

## Reducing Mine Site Costs Using a Handheld Infrared Technology for Measuring Total Petroleum Hydrocarbons (TPH) in Soil

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**Background/Objectives.** Fortescue Metals Group (FMG) is one of Australia's largest iron ore miners located in the Pilbara region of Western Australia. At its two main mine sites, Cloudbreak and Solomon, hydrocarbon spills occur daily; the main management approach is to excavate the contaminated soil and take it to a biofarm area where nutrients and water are added and the soil is aerated to stimulate natural microorganisms to bioremediate the hydrocarbons in the soil over time.

To ensure the efficiency of spill management at these two mine sites, FMG uses a handheld portable infrared detector (marketed as RemScan™) for the rapid and accurate measurement of TPH (C<sub>10</sub> to C<sub>40</sub>) in soil. This presents a viable alternative to offsite laboratory analysis which, in this remote and harsh environment, is logistically challenging, time-consuming and relatively costly.

This study will present how FMG is applying this infield technology to save operating costs and reduce long term mine site liabilities.

**Approach/Activities.** Representative soils were collected from each mine site, and a site-specific calibration model was constructed for each site to calibrate the unit. This minimizes interference from soil properties such as carbonates and organic matter and differences in soil mineralogy.

Once calibrated, infrared units were deployed to each of the two mine sites and local FMG staff were fully trained how to use the instruments during a half-day workshop at site. The RemScan units are being used weekly at both sites for a variety of applications, reducing the requirements for laboratory analysis and allowing more accurate and rapid soil management decisions to be made.

Applications that will be discussed in this presentation include:

- Better spill delineation to reduce costly over- or under-excavation;
- More frequent monitoring of the bio-degradation process which gives more confidence in the results and reduces the reliance on laboratory analysis;
- Identification of spills in contractor lay-down areas which leads to better management of site liabilities before contractor demobilization.

**Results/Lessons Learned.** FMG estimates the cost savings per instrument per year to be in excess of \$70,000 AUD. This equates to a payback period of less than 12 months, which it regards as an excellent return on capital considering that the instruments have an expected operating life of up to 8 years.