INTERNATIONAL MARITIME ORGANIZATION

GIWACAF

The Global Initiative for West, Central and Southern Africa

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Webinar #3: the use of dispersants in case of an oil spill

Example of the good use of dispersants as part of oil spill response

Justina Lee
OSEC, Shell

21 June 2021

Agenda

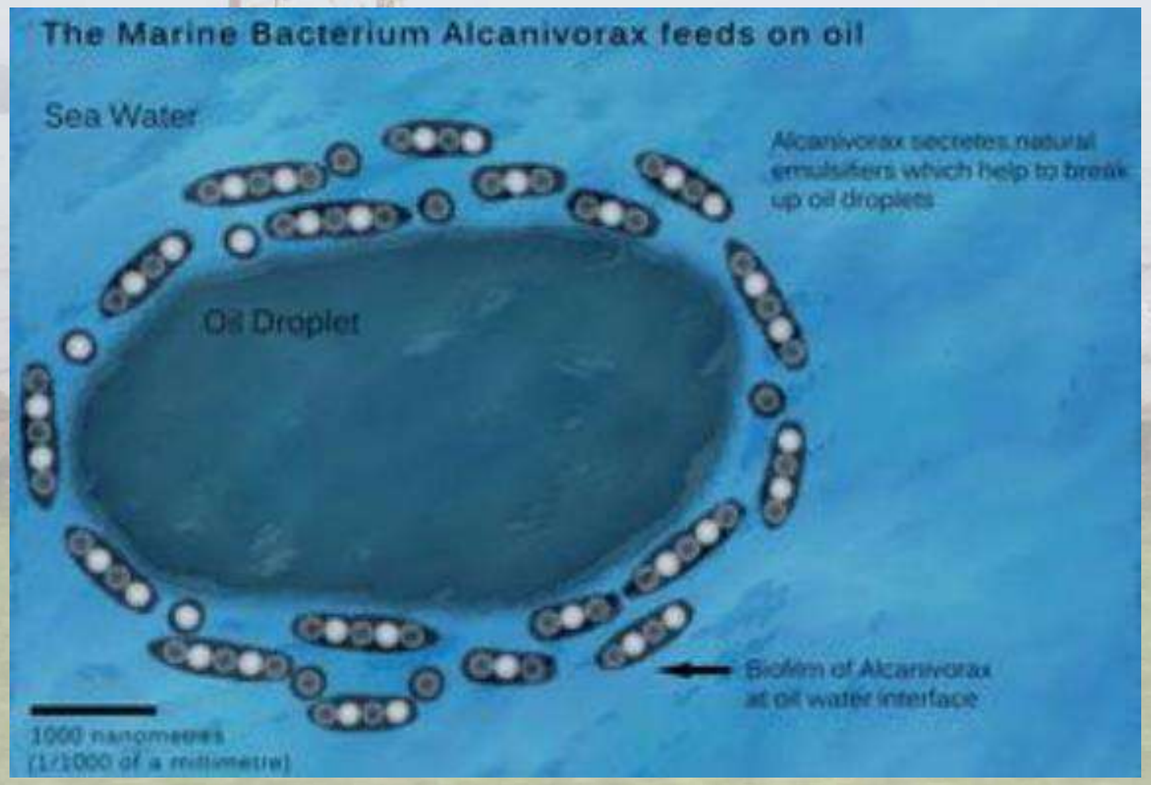
- What are dispersants?
- Oil eating bacteria
- Dispersants toxicity tests
- NEBA/SIMA of dispersant use
- Planning for dispersant use
- Dispersants best practice

