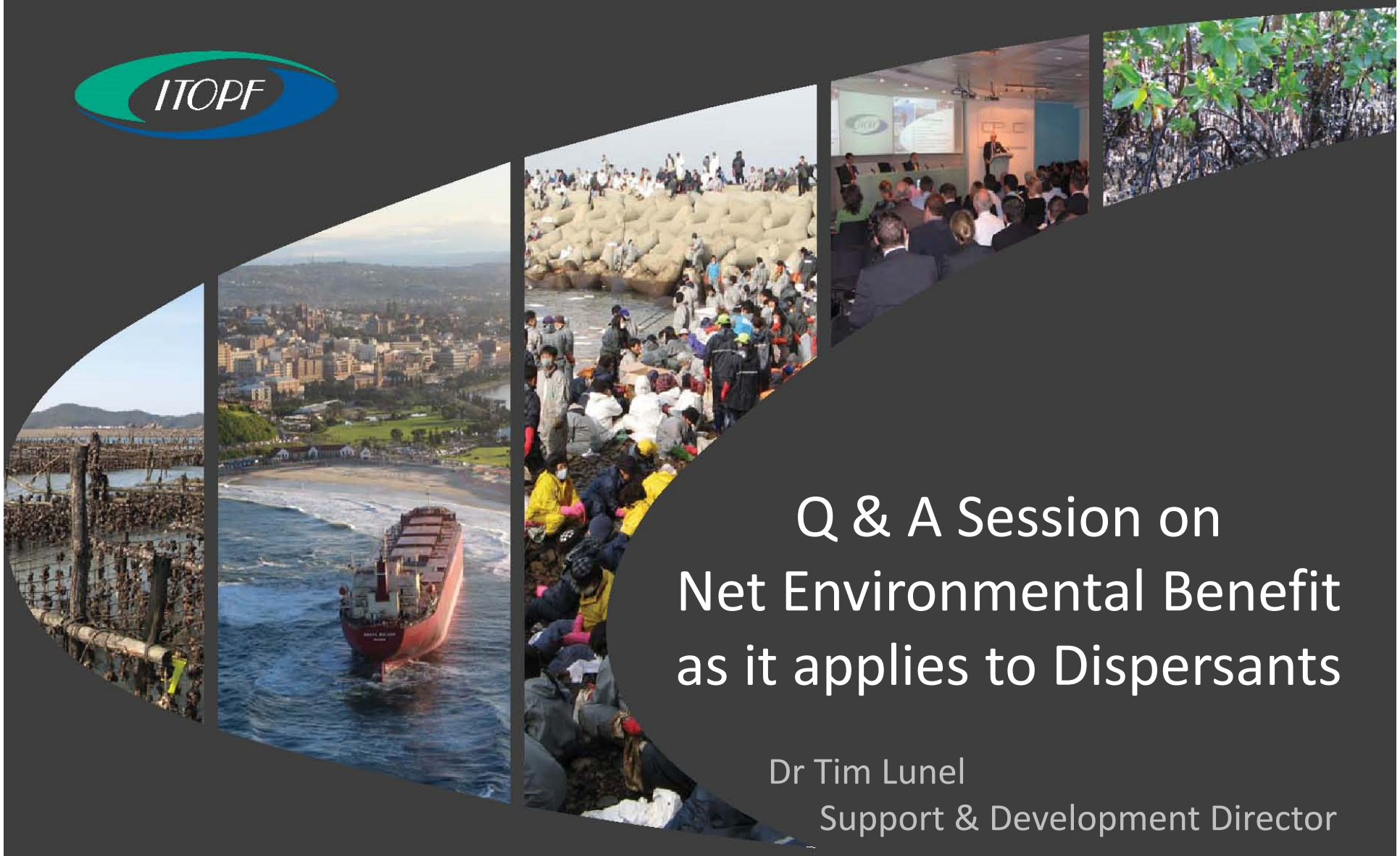


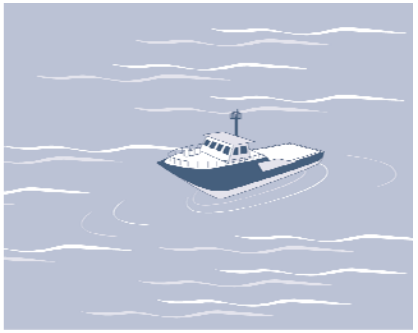
Q & A Session on Net Environmental Benefit as it applies to Dispersants

