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# Dispersants: A Brief Overview

Dr. Tom Coolbaugh  
ExxonMobil Research and Engineering  
Fairfax, Virginia

# Spill Response Options: The Toolbox



**Monitor & Evaluate**



**Mechanical Recovery**



**In-Situ Burning**

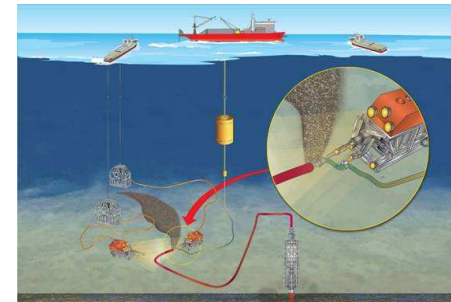
**Aerial**



**Dispersants  
Vessel**



**Subsea**

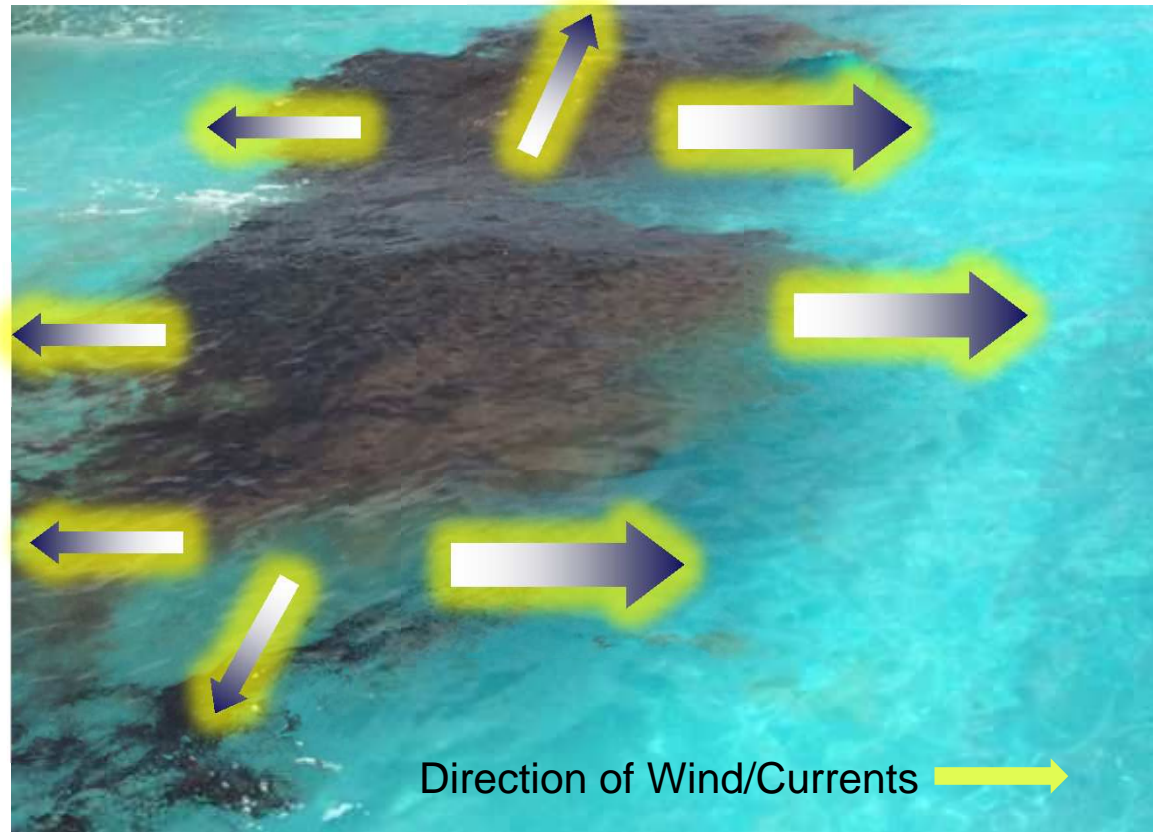


*The goal is to design a response strategy based on Net Environmental Benefit Analysis (NEBA)*



