Guidance on SSDI Monitoring: Informing Response Operations

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Clean Gulf Conference – 2016
Subsea Dispersant Monitoring Session

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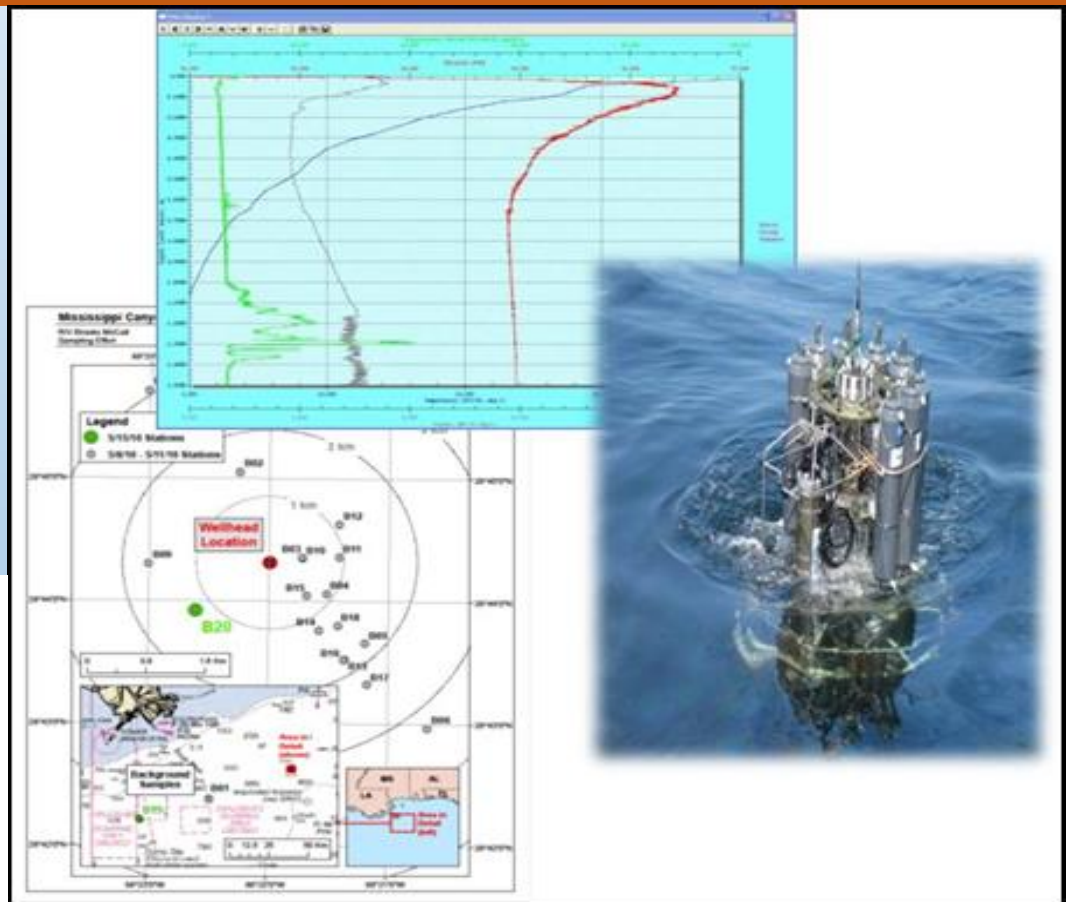