Dr Tim Lunel
Support & Development Director

New Delhi Seminar – Government & Industry Collaboration – 20th November 2013

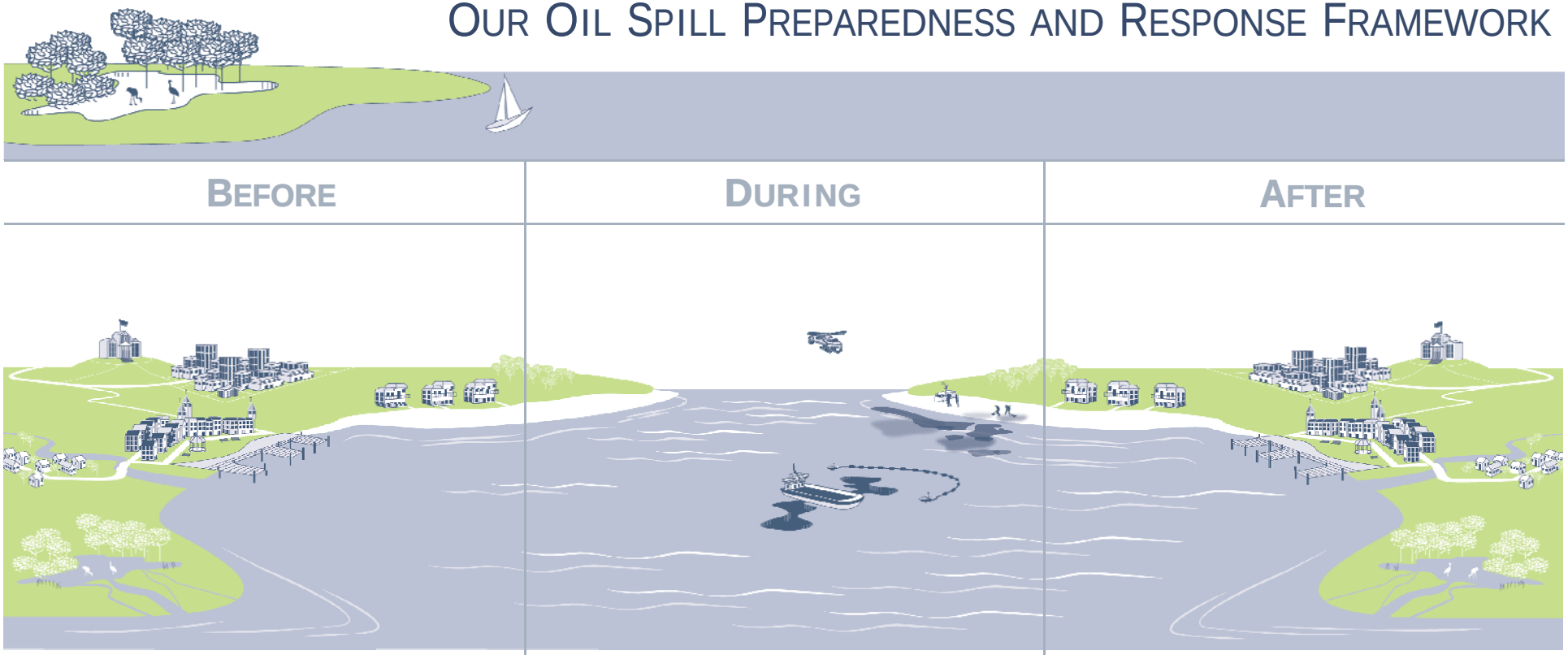
NEBA Helps Protect People and the Environment

Net Environmental Benefit Analysis (NEBA) 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 response community strives to prote
community assets with every operational decisio

Our Oil Spill Preparedness and Response Framework



Before

- ☑ **Plan:** Develop plans based on potential scenarios
- ☑ **Assess:** Identify and prioritize environmental and community assets and review previous spill cases
- ☑ **Decide:** Select the most effective response approach based upon priorities and tradeoffs

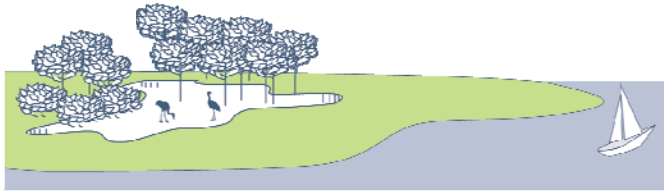
During

- ☑ **Deploy:** Rapidly implement response based on pre-planning
- ☑ **Evaluate:** Assess current conditions and response
- ☑ **Adapt:** Modify response approach as conditions continue to evolve

