

ON-SITE, REAL-TIME ASSESSMENT OF TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL USING A HANDHELD INSTRUMENT

BACKGROUND/OBJECTIVES

Laboratory (lab) analysis of total petroleum hydrocarbons (TPH) in soil can be costly and time consuming, in particular, for large-scale remediation projects that have high data volumes, require real-time decision making, and may be located far from commercial laboratories.

Whilst the setup of a dedicated on-site laboratory would reduce the turnaround time (TAT), there are significant setup and operational costs. To evaluate if there is a viable alternative that provides reliable, near-instantaneous results at a lower cost, Cardno trialled the use of a handheld instrument, RemScan[®], during a pilot remediation project.



APPROACH/ACTIVITIES

The study site was remote (located approximately 180km away from the nearest laboratory) and was primarily impacted by mid- to heavy-end fraction TPH.

- > The instrument first underwent site-specific calibration against laboratory results.
- > During a two-week pilot soil remediation project, 29 soil samples of varying TPH concentrations were measured by both RemScan[®] and analysed by the laboratory.
- > For RemScan[®] measurements, samples were first dried, then homogenised and split into five sub-samples with each sub-sample measured five times with the instrument.
- > The 25 total readings were then averaged to give one RemScan[®] reading for that sample.
- > Two laboratory samples underwent five separate digestions to enable assessment of variability due to sample heterogeneity.

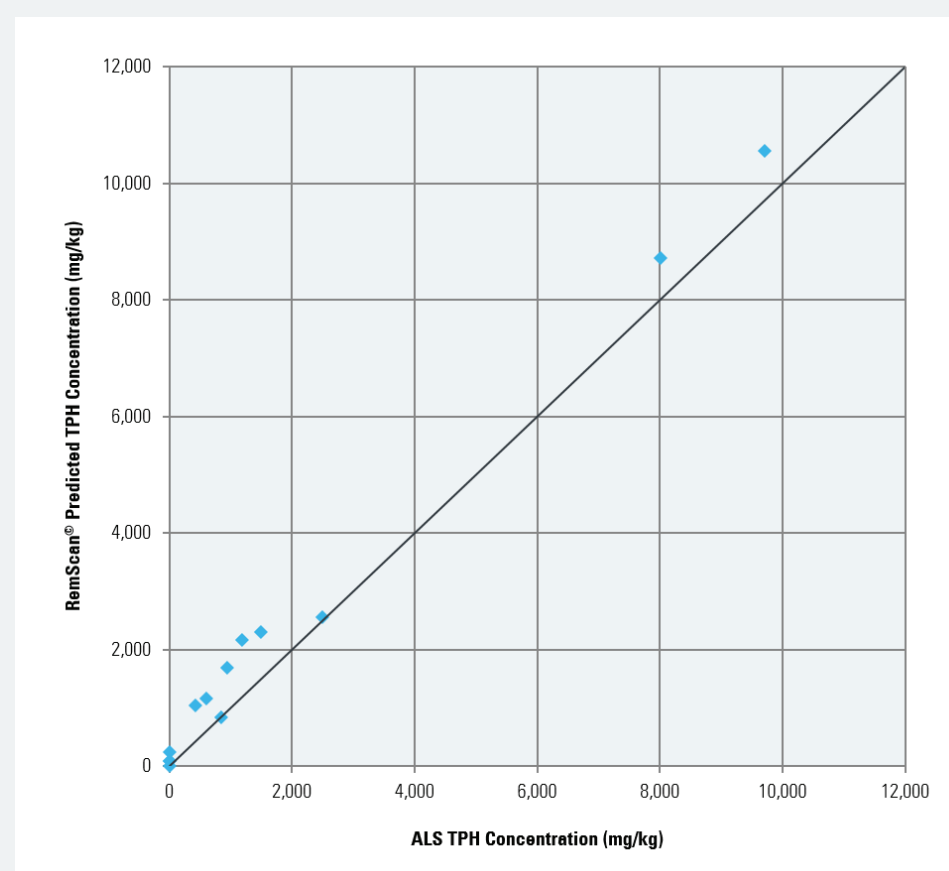


RESULTS/LESSONS LEARNED

The RemScan[®]-laboratory correlation from the initial results was poor due to heterogeneity within the sample. The laboratory samples were subsequently homogenised and re-analysed, with results showing a strong correlation to the RemScan[®] results ($R^2=0.93$, gradient=0.99). The trial showed that RemScan[®] was a useful field tool, allowing real-time decision making (short TAT) and being able to analyse a large number of samples with minimal additional expense.

Possible constraints include not being able to analyse volatile TPH (<C10), reporting total TPH reading rather than bands (NEPM fractions), requires initial site-specific calibration and drying and homogenization of samples.

Overall, RemScan[®] provided a **reliable means** of assessing TPH concentrations in the field (with ongoing confirmation to laboratory results) and is **cost-effective for large projects** but may not be suitable for smaller projects. It will be utilised for an upcoming large-scale remediation project (1-2 years duration) at the trial site.



About Cardno

Cardno is a global provider of integrated professional services which enrich the physical and social environment for the communities in which we live and work around the world. We are a dynamic, global team of multidisciplinary specialists with expertise and more than 70 years' experience in designing, developing and delivering sustainable projects and community advancement programs. Established in 1945, Cardno listed on the Australian Securities Exchange in 2004. [ASX: CDD]. www.cardno.com