



ISCO NEWSLETTER

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News

MEDITERRANEAN REGION: IEMS EGYPT – A NEW SPILL RESPONSE COMPANY ESTABLISHED IN EGYPT



The IEMS Team

April 21 - This week ISCO welcomes a new Corporate Member – IEMS Egypt. IEMS is short for International Environmental and Marine Services, reflecting the new company's focus on pollution control and other services in the marine sector.

IEMS is already in the process of establishing a new Tier 2 response Centre in Abu Qir on Egypt's Mediterranean Coast. With secured funding of an additional € 2 million Euros, base construction is progressing quickly and the new base is expected to become fully operational next month.

The base provides for an operations control room, fully equipped maintenance workshop, response equipment and materials storage areas, training room and comprehensive staff facilities.

A comprehensive inventory of state-of-the-art response equipment is in process of mobilisation and local personnel are being employed at all levels throughout the company.

The company offers contractually assured rapid mobilisation of Tier 2 support and, in event of a Tier 3 spill, will provide close liaison and support to international teams. For oil industry and other clients requiring Tier 1 response packages, IEMS will supply or lease equipment with maintenance / operations

News (continued)

support provided by manufacturer-certified technicians. Leasing or shorter time rental provides an economic option allowing more flexibility and expert guidance is available to help optimise equipment selection.

The IEMS management team has substantial experience of major incident response operations management, preparation of oil spill contingency plans, organisation of spill response exercises, and provision of classroom and hands-on training for personnel.

The new company has already gained the formal approval of the Egyptian Environmental Affairs Agency (EEAA) the Egyptian General Petroleum Corporation (EGPC) and The Egyptian Natural Gas Holding Company (EGAS) for the provision of oil spill response services in Egypt and has begun contract negotiations with a number of clients.

IEMS is a member of the joint oil company – response forum the Mediterranean Oil Industry Group (MOIG) and the Oil Spill Response Alliance (OSRA), a co-operative grouping of companies in the Mediterranean Region through which IEMS can mobilise additional regional oil spill combat resources. More information about OSRA will be published in a forthcoming issue of the ISCO Newsletter. [IEMS Website](#)

UK: TOTAL – ELGIN PLATFORM GAS LEAK UPDATE

Plans to stop leak progressing

April 20 - The two technical solutions to stop the gas leak on well G4 of the Elgin platform are progressing according to plan. As announced, drilling of the G4 relief well (G4-K1) commenced while in parallel experts continued with key tasks in preparation for the well control operation to stop the leak on the Elgin platform.

The Sedco 714 drilling rig spudded the relief well on April 18 to be used as a back-up option to the G4 well control operation. The Sedco 714 well site is located approximately 2 kilometres east of the Elgin complex in water depths of around 90 meters. The drilling began following the granting of all necessary approvals by the UK authorities.

Another drilling rig, the Rowan Gorilla V, is suspending operations on the nearby West Franklin field and will be available to be deployed by early-May.

In parallel, plans are being finalized for the positioning of the pumping vessel required for the well intervention alongside the Elgin complex. The West Phoenix is currently on standby just outside the two nautical mile Elgin exclusion zone. Total has also mobilised the intervention vessel Skandi Aker, currently in the Scottish port of Peterhead, which will also be used to support the well intervention operation. *Subsea World News* [Read more](#)

Total says gas leak cut to a third after relief work

April 20 - The amount of gas leaking from Total's North Sea Elgin platform has shrunk to one third of the volume it started spewing in late March, after the company started drilling a relief well to control the escaping gas, Total said on Friday.

"The latest scientific flights, modeling and platform visits this week confirm a decrease in the gas leak rate, to around one third of the initial estimate of 200,000 cubic meters per day made in the first days of the Elgin gas leak," the French oil and gas major said in a statement. *Reuters* [Read more](#)

USA AND UK: NEWS UPDATES ON FRACKING

UK government report gives green light to fracking

April 17 - A [report](#) published today by the UK [Department of Energy and Climate Change](#) (DECC) says that hydraulic fracturing, or fracking, should continue in the country, despite the minor earthquakes it may cause. The report gives recommendations for mitigating the risks of such earthquakes and invites the public to share their comments.

The report arrives at similar conclusions to one [published](#) last November by the UK energy company Cuadrilla, but provides stricter recommendations for future fracking procedures.

