



# ISCO NEWSLETTER

The Newsletter of the International Spill Response Community  
Issue 329, 9 April 2012

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### News

#### UK: TOTAL PREPARES FOR WELL CONTROL OPERATION ON ELGIN PLATFORM



April 6 - Total announces that its experts and specialist contractors boarded the Elgin complex yesterday and successfully carried out their objective.

In a key milestone toward bringing the situation under control, the team spent nearly four hours on the Elgin complex to gather preliminary information that will be used to assist in preparation for deploying the necessary equipment to perform a well control operation.

The aim of the reconnaissance mission was to carry out a preliminary survey of the leak area, establish zones which can be safely accessed and gather data on the G4 well. The team also sought to visually confirm potential pipeline & hose routing options and tie-in points for equipment required in any well control operation.

A helicopter, transporting three Total employees familiar with the platform and five specialists from Wild Well Control, a specialized well intervention company, took off from Aberdeen at 10:30 (local time) and landed on the Elgin PUQ (Process, Utilities, Quarters) before safely returning to Aberdeen at 16:50 (local time). *Subsea World News* [Read more](#)

April 6 - Plans to "kill" a [gas](#) leak on an offshore platform by pumping mud into it can go ahead, experts said on Friday.

## News (continued)

A team inspected the leak on the Elgin platform about 150 miles off Aberdeen to decide how best to stop the leak. No one had been back to the platform since the leak forced its evacuation nearly two weeks ago.

The inspection confirmed gas was leaking from the well head but not from underwater, so intervention could proceed as planned. A spokesman for Wild Well Control said: "Everything went as we would have hoped and the planned well intervention is achievable." *The Guardian* [Read more](#)

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### NEW ZEALAND: STERN OF CARGO SHIP RENA SINKS OFF NEW ZEALAND COAST



April 4 - The stern of a cargo ship off the coast of New Zealand which has been stranded for six months finally sank Tuesday. Battered repeatedly by powerful 40-foot waves, the rear section of the Greek-owned Rena broke off three months ago near Tauranga.

"The Bay of Plenty and Coromandel communities are advised that the sinking of the stern section will likely result in the loss of more debris and small amounts of oil into the sea, which may then come ashore," Maritime New Zealand said.

About 11 containers, along with debris and oil, have reportedly washed up on shore.

The ruptured vessel has spilled hundreds of cargo containers, as well as tons of fuel and oil, into the Bay of Plenty since a storm in October left it stranded, authorities said. *NY Daily News* [Read more](#)

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### ITALY: COSTA CONCORDIA UPDATE: SALVAGE BID CONTINUES, SALVAGE OPERATION CONFIRMED

April 2 - Over the last two months, there has been circulating speculation over what will be done with the Costa Concordia wreck. Additionally, salvage experts are still in the negotiation process. However, it has now been confirmed that whoever lands this massive undertaking will be responsible for refloating the cruise ship and towing it to its home port of Genoa in one piece.

Work by salvage teams and engineers is scheduled to start in May with an estimated total completion time ranging at one year. The cost of the salvage operation is expected to reach around US\$288 million. *The Maritime Executive* [Read more](#)

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### UK: CONCERN FOR WILDLIFE AS STRICKEN CARGO SHIP CARRIER LEAKS FUEL

April 4 - The stricken cargo ship which is currently being battered against rocks on the Welsh coast is leaking fuel, it has emerged. The Maritime and Coastguard Agency said "a quantity of marine gas oil has leaked from the vessel". The 82-metre ship, Carrier, is carrying 40,000 litres of fuel. It has been holed in three places on the starboard side, where an 8,000-litre 'settling tank' is located. But the port side, where the main fuel tank - holding 32,000 litres of fuel - is located, is intact.



The ship, which ran aground at 8.15pm last night at Raynes Jetty in Llandudlas, remains hard aground in the same location. Officers from the MCA's Counter Pollution and Salvage branch are working with all agencies on plans to remove the fuel "as soon as possible". Workers have climbed aboard the ship to inspect it this afternoon. *Wales Online* [Read more](#) Update April 7 *BBC News* [Read more](#)

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## USA: SHELL DRILLING PLAN FAILS TO ACCOUNT FOR RISK FACTORS IN ARCTIC, REPORT SAYS

April 1 - Days after the Obama administration approved Royal Dutch Shell's oil spill response plan for drilling in the Arctic Ocean off the Alaskan coast, an independent federal report said that Shell's plan fails to take into account the risks unique to oil production in harsh, icy offshore conditions.

After years of delays, Shell's plan to drill for oil in the Beaufort Sea as early as this summer has gained momentum as it won necessary permits from the Interior Department.

Shell's project would be the first time oil drilling occurred in the U.S. Arctic Ocean since the early 1990s. But environmentalists, some indigenous Alaskan groups and members of Congress have argued that there are not enough safeguards in place to contain a well blowout or clean up a spill in rough Arctic conditions.

