An Inventory of Research Projects on Oil Spills in Arctic Waters

This matrix is a selection of Arctic oil spill research drawn largely from US government sources and supplemented by representative projects from other sources including foreign governments and privately funded programs. The collection of refrences are limited to those available in the public domain.

Research Initiatives	Links	Description	Facility	PI	Funding	Year	Objective
Assessments and Workshops							
	AK-11-11	Interagency Protocols for Immediate On-Scene Arctic Oils Spill Impact Science		NA	BOEM-AK	2012	Beaufort, Chukchi
		Arctic and Marine Oilspill Program (AMOP) Technical Seminar on Environmental Contamination and Response		NA	EC	2012	http://www.etc-cte.ec.gc.ca/news/conferences_e.html
		Spill Response in the Arctic Offshore		SL Ross, DF Dickins Associates, Polaris Applied Sciences	API- OSRI	2011	Prepared for the American Petroleum Institute and the Joint Industry Programme on Oil Spill Recovery in Ice http://www.api.org/~/media/Files/EHS/Clean_Water/Oil_Spill_Prevention/Spill-Response-in-the-Arctic-Offshore.ashx
		Offshore Technology Conference-Arctic				2011	
		Joint Industry Program on Oil Spill Contingency for Arctic and Ice-Covered Waters: Summary Report		SINTEF, SL Ross, DF Dickins Associates	JIP SINTIF Oil In Ice	2010	Summary of the Joint Industry Program on Oil Spill Contingency for Arctic and Ice-Covered Waters (JIP on oil in ice. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-32-Summary-report.pdf

	Beaufort Sea Oil Spills State of Knowledge Review and Identification of Key Issues		SL Ross, DF Dickins Associates, Envision Planning Solutions	Environmental Studies Research Funds	2010	Comprehensive review of the Arctic oil spill knowledge, including behavior and modeling, surveillance and monitoring, containment, recovery, in situ burning, dispersants, oil waste management, shoreline spill response and case histories. http://www.esrfunds.org/pdf/177.pdf
	Advancing Oil Spill Response in Ice-Covered Waters				2009	http://www.arctic.gov/publications/oil_in_ice.pdf
	Arctic and Marine Oilspill Program (AMOP) Technical Seminar on Environmental Contamination and Response				2009	Conference is every other year. http://www.ec.gc.ca/scitech/default.asp?lang=En&n=66A57AF7-1
587	International Oil in Ice Workshop 2007		SL Ross, DF Dickins Associates	MMS, ACS, Alaska Department of Environmental Conservation, Cook Inlet Spill Prevention and Response, OSRI, USCG	2008	Project is to organize and conduct an international workshop on recent advances in cleanup of oil spills in ice and cold climates.
	Arctic Oil Spill Response Research and Development Program: A Decade of Achievement		MMS	MMS	2008	Report provides a comprehensive summary of activities and accomplishments of the (MMS) Arctic Oil Spill Response Research (OSRR) program. Significant accomplishments of the OSRR program include: • Detection of oil in and under ice • Oil spill thickness sensor • Mechanical containment and recovery in ice environments • In situ burn research • Dispersants in cold water/broken ice environments • Chemical herders • Operation of Ohmsett http://www.iccopr.uscg.gov/iccopr/i/files/MMSArcticResearch_2009.pdf

	Short State-of-the-Art Report on Oil Spills in Ice-Infested Waters		SINTEF	JIP SINTIF Oil In Ice	2006	The objective of this report is to give a short and "to-the-point" presentation of the status, knowledge gaps, and research needs regarding oil spill response in Arctic and primarily in ice-infested waters. The report identifies technology gaps and recommendations are to be used to develop a scope of work for an R&D program to support petroleum exploration and production in Arctic areas. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-1-State-of-the-art-2006-oil-in-ice.pdf
555	Partnering in a Workshop to Determine the Scope of an Experimental Oil Spill in Pack Ice in Canada		SL Ross, DF Dickins Associates	MMS	2006	Conduct a planning workshop for an experimental oil spill in pack ice offshore Canada.
512	Transfer of Decanting Technology Research to Oil Spill Response Organizations and Regulators		SL Ross	MMS	2005	Distill research results collected during the past six years of decanting experiments (including the use of chemical demulsifiers to enhance water separation) into proposed guidelines for operational use and to transfer technology to responders and regulators.
518	Workshop on the Issue of Prevention: What are the Next Challenges?		American Petroleum Institute	MMS	2005	International Oil Spill Conference (IOSC) is the pre-eminent gathering of oil spill experts from around the world.
520	**Project Canceled** Summary Report of Activities at the Bureau of Ocean Energy Management, Regulation, and Enforcement Ohmsett Facility		ATRP Corporation	MMS	2005	The objective of this project was to prepare a series of technical summaries detailing the oil spill related research, testing, and training activities conducted at Ohmsett.
451	Global Challenges to Preparedness and Response Regimes Workshop		American Petroleum Institute	MMS	2003	International Oil Spill Conference (IOSC) is the pre-eminent gathering of oil spill experts from around the world.
354	International Oil and Ice Workshop		DF Dickins Associates	MMS & ACS	2002	The workshop assembled experts on oil fate and behavior, Arctic oil spill response, ice environments, and Arctic oilfield development to present the leading edge technologies in a seminar and field setting.

	153	Alaska Arctic Workshop		NIST	MMS	1990	The objectives of the workshop were to: (1) Provide a public forum to describe existing research programs (2) Identify future research needs and priorities (3) Improve and to advance Arctic oil spill response capabilities (4) Present discussions of the state-of-the-art for all aspects of oil spill response under Arctic conditions Alaska Arctic Offshore Oil Spill Response Technology, November 29– December 1, 1988, Workshop Proceedings, National Institute of Standards and Technology Special Publication 762, April 1989.
Fate and Behavior of Oil							
	120	Physical Behavior of Oil in the Ocean		EC-ESD	MMS & EC	2002	Behavior and oil properties, particularly those of heavy oils. The study includes: buoyancy behavior, solubility, evaporation, dispersion, photo-oxidation, and emulsification
	347	Emulsions Formed at Sea and in Test Tanks		EC	MMS	2002	Evaluate the tendency of oils to emulsify at sea into unstable, mesostable, or stable emulsions
	298	Testing at Ohmsett to Determine Optimum Times to Decant to Temporary Storage Devices		SL Ross	MMS	2001	Conduct full-scale tests of recovered oil/emulsion/water separation rates
	287	Fate and Behavior of Deepwater Subsea Oil Well Blowouts in the Gulf of Mexico		SL Ross	MMS	1997	Analyze the behavior of oil spilled during a deepwater blowout
	162	Development of a Portable Oil Analysis Kit for Responders		EC-ESD	MMS & EC	1992	Develop a field kit to measure oil properties
Environmental Effects							
Proposed	RFP	Environmental impacts of Arctic spills and their response			OSRT-JIP	2012	Provide a robust information base that will support the use of net environmental benefit analysis (NEBA) for Arctic oil spill environmental impact assessments and response decision-making
Ongoing		Environmental Response Management Application (ERMA)		UNH	NOAA, UNH, EPA,USCG and Department of Interior,	2012	Online mapping tool that integrates both static and real-time data, such as Environmental Sensitivity Index (ESI) maps, ship locations, weather, and ocean currents, in a centralized, easy-to-use format for environmental responders and decision makers. http://response.restoration.noaa.gov/erma_portal
	AK-08-09	Aggregate Effects Research & Environmental Mitigation Monitoring of Oil Operations in the Vicinity of Nuiqsut			BOEM-AK	2012	Beaufort

Detection, Mapping and Tracking

Proposed	RFP	Trajectory modeling in ice			OSRT-JIP	2012	Create or adapt an existing numerical model that is capable of modeling the trajectory of spilled oil in various ice concentration
	RFP	Oil spill detection and monitoring in low visibility and ice			OSRT-JIP	2012	To advance and expand the oil and gas industry's oil spill remote sensing and mapping capabilities and technologies in Arctic conditions
Reports on Remote Sensing		Project P5: Remote Sensing Summary Report		DF Dickins Associates	JIP SINTIF Oil In Ice	2010	The main objective s of this report are threefold: (1) summarize the findings of the primary JIP remote sensing activities from 2007 to 2009,(2) draw conclusions recommending the most effective combination sensors and systems based on information gathered through the JIP, including the initial technology screening and assessment and field experiments offshore and on Svalbard, and (3) highlight several evolving technologies and/or research that could enhance industry's capabilities in the next few years. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-30-RSSummaryFinal.pdf
		Remote Sensing Technology Review and Screening		DF DickinsAssociates & Norconsult	SINTEF Oil in Ice JIP - AGIP KCO, Chevron,Conoco Phillips,Shell, Statoil & Total	2009	Spill detection and mapping are particularly important for Arctic spills as oil may be hidden from view under snow and ice during periods of almost total darkness. Very little is known about the capabilities of existing remote sensing systems—airborne, surface, and satellite—when faced with an accidental spill in a specific ice condition ranging from very open drift ice (1–3/10) to very close winter pack ice (9/10). This report considers the likely performance of different sensors in a range of ice types based on their signal attributes and identifies the most likely systems for future field testing in the JIP such as airborne multispectral systems, synthetic aperture radar, ground penetrating radar, and trained dogs. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-22-RSScreening-Final.pdf
Underwater		Underwater sensors to detect and map oil spills under ice	CRREL	OSRI	WHOI & SAMS	2012	Explored the possibility of using upward-looking capabilities to detect and map oil spills under ice. The suite of sensors, to include cameras, sonar and lasers, were attached to a submersible trolley, which was pulled under ice.

