



## **In-Situ® Rentals**

## **Real-Time Measurement Technologies for Groundwater Remediation Applications**

When you rent from In-Situ, you're not just getting equipment—you're getting technical support, well-maintained sensors, and the knowledge that your system will meet your needs and surpass your expectations.

### **Characterize Aquifers with the Virtual HERMIT® Pump Test Kit**

- Streamlines step-drawdown and constant-rate tests
- Simultaneously configures, starts, displays, or stops all connected instruments
- Steps a test and captures pump and recovery data on the same log
- Displays real-time data so you can quickly adjust test protocols
- Minimizes data processing

### **Monitor Borehole Pressure & Water Level in SVE & DPE with the Level TROLL® 700**

- Features 0.72" titanium housing for use in harsh conditions
- Measures and logs level, pressure, and temperature
- Includes linear, event, linear average, step linear, true logarithmic, and fast linear (4x/second) logging types
- Monitors performance indicators in real-time
- Offers remote data access via TROLL® Link telemetry system
- Vented and non-vented instruments and RuggedCable® systems available

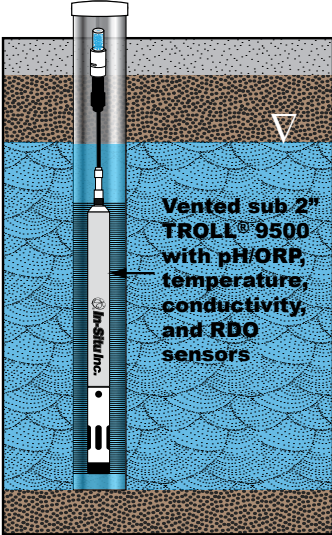
### **Conduct ISCO/R, Biosparging, Air Sparging, & More with the TROLL® 9500 Instrument**

- Measures and logs level, dissolved oxygen, pH/ORP, turbidity, conductivity, temperature, and barometric pressure
- Improves performance and reduces maintenance when deployed with the RDO® optical DO sensor
- Features EPA-approved DO method
- Monitors performance indicators in real-time
- Offers remote data access via TROLL Link telemetry system

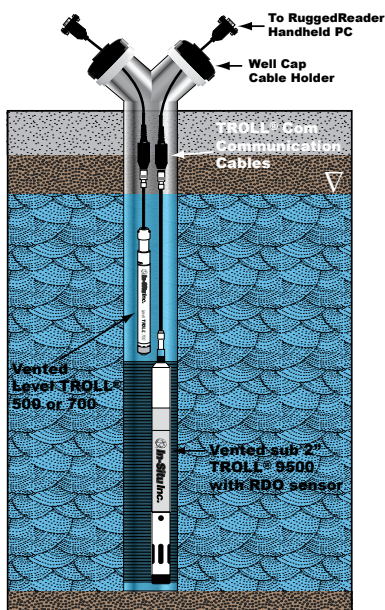


### **Additional Benefits of In-Situ Rentals**

- Pre-paid return shipping option
- 24/7 technical support
- Factory-maintained equipment
- Large inventory available