The report issued Friday by the Government Accounting Office cited Interior Department and Coast Guard officials who said "that a well containment response in Alaskan waters might face certain risks that could delay or impede a response to a blowout." *Juneau Empire* [Read more](#)

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## USA: BP OIL SPILL TRIAL PLAN COULD CHANGE

April 4 - Now that **BP** has a proposed settlement with a large class of plaintiffs in the federal [oil spill case](#), the **U.S. District Court** in New Orleans is considering changing the way the case should move forward. For the first time Friday, parties to the lawsuit openly considered changing the trial plan to move up BP's largest liability, the U.S. government's civil penalty claims under the Clean Water Act.

U.S. Magistrate Judge Sally Shushan asked the attorneys general from the affected Gulf Coast states, led by Alabama and Louisiana, to propose schedules for discovery if the court were to keep the plan of taking testimony on what caused the April 2010 [oil spill](#), or, alternatively, if it were to go directly to considering the government's imposition of fines.

The proposed settlement with most private economic damage and medical claims plaintiffs, estimated by BP to cost about \$7.8 billion, is not the biggest ticket item BP and its co-defendants are facing.

The Clean Water Act fines could more than double that amount, if the responsible parties are found to be grossly negligent. Clean Water Act fines are based on the amount of oil spilled, pegged by the government at 4.9 million barrels, with 800,000 barrels collected at the wellhead. The resulting 4.1 million barrels discharged into the water would translate to about \$17.6 billion in fines if gross negligence or willful misconduct is proven. *Nola.com* [Read more](#)

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## FRANCE: ERIKA - FRENCH COURT MAY OVERTURN TOTAL OIL SPILL RULING

April 6 - France's highest court could annul a verdict against national oil giant Total over a devastating 1999 oil spill off the Brittany coast, a legal source told Reuters on Friday.

Total, currently battling to cut off a gas leak at its North Sea Elgin platform off Scotland, was found guilty for damage caused to a vast expanse of coastline and wildlife when the Erika, a 24-year-old tanker it had chartered, broke apart in a 1999 storm, spilling some 20,000 of crude into the Bay of Biscay.

France's top appeals court is to rule on May 24 on Total's appeal against that verdict and a source with access to the case documents said the public prosecutor will recommend a definitive annulment on the grounds the tanker did not sink in French waters. *Reuters* [Read more](#)

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## BRAZIL SEEKS \$10.9 BILLION FROM CHEVRON OVER OIL SPILL

April 4 - A Brazilian prosecutor is demanding that [Chevron \( IW 1000/7\)](#) and the oil drilling contractor Transocean pay \$10.9 billion for a spill off southeastern Brazil last month, Chevron said on March 4. The penalty sought, "is arbitrary, speculative and not based on facts," the U.S. oil company said.

On March 4, an oil spill was detected at a depth of 4,200 feet, two miles from the site of a bigger spill that occurred last November in the Frade field operated by Chevron, some 230 miles northeast off Rio de Janeiro state.

"The oil spill from Frade has yet to be contained. The damage to the environment is immeasurable. Each new accident increases the damage and spotlights the mistakes of the accused," Eduardo Santos de Oliveira, the prosecutor from Campos, said.

Chevron had already been fined a total of \$54 million after the first oil spill at the Frade field in November. And last month, federal prosecutors in Rio de Janeiro accused Chevron and 17 executives of "environmental crimes" in connection with the November spill. *Industry Week* [Read more](#)

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## USA: SHOULD GULF OIL SPILL DISPERSANT, CLEAN-UP COMPANIES STAY IN THE LITIGATION?

April 3 - The manufacturer of the chemical dispersant used to break-up the oil during the Gulf of Mexico **oil spill** in 2010 and other companies involved in cleaning up the oil have asked **U.S. District Judge** Carl Barbier to **dismiss them from liability** for any health claims because they were working on behalf of the U.S. government in responding to the spill and are entitled to immunity. If successful, the move could remove more than a dozen companies from potential liability if people get sick.

But at the same time, the question comes as **BP** and the committee of plaintiff attorneys steering the litigation have reached an agreement that includes a deal for BP to cover the health bills for clean-up workers and people who live very close to the shore or oiled marshes.

In late January, Nalco, the manufacturer of the dispersant, filed a renewed motion to dismiss the claims. In mid-February, the plaintiffs steering committee filed a motion saying that it believed that BP would ultimately be responsible for any health issues associated with responding to the spill, so it asked the court if it could remove the clean-up, responder and dispersant defendants from its complaint so it could concentrate on BP. The plaintiffs said that such a move would dismiss the companies from the litigation, but not let them entirely off the hook.

"The PSC (plaintiffs steering committee) believes and intends that this will have the effort of dismissing, without prejudice, the claims against such...defendants...while at the same time preserving the rights of individual plaintiffs to assert claims against such defendants in their own individual petitions or complaints, should they so desire," the Feb. 16 motion says.