Sponson *group*
www.sponson.net

Monitoring Overview

Logistics and Planning Issues

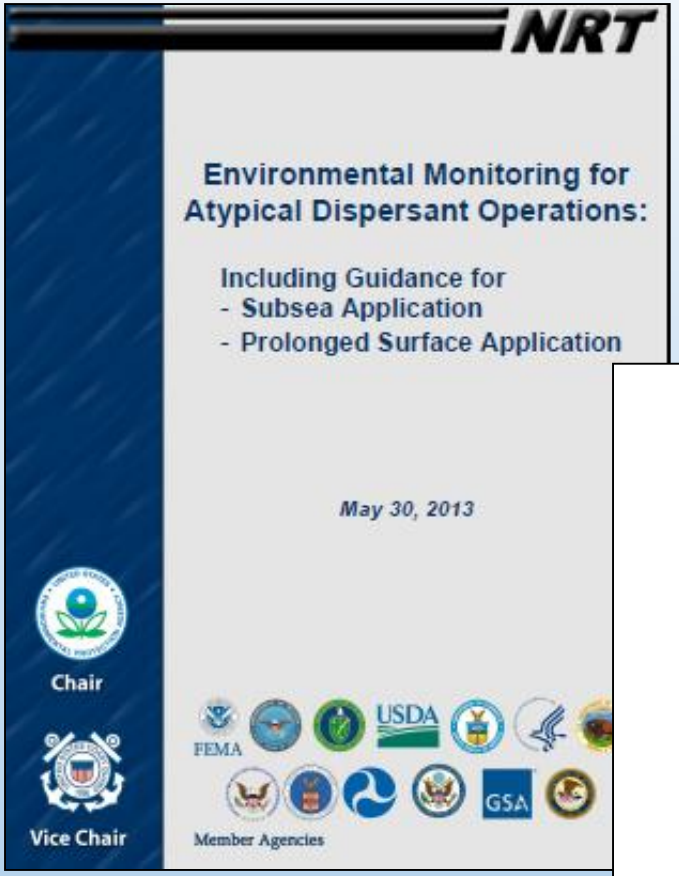
Plan Approval

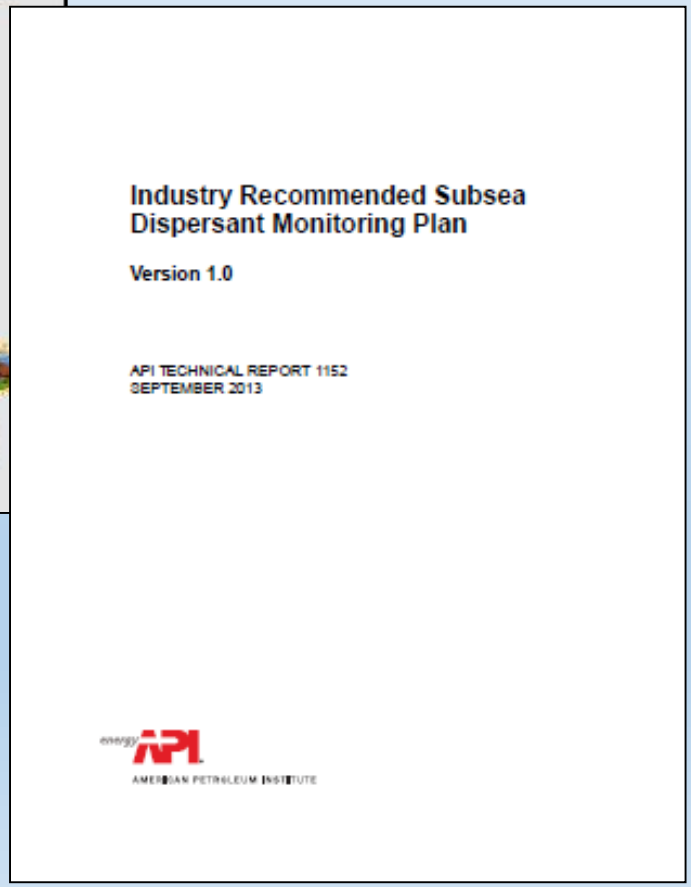
Contract Vessels

Organize Crew

Obtain Equipment

Guidance for Subsea Dispersant Monitoring





We must recognize the distinction between monitoring efforts specifically designed to support operational decision-making, versus that which supports natural resource assessments.
Both of these documents provide:

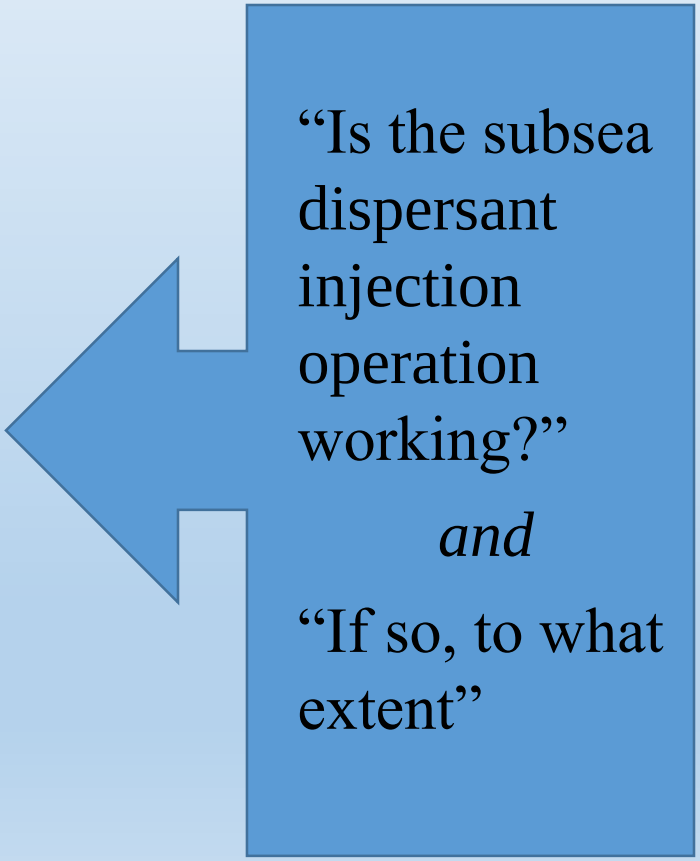
- guidance to develop operational, incident-specific monitoring plans
- comparable methods and equipment for determining dispersant efficacy and characterizing subsea dispersed oil plumes
- recommended procedures for ensuring data quality and communicating monitoring results with internal and external stakeholders

