SINTEF A16030 Open

REPORT

Oil in Ice - JIP

Report no.: 17

FEX 2008. Activity Report

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SINTEF Materials and Chemistry

Marine Environmental Technology

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Preface

SINTEF has in cooperation with SL Ross Environmental Research Ltd and DF Dickins Associates LLC on behalf of the oil companies AGIP KCO, Chevron, ConocoPhillips, Shell, Statoil and Total initiated an extensive R&D program; *Joint industry program on oil spill contingency for Arctic and ice covered waters.* This program was a 3-year program initiated in September 2006 and finalized in December 2009.

The objectives of the program were;

- To improve our ability to protect the Arctic environment against oil spills.
- To provide improved basis for oil spill related decision-making:
- To advance the state-of-the-art in Arctic oil spill response.

The program consisted of the following projects:

- P 1: Fate and Behaviour of Oil Spills in Ice
- P 2: In Situ Burning of Oil Spills in Ice
- P 3: Mechanical Recovery of Oil Spills in Ice
- P 4: Use of Dispersants on Oil Spills in Ice
- P 5: Remote Sensing of Oil Spills in Ice
- P 6: Oil Spill Response Guide
- P 7: Program Administration
- P 8: Field Experiments, Large-Scale Field Experiments in the Barents Sea
- P 9: Oil Distribution and Bioavailability

The program has received additional financial support from the Norwegian Research Council related to technology development (ending December 2010) and financial in kind support from a number of cooperating partners that are presented below. This report presents results from one of the activities under this program.

Stein Erik Sørstrøm
Program Coordinator
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Funding Partners

Eni Agip KCO ConocoPhillips Chevron Shell TOTAL Statoil

R&D Partners

SL ROSS DICKINS

Cooperating Partners

The Research Council of Norway NOFO acs alaska clean seas

UNIS MMS

Oil Spill Recovery Institute Cordova, Alaska KYSTVERKET Coastal Response Research Center at the University of New Hampshire

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SINTEF REPORT

TITLE

JIP Oil in ice FEX 2008. ACTIVITY REPORT

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CLIENT(S)

AGIP KCO, Chevron, ConocoPhillips, Shell, Total and Statoil

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ABSTRACT

The 2008 JIP oil in ice full scale field experiment was completed with almost 100 % accomplishment in relation to plans. The only test we missed was the remote sensing operation by LN-SFT surveillance aircraft. The aircraft was already located in Longyearbyen ready for our mission when it had to move to the Statfjord field due to the oil spill situation that occurred on the 24th of May - the same morning the remote sensing was scheduled for our field experiment. Except for this all planned activities was carried out as scheduled.

KEYWORDS	ENGLISH	NORWEGIAN
GROUP 1	Oil spill contingency	Oljevern
GROUP 2	Arctic	Arktis
SELECTED BY AUTHOR	Field experiment	Feltforsøk

JOINT INDUSTRY PROGRAM ON OIL SPILL CONTINGENCY FOR ARCTIC AND ICE COVERED WATERS.

FEX 2008.
ACTIVITY REPORT

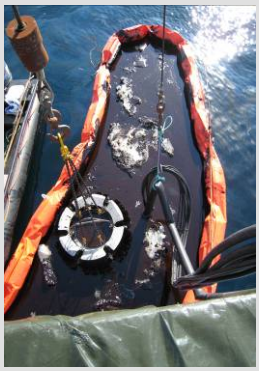
Stein Erik Sørstrøm
SINTEF

This report gives an overview of activities during FEX 2008, May 18th - 28th
N77.30 – E 30.90
East of Hopen in the Barents Sea.

All pictures in this report is taken with a Canon Ixus 850 S pocket camera.






Summary

The 2008 JIP oil in ice full scale field experiment is completed with almost 100 % accomplishment in relation to plans. The only test we missed was the remote sensing operation by LN-SFT surveillance aircraft. The aircraft was already located in Longyearbyen ready for our mission when it had to move to the Statfjord field due to the oil spill situation that occurred on the 24th of May - the same morning the remote sensing was scheduled for our field experiment. Except for this all planned activities was carried out as scheduled and with no negative environmental effects.