But Nalco and the responder defendants -- companies such as O'Brien's Response Management Inc., National Response Corp., Marine Spill Response Corp., Dynamic Aviation Group Inc., Airborne Support Inc., Airborne Support International Inc., DRC Emergency Services LLC, International Air Response Inc., Lynden Inc., Lane Aviation, Tiger Rentals Ltd., The Modern Group Ltd., and the Modern Group GP-SUB Inc. -- replied that if they're going to be dismissed from the litigation, they should be dismissed for real, or "with prejudice." *The Times - Picayune* [Read more](#)

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## CHINA: WARNING ON ILLEGAL SLUDGE DELIVERY PRACTICES

Following the introduction of the new China Oil Pollution Regulations in 2010 as reported by INTERTANKO in [Weekly News 15/2011](#), it has come to light that a number of reception facility providers and collection services in China are requesting the delivery of additional oil when collecting fuel oil sludge and other oily wastes.

INTERTANKO has received reports that the ruling related to the compulsory discharge of sludge prior to departure is being abused by certain service providers in several Chinese ports. Individuals representing reception facility providers are offering ships' crews incentives to discharge additional oil along with the sludge. Some reports indicate that the offers have been coming from the sludge barge operators with additional oil being requested in exchange for cash (US dollars).

It is understood that the Chinese authorities, Maritime Safety Authority (China MSA) and Customs Authority, are aware of the issue and have already identified several vessels that have been involved. INTERTANKO will continue to urge the China MSA and associated authorities to eradicate this illegal practice at its source in the ports. *Intertanko News* [Read more](#)

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## GHANA MOVES TO BECOME HUB FOR RAPID OIL SPILL RESPONSE

April 8 - Even as Ghanaians wonder about the level of the country's preparedness in responding to oil and oil-related spillage, environmental experts are already looking at Ghana becoming the hub for rapidly responding to such incidents in the West African sub-region.

Disclosing this to participants on the second day of the three-day Ghana Summit on oil and gas held at the Accra International Conference Centre (AICC) last week, Mr. Kojo Agbenor-Efunam, Principal Programme Officer (Oil and Gas) of the Environmental Protection Agency (EPA), said recent industry activities and discoveries in other West African countries such as Liberia and Sierra Leone, have increased risk levels and therefore stakeholders have been discussing the need to pool resources together to effectively respond to any spillages. *Joy Online* [Read more](#)

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## USA: GOVERNMENT REQUIRES NEW LABELS FOR HAZARDOUS CHEMICALS

March 20 - The Obama administration announced long-awaited regulations Tuesday to improve labels on hazardous chemicals and make them conform with international guidelines developed by the United Nations.

The Occupational Safety and Health Administration estimated that such labels could prevent more than 40 deaths and about 500 workplace injuries and illnesses from exposure to hazardous chemicals each year. Assistant Labor Secretary David Michaels said labels will be easier to understand and less confusing, especially for low-literacy workers. About 43 million U.S. workers come in contact with hazardous materials on the job. *NorthJersey.com* [Read more](#) [Thanks to Don Johnston of DG & Hazmat Group]

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## MULTIPLE REPORTS OF SEA ANIMAL ILLNESS & DEATHS

**USA: Barataria Bay** – Severe ill health of Bottlenose Dolphins - See report in ISCO Newsletter 327 of 26 March 2012-04-08

**PERU: Thousands of dolphins may have died in Peru's massive die-off; cause could remain mystery**

April 6 - When a retired fisherman called to report that about 1,500 dolphins had washed up dead on Peru's northern coast, veterinarian Carlos Yaipén's first reaction was, "That's impossible." But when Yaipén traveled up the coast last week, he counted 615 dead dolphins along a 135-kilometer stretch of coastline. Now, the death toll could be as high as 2,800, based on volunteers' counts. Peru's massive dolphin die-off is among the largest ever reported worldwide. The strandings, which began in January, are a marine mystery that may never be unraveled. The causes could be acoustic impact from testing for oil or perhaps an unknown disease. In addition, stress or toxic contaminants can make marine mammals more vulnerable to pathogens such as viruses, said Peter Ross, a research scientist at Canada's Institute of Ocean Sciences. In a mass die-off, "there might be a smoking gun, but often we find that it's two or three or four factors," said Ross. *Environmental Health News* [Read more](#)

**INDIA: Alarming sea animal deaths on India's west coast**

Two giant Baleen's humpback whale sharks washed up dead on the Mumbai and Thane beaches in separate incidents last week. This was preceded by a Bryde's whale shark getting washed ashore at a beach in Ratnagiri, around 250 km south of Mumbai. In the past couple of months alone, over a dozen dead dolphins, usually seen frolicking in the calm blue-green Konkan coast waters, washed up on different virgin beaches in the region. Conservationists suspect chemical or oil poisoning. *The Times of India* [Read more](#)

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## USA: CSB BOARD REQUESTS COMMENTS ON ITS DRAFT STRATEGIC PLAN FOR 2012 TO 2016

March 29 - The U.S. Chemical Safety Board (CSB) today announced it is requesting public comments on its draft [2012-2016 CSB Strategic Plan](#). The draft plan is an update of the [2007 – 2012 CSB Strategic Plan](#), and includes the CSB's strategic goals, strategic objectives, and associated measures for managing and evaluating agency operations.