Surface/ Instrumentation		Measurement of Methane Emission from Oil Spill Experiments at Svea Test Site, Svalbard, April 2007		Shell	JIP SINTIF Oil In Ice	2010	The spills were primarily aimed at improving understanding of the weathering and ignitability of spilled crude. However, they provided an opportunity for Shell staff supported under the JIP tto obtain the first ever measurements of methane emissions from such spills. Those emission rates are reported here. Gas dispersion modeling shows that the level of emissions from a significant spill are probably sufficient for its remote detection and mapping from a range of several kilometers using LightTouch™, Shell's hydrocarbon seepage detection technology. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-23-MethaneFinalUnrestricted.pdf
	517	New and Innovative Equipment and Technologies for the Remote Sensing and Surveillance of Oil in and Under Ice	CRREL	Dickins/ BSU	MMS, Statoil, ACS	2005	Project positively detected oil trapped in and under ice with two completely independent technologies
	547	Developing New and Innovative Equipment and Technologies for the Remote Sensing and Surveillance of Oil in and Under Ice - Phase 2		Dickins/ BSU	MMS, Statoil, ACS	2005	Follow up on work to develop technologies to detect oil located in or under ice. See 517 and 569
	161	Development of a New Generation Laser Fluorosensor		EC-ESD	MMS, EC, USCG, Canadian Transportation Development Centre, and the Canadian Petroleum Association	2002	Develop the new laser fluorosensor technology for the detection of oil on water, ice, and shorelines.
	348	Detection and Tracking of Oil Under Ice		Dickins	MMS	2002	Establish a baseline of information that can be used to plan field trials with prototype systems to detect and map oil under ice
Surface / Dogs		Using dogs to detect oil hidden in snow and ice–results from field training on Svalbard April 2008		SINTEF & Trondheim Hundeskole	JIP SINTIF Oil In Ice	2009	The main objective of this project has been to train dogs to find oil spills hidden in snow or ice. Previous tests performed during 2007 in a laboratory environment in Trondheim showed that dogs are able to detect and identify the smell of oil, both weathered crude and bunker fuels. Outdoor tests in the Trondheim area have also shown that dogs detect the smell of oil and can find point source at an outdoor temperature down to -5C. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-14-Oildog-snow-ice.pdf

		Oil Detection By Specially Trained Dogs				2007	Brandvik, P.J. and T. Buvik. Nov 2007. *Oil Detection By Specially Trained Dogs*. Report from Phase 1 feasibility study. Memo prepared by SINTEF and Trondheim Hundeskole as part of Oil-in-Ice JIP Project 5 – Remote Sensing
Vessel	157	Development of an Airborne Oil Spill Thickness Sensor		EC-ESD	MMS	2000	Develop the technology of oil slick thickness sensor for the measurement of oil slick thickness on water from an airborne platform
	154	Development of Improved Oil Spill Remote Sensing Techniques		EC-ESD	MMS & EC	1990	Three approaches were taken: 1. Use of shipborne radar as a practical aid to spill control 2. Study Infrared oil spill remote sensing 3. Study dispersant signature in remote-sensing imagery.
	136	Shipboard Navigational Radar as an Oil Spill Tracking Tool		MMS	MMS	1989	Refine the use of existing shipboard navigational radar units to detect and track oil spill slicks
	659	Detecting Oil On and Under Sea Ice Using Ground Penetrating Radar: Development of a New Airborne System		Dickins, BSU	ACS, BSEE, ConocoPhillips, ExxonMobil, Shell, Statoil	2010-12	Expand the practical operating window for oil detection with ground penetrating radar (GPR) to cover a wider range of sea ice and climate conditions. This project is a direct continuation of TAR projects 348, 517, 547, 569, and 588
		Evaluation of Airborne Remote Sensing Systems for Oil in Ice Detection		Dickins & Norconsult	JIP SINTIF Oil In Ice	2010	The airborne programs in 2008 and 2009 provided real-world demonstrations of the capabilities and limitations—technical and operational—of using airborne surveillance aircraft to detect and monitor spills confined by ice in remote Arctic areas. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-28-AirborneRSFinal.pdf
		Airborne GPR to Detect Oil Under Snow		BSU, Dickins, SINTEF	JIP SINTIF Oil In Ice	2010	Numerical modeling shows that GPR is sensitive to the presence of oil in the snow pack over a broad range of snow densities and oil types. Results of a controlled field experiment using a helicopter borne, 1000 MHz GPR system, showed that a 2 cm thick oil film trapped between snow and sea ice was detected based on a 51% decrease in reflection strength. Our results indicate that GPR has the potential to become a robust tool that can substantially improve oil spill characterization and remediation. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-24-GPRFinal.pdf

Airborne	658	Open Water Multispectral Aerial Sensor Oil Spill Thickness Mapping In Arctic and High Sediment Load Conditions		Ocean Imaging Corporation	BSEE	2011	Temperate sea and atmospheric conditions with reasonable water clarity do not exist in the Arctic conditions at high latitudes. There is a need for the testing of simplified, self-contained multispectral system configurations. This project is a direct continuation of TAR projects 544 and 594.
	594	Development of a Portable Multispectral Aerial Sensor for Real-Time Oil Spill Thickness Mapping in Coastal and Offshore Waters	Ohmsett	Ocean Imaging Corporation	MMS & Cala F&G-Oil Spill Prevention and Response	2009	Develop a portable, easy-to-operate aerial sensor to detect and accurately map the thickness and distribution of an oil slick in coastal and offshore waters in real time
	588	Detection of Oil on and Under Ice - Phase 3		Dickins & BSU	MMS	2008	The development of oil and ice detection system has made significant progress through a series of successful projects (TAR-517, TAR-547 and TAR-569). This new research project will undertake a series of four tasks to assess the technical feasibility and cost of developing and incorporating airborne oil detection systems in future field trials with oil and ice.
	544	Real-time Detection of Oil Slick Thickness Patterns with a Portable Multispectral Sensor		Ocean Imaging Corporation	MMS	2007	Develop an oil slick thickness measurement algorithm with laboratory and field validation.
	240	Development of a Frequency Scanning Radiometer to Measure Oil Slick Thickness, Phase II		USAF / MIT, Lincoln Laboratory	USAF	2000	Development of an all-weather, airborne instrument capable of measuring oil thickness over an oil-slick area in real time.
Satellite	AK-08-12-08	Satellite Tracked Drifter Measurements in the NE Chukchi Sea			BOEM-AK	ongoing	Chukchi Sea
		Detection of Oil Under Ice Using Satellite	CRREL	TAS		2012	Test ability to detect oil under ice leveraged with TAR 659.
		The Utilization of Satellite Images for the Oil in Ice Experiment in the Barents Sea. May 2009		NERSC & KSAT	JIP SINTIF Oil In Ice	2010	Twenty-six satellite images were received for analysis as a part of the Oil in Ice project: 10 Envisat ASAR wide swath images, 6 Radarsat-I images, 7 Radarsat-2 images, and 3 COSMO¬SkyMed. The main objectives were to determine which images cover the activities, and what can be seen in these images with regards to ships, oil, and ship tracks through ice. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-29-SatelliteFinal.pdf
	626	Evaluation of Satellite Data in Determining Pollution Resulting from Damage to the Oil & Gas Industry Infrastructure of the GOM **Project Canceled**		Naval Research Lab	MMS	2008	Identifying damage to the pipelines and structures in the Gulf of Mexico and resulting oil pollution by sensors on board satellites such as the such as the Advanced Very High Resolution Radiometer (AVHRR) on board the NOAA-n satellite series, and the Moderate-resolution Imaging Spectroradiometer (MODIS) on board of the TERRA and AQUA satellites.

	355	Using Satellite Radar Imagery to Detect Leaking Abandoned Wells on the US Oouter Continental Shelf		Advanced Resources International	MMS	2004	Use satellite radar imagery to detect if there are leaking abandoned wells.
Numerical Models		Review of Oil Spill Trajectory Modelling in the Presence of Ice		COOGER	COOGER	2011	The review addresses all the components of a comprehensive oil spill trajectory model, including: (1) a blowout plume model to determine the distribution of oil in the water column for spills that occur at depth, (2) models for the physical environmental forcing (wind, air temperature, precipitation, ocean currents, sea ice, and waves), and (3) an oil fate-and-effects model to address weathering, evaporation, ice-oil interactions, and other details of the oil's interplay with the environment. http://www.dfo-mpo.gc.ca/Library/344774.pdf
		OWM Weathering model		SINTEF		2011	(OWM) provides comprehensive predictions of the behavior of spilled oil at sea under different weather conditions. Excellent agreement with field observations has been consistently achieved with this model when predictions are based on standardized laboratory studies of specific oils and petroleum products
		Modelling of Oil in Ice with OSCAR		SINTEF	JIP SINTEF Oil In Ice	2011	Fresh crude oil was released uncontained between the ice floes to study oil weathering and spreading in the ice by multiple sampling throughout the six-day experiment, including meteorological and oceanographic (MetOcean) data. The objective of the comprehensive sampling program was to acquire more knowledge of how the presence of ice influences the distribution and spreading of oil on the surface and in the water column. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/A19804%20JIP-report-no%2035%20Petromaks%20modelling%20Final.pdf
		OSCAR Model		SINTEF		2011	Develop models addressing effects and risks associated with operational and accidental discharges to the marine environment. The OSCAR model provides a scenario-based and 3-D statistic approach to objective evaluation of alternative response strategies. Both physical and biological measures of success and effectiveness are provided. This 3-D map-based system uses the SINTEF OWM for weathering calculations.