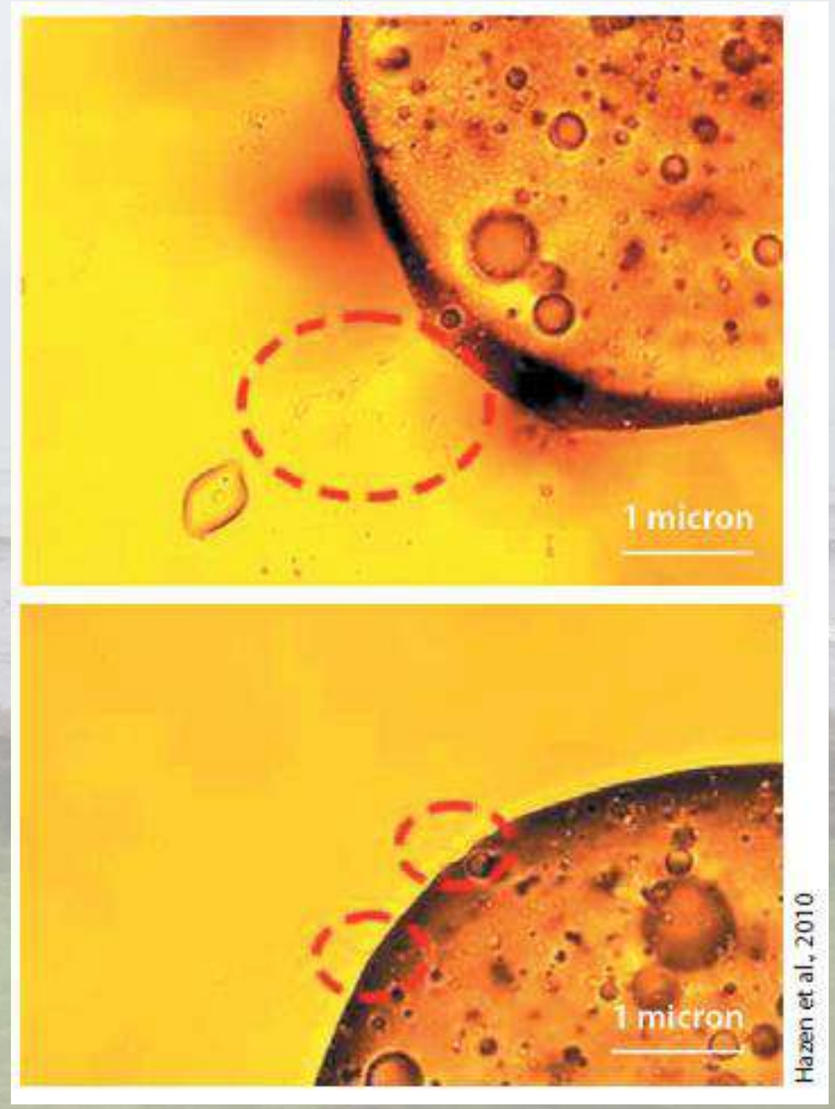
Oil eating bacteria

Dispersants break the large oil slick up in tiny droplets,

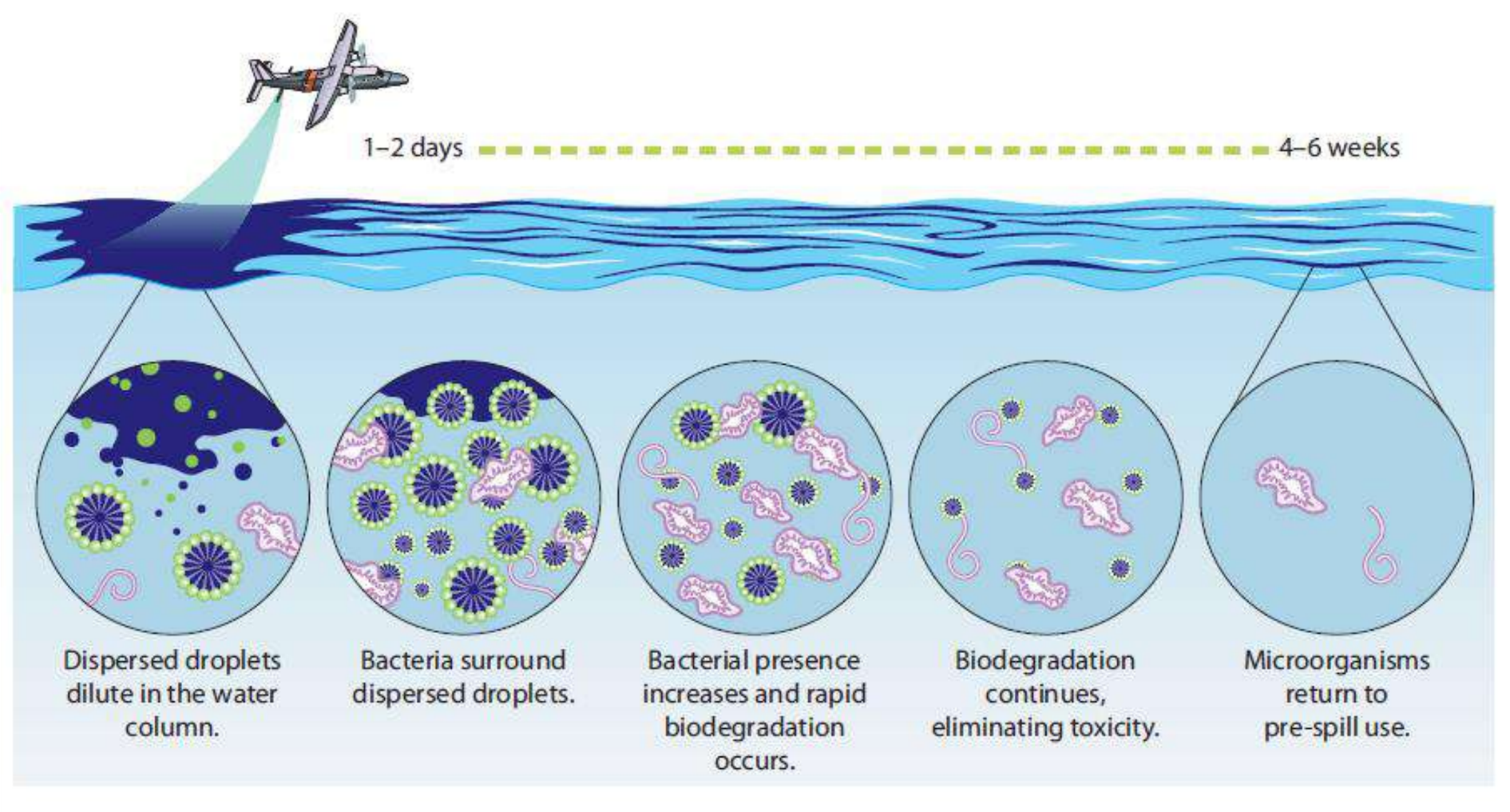
smaller than a human hair.

Small tiny droplets are easier for bacteria to eat, rather than a large slick





How quickly can the bacteria eat the oil?



Dispersant ingredients

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

FIGURE 1. Example of an LC_{50} test showing the concentration of a chemical that will kill 50 percent of the animals tested. Source: A. Bejarano, 2012.