CSB Chairperson Dr. Rafael Moure-Eraso said, "The CSB is well positioned to work towards its mission of accident prevention. We will continue to advocate for the right to a safe workplace, and the efforts to make this right a reality."

The draft plan is now posted on the CSB's website and available at [www.csb.gov](http://www.csb.gov). Please submit comments by April 12, 2012, via email to [strategicplan@csb.gov](mailto:strategicplan@csb.gov). [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group for this report]

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## USA: ONCE A CLEANUP LEADER, MICHIGAN STRUGGLES WITH LEAKING FUEL

March 29 - Michigan has 9,100 polluted LUST sites, second most in the United States, where fuel leaks have contaminated soils and groundwater, and, in some cases, fouled drinking water wells and surface waters. At least 1,440 of those LUST sites pose an immediate risk to human health, according to the U.S. Environmental Protection Agency.

Underground storage tanks cause problems when corrosion and rust eats away at aging metal tanks and allows gasoline or other chemicals to seep into soils and groundwater. Federal regulations enacted in the 1980s require gas stations to replace leaky metal tanks with more durable fiberglass tanks. Gas stations also must install leak detection systems, which are designed to prevent small leaks from becoming a major environmental problem. *Circle of Blue* [Read more](#)

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## People in the news

### FORMER US COAST GUARD COMMANDANT THAD ALLEN TO KEYNOTE COUNTER TERROR EXPO US



March 27 - Organizers of [Counter Terror Expo US](#), being held May 16-17, 2012 at the [Walter E. Washington Convention Center](#), today announced that Thad Allen, the former 23rd Commandant of the US Coast Guard and current Booz Allen senior vice president, will deliver the event's keynote address on Thursday, May 17. Allen's address on "Where Counterterrorism and Disaster Response Meet" is an important addition to the event's conference program which is designed to provide a forum for collaboration between public and private sectors in order to gain a better understanding of the solutions available to detect, defend against and reduce future counter terror risks.

In 2010, Mr. Allen was selected by President Obama to serve as the National Incident Commander for the unified response to the Deepwater Horizon oil spill in the Gulf of Mexico. Working closely with the US Environmental Protection Agency, DHS, the Departments of Defense, Interior, Commerce, and Health and Human Services, state and local entities, and BP, he sought to bring a unity of effort to response operations. *Yahoo Finance* [Read more](#)

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## MINUTES OF 2012 AGM

The minutes of the ISCO AGM held in London on 14 March 2012 have been sent out to all members. Any member who has NOT received the minutes should contact the Secretary at [john.mcmurtrie@spillcontrol.org](mailto:john.mcmurtrie@spillcontrol.org)

## DEVELOPMENT OF IMO GUIDELINES – “INTERNATIONAL OFFERS OF ASSISTANCE”

At the IMO OPRC-HNS Technical Group Meeting in March 2012, ISCO together with other delegations agreed to participate and contribute to a Correspondence Group led by the United States and focused on the development of Guidelines for International Offers of Assistance, including the development of an international inventory of spill response resources. The paper submitted by the US Delegation is attached.

As the only delegation at IMO representing the wider international spill response community members of the ISCO delegation felt that it would be remiss for ISCO not to become involved. As you are aware, a key objective of ISCO is to promote effective international co-operation and efficiency in major spill events calling for co-ordinated international response.

In any major pollution event there are well established mechanisms for inter-governmental co-operation. ISCO provides a complementary facility for authorities and other entities to quickly access support from the private sector, assisting in the rapid sourcing of specialised know-how, equipment and materials.

ISCO made positive contributions to international co-operation during the Exxon Valdez spill (1989) and Gulf War pollution (1991). Assistance was offered during the 2006 Lebanon oil spill and a more recent example was during the Deepwater Horizon spill. The support provided by ISCO during this event was personally acknowledged by the National Incident Commander, Admiral Thad Allen.

Our initial thinking is that ISCO should continue to aim to augment (rather than in any way to duplicate) the inter-governmental response co-operation functions provided by REMPEC, RAC-REMPEITC Caribe, PEMSEA, NOWPAP-MERRAC, EMSA and other regional organisations. Specifically, ISCO should focus only on the resources available from the private sector.

