

MC 252: The Use of Dispersants on Sea and Subsurface.

Dave Salt, Operations Director, *Oil Spill Response*

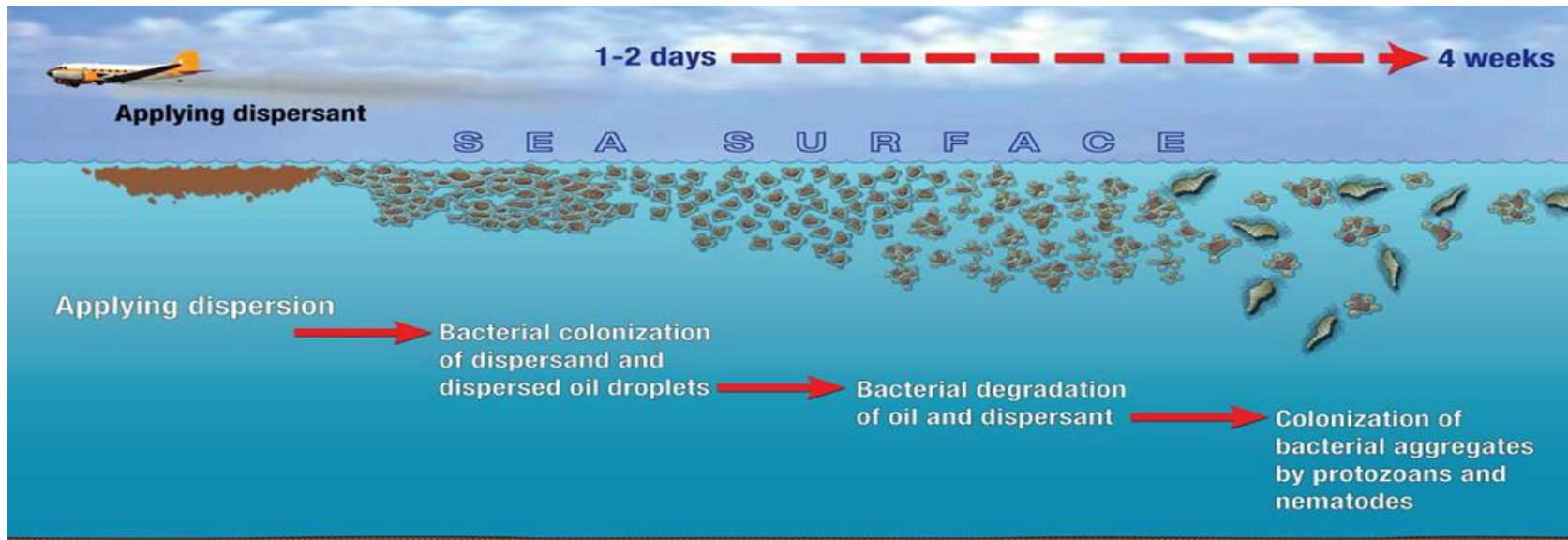
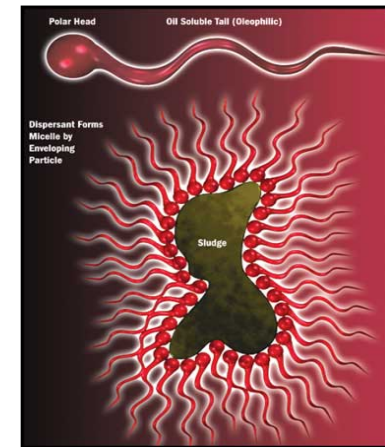


Contents

- Overview of dispersants.
- Use of dispersants subsurface on the Deepwater Horizon Spill.
- Use of dispersants on the sea surface during Deepwater Horizon.
- Use of dispersants in reducing VOCs near the source.
- Dispersant Effectiveness Monitoring during Deepwater Horizon.
- Public Opinion on the use of dispersants on the Deepwater Horizon.
- Future dispersant issues

Dispersants

- Dispersants are solutions of surfactants dissolved in a solvent
- Surfactants reduce oil-water interfacial tension – allows slicks to disperse into very small droplets with minimal wave energy
- Dispersed oil rapidly dilutes to concentrations <10 ppm within minutes, <1 ppm within hours, ppb range within a day
- Each dispersed oil droplet is a concentrated food source that is rapidly colonized and degraded by marine bacteria
- Dilution allows degradation to occur without nutrient or oxygen limits





Why use Dispersants?

