An aerial photograph of an industrial facility, likely a testing or processing plant. The facility features several large, rectangular tanks filled with a bright blue liquid. There are several white and blue buildings, a parking lot with numerous vehicles, and various pieces of equipment. The facility is situated in a flat, open area with some vegetation and a body of water in the background.

# **Cold Water Dispersant Effectiveness Experiments Conducted at Ohmsett with Alaskan Crude Oils and Corexit 9500 and 9527 Dispersants**

**Joseph Mullin  
U.S. Minerals Management Service  
Herndon, Virginia**

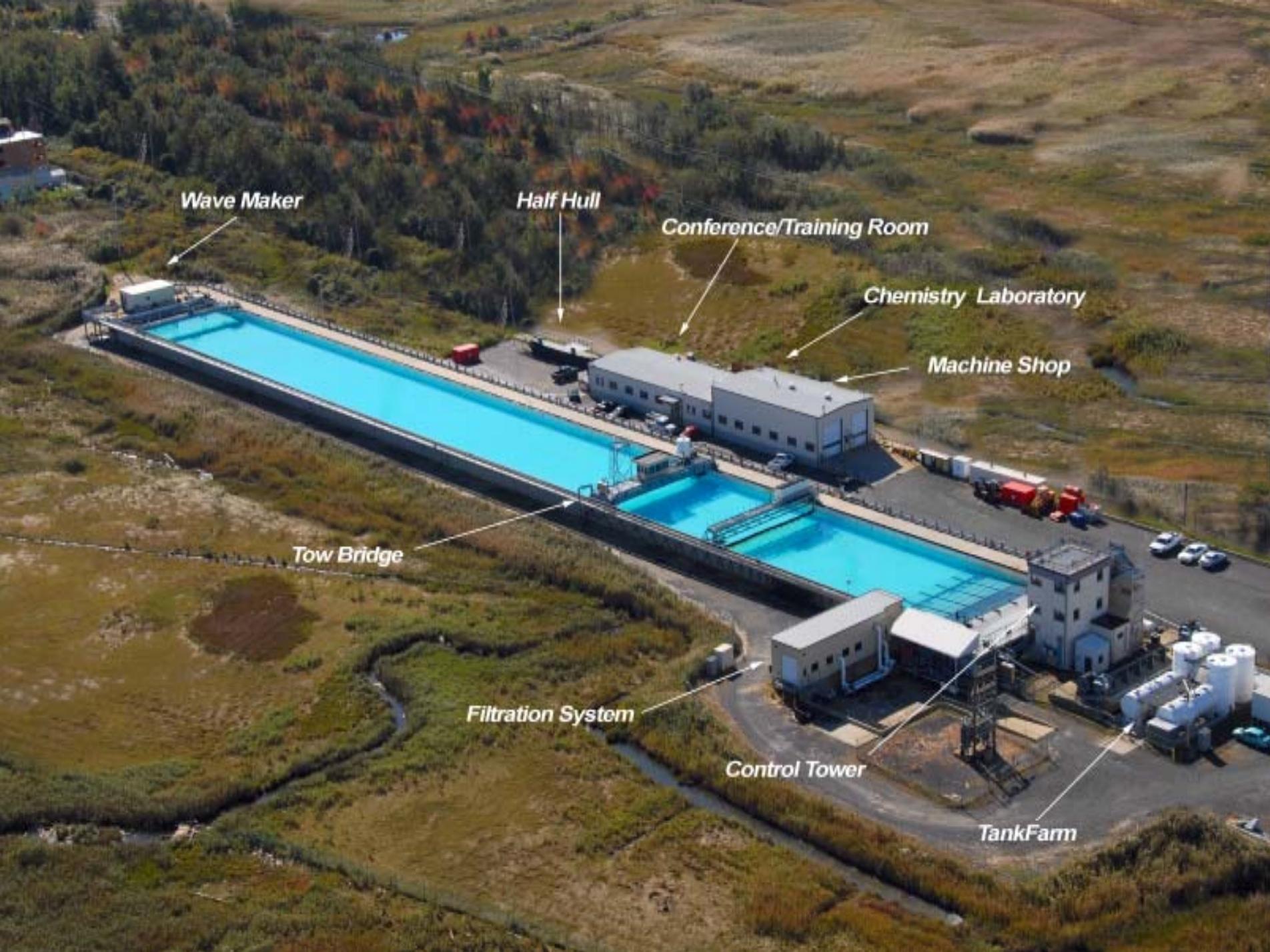
**October 11, 2007**

# Question

**Should chemical dispersants remain part of the response tool box in Alaska?**

**Are the dispersants currently stockpiled in Alaska (Corexit 9500 and 9527) effective in dispersing fresh and weathered Alaskan crude oils in very cold water?**