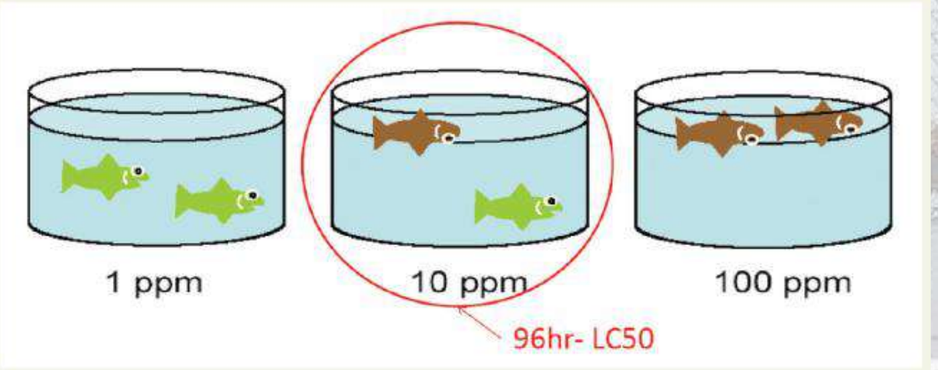
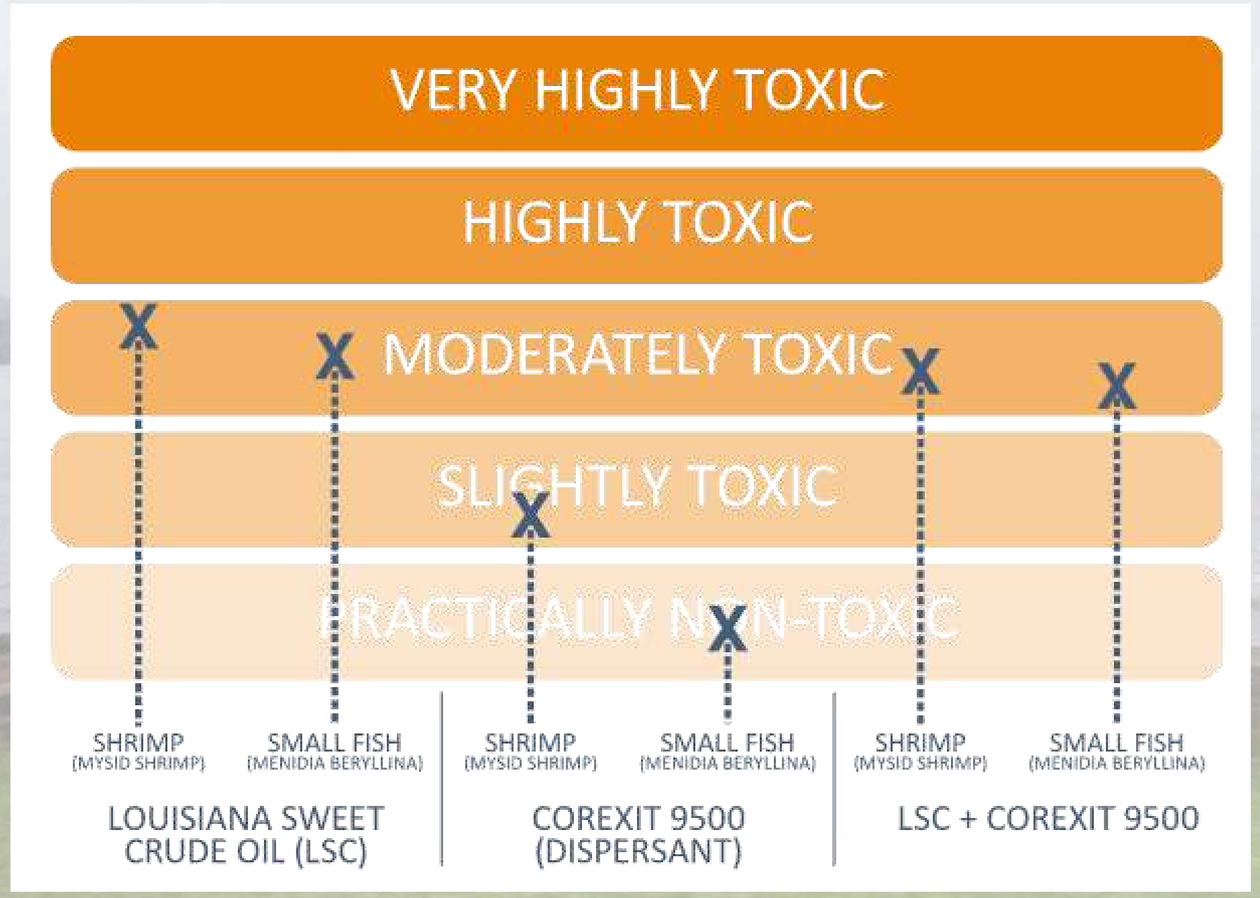
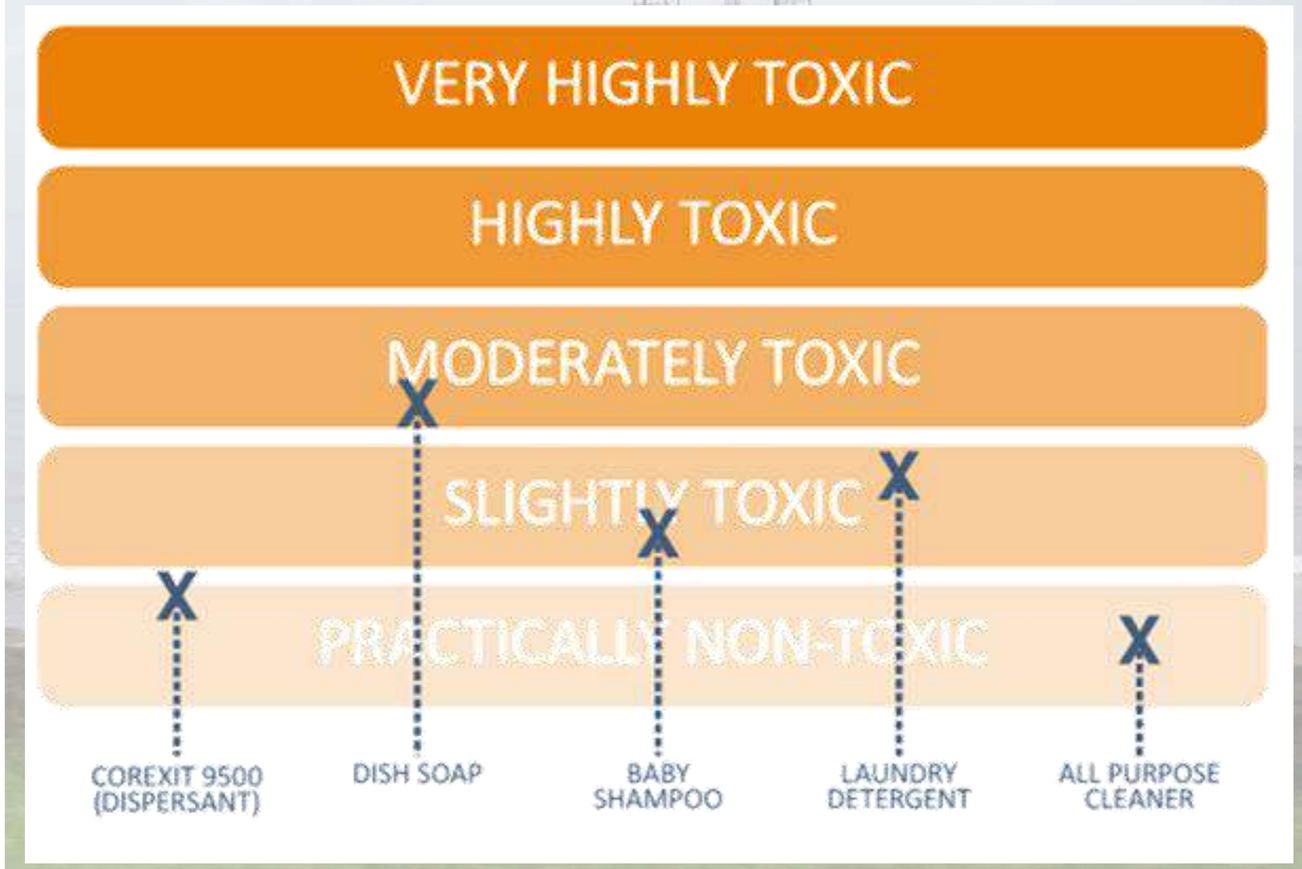


