ISCO NEWSLETTER

The Newsletter of the International Spill Response Community

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International news

ISCO: NEW MEMBER OF ISCO EXECUTIVE COMMITTEE AND APPOINTMENT OF TWO NEW MEMBERS OF ISCO COUNCIL

At the ISCO 2012 AGM held last week at the Interspill Conference in London, Members elected Capt. William Boyle MNI as a new Member of the Executive Committee. Capt. Boyle has more than 25 years experience in oil spill response and is currently General Manager of Briggs Environmental Services, responsible for day to day National and International Operations, liaising with Clients and Governmental Agencies National and International. Other members of the ISCO Executive Committee are David Usher (President), John McMurtrie (Secretary), Rear Admiral M. L. Stacey CB, Daniel F. Sheehan, Marc K. Shaye, Jean-Claude Sainlos, M. Kerem Kemerli, Paul Pisani, Simon Rickaby and Li Guobin.

The meeting also approved the appointment of two new Members of ISCO Council – John Wardrop as Member of Council for Australia and Dark Domovic as Member of Council for Croatia. John Wardrop is an international consultant to governments and industry with over 25 years experience in spill response. Darko Domovic, formerly Senior Programme Officer for REMPEC in Malta is now Technical Advisor to the Oil Spill Education Centre in Croatia.

The Guest Speaker at the meeting was Dr Merv Fingas, ISCO Member of Council for Canada and former Head of Emergencies Science at Environment Canada. In his illustrated talk on "Burning the Unburnable" he exploded the myth that a number of heavy oil types cannot be dealt with by in-situ burning.

ISCO President David Usher was unfortunately unable to be present but he opened the meeting via Skype AV link. He welcomed those present and spoke of the importance of ISCO in raising awareness of the role of professionals in the industry and the contribution they are making to protecting our environment.

ISCO Secretary John McMurtrie was acting Chairman and in the Secretary's Report he welcomed recently joined new members including KBKM and Associates (USA), TerraTech (USA), Clean Harbors (USA), INTERTANKO, Eco Strategic Consultants (Australia), Enviro Voraxial Technology Inc. (USA), The University of Petroleum and Energy Studies (India) and Heather Parker (USA).

The Secretary also reported on progress made with the ISCO Professional Membership initiative under which individual professionals in the Spill Response Community can achieve professional recognition – Fellow, Member, Associate Member, Student Member – in accordance with their experience and qualifications. Over the last few months more work has been done to enhance the candidate assessment process to ensure that it is rigorous and verifiable, rules, guidelines, and a code of professional conduct have been developed. Professional Membership provides a career path for new entrants to the industry.

International news (continued)

For individuals Professional Membership provides a visible mark of quality, competence and commitment. Interested candidates are now being listed and some corporate members have indicated intention to sponsor employees. The Meeting agreed to empower the Executive Committee to progress implementation of the initiative and the hope was expressed that this would soon be achieved.

The minutes of the AGM will be circulated to Members in the near future.

Major incident reports

NEW ZEALAND: RENA UPDATE

March 16 - Svitzer salvors have attached a hot tap to the starboard wing tank in an effort to extract the remaining oil in the submerged tank. Yesterday, they removed an estimated 10 tonnes of heavy fuel oil from the number 5 starboard tank While the exact figure of oil left in this tank is unknown, it is estimated to be up to 30 tonnes.

The Braemar recovery team has been working with divers to retrieve parts of two submerged containers from the seabed at the north end of Motiti Island. The containers are lying in water about six metres deep. The divers are using air-driven equipment to cut the containers into pieces so they can be winched onto a barge. Container numbers remain unchanged from Monday. A total of 573 have been retrieved from the wreck by Svitzer salvors, and 72 from the sea or shore by Braemar Howells container recovery teams, making a total of 645 accounted for on shore. 21 total containers have been located on the sea bed away from Rena, but are yet to be recovered *Maritime New Zealand* Read more

GREECE: GREEK TANKER SINKS OFF ATHENS, GREEK CAPTAIN DEAD

March 5 - The captain of a Greek tanker was killed when his ship, carrying more than 2,000 tonnes of oil and diesel, sank west of Athens on Monday, coastguard officials said. The other 10 members of the crew were rescued and safe, the officials said. No oil spills have been spotted so far. "The 48-year-old Greek captain was just found dead," one coastguard official said.

The "Alpha 1" refuelling tanker, which sank off the Athens region's Elefsina refineries, was carrying 1,800 tonnes of crude oil and 235 tonnes of diesel when it foundered at around 10.30 a.m. (0830 GMT). *The Seafarer Times* Read more

IRAN: 24 PINOY CREW MEMBERS RESCUED AFTER BLAST ON LIBERIAN-FLAGGED VESSEL

March 17 - At least 24 Filipino seafarers were rescued by US Navy forces after an explosion hit a Liberian-flagged chemical tanker they were serving on while navigating in the Arabian Gulf on Thursday.