- Advantages
 - Safety benefit
 - Rapid response over large areas
 - Application in relatively rough weather
 - May break / inhibit formation of emulsions
 - Reduces waste, through reduced shoreline impact
- Disadvantages
 - Redistribution of pollution
 - Effects on organisms in the top part of the water column or shallow water e.g. Aquaculture
 - Time window for effective use
 - Release profile important
 - Monitoring arrangements / protocols
 - Required resources – boats, planes, support staff

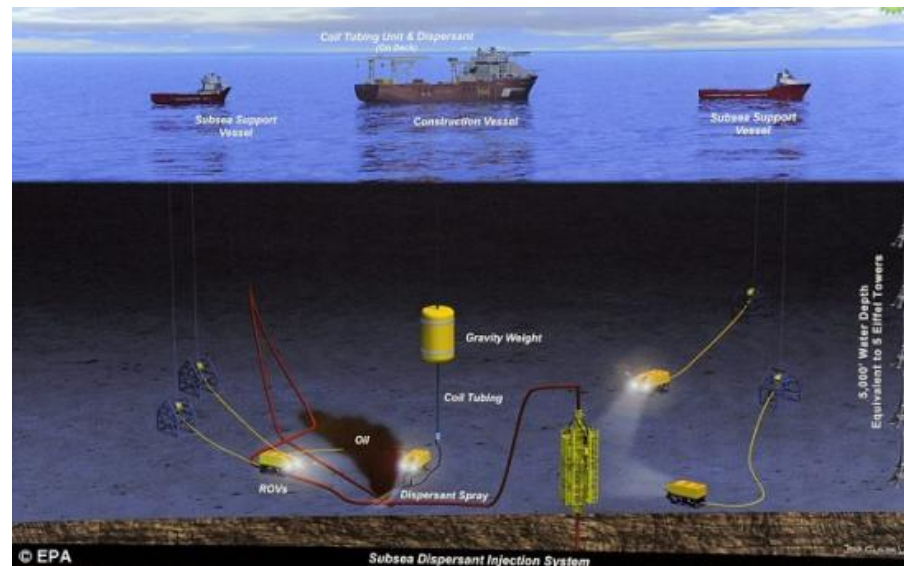


Logistics Required to Spray Dispersant

- Supply chain. Dispersant was manufactured during the Deepwater Horizon response to ensure that stocks matched demand.
- Planes. Aircraft that are fitted to spray and spotter planes required to guide them onto the oil.
- Boats. Used either to spray more smaller volume, localised areas of hydrocarbon or to deploy dispersant effectiveness equipment from.
- Control of the airspace is an important consideration in large scale responses such as GOM, on peak days there were nearly a 100 sorties.

Use of Dispersants Subsurface

- The EPA (Environmental Protection Agency, USA) has allowed the use of dispersants subsurface since the 1990's.
- On the Deepwater Horizon dispersant was originally applied straight into the oil at source, latterly being applied through the 'top hat'.
- Safety benefit of treatment
- Injection of dispersant direct into the source increases the effectiveness of oil treatment.



Deepwater Horizon Source

- Photo on the left shows the source site prior to subsurface injection and the one on the right shows it subsequent to the injection starting.



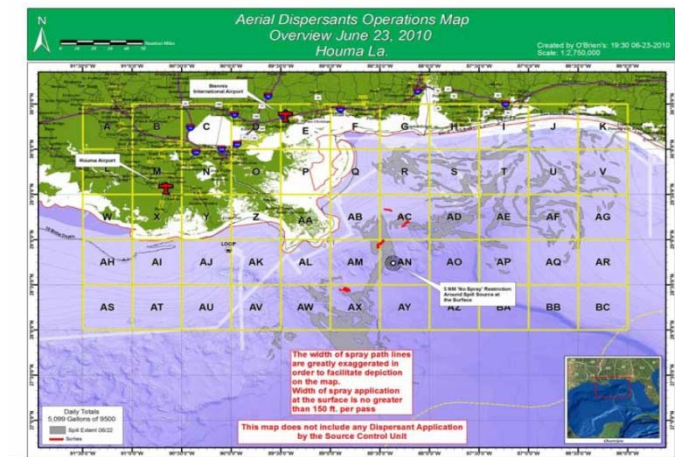
Use of Dispersants on the sea surface near the source - Deepwater Horizon

- Using the *HOS Super H* and the *Adriatic* vessels.
- Dispersant was applied using boat spray sets when the levels of the VOCs near the source site reached unacceptable levels, enabling work to continue on the drilling and containment rigs/vessels.