After

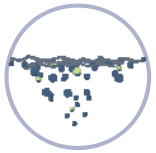
- ☑ **Restore:** Work with communities and governments to restore the environment and community assets to pre-spill use
- ☑ **Learn:** Gather and incorporate lessons learned into future policies, plans, and good practice guides

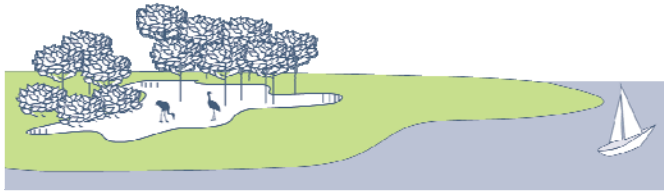
Communication & Monitoring



Balancing Tradeoffs

When a spill occurs, source control is immediately applied – after which, response tools are implemented.

	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 initially affect local water column-dwelling wildlife and vegetation
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
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
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 use than other response techniques



Tradeoffs of Dispersants

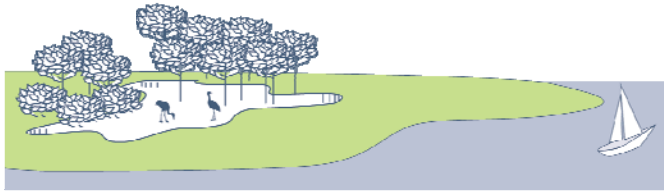
Response Decision: Dispersant Use

Benefits

- Reaches and treats significantly more oil than other response options
- Can be applied over a broader range of weather conditions
- Speeds up oil removal from the water column by enhancing natural biodegradation
- Prevents oil in a subsea spill from surfacing, mitigating harm to sea birds, mammals, and other wildlife
- Prevents oil from spreading to shoreline, reducing risk for sensitive shoreline vegetation and wildlife
- Reduces impact on community assets and local industries

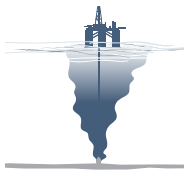
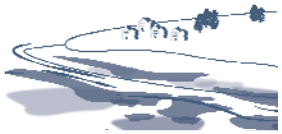
Drawbacks

- Does not directly collect the oil from the environment, but rather transfers it from the surface to the water column where it can be biodegraded
- Potential effects of dispersed oil on water column-dwelling wildlife and vegetation (anticipate short-lived and localized exposures)
- Will not work on high viscosity fuel oils in calm, cold seas
- Has a limited "window of opportunity" for use
- Potential impact to fishing industries due to public misunderstanding of dispersants' effects on seafood



Pre-Selecting Options

When pre-selecting options, source control as the initial response is taken into consideration.

Example Scenarios	Possible Response Tools				
	Dispersants	Mechanical Recovery	In-Situ Burning	Physical Removal	Natural Processes
Offshore Release Tanker spill 					
Offshore Release Subsea spill 					
Offshore Release Spill flowing towards populated area 					
Near Shore Release Spawning season 					
Onshore or Near Shore Release Near marsh or sand beach  					

SEA EMPRESS - PEMBROKESHIRE, UK (15 FEB 1996)

- Full-scale aerial spraying operation for 8 days
- UK government & OSRO aircraft utilised
- 446 MT dispersant applied (7 different types)
- All dispersants pre-approved for application