# Oil Slicks Spread Quickly

- A slick continuously expands and oil thins
  - The size of the problem will increase with time
- Response options get less efficient with time



# Dispersants – What are they?

- Dispersants are solutions of surfactants in a solvent
- Surfactants reduce oil-water interfacial tension – allows slicks to disperse into very small droplets with minimal wave energy



**Water-Compatible (Hydrophilic)**

**Oil-Compatible (Lipophilic)**

- Dispersed oil dilutes to concentrations <10 ppm within minutes, <1 ppm within hours, ppb range within a day
- Dispersed oil droplets are a concentrated food source that is rapidly colonized and degraded by marine bacteria
- Dilution allows biodegradation to occur without nutrient or oxygen limits

# Human Health Considerations

- Modern dispersants use ingredients found in household products
  - NALCO website\*
  - Centers for Disease Control assessment supports low health risk
- Following proper application procedures and wearing appropriate equipment is important
- NOAA & FDA test results for dispersants in Gulf seafood, "There is no question Gulf seafood coming to market is safe from oil or dispersant residue."

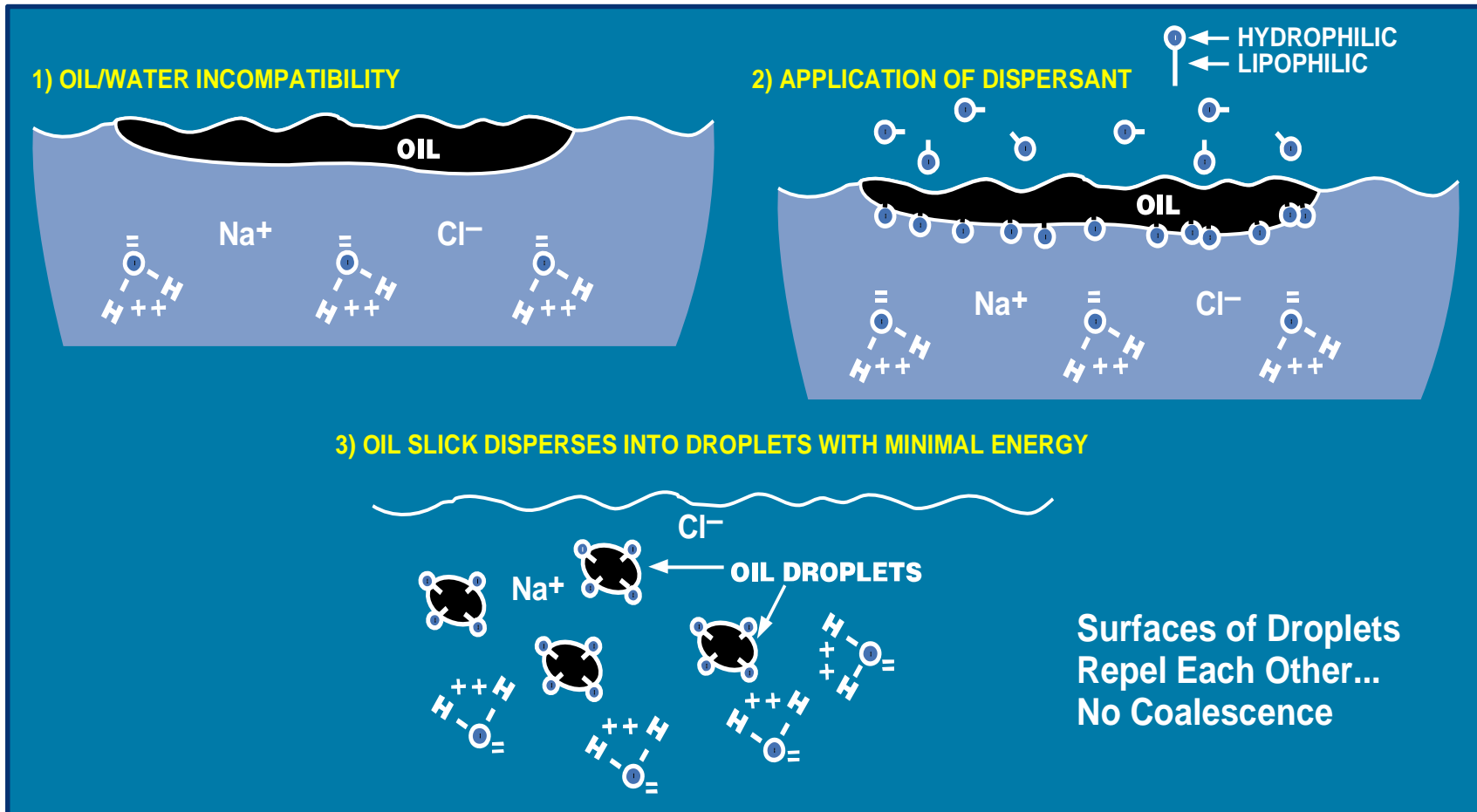
*([http://www.noaaews.noaa.gov/stories2010/20101029\\_seafood.html](http://www.noaaews.noaa.gov/stories2010/20101029_seafood.html))*