Both investigations were prompted by earthquakes in April and May 2011, of magnitude 2.3 and 1.5, respectively, near one of Cuadrilla's shale fracking wells in Lancashire, UK. Fracking taps natural-gas reserves by pumping several million litres of fluid beneath the Earth's surface, fracturing the rock and creating channels for trapped gas to flow into the well. *Nature News* [Read more](#)

USA: Obama sets up unconventional gas working group

April 13 - The White House is setting up a new interagency working group to promote the safe development of domestic natural gas, President Obama announced today.

The group will be chaired by the director of the Domestic Policy Council and will focus on development of so-called unconventional

News (continued)

gas, which typically employs a controversial production technique known as hydraulic fracturing.

The working group, which will comprise more than a dozen agencies, including the departments of the Interior and Energy and U.S. EPA, is designed to "facilitate coordinated administration policy efforts to support safe and responsible unconventional domestic natural gas development," according to an [executive order](#) signed today by the president. *eeNews.net* [Read more](#)

Can science be bought? Opponents in fracking debate discredit each other's research

April 13 - A core issue of the contentious gas-drilling debate is centered on a single question: Can science be bought?

In several cases, those on both sides of the argument over hydraulic fracturing have moved quickly to downplay or discredit scientific studies based on the source of their funding. *The Ithaca Journal* [Read more](#)

CANADA: CUTS AT ENVIRONMENT CANADA MEAN FEWER LEFT TO CLEAN UP OIL-SPILL MESS

April 14 - The unit at Environment Canada that responds to oil-spill emergencies will be dramatically scaled back and most of its regional offices will be closed to meet the cost-cutting demands of the federal government.

"My entire program, which is about 60 people nationwide, got notices" saying their jobs could be eliminated, one of the employees who works for the Environmental Emergencies Program said Friday. "Everybody in the program is going to be vying for positions because the organization is being cut in half."

The cuts are part of sweeping reductions to the federal workforce that are being made to help the Conservative government tackle a multibillion-dollar deficit.

They come as the government is promoting a plan to transport bitumen from the Alberta oil sands to Asia by tanker – a process that critics say is fraught with the potential for spills. *The Globe and Mail* [Read more](#)

CHINA LAUNCHES OIL SPILL RESPONSE VESSELS

April 14 - China has put the country's first oil spill response vessels (OSRV) into use, a move to strengthen emergency response capabilities in case of oil spill accidents.

The vessel named "Haite 191" was put into operation Thursday off southern China's Guangxi Zhuang autonomous region, said Li Guokai, chief of the region's Maritime Safety Administration (MSA).

The vessel is equipped with the world's most advanced oil spill recovery technology, and oil spill recovery rates could reach 200 cubic meters per hour, according to Li.

A comprehensive oil spillage surveillance, tracking and detection radar system was installed on the vessel, and lifting equipment was also available so as to install fencing equipment to contain the spilled oil at sea, said Li.

At a cost of 65 million yuan (\$10.3 million U), the kiloton vessel has a cruising range of 800 sea miles with a maximum speed of 15 knots.

The vessel, 60 meters long and 12 meters wide, also will serve as a daily cruising vessel, Li said.

The ship is among the first of three specialized OSRVs which was approved for construction by China's MSA in 2010. Another, named "Haite 071" was put into use on Monday off Qingdao, eastern Shandong province, and "Haite 111," will go into operation within one month in the sea off Zhejiang province. *China Daily* [Read more](#)

USA: BP AND PRIVATE PLAINTIFFS SETTLE IN GULF OIL SPILL CASE

April 18 - BP has reached final agreements with more than 100,000 private plaintiffs to resolve claims for economic, medical and property damages resulting from their infamous 2010 oil spill in the Gulf of Mexico.

The oil giant believes the cost of the settlement is to remain \$7.8 billion, which will be dispersed from a \$20 billion trust fund that was previously set aside.

BP executives state that this settlement lays the framework for the company to continually aid in the economic and environmental restoration of the Gulf Coast. Those affected by the disaster will receive full and just compensation, without having to wait on a long trial process.

News (continued)

According to settlement papers, about 109,000 condominium owners, hotel and resort operators, restaurateurs, shrimpers and others may be eligible to recover on economic and property claims. About 16,000 plaintiffs may recover for medical claims, reports Reuters. Lawyers for the plaintiffs may be awarded as much as \$600 million to cover fees and costs. This will be paid out separate from any amounts paid to spill victims, settlement papers show.