**Are there scientific data, measurements and calculations to support these findings?**



Wave Maker

Half Hull

Conference/Training Room

Chemistry Laboratory

Machine Shop

Tow Bridge

Filtration System

Control Tower

Tank Farm



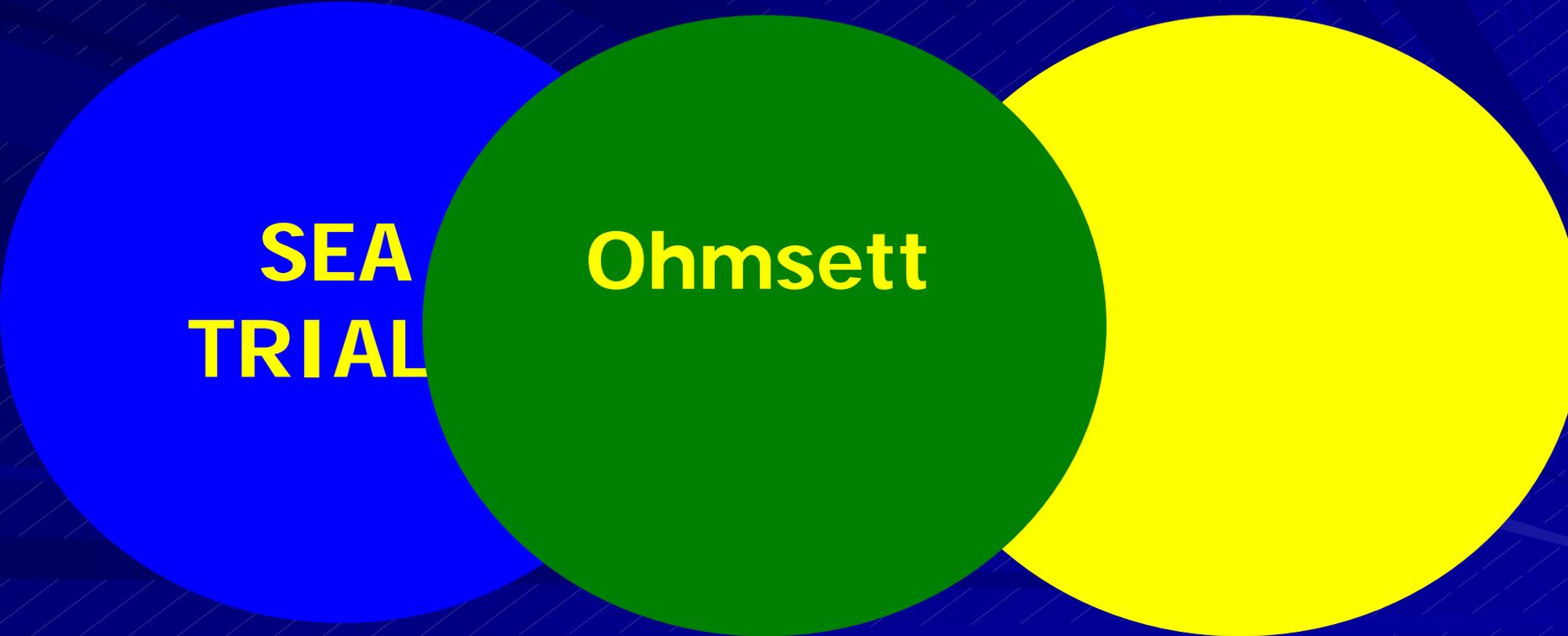








# Ohmsett is a 'Bridge' Between Dispersant Testing At Sea and Laboratory Tests



**SEA  
TRIAL**

**Ohmsett**

**LABORATORY  
TESTS**

# Test Objective

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

The test matrix includes four crude oils (Alaska North Slope, Endicott, Northstar and Pt. McIntyre).

