Dispersant Effectiveness Experiments Conducted on Alaskan Crude Oils in Cold Water at the Ohmsett Facility

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Dispersed Oil Forum
February 2, 2007

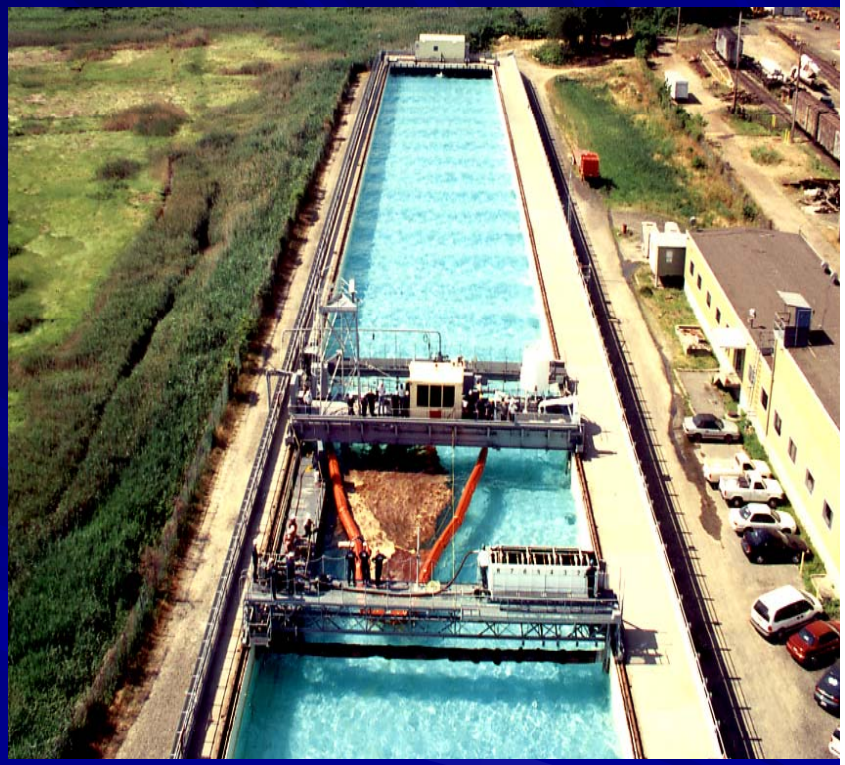
Topics of Today's Presentation

- **What is Ohmsett?**
- **Dispersant Effectiveness Experiments with Alaskan Crude Oils**
- **Ohmsett Dispersant Test Protocol**
- **Results**
- **Acknowledgements**

Ohmsett:

The National Oil Spill Response Test Facility

Operated by the Department of the Interior, Minerals Management Service

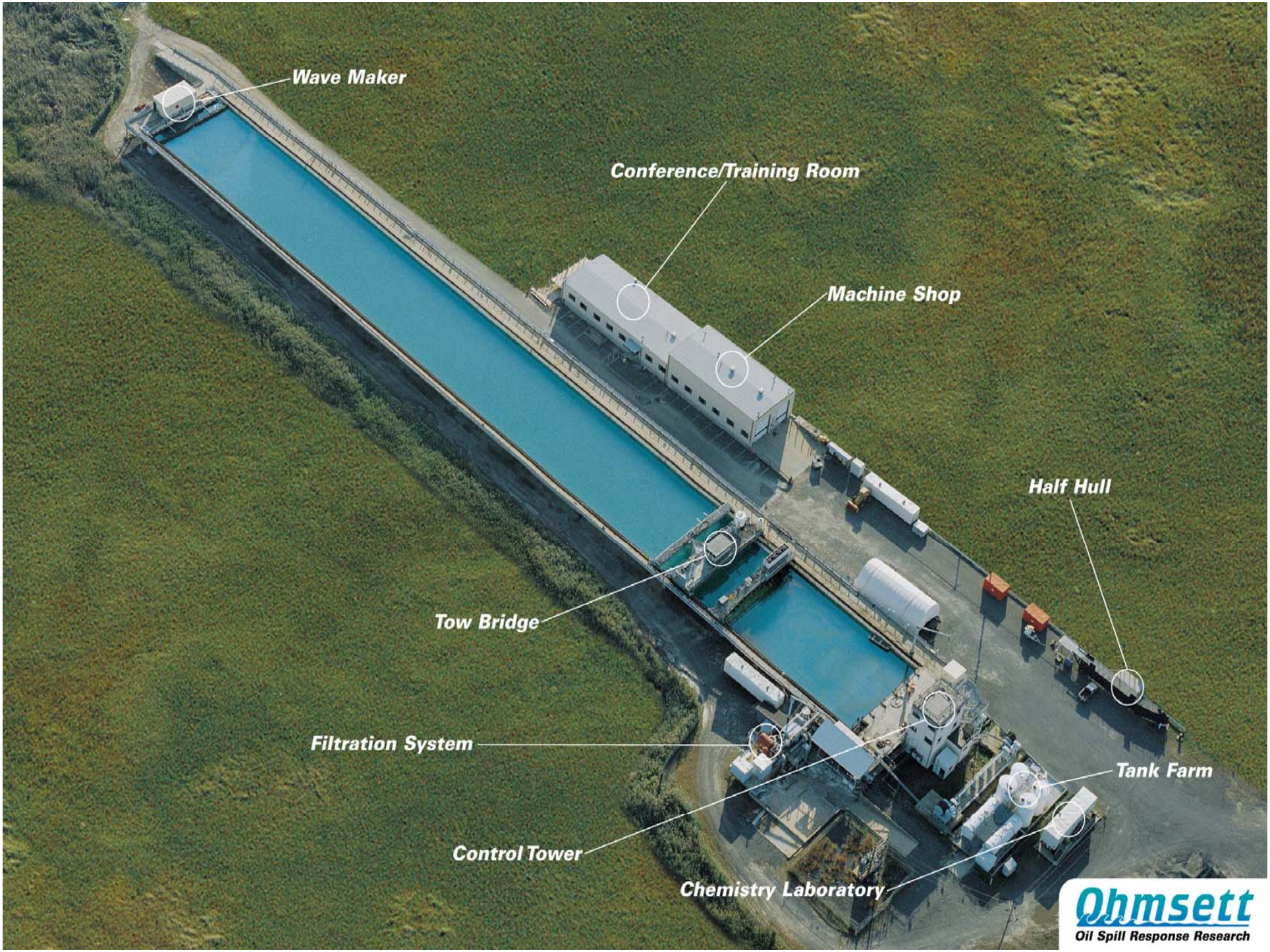


Unique Capabilities

- Largest oil spill test tank in North America
- Tank dimensions
  - 203 meters long
  - 20 meters wide
  - 3.5 meters deep
  - 10 million liters clear salt water

Full Scale Testing, Training, and Research with ***Oil***

- Tow bridge capable of speeds up to 6.5 knots
- Wave generator can produce 3-foot waves and harbor chop waves
- Release up to 5,678 liters of oil at 1,135 liters per minute/per run


