



Innovative Technology Verification Report

Field Measurement Technologies for Total Petroleum Hydrocarbons in Soil



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Research and Development
Washington, DC 20460

Demonstration Plan: Field Measurement Technologies for Total Petroleum Hydrocarbons in Soil

Executive Summary

Performance verification of innovative environmental technologies is an integral part of the regulatory and research mission of the U.S. Environmental Protection Agency (EPA). The Superfund Innovative Technology Evaluation (SITE) Program was established by the EPA Office of Solid Waste and Emergency Response and Office of Research and Development under the Superfund Amendments and Reauthorization Act of 1986. The program is designed to meet three primary objectives: (1) identify and remove obstacles to the development and commercial use of innovative technologies, (2) demonstrate promising innovative technologies and gather reliable performance and cost information to support site characterization and cleanup activities, and (3) develop procedures and policies that encourage use of innovative technologies at Superfund sites as well as other waste sites or commercial facilities. The intent of a SITE demonstration is to obtain representative, highquality performance and cost data on innovative technologies so that potential users can assess a given technology's suitability for a specific application.

The demonstration of innovative field measurement devices for total petroleum hydrocarbons (TPH) in soil is to be conducted under the SITE Program in June 2000 at the Navy Base Ventura County site in Port Hueneme, California. The demonstration is being conducted under the Monitoring and Measurement Technology Program, which is administered by the Environmental Sciences Division of the EPA National Exposure Research Laboratory in Las Vegas, Nevada. The primary purpose of the demonstration is to evaluate innovative field measurement devices for TPH in soil based on comparison of their performance and cost to those of a conventional, off-site laboratory analytical method.

The following seven field measurement devices will be demonstrated:

- CHEMetrics, Inc.'s, RemediAid™ Total Petroleum Hydrocarbon Starter Kit
- Wilks Enterprise, Inc.'s, Infracal® TOG/TPH Analyzer, Models CVH and HATR-T
- Horiba Instruments, Incorporated's, OCMA-350 Oil Content Analyzer
- Dexsil® Corporation's PetroFLAG™ Hydrocarbon Test Kit for Soil
- Environmental Systems Corporation's Synchronous Scanning Luminoscope
- siteLAB® Corporation's Analytical Test Kit UVF-3100A
- Strategic Diagnostics, Inc.'s, EnSys Petro Test System

The performance and cost of each device will be compared to those of a conventional, off-site laboratory analytical method—that is, a reference method. The performance and cost of one device will not be compared to those of another device. The reference method that will be used for the demonstration is “Test Methods for Evaluating Solid Waste” (SW-846) Method 8015B (modified). A separate innovative technology verification report (ITVR) will be prepared for each device.

The demonstration has both primary and secondary objectives. The primary objectives are critical to the technology evaluations and require use of quantitative results to draw conclusions regarding technology performance. The secondary objectives pertain to information that is useful but do not necessarily require use of quantitative results to draw conclusions regarding technology performance. The primary objectives for the demonstration of the individual field measurement devices are as follows:

- P1. Determine the method detection limit
- P2. Evaluate the accuracy and precision of TPH measurement for a variety of contaminated soil samples
- P3. Evaluate the effect of interferences on TPH measurement
- P4. Evaluate the effect of soil moisture content on TPH measurement
- P5. Measure the time required for TPH measurement
- P6. Estimate costs associated with TPH measurement

The secondary objectives for the demonstration of the individual field measurement devices are as follows:

- S1. Document the skills and training required to properly operate the device
- S2. Document health and safety concerns associated with operating the device
- S3. Document the portability of the device
- S4. Evaluate the device's durability based on its materials of construction and engineering design
- S5. Document the availability of the device and associated spare parts

To address the demonstration objectives, both environmental and performance evaluation (PE) samples will be analyzed during the demonstration. The environmental samples will be collected from five areas contaminated with gasoline, diesel, lubricating oil, or other petroleum products, and the PE samples will be obtained from a commercial provider. Collectively, the environmental and PE samples will have the range of physical (sand, silt, and clay) and chemical (petroleum hydrocarbon type and concentration) characteristics necessary to properly evaluate the field measurement devices.

Upon completion of the demonstration, field measurement device and reference method results will be compared to evaluate the performance and associated cost of each device. The ITVRs for the seven devices are scheduled for completion in October 2001.