		Experiment Oil Release in Broken Ice – A Large-Scale Filed Verificatioon of Results From Laboratory Studies of Oil Weathering and Ignitability of Weathered Oil Spills		SINTEF	JIP SINTEF Oil In Ice	2010	This field data from the large-scale experiment (70–90% ice coverage) correspond well with data from previous mesoscale basin experiments at similar ice coverage. This confirms that the results from the weathering experiments performed in the mesoscale basins at SINTEF SeaLab can be interpreted as reflecting realistic conditions. This is a significant verification since the possibility to perform large-scale field experiments is limited. The data set from the basin studies and field verification is used to improve SINTEF Oil Weathering Model's capability to predict weathering of oil spills: in cold conditions and ice. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-26-FEX2009-weathering-ISB%20final.pdf
Mitigation							
Planned	AK-11-12	Maximum Credible Blowout Occurance and Size Estimators for AK OCS		NA	BOEM-AK	2012	Beaufort, Chukchi
	AK-11-15	AK Environmental Database		NA	BOEM-AK	2012	Beaufort, Chukchi
	AK-12-03a	Characterization of the Circulation on the Continental Shelf Areas of the Northeast Chukchi and Western Beaufort Seas		NA	BOEM-AK	2012	Beaufort, Chukchi
	AK-12-03b	Applications for Mapping Spilled Oil in Arctic Waters		NA	BOEM-AK	2012	Chukchi
	NT-08-02	Adaption of Arctic Circulation Model		NA	BOEM-AK	2011	Chukchi
	AK-11-01	Updates to the Fault Tree for Oil-Spill Occurance Estimators Needed Under Forthcomming BOEM 5 year program		NA	BOEM-AK	2011	Beaufort, Chukchi

On Going	AK-11-02	Oil Spill Occurrence Estimator for Onshore AK North Slope Crude and Refined Oil Spills Training and Response (STAR) Calculator Program		NA	BOEM-AK	2011	Beaufort, Chukchi
	AK-11-07	Shore Zone Shoreline Mapping of the North Slope AK		NA	BOEM-AK	2011	Beaufort, Chukchi
		Ice Regimes for Oil Spill Response Planning		SINTEF, Oil Spill Consultant, Counterspil Research	JIP SINTIF Oil In Ice	2008	The ice conditions were reviewed for nineteen regions where oil exploration and production (E&P) activities are either ongoing or planned. Using internationally accepted classification terminology to describe the ice, the immediate objective of the work became one of identifying ice regimes common to most circumpolar areas of the world. There are some overall similarities in the ice conditions of the 19 regions that have permitted grouping according to five ice regimes: i.e. Arctic shallow semi-enclosed sea, Arctic open-sea, Arctic and sub-Arctic coastal, sub-Arctic estuary and non-Arctic shallow sea. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-15-Ice%20regimes-final_2010.pdf
	662	Combining Mineral Fines with Chemical Dispersants to Disperse Oil in Low Temperature and Low Mixing Energy Environments		DoFO	BSEE	2012	Assess the feasibility of a cold water and Arctic marine oil spill countermeasure strategy based on the stimulation of oil-mineral aggregate (OMA) formation in the presence of a chemical dispersant.
	647	Research on Improving Methods for Recovering Residues from In Situ Burning of Marine Oil Spills		SL Ross	BSEE	2011	Research program is to develop methods for (1) recovering potentially nonbuoyant ISB residues through innovative surface and subsurface collection mean, and (2) recovering buoyant residues, including those attached to sorbent agents that were intentionally added to the residue to prevent subsequent residue sinking.

Response	673	Effective Daily Recovery Capacity (EDRC) Project		Genwest Systems, Inc.	BSEE	2011	Deepwater Horizon oil spill response has highlighted that the EDRC for an oil skimmer may not be an effective or accurate planning standard and predictor of oil response equipment recovery capacity. EDRC is a regulation that greatly influences vessel and facility response planning standards nationwide and established the basis for the initial capitalization of Oil Spill Removal Organizations (OSROs).
	625	Oil Spill Training and Response (STAR) Calculator Program		Genwest Systems, Inc.	MMS, Shell International Exploration and Production, Inc. and the American Petroleum Institute, NOAA	2010	Project are to standardize the existing software packages; to enhance their utility, user-interface and output; and to integrate all three response options (mechanical, burning, and dispersants) using improved algorithms for their efficient use under a variety of spill scenarios.
	585	Mitigating Oil Spills from Offshore Oil and Gas Activities by Enhancement of Oil-Mineral Aggregate Formation		COOGER	MMS & Department of Fisheries and Oceans	2009	Project will assess the feasibility of a marine oil spill countermeasure strategy based on the stimulation of OMA formation. Experiments will be conducted on both laboratory and wave tank systems under controlled conditions to evaluate its potential effectiveness for the treatment of oil spills from ships, facilities, or pipelines. http://www.dfo-mpo.gc.ca/science/publications/article/2009/05-19-09-eng.htm
		Oil Spill Management		SINTEF		2005	Oils cause them to behave very differently when spilled at sea. Also, recent incidents of various light, medium, and heavy bunker fuel oils like the North Cape Spill in the US, Erika incident in France, the Baltic Carrier in Denmark, and the Green Ålesund and John R incidents in Norway have shown a wide spectre in physical behavior, biological effects, and in the performance of response options. Prior knowledge of the likely behavior and weathering of various oils and pre-spill analyses of the feasibility and effectiveness of different response strategies under various environmental conditions, are essential part of any oil spill contingency planning to optimize the overall "Net Environmental Benefit" of a combat operation.
	453	Production of a White Paper and Workshop Regarding a Full Scale Experimental Oil Release in the Barents Sea Marginal Ice Zone		SINTEF	MMS	2004	Evaluated alternative oil spill response options and in supplying data strengthened model simulations of oil-ice interactions.

	310	Mechanical Oil Recovery in Ice Infested Waters (MORICE) - Phase III	OHMSETT	SINTEF	MMS, Alaska Clean Seas, Prince William Sound Oil Spill Recovery Institute, BP Exploration, Phillips Alaska, Norsk Hydro and Store Norske Spitzbergen Kulkompani	2003	Develop technologies for more effective recovery of oil spills in ice-infested waters.
	390	A Method to Determine Worst Case Discharges From Facilities That Produce Or Transport Oil in the U.S. Outer Continental Shelf (OCS)		SINTEF	MMS and 23 different oil companies to conduct this research	2003	Produced a model to predict a discharge from a pipeline. It also included a pocket guide to quickly make an estimate of a worst case discharge from a pipeline. The model is known as the MMS Pipeline Oil Spill Volume Estimation Model (POSVEM). POSVEM is a computer-based methodology to estimate discharges from seafloor pipelines.
	297	Comprehensive Spill Response Tactics for the Alaska North Slope-Oil in Broken Ice Spill Response Scenarios		SL Ross, DF Dickins Asscociates, Vaudrey	MMS and Alaska Clean Seas	1998	Developed comprehensive oil spill response plans for petroleum operations on the North Slope of Alaska. The objective of the study was to evaluate the capabilities to recover spilled oil from very large oil well blowouts occurring during broken ice conditions in the southern Beaufort Sea.
	156	World Catalog of Oil Spill Response Products		Environ-mental Consultants Inc.	MMS, USCG, EC	1991	Equipment listed in catalog has become obsolete. Updated list available at http://www.slross.com/WorldCat/WorldCatmain.htm
Contaiment Booms		Fighting Oil Spills with Air Bubbles		SINTEF		2009	Obvious advantages in using the bubble curtain instead of traditional oil-booms: it is an efficient way of closing off a vulnerable area to prevent an oil-spill from entering it. It also enables us to limit the spread of a spill and improves our prospects of collecting the oil.
	330	Oil Spill Response - Performance Review of Booms		Environ-mental Consultant	MMS	2005	Analyzed and summarized all available performance test data of oil spill containment boom.
	353	The Use of Ice Booms for the Recovery of Oil Spills from Ice Infested Waters		Fleet Technology Limited	MMS	2004	The objective of this research contract was to study the technology in the design and use of ice booms for recovering spilled oil in ice infested waters.
	457	Effect of Oil Spill Containment Boom Characteristics on Boom Performance	Ohmsett	SL Ross	MMS	2004	Research investigated the effect of a previously identified key containment boom characteristic on boom performance.
	299	Estimation of Towing Forces on Oil Spill Containment Booms	Ohmsett		MMS	2001	The purpose of the study is to determine the maximum towing forces allowable for different boom types.