The settlements require approval by U.S. District Judge Carl Barbier in New Orleans. A hearing to consider primary approval is set for early November. The settlement put a trial over the spill on hold. Barbier has not set a new trial date. The case is In re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010, U.S. District Court, Eastern District of Louisiana, No. 10-md-02179. *The Maritime Executive* [Read more](#)

USA: MARINE SCIENTISTS URGE GOVERNMENT TO REASSESS OIL SPILL RESPONSE

April 20 - On the second anniversary of the Deepwater Horizon blowout, a national panel of researchers including University of Georgia marine scientist Samantha Joye is urging the federal government to reassess how it would respond to similar oil spills that might occur in the future.

The 22 researchers, whose paper was published April 20 in the peer-reviewed journal *Bioscience*, noted that the 2010 Deepwater Horizon oil spill was unlike any other oil spill encountered previously. Although the well blowout occurred at unprecedented depths and released enormous quantities of oil (an estimated 4.9 million barrels or 206 million gallons), the response to cleanup and contain the oil followed a framework that assumed the oil's behavior would mimic previous shallow-water and surface spills.

In addition to creating a new model for understanding how deep water oil spills occur, the authors argue for an increase in immediately accessible research funding following [oil spills](#) so that society can be better prepared to respond to future spills, should they occur. They also noted that the requirement of the federal Natural Resource Damage Assessment Process that requires cooperative decision-making between the government and the responsible party and mutual approvals of research studies slows down the process and limits the scope of studies that are conducted. *Phys Org* [Read more](#)

CARIBBEAN LACKS RESOURCES TO COMBAT OIL SPILLS, WARNS JAMAICA

April 16 - The Caribbean region including Jamaica and other Small Island Developing States lacks the resources to combat a major oil spill, delegates to a regional convention on oil spill prevention and response have been warned.

Opening the convention to discuss oil spill prevention, preparedness and response in the Gulf of Mexico, keynote speaker Christopher Cargill, Chairman of the Petroleum Corporation of Jamaica, said Jamaica and other islands in the region do not have access to vast amounts of resources to combat major oil spills of the magnitude of the BP Deepwater Horizon incident – which occurred two years ago this month in the Gulf of Mexico.

The objective of last week's convention, held in Kingston, Jamaica from April 11-13th, was to further regional preparedness and cooperation to oversee the offshore oil exploration and exploitation industry and to improve oil spill response preparedness and capabilities. *The Maritime Executive* [Read more](#)

RUSSIA: TNK-BP SLAMMED OVER OIL SPILLS IN RUSSIA'S MAJOR OIL FIELD

April 18 - TNK-BP has been grilled by the Russian Minister of Natural Resources Yuri Trutnev over negligent drilling safety after allegedly allowing more than 700 oil spills this year.

After visiting one of the oldest oil fields Samotlor in Nizhnevartovsk district, which is developed by a TNK-BP subsidiary, Trutnev slammed TNK-BP management over its high breakdown rate and described the drilling methods as 'inadmissible'.

The majority of spills happen because of the worn out equipment, he stressed.

"The main reason [of breakdown rate] is that the company doesn't invest enough money to replace old pipelines in order to fight old spills and prevent new ones," Trutnev said. *"They should simply invest more money in modernization of the exploration system"*.

Samotlor is one of the oldest oil fields in Russia: it was discovered in 1965, and development started in 1967. The proven reserves are approximately 44 billion barrels. About 2200 hectares of the Samotlor region has been contaminated because of oil exploration since Soviet times.

Meanwhile TNK-BP claims it has already invested \$270 million in an oil pipeline modernization program begun in 2004. The company also says it has spent \$2.1 billion on ecological work including \$285 million on a clean up of the Samotlor oil field. *rt.com* [Read more](#)

SOUTH AFRICA: REPORTING OF OIL SPILLS AND SHIPPING CASUALTIES THREATENING POLLUTION

Marine Notice No. 10 of 2012 - The notice incorporates MARPOL reporting requirements and updated contact information for oil spill reporting. [More information](#)

NIGERIA: LEAD POISONING FROM GOLD MINING

April 13 - For the past two years a medical disaster of historic proportions has been unfolding in remote villages in northern Nigeria. The soaring world price of gold sent villagers prospecting for flakes of the rare metal, but what the local miners also found was rock laced with lead. So far thousands of villagers have been exposed to massive levels of lead and 400 children have died from the neurotoxin, in what is believed to be the worst lead poisoning epidemic in modern history.

It's a result of artisanal gold mining, which is small-scale mining. And in northern Nigeria, there's a geologic anomaly where the gold is actually running with lead. So there's lead and gold together, which is not something that we normally see. And when people take the rock ore out of the ground, they crush it and they grind it and then a dust is made from that and that dust is contaminated with lead. *Living on Earth* [Read more](#)

USA: NEW PROPOSED KEYSTONE XL PIPELINE ROUTE UNVEILED

April 19 - Officials unveiled a new preferred route Thursday for the Nebraska portion of the stalled Keystone XL oil pipeline that avoids the state's groundwater-rich Sandhills region.