The experiment was carried out in the vicinity of position 77,6 – 30,9 in an area covered by a slightly drifting (north to south) and opening ice field.

The scheduled field program is completed two days ahead of schedule tanks to an impressive effort from all participants.

The following program was included;

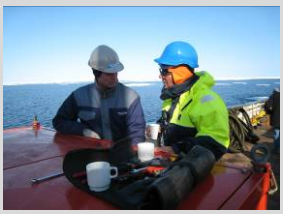
- Approximately 10 separate skimmer tests,
- two experiments with towing of two types of fire proof booms in ice,
- two open water and ice burn experiments
- one remote sensing experiment (with SAR-satellite)

The experiments has verified findings from laboratory tests and supplied additional important knowledge for the development of oil spill contingency for ice covered areas.

The released oil was either collected by skimmers or removed by burning. Each experiment was concluded with a clean up operation and only a few liters of residue was left on the surface after clean up. This residue was treated with absorbing pads and bark. None of the experiments has resulted in pollution of the surroundings.

During the experiment we have spotted approximately 18 different polar bears – and acquired a large number of good pictures and video recordings.

On the following pages you will find a day to day short overview of activities. A full report with results from the various experiments will be provided as soon as possible








The team

Stein Erik Sørstrøm	Program Manager
Ivar Singsaas	Project management, skimmers
Rune Høgstrøm	Lamor LRB Skimmer
Svein-Bjarne Olsen	Norlense
Erik Refsgaard	Desmi skimmers
Lauri Solsberg	Skimmer and boom operations and documentation
Janne Resby	Chemical analyses
Bror Johansen	Field operations
Frode Lervik	Field Operations
Ian Buist	Project management, Herding and burning
Steve Potter	Project management, Boom testing
David Dickins	Project management, Remote sensing
Vidar Bakken	Wildlife observations
Ian Dennes	Observer, ConocoPhillips
Paul Verlaan	Observer, Shell
Crew on RV Lance and on helicopter	Operations


Stein Erik Sørstrøm


Steve Potter


Frode Leirvik


Ivar Singsaas


Janne Resby


Bror Johansen


Lauri Solsberg


Rune Høgstrøm


Erik Refsgaard


Paul Verlaan


David Dickins

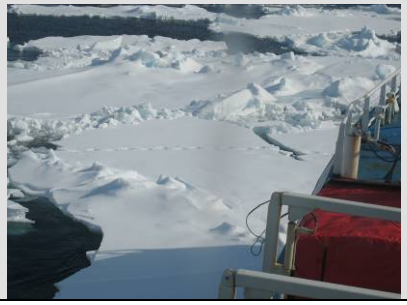

Vidar Bakken


Ian Buist


Svein-Bjarne Olsen


Ian Dennes


Crew on Lance and helicopter

Date and time		Activity	Comments
180508	2315	Arrival at Lance	Cargo loaded by Bror and the rest of the crew
190508	0130	Departure from port	
			
	0845	Briefing of participants	
	1245	Safety instructions	Pål, Chief officer on Lance
		HES and Confidentiality declaration	Signed by all participants
		Continue transport to location	
200508	0800	Briefing of today's activities	Ivar informs about "dry-test" of skimmers and boom
		Transport to location	
	1500	In position	
		Helicopter survey to find an open space in the ice	Position 77,48 - 29,34
		Start dry test	Problems with generator Problems with hydraulics
	1700	Problems solved	
		Weather conditions	Excellent
		Ice conditions	Slightly opening ice. Approximately 90-100 % coverage with open "ponds in between
		Polar bear	Spotted the first polar bear around 1500, close to Lance
	2000	Debriefing of today's activities	
			