	247	Numerical Modeling of Oil Boom Behavior and Rapid Current Boom Development		URI, UNH	USCG	2000	Develop a rapid current boom using the submergence plane concept.
	333	Field Experiments at the Ohmsett Facility, Especially for a Newly Designed Boom System	Ohmsett	University of Miami	MMS	2000	Developed a new boom design that uses inclined plane technology project was to build a full-scale prototype and test it at Ohmsett.
	121	Water Jet Barrier Containment of Oil in the Presence of Broken Ice		EC-ESD	MMS and EC	1997	Optimize the design of an innovative oil spill containment barrier. The barrier uses high pressure water and fine droplets above and parallel to the water surface resulting in a high-velocity local wind.
Herders	RFP	Chemical Herders to Expand ISB Window of Opportunity		OGP	JIP- AOSRT	2012	Conduct meso- and large-scale basin research and field verification experiments with chemical herders to enhance and improve the effectiveness of ISB in specific Arctic ice environments.
		Field Testing of the USN Oil Herding Agend on Heidrun Crude in Loose Drift Ice		SINTEF & SL Ross	JIP SINTIF Oil In Ice	2010	A two-day field research program was conducted off Svalbard in late May 2008 to test the efficacy of a chemical herding agent in thickening oil slicks on water among very open drift ice for subsequent in situ burning. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-6-FEX2008-Herders-Final.pdf
	617	Employing Chemical Herders to Improve Oil Spill Response Operations	Ohmsett	SL Ross	MMS	2011	Extend the research on chemical herders into pack ice conditions (mechanical containment recovery), in salt marshes (mechanical recovery, and in situ burning), and in open water (dispersants). This project was a direct continuation of TAR Project 554 Mid-Scale Test Tank Research on Using Oil Herding Surfactants to Thicken Oil Slicks in Broken Ice. As a skimmer removes oil from the center of a herded slick, the action of the herding agent may cause the slick to continuously contract towards the skimmer, eliminating the need to move the skimmer around to contact all the oil.
	554	Mid-Scale Test Tank Research On Using Oil Herding Surfactants To Thicken Oil Slicks In Broken Ice	CRREL	SL Ross	MMS,ExxonMobil &PERF	2007	Research on the use of chemical herding agents to thicken oil spills in broken ice to allow them to be effectively ignited and burned in situ.
	RFP	State of Knowledge		OGP	JIP-AOSRT	2013	To prepare educational and outreach materials to educate and make stakeholders aware of the significant body of existing knowledge on ISB.

RFP	Aerial Ignition Systems		OGP	JIP-AOSRT	2013	To provide technology improvement that will deliver a reliable means of aerial ignition and improve oil slick targeting to support the use of in situ burning.
683	Using Oil Herding Agents for Rapid Response in situ Burning of Oil Slicks on Open Water	Ohmsett	SL Ross	BSEE	2012	Evaluate the feasibility of using herders to enable in situ burning as a rapid-response technique in open water. This research was accomplished by performing experiments in the laboratory with the US Navy's hydrocarbon based herder formulation and the best silicone herder formulation to find the most effective product for various water temperatures. Continuation of TAR Projects 554 and 617
	Tests of Fire-Resistant Booms in Low Concentrations of Drift Ice- Field Experiment May 2009		SL Ross	JIP SINTIF Oil In Ice	2010	The goal in the 2009 tests was to tow the same two sections of fire-resistant boom through a field of drift ice containing oil, and then burn the oil in situ. Boom 's mechanical performance was tested in 2008. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-27-FEX2009-FireboomFieldTests-final.pdf
	Experiment Oil Release in Broken Ice-A Large-Scale Filed Verificatioon of Results From Laboratory Studies of Oil Weathering and Ignitability of Weathered Oil Spills		NA	JIP SINTIF Oil In Ice	2010	Ignitability for In Situ Burning of Oil Spills. For removal of oil spilled in ice-infested waters, in situ burning (ISS) is one of the response techniques with the highest potential for Arctic conditions especially in snow and dense ice. In order to make in situ burning an operational tool, there is at need to better define the potential and limitations for ignition of oil spills with regard to oil type and weathering degree. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-26-FEX2009-weathering-ISB%20final.pdf
	Establishing, Testing, and Verification of a Laboratory Burning Cell to Measure Ignitability for In Situ Burning of Oil Spills		SINTEF	JIP SINTIF Oil In Ice	2010	For removal of oil spilled in ice-infested waters, in situ burning is one of the response techniques with the highest potential for Arctic conditions especially in snow and dense ice. In order to make In situ burning an operational tool, there is at need to better define the potential and limitations for ignition of oil spills with regard to oil type and weathering degree. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-20%20Burning-cell-final.pdf

In-Situ Burning (ISB) Fire Booms		Tests of Fire-Resistant Booms in Low Concentrations of Drift Ice – Field Experiment May 2008		SINTEF & SL Ross	JIP SINTIF Oil In Ice	2010	The overall objective of this portion of the field program was to determine whether fire-resistant containment boom can be used to aid in burning oil in situ in lower drift ice concentrations. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-5-FEX2008-FireboomFieldTests-final.pdf
	286	**Project Cancelled**: In Situ Oil Burning Manual Preparation		EC	MMS, EC, CCG, USCG	2010	Research on the environmental effects of burning oil in situ.
	102	Analysis of Oil-Slick Combustion		NIST	MMS	2005	Focuses on the burning characteristics of crude oil fires on water; ALOFT--FT (A Large Outdoor Fire plume Trajectory model). http://fire.nist.gov/aloft/.
	391	Fire Boom Testing at Ohmsett	Ohmsett	SL Ross	MMS	2004	fire exposure portion of the test involves three cycles of one-hour exposure to air-enhanced propane flames in waves, followed by a one hour cool down period in waves alone,
	452	Mid-Scale Tests to Determine the Limits to In Situ Burning in Broken Ice		SL Ross	MMS	2004	This purpose of this research project is to investigate the minimum ignitable thickness, combustion rate, effects of waves, and residue amount for crude oils burned in situ in cold water and broken ice conditions.
	312	Laboratory Testing to Determine In Situ Burning Parameters for Six Additional U.S. OCS Crude Oil		SL Ross	MMS	2000	Six additional oils from OCS facilities are being analyzed to determine if their suitability of spill response by in situ burn methods. See 288.
	244	Testing of Fire Resistant Booms in Waves and Flames		SL Ross	MMS & CCG	1999	Develop a near full-scale screening test protocol for the effectiveness and durability of fire resistant oil containment boom that incorporates simultaneous testing in waves and flames.
	259	Laboratory Testing to Determine Operational Parameters for In Situ Burning of U.S. OCS Crude Oil Spills		SL Ross	MMS	1999	Baseline burn tests were conducted to determine the natural burning characteristics of water-free and emulsified slicks of fresh and weathered oils. Burn efficiency and burn rate were calculated from the data gathered in the burn tests.
	289	Re-Engineering of a Stainless Steel Fireproof Boom for Using in Conjunction with Conventional Firebooms	Ohmsett	SL Ross	MMS	1999	Re-engineer an existing stainless steel fire boom. The new boom design is reduced in size, weight, and cost.

	291	Technology Assessment and Concept Evaluation for Alternative Approaches to In Situ Burning of Oil in the Marine Environment		Marine Research Associates LLC	MMS	1998	Assess the technical and operational feasibility of two alternative approaches to in situ burning of oil spills.
	288	Outdoor Wave Tank and Program of Mid-Scale In Situ Burn Testing in Alaska		SL Ross	Alaska Department of Environmental Conservation, Alaska Clean Seas, BP Exploration	1997	Consisted of a modest laboratory-scale program to evaluate the burning characteristics of four Alaska risk oils.
	152	Recovery Methods for High Viscosity Oils		EC-ESD	MMS & EC	1991	Evaluate two different atomization systems to be used in a catamaran-type burner to recover high viscosity oils.
	119	Helicopter-Borne Laser Ignition of Oil Spills		Physical Sciences Inc.	MMS& EC	1990	Evaluate necessary components for the development of airborne laser ignition of oil spilled on the open ocean.
Dispersants	RFP	Fate of Dispersed Oil Under Dynamic Drift and Pack Ice		OGP	JIP-AOSRT	2013	Develop a numerical model to predict the fate of a dispersed oil plume that develops under ice, particularly the resurfacing potential.
	RFP	Dispersant Testing Under Realistic Field Conditions		OGP	JIP-AOSRT	2013	Understand operational needs for dispersant and mineral fines application in Arctic conditions. Conduct large-scale basin tests and field verification on the efficacy of dispersant and mineral fines in Arctic marine waters.
	637	Validation of the Two Models Developed to Predict the Window of Opportunity for Dispersant Use in the Gulf of Mexico		EC	BSEE	2012	BSEE-funded research project entitled: Identification of Window of Opportunity for Chemical Dispersants on Gulf of Mexico Crude Oils. Two correlation models were developed to predict the window of opportunity (or time window) for successful chemical dispersant use in the Gulf of Mexico. The models consist of correlation relationships established using best-fit correlation between readily available fresh oil properties and the window of opportunity for successful chemical dispersant.
	638	Chemical Dispersant Research at Ohmsett: Phase 2		SL Ross	BSEE	2011	A review of oil spill dispersants, their efficacy and effects, recently completed by the US National Research Council (NRC 2005), recommended that research on chemical dispersants be conducted in several different areas. See TAR project 615.