Stolt Valor is a chemical tanker carrying approximately 13,000 metric tons of methyl tertiary butyl ether (MTBE), which is used to increase oxygen content in gasoline throughout the US, to reduce carbon monoxide and ozone levels caused by auto emissions. MTBE is considered soluble, but not biodegradable.

Combined Maritime Forces battle watch officer reported the incident to the Marine Emergency Mutual Aid Center, who dispatched tugs with firefighting capability to the scene. *GMA News* Read more

BRAZIL: OIL AGAIN LEAKING NEAR SITE OF 2011 CHEVRON SPILL

March 16 - Oil started leaking again from cracks on the ocean floor near an offshore Chevron well where at least 110,000 gallons spilled late last year, Brazil's oil regulator said Thursday.

The size of the new leak, which is ongoing, is unknown, said a spokeswoman with Brazil's National Petroleum Agency, known as ANP. *San Francisco Chronicle* Read more

USA: INVESTIGATION CONTINUES INTO ABBEVILLE, SOUTH CAROLINA, TRAIN DERAILMENT

March 13 - CSX officials along with Abbeville City & County crews are still trying to find out exactly what caused a train to derail last week.

The tanker carrying hazardous materials has been moved from the site of a massive train derailment in Abbeville. 28 cars derailed Thursday morning. Crews are working around the clock to remove the cars. By early afternoon Friday, only nine cars remained.

WSPA News Read more

Major incident reports (continued)

INDIA: FIRE BREAKS OUT ON SHIP MINUTES AFTER UNLOADING

A major fire broke out on a Korean-flagged chemical tanker that was berthed at Pir Pau berth of Mumbai Port Trust (MbPT) around 11.30am on Saturday. Officials said there were no casualties, but three persons had to be rushed to hospital with burn injuries.

A greater tragedy was averted as the fire occurred minutes after the 9,500 dead-weight tonnes (DWT) chemical tanker "Royal Diamond" had discharged 2,000 tonnes of toluene. It took almost two hours to bring the fire under control. *The Times of India* Read more

Regional and national news

USA: BP'S INFLUENCE PEDDLING IN CONGRESS BEARS FRUIT TWO YEARS AFTER GULF SPILL

March 12 - As millions of barrels of oil began pouring into the Gulf of Mexico in April 2010, Democratic lawmakers began asking the question: what was the proper amount of money that the company responsible for the spill should have to pay?

This wasn't some sort of philosophical exercise. Oil companies pay money into the Oil Spill Liability Trust Fund to help cover the costs of major disasters. But under the Oil Pollution Act of 1990, a company responsible for a spill is liable for only $75 million in economic damages, provided it didn't exhibit "gross negligence." The federal government picks up the next $1 billion.

Since it quickly became evident that the cost of damages to the Gulf would far exceed those figures, a group of senators, led by Robert Menendez (D-N.J.), tried to change the law. They proposed raising the $75 million cap on liability to $10 billion.

The bill was dubbed the "Big Oil Bailout Prevention Unlimited Liability Act." Introduced during the peak of anger over the spill and amid legitimate fears over how long the oil would continue to flow unabated, it seemed as though there was a fairly reasonable chance it would pass. When President Barack Obama not only endorsed the measure but also argued for eliminating a cap altogether, its prospects improved further.

It never even made it to an up-or-down vote. Republican senators and several oil-state Democrats -- pitching symbolic, watered-down alternatives -- filibustered the bill's consideration. A separate attempt to use unanimous consent was blocked as well. *Huffington Post* Read more

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ISRAEL: MINISTRY LAUNCHES BILL ON OIL SPILLS

March 12 - The Environmental Protection Ministry issued a bill on Monday to regulate preparedness and response routines for coping with marine and beach-side oil spills.

If passed, the bill would obligate all authorities that have stretches of beach or sea within their jurisdictions – such as local authorities, the Israel Nature and Parks Authority, ports, factories, security installations and oil and gas exploration and extraction stations – to prepare plans for handling incidents of sea and coastal contamination by oil, as well as provisions for coping with the aftermath of such events. A relevant body that fails to organize such a system and neglects to take action in a timely manner after such a spill will be subject to fines of up to NIS 452,000 or a year of imprisonment for site administrators, the ministry said. *The Jerusalem Post* Read more

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OMAN: RESEARCHERS TO STUDY OIL SPILLS IN OMAN

March 15 - A team of researchers is seeking ways to address the issue of oil spills in Oman and ways to treat them.

The project, headed by Dr Raeid Abed from the College of Science, Sultan Qaboos University (SQU) and funded by The Research Council, aims at testing various bio-remediation approaches, mainly bio-stimulation and bio-augmentation, for the clean-up of oil pollution using indigenous bacteria under the extreme environmental conditions of the Gulf region.

The team will investigate the use of oil-polluted cyanobacterial mats and isolated cyanobacterial consortia for bio-remediation.