FIGURE 2. US EPA's LC_{50} aquatic toxicity scale for laboratory-generated aquatic toxicity data. Source: EPA online, 2012.

- Very Highly Toxic (<0.1 mg/L or ppm)
- Highly Toxic (0.1-1 mg/L or ppm)
- Moderately Toxic (1-10 mg/L or ppm)
- Slightly Toxic (10-100 mg/L or ppm)
- Practically Non-toxic (>100 mg/L or ppm)

Toxicity


VERY HIGHLY TOXIC
HIGHLY TOXIC
MODERATELY TOXIC
SLIGHTLY TOXIC
PRACTICALLY NON-TOXIC
SHRIMP (MYSID SHRIMP)
SMALL FISH (MENIDIA BERYLLINA)
SHRIMP (MYSID SHRIMP)
SMALL FISH (MENIDIA BERYLLINA)
SHRIMP (MYSID SHRIMP)
SMALL FISH (MENIDIA BERYLLINA)
LOUISIANA SWEET CRUDE OIL (LSC)
COREXIT 9500 (DISPERSANT)
LSC + COREXIT 9500


VERY HIGHLY TOXIC
HIGHLY TOXIC
MODERATELY TOXIC
SLIGHTLY TOXIC
PRACTICALLY NON-TOXIC
COREXIT 9500 (DISPERSANT)
DISH SOAP
BABY SHAMPOO
LAUNDRY DETERGENT
ALL PURPOSE CLEANER

Dispersants NEBA/SIMA

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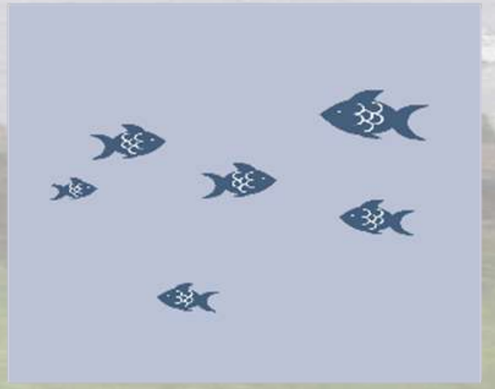
NEBA

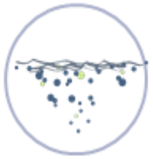
NET ENVIRONMENTAL BENEFIT ANALYSIS (NEBA) AKA SPILL IMPACT MITIGATION ASSESSMENT (SIMA)

IS A PROCESS USED BY THE RESPONSE COMMUNITY FOR MAKING THE BEST CHOICES TO MINIMIZE IMPACTS OF OIL SPILLS ON PEOPLE AND THE ENVIRONMENT.



Through the use of NEBA, the oil and gas industry strives to uphold community values and protect community assets with every operational decision.

Balancing trade-offs

	Benefits	Drawbacks
DISPERSANTS 	• Removes surface oil that could harm wildlife and keeps oil from spreading to shoreline; enhances natural biodegradation of oil and reduces vapors on water surface	• Dispersed oil has the potential to affect water column-dwelling wildlife and vegetation
IN-SITU BURNING 	• Removes large amounts of oil rapidly via controlled burning	• Burning presents a potential safety risk and localized reduction of air quality; burn residue can be difficult to recover
MECHANICAL RECOVERY 	• Removes oil with minimal environmental impact	• Mechanical recovery can be inefficient, resource-intensive, and restricted by water conditions, with typically no more than 10-20 percent oil recovery
PHYSICAL REMOVAL 	• Selectively restores environmental and social value to specific locations using a variety of tools	• Aggressive or inappropriate removal methods may impact ecosystems and individual organisms
NATURAL PROCESSES 	• Takes advantage of natural processes for oil removal, including biodegradation, and avoids intrusive cleanup techniques that may further damage the environment	• Natural removal can take more time to achieve pre-spill conditions than other response techniques

