



Assuring Good Practice in Dispersant Application:
Effectiveness Monitoring
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Learning Outcomes

- ▶ Understand the Tiered SMART approach
- ▶ Understand the basic principles of Fluorometry
- ▶ Why we use SMART

What is SMART

- ▶ Special Monitoring of Appplied Response Technologies
- ▶ A three tier system to monitor the effectiveness of dispersant operations and to feed real time data back to unified command.
- ▶ The monitoring data provided by these teams assist the Unified Command with the critical question:

When dispersants are used during spill response, are the dispersants effective in dispersing the oil?

SMART Tier I: Visual Observations

- ▶ Qualitative assessment of dispersant effectiveness by a trained observer.
- ▶ Visual monitoring may be enhanced by advanced sensing instruments such as infrared thermal imaging.
- ▶ Visual monitoring is relatively simple and readily done.



Under dosing/ineffective

- ▶ Too little dispersant is applied, which will mean that the spray run will be ineffective and you will see no effect other than the temporary herding caused by the bow wave. The oil will remain on the surface in its original state



Overdosing/ineffective

- ▶ Where too much dispersant is applied, will result in a cloudy white plume appearing in the water. This can be counteracted by increasing the speed of the vessel or decreasing the pump rate, thereby reducing the application rate.



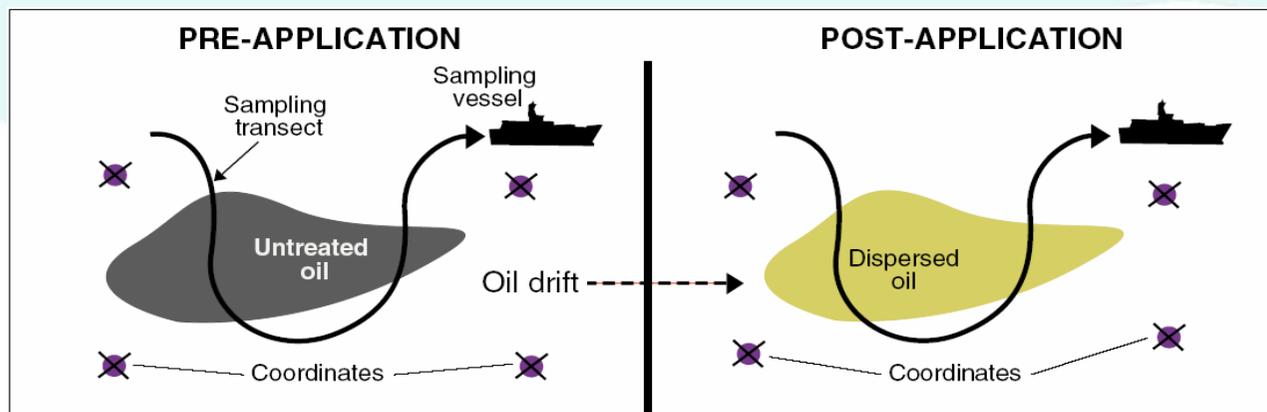
Effective Dispersion

- ▶ Effective application of dispersant is characterised by seeing a grey or coffee coloured plume appearing in the water column



SMART Tier II: On-Water Monitoring for Efficacy

- ▶ Real-time monitoring (fluorometry) and water sampling.
- ▶ Under ideal circumstances, the team collects data in three primary target locations:
 - 1) *Background water (no oil)*
 - 2) *Oiled surface prior to dispersant application*
 - 3) *Post dispersant application*



What is Fluorometry?

- ▶ Fluorescence is the molecular absorption of light energy at one wavelength and its nearly instantaneous re-emission at another, usually longer wavelength.
- ▶ Fluorometers measure the natural tendency of some compounds to fluoresce after absorbing UV light. All compounds vary in their absorption and emission spectra which allows fluorometry to be a highly analytical tool.