Frequent incidences of oil pollutions have been reported in Oman, some of high magnitude that caused severe impacts on terrestrial and marine environments. Oil pollution poses serious threats for the sultanate's economy, fishing industry, public health, water desalination plants, underground water, agriculture soils and tourism. So far, there have been very few national projects that deal with oil spills and ways to treat them. *Khaleej Times* Read more

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USA: OFFSHORE OIL PRODUCTION SAVES LOCAL WILDLIFE

Just offshore Santa Barbara lie the world's second-largest natural oil and gas seeps, and offshore oil production has been drying up these seeps for more than 50 years. Local residents have seen their beaches slowly becoming cleansed of seep oil.

The reduction in natural seepage pollution as a result of offshore oil drilling has been established by long-term UCSB studies. What many residents don't realize is local natural oil seepage kills wildlife. Far more birds have died from these seeps than from all California offshore oil spills combined over the last 50 years.

Just last month, the Long Beach-based International Bird Rescue Research Center reported, "Natural Seep Oil Prompts Bird Rescue in California" with more than 50 birds oiled in January. In March 2011, the IBRRC headline was, "Natural Seep Oiled Birds Continue to Flood IBRRC." Santa Barbara Wildlife Care Network routinely sees dead seep-oiled birds. A local 2005 natural oil seepage event killed more birds than the 1969 oil spill in the Santa Barbara Channel. *Noozhawk* Read more

USA: FEMA SEEKS INPUTS ON NATIONAL RESPONSE FRAMEWORKS

The Federal Emergency Management Agency (FEMA) and its partner agencies are seeking input on a series of draft national planning frameworks related to incident Response, Prevention, Protection, and Mitigation. FEMA is updating the existing National Response Framework, and federal agencies have developed new national frameworks for Prevention, Protection, and Mitigation activities.

- The National Response Framework addresses how the "whole community" -- which includes all levels of government, individuals and communities, businesses, non-profits, and faith-based organizations -- work together to respond to "all-hazard" incidents.
- The National Prevention Framework addresses whole community roles and actions in the prevention of terrorism in our Nation.
- The National Protection Framework addresses whole community roles and actions in protecting our Nation against natural disasters and man-made hazards, including terrorism.
- The National Mitigation Framework addresses whole community roles and actions in lessening the impact of disasters through mitigation.

In addition, you may be aware that FEMA issued a National Disaster Recovery Framework in September 2011. FEMA has just developed a draft Federal Recovery Interagency Operational Plan, which supports the Framework and provides additional details on Federal implementation of the Framework.

All of this work is being conducted under a presidential directive called Presidential Policy Directive-8. FEMA and its partner agencies have released these draft documents for a national public engagement period and is inviting national comment on these documents by April 2. You may download a copy of these documents and instructions for providing comments on them at the following FEMA website: http://www.fema.gov/prepared/ppd8.shtm [Thanks to Dana Robinson for providing this info]

IMO SEEKING TECHNICAL/TRAINING EXPERTS IN OPRC-HNS FIELD TO ASSIST WITH ITCP ACTIVITIES

There has been an increasing request from developing countries to IMO to provide technical assistance in building relevant capacity to address HNS issues and to prepare national and regional contingency plans to deal with HNS spills.

Due to such increased demand from developing countries, IMO's Integrated Technical Co-operation Programme (ITCP) programme has planned several training activities and seminars in this field with a view to develop the necessary capacity in developing regions. However, due to the complex technical nature of this issue, it has not always been easy to identify the relevant experts to provide such training courses in developing regions.

In light of the above. We would like to encourage the OPRC-HNS technical experts from various regions, who might be interested in undertaking IMO ITCP activities (training courses, regional workshops, etc.) to become registered.

Please contact Mr Jose Matheickal, Head, Technical Co-operation Co-ordination & Major Projects Section of the Marine Environment Division, should you have an interest inbeing considered as an IMO consultant in the OPRC-HNS field. Mr Matheickal can be contacted at jmatheic@imo.org

Correspondence

Sir - I am currently a final year student at Bournemouth University completing my dissertation. I am looking for people within the oil spill response industry to help me, by providing their knowledge in order to gain primary data for my Research project. My project outlines oil spill response techniques and technologies and how they have advanced over the years, so that oil spills around the globe are dealt with as quickly and efficiently as possible.

Please could you pass this on the relevant people within your organisation for it to be completed and sent back. I appreciate it is a busy industry; however it will only takes around 15 minutes and would be very helpful. Questionnaire link-
https://docs.google.com/spreadsheet/viewform?pli=1&formkey=dHNwR21jRWd0aDd3NldfU2ZseEhad2c6MQ#gid=0

Many Thanks, Thomas Boakes, Environmental Management student

Cormack's Column

In this issue of the ISCO Newsletter we are printing No. 68 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 68: KNOWLEDGE OF REMOTE SENSING AND IDENTIFICATION SAMPLING

In light of the progress reviewed in articles 63-67, WSL contributed through the NATO Committee on the Challenges of Modern Society (CCMS) to designing the International Standard Oil Wake Experiment (ISOWAKE) by which individual member states could further evaluate remote sensing equipment for the apprehension of illegal oil dischargers. Thus, the member states agreed that discharges should consist of diesel oil as specified and, if desired one or more of the: heavy fuel oils or crude oils such as Bachequero 17, Minas, Nigerian medium, Sahara blend or Arabian; that such should be discharged at 30, 60, 120 and 240 litres per mile in water discharged at 3000 litres per mile; that these discharges should be effected through a 100mm pipe facing vertically down, positioned between 0.2 and 0.5 m of the ship's side, and terminating 0.5 m above the mean sea surface; that preferably the ship should be at least 100 tonnes gross; that it should be travelling at between 8 and 10 knots; and that the water depth should be sufficient to avoid wake entrainment of bottom sediment.