In discussions at the recent Technical Group meeting it was suggested that, in order to make the task of compiling and maintaining an international resource database more manageable, the work should focus on larger items such as skimmer and other support vessels, large boom systems, high capacity pumps and skimmers, dispersant stockpiles, specialised aircraft, etc. but we would submit that the listing should also include many smaller items of a specialised nature that are not often available in typical response inventories.

We believe that it would be very much in the interests of our members for ISCO to contribute to this project but we do have a problem - the management and financial resources available to ISCO are limited. One possible route way would be to break the work into small parts, perhaps adopting a country by country approach.

Members of ISCO Council have been invited to come up with ideas on how we might best be able to move this forward. Inputs from other members and readers of the ISCO Newsletter would also be welcomed. You can send an email to the Secretary at [john.mcmurtrie@spillcontrol.org](mailto:john.mcmurtrie@spillcontrol.org)

## THE ISCO COUNCIL – WHAT IT DOES

The ISCO Council is composed of the appointed National Representatives of each country in which there are one or more Members of ISCO. The ISCO Council acts as an advisory and consultative body, assisting the Executive Committee on policy, new initiatives and other matters.

Members of Council also have other responsibilities –

- Acting as the primary point of contact between the membership in each country and the Executive Committee
- Providing support in facilitating communications between ISCO and government ministries or agencies, and other national authorities, institutions or bodies in the countries represented.
- Encouraging the formation of national (or regional) associations which bring together individual professionals, companies and other entities involved in spill control in their countries, as a means of raising levels of co-operation, knowledge and competence, facilitating sector recognition and creating channels of communication with governments.
- Promoting ISCO's objectives and encouraging growth of ISCO membership in their countries.
- Organising local meetings of members.
- Supporting ISCO initiatives in the countries represented.

## ON-LINE PAYMENT OF ISCO MEMBERSHIP SUBSCRIPTIONS

Recently there was a problem with the functioning of the facility for making online subscriptions using credit cards. This has now been rectified and members who may have tried unsuccessfully to make online payments can now do so again.

It will be of great help to our Membership Director, Mary Ann Dalgleish, if all members would pay their annual subscriptions promptly as they become due.

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In this issue of the ISCO Newsletter we are printing No. 71 in a series of articles contributed by Dr Douglas Cormack.

Dr Douglas Cormack is an Honorary Member of ISCO. As the former Chief Scientist at the British Government's Marine Pollution Control Unit and head of the UK's first government agency, the Warren Spring Laboratory, Douglas is a well known and highly respected figure in the spill response community. He is the Chairman and a founder member of the [International Spill Accreditation Association](#)

## CHAPTER 71: KNOWLEDGE OF MECHANICAL RECOVERY

While the reference encounter rate of 0.18 tonnes per hour can be increased for dispersant treatment by increasing the travel speed of ships and aircraft, the speed of ships towing booms to increase swath width, cannot exceed that which causes water-flow under and normal to the boom to exceed 1 knot, beyond which it causes pollutant to escape with it, thus defeating the objective of boom towing or of mooring in a tideway, while the natural layer thickness of the pollutant otherwise remains at the 0.1mm of Fay's Phase II spreading, though it will subsequently increase to 0.4mm as it emulsifies to a water-content of 80% as we have already recorded. However, this one knot escape velocity applies to booms whether actively towed by ships in collecting mode or moored in a current of one knot normal to the boom in passive protection of inner-estuarine shorelines. If such passive booms are deployed at an angle  $\theta$  to the current, however, its component normal to the boom is reduced by the factor, cosine  $\theta$ , and the pollutant is deflected to the downstream shore for collection where the current flow is lowest in any case.. However, while increase in escape velocity much above one knot normal to the boom is impossible to achieve, failure to attain this fundamental limit or to avoid pollutant escape for other reasons is always possible through ignorance of the principles of boom design which are intended to ensure:

- attainment of the fundamental limit of one knot escape velocity;
- maintenance of this performance and avoidance of other loss mechanisms while under internal boom-tensions induced by those of towing and mooring;
- adequate structural strength to withstand these tensions;
- sufficient lightness to be conveniently handled in deployment, use, and recovery;
- minimisation of bulk to facilitate storage and transportation.

As to internal tensions which can reduce the wave following characteristics of a boom and thus diminish the pollutant retention of its nominal freeboard and draft, it has been found that the force,  $F$ , exerted on the sub-surface area,  $A$  ( $m^2$ ) by relative water flow,  $V$  (knots) is  $F=KAV^2$  where  $K$  is the proportionality constant which has been observed to have a value of around 15 for a range of internal tension booms and 26 for the separate tension line Troilboom of Erling Blomberg.. Thus, the tension in a 100m boom of 0.6m draught in a relative current of 0.5 knots would be 225kg ( $K=15$ ) or 390kg ( $K=26$ ), though  $K$  should properly be determined for specific booms. As to wind, the effective speed may be taken to be a fortieth of that of water at the same speed. Thus, for 100m of boom of 0.5m freeboard in a wind speed of 15mph normal to the boom,  $V$  should be entered in the above equation as 15/40 to give  $F= 183kg$ . Clearly, wind has a significant effect.