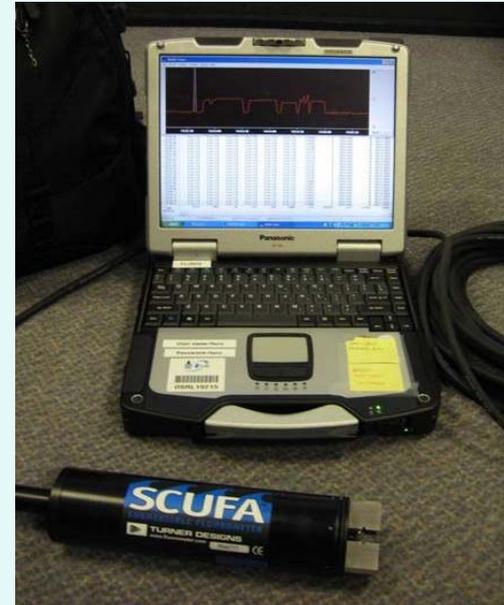
What equipment do we use?

► SCUFA & C3

- Lightweight
- Low power
- Easy to set up and use

► Contents:

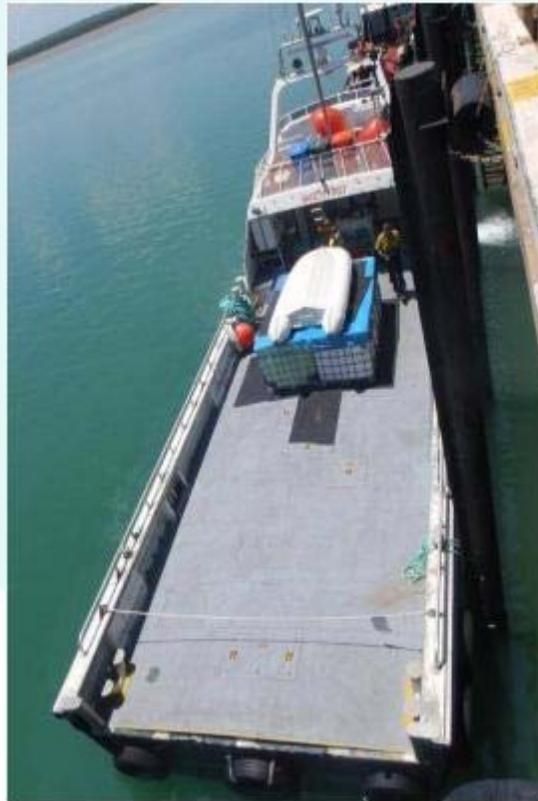
- SCUFA
- Cable
- Computer with integral GPS