Special consideration for dispersant use

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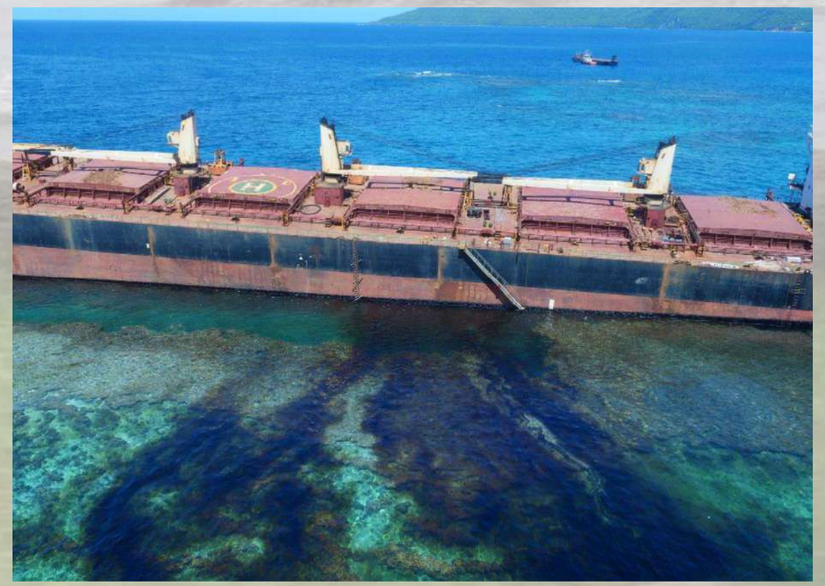
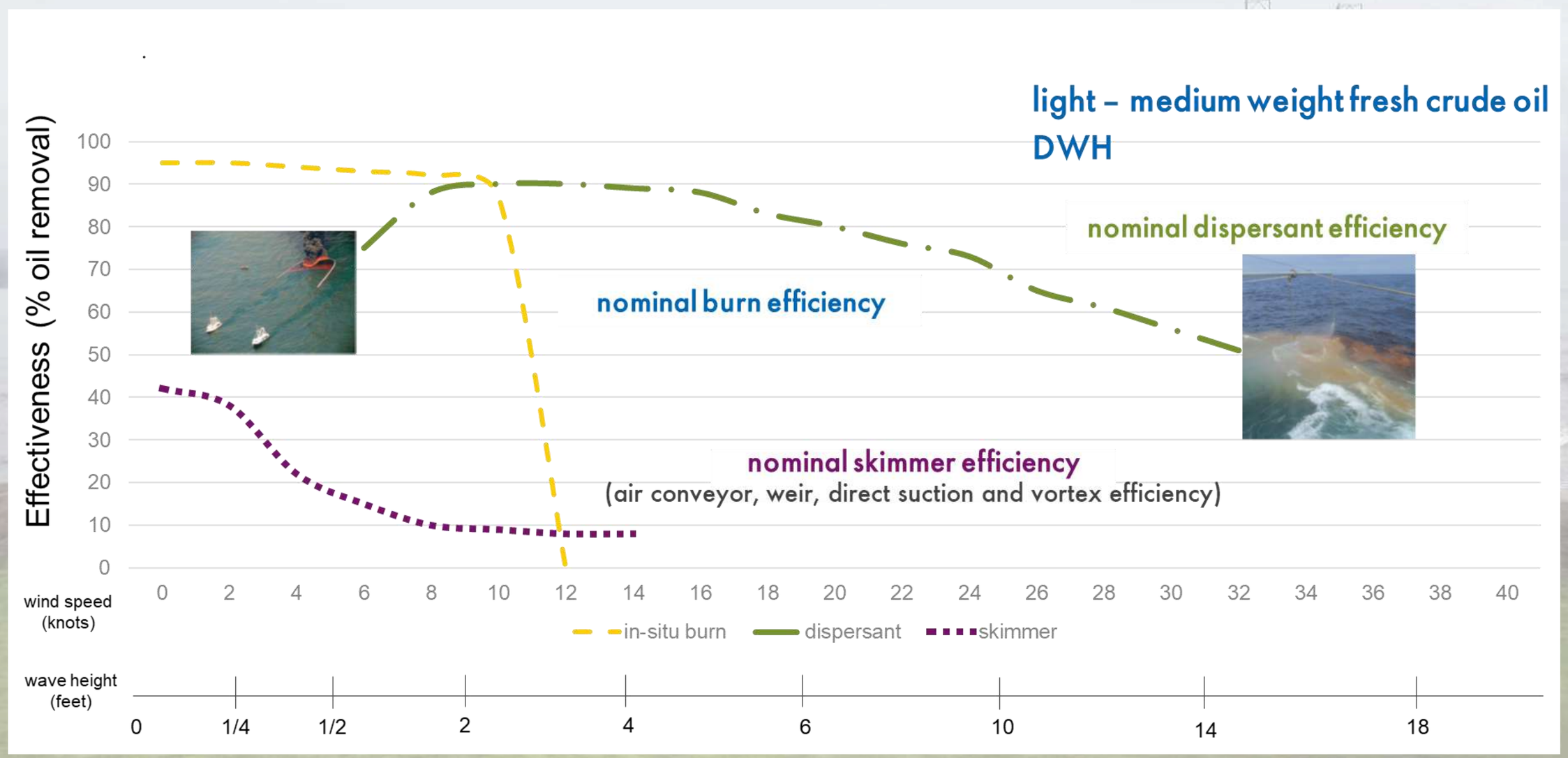
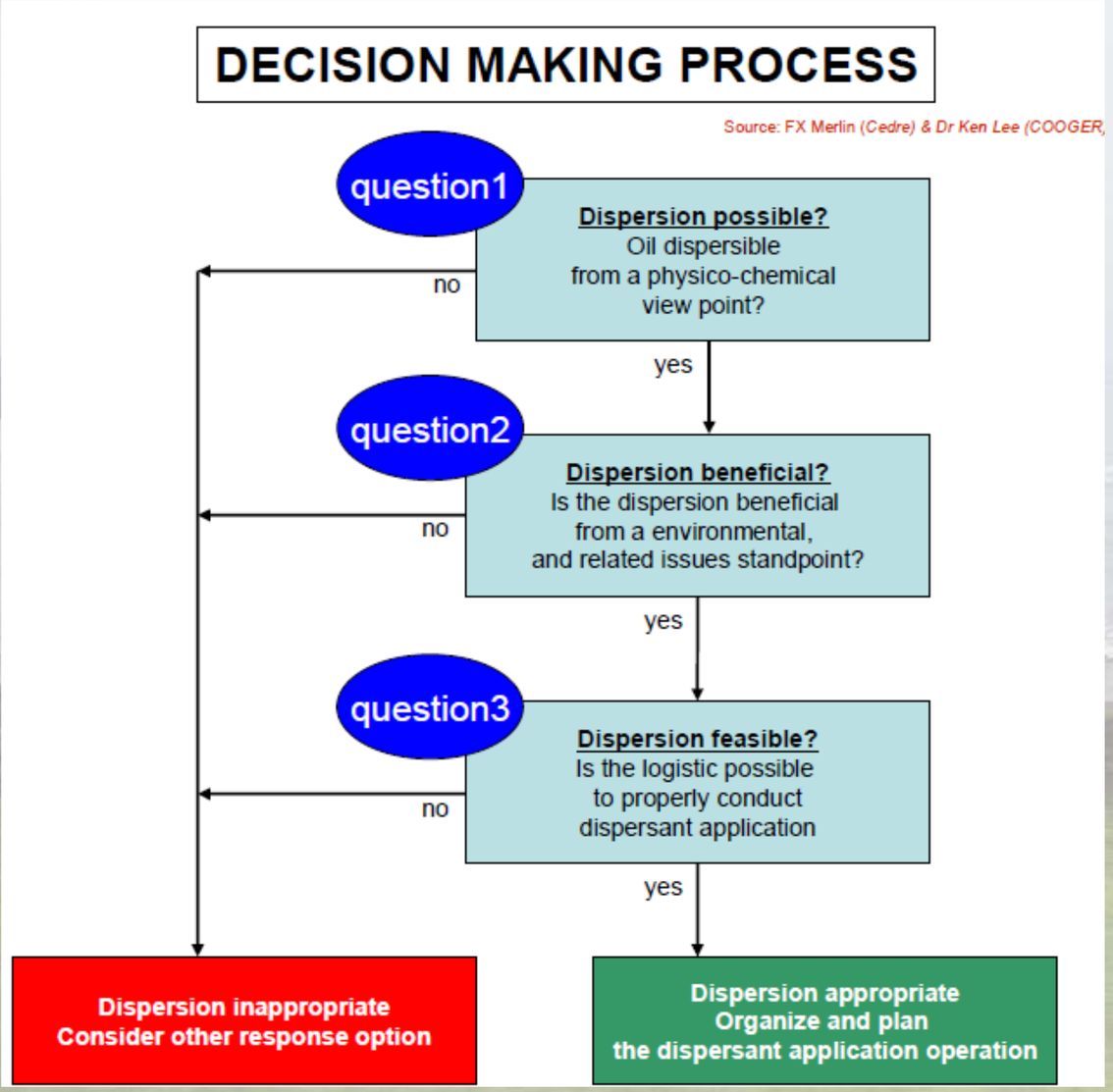


