

Aussie detector launched in the US

A handheld detector that was developed in Australia for use on sites contaminated by petroleum products has been successfully launched in the US. By Dr Richard Stewart.



Using RemScan as a screening tool at Site 2.

RemScan, developed by Ziltek in collaboration with the CSIRO, uses an infrared signal to directly measure petroleum hydrocarbons in the soil, giving a result in around 20 seconds.

The ability to rapidly and accurately detect petroleum contamination onsite, instead of the traditional method of sending soil samples to a laboratory and waiting days for results, enables industry to close projects or declare sites contaminant free with a faster, greater degree of certainty.

The technology has the potential to annually save the environmental remediation industry millions of dollars globally in laboratory and project costs.

Petroleum contamination as a result of leaking tanks or industrial spills is a widespread global issue with potentially serious impacts for human and environmental health.

Successfully commercialised in Australia by Ziltek in 2012, RemScan is now in use by the mining industry and the oil and gas industries in various parts of the country.

CSIRO holds the recently accepted US patent for the RemScan method, which is licensed exclusively to Ziltek for global distribution.

Put through its paces

Ziltek recently engaged the services of Battelle, an independent testing organisation in the United States, to test the accuracy and usability of the technology.

The study was conducted in line with the former Environmental Technology Verification (ETV) program.

It was designed to provide objective and quality-assured performance data on environmental technologies so that users, developers, regulators and consultants could make informed decisions about purchasing and applying these technologies.

Ziltek made a number of claims

Summary of RemScan Performance

	Site 1	Site 2	Vendor Claims Met
Accuracy	9.4%	N/A*	✓
Repeatability	1.8%	3.3%#	✓
Detection limit	66mg/kg	64mg/kg	✓
False positives/negatives (1000mg/kg)	Nil	Nil	N/A
Battery life	Full day of continuous use with one battery swap		
Throughput rate	10-20 samples per hour		
Operational cost	No incremental cost		
Instrument cost	\$US70,000		
Breakeven cost threshold	7 days (1400 samples)		
Formal training required	<2 hours		
Infield calibration time	3 minutes every hour		

*Insufficient data to calculate #Adjusted to compensate for volatilisation effects

relating to accuracy (<12% RSD), repeatability (<7% RSD) and detection limit (<250 mg/kg) that were also assessed as part of this study.

Soil samples (100) were collected at each of two US Department of Defense sites.

For each site, 60 samples were used to build a site-specific calibration model in the RemScan instrument, which was then used to scan the other 40 blind samples and predict their TPH concentrations.

Scanning was undertaken by Ziltek and then repeated by Battelle.

The RemScan predictions were compared to laboratory assay data (US EPA Method 8100 TPH) for each of the samples to determine the accuracy of the technology.

Repeatability measurements were also carried out on selected samples.

After two hours of formal training, Battelle staff were asked to comment on a number of usability claims and to fill out a questionnaire.

For Site 1, the accuracy of RemScan was 9.4% RSD compared to accredited laboratory data, and the repeatability was 1.8% RSD. For Site 2, the accuracy could not be calculated due to lack of data

points between 5000-10,000mg/kg and the repeatability was 3.3%.

The detection limit of the method for both sites was around 65mg/kg, which compares favourably with commercial laboratories.

Using a regulatory criteria of 1000mg/kg, there were no false negatives or positives for either test site, which meant that the RemScan technology could have been used confidently at these sites with no requirements for laboratory analysis.

The main limitation of the RemScan technology is the requirement for the soil surface to be air-dried. The latest release of RemScan notifies the user when moisture content of the sample is sufficient to scan.

All claims relating to accuracy, repeatability and detection limit were met as independently verified by Battelle during the blind study.

Apart from oil detection, CSIRO is continuing to work with Ziltek to extend the technology to enable rapid detection of other soil contaminants.

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