666	Baffled Flask Dispersant Effectiveness Testing		EPA	BSEE	2011	Large-scale test tank produced DE data on 20 crude and fuel oils using Corexit 9500 dispersant. Laboratory-scale DE tests at Ohmsett will be conducted using the same dispersant and oil combinations, and results will be compared to determine if the bench-scale test results can be used to provide reasonable estimates of field performance.
	The effects of use on dispersants and in situ burning on Arctic marine organisms- A laboratory Study		SINTEF	JIP SINTIF Oil In Ice	2011	The effect and toxicity of a water soluble fraction (WSF) of oil versus oil added dispersants, and WSF versus the underling water after in situ burn, were studied. The exposure concentrations used were based on monitoring of the WSF in the water column during an offshore field experiment. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/A19803%20Jip-rep-no-34-Petromaks%20exposure-final.pdf
681	Laboratory-Scale Investigation of a Method for Enhancing the Effectiveness of Oil Dispersants in Destabilizing Water-in-Oil Emulsions		Auburn University	BSEE	2011	Investigated the feasibility of enhancing the de-emulsifying properties of commercially available oil dispersants by modifying the composition and fraction of polar constituents in the oil phase of water-in-oil emulsions and increasing the pH of the emulsion aqueous phase.
685	Operational Chemical Dispersant Research at Ohmsett	Ohmsett	SL Ross	BSEE	2011	(DWH) oil spill and subsequent use of large quantities of chemical dispersants in the response to the spill has heightened the interest in the use of dispersants questions concerning the use of dispersants so regulators, decision makers, end-users, and the public can make informed decisions regarding their use. This proposed project is a direct continuation of TAR Project 638 “Chemical Dispersant Research at Ohmsett: Phase 2.”
697	Assessment of Dispersant Effectiveness using Ultrasound to Measure Oil Droplet Particle Size Distributions		Applied Research Associates, Inc. (ARA)	BSEE	2011	Develop novel ultrasonic scattering methods to measure the droplet size of dispersed oil to provide technologies to monitor the efficacy of dispersants subsea. ARA will develop ultrasonic measurements to determine the crude oil droplet size of dispersed oil to monitor/determine the efficacy of dispersants as a function of oil type, dispersant type, dispersant-to-oil ratio, water temperature, oil temperatures, and the presence of sediment on the effectiveness of dispersants.

	Development and testing of a containerized dispersant spray system for use in cold and ice-covered area		SINTEF	JIP SINTIF Oil In Ice	2010	The overall goal has been to optimize and improve the methodology and strategies for dispersant response operations in cold and ice-covered areas. This paper summarizes the systematic and scientific approach in this technological development and tests documentation of the containerized dispersant spray system. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-13-Development-of-spray-arm-final.pdf
	Evaluation of Dispersant Spray Systems and Platforms for Use on Spilled Oil in Seas with Ice Present (JIP Project 4, Act 4.21)		SINTEF	JIP SINTIF Oil In Ice	2007	This report gives a short overview and evaluations of different dispersant application platforms for use in ice-covered areas. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-12-Evaluation-of-dispersants-spray-platforms-200207.pdf
	A Review of Studies of Oil Spill Dispersant Effectiveness in Arctic Conditions. (JIP Project 4, Act.4.11)		SINTEF	JIP SINTIF Oil In Ice	2007	This report gives a short state-of-the art of the testing oil spill dispersants in simulated cold conditions that has been undertaken by several research groups, but with different combinations of low temperature, absence or presence of ice, and water salinity. This report was to ensure transfer of newest knowledge and a good planning and experimental design of the dispersant effectiveness testing in task 4.1. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-11-Dispersant-Effectiveness-in-Arctic-Conditions-150207.pdf
615	Chemical Dispersant Research at Ohmsett	Ohmsett	SL Ross	MMS	2010	PERF funded a research project conducted by SINTEF in Norway and Cedre in France that has looked at the same issue of dispersant wash out but at laboratory bench scale. The Oseberg crude oil used in the PERF study was shipped to Ohmsett and was used in the 2007 study (TAR Project 563).

635	Literature Review on Chemical Treating Agents in Fresh and Brackish Water		SL Ross	MMS	2010	Chemical dispersants are designed to work effectively in salt water (35 ppt salinity). Nearshore environments water in these areas will be fresh (0% salinity) and brackish (10–15% salinity) and this may alter the effectiveness of chemical treating agents and dispersants and thus alter the treating agents and dispersant use decision. The three regional representatives on the MMS oil spill response research team identified an information gap and requested a comprehensive review of the of the effectiveness of chemical treating agents, including dispersants in fresh and brackish water.
663	Heavy Oil Dispersion Research		SL Ross	BSEE	2010	The objective of the project was to study the mechanism by which oil viscosity limits the effectiveness of dispersants. Specifically, two viscosity issues were studied. One was the ability of the dispersant to penetrate into viscous oil upon initial application prior to being washed away by surface water. The other was the internal visco-elasticity of the oil-dispersant mix (in conjunction with the dispersant dosage that has successfully mixed into the oil) that may prevent the oil from being broken into droplets when wave energy is applied.
613	Development of a Training Package on the Use of Chemical Dispersants for Ohmsett – The National Oil Spill Response Test Facility	Ohmsett	SL Ross	MMS	2009	This project will develop a chemical dispersant training course to be conducted at Ohmsett that includes practical hands-on experience with handling, safety, application, monitoring, efficacy, and recovery in breaking wave environments.
	Evaluating the Biodegradability and Effects of Dispersed Oil using Arctic Test Species and Conditions		UAF, NewFields Northwest	JIP with Shell, ExxonMobil, Statoil and ConocoPhillips	2008	Addressed the following data gaps: (1) the toxicity of physically and chemically dispersed oil on pelagic species that are key components of Arctic food webs, and (2) the biodegradation of physically and chemically dispersed oil released into pelagic waters using indigenous Arctic microbes under Arctic conditions. see AMOP 2011 proceeding
563	Understanding the Effects of Time and Energy on the Effectiveness of Dispersants		SINTEF	MMS	**2008**	Designed to gather data to support decision makers in the process of determining whether dispersants should be used in low energy environments. This information will be useful for dispersant decision making in ice cover (an ice field reduces wave motion) or other calm conditions.
589	Investigation of the Ability to Effectively Recover Oil Following Dispersant Application	Ohmsett	SL Ross	MMS	2008	Determine whether the application of dispersants to an oil slick reduces the ability to subsequently recover oil with conventional skimming systems.

590	Changes with Dispersant Effectiveness with Extended Exposure in Calm Seas	Ohmsett	SL Ross & Alun Lewis Oil Spill Consultancy		2008	The project is to continue to investigate the conditions that might lead to the loss of surfactants from dispersant-treated oil so that subsequent application of breaking waves will not result in dispersion.
598	Upgrade of SMART Dispersant Effectiveness Monitoring Protocol		SL Ross	MMS	2008	Analysis of monitoring data (visual and instrumental monitoring) collected during Ohmsett dispersant experiments, completed between 2003 through 2007, for the purposes of verifying the reliability of existing SMART effectiveness monitoring protocols.
542	Dispersant Effectiveness Testing on Realistic Emulsions at Ohmsett	Ohmsett	SL Ross	MMS	2007	Determine the viscosity limit for the effective application of chemical dispersants to realistic emulsions. Large-scale dispersant effectiveness experiments will be conducted at Ohmsett on these emulsions using Corexit 9500 and Corexit 9527 dispersants.
545	Calm Sea Application of Dispersants	Ohmsett	SL Ross	MMS, ExxonMobil, & PERF	2007	Determine the period of time that oil spill dispersants applied to spilled oil in a calm sea will remain effective before the sea state increases and dispersion occurs.
427	Dispersant Effectiveness Test Protocol Development for Ohmsett	Ohmsett	SL Ross	MMS	2006	Developed a standard test protocol for a wide range of dispersant related variables at the Ohmsett facility.
477	Correlating Results of Dispersants Effectiveness at Ohmsett with Identical At-Sea Trials: Effects of Oil Viscosity and Dispersant to Oil Ratio	Ohmsett	SL Ross	MMS	2006	Determine if the results of dispersant effectiveness tests are consistent with laboratory and actual at-sea conditions deployment of the Surveillance and Monitoring for Alternative Response Technology monitoring protocols in experiments where direct, independent measurements of effectiveness.
514	Dispersant Effectiveness Testing on Heavy OCS Crude Oils at Ohmsett		SL Ross	MMS	2006	Project will determine the limiting viscosity for the effectiveness of chemical dispersants applied to viscous US Outer Continental Shelf (OCS) crude oils from the Gulf of Mexico and Pacific OCS.
526	Correlate Ohmsett Dispersant Tests with At-Sea Trials; Supplemental Tests to Complete Test Matrix	Ohmsett	SL Ross	MMS	2006	Testing will be conducted on IFO-180 fuel oil treated with Corexit 9500 dispersant at a DOR of 1:25. In replicated tests at sea this combination yielded consistently high levels of dispersant performance. See TAR 477.