Dispersants as part of the response toolkit



Planning to use dispersants



Regulator approval of dispersant use through:

1. Dispersant product approval
Describes which dispersants are approved for use, and how dispersants can be added to an approved dispersant list

2. Dispersant use authorization
Describes where and when the approved dispersants may be authorized for use

Information contained in NOSCP or separate dispersant policy

Dispersant Policy

Included in the NOSCP:

YES	13
NO	9

Dispersant Policy

Approval procedure and list of pre-approved dispersant:

YES	8
NO	14

Pre-authorised dispersant use

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Middle East (ROPME members) approved dispersant list and application guide:

MEMAC

Fact Sheet — **Application of Dispersants in the ROPME Sea Area**

Introduction

Dispersants are a group of chemicals designed to be sprayed onto oil slicks to accelerate the process of natural dispersion. Significant environmental and economic benefits can be achieved, particularly when other at-sea response techniques are limited by weather conditions or the availability of resources. In certain situations, dispersants may provide the only means of removing significant quantities of surface oil quickly, thereby minimizing or preventing damage to important sensitive resources. Their use is intended to minimize the damage caused by floating oil, for example to seabirds and sea mammal population or before the oil may impact a sensitive shoreline. By taking the oil into water column in the form of small droplets less than 70 mm in diameter, the aim is to use the dilution power of the sea. However, in common with all spill response options, the use of dispersants has limitations and their use should be carefully planned and controlled.

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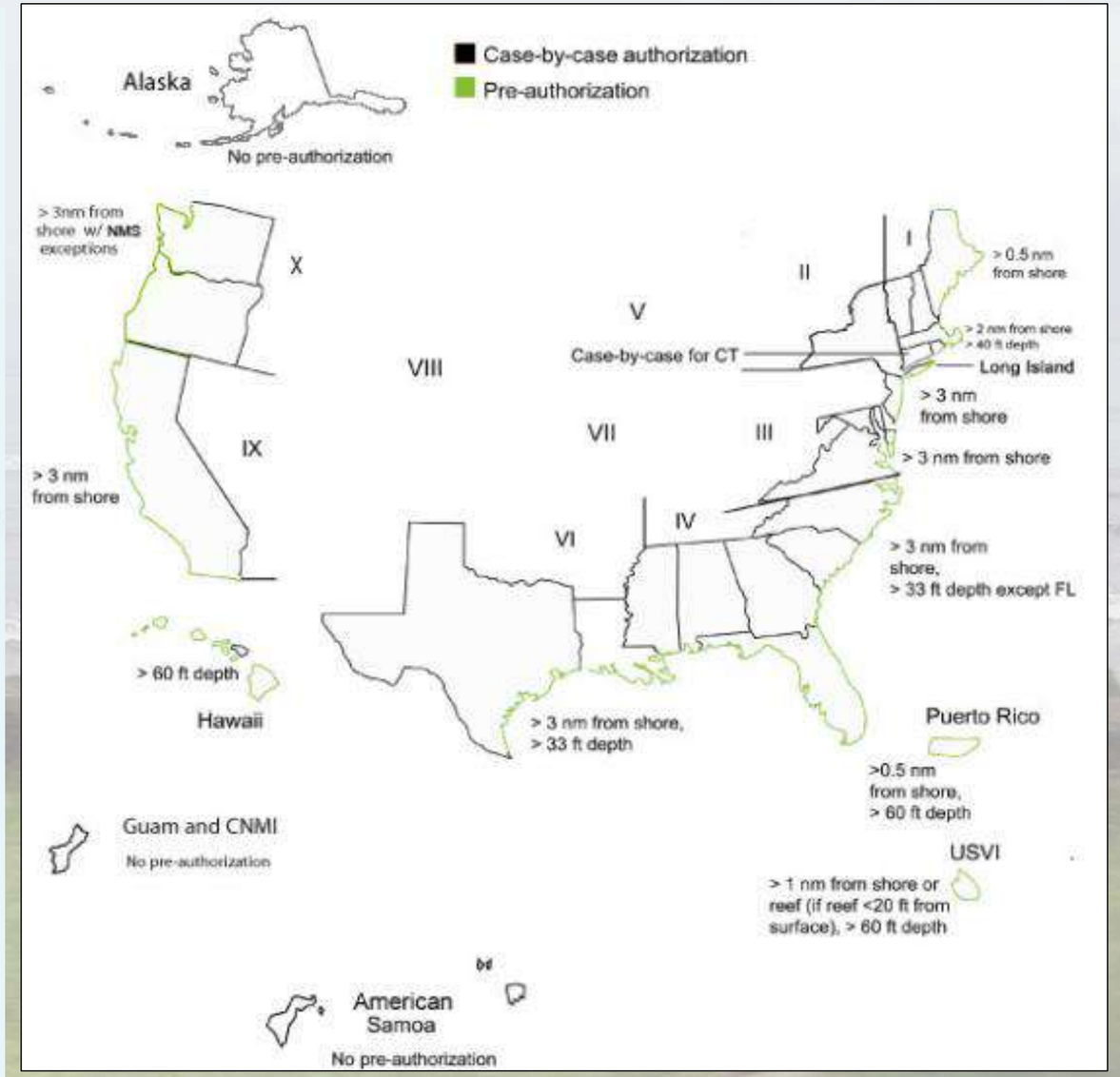
Limitations