Corexit® 9500 Ingredients	Common Day-to-Day Use Examples
Span™ 80 (surfactant)	Skin cream, body shampoo, emulsifier in juice
Tween® 80 (surfactant)	Baby bath, mouth wash, face lotion, emulsifier in food
Tween® 85 (surfactant)	Body/Face lotion, tanning lotions
Aerosol® OT (surfactant)	Wetting agent in cosmetic products, gelatin, beverages
Glycol butyl ether (solvent)	Household cleaning products
Isopar™ M (solvent)	Air freshener, cleaner

\*<http://www.nalco.com/applications/corexit-technology.htm>

# How Dispersants Work

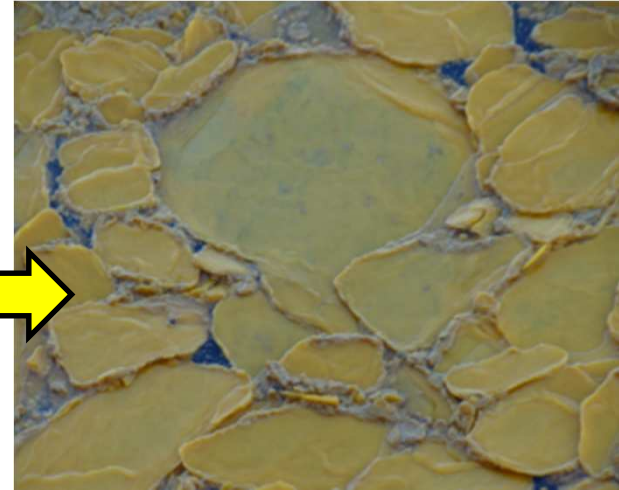
The Goal: Reduce Oil Concentration to Below Impact Levels Rapidly