The member states also agreed that aerial survey flight paths were to be towards or away from the ship along the ship's track, and perpendicular to the track 400m behind the ship; that additional flight paths were to vary the Sun/oil-sensor angle and the wind/oil-sensor angle; that the preferred times were noon, 1600-1800 hrs and midnight local time; that the preferred over-flight altitudes were 500 and 2000 ft; that additional flight lines and altitudes might be required and were thus recommended fully to exploit specific sensor performance; and that comparison flights should be conducted with no oil discharge at all. Finally, as regards reporting results, the Pilot Group agreed a facilitating format and invited the participating states to submit details of test plans and schedules beforehand.

It was expected that such tests would establish the potential of existing remote sensing systems to detect illegal dischargers in the act of discharging, to show when these discharges were above legal limits, to show by how much they were in excess of these limits, and to provide hard copy evidence for use in court: all despite the inability to deliver such quantification having already been demonstrated (c.f. article 66. Again, given the difficulties of attributing operationally discharged slicks to an already departed ship, there seemed little point in remotely sensing the former unless it was unusually large enough to justify mounting a seagoing dispersant or mechanical recovery response.

However, WSL also reported to the NATO CCMS that while the SLAR operated on its behalf by the RSRE had detected a discharge of 60 litres per mile from *RV Seaspring* at a range of 5.5 km and while it could detect much less, it could not quantify thickness variation and therefore could not quantify amount; that while within the SLAR detected slick, the associated UVLS equipment could differentiate oil from any thermal discharges undifferentiated from bright oil images by the associated IRLS equipment, it could no more quantify the amount of oil present than could SLAR,; that while free from such other thermal interference such as cooling water discharges, the IRLS could differentiate areas of differing oil layer thicknesses within the UVLS image, it could not absolutely determine the quantity of oil present; that in making no such differentiation the UVLS provides an image similar in extent to the naked eye within the area of the SLAR image; that while such a combined approach is adequate to the needs of maximising encounter rates for release response, it is inadequate to quantify oil amounts sufficiently to convict a discharger for exceeding stipulated discharge limits unless the limit is zero. As to ship identification, however, WSL reported that this is difficult at night unless suitable illumination and camera equipment are provided by the aircraft to acquire the ship's name and port of registry; that laser-activated gated LLLTV would be a boon in these regards in due course; and that such would satisfy all hard copy documentation requirements as to ship identification.

WSL additionally reported with respect to both general discharge monitoring and guidance to maximal effectiveness of spill response, that the output from the IRLS, UVLS and SLAR equipment should be displayed as a TV image onboard the aircraft; that the TV should have a freeze and recall facility and that the running image should be recorded and converted to hard copy photographs. Again, because the IR/UVLS has a swath width of only a few thousand metres while the SLAR swath width is 10-20km, the images of the former must be geographically located within the image of the latter which must itself be so located; that this can best be done by annotating the images with position, time, date, altitude, flight direction *etc*.; and that this can best be done by direct linkage to the navigational and other instrumentation of the aircraft. Yet again, WSL reported that decisions on the optimal deployment of dispersant spraying and mechanical recovery could be taken onboard the aircraft or the information could be transmitted to a central and/or subordinate control centre for such knowledge-based decisions to be made there.

1 The *Rational Trinity: Imagination, Belief and Knowledge*, D.Cormack, Bright Pen 2010 available at 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.

Contributed article

KNOWLEDGE-BASED CONTINGENCY AND INCIDENT-SPECIFIC ACTION PLANNING

At the MEPC Technical Group Meeting TG 13, 5-9 March 2012, Doug Cormack presented his Paper OPRC-HNS/TG13/5/5 entitled Knowledge-Based Response Planning.

This, paper summarised the knowledge currently being reviewed in Cormack's Column by recalling that floating layers evaporate, disperse and/or dissolve to atmospheric and seawater concentrations too low to be other than transiently toxic at most; that only those not evaporated, dispersed or dissolved come ashore to the detriment of commercial activity; that the fraction which comes ashore depends on the proximity of shore to release-point; that cargo/bunker transfer and well-capping limit releases; and that while that which evaporates, disperses or dissolves cannot be recovered, no species-extinction/ ecological-disaster has yet resulted from any total cargo and bunker release or from any well blow-out however prolonged. Thus this paper notes that dispersants may be used to reduce the amount coming ashore and to disperse any stranded amounts back to the sea; that pollutant viscosity determines the dispersant/recovery choice; that dispersants can avoid the need for the recovery which onshore requires pollutant/beach-material separation and the subsequent processing common to recovery whether at sea or onshore; that such separation and processing are avoidable by natural or induced dispersion, while the amounts dispersible or recoverable in operational sub-areas at sea are generally much smaller than the amounts dispersing naturally over the total area affected at sea; and that these low response capabilities emphasise the need for cargo/bunker transfer and well-capping. Again, the paper notes that the only known effects are the physical coating of shorelines and individual organisms, all effects in the water column being excluded by their concentration dependence and/or by the degradation of all organic chemicals to the carbon dioxide of their photosynthesised precursors.