Operational Monitoring Considerations

FACTORS	*EXAMPLES*
1. Conducted in a safe manner without impeding Source Control activities	➢R/V activities must integrate into SIMOPS; and cannot interfere with ROV cables/tethers
2. Feasible data or sample collection	➢Down-hole sample of oil may be unobtainable (if so, use a surrogate)
3. Operationally realistic	➢Limited instrumentation capacity in a vertically deployed array
4. Technologically current instrumentation that is appropriate for seaboard conditions	➢Optical DO probe vs Winkler titration
5. Collect data and/or samples that can be processed and interpreted to provide near real-time information to determine if dispersant is working as expected	➢Surface slick visual surveillance, droplet particle size and DO data are available immediately (operational); water, tissue and sediment samples specified in NRT document take longer (NRDA)
6. Flexible approach that can be adapted to changing weather, ocean conditions, and spill characteristics	➢If monitoring needs to be temporarily suspended, dispersant ops should continue

SSDI Operational Monitoring Objectives

1. Monitor VOC concentrations at Source Control in order to maintain a safe working environment
2. Confirm dispersant effectiveness
3. Characterize dispersed oil concentrations and dissolved oxygen concentrations at depths in the water column
4. Obtain detailed chemical characterization of water samples



Obj. 1 VOC and LEL Data

- Primary emphasis of surface air VOC and LEL monitoring should be on worker health and safety concerns associated with Source Control and other direct response activities at the wellhead
- This data should be collected by first vessels arriving on scene (before research vessels deploy)
- Industrial hygienist who understands protection levels and OSHA requirements

The device was provided by: Josh Etzkorn (CTEH)
Photos property of EM&A, Inc.

Obj. 2 Confirm Dispersant Effectiveness

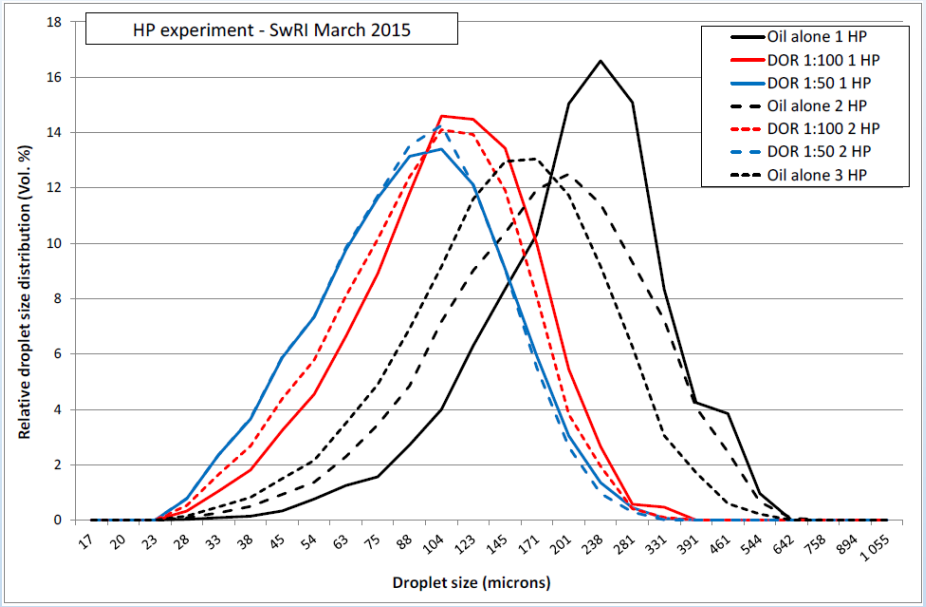
- Laboratory and mesocosm studies performed in past 5 years have confirmed that SSDI is effective under high pressure
- During a spill, effectiveness is determined:

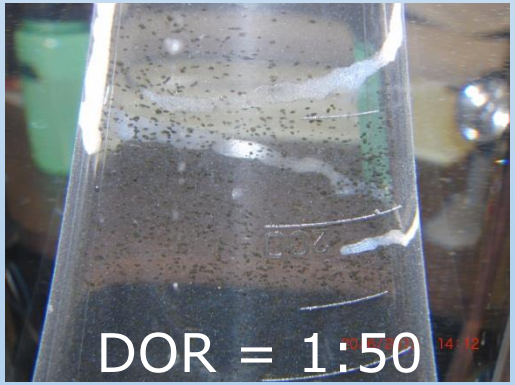
Qualitatively

- visual reduction in surface slick and visual change in subsea plume

Quantitatively

- VOC reduction
- Confirm a shift to smaller droplet sizes





API funded studies:
Top (SINTEF/SWRI);
Bottom (Univ. of Hawaii)

Obj. 3 Rapid Characterization of Hydrocarbon & Dissolved Oxygen Concentrations

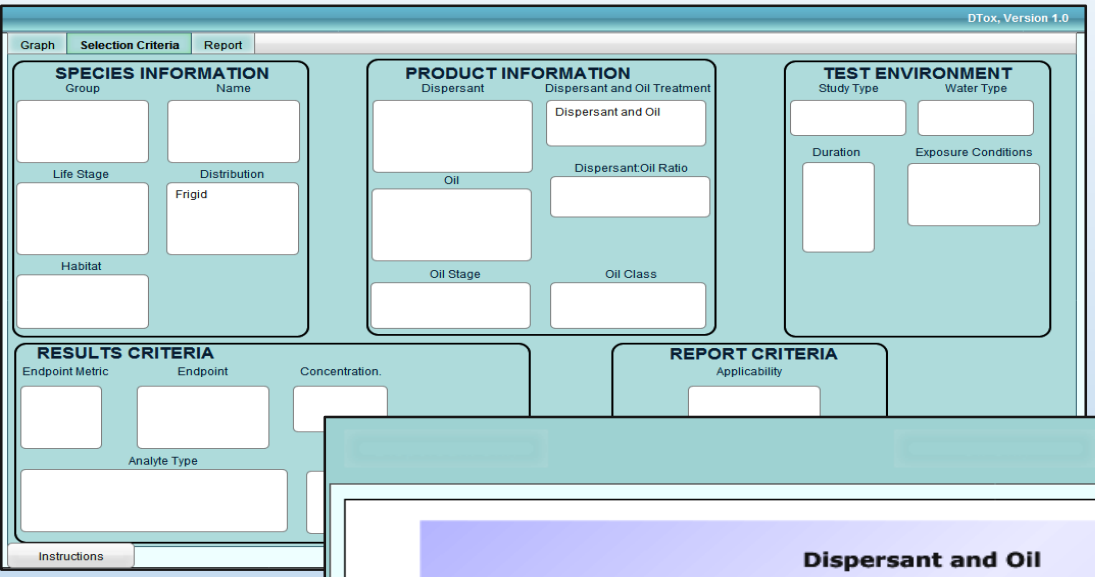
- Fluorometer and dissolved oxygen (DO) probes can provide “real-time” information. This information serves two purposes:
  - Increased HC concentrations in the water plume and a small reduction in DO is an indication that SSDI is working
  - This data stream can be used to validate the original NEBA/SIMA justification for SSDI use at the spill.