Dispersants have little effect on very viscous, floating oils, as they tend to run off the oil into the water before the solvent can penetrate. As a general rule, dispersants are capable of dispersing most liquid oils and emulsions with viscosities of less than 2000 centistokes, equivalent to a medium fuel oil at 10-20ºC. They are unsuitable for dealing with viscous emulsions (mousse) or oils which have a pour point near to or above that of the ambient temperature. Even those oils which can be dispersed initially become resistant after a period of time as the viscosity increases as a result of evaporation and emulsification. For particular oil, the time available before dispersant stops being effective depends upon such factors as sea state and temperature, but it is unlikely to be longer than a day or two. Dispersants can, however, be more effective with viscous oils on shorelines because the contact time may be prolonged, allowing better penetration of the dispersant into the oil.

This MEMAC Fact Sheet should be read in combination with the IPIECA report 'Dispersants and their Role in Oil Spill Response' as an attachment for the ROPME Sea Area.

www.memac-rsa.org - e-mail: memac@batelco.com.bh - Tel. +973 17274554 / Fax +973 17 274551
Thuraya Tel: +8821666010495 Capt. Dr. A.M. Al Janahi : +973 39622744



USA pre-authorized zones of dispersant use:

Dispersants good practice

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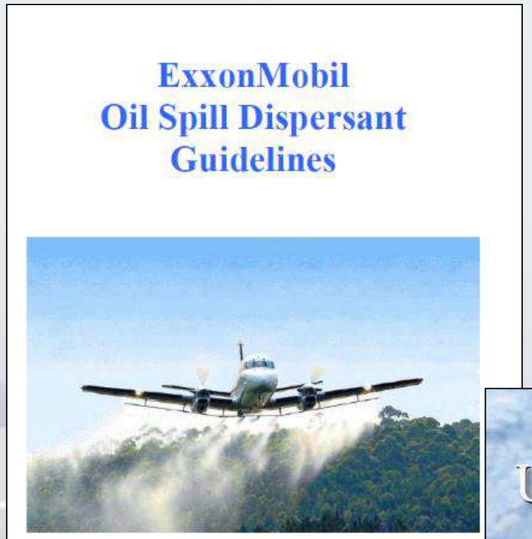