This paper proceeded to show how the above physicochemical and biological knowledge will be made the basis of the new contingency plans for salvage, shipboard, seaborne and shoreline response action in such ways as to preserve this knowledge despite staff changes in response organisations; how incident-specific assessments of need and consequent action plans will be produced by inserting incident specific values for all the parameters identified in template format as relevant to each of the four components of the contingency plan. Again this paper recognises that the quantities of released cargo decrease with the volumes of compartmentalisation from oil tanks through HNS tanks to containers and to individual packages within containers; and that further release is preventable by cargo transfer in all cases.

Again, to emphasise the need for knowledge to replace belief in incident response, the paper compared examples of knowledge-based progress with belief-based stalemate within the wider IMO context; differentiated belief from knowledge by the reality-evaluation which converts the former to the latter by quantification of cause and effect and which thus differentiates science from pseudoscience by its presence or absence; provided examples of environmentalist beliefs which are either incompatible with available knowledge or directly opposed to it; and invited environmentalist NGOs to reality-evaluate their beliefs to knowledge where this has not yet been done by them or anyone else.

As to how this might be done this paper invited these NGOs to validate or refute their beliefs in species-extinction/ecological-disaster by reality-evaluation of the specific hypotheses offered therein in respect of concentration-related toxicity and individual organism-coating; and to validate or refute their belief in anthropogenic global warming by reality-evaluation of the hypotheses offered therein in respect of carbon dioxide abstraction and release rates within the biological and geological processes by which it is known to be recycled, or by reality-evaluation of any hypotheses which these NGOs can generate.

The Technical Group having considered the above paper OPRC-HNS/TG 13/5/5:

-noted the information provided on the work of ISCO on knowledge-based response planning;
-noted that relevant NGOs have been invited by ISCO to contribute to the finalisation of this work[1]; and
-requested MEPC to invite interested delegations and observers to contribute to the work of ISCO on this topic.

1. Despite having intervened at MEPC 62, to invite environmentalist NGOs to reality-evaluate their beliefs to positive or negative knowledge in respect of water-column concentration, individual organism-coating, and anthropogenic global warming, ISCO has received no response as yet.

Special series

OIL SPILL REMOTE SENSING

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

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 9th 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.

Radar

Capillary waves on the ocean reflect radar energy, producing a 'bright' image known as sea clutter. Since oil on the sea surface dampens capillary waves, the presence of an oil slick might be detected as a 'dark' sea or one with an absence of this sea clutter.[3] Unfortunately, oil slicks are not the only phenomena that are detected in this way. There are many interferences or false targets, including fresh water slicks, wind slicks (calms), wave shadows behind land or structures, shallow seaweed beds that calm the water just above them, glacial flour, biogenic oils, and whale and fish sperm.[3,24-29] As a result, radar can be marginally effective in locations such as Prince William Sound, Alaska where dozens of islands, fresh water inflows, ice, and other features produce hundreds of such false targets. Liu et al. showed that even with extensive processing that false hits on SAR imagery were 20%, that is 20% of the images reported as oil were still look-alikes.[25] Figure 10 illustrates some of the many slick look-alikes which appear in radar displays. Despite these limitations, radar is an important tool for oil spill remote sensing because it is the only sensor that can be used for searches of large areas and it is one of the few sensors that can detect anomalies at night and through clouds or fog.

