



About

Dispersants are chemical agents used to break up oil into smaller droplets throughout the water column. Dispersants are applied to surface oil floating on water, or below the surface closer to an uncontrolled release of crude oil from a well blowout source. This series of fact sheets details monitoring requirements and how to apply the collected data to inform the use of dispersants under **Subpart J of the National Contingency Plan (NCP)**.

Total Petroleum Hydrocarbons (TPH)

Oil is made up of many types of hydrocarbons with various molecular structures and properties. TPH are a summation of the identifiable hydrocarbon compounds in the oil.

Measuring and Reporting TPH

TPH measurements from water column samples are obtained through gas chromatography (GC). This analytical technique separates and detects the chemical components to determine their presence, absence, and/or quantities. GC separates compounds into their gaseous phase, with individual compounds then identified by different methods:

- GC with a flame ionization detector (GC/FID)
 - An FID uses a flame to ionize the organic compounds that contain carbon and reads them with an electron detector to identify the compounds.
- GC with mass spectrometry (GC/MS) (Figures 1 and 2) – The MS ionizes the gases and identifies the compounds based on their mass-to-charge ratio.
- Field-based GC technology measurements can supplement laboratory analyses.

Chromatograms show the distribution of individual hydrocarbon compounds and can be used to calculate TPH (Figure 3). Hydrocarbon concentrations are reported in micrograms per liter ($\mu\text{g/L}$) or milligrams per liter (mg/L).

Description of the Requirement

The responsible party must collect and analyze water column samples from the ambient background, baseline oil plume, and dispersed oil plume for TPH, individual resolvable constituents including volatile organic compounds, aliphatic hydrocarbons, monocyclic, polycyclic, and other aromatic hydrocarbons including alkylated homologs, and hopane and sterane biomarker compounds, using standard operating and quality assurance procedures. Refer to the regulatory requirement in the Code of Federal Regulations (CFR): **40 CFR 300.913(b)**.

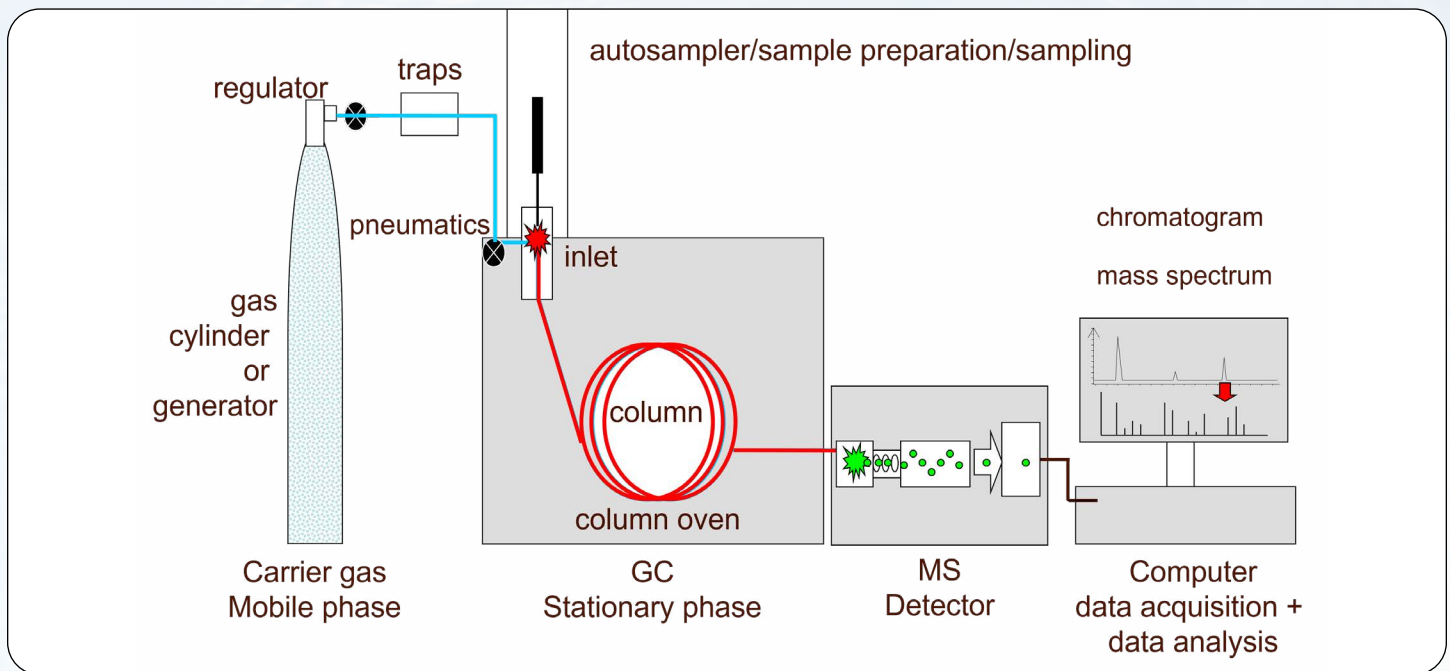
Using TPH Data

- TPH data identify the oil constituents present in the source oil and in the oil within the water column.
- TPH results can be compared with those from the source oil. As the oil in the discharge weathers, the TPH composition will change by the loss of lower molecular weight compounds.
- Oil composition impacts dispersants, with dispersant effectiveness decreasing as the oil weathers.