As to moored booms, it is necessary to relate such internal tensions to the holding capacity of anchors. The fisherman type anchor is best on rocky bottoms where the holding is a matter of the size and location of the rock or rocks against which the anchor has come up fast and is thus difficult to calculate. However, the holding capacity of Danforth type is a matter of the cohesion of the bottom in which the anchor is embedded this being in kg 1.5-2.0 times the projected fluke area in  $cm^2$  and related to anchor size (weight) and bottom cohesion as tabulated below.

Holding Capacity of Danforth-Type Anchors

Anchor Weight, kg	Holding Capacity for Bottom Types, kg		
	Mud	Sand/gravel	Clay
15	200	250	300
25	350	400	500
35	600	700	700

In mooring booms to protect estuaries against pollutant ingress, no boom element should be permitted to be at right angles to the current direction unless close to the bank or shore where current flow is minimal to zero and where such a cusp might be helpful to pollutant recovery. The recommended arrangement is to moor one end of each of two booms to a stake or block on the opposite sides of the entrance and to attach their other ends together in mid-channel to form a double chevron the common apex of which is attached to a mid-channel anchor upstream in the incoming tide or to a bridle attached to twin anchors laterally placed either side of what would have been the chosen position for one. In practice it is best to maintain both chevron arms as smooth curves by deploying intermediate anchors to each arm by a series of double-armed bridals spread at about 70° to a series of waterline boom attachments from the chevron apex to the high-water mark on both arms, the preferred angle between boom and shore being 25-35°. Such intermediate anchors also share the load with anchor, post or block at each boom-end.

1 The *Rational Trinity: Imagination, Belief and Knowledge*, D.Cormack, Bright Pen 2010 available at [www.authorsonline.co.uk](http://www.authorsonline.co.uk)  
 2 *Response to Oil and Chemical Marine Pollution*, D. Cormack, Applied Science Publishers, 1983.  
 3 *Response to Marine Oil Pollution - Review and Assessment*, Douglas Cormack, Kluwer Academic Publishers, 1999.

## OIL SPILL REMOTE SENSING : CHAPTER 12



A short series of articles on Oil Spill Remote Sensing contributed by Dr Merv Fingas of Spill Science, Edmonton, Alberta, Canada T6W 1J6 [fingasmerv@shaw.ca](mailto:fingasmerv@shaw.ca)

Merv Fingas MSc PhD worked for more than 35 years in the field of oil spill technology at Environment Canada's Environmental Technology Center in Ottawa, Ontario. As head of the Emergencies Science Division at the Centre, he conducted and managed research and development projects. He is currently working independently in Alberta. Dr Fingas is the Member of ISCO Council for Canada.

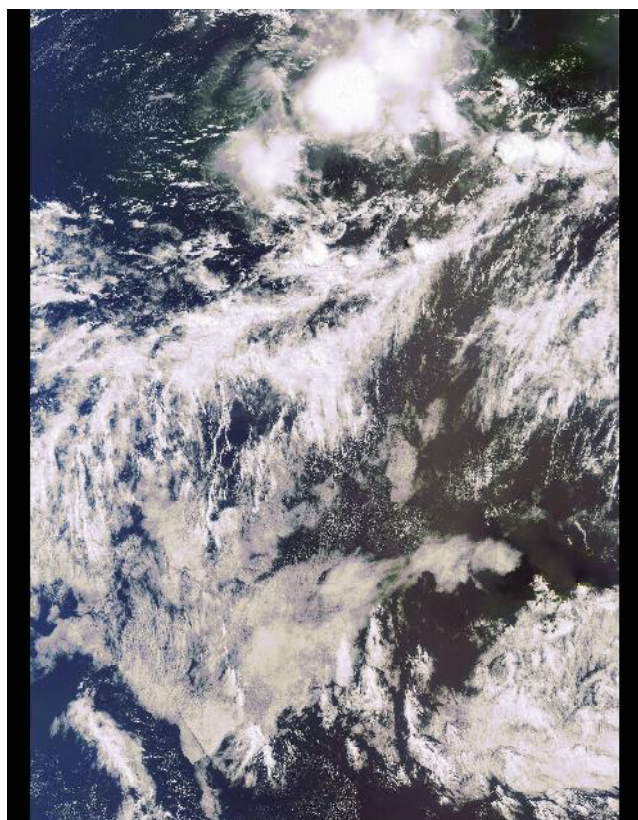
This is the 12th of a series of articles which will go into the remote sensing of oil spills. This series will cover oil spill remote sensing step by step and will present the latest in knowledge on the topic.