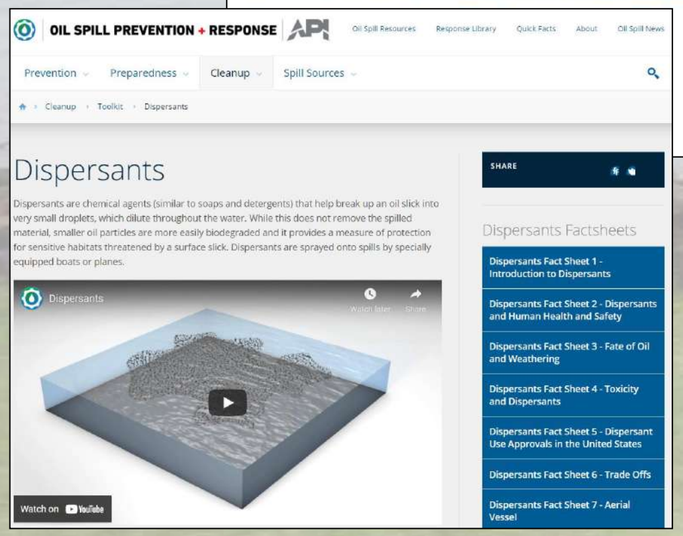

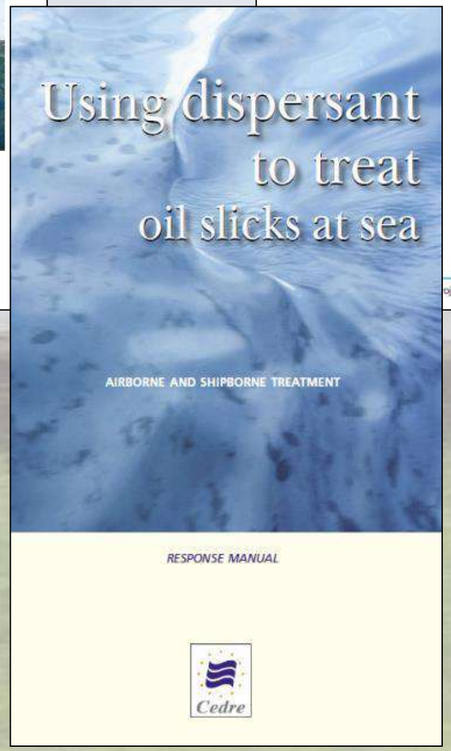

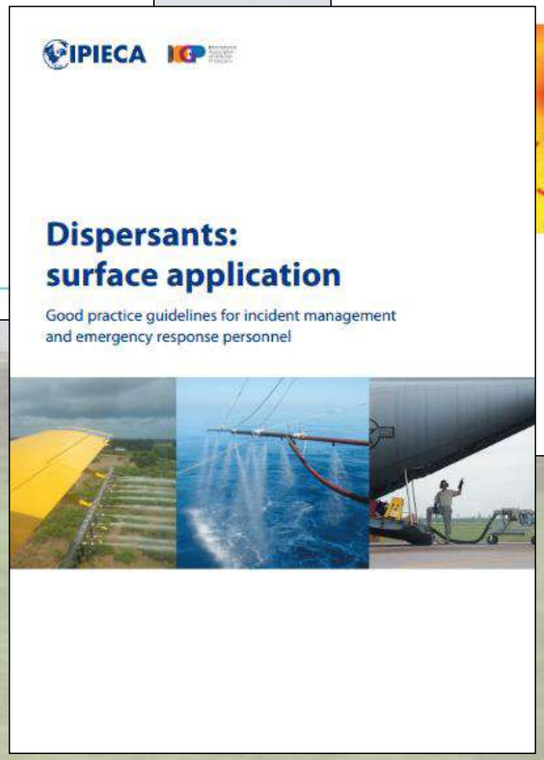

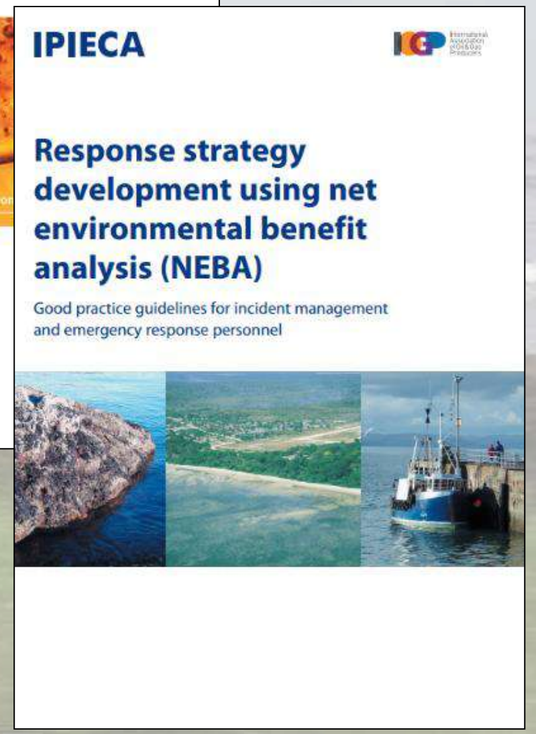

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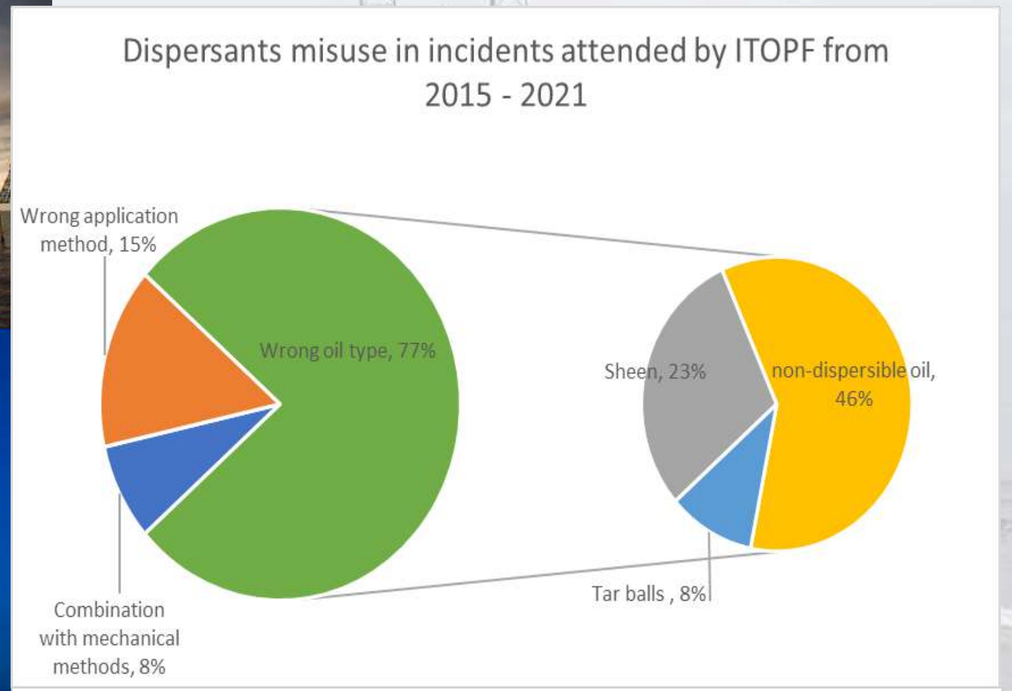

Cohort Purpose

- Develop working group to explore the challenges of dispersant mis-use
- Review communications materials are currently available
- Develop fit for purpose materials for smaller companies who may use dispersants incorrectly.
- Easy access to materials and information for field responders, and for ITOPF and other supporting organisations to ‘push’ to responders when receiving the first call.

QUIZ

Oil eating bacteria has been found throughout the water column, up to 11,000 depth?

1. True
2. False

QUIZ

Dispersants have the same ingredients in them as baby shampoo, soap and cleaning products?

1. True
2. False