Wave Maker
Conference/Training Room
Machine Shop
Half Hull
Tow Bridge
Filtration System
Tank Farm
Control Tower
Chemistry Laboratory
Ohmsett
Oil Spill Response Research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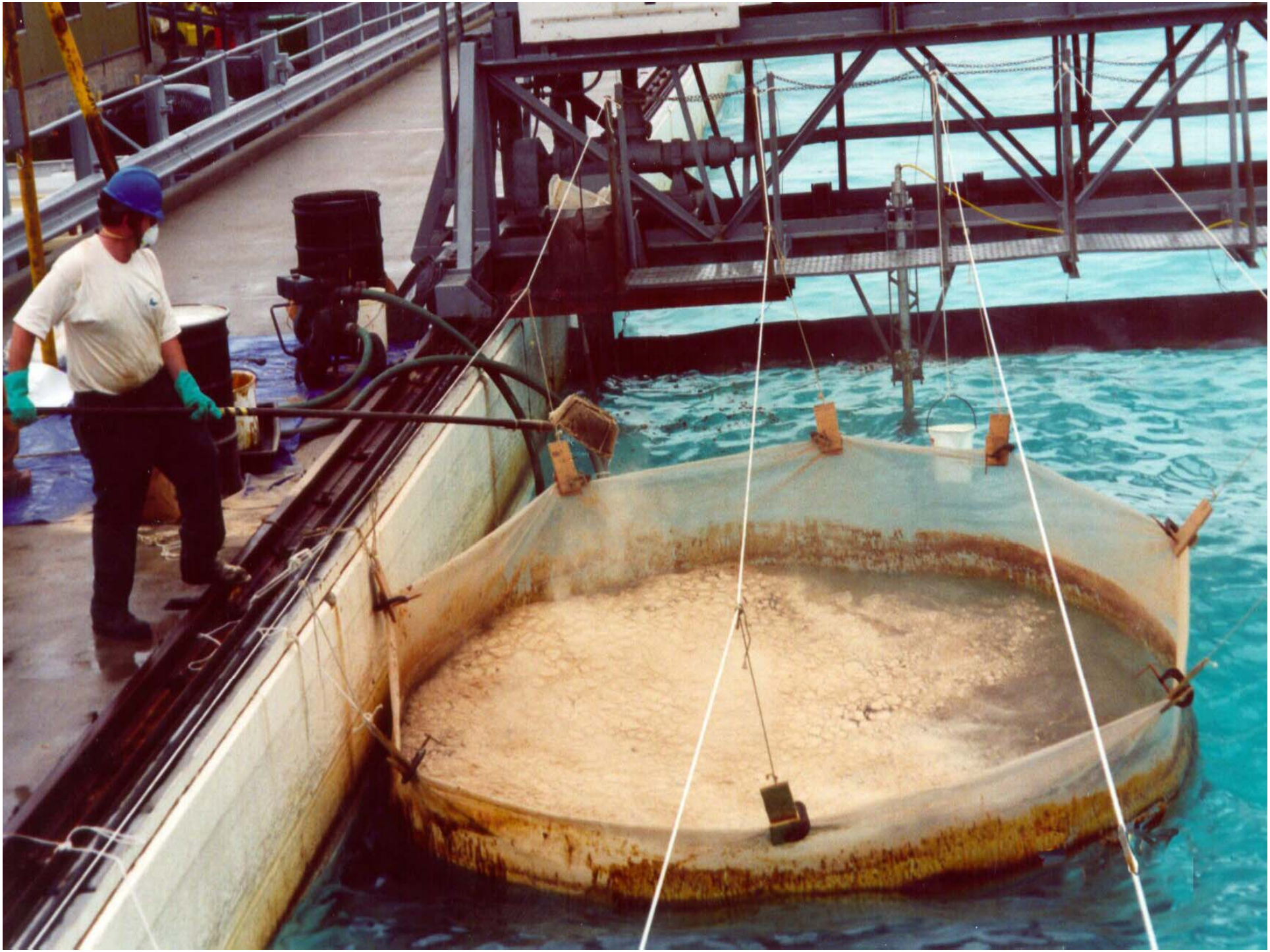