527	The Effect of Warming Viscous Oils Prior to Discharge on Dispersant Performance	Ohmsett	SL Ross	MMS	2006	Assess the dispersibility of fresh and weathered Alaskan and Canadian crude oils in very cold water. Results from these experiments indicate that the crude oils tested were dispersible at near freezing water temperatures.
529	Analysis of Dispersant Effectiveness of Heavy Fuel Oils and Weathered Crude Oils at Two Different Temperatures Using the Baffled Flask Test		EPA and University of Cincinnati	US EPA and MMS	2006	Conduct laboratory effectiveness testing using two test protocols the BFT and the and SWT with three dispersants (Corexit 9500, SuperDispersant 25 and Agma DR 379), two oils (IFO-180 and IFO-380) at one Dispersant to Oil Ratio (DOR 1:25) at one temperature (16°C). See TAR 513.
546	Chemical Dispensability of OCS Crude Oils in Non-Breaking Waves, Part 1: Determining the Limiting Oil Viscosity for Dispersion in Non-Breaking	Ohmsett	SL Ross	MMS, ExxonMobil, & PERF	2006	Determine whether chemically treated low-viscosity OCS crude oils disperse in a nonbreaking wave environmental and if so, to determine whether there is a limiting oil viscosity for chemical dispersion for OCS crude oils in nonbreaking waves.
568	Research at Ohmsett on the Effectiveness of Chemical Dispersants on Alaskan Oils in Cold Water	Ohmsett	SL Ross & Dickins	MMS	2006	Large-scale dispersant experiments in very cold water at Ohmsett using Alaska North Slope, Endicott, Northstar and Pt. McIntyre crude oils; Corexit 9500 and Corexit 9527 dispersants were used in the two test series.
375	Development of Dispersant Test Protocol at Ohmsett	Ohmsett	SL Ross	MMS	2005	Examined various ways that dispersant testing might be accomplished at Ohmsett and evaluated the feasibility and costs.
449	Effects of Chemically Dispersed and Biodegraded Oils		Plymouth Laboratories, Inc.	MMS	2005	Determined the effects of chemically dispersed and biodegraded oils.
493	Understanding Oil Spill Dispersants: Efficacy and Effects		National Research Council, Ocean Studies Board	MMS, NOAA, API, and USCG	2005	Review and evaluate existing information regarding the efficacy and effects of dispersants as an oil spill response technique.

296	Chemical Response to Oil Spill: Ecological Effects Research Forum (CROSERF)		Ecosystem Management and Associates, Inc.	API, Exxon, Chevron, Marine Spill Response Corporation, state government agencies (AK, CA, FL, LA, TX, WA), federal government agencies (MMS, NOAA, EPA) Env Canada	2004	Coordinate and disseminate the research information on dispersants funded by private industry (API, Exxon, Chevron, Marine Spill Response Corporation), state government agencies (AK, CA, FL, LA, TX, WA), federal government agencies (MMS, NOAA, EPA,) and Environment Canada.
350	Laboratory Study to Compare the Effectiveness of Chemical Dispersants When Applied Dilute versus Neat		SL Ross	MMS	2004	Determine if the application of dispersants in a dilute form reduces their effectiveness when compared with neat application.
413	Assessment of the Use of Dispersants on Marine Oil Spills in California		SL Ross	MMS	2004	Assessment of the operational and environmental factors associated with the use of chemical dispersants to treat oil spills in California Marine waters, with a view toward expediting dispersant use decision making and planning for such spills.
450	Using Dispersants to Test and Evaluate the Effectiveness of Dispersants in Cold Water and Broken Ice		SL Ross	MMS	2004	Evaluate the effectiveness of Corexit 9500 and Corexit 9527 dispersants on Alaskan and Canadian crude oils.
476	Ohmsett 2003 Cold Water Dispersant Effectiveness Experiments	Ohmsett	SL Ross	MMS	2004	Fourteen large-scale dispersant effectiveness experiments test were completed at the Ohmsett facility with various combinations of oil type and dispersant-to-oil ratios (DORs).
506	Analysis of IFO-180 and IFO-380 Oil Properties for Dispersant Window of Opportunity	Ohmsett	SL Ross	MMS	2004	Extend the work to complete property analyses on IFO-180 and IFO-380 fuel oils used in the June 2003 UK field trials and in the Ohmsett dispersant effectiveness experiments completed in the fall of 2003.
507	Correlating Results of Ohmsett Dispersant Test with At-Sea Trials: Workshop to Coordinate Publications and Prioritize Follow-up Research	Ohmsett	SL Ross	MMS	2004	Project was to coordinate the publications of results of the 2003 MMS-sponsored “Correlating Results of Ohmsett Dispersant Tests with Identical At-Sea Trials.”

Dispersants	160	Study of Oil Spill Chemical Treating Agents		EC-ESD	MMS & EC	2002	1. Develop tests for oil spill chemical treating agents and develop more effective and improved products 2. Test commercial products for efficacy and toxicity 3. Test oil spill dispersants to understand effectiveness and how they might be improved 4.Test new product ideas (i.e. dispersants: emulsion breakers, biodegradation agents, solidifiers)
	338	Biodegradation of Chemically Dispersed Oil an Ecosystem Approach		AEA Technology	MMS, USCG, and Alaska Department of Environmental Conservation	2002	Determine the fate and effects of chemically dispersed oil in the context of an ecosystem approach.
	RFP	Mechanical Recovery in Ice-Infested Waters		OGP	JIP-AOSRT	2013	The objective is to conduct a workshop that identifies as possible step change in recovering spilled oil in ice-infested waters (completed March 2012).
		"Oil in Ice JIP" Testing of Oil Skimmer via Field Experiments in the Barents Sea, May 2009		SINTEF & CounterSpil Research	JIP SINTIF Oil In Ice	2010	The main objective of the field testing was to test and verify the Ro-Clean Desmi and Framo skimmers in the field under more realistic conditions compared to what can be accomplished in the basin testing. This includes lower oil, temperature fluctuations, wind, and a more dynamic ice field. This report covers the of mechanical recovery equipment performed during the experimental field trial in the Barents Sea from May 7–23, 2009. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-21-Field%20report%202009-mechanical-final_2010.pdf
		Testing and Verification of Oil Skimmers During the Field Experiment in the Barents Sea , May 2008		SINTEF	JIP SINTIF Oil In Ice	2010	The work reported herein was part of an experimental field trial in the Barents Sea from 18 to 30 May 2008. The field trial was performed in the eastern part of the Barents Sea east of the island of Hopen. Three oil recovery skimmers were tested during this field trial over a period of two days. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-9-Field%20report%202008-mechanical-final_2010.pdf

Mechnical Recovery		Testing of Ro-Clean Desmi Polar Bear Skimmer in SINTEF Ice Basin. Task 3.2 Testing of New Concepts and Units	SINTEF	SINTEF, SL Ross, & DF Dickins Asscoiates	JIP SINTIF Oil In Ice	2010	This report summarizes the findings of a test program conducted in September 2008 in the SINTEF ice basin of the Polar Bear skimmer. The skimmer is a mechanical oil recovery device that was designed on the basis of 2007 tests in the SINTEF ice basin of Ro-Clean Desmi's Helix Skimming adapter and Ice Skimmer as well as subsequent field evaluations of the Helix in the Barents Sea in May 2008. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-10-Desmi%20Polar%20Bear-Basin%20test-2008-final_2010.pdf
		Testing of Lamor GT 185 Skimmer and LRB 150 Skimmer in SINTEF Ice Basin. Task 3.1.Testing of Existing Concepts. A Technical Report	SINTEF	SINTEF	JIP SINTIF Oil In Ice	2010	The main objective of this project was to document the capability and potential application of commercially available skimmers for recovering oil in ice. Based on this documentation, suggestions should be possible for defining and improving the operational spill response window in ice and cold conditions. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-8-Report-Lamor-task%203.1-final_2010.pdf
		Testing of Ro-Clean Desmi Ice Skimmer and Helix Skimmer in SINTEF Ice Basin. Task3.1: Testing of Existing Concepts	SINTEF	SINTEF	JIP SINTIF Oil In Ice	20010	The main objective of this project was to document the capability and potential application of commercially available skimmers for recovering oil in ice. Based on this documentation, suggestions should be possible for defining and improving the operational spill response window in ice and cold conditions. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-7-Report-Desmi-task%203.1-final_2010.pdf
	486	Fate of Emulsion Breakers Used for Decanting	Ohmsett	SL Ross	MMS	2008	Determine the partitioning of different chemical emulsions breakers between oil and water phases when they are used to enhance decanting of recovered water from offshore. See 395 skimming operations.
	180	Testing and Evaluation of Sorbents		SAIC-Canada	MMS & EC	2007	Performance of sorbent materials used in the remediation of oil spills. http://www.etc-cte.ec.gc.ca/databases/Sorbent/Default.aspx.
	573	Oil Recovery with Novel Skimmer Surfaces under Cold Climate Conditions	CRREL	U of C-SB / Ohmsett Staff	MMS	2007	The objective of this project was to perform a comprehensive analysis of the adhesion processes between oil or ice-in-oil mixtures and various surface patterns and materials that are being used or proposed for use in oil skimmers, under cold climate conditions.

