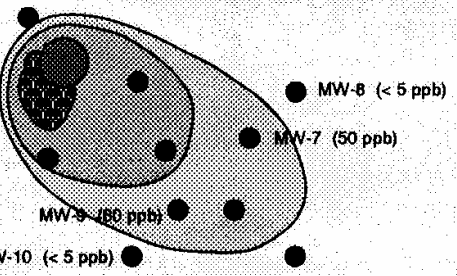
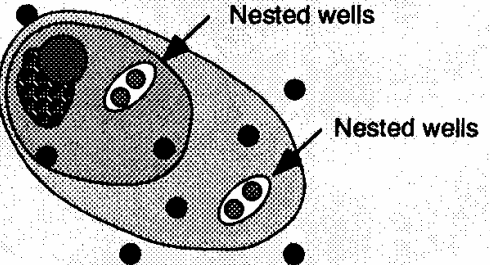


CI 61Q REMEDIATION



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 <p>Underground storage tank</p> <p>Soil contamination: extends to depth of underlying saturated zone</p>	<p>Step 1: Source Delineation</p> <ul style="list-style-type: none"> • Locate potential sources. • Define lateral and vertical extent of soil contamination. • Characterize contaminant properties: solubility, density, etc. • Select indicator parameters.
 <p>MW-1 SWL: 91.2' Conc: < 5 ppb</p> <p>Background well</p> <p>MW-3 SWL: 91.0' Conc: 250 ppb</p> <p>MW-2 SWL: 91.1' Conc: 200 ppb</p> <p>Hydr. Cond. $K = 2500$ ft/yr</p> <p>Eff. Porosity $n = 0.25$</p> <p>Gradient $I = 0.01$ ft/ft</p>	<p>Step 2: Detection Monitoring</p> <ul style="list-style-type: none"> • Drill adjacent to source zone to define stratigraphy and identify uppermost water-bearing unit. • If DNAPLs are indicated, use drilling precautions or outside-in strategy for detection monitoring. • Install at least 3 wells to define ground water flow direction. • Compare indicator compound concentrations in upgradient and downgradient wells. • Run slug tests to define aquifer hydraulic properties.
 <p>Seepage velocity $V_s = Ki / n = 100$ ft/yr</p> <p>Tank Age: 10 yrs</p> <p>Est. plume length: 1000 ft</p> <p>MW-4 (100 ppb)</p> <p>MW-5 (20 ppb)</p> <p>MW-6 (<5 ppb)</p>	<p>Step 3: Plume Length</p> <ul style="list-style-type: none"> • Locate wells to define plume length. • Use gradient, porosity, and K to define seepage velocity (v_s). • Use v_s and estimated source age to estimate plume length. • Space downgradient wells accordingly. • Repeat as necessary to determine length.
 <p>MW-8 (< 5 ppb)</p> <p>MW-7 (50 ppb)</p> <p>MW-9 (80 ppb)</p> <p>MW-10 (< 5 ppb)</p>	<p>Step 4: Plume Width</p> <ul style="list-style-type: none"> • Locate wells on transverse line to determine plume width. • Can estimate width using advection/dispersion equation. • Unusual plume shapes indicate possible presence of NAPLs.
 <p>Nested wells</p> <p>Nested wells</p>	<p>Step 5: Plume Thickness</p> <ul style="list-style-type: none"> • Install nested wells to determine depth of contamination. • Estimate vertical gradient by comparing static water levels in deep and shallow nested wells. • Use drilling precautions if presence of DNAPL is indicated.