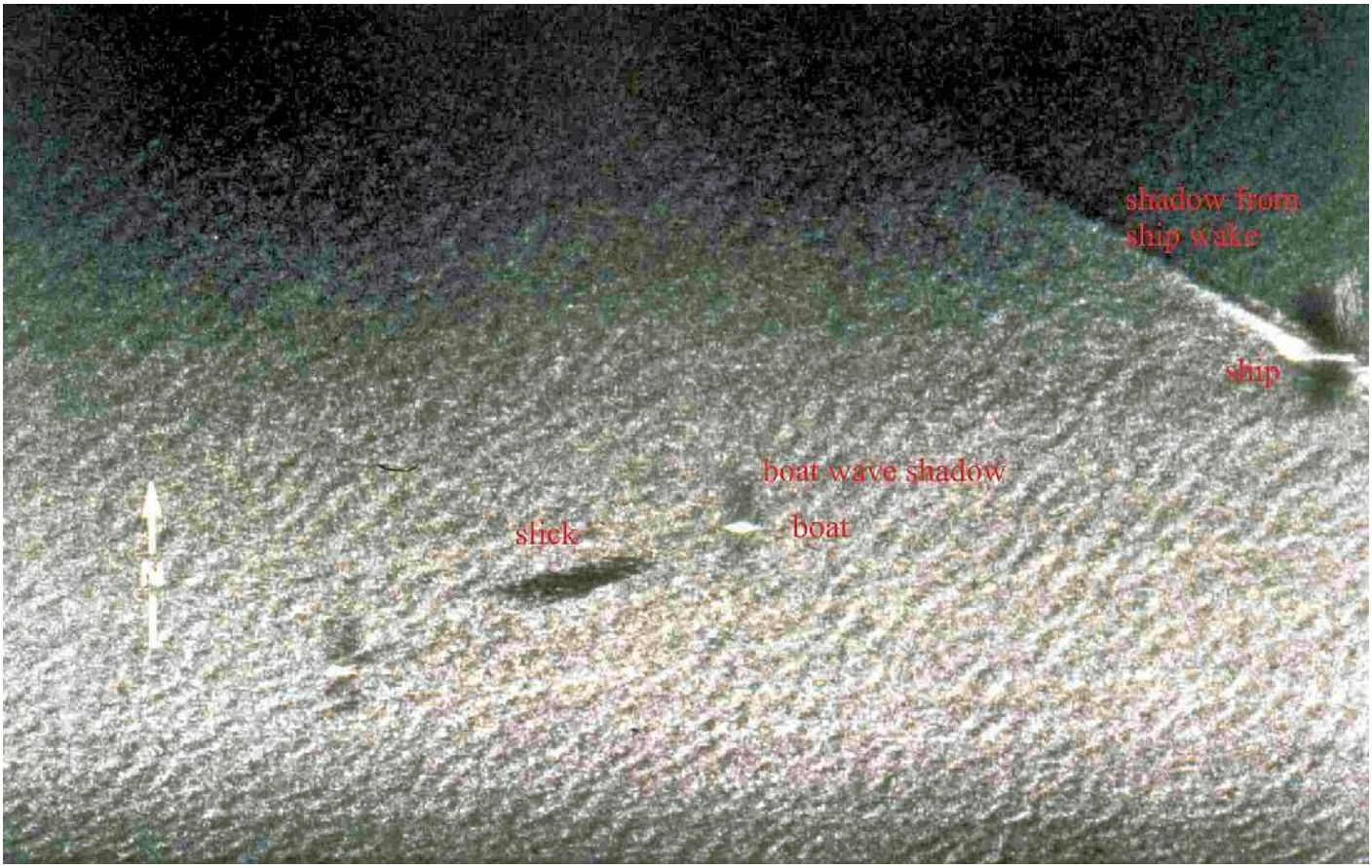

Figure 10 Airborne radar image of a small test slick attended by two boats. Note that the boats cast a radar shadow on both their sides. A ship is passing to the top right of the image and the ship's wake also casts a radar shadow.

The two basic types of imaging radar that can be used to detect oil spills and for environmental remote sensing in general are Synthetic Aperture Radar (SAR) and Side-Looking Airborne Radar (SLAR). The latter is an older, but less expensive technology, which uses a long antenna to achieve spatial resolution. Synthetic aperture radar uses the forward motion of the aircraft to synthesize a long antenna, thereby achieving very good spatial resolution, which is independent of range, with the disadvantage of requiring sophisticated electronic processing. While inherently more expensive, the SAR has greater range and resolution than the SLAR. Comparative tests show that SAR is vastly superior.[3] Search radar systems, such as those frequently used by the military, cannot be used for oil spills as they usually remove the clutter signal, which is the primary signal of interest for oil spill detection. Furthermore, the signal processing of this type of radar is optimized to pinpoint small, hard objects, such as periscopes. This signal processing is very detrimental to oil spill detection.

SLAR has predominated airborne oil spill remote sensing, primarily because of the lower price.[3] There is some recognition among the operators that SLAR is very subject to false hits, but solutions are not offered. Experimental work on oil spills has shown that X-band radar yields better data than L- or C- band radar.[3] Several different polarizations exist based on vertical (V) and horizontal (H) electromagnetic wave propagation. Typically transmission and reception are in the same polarity, ie. VV or HH. But, there are actually 4 poles available: HH, VV, HV and VH. Use of all four of these is designated as quadrapole. It has also been shown that vertical antenna polarizations for both transmission and reception (VV) yield better results than other configurations.[3] Several researchers have shown that VV is best for oil spill detection and discrimination.[3] Some workers noted that VV polarization tends to be more suitable for oil pollution detection when winds are strong and HH when winds are light although this was observational.[3] However, the dependency of HH polarization on the incidence angle is greater than that of VV polarization. This means that if the incidence angle is small, the difference in intensity between HH and VV polarization is small, but if the incidence angle is large, the

VV image on the sea is brighter than the HH image. This suggests that generally the VV image is better for detecting oil spills.