	511	Tailored Polymeric Materials for Oil Spill Recovery in Marine Environments		U of C-SB	MMS	2006	This project substantially increased the efficiency of mechanical oil spill recovery equipment by replacing traditional recovery unit materials with polymetric materials that have the highest affinity for oil and are specifically tailored to collect oil from water surfaces.
	528	Optimization of Oleophilic Skimmer Recovery	OHMSETT	U of C-SB	MMS	2006	Existing oleophilic skimmers collect oil at a relatively slow rate, in large part because the selection of materials used for the adhesion surfaces of the oil recovery units has not been based on their adhesion properties, but rather on historical practice or availability. See TAR 511.
	159	Evaluation of Skimmers for Offshore and Ice-Infested Waters		EC-EED	MMS & EC	1993	Innovative skimming technology for oil spill cleanup offshore and in icy waters. Current skimmer technology for recovering oil in broken ice conditions was practically nonexistent.
	114	Field Evaluation of Oil Spill Chemical Additives		EC-C&PA	MMS &EC	1990	Evaluated two new oil spill chemical additives during a series of intentional oil spills off the Canadian coast during September 1987 to mechanical recovery.
	084	Surface Oil Spill Containment and Cleanup		Veritas Technical Services, Inc.	MMS	1987	Engineering concept analysis of the effectiveness of a large, self-contained oil spill collection ship capable of deploying large skimming booms in the proximity of a blowing oil well.
	085	Subsea Collection of Blowing Oil and Gas		Brown and Root	MMS	1985	The prospects are attractive for using large, self-contained collection ships which can deploy subsea collectors.
Deep Well	377	Project "Deep Spill"		SINTEF	MMS and 23 different oil companies to conduct this research	2005	Simulate a blowout or pipeline rupture in deep water and obtain data to verify the predictions of a deep water blowout model.
	311	Oil Spill Containment, Remote Sensing, and Tracking from Deep Water Blowouts Status of Existing and Emerging Technologies		PCCI Marine and Environmental Engineering	MMS	1999	Assessment of existing or developing technologies that could be used to sense, track, contain, and recover oil released by deep water blowouts or pipeline ruptures.
	290	**Project Cancelled**: In Situ Burning on Mud Flats		SINTEF	MMS	2010	Investigate the feasibility of using in situ burning to remove crude oil from mud flats in an environmentally and ecologically favorable manner.

Beach	295	In Situ Clean up of Oiled Shorelines; Svalvard Shoreline Project		EC	MMS, EC, Texas General Land Office, Norwegian Pollution Control Authority, Exxon Imperial Oil Resources Ltd., UK Marine Pollution Control Unit, Swedish Rescue Service, and the CCG.	1999	Investigated the effectiveness of mainstream in situ shoreline cleanup techniques (tilling, surf-washing), as well as some of the scientific aspects of oil behavior and oil removal from shorelines by what was commonly referred to as the clay-oil flocculation process.
	158	Development and Evaluation of Shoreline Cleanup Techniques		EC-W-TDB	MMS & EC	1994	Evaluated the effectiveness of minimizing biological damage of spilled oil to such beaches and attempted to establish a correlation between cleanup effectiveness and environmental damage caused by various cleanup techniques.
Micro-Biological Remediation		Oil Distribution and Bioavailability Field Experiment–FEX 2009		SINTEF	JIP SINTIF Oil In Ice	2010	GPS trackers, large-volumes water samplers (KISPs), in situ oil-in-water monitoring systems and passive absorption devices (SPMDs) were all installed under ice floes in and around the oil slick to enable a detailed monitoring of oil-in-water dynamics and ice interactions throughout the six-day experiment. Meteorological and oceanographic data were recorded for the monitoring of wind speed and direction, air temperature, currents, and ice movement. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-33-FEX2009%20Oil%20distribution%20and%20bioavailability.pdf
		Oil Biodegradation in Arctic ice		SINTEF		2005	Biodegradation is one of the most important processes for the removal of petroleum hydrocarbons from marine environments. Also, in Arctic environments, biodegradation is important, and during summer conditions degradation follows a pattern indistinguishable from that exhibited under temperate climate conditions. However, the necessary knowledge about hydrocarbon biodegradation of oil frozen in Arctic ice is lacking. The ice contains a variety of cold-adapted microorganisms, and metabolic activities have been measured at ice temperatures well below –10°C.
Testing Standards							

	513	Laboratory Testing to Determine Dispersion Predictability of the Baffled Flask Test (BFT) and Swirling Flask Test (SWT)		US EPA / University of Cincinnati	MMS	2006	Conduct standardized laboratory dispersant effectiveness testing to determine if either the Baffled Flask Test (BFT) or the Swirling Flask Test (SWT) is able to predict chemical dispersion effectiveness of oil spills.
	373	Development of a Draft ASTM Standard on Characterizing Oils for In Situ Burning		SL Ross	MMS	2005	Developed a draft ASTM guidelines for in situ burning from lab analysis of the oil to determine how easily it can be burned.
	428	Procedures for Reporting Tests of Oil Spill Containment Booms and Skimmers		Environ-mental Consultant, Inc.	MMS	2005	Reviewed existing test procedures for oil containment booms and skimmers and developed standardized test reporting procedures that will eliminate the problems of incomplete test documentation.
	478	Development of a Standard Method for Measuring the Buoyancy-to-Weight Ratio for Oil Spill Containment Boom	OHMSETT	SL Ross	MMS	2005	The objective of the work was to develop a standard method for measuring the buoyancy-to-weight ratio of oil spill containment booms.
	516	Development of a Method to Produce Large Quantities of Realistic Water-In-Oil Emulsions for use in Evaluating Oil Spill Response Equipment and Methods		SL Ross	MMS	2005	Developed a methodology and equipment to enable researchers to produce large quantities of realistic water-in-oil emulsions.
	163	Preparation a Test Protocol for Offshore Oil Skimmers and Containment Booms		Chapman	MMS & EC	1992	Development of a nonpolluting, cost-effective standard test procedure for evaluating the performance of open ocean containment booms and oil skimmers is needed. (1) Test Protocol for the Evaluation of Oil-Spill Containment Booms (February 1992) and (2) Suggested Test Protocol for the Evaluation of Oil Spill Skimmers for the OCS (February 1992).
	109	Oil Spill Response Equipment Performance Verification	OHMSETT	Frank Weston and Associates	EPA	1990	Develop and verify an innovative test procedure for measuring the performance of offshore oil spill response equipment at sea.
	113	Open Ocean Boom Test		EC-C&PA	MMS & EC	1990	Develop a nonpolluting and cost-effective testing procedure for recovery equipment.

Recent Field Demonstrations (post 2000)

	RFP	Countermeasure Verification Through Controlled Field Releases and Exercises		OGP	JIP-AOSRT	2012	To create opportunities for the JIP technical working groups to test, evaluate, and verify selected technologies and to conduct related research (for example, environmental effects) in a field setting.
		Field experiment in the St. Lawrence River estuary		COOGER & CCG		2008	A small spill was carried out in pack ice from a Coast Guard icebreaker and immediately treated by spraying OMA and agitating the oil dispersant mixture.
		Full scale field experiment 2009 Cruise report		SINTEF	JIP SINTIF Oil In Ice	2009	This report gives an overview of the activities and main findings during the full-scale field experiment carried out in the period May 9–25, 2009, in position N77.30 - E30.90 east of Hopen in the Barents Sea. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-25-Field-report-FEX%202009-final.pdf
		Field experiments in the Norwegian Barents Sea - East of Svalbard		SINTEF Oil in Ice JIP	AGIP KCO, Chevron,Conoco Phillips,Shell, Statoil & Total	2008/09	Series of experimental spills carried out from research vessel and icebreaker. Response techniques included herding agents, burning in situ and in fireproof booms, dispersants, mechanical systems, and remote sensing
	586	Planning Support for an Experimental Oil Spill in Pack Ice. Project was **canceled a due to CGC rescue mission**		SL Ross & Dickins	MMS	2008	Experimental oil spill was to be conducted by the Department of Fisheries and Oceans (DFO) Canada offshore eastern Canada in March 2007. The Canadian Coast Guard (CCG) was committed to supplying an ice breaker and helicopter as support vessels for one week as services in kind to the project.
		Full-Scale Field Experiment 2008, Summary of Results		SINTEF	JIP SINTIF Oil In Ice	2008	Report is an overview of the activities and main findings during the full-scale field experiment carried out in the period May 18–28, 2008, in position N77.30–E30.90, east of Hopen in the Barents Sea. http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-18-FEX-2008-field-results-summary.pdf
		FEX 2008. Activity Report		SINTEF	JIP SINTIF Oil In Ice	2008	Report is an overview of the 2008 JIP oil in ice full-scale filed experiment http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/publications/JIP-rep-no-17-FEX-2008-field-activity-report.pdf

	569	Svalbard, Norway Experimental Oil Spill To Study Spill Detection and Oil Behavior in Ice		DF Dickins Asscoiates, SINTEF, BSU, The University Center at Svalbard	MMS, ADEC, ACS, ConocoPhillips, ExxonMobil, Shell Technology Norway, and Statoil ASA	2006	This project involved spilling 3,400 liters of crude oil within a skirt inserted through fast ice at Svea on Svalbard. Acoustic and GPR systems (surface and airborne) were tested for there abilities to detect oil under ice. Oil behavior was studied to look at migration rates, dissolution into the water column and weathering. The oil was removed successfully by burning.
		Oil-in-Ice on Svalbard		SINTEF	Norwegian Research Council, Statoil, and Hydro	2005	The purpose of this three-year project was to investigate weathering processes in marine oil spills under Arctic conditions. The focus was on weathering of the bulk oil phase (evaporation, w/o emulsification, and dispersion), dissolution of water-soluble components, photo-oxidation and biodegradation processes of oil in ice.
Miscellaneous							
	636	Characteristics, Behavior and Response Effectiveness of Spilled Dielectric Insulating Oil in the Marine Environment		Louisiana State University		2011	of wind turbine generators connected to a centralized electrical service platform (ESP). The ESP could contain approximately 40,000 gallons of dielectric insulating oil and approximately 2,000 gallons of assorted oil-based fluids (diesel fuel, lubricating oils, etc.) stored on site for facility maintenance.
	668	Ohmsett Biofuel Feasibility Study		SL Ross	BSEE	2011	BioFuels (bio-diesels, and gasoline/ethanol blends) in the worldwide marketplace. The different physical and chemical properties of these products in comparison to the petroleum products they are replacing leads to the issue of response countermeasure actions in the event of a BioFuel spill. In order to pursue testing and implementation of BioFuel response techniques at Ohmsett, the facility's operating systems and protocols for traditional oil spill response must be reviewed, compared, and possibly modified, to adapt to the potential requirements for BioFuel response techniques testing.