<b>Treatment Technology</b>	<b>Chemical Oxidation (ISCO)</b>	<b>Chemical Reduction (ISCR)</b>	<b>Enhanced Bioremediation</b>
<b>Online resource</b>	www.epa.gov/ada/topics/oxidation.html	www.clu-in.org/remediation/	www.epa.gov/oust/cat/airsparg.htm
<b>Synonyms</b>		In-situ reduction or reductive dechlorination	Enhanced biodegradation, enhanced bioattenuation
<b>Summary of process</b>	The most rapidly growing remedial technology applied at EPA hazardous waste sites. It involves the introduction of a chemical oxidant into the subsurface for the purpose of transforming groundwater or soil contaminants into less harmful chemical species.	In-situ reduction is a young technology and thus far has been applied primarily to chlorinated solvents. It is defined as the combined effect of stimulated biological oxygen consumption (via "fermentation" of complex organic carbon sources), direct chemical reduction with reduced metals, and the corresponding enhanced decomposition reactions that are realized at the lowered redox ( $E_h$ ) conditions.	This technology is designed to remediate chlorinated solvents in groundwater. An organic source, nutrients, electron acceptors, and/or microbial cultures are injected to stimulate degradation.  EISB systems may be used to remediate areas of high concentration within plumes or source areas, to help provide containment of a chlorinated solvent plume, or as part of a treatment train downgradient from a primary cleanup or containment system.
<b>Achieved by applying</b>	Liquid hydrogen peroxide, potassium permanganate, ozone, sodium persulfate, or occasionally oxygen (no sodium hypochloride)	Dithionite, gaseous hydrogen sulfite, colloidal zero valent iron	Nutrients, electron acceptors, and/or microbial cultures
<b>Affected zone(s)</b>	Vadose, saturated	Groundwater and contaminant source zones	Saturated
<b>Target contaminant</b>	VOCs, including DCE, TCE, and PCE; BTEX compounds, including benzene, toluene, ethylbenzene, xylene; SVOCs, pesticides; PAHs; PCBs	Chlorinated organic pesticides and other CVOCs, heavy metals, and other persistent compounds (e.g., perchlorate)	Chlorinated solvents
<b>Key parameters measured</b>	DO, pH/ORP, conductivity, TDS, temperature, turbidity.	DO, pH/ORP, conductivity, TDS, temperature, turbidity.	pH/ORP, temperature, oxygen
<b>Required equipment, per well</b>	1 sub-2" TROLL® 9500 Professional with RDO® optical DO sensor (pH/ORP, conductivity, temperature, and barometric sensors included); onboard turbidity available with Clark cell DO only; 1 vented Tefzel® cable from 6' to 4,000'; 1 TROLL® Com USB for use with laptop or TROLL Com RS232 for use with RuggedReader® handheld PC		
<b>Typical deployment in a 2" monitoring well</b>	<p>Attach RuggedReader handheld PC or laptop via TROLL Com when downloading data</p>  <p><b>Key Benefits Include:</b></p> <ul style="list-style-type: none"> <li>• Real-time measurement of physical and chemical parameters supported by the TROLL 9500 allows for a dynamic work strategy per the EPA Triad Approach to site remediation.</li> <li>• To find details on the EPA Triad Approach, visit <a href="http://www.triadcentral.org/index.cfm">www.triadcentral.org/index.cfm</a>.</li> <li>• EPA-approved DO method</li> </ul>		

<i>Biosparging</i>	<i>Air Sparging (AS)</i>	<i>Soil Vapor Extraction (SVE)</i>	<i>Dual-Phase Extraction (DPE)</i>
<a href="http://www.epa.gov/oust/cat/biosparge.htm">www.epa.gov/oust/cat/biosparge.htm</a>	<a href="http://www.epa.gov/oust/cat/airsparg.htm">www.epa.gov/oust/cat/airsparg.htm</a>	<a href="http://www.epa.gov/oust/cat/SVE1.htm">www.epa.gov/oust/cat/SVE1.htm</a>	<a href="http://www.epa.gov/oust/cat/dualphas.htm">www.epa.gov/oust/cat/dualphas.htm</a>
	In-situ air stripping or in-situ volatilization	Soil venting or vacuum extraction	High vacuum, multi-phase extraction, vacuum-enhanced extraction, bioslurping
Air (or oxygen) and nutrients (if needed) are injected into the saturated zone to increase the biological activity of the indigenous microorganisms. It can be used to reduce concentrations of petroleum constituents that are dissolved in groundwater, adsorbed to soil below the water table, and within the capillary fringe.	Air sparging is an in-situ remedial technology that reduces concentrations of volatile constituents in petroleum products that are adsorbed to soils and dispersed in groundwater. Air is injected into the subsurface saturated zone, which enables a phase transfer of hydrocarbons from a liquid to a vapor phase. The air is then vented through the unsaturated zone.	This in-situ remedial technology reduces concentrations of volatile constituents in petroleum products adsorbed by soils in the unsaturated (vadose) zone. A vacuum is applied through wells in the soil near the source of contamination.	This in-situ technology uses pumps to remove various combinations of contaminated groundwater, separate-phase petroleum product, and hydrocarbon vapor from the subsurface.
Air (5 to 50 m <sup>3</sup> /h typical) and/or nutrients.	Air (low purity, high volume) to volatilize contaminants in sealed wells	Vacuum	High vacuum
Saturated capillary fringe	Vadose, saturated capillary fringe	Vadose	Vadose, saturated and capillary fringe
SVOCs; BTEX compounds, including benzene, toluene, ethylbenzene, xylene; and naphthalene	VOCs, including DCE, TCE, and PCE; and fuels	VOCs and some SVOCs but not heavy oils, metals, PCBs, or dioxins	VOCs, SVOC, and fuels
DO, pH/ORP, temperature, vented water level	DO, vented water level, borehole pressure	Vented level, borehole pressure	Vented level, borehole pressure
1 sub-2" TROLL 9500 Professional with RDO optical DO sensor (pH/ORP, conductivity, temperature, and barometric sensors included); vented Level TROLL® (where depth readings are desired); 2 vented Tefzel cables from 6' up to 4,000'; 2 well cap cable holders for sealed well applications; 2 TROLL Com USB for use with laptop OR 1 RuggedReader handheld PC with 2 RS232 (serial) TROLL Coms		1 TROLL 9500 Professional with vented level sensor and onboard barometric sensor (no water quality sensors installed); 1 vented Tefzel cable from 6' up to 4,000'; 1 well cap cable holder; 1 TROLL Com USB for use with laptop OR 1 RuggedReader with RS232 (serial) TROLL Com	