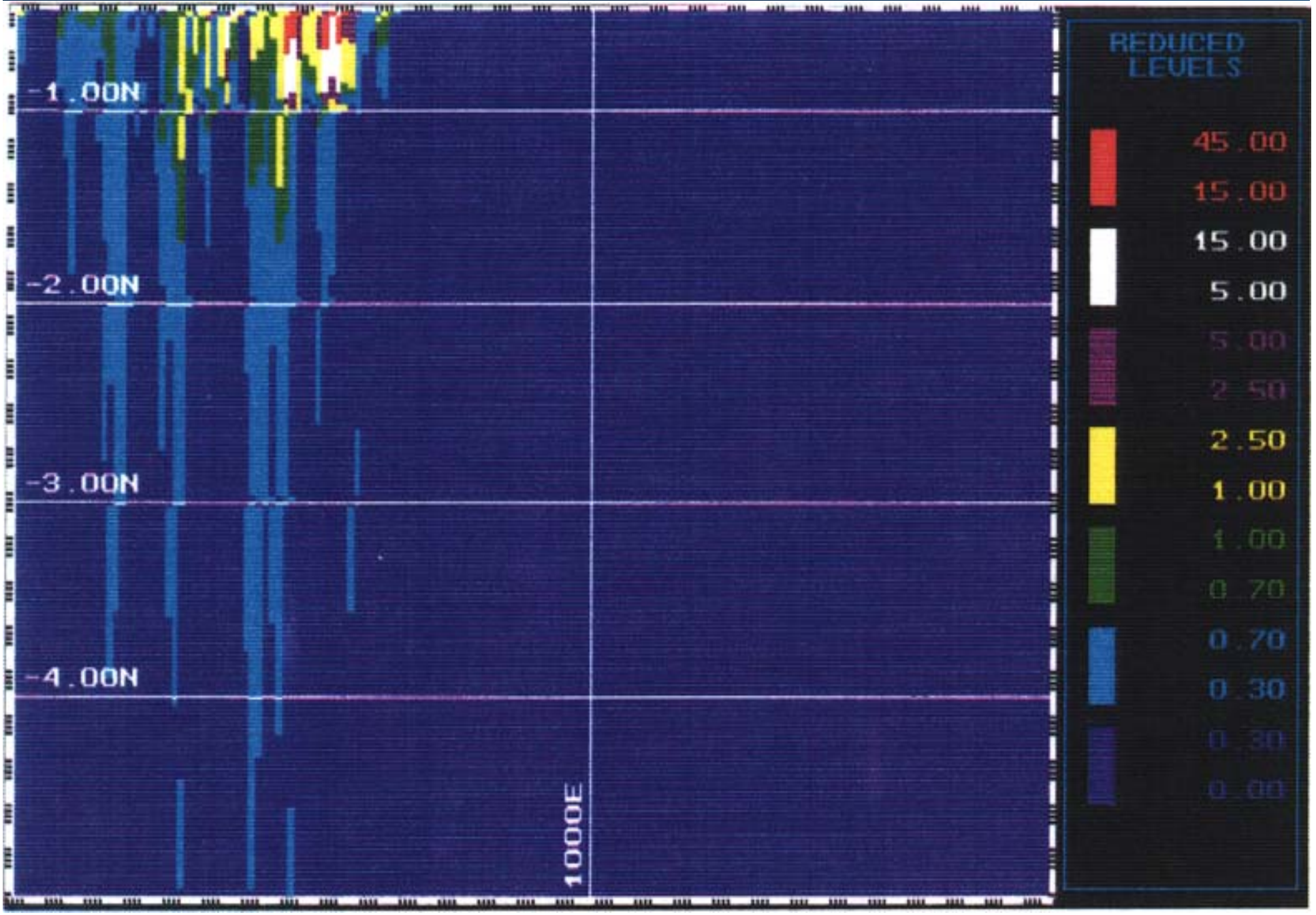
PEMBROKESHIRE COAST NATIONAL PARK

COMMAND & CONTROL

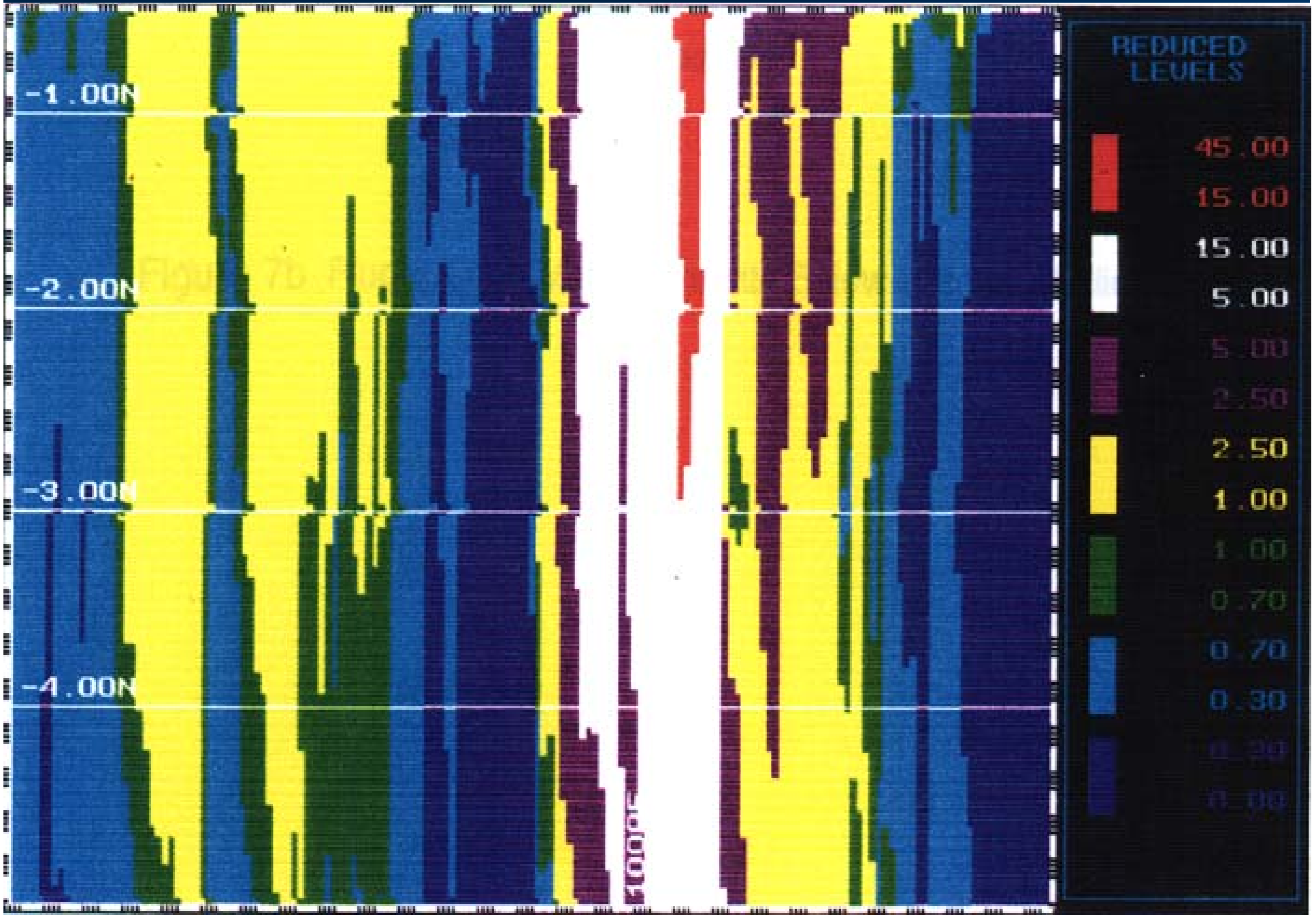
High efficiency, 40 tonnes of oil dispersed for 1 tonne of dispersant, because:

- Spraying coordinated from surveillance aircraft allowed for highly focussed application
- Prioritised freshly released thicker slicks
- Application stopped once dispersant ineffective

UV- FLUORIMETRY: PRE-SPRAY



UV- FLUORIMETRY: POST-SPRAY



SHORELINE CLEAN-UP

- 40% evaporated 29,000 MT
- 2% recovered at sea 1,400 MT
- 6% stranded on shore 4,300 MT
- 52% dispersed 37,500 MT

ENVIRONMENTAL IMPACTS

- Extensive pre-spill data for area
- Temporary impacts on rocky shore
- Pre-spill densities by 1998/99
- Localised losses of amphipods
- Concerns over cushion starfish

FISHERIES IMPACTS

- Important to local economy
- Good pre-spill catch statistics
- No mortalities of stock recorded
- Decline in 1996 catches due to ban
- Increased growth & landings in 1997

SUMMARY – MONITORING DEMONSTRATED NET ENVIRONMENTAL BENEFIT AT SEA EMPRESS

- Very large oil spill (twice the volume of EXXON VALDEZ) in a highly sensitive area
- Impact much less severe than expected
- Contributory factor: DISPERSANT USE

Surface oil

Mangrove

Dispersed oil

Mangrove

Jim Clark 2004

ITOPF – Technical Information Paper series - TIPs


ITOPF
Thank you
Tim.Lunel@ITOPF.com

NATUNA SEA - SINGAPORE STRAIT (3 OCT 2000)

- Nile Blend Crude
- High wax content
- Pour point: 33-36°C
- Sea surface: 26-28°C

LIMITATIONS DUE TO POUR POINT

- Oil formed semi-solid within first day
- Test not conducted prior to application
- Dispersant observed to be ineffective

POUR POINT + WEATHER CONDITIONS

- UV fluorimetry confirmed observations