The proposed route would veer east around the the Sandhills before looping back to the original route. Developer TransCanada has said the reroute adds about 100 miles to the original 1,700-mile project that would carry oil from Canada to the Gulf Coast.

The company submitted the proposal after Gov. [Dave Heineman](#) allowed state officials to proceed with an environmental review. The review stalled in January when the Obama administration rejected a federal permit for the pipeline. Administration officials said they didn't have time to review the project before a congressional deadline and cited uncertainty about the Nebraska route. *Seattle pi* [Read more](#)

USA: INTERNATIONAL BIRD RESCUE CELEBRATES 40 YEARS

April 19 - Founded in 1971 by a retired Berkeley nurse who watched with horror as thousands of birds died after an 800,000-gallon oil spill in San Francisco Bay, the organization has become the first-responder to oil spill disasters around the globe.

It's a 40-year history that the group will celebrate Friday in Berkeley during an evening fundraiser and birthday party at the David Brower Center.

Now based in Long Beach, Bird Rescue has a staff of 12, a yearly budget of about \$1.3 million and two rehabilitation centers in California where birds harmed by oil spills, large and small, are treated and prepared for release back into the wild.

But, most importantly, the organization has an army of professional volunteers who can drop everything and respond when news of an oil spill arrives. *Oakland Tribune* [Read more](#)

USA: DERAILMENT LEADS TO UNEXPECTED BENEFITS FOR LANDOWNER

April 8 - An interesting story from Indiana, USA. Sometimes there some unexpected benefits that can arise from spill clean-up actions.

In this case the landowner ended up getting a new access road and troublesome overhead power lines were buried underground

The accident took place in Ligonier, Goshen, Indiana when a derailment, involving 22 cars on March 27, caused a hazardous chemical spill and a toxic fire that burned for nearly two days and led to a series of evacuations for residents north of the tracks.

Guyas, a retiree who lives in a house with his wife on the east side of C.R 1100 West, just south of the Norfolk Southern tracks, watched as his property was literally overrun by emergency personnel and officials from Norfolk Southern and related train repair companies. Norfolk Southern constructed a temporary road off Guyas' drive way to the staging area. Representatives of the company, in the midst of the emergency, assured Guyas that they would restore his property to original conditions when work was complete, but Guyas said Thursday he likes the new gravel road and is content to leave it. *Mena FM* [Read more](#)

USA: 56 YEARS AFTER GRUESOME CHEMICAL CATASTROPHE, SCIENCE PREVENTED SECOND TEXAS CITY DISASTER

With acknowledgement to NOAA Office of Response and Restoration. In addition to authors Vicki Loe and CJ Beegle-Krause, [Charlie Henry](#), [Doug Helton](#), and Amy Merten contributed to this article. Originally published on 16 April 2012.

On a cool April morning in 1947, the S.S. *Grandcamp* sat docked in Texas City, waiting as it was loaded with sacks of ammonium nitrate fertilizer. A few years earlier, this humble cargo ship had been part of the U.S. Navy's Pacific Fleet. After World War II, the U.S. government gave it to France as a gift to help rebuild a shattered Europe, where it was renamed the *Grandcamp* and converted into a slightly less grand cargo ship, which now found itself waiting fatefully in a Texas port.

The *Grandcamp's* freight that day, ammonium nitrate fertilizer, is usually a relatively safe cargo, but it can quickly become unstable and explosive under certain conditions, which is also why it is used as an industrial and military explosive. Arriving by train in Texas City, this cargo may have become too warm to ship safely, but at the time, few chemical safety regulations existed, and the fertilizer was packed onto the *Grandcamp* along with its previous shipments of twine, peanuts, tobacco, and 16 cases of small arms ammunition.

Around 8:00 a.m. on April 16, after about 2,300 tons of fertilizer were loaded, workers noticed smoke and vapors coming from the ship. No one knew what caused the fire in the hold. The captain ordered the hatches battened and tarpaulins thrown over them, calling for steam to be piped into the ship—a firefighting technique he hoped would put out the fire but preserve the cargo. However, this would only make things worse.



This barge, originally located near the explosion, was lifted out of the water and landed 100 feet inland. The firetruck at left (behind the man) was thrown there by the second explosion. Photo taken April 18, 1947. (Courtesy of Special Collections, University of Houston Libraries. UH Digital Library)

Shortly after 9:00 a.m., the ship exploded with tremendous force. The resulting explosion launched the cargo 2,000 to 3,000 feet into the sky, caused a 15-foot tidal wave, and was felt as far as 250 miles away.