Montara – First Class

- Shelter?
- Sanitary?
- Food?
- Water supply?
- Working space?
- 1- to 2 knots



Deepwater Horizon –
International Peace

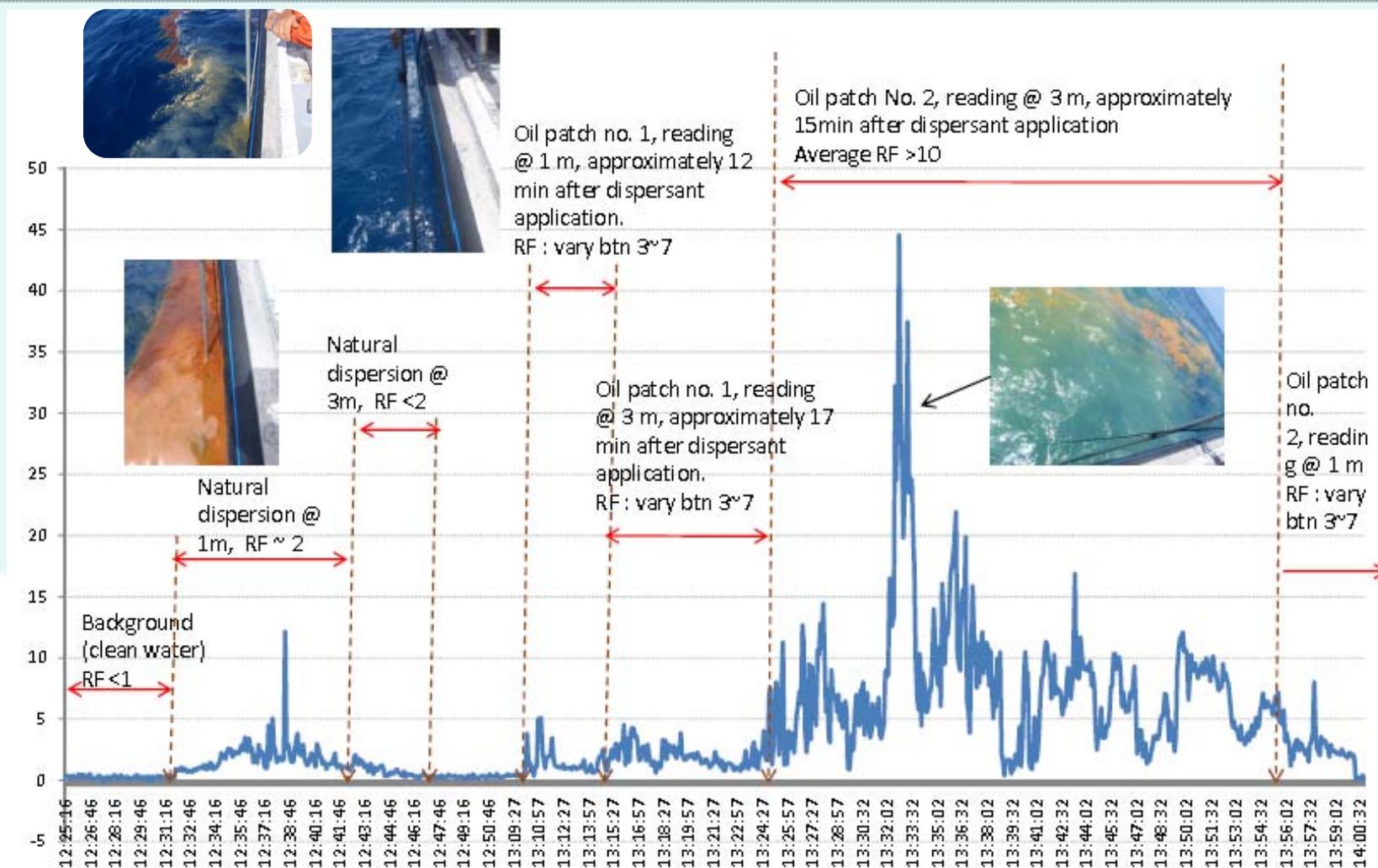


SMART Tier III: Additional Monitoring

Tier III collects information on the transport and dispersion of the oil in the water column. It helps to verify that the dispersed oil is diluting toward background levels and may include:

- *Multiple depths with one instrument (depth transects)*
- *Transect at two different depths*
- *Water parameters*
- *More involved sampling*

Fluorometry result- Montara

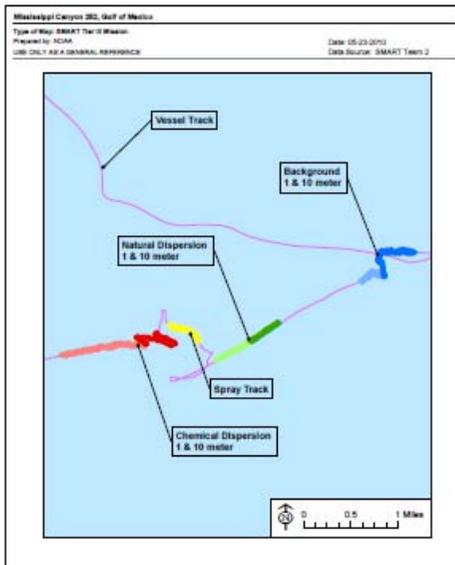
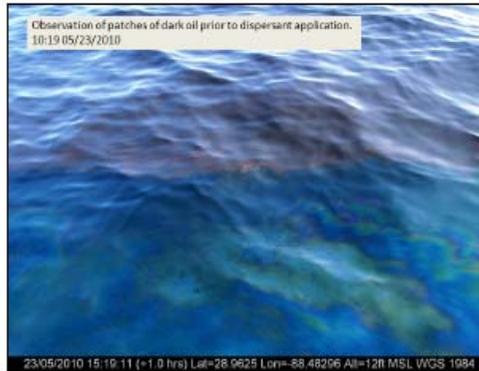
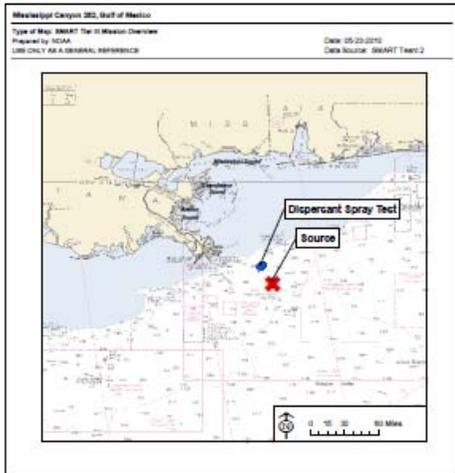


