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13. ABSTRACT ***(Maximum 200 Words)***

Results are presented from a comprehensive field validation effort in which measurements from a cone penetrometer deployed laser-induced fluorescence (LIF) sensor are compared directly with results from conventional laboratory based chemical analyses of samples collected using traditional methods. In order to minimize spatial and temporal variability associated with sampling, discrete samples were collected immediately after push measurements by overdrilling the push hole with a hollow stem auger and collecting soil samples with a split spoon sampler. Data from sites investigated to date indicate that the *in situ* sensor data agrees(based on a detect/non-detect criterion) with EPA methods 418.1, Total Recoverable Petroleum Hydrocarbons (TRPH) and EPA method 8015, Total Petroleum Hydrocarbons (TPH) approximately 85% of the time. Results indicate that this is the same level of agreement observed for comparison of the two standard laboratory methods.

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ABSTRACT

Field Validation of the Site Characterization and Analysis Penetrometer System (SCAPS): Establishing Regulatory Acceptance for a New Field Screening Technology

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The Tri-Service (Army, Navy, Air Force) Site Characterization and Analysis Penetrometer System (SCAPS) program first demonstrated the use of a real-time chemical sensor deployed with a cone penetrometer for delineation of subsurface petroleum contamination. The SCAPS petroleum sensor uses an optical fiber (up to 100 meters long) to transmit 337 nanometer excitation energy from a pulsed nitrogen laser located at the surface through a sapphire window in the penetrometer probe. Fluorescence induced in aromatic hydrocarbons in the soil that contacts the window is returned to the surface over a second optical fiber where it is spectrally quantified using a photodiode array detector. Over the last several years this first generation nitrogen laser-based LIF sensor and more recently the "tunable" wavelength based LIF system have been demonstrated at numerous sites. Based on results from these initial investigations the Department of Defense proceeded with an implementation program that includes acquisition of government owned/government operated systems and private commercialization via tech transfer. In order establish the broadest possible acceptance of this new technology and thereby maximize potential cost savings a concurrent effort was launched by the Navy on behalf of the DoD Tri-Services to establish regulatory acceptance of the technology through a comprehensive field validation program.

In this paper we present results from a comprehensive field validation effort in which measurements from the cone penetrometer deployed LIF sensor are compared directly with results from conventional laboratory-based chemical analyses of samples collected using traditional methods. To minimize spatial and temporal variability associated with sampling, discrete samples are collected immediately after push measurements by overdrilling the push hole with an auger and collecting soil samples with a split spoon sampler. Data from sites investigated to date indicate that the *in situ* sensor data agrees (based on a detect/non-detect criterion) with EPA methods 418.1, Total Recoverable

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