## Satellite remote sensing – Optical

The use of optical satellite remote sensing for oil spills has been attempted several times. The slick from the IXTOC I well blowout in Mexico was detected using GOES (Geostationary Operational Environmental Satellite) and by the AVHRR (Advanced Very High Resolution Radiometer) on the LANDSAT satellite.<sup>3</sup> A blowout in the Persian Gulf was subsequently detected. The large EXXON VALDEZ slick was detected on SPOT (Satellite Pour l'Observation de la Terre) satellite data. Oiled ice in Gabarus Bay resulting from the KURDISTAN spill was detected using LANDSAT data. Several workers were able to detect the Arabian Gulf War Spill in 1991.<sup>3</sup> The HAVEN spill near Italy was also monitored by satellite. A spill in the Barents sea was tracked using an IR band on NOAA 10. There were many uses of visual imagery from satellites during the Deepwater Horizon spill in the U.S.A.<sup>3</sup> It is significant to note that, in all these cases, the position of the oil was known and data had to be processed to actually see the oil, which sometimes took several weeks. Newer findings show that the ability to detect oil may be a complex function of conditions, oil types and view angles.

Land spills have been defined by visible satellites on several occasions. Hese and Schmulius mapped out the oil land contamination in Western Siberia using Landsat and QuickBird data.<sup>3</sup>

In the past, there were several problems associated with relying on satellites operating in optical ranges, for oil spill remote sensing. The first is the timing and frequency of overpasses and the absolute need for clear skies to perform optical work.<sup>3</sup> This is particularly true with older satellites with very infrequent overpasses. The chances of the overpass and the clear skies occurring at the same time gave a very low probability of seeing a spill on a satellite image. This point is well illustrated in the case of the EXXON VALDEZ spill. Although the spill covered vast amounts of ocean for over a month, there was only one clear day that coincided with a satellite overpass, and that was on April 7, 1989. Another disadvantage of satellite remote sensing is the difficulty in developing algorithms to highlight the oil slicks and the long time required to do so. For the EXXON VALDEZ spill, it took over two months before the first group managed to 'see' the oil slick in the satellite imagery, although its location was precisely known. Fortunately, this has changed with the data availability in modern satellites.



**Figure 12 The MERIS Medium Resolution Imaging Spectrometer (MERIS) image of the Coast of France. On this particular day there was so much cloud that even the coastline is obscured. This illustrates that clouds are the major obstacle to satellite optical remote sensing. (Photo from European Space Agency website <http://www.esa.int/esaEO/>)**

Recently several workers have attempted to use visible data to detect oil spills.<sup>3</sup> These techniques generally rely on ancillary data such as suspected position or other satellite data, to be successful. Srivastava and Singh used only MODIS to detect known oil spills in Lake Maracaibo, Venezuela.<sup>3</sup> First, the use of L1B data visually did show oil, however, uncorrected features at 469, 555 and 645 nm showed significant indications of oil. Further study showed that the ratio of the difference and sun at 645 and 555 nm, normalized by 469 nm provided the best results. More recently, several workers used MODIS and other satellite data to detect the oil during the Macondo spill in the U.S. Gulf of Mexico.<sup>3</sup> Hu demonstrated a technique to remove sun glint from MODIS imagery.<sup>3</sup> This correction was at wavelengths of 469, 555, 645, 959 and 1240 nm.

Cococcioni et al. and Corucci used MODIS imagery to locate oil spills.<sup>37</sup> The procedure was to take a multi-spectral image from MODIS, and subject it to a series of corrections and then used a supervised classification system to highlight oil spills. This was tested on small slicks in the Mediterranean sea. Grimaldi et al. used MODIS and AVIRIS data to locate oil spills. This was tested on the Lebanon oil spill.<sup>38</sup>

The major interference to optical satellite use is the presence of clouds. Figure 12 illustrates cloud blockage of optical satellite





**Figure 13** A MODIS image of a spill in China. The MODIS sensor flies aboard the NASA Aqua satellite. MODIS/Aqua image taken June 14, 2011. The oil slick is outlined in yellow. Islands in Bohai Bay are labeled for reference. (Photo from Skytruth website <http://blog.skytruth.org>)

sensing and Figure 13 illustrates the use of optical sensing where clouds were not a major issue. During the Gulf of Mexico spill, extensive efforts were made to use optical satellite data.

There is some information on slicks available from angular information. For example, Chust and Sagarminaga used the Multi-angle Imaging SpectroRadiometer (MISR) sensors aboard a satellite to detect oil spills on Lake Maracaibo, Venezuela.<sup>39</sup> This sensor uses nine push-broom cameras at fixed angles from nadir to 70.5° to examine particular surfaces. A comparison of this angular sensor shows that better contrast was obtained than a simple nadir camera on another satellite. Data analysis showed that oil spills appear in greater contrast in those view angles affected by sun glitter because of the presence of oil.