Our involvement in Macondo

- ▶ Preparation for SMART
 - Sourcing the vessel
 - Fluorometry setup
- ▶ Tier III SMART Protocol
 - Visual Observation
 - In-situ water monitoring for efficacy
 - Multi depths monitoring
- ▶ Scientific monitoring

Example of fluorometry report

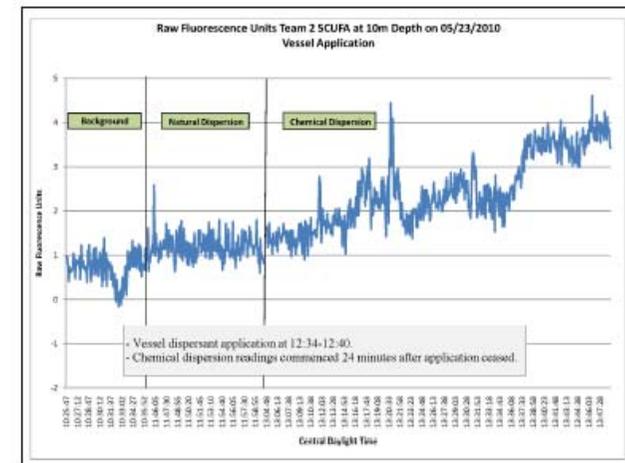
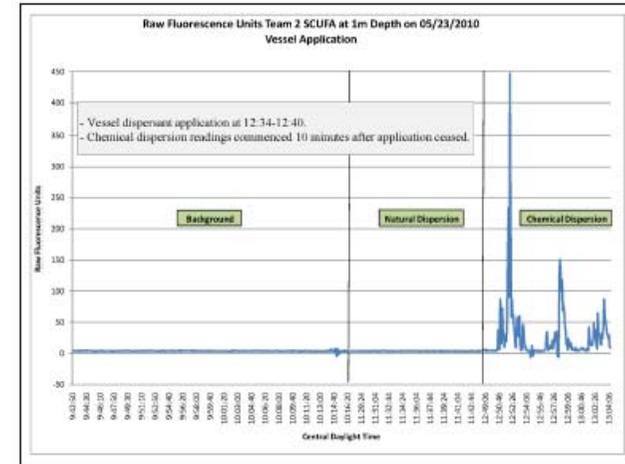
SMART Team 2 Dispersant Monitoring May 23, 2010



Weather Information

Wind: Force 2-5 Swell: 1-3 ft Water: Bluish green Visibility: Good
 Seas: calm Water Temp: 29.2°C Air Temp: 30°C Sky: Clear

Results of a vessel applied dispersant application test to evaluate the efficacy of chemical dispersants on Mississippi Canyon 252 crude.



ASSESSMENT -

Based on fluorometry and visual observations, this dispersant applications appears quite effective.

Why use SMART?

- ▶ Helps decide on suitable response strategies.
- ▶ Provides the client with visual and scientifically based data of dispersant effectiveness.
- ▶ Proof of presence of oil in the water column.
- ▶ Prevents unnecessary spraying on unsuitable hydrocarbons avoiding:
 - *excessive cost,*
 - *environmental damage.*

What this means to us?

- Credibility of the response
- Accountability
- Evidence of effectiveness
- Qualitative results
- Need for higher level of information
- Building history and case studies