649	The Industry/University Cooperative Research Center for Multiphase Transport Phenomena		Michigan State University and the University of Tulsa	BSEE	2010	Multiphase Transport Phenomena has focused on two technologies important to DOI/MMS: (1) cross flow filtration hydrocyclones for oil/water separation (onshore, offshore, subsea, and downhole) and (2) the use of computational methods to address flow assurance issues associated with oil and gas production.
567	Synthetic Based Drilling Fluid Droplet Survey		Southwest Research Institute	MMS	2007	Synthetic-based drilling muds (SBMs) have been developed to provide the desirable operating qualities of oil-based muds with the lower toxicity of water-based muds. The objective of this project was to evaluate the fall velocity distributions that would result from an accidental release of SBMs in offshore waters.
595	Identification of Window of Opportunity for Chemical Dispersants on Gulf of Mexico Crude Oils		SL Ross	MMS	2007	Develop best-fit correlations between readily available fresh oil properties and the window of opportunity for successful chemical dispersant use on Gulf of Mexico crude oils.
458	Process for the Removal of Spent Oil Spill Dispersants from Test Water at Ohmsett	Ohmsett	SAIC Canada	MMS	2004	The project identified potential methods for the removal of dissolved dispersants from Ohmsett tank water using membrane filtration technology. The goal was to lower the dispersant concentration in the tank water to undetectable levels after dispersant effectiveness testing.
515	Wave Field Characterization at the Ohmsett Wave Test Basin	Ohmsett	U of Wa	MMS	2004	The project was designed to find out the characterizations of waves in the Ohmsett Wave Basin facility.
456	Techniques to Remove Dissolved Dispersant from Ohmsett Basin Water	Ohmsett	SL Ross	MMS	2003	Researched techniques to remove dissolved dispersant from Ohmsett water after the tank has been used for a series of chemical dispersant effectiveness experiments.
309	Development of an Ohmsett Activity Summary Report	Ohmsett	Marine Research Associates LLC	MMS	1998	Develop an effective means of summarizing and disseminating the testing capabilities, protocols, and test results for the MMS Ohmsett.

	155	Identification of Substitute Test Facilities for Ohmsett		EC-EED	MMS	1990	EPA suspended operation of the Ohmsett facility, and alternative facilities and procedures are necessary to minimize the delay in testing innovative oil spill response technology and procedures.
		Oil and Gas Transportation Russia-Europe		SINTEF			Research and development project supported by the European Union. The overall objective of ARCOP is to form an operational platform for the development of oil and gas transportation from the Russian Arctic (the Pechora and Kara Sea) to Europe. http://www.sintef.no/home/Materials-and-Chemistry/Marine-Environmental-Technology/Projects-and-News/Oil-and-gas-transport-Russia---Europe-/

Acronyms Used in "An Inventory of Research Projects on Oil Spills in Arctic Waters"

Acronym	Summary	Web Site
ACS	Alaska Clean Seas: ACS protects the environment by providing effective response services to the Alaska North Slope Crude Oil Producers and the first 167 miles of the Trans-Alaska Pipeline System	http://www.alaskacleanseas.org/
AKEC-SPAR	Alaska Department of Environmental Conservation Spill Prevention and Response (SPAR) prevents spills of oil and hazardous substances, prepares for when a spill occurs and responds rapidly to protect human health and the environment.	http://dec.alaska.gov/spar/index.htm
BOEM	Bureau of Ocean Energy Management: Protecting the environment while ensuring the safe development of the nation's offshore energy and marine mineral resources is a critical part of BOEM's mission.	http://www.boem.gov/
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement	http://www.boemre.gov/
BSU	Boise State University, John Bradford	http://cgiss.boisestate.edu/~johnb/Pubs.html
BSEE	Bureau of Safety and Environmental Enforcement works to promote safety, protect the environment, and conserve resources offshore through vigorous regulatory oversight and enforcement.	http://www.bsee.gov/
CCG	Canadian Coast Guard	http://www.ccg-gcc.gc.ca/eng/CCG/Home?is_mobile=2
CISPRI	Cook Inlet Spill Prevention & Response Inc. (CISPRI) Team provides our Member companies with the most professional, cost-effective contingency planning and spill removal possible.	http://www.cispri.org/
COOGER	Centre for Offshore Oil, Gas and Energy Research (COOGER). Fisheries and Oceans Canada established COOGER in 2002 to coordinate the department's nation-wide research into the environmental and oceanographic impacts of offshore petroleum exploration, production, and transportation.	http://www.dfo-mpo.gc.ca/science/coe-cde/cooger-crpgee/index-eng.htm
CRREL	US Army Cold Regions Research and Engineering Laboratory	http://www.crrel.usace.army.mil/ http://www.crrel.usace.army.mil/innovations/oil_spill_research/
Dickins	DF Dickins and Associates, LLC	http://www.dfdickins.com/
DFO	Department of Fisheries and Oceans Canada (DFO) and its Special Operating Agency, the Canadian Coast Guard, deliver programs and services that support sustainable use and development of Canada's waterways and aquatic resources.	http://www.dfo-mpo.gc.ca/index-eng.htm
EC	Environment Canada is a diverse organization where our programs, services, and people lead the way in implementing the Government of Canada's environmental agenda. We collaborate with our partners at home and abroad, to realize concrete progress on initiatives that will protect the health of our people and our planet.	http://www.ec.gc.ca/default.asp?lang=En&n=BD3CE17D-1
EC-C&PA	Conservation and Protection Agency, Environment Canada	
EC-EED	Emergencies Engineering Division, Environment Canada	http://www.ec.gc.ca/ee-ue/
EC-ESD	Emergencies Science Division, Environment Canada	http://www.etc-cte.ec.gc.ca/organization/estd_e.html
EC-W-TDB	Western Office, Technology Development Branch, Environment Canada	

EPA	EPA seeks to prevent, prepare for, and respond to oil spills that occur in and around inland waters of the United States. EPA is the lead federal response agency for oil spills occurring in inland waters, and the US Coast Guard is the lead response agency for spills in coastal waters and deepwater ports.	http://www.epa.gov/oilspill/
JIP- AOSRT	Arctic Oil Spill Response Technology (AOSRT)–Joint Industry Programme. An international research program to further enhance industry knowledge and capabilities in the area of Arctic oil spill response.	http://www.arcticresponsetechnology.org/
JIP-API	American Petroleum Institute and the Joint Industry Programme on Oil Spill Recovery in Ice	
JIP-SINTEF		http://www.sintef.no/Projectweb/JIP-Oil-In-Ice/
MMS	Mineral Management Services evolved to BOEMRE and subdivided to BOEM and BSEE	
Ohmsett	The National Oil Spill Response Research & Renewable Energy Test Facility provides independent and objective performance testing of full-scale oil spill response equipment and marine renewable energy systems (wave energy conversion devices), and improving technologies through research and development.	http://www.ohmsett.com/
OSRI	Prince William Sound Oil Spill Recovery Institute	http://www.pws-osri.org/
PERF	Petroleum Environmental Research Forum (PERF)was established in 1986 to stimulate cooperative research & development of technology for environmental pollution control & waste treatment for the petroleum Industry.	http://www.perf.org/
SL Ross	SL Ross Environmental Research Ltd.	http://www.slross.com/
SAIC Canada		http://www.companylisting.ca/SAIC_Canada1/default.aspx
SAMS	Scottish Association for Marine Science	http://www.smi.ac.uk/
SINTEF	SINTEF is the largest independent research organization in Scandinavia. Its goal is to create value through knowledge generation, research, and innovation, and develop technological solutions that are brought into practical use.	http://www.sintef.no/home/ http://www.sintef.no/home/Materials-and-Chemistry/Marine-Environmental-Technology/Fate-and-effects/
Statoil		http://www.statoil.com/en/EnvironmentSociety/Sustainability/2007/Environment/Environment/Research/Pages/OilInNorth.aspx
TAS	Thales Alenia Space	http://www.thalesgroup.com/Markets/Space/Related_Activities/Thales_Alenia_Space/
TC	Transport Canada	http://www.tc.gc.ca/
UNH-CRRC	Costal Response Research Center at University of New Hampshire	http://www.crrc.unh.edu/
USCG	US Coast Guard	http://www.uscg.mil/default.asp
WHOI	Woods Hole Oceanographic Institution	http://www.whoi.edu/