IR data from satellite has been used to map the land oil pollution in Kuwait.<sup>3</sup> It was found that the old hydrocarbon-contaminated areas showed as much as 10°C difference from the surrounding land. Ground-truthing was used extensively in compiling the data. Casciello also made an attempt to use IR imagery from the thermal infrared region of the AVHRR satellite to locate known oil spills.<sup>3</sup> Grimaldi et al. used channels 4 and 5 of the thermal infrared channels of AVHRR to calculate the presence of oil spills.<sup>38</sup> This technique relies on the contrast in the IR between clean and oiled water. Li et al. used the SST (Sea Surface Temperature) information in the infrared from MODIS to detect oil spills.<sup>3</sup>

In summary, the use of optical satellite data shows mixed results. In any case, clouds become the major obstacle to oil detection and mapping. Visible imagery does show oil spills under ideal conditions as does infrared imagery. In recent years, the success for using optical satellite data has increased, but is not at the point where it could be used as a reliable and routine technique.

3 Fingas, M. and C.E. Brown, *Oil Spill Remote Sensing: A Review, Chapter 6, in Oil Spill Sci. Techn., M. Fingas, Editor, Gulf Publishing Company, NY, NY, 111, 2011*

37 Cococcioni, M. And L. Corucci, *Issues and Preliminary Results in Oil Spill Detection Using Optical Remotely Sensed Images, IEEE, 2009*

38 Grimaldi, C.S.L., D. Casciello, I. Coviello, T. Lacava, N. Pergola and V. Tramutoli, *Satellite Oil Spill Detection and Monitoring in the Optical Range, IGARSS, 4487, 2010*

39 Chust, G. And Y. Sagarminaga, *The Multi-angle View of MISR Detects Oil Slicks under Sun Glitter Conditions, Remote Sensing of the Environment, 232, 2007*

## Events

### UK & IRELAND: ISAA ALL-IRELAND ACCREDITATION SCHEME STEERING GROUP

The next meeting of the ISAA All-Ireland Spill Response Organisation Steering Group will take place at 1030 am on 9 May 2012 at the HQ of the Irish Coastguard in Leeson Lane, Dublin.

The Agenda will be sent out shortly. All stakeholders are invited to come to the meeting. As usual, for security reasons, all attendees are in advance requested to advise the Administrator of their intention to be at the meeting.

## Events (continued)

### USA: SPRING 2012 APICOM MEETING

Las Vegas, Nevada on May 11-13, 2012, Hosted by: SEAPRO, Alaska Chadux, and Clean Channel Association [More info](#)

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### POLAND: BALTIC OILED WILDLIFE RESPONDERS EXCHANGE MEETING

Gdynia, Poland on 16-17 April, 2012 [More info](#)

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### POLAND: 15<sup>TH</sup> MEETING OF THE RESPONSE GROUP (HELCOM RESPONSE 15/2012)

Sopot, Poland on 18-20 April, 2012 [More info](#)

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### TUNISIA: NATIONAL WORKSHOP ON OIL SPILL WASTE MANAGEMENT

Tunis, Tunisia on 8-10 May, 2012 [More info](#)

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### MALAYSIA: OFFSHORE DECOMMISSIONING ASIA

Kuala Lumpur, 18-21 June, 2012 [More info](#)

## Publications

### CEDRE: UNDERSTANDING CHEMICAL POLLUTION AT SEA

Today, the chemical industry is at the heart of the global economy and requires major flows of goods from production sites to consumption areas. Some 37 million chemicals are used by the world's population and 2,000 are regularly transported by sea. The volumes shipped are currently on the rise, with maritime chemical transport having more than tripled in the past 20 years.

The risks have become increasingly acute, in particular due to the growing number of ultra-large ships together with the high intensity imposed by global market pressure. The threat of a chemical spill at sea concerns many public and private interest groups as the pollution caused is often invisible and may appear difficult to manage.

Transport Canada is aware of this issue and strives to ensure more efficient, safer and more sustainable maritime transport through its Marine Safety Directorate. In order to improve maritime safety, Transport Canada works in cooperation with various foreign experts, including the French Centre of Documentation, Research and Experimentation on Accidental Water Pollution (Cedre).

Based on the observation that no such educational guide existed worldwide on chemical spills, Transport Canada produced this document in partnership with Cedre. It is made up of a 93-page book and 2 posters. [More info](#)

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### US EPA PUBLICATIONS

**TechDirect, April 1 Issue** - New technical, policy and guidance resources related to the assessment and remediation of contaminated soil, sediments and ground water. [Download](#)

**Technical Innovation News Survey, February 16=29 Issue** - Market/commercialization information; reports on demonstrations, feasibility studies and research; and other news relevant to the hazardous waste community interested in technology development. [Download](#)

## Training

### EUROPE: PREPAREDNESS FOR OIL-POLLUTED SHORELINE CLEANUP AND OILED WILDLIFE INTERVENTIONS

2012-2014 POSOW Project [More info](#)

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