Oil Spills and Environmental Forensics

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Regulatory agencies and trustees of natural resources are increasingly trying to identify parties responsible for accidental and uncontrolled releases of contaminants in receiving waters, ground water, sediments, and soils. As a result, potentially responsible parties find themselves needing to determine their share of the problem and associated costs for remediation, cleanup, and/or restoration of the contaminated environment.

For more than 10 years, professionals at ICF International have been assisting clients untangle the complex issues associated with determining responsibility and liability in the midst of a sensitive environmental problem like an oil spill. Our next-generation approach, Advanced Chemical Fingerprinting (ACF), involves source-specific chemical analyses and interpretation strategies to successfully identify, differentiate, and source-allocate contaminants. Our approach is no more expensive than traditional methods, yet it is more focused and efficient. The precise usage of the tools of ACF depends on the complexity of chemical contamination—the more complex the pollution sources, the greater the need for ACF techniques.

Specifically, we utilize ACF tools to help:

- Identify specific sources of contaminants or wastes in complex chemical environments
- Differentiate among multiple contaminant sources
- Allocate contributions of targeted contaminants to their respective sources

Meeting Our Client's Needs

ICF uses a core of investigative, analytical, and statistical techniques customized to meet the objectives of the particular situation. A customized approach makes the assessment more focused and cost effective.

Our experts work closely with our clients to assist in all aspects of the assessment, including sampling strategy and field collection in the important initial phase of the response. We work with the top laboratories in the US and internationally and provide technical and managerial support for the complex laboratory analyses. Our oversight ensures that sample analyses yield the high quality data required for the study. We also provide the necessary expert support in later phases.

Due to our extensive experience working on spills, our staff are experts in the management and analysis of the complex chemical data that has to be organized, analyzed, and presented. We offer customized data management services including validation, database development, GIS integration, and reporting.

A Multi-faceted Technical Approach

At the heart of our ACF service is our ability to:

- Tailor the approach to address the overall issue
- Target a very specific group of analytes
- Interpret the complex data from the perspective of the attorneys and experts who will use the data

Our formula for success includes a sequence of separate, but strategically-related, steps:

1. Determine possible sources of contamination

2. Select project-specific chemical targets and development of sampling strategies

3. Characterize identified sources, in terms of similarities and differences

4. Implement high-quality chemical analyses tailored to the project's specific requirements

5. Use statistical analyses and appropriate technical visual presentation

6. Implement allocation techniques

For oils spills, the incident generally compresses the first 4 steps and the need for advanced preparation is critical. We work with clients to develop and implement a defined set of initial response steps, including standardized procedures that can be rolled out across the organization.

Selected Projects

Our projects have involved nearly every type of petroleum product possible, from crude oil to gasoline; finished product, refinery intermediates, wastes; and fuels and lubricating oils. Our experience also includes projects involving other significant environmental contaminants such as coal tars and MGP wastes; chlorinated oils; solvents; road runoff and non-point sources like soot and air pollutant fallout; pesticides; and polychlorinated biphenyls and Aroclors. Examples of ICF's applications of ACF to oil spills include the following:

- For a pipeline release in Pearl Harbor, Hawaii, ICF provided response support to the commercial operator in the way of field technicians, data management, and chemical analysis support. ACF was used to determine the impact of the spill and to differentiate oil from the release from existing confounding sources including sunken naval vessels.
- For a spill of San Joaquin Valley crude oil in California, we used interpretation tools to distinguish petroleum hydrocarbon residues in spill-impacted sediments from chronic background and other potential spill sources.
- For a spill of No. 2 fuel oil in a heavily contaminated area of Arthur Kill, New York, we provided evidence that the contribution from the spill was negligible compared to the substantial background pollution consisting of crude and fuel.
- For an accidental oil release from a pipeline in Bolivia, South America, chemical analyses were used to evaluate source oil, oil residues, oiled sediment, water, and vegetation samples. We used high definition analyses to determine the effects of physical, chemical, and biological degradation on the spilled oil. Of particular note was the finding of significant photodegradation of the toxic components of the oil.
- For a project involving determination of the extent of contamination in an urban river from a coal-gasification plant, we relied on PAH sulfur-and nitrogen-heterocyclic compounds and triterpenoid biomarkers to differentiate sources of contamination from other sites.
- For an oil spill, we identified and allocated sediment hydrocarbons from natural seep and spill-related sources in a marine environment by using the unique relationships of substituted three-and four-ringed PAHs of the different sources.

About ICF International

ICF International (NASDAQ: ICFI) partners with government and commercial clients to deliver consulting services and technology solutions in the energy, climate change, environment, transportation, social programs, health, defense, and emergency management markets. The firm combines passion for its work with industry expertise and innovative analytics to produce compelling results throughout the entire program life cycle, from analysis and design through implementation and improvement. Since 1969, ICF has been serving government at all levels, major corporations, and multilateral institutions. More than 2,500 employees serve these clients worldwide. ICF's Web site is www.icfi.com.

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