A larger standard deviation for the slick compared to the sea typically indicates that it is oil. Several workers have noted that polarimetric SAR can provide powerful discrimination between slicks and look-alikes.[3] Additionally, phase differences can be used to detect oil. Migliaccio et al. calculated that the co-polarized phase difference (CPD) would yield a larger signal for oil compared to that for the sea.[3] Migliaccio et al. showed that the co-polarized phase difference - e.g. the difference between the HH and VV phases, can be used to discriminate oil slicks from biogenic slicks. Velotto et al. studied the use of co-polarized radar data for oil spill detection.[3] They use the TERRASAR-X dual polarized HH and VV bands and calculated the co-polarized phase difference between these bands. They claimed that this approach is able to better discriminate oil spills from weak-damping look-alikes.

The ability of radar to detect oil is limited by sea state. Sea states that are too low will not produce enough sea clutter in the surrounding sea to contrast to the oil and very high seas will scatter radar sufficiently to block detection inside the wave troughs. Indications are that minimum wind speeds of 1.5 m/s (~3 knots) are required to allow detection and a maximum wind speed of 6 m/s (~12 knots) will again remove the effect.[3] The most accepted limits are 1.5 m/s (~3 knots) to 10 m/s (~20 knots). This limits the environmental window of application of radar for detecting oil slicks. Gade et al. studied the difference between extensive systems from a space-borne mission and a helicopter-borne system.[3] They found that at high winds, it was not possible to discriminate biogenic slicks from oil. At low wind speeds, it was found that images in the L-band showed discrimination. Under these conditions the biogenic material showed greater damping behaviour in the L-band. Okamoto et al. studied the use of ERS-1 using an artificial oil (oleyl alcohol) and found that an image was detected at a wind speed of 11 m/s, but not at 13.7 m/s.[3]

Shipborne radar has similar limitations and the additional handicap of low altitude, which restricts its range to between 8 to 30 km, depending on the height of the antenna. Ship radars can be adjusted to reduce the effect of sea clutter de-enhancement. Shipborne radar successfully detected many slicks and commercial systems are now available. During the *Prestige* spill, a Netherlands vessel successfully used this technique to guide a recovery vessel into slicks.[28] The technique is, however, very limited by sea state and in all cases where it was used, the presence and location of the slick were already known or suspected. Recently researchers have carried out work on improving the imaging of slicks from ship-borne radars.[3] Today there are some commercial products to enhance the images from ship-borne radar to enable some oil imaging.

Gangeskar has proposed an automatic system that could be mounted on oil drilling platforms.[3] This system would use standard X-band ship navigation units and would provide an alert if an oil spill is present. The system includes an extensive post-processing system to provide both a user-friendly Graphic Use Interface (GUI) and an automatic detection and alert system. The system has not been fully tested to date.

Radar has also been used to measure currents and predict oil spill movements by observing frontal movements.[3] Work has shown that frontal currents and other features can be detected by SAR.

In summary, radar optimized for oil spills is useful in oil spill remote sensing, particularly for searches of large areas and for night-time or foul weather work. The technique is highly prone to false targets, however, and is limited to a narrow range of wind speeds. Because of the all-weather and day-night capability, radar is now the most common means of oil spill remote sensing.

False Detections and No Detections

Because radar detection of oil spills is so highly susceptible to false images, much work has taken place on means to differentiate oil slicks and false targets, often called look-alikes. These look-alikes include: low wind areas, areas sheltered by land, rain cells, organic films, grease ice, wind fronts, up-welling zones, oceanic fronts, algae blooms, current shear zones, etc.[3] Extensive effort has been placed upon removing these look-alikes from imagery and automating the process of slick detection.[27-29] This issue is relevant to both satellite and airborne SAR systems.

Anderson et al. noted that false detections and lack of detections on satellite-borne systems can be high.[30] In analyzing 775 SAR images over the Baltic sea with potential oil spills, they classified 94% of as low or medium confidence. On the other hand they noted that of 69 actual oil pollution incidents in the Latvian Baltic, only about 45% were actually detected by SAR. About 40% of the SAR detections were slick look-alikes or were very minor amounts of oil.

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Technology

SHOCKING PINK: AN INEXPENSIVE TEST FOR CHEMICAL WEAPON ATTACKS

Paper sensors change color from blue to pink within 30 seconds of exposure to trace amounts of the toxic gas

March 15 - It seems unlikely that the maker of hundred-million-dollar Hollywood blockbusters such as *Armageddon* and *The Transformers* could inspire scientists to develop an ultralow-cost tool for quickly sensing airborne chemical weapons. Yet one former University of Michigan at Ann Arbor (U.M.) researcher says his idea to use a nerve-gas antidote to create an inexpensive litmus paper–like nerve-gas sensor emerged shortly after watching *The Rock* on DVD a few years ago.

During the climax of that 1996 Michael Bay movie, chemical weapons specialist Stanley Goodspeed (played by Nicholas Cage) injects himself in the heart with atropine to prevent certain death from VX gas. After watching the movie with his wife, Jiseok Lee became intrigued by the possibility of using the nerve-agent antidote pralidoxime (also known as 2-PAM) to detect the presence of organophosphate nerve gases such as VX and sarin.