A nearby ship, the S.S. *High Flyer*, also loaded with ammonium nitrate, ignited and about 16 hours later, also exploded.

The combined explosions resulted in the largest industrial disaster of its time in the U.S., taking the lives of an estimated 500–600 people. Thousands more were injured.

On a warm November evening in 2003, Barge NMS 1477 sat docked in Texas City, just across from the same dock where the *Grandcamp* had been waiting fatefully 56 years earlier. Loaded with 197,000 gallons of concentrated sulfuric acid (>97%), the barge capsized during the final stages of loading on November 3. With the barge now floating upside down at the dock, acid began slowly leaking from the vents as seawater rushed in, dangerously diluting the acid.

Charlie Henry, then NOAA's Scientific Support Coordinator for the region, quickly reported to the scene to support the United States Coast Guard Captain of the Port. While the situation appeared stable, the threat of a possible disaster was slowly growing. Inside the bowels of the barge, an aggressive chemical reaction was taking place.

Highly concentrated acid is actually stable when shipping, but partially diluted concentrated sulfuric acid is highly corrosive. As the acid began mixing with small amounts of seawater, it began eating away at the barge's steel structure, releasing heat and explosive hydrogen gas.



Special article from NOAA (continued)

The gravity of this situation was not lost on Charlie and others involved in the response. This was quickly becoming a very dangerous situation for the responders and the local public.

With the gruesome 1947 catastrophe on their minds, the local NOAA responders along with a Louisiana State University chemist providing scientific support arrived at the site of the partially sunken barge on November 5, and the Seattle-based NOAA response team also went into high gear. The response team included the U.S. Coast Guard, the Texas Commission of Environmental Quality, Texas Parks and Wildlife, the U.S. Environmental Protection Agency, and NOAA, as well as representatives from the barge's operator, Martin Product Sales LLC, all working together to minimize the impact of this incident.

The barge had now tilted on its side and rested on the bottom at the dock. This was the same spot that the unfortunate S.S. *High Flyer* was docked in 1947. Everyone's immediate concern was the potential for an explosion from the hydrogen gas now built up in the barge. The gas had expanded the barge's side-plates and vigorously bubbled from vents located underwater near where the side of the barge rested on the bottom.

Since 1947, this area in Texas City had been extensively developed to support the chemical and oil industries, meaning that an explosion on the barge could lead to even more damage and disaster than before.

Because the threat of explosion was so great, the responders made the unusual but necessary decision to do a controlled spill of the vessel's remaining sulfuric acid into the adjacent harbor waters. To dilute such large volumes of acid to a concentration considered below an environmental hazard, it would have to be mixed with huge volumes of water. The buffering salts in seawater would also help mitigate the acid. The operation was complete by November 13, nine days after the accident.

The decision to intentionally spill the cargo wasn't easy, but later environmental sampling showed that the acid was highly buffered and diluted when it entered the adjacent open bay. Furthermore, tidal flow and the movement of ships in the area appeared to help reduce the environmental impacts as well. Monitoring continued as the "footprint" of the plume of the discharged acid dissipated throughout the waters.

Fortunately, a smart use of science helped avoid another explosion in Texas City. The scarred propeller from the S.S. *High Flyer* sits at the entrance to the Port at Texas City as a reminder of a less fortunate emergency response which now happened 65 years ago. *The original article contains more photos as well as source references and profiles of the authors.* [Read original article](#)

Cormack's Column



In this issue of the ISCO Newsletter we are printing No. 73 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 73: KNOWLEDGE OF MECHANICAL RECOVERY

Having reviewed the nature and magnitude of the loading forces on moored and towed booms in articles 70-72, I now consider how these forces affect the performance of booms thus restrained, in respect of the influence of their differing design elements on the pollutant escape velocity by entrainment in the under-flowing water and by other identifiable loss mechanisms.