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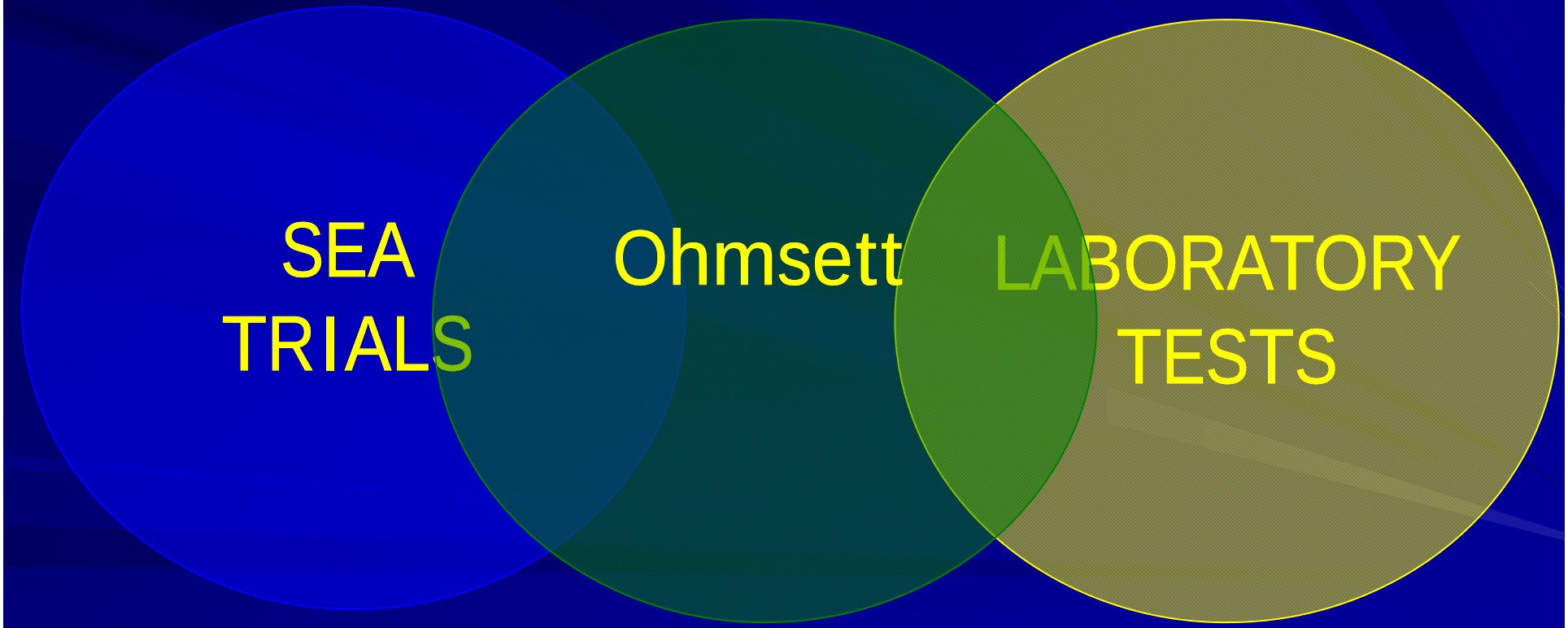
Ohmsett is a 'Bridge' Between Dispersant Testing At Sea and Laboratory Tests



Can We Test With Dispersants at Ohmsett?

- Feasibility of Using Ohmsett for Dispersant Testing - 1999
- Ohmsett Test Protocol Development – 2000
- Research into Techniques to Remove Dissolved Dispersant from Ohmsett Basin Water - 2000

Test Objective

To determine the dispersibility of fresh and weathered Alaskan crude oils in very cold water conditions.

The test matrix included four crude oils (Alaska North Slope, Endicott, Northstar and Pt. McIntyre) to be tested with one dispersant (with Corexit 9527).

To compare the process of on tank weathering with that of air-sparged weathering

2006 Ohmsett Cold Water Dispersant Effectiveness Test

•10 control (no dispersant applied) and 15 Corexit 9527 dispersant applied tests were conducted

• Many tests were conducted at small scale to develop the test matrix

• Approximately 80 liters of crude oil and 4 liters of dispersant were used in each dispersant experiment. The target dosage of dispersant was 1:20

• Analytical methods include crude oil characterization, fluorometry, laser particle size analyzer, chemical analyses of grab samples taken during each experiments.

• This test program repeats the same experiments that MMS funded and conducted at Ohmsett in 2003.