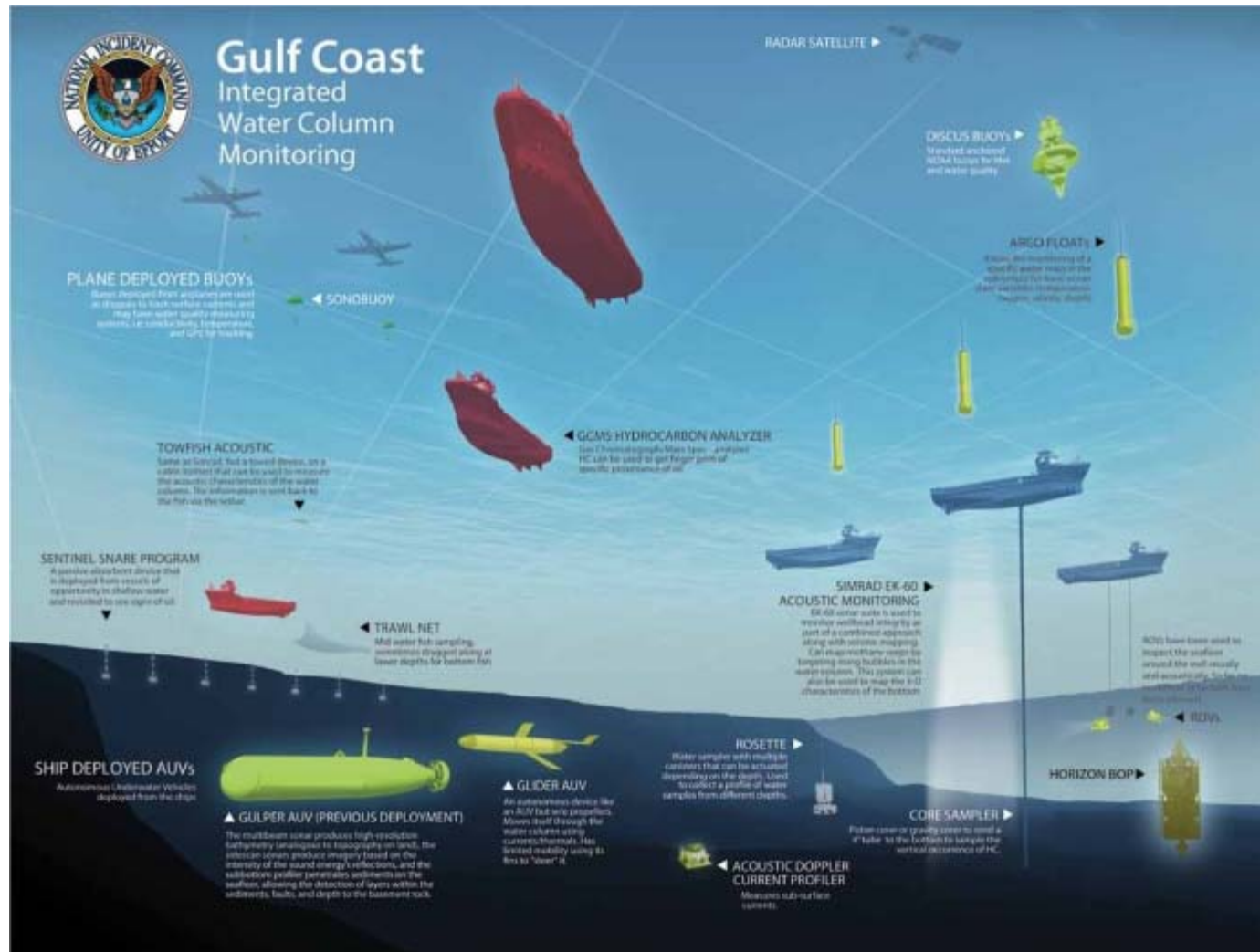


Use of Dispersants on the Sea Surface - Deepwater Horizon

- 976,000 gallons of dispersant applied.
- 90 days of continuous operations.
- 61 days of spraying.
- Using 20 aircraft (12 spray planes, 8 spotter planes).
- Air traffic and spray management programme
- Conducting 412 Spray sorties.
- 816 recon and spotter sorties.



Deepwater Horizon- Water Column Monitoring



SMART

- Special Monitoring of Applied Response Technologies.
- Provides measures of dispersant effectiveness.
- Tier 1- Visual Observation
- Tier 2- Fluorometer takes readings at 1m and water samples taken.
- Tier 3- Fluorometer takes readings at 1 and 10m a portable water laboratory provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity.





Public Reaction to the Use of Dispersants in the Deepwater Horizon Spill

- Negative media and public reaction to the use of dispersants restricted their use on the spill.
- JITF / OGP recognised this in their lessons learnt report on the GOM spill.
- It is recommended that industry and (US government) agencies work together to communicate the risks v benefits of dispersant use.
- Research into the behaviour and long term fate of dispersant should also be conducted.



Future dispersant issues

- Stakeholder Communication
- Approvals and permissions
 - International issues remain
 - Harmonise approval systems
 - Extending range of products available
- Application systems
 - Surface / subsurface / aerial
- Dispersant supply
 - Product volumes
 - Logistics



Summary

- Dispersants can be an effective way of reducing the shoreline impact through either subsurface or subsurface application.
- The use of dispersants on Deepwater Horizon was unprecedented in its scale which led to many logistical challenges on product supply delivery.
- Dispersant was used in novel ways such as to suppress VOCs as a safety element of response
- A large amount of data on the effectiveness of dispersant use has been gathered via different means.
- Questions remain that must be addressed beyond reasonable doubt
- Monitoring protocols must be developed to support use
- Better communication of the argument to use dispersants is still required.