Date and time		Activity	Comments
210508	0600	Polar bear	First bear spotted to day – just outside the window of the cabin
	0800	Briefing of today's activities	Helicopter survey Test of Desmi Helix skimmer with 1 m^3 of emulsion
		Weather	Excellent
		Ice conditions	Just as planned
	1100	Difficult to collect ice efficiently, but finally finished	Approx 25% ice inside the boom
	1300	Skimmer works perfect	The crane is not easy to operate, but the skimmer is efficient in relatively low ice condition
		Pollution	Only blue shine outside the boom. A few deciliters may have escaped the boom, but disperses rapidly under some agitation from small boats.
	1400	Second Desmi test with 0,5 m3 of oil	Skimmer works very efficiently
		Polar bear and whale	Both "watching" the experiment. Bear waiting for a fresh scientist for supper, but moves disappointed to other hunting grounds.
	1500	Experiment finished	
		Clean up with skimmer, pads and absorbing booms.	Only trace amounts on surface.
	1830	Transport back to position	
		Polar bear spotted	Number three to day
	2000	De briefing	Ivar
		Plan for tomorrow	Ian – micro full-scale field experimental burn as a trial before the full scale burn on saturday

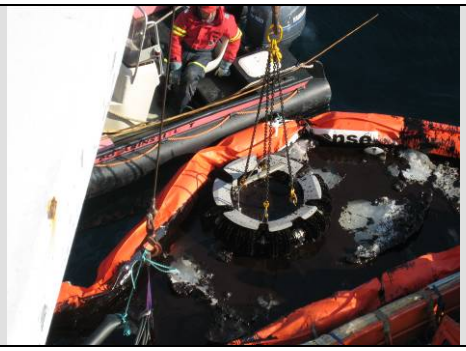
Conclusion from today's activities; Program accomplished as planned. Skimmer effective.The skimmer will be tested again on 23rd of May

Date and time		Activity	Comments
220508	0800	Briefing	
		Weather	Too much wind (7.3 m/s) for today's experiment.
		Postponement	Decided to postpone decision on the burn trial till 1100
		Polar bear	One passing by pluss one with two cubs spotted earlier this morning
		The two teams start preparing both skimmer and burn experiment	Decide on burn or skimmer in next meeting
	1100	Decided to burn as planned	Slightly modified test program, but as planned for the most part.
		Polar bear	One on distance
			One young and curious approaching the ship. Excellent photos and videos at very short (3 m) distance (from deck of ship). Stays in the area for a long time waiting for scientists or engineers. No luck.
	1200	Start of burn test	Slow start, but starts to burn on open water after applying herder. Small boat runs over the fire and extingushes it. Then it starts to burn vigourously at another spot.
		Re-ignition	Remaining oil on ice-water edge. More than 80 % removed by burning.
	1500	Burn test successfully completed	Concluded with clean up with absorbing boom and pads
	1600	Start preparing Lamor skimmer – dry test	Test of functionality to see if every thing is OK.
	1830	Helicopter survey to position 77,60 – 31,00 to see if ice conditions has improved	Conclusion; We will go there with Lance on Friday evening if the ice filed opens even more tomorrow
		Polar bear	Two more spotted from the helicopter – that gives a total of 7 polar bear spotted to day. Tracks all over.
	2000	De-briefing	Another successful story
		Plan for tomorrow and next days	Test two skimmers tomorrow, then the last skimmer as well as the final burn test on Saturday – if weather conditions still are as good as they have been so far.

Conclusion from today's activities; The pilot test proved to be very useful as a test before the larger test. Herders seem to work as planned and despite very little oil on water, the oil caught fire on open water. The main part of the oil was however burned against the ice edge.

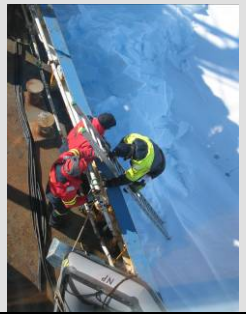
Date and time		Activity	Comments
230508	0800	Aerial survey	Checking for birds and mammals before skimmer test.
		Start preparing skimmer test	We decided in yesterdays de briefing to test the Lamor skimmer as well as the Helix skimmer (once more)
	1030	Ice collection completed	Better technique this time
		Lamor LRB test	The test set up not good enough due to low maneuverability of crane. The skimmer works well when it is positioned correct in the oil/ice, but we fail to move it systematically within the boom. Several tests with similar results.
	1500	End of Lamor LRB test	
		Test of Desmi Sea Mop	During the day it was decided to test all three skimmers ending with the Helix skimmer as clean up skimmer. The Sea Mop does not work well on viscous oil in ice.
	1600	Helicopter survey	To see if ice conditions has improved further. The goal is to move Lance within the frame of the satellite to ensure that the large experiment is carried out within the frame covered by the satellite.
	1700	End Sea Mop test	
	1900	Start Desmi test and clean up	This is the final skimmer test, one day ahead of schedule.
	2300	Start moving to 77.60 – 31.00	