# Factors Influencing Effectiveness

- Oil Type/Properties

- Viscosity
- API Gravity
- Wax Content/Pour Point

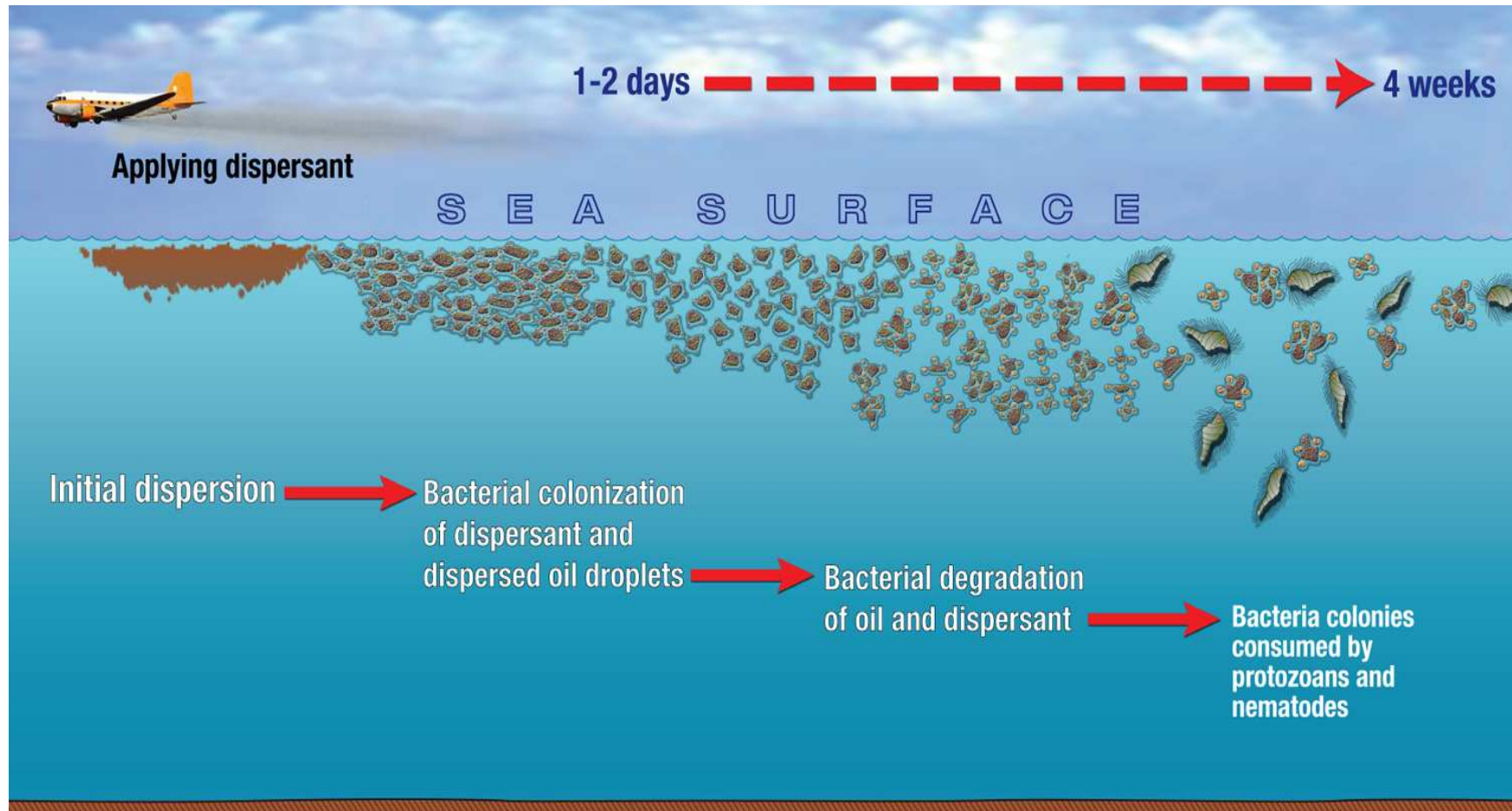


- Environmental Conditions

- Water Temperature
- Sea State (Mixing Energy)
- Extent of Weathering (How Long on the Sea)
- Water Salinity

# Dispersants Enhance Removal of Oil

*Through Biodegradation*





# Summary

- Oil spill response must be robust and should use all available tools
- Highest priority is human health and safety
- Basic strategy for addressing a spill
  - Respond as close to the source as possible
  - Use all appropriate tools to keep oil from reaching shorelines
- Dispersant use presents significant advantages over the limitations of mechanical recovery and should be considered as a primary response option
- Work is ongoing to enhance response capabilities