"I was inspired to use an antidote because an antidote always has a nice affinity to poison," says Lee, now a postdoctoral associate in the Massachusetts Institute of Technology's Department of Chemical Engineering. "That was the start of this research."

Lee and his U.M. colleagues were able to detect the presence of a nerve agent related to sarin gas at a low concentration of 160 parts per billion using a litmus-like paper sensor designed to change color from blue to pink (Lee says although it looks pink, technically, it is red) within 30 seconds of exposure to trace amounts of the toxic gas. The sensor combines a group of atoms from a nerve gas antidote with a molecule that changes color when it is under stress, the researchers reported recently in the online version of *Advanced Functional Materials*. *Scientific American* Read more

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SPILL CLEAN-UP METHOD THAT CAPTURES AND COLLECTS THE CONTAMINATION AT THE POINT OF CONTACT AND PREVENTS IT FROM BEING TRANSFERRED BACK INTO THE ENVIRONMENT.

Conceptualized in Valdez, Alaska BellTech's method consists of taking the current state of the oil and changing the viscosity thus returning it back to a liquid form to be managed effectively. Our approach incorporates adjustable water temperature and pressure for agitation purposes along with a powerful vacuum to extract the water and contaminates directly into a holding tank. Using an assortment of clean and capture tools ranging from a wide surface area to a crevasse, decontamination is contained within the footprint of the attachment preventing cross contamination to ultra-sensitive areas.

The company specializes in ecological management as it relates to the response, recovery and restoration of spill response activities. With over 24 years of experience ranging from the Exxon Valdez to the Deepwater Horizon Incidents, BellTech has cleaned more contaminated vessels than anyone in the world. This proven method has transformed to land based operations addressing tanker trucks, storage tanks, frozen tundra and recovery from a multitude of surfaces. The Bell-Vac System that is used to facilitate the decontamination is unlike any other process used in spill recovery operations today as it is capable of 100% contaminant capture and recovery. More info

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NEW BOAT PLATFORM FOR COLLECTING AND PROCESSING PLASTIC FLOATING WASTE AND LEAKED OIL'

At Interspill 2012 inventor SAMARDŽIJA LJUBOMIR featured innovation in the area of sea environment protection. The name of the innovation is 'Boat Platform for Collecting and Processing Plastic Floating Waste and Leaked Oil'. In its unique entirety the Boat Platform includes multiple operations and procedures of collection of floating waste and oil. It can collect all types of oil (light and heavy). There was a model of the Boat Platform on the stand, with all functions relating to the collection of floating plastic waste and leaked oil.

Technology (continued)

So far there has not been such an efficient and economic method of waste and oil collection from the ocean surface. Nobody has collected plastic waste which has resulted in the formation of five large waste / garbage islands, The Pacific one being the biggest. (three times bigger than the state of Texas). Only by this means of collection it is possible to significantly reduce its surface and amount of these 'islands' over the period of several years. Boat Platform could, therefore, contribute to the solution of one of the biggest ecological problems. An exclusive characteristic of this new product is its ability to collect small waste – particles (balls) of few millimetres and more in diameter.

This type of plastic waste together with small particles – balls is called Plastic Soup. It is extremely dangerous because sea animals swallow it, and as they cannot digest it, they die.

You can visit the site www.algalita.org in order to convince yourself of the gravity of this issue. Read more

Publications

ITOPF LAUNCHES SET OF NEW TECHNICAL INFORMATION PAPERS (TIPS)

March 14 - Some 150 representatives from the maritime industry and government agencies helped ITOPF to celebrate the launch of its set of 17 new Technical Information Papers (TIPs) earlier this week. These publications represent the culmination of several months of work on the part of ITOPF's staff (past and present) and serve to provide realistic and practical guidance to readers on the many aspects of oil and chemical spills.

ITOPF's Managing Director, Dr Karen Purnell, said that "we take pride in the fact that each of these TIPs has been written by our own technical staff and provides advice based on real-life experience from some 700 spills attended worldwide".

The complete set of TIPs comprises the following titles:

1. Aerial observation of marine oil spills
2. Fate of marine oil spills
3. Use of booms in oil pollution response
4. Use of dispersants to treat oil spills
5. Use of skimmers in oil pollution response
6. Recognition of oil on shorelines
7. Clean-up of oil from shorelines
8. Use of sorbent materials in oil spill response
9. Disposal of oil and debris
10. Leadership, command & management of oil spills
11. Effects of oil pollution on fisheries and mariculture
12. Effects of oil pollution on social and economic activities
13. Effects of oil pollution on the marine environment
14. Sampling and monitoring of marine oil spills
15. Preparation and submission of claims from oil pollution
16. Contingency planning for marine oil spills
17. Response to marine chemical incidents

The set can be downloaded from the Publications page of ITOPF's website at http://www.itopf.com/information-services/publications/technical-reports/.