Clearly, if booms are to be successful at all, the design elements of freeboard and draught must be adequate to prevent pollutant overtopping on waves and escaping beneath at flow rates less than the fundamental escape limit, the actual escape velocity having been shown by HRS to vary depending on whether the mooring points were designed to be at the waterline or the foot of the draught (article 72). Thus, we see that mooring attachment at the water line reduces freeboard and draught by allowing the boom to tilt with the under-flowing current; that mooring attachment at the foot of the skirt reduces such tilting though reverse tilting can occur to the point of freeboard submergence; that such attachment cannot remove reverse tilting nor can it remove wind induced tilting; and that the combined tensions of terminal and intermediate mooring reduce the constancy of freeboard and draught by reducing the wave-following capacity of booms in the presence of waves even for booms designed to be inherently wave-following. To some extent these adverse tendencies can be reduced by reducing the mooring tensions by reducing areas of freeboard and draught exposed wind and water, though the Blomberg separate tension line and bridle design (article 72) permits the inherent wave-following flexibility of the freeboard/draught curtain to be fully realised with minimal floatation and ballast volume and with the top and bottom bridles maintaining a vertical and concave presentation of boom-face to pollutant.

In any case, conventional booms with attached flotation and ballast pads at intervals have to have flotation volumes sufficient to counter the ballast weight and the vertical component of the mooring tensions, while the resulting lack of a smooth boom-face produces vortices which enhance the rate of pollutant escape through underflow entrainment. However, when the freeboard is a continuous buoyancy chamber filled with plastic particles for wave-following flexibility such vortex formation is eliminated. Again, the figure-of-eight boom, consisting of a continuous air flotation chamber and a continuous water ballast chamber, eliminates pad-induced vortices while its bulk when not in use is very low and conducive to reel-storage. The Vikoma boom, designed on this

Cormack's Column (continued)

principle as a free-floating element of a seagoing pollutant recovery system, even eliminated the need to moor other than terminally to sea anchors which greatly reduced internal tension of benefit to its inherent wave-following characteristics.

Of course booms are in effect towed from the waterline and may thus have their draught component tilted backwards except when they are designed on the separate tension line and bridle principle. However, an additional advantage of this design is that unrestrained floating objects have a cyclic motion in waves; that pollutant close to the bridled barrier and the barrier itself are both free to pursue this motion; and that the relative movement between floating pollutant and barrier is thus reduced to the benefit of pollutant retention. On the other hand, the free-floating boom was designed with the intension of reducing the relative movement of pollutant and barrier virtually to zero. Thus, the boom deployed in a U-shape was intended to collect oil moving into it at 3% of the wind speed and to thicken therein because boom movement was constrained by a sea anchor at each end. However, WSL showed the concept to be invalid because the pollutant moves not only on the wind but as the vector sum of the wind and tide vectors, while the boom is almost wholly tide driven because of the sea anchors, while any cross wind on the boom itself causes it to swing round the sea anchors to close the U by bringing its arms together as long and short contiguous lengths.

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.

Special series

OIL SPILL REMOTE SENSING : CHAPTER 14



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 14th 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.

Miscellaneous Topics

Oil under ice detection

The difficulties in detecting oil in or under ice are numerous. Ice is a heterogeneous material and incorporates air, sediment, salt, and water, many of which may present false oil-in-ice signals to the detection mechanisms. In addition, snow on top of the ice or even incorporated into the ice adds complications. During freeze-up and thaw in the spring, there may not be distinct layers of water and ice. There are many different types of ice and different ice crystalline orientations. This is a separate field and readers may consult the literature.³

Under-water detection and tracking

Many different techniques have been tried for under-water oil detection. First, the division should be made between oil in the water column or floating on a pycnocline, and oil on the bottom. Quite different physics and conditions can apply to these different situations.

Several parties have tried to use standard sonars to detect submerged oil on the bottom. Oil on the bottom can appear as a softer surface than ordinary bottom sediment.³ The problem arises in that vegetation on the bottom also appears similar and thus many false positives arise. In the water column, sonar can be useful as it can locate intermediate oil on pycnoclines, however there is no unique signature and there are often weeds and other debris on pycnoclines. Wendelboe et al. report on tests using a 200 and 400 kHz (dual-frequency) multi-beam system.⁴³ The contributing signal is the lower acoustic reflectivity of the oil than typical bottom geological formation or the better reflection than weed beds. Wendelboe et al. used the back scatter signals from several tests to develop algorithms for oil detection. This was tested in a tank with a 90% success rate and a 23% false detection rate.⁴³ Hansen reviewed various systems noting that the narrow-scan sonar systems showed promise.⁴⁴ Medialdea et al. studied the use of commercially-available multi-beam sonars to characterize bottom material.³ They were able to characterize bottom sediments and suggested that oil on the bottom might be characterized by such a technique. These workers did not actually scan areas where there was known oil.