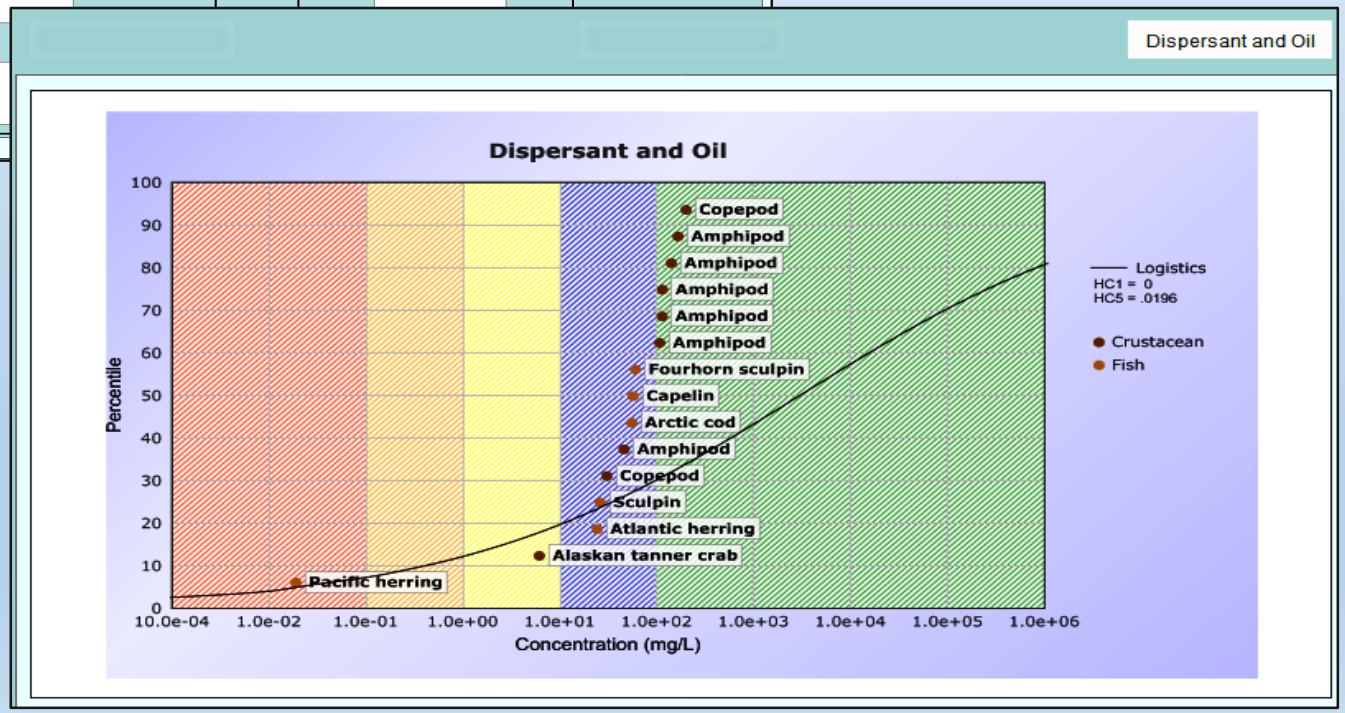
Plume Rating	Fluorescence signal (mg/m^3)
No plume	Background
Weak	+ 5 mg/m^3 above background
Moderate	+5 to +15 mg/m^3 above background
Strong	>15 mg/m^3 above background

** Spill Impact Mitigation Analysis or “SIMA” is the environmental tradeoff analysis for response options.*

Obj. 4 Detailed Characterization of Hydrocarbon Concentrations

DTox Database Tool for Examining Biological Effects (available on NOAA ORR website – CAFE)





Bejarano A. C., J. Clark, and G. Coelho. 2014. Issues and challenges with oil toxicity data and implications for their use in decision making: A quantitative review. Environmental Toxicology and Chemistry 33:732-742.

Interpreting the Data

Exceedance of any set action levels should not necessarily trigger a subsea dispersant shut-down

- May not indicate that the rationale used to employ subsea dispersant use has changed

and

- Should trigger a SIMA re-assessment of subsea dispersant use by a team of experts

Other Monitoring Considerations

- The guidance documents provide a flexible framework
- They are not a replacement for a detailed shipboard data collection plan
- Science team needs to understand dispersant and dispersed oil science in order to meaningfully interpret that data to inform ongoing subsea dispersant ops and SIMA
- Surface and subsea dispersant monitoring, and monitoring programs for regulatory compliance and NRDA may be occurring concurrently. Try to coordinate to the extent practicable.

Final Thoughts

- Industry engagement with Regional and National agencies has led to improvements in:
  - Operational methods
  - Monitoring technologies and protocols
  - Regulatory engagement protocols

- Value of API Industry Plan
  - Aligned with NRT guidance
  - Globally transferable
  - Centered on clear, operational use and decision-making
  - Provides practical guidance on subsea monitoring
  - Adaptive, collaborative approach to improve process

Additional Information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2014 INTERNATIONAL OIL SPILL CONFERENCE

A Collaborative Effort to Define the Application, Approval, and Monitoring Process for Subsea Dispersant Use

- Available at:

http://ioscproceedings.org/doi/pdf/10.7901/2169-3358-2014.1.238