

Diagnostic Tests for Site Specific Characterization and Modeling

ANALYSIS	TYPICAL DATA APPLICATION	METHOD
<p><u>SOIL PROPERTIES:</u></p> <ul style="list-style-type: none"> ✓ Soil Porosity, Total or Effective Pore Size Distribution ✓ Bulk Density ✓ Volumetric Vapor Content ✓ Volumetric Water Content ✓ Hydrocarbon Saturation ✓ Total Organic Carbon Soil Specific Gravity, Grain Density Cation Exchange Capacity ✓ Soil pH ✓ Moisture Content 	<p>Volumetric calculations Permeability, capillary pressure estimation Transport calculations Vapor phase transport Immiscible, vapor phase transport, dissolved concentrations Plume delineation, vapor calculations, risk assessment Retardation factor, transport calculation, attenuation Lithology and clay indicator Retardation factor, attenuation, clay content Bioparameter Transport calculations</p>	<p>API RP40 ASTM D4404 ASTM D2937 API RP40 API RP40 API RP40 Walkley-Black ASTM D854 EPA 9081 EPA 9045 ASTM D2216</p>
<p><u>GEOLOGIC PROPERTIES:</u></p> <p>Lithology, Mineralogy</p> <p>Clay Content</p> <ul style="list-style-type: none"> ✓ Soil Texture, Grain Size Distribution <p>Pore Geometry Core Description Core Photography</p>	<p>Soil Classification, clay quantification</p> <p>Retardation, permeability reduction Soil classification, estimation of permeability, porosity, capillary pressure Permeability, capillary pressure estimation Stratigraphy, Lithology, Depositional & Hydrogeologic setting Historical documentation of soil characteristics for regulators, litigation and future use</p>	<p>X-Ray, Thin Section X-Ray ASTM D4464M ASTM D422 SEM</p>
<p><u>HYDROGEOLOGIC, FLUID TRANSPORT PROPERTIES:</u></p> <ul style="list-style-type: none"> ✓ Hydraulic Conductivity ✓ Permeability to Air Relative Permeability, Multiple Fluid Flow ✓ Capillary Pressure, Moisture Potential ✓ Volumetric Residual Hydrocarbon ✓ Leaching Studies 	<p>Basic transport property SVE models Modeling free product recovery, migration off-site, risk calculations Calculate true product thickness, saturation above water table, SVE calculations Calculate depth of contaminant penetration Evaluate remediation alternatives</p>	<p>ASTM D2434 API RP40 Site Specific ASTM D4404 Multiple Site Specific</p>
<p><u>HYDROCARBON PROPERTIES:</u></p> <p>Interfacial Tension</p> <ul style="list-style-type: none"> ✓ Fingerprinting C₈ - C₃₅ ✓ Reid Vapor Pressure ✓ Viscosity ✓ Density, API Gravity ✓ Distillation Gas Analysis: C₁-C₉, CO₂, O₂, N₂, H₂S 	<p>Product recovery, mobility, capillary pressure Characterize hydrocarbon, determine lateral and vertical continuity, product recovery, plume migration SVE Models Risk calculation, product recovery, mobility Product recovery Thermal SVE Modeling Thermal SVE Modeling</p>	<p>ASTM D971 IP 318/78M ASTM D223 ASTM D445 ASTM D1481 ASTM D86 ASTM D2163M</p>

✓ Tests referenced in ASTM E 1739-95, Risk-Based Corrective Action Applied at Petroleum Release Sites.