Ohmsett Improvements and Upgrades

- New oil distribution and pumping system that no longer requires that viscous oils be heated prior to discharge
- New dispersant spray bar, control nozzles and pumping system
- Longer and wider test area (entire tank is used)
- New Instrumentation
  - Sontek Acoustic Doppler Velocimeter for tank turbulence measurement
  - LISST 100 Particle Size Analyzer for dispersed oil concentration and particle size measurement
  - New chemistry laboratory and analytical equipment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Oil Evaporation Setup

Evaporated or “weathered” oil generated by bubbling air through heated drums of oil

Weight of oil was monitored during air sparging using a weight scale and a drum lift


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Test Program Results

	2003 % Dispersed	2006 % Dispersed
Alaska North Slope		
•Fresh	98	95
•Air Sparged	86	97
•On-Tank Low	-	97
•On-Tank High	-	97
Endicott		
•Fresh	74	100
•Air Sparged	3	85
Northstar		
•Fresh	100	96
•Air Sparged	2	91
•On-Tank Low	-	-
•On Tank High	-	40
Pt. McIntyre		
•Fresh	77	99
•Air Sparged	-	99
•On-Tank Low	-	77
•On-tank High	-	72

Acknowledgements

This paper is an overview of a number of dispersant effectiveness studies conducted by a team that included:

Randy Belore and Dr. Ken Trudel – S.L. Ross Environmental Research Ltd.
Alun Lewis - Alun Lewis Oil Spill Consultancy
The Ohmsett Facility Technical Staff

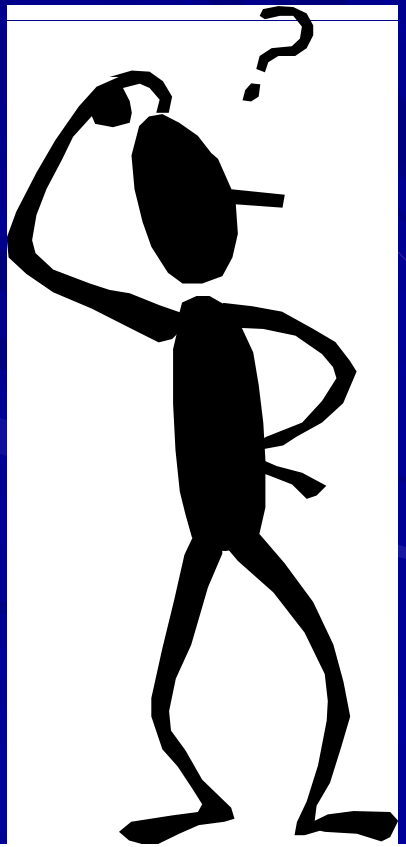
The Minerals Management Service wishes to acknowledge the following:

Mike Bronson and Ed Thompson - BP Exploration Alaska
Dr. Jim Clark - ExxonMobil
Lee Majors and Ken Linderman - Alaska Clean Seas
Oil Spill Response Limited
Turner Designs Hydrocarbon Instruments

Questions?

For more information on Minerals Management Service - Oil Spill Response Research Program and the Ohmsett Facility visit our websites at:

- **WWW.MMS.GOV/TARPHOME**
- **WWW.OHMSETT.COM**



Ohmsett Dispersant Testing Improvements

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- Longer and wider test area (entire tank is used)
- New Instrumentation
  - Sontek Acoustic Doppler Velocimeter for tank turbulence measurement
  - LISST Particle Size Analyzer for dispersed oil concentration and particle size measurement
  - Analytical equipment for chemistry laboratory
- Improved methods and protocols for on-tank, long term weathering and emulsion formation on the Ohmsett tank or using batch process off tank


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PACIFIC STRIKE TEAM

Test Oil Properties

	2003	2006	
Alaska North Slope	**Density**	**Density**	**Viscosity**
•Fresh	0.873	0.863	22
•Air Sparged	0.912	0.887	93
•On-Tank Low		0.901	203
•On-Tank High		0.903	200
Endicott			
•Fresh	0.878	0.902	270
•Air Sparged	0.914	0.917	644
Northstar			
•Fresh	0.812	0.802	8
•Air Sparged	0.864	0.839	36
•On-Tank Low		0.842	116
•On Tank High		0.843	143
Pt. McIntyre			
•Fresh	0.890	0.861	34
•Air Sparged	0.902	0.880	76
•On-Tank Low		0.884	214
•On-tank High		0.898	695