Conclusion from today's activities; Some small problems with the maneuverability of the crane. Tests completed as scheduled. All three skimmers tested one day ahead of schedule.

Date and time		Activity	Comments
240508	1230	Briefing	Ian Buist - on large herd and burn experiment
		Weather forecast	Excellent. Wind less than 2 m/s
		Position	Allmost bulls eye, 77.26 – 31.32
		Satellite pass	17.26
		Scheduled release	1715
		LN-SFT	In position from 1650
		Scheduled herder application	1740
	1330	Helicopter survey	Find pond for in situ burn experiment
	1600	Drums with oil on ice floe	Lancee moves away cross wind
		2 small boats on water	Sampling (2 samples before and 2 after application of herder, herder application and ignition
	1711	Oil release	Takes less than 2 minutes, Wind speed 3,5 m/s
	1726	Satellite pass	
	1727	Application of herder	Oil slick contracts immediately, especially the blue shine area
	1732	Ignition	Successfully accomplished. The slick burns to almost total extinction
	1745	Fire extinguishes	Preliminary estimated burn efficiency 90 %
	1830	Clean up completed	Only trace amounts of oil on surface after burn



Conclusion from today's activities; The large burn experiment was accomplished as scheduled. The removal efficiency was probably around 90 %. Clean up after burn took less than 1,5 hours. The experiment represents the largest herd and burn experiment on open water/with ice ever accomplished.

Date and time		Activity	Comments
250508		Transport back to Longyearbyen	Unloading of skimmers, loading of booms
		Preparing to unload	
	1300	Project meeting to discuss next years field experiment -skimmers	
260508		Transport and prepare for shipment of equipment	
	1000	Briefing of tomorrow's boom test	Steve
	2130	In Longyearbyen	
	2200	Unloading	
270508	0100	Booms loaded	Another long day
	0130	Transport to Billefjord	Experimental site for boom towing experiment



Conclusion; We saved one day by spending the evening and parts of the night on unloading and loading of equipment. Thanks to everyone for enthusiastic contribution.

Date and time		Activity	Comments
270508	0800	Briefing boom tow test	Steve
	0830	Start preparing boom test	Billefjord
		AFTI boom test started	
	1430	AFTI boom test completed	
	1130	Lunch	
	1600	AFTI boom recovered	
	1630	3M boom deployed	
	1705	3M boom test completed	
		3M boom recovered	
	1900	Supper for all participants	
		We stay in Billefjord over night	By the glacier
280508	0600	Transport back to Longyearbyen	
	0800	In Longyearbyen	
	1000	Finnished unloading	
	1445	Departure from Longyearbyen	Back to office

Comments; Skepticism before test turned to success as we learned how to deploy, operate and retrieve booms. Program completed two days ahead of schedule.

PICTURES











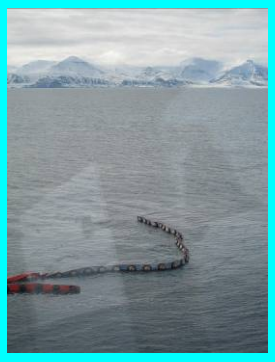
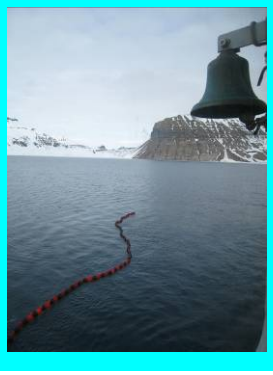











END OF EXPERIMENT