Oil on the bottom has successfully been mapped by under-water cameras, often mounted on sleds.⁴⁵ The problems with this technique are the bottom visibility - often insufficient to discriminate, and the difficulty in towing the camera vehicle as slow as 1 knot, the necessary speed. Pfeifer et al. were successful in employing mosaics of photographs to determine the aerial extent of oil on the sea floor.⁴⁶

A low-technology approach had been historically employed. Heavy oil, having a density as would cause it to sink, often adheres to

Special series (continued)

Oil snares or pom-poms, which are polypropylene strips mounted as cheerleaders pom-pom. These can be mounted on a beam and towed over the bottom and then raised periodically to see if oil has adhered.³ Alternatively they can be mounted on an anchor with a marker buoy. These are then raised periodically to check if the subsurface oil has contacted them.

The use of laser fluorosensors for underwater oil has been suggested.³

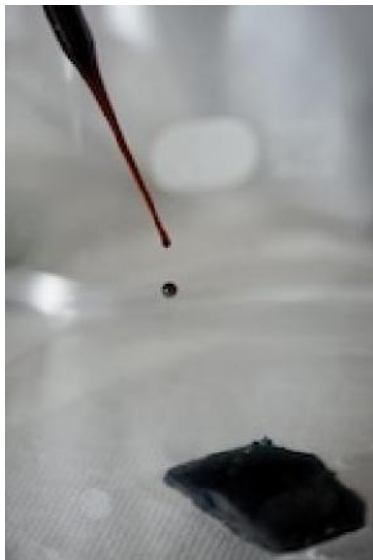
Camilli et al. have successfully applied mass spectrometry to the detection of sunken heavy oil (Fuel Oil #6).⁴⁷ Using the small and enclosed mass spectrometer, TETHYS, the low molecular weight hydrocarbons coming from sunken oil masses are monitored. The mass spectrometer is mounted in a submersible which is driven over the sea floor. The exact position of the submersible is monitored closely using an acoustic positioning system on the surface. Signals then can be correlated closely to the position on the seafloor. Three ion peaks of m/z 43, 41, 27, are monitored to establish hydrocarbon presence. Tests show that the ion peaks provide sensitivity as low as 0.4 ppb. This is fully sufficient to monitor sunken oil. Tests were conducted in a test tank and later over actual spills in the Gulf of Mexico. The technique was able to find concentrations of sunken oil and place the locations within 1 metre. The tests in the Gulf of Mexico were conducted at depths of 200 metres and confirmed by using cameras on the submersible.

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Science and technology

SPONGING UP OIL SPILLS: NANOSPONGES SOAK UP OIL AGAIN AND AGAIN



The superhydrophobic carbon nanotube sponge shows a remarkable ability to soak up oil from water. Researchers found that adding boron to the growth process creates covalent bonds in the nanotubes, making dense networks with robust qualities. (Credit: Jeff Fitlow/Rice University)

Researchers at Rice University and Penn State University have discovered that adding a dash of boron to carbon while creating nanotubes turns them into solid, spongy, reusable blocks that have an astounding ability to absorb oil spilled in water.

That's one of a range of potential innovations for the material created in a single step. The team found for the first time that boron puts kinks and elbows into the nanotubes as they grow and promotes the formation of covalent bonds, which give the sponges their robust qualities. The researchers, who collaborated with peers in labs around the nation and in Spain, Belgium and Japan, revealed their discovery in *Nature's* online open-access journal *Scientific Reports*. Lead author Daniel Hashim, a graduate student in the Rice lab of materials scientist Pulickel Ajayan, said the blocks are both superhydrophobic (they hate water, so they float really well) and oleophilic (they love oil). The nanosponges, which are more than 99 percent air, also conduct electricity and can easily be manipulated with magnets.

To demonstrate, Hashim dropped the sponge into a dish of water with used motor oil floating on top. The sponge soaked it up. He then put a match to the material, burned off the oil and returned the sponge to the water to absorb more. The robust sponge can be used repeatedly

and stands up to abuse; he said a sample remained elastic after about 10,000 compressions in the lab. The sponge can also store the oil for later retrieval, he said.

"These samples can be made pretty large and can be easily scaled up," said Hashim, holding a half-inch square block of billions of nanotubes. "They're super-low density, so the available volume is large. That's why the uptake of oil can be so high." He said the sponges described in the paper can absorb more than a hundred times their weight in oil.

Ajayan, Rice's Benjamin M. and Mary Greenwood Anderson Professor in Mechanical Engineering and Materials Science and of chemistry, said multiwalled carbon nanotubes grown on a substrate via chemical vapor deposition usually stand up straight without any real connections to their neighbors. But the boron-introduced defects induced the nanotubes to bond at the atomic level, which

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tangled them into a complex network. Nanotube sponges with oil-absorbing potential have been made before, but this is the first time the covalent junctions between nanotubes in such solids have been convincingly demonstrated, he said.