**Key Benefits Include:**

- Real-time measurement of physical and chemical parameters
- RDO sensor responds quickly. For long-term studies, labor costs are reduced due to robust RDO calibration.
- EPA-approved DO method



**Key Benefits Include:**

- Real-time monitoring of performance indicators
- Single instrument per well. Internal barometric sensor logs borehole pressure.
- Vented pressure sensor logs water level corrected for borehole pressure.
- Well cap cable holder allows real-time access to changing well conditions.

# Using In-Situ® Products in Your Remediation Project

## Virtual **HERMIT**® Aquifer Testing Kit for Site Characterization

- Contains Virtual HERMIT software for PC, an eight-port Rugged TROLL® net hub, up to eight Level TROLL® 700 instruments, one RuggedReader® handheld PC to download data from difficult-to-access sites, and a USB or RS232 TROLL® Com communication device
- Connects up to 16 Level TROLL 700 instruments to each “HERMIT” (designated in the software) when connecting two or more Rugged TROLL net hubs. A limitless number of “HERMITs” can be associated with each aquifer test.



## Aqua **TROLL**® 200 Instrument for Remedial Investigation & Feasibility Studies

- Measures and logs level, conductivity, salinity, density, resistivity, total dissolved solids, and temperature
- Connects to TROLL® Link telemetry system for real-time access
- Features titanium housing for use in corrosive environments



## **TROLL**® 9500 Water Quality Instrument Features **RDO**® Optical DO Sensor



### Higher reliability

- Corrosion-resistant housing suitable for fresh, waste, and saline waters
- Field-replaceable sensors for easy maintenance and calibration
- RDO optical DO sensor holds a calibration, withstands abrasion, and excels in hypoxic conditions.

### Proven accuracy

- Factory calibrated with NIST®-traceable standards where applicable. A report is included with each unit.
- Rigorous, independent third-party validation proves the RDO sensor performs to its specifications over long-term deployments.

## **TROLL** 9500 Low-Flow System & Flow-Sense Software for Groundwater Monitoring

- Complete systems, ready to use immediately
- Automates collection of well and pumping information
- Monitors and records the stabilization of key water quality parameters
- Minimizes hazardous waste disposal
- Generates calibration reports and customizable sample reports that conform to federal and regional regulations

*In-Situ instruments feature real-time measurement technologies that are ideal for projects using the EPA Triad Approach. Adapt to changing conditions as new data becomes available. Complete projects more quickly and at a lower cost than traditional approaches.*

**Call to rent or purchase — [www.in-situ.com](http://www.in-situ.com)**

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