▶ Decision Points for Responders

The On-Scene Coordinator should consider all available data and information relevant to the response and consult with subject matter experts. Comparing samples taken at different times during the response will provide a measure of oil weathering and can inform the On-Scene Coordinator whether dispersant use should begin, continue, continue with modifications, or cease.

Figure 1: Diagram of a gas chromatograph/mass spectrometer.



Credit: Anthias Consulting Ltd.

Figure 2: A gas chromatograph/mass spectrometer.



Credit: EPA

Data Collection and Reporting Frequencies

Collection

TPH data from the ambient background water column and baseline oil plume.

Daily: TPH data from the dispersed oil plume.

Reporting

Immediate: Important ecological receptors' exposure to TPH.

Daily: Most current available TPH data and analyses – not to exceed a five-day window between collection and reporting.

Additional Resources

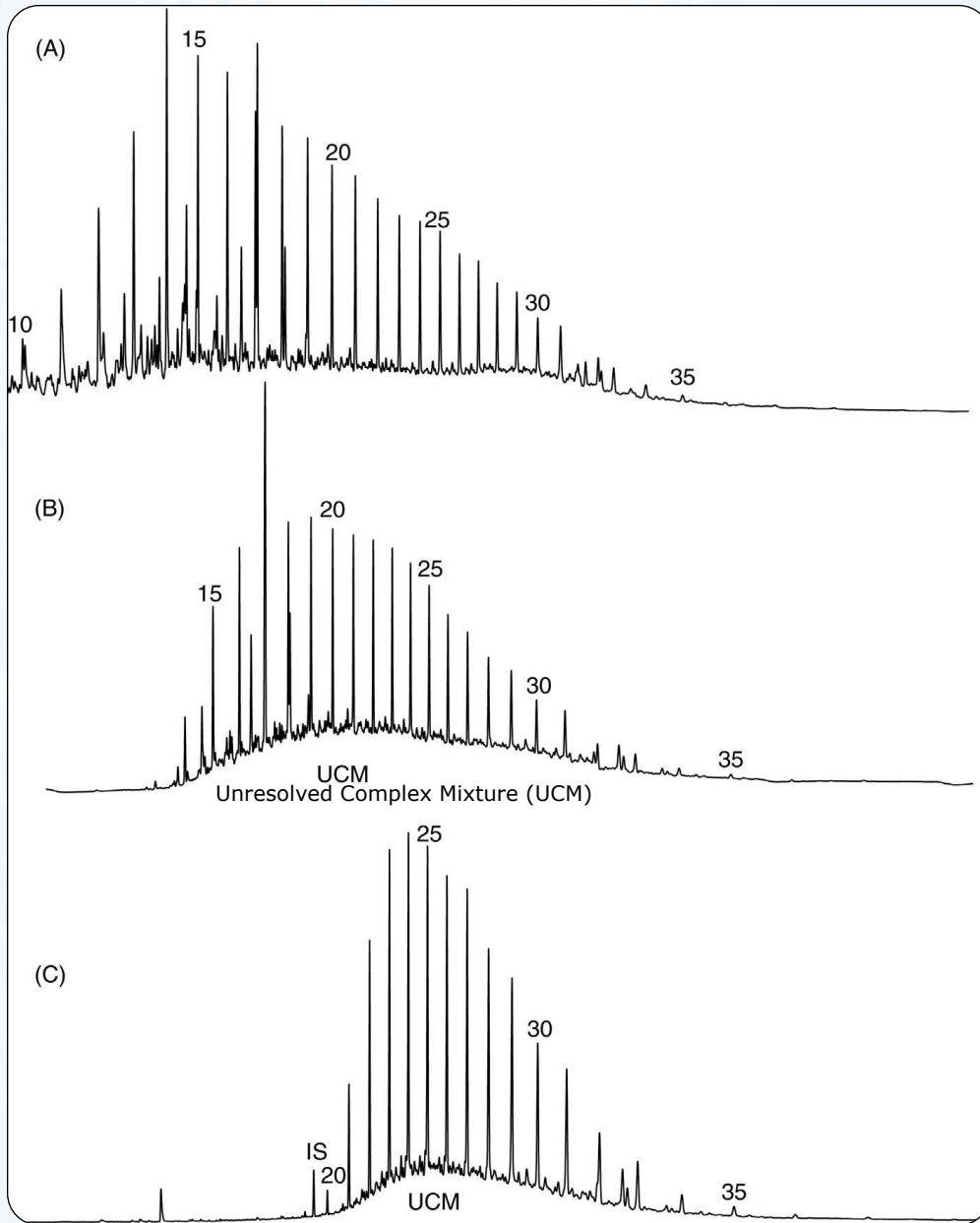
NCP Product Schedule Technical Notebook

A compilation of product bulletins summarizing data requirements and test results for dispersant products listed in EPA's NCP Product Schedule. The Technical Notebook includes information on dispersant application methods, toxicity and effectiveness, and physical properties.

Oil Spill Emergency Response – Monitoring the Use of Dispersants Fact Sheets

- Water Column Sampling
- Reporting of Dispersant Use
- Characterization of Ecological Receptors – Habitats
- Characterization of Ecological Receptors – Toxicity

Figure 3: Sample chromatogram showing oil weathering: (A) slightly evaporated crude oil, (B) moderately evaporated crude oil, and (C) severely evaporated crude oil. The peaks represent individual hydrocarbon compounds. For example, “15” represents a compound with 15 carbon atoms (C15).



Credit: Stout and Wang (2016)

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