Two dispersants (Corexit 9500 and Corexit 9527).

To compare test oils prepared through the process of air sparging with those oils weathered naturally on the waters surface.

# Dispersant Effectiveness (DE) Testing

## In 2006 - 25 DE experiments were conducted

- 10 control (no dispersant applied) and 15 Corexit 9527 dispersant applied experiments.
- Between 65 and 80 liters of oil and 4 and 16 liters of dispersant were used in each experiment.
- DORs ranged from 1:17 to 1:43.

## In 2007 19 DE experiments were conducted

- 9 control (no dispersant applied) and 10 Corexit 9500 dispersant applied experiments.
- Between 70 and 85 liters of oil and 7 and 12 liters of dispersant were used in each experiment.
- DOR's ranging from 1:16 to 1:25.

# Physical Properties of Test Oils

Oil	2006 Test Oils		2007 Test Oils	
	Density (mg/l) @20°C	Viscosity (cP) 100s <sup>-1</sup> , 1°C	Density (mg/l) @20°C	Viscosity (cP) 100s <sup>-1</sup> , 1°C
<b>Alaska North Slope</b>				
Fresh	0.863	22	0.862	65
Air sparged 15%	0.887	93	0.893	200
Air sparged 22%			0.900	300
<b>Endicott</b>				
Fresh	0.902	270	0.901	350
Air sparged 18%	0.917	644	0.916	520
<b>Northstar</b>				
Fresh	0.803	7.6	0.814	6
Air sparged 30%	0.839	36	0.842	30
<b>Pt. McIntyre</b>				
Fresh	0.861	34	0.862	45
Air sparged 15%	0.880	76	0.898	400

# Oil Weathering

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

Weathering of the oil was monitored during air sparging using a weight scale and a drum lift.

The crude oils were also weathered naturally on the tank with waves to simulate at-sea conditions





**Industrial Water Chiller**

# Ohmsett Improvements

- New oil distribution and pumping system
- New analytical chemistry laboratory
- Improved methods and protocols for on-tank, long term weathering and emulsion formation.
- New Instrumentation
  - **Sontek Acoustic Doppler Velocimeter** for tank turbulence measurement
  - **LISST Particle Size Analyzer** for in-water dispersed oil concentration and particle size measurement
  - **Turner Design TD3100**, hand held fluorometric hydrocarbon analyzer.



1

2

3

TEST NO.

15









1

2

3

TEST NO.

20



10-301  
Fluorometer

U.S.  
COAST GUARD

14 10:32 AM



# Comparison of 2006 and 2007 Test DE Results

Oil	2006 Corexit 9527 % Dispersed/Lost	2007 Corexit 9500 % Dispersed/Lost
<b>Alaska North Slope</b>		
Fresh	95	98
Air sparged 15%	97	99
<b>Endicott</b>		
Fresh	99	98
Air sparged 18%	91	94
<b>Northstar</b>		
Fresh	96	99
Air sparged 30%	91	99
<b>Pt. McIntyre</b>		
Fresh	99	99
Air sparged 15%	99	99

# Question/Answer

Should chemical dispersants remain part of the response tool box in Alaska?

**Results from laboratory, small scale and Ohmsett testing indicate the answer is yes.**

Are the dispersants currently stockpiled in Alaska (Corexit 9500 and 9527) effective in dispersing fresh and weathered Alaskan crude oils in very cold water?

**Yes**

Are there scientific data, measurements and calculations to support these findings?

**Final reports and video clips from both of these dispersant test series are available free of charge on the MMS website.**

# Acknowledgements

**This presentation is an overview of dispersant effectiveness research conducted by a team that included:**

**Randy Belore & 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 for their assistance and support:**

**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 visit our websites:

- [WWW.MMS.GOV/TARPHOME](http://WWW.MMS.GOV/TARPHOME)
- [WWW.OHMSETT.COM](http://WWW.OHMSETT.COM)