"The interactions happen as they grow, and the material comes out of the furnace as a solid," Ajayan said. "People have made nanotube solids via post-growth processing but without proper covalent connections. The advantage here is that the material is directly created during growth and comes out as a cross-linked porous network." *Science Daily* [Read the whole article](#)

TECHNOLOGY DEVELOPED FOR ALGAE HARVESTING HAS SHOWN PROMISE IN RECLAIMING HYDRAULIC FRACTURING FLOWBACK WATER

Petroleum extracted from West Texas frac flowback water using OriginOil's lab-scale system on 3 April 2012 (Photo: Business Wire)

[OriginOil, Inc.](#) the developer of breakthrough technology to convert algae into renewable [crude oil](#), announced today that a breakthrough chemical-free process developed for algae harvesting may also help clean up the water produced in oil [well water](#) flooding and [hydraulic fracturing](#).

Using a lab prototype of the technology, OriginOil researchers have been able to clarify samples of flowback water from a Texas oil well carrying heavy concentrations of [dissolved organics](#), known as frac flowback. In this [photo](#), the heavy concentration of petroleum in the oil [well water](#) samples was easily separated from water and floated to the surface for removal.

The [petroleum industry](#) uses large quantities of water to help fracture or "frac" rock formations deep underground to release more [oil and gas](#). According to the energy industry resource [Platts](#), the global [hydraulic fracturing](#) market grew 63 percent from \$19 billion in 2010 to \$31 billion in 2011, and is projected to rise a further 19 percent in 2012.

"Our research team has learned that extracting petroleum and contaminants from water is very much like extracting algae," said [Riggs Eckelberry](#), OriginOil CEO. "They are both very hard to remove without using chemicals and heavy machinery. Our innovative chemical-free, high flow and low-energy process holds promise for the billions of gallons of water used daily in the [oil and gas](#) industry worldwide." *Environmental Expert* [Read more](#)



ACOUSTICS COULD GUIDE DISPERSANT USE DURING SUBSEA OIL SPILLS



Researchers Paul Panetta and Carl Friedrichs of the Virginia Institute of Marine Science (VIMS) compared the performance of acoustic and optical instruments using this oil slick in the Ohmsett wave tank. Credit: Photo by Paul Panetta.

Two years ago this week, oil began streaming from the seafloor into the Gulf of Mexico following the explosion of the Deepwater Horizon platform. All told, the disaster cost 11 lives, released 4.9 million barrels of crude oil, and caused still unspecified impacts to marine life and the Gulf economy.

Now, a pair of researchers at the Virginia Institute of Marine Science is using a 1-year, \$350,000 contract from the U.S. Department of the Interior to test whether sound waves can be used to determine the size of oil droplets in the subsea—knowledge that could help guide the use of chemical dispersants during the cleanup of future spills. The effort is also supported by the VIMS-Industry Partnership.

Chemical dispersants have conventionally been applied to surface oil slicks to produce smaller droplets that can more easily be mixed downward by ocean turbulence. Dispersal through a larger water volume lessens the immediate threat

to the shoreline and to organisms such as seabirds, marine mammals, and turtles. Dispersion also increases the surface area available for bacterial decay.

During their Ohmsett tests, Panetta and Friedrichs compared the performance of optical and acoustic instruments borrowed from their labs at VIMS, transmitting, receiving, and interpreting sound waves and light as they reflected against an aqueous slurry of 20 parts of oil to 1 part dispersant.

In a second experiment at VIMS, the pair performed a similar experiment but on a much smaller—and simpler—scale. This time they compared the performance of their optical and acoustical instruments in a small bucket, adding dispersants to the same crude

Science and technology (continued)

oil used at Ohmsett and creating turbulence with a drill-powered paint mixer.

They recently conducted a third test in Norway, in a tank operated by SINTEF, the largest independent research organization in Scandinavia. This "tower tank"—specifically created for studying subsurface releases of oil—measures 21 feet tall by 9 feet wide and allows room for various instruments including video cameras, a LISST, and, in this case, the acoustic equipment supplied by the VIMS team.

In all three cases, the team's preliminary results qualitatively confirm the potential superiority of an acoustic approach to monitoring oil dispersion. "Our tests showed that acoustic techniques were effective at penetrating the plume," says Panetta, "whereas the LISST would have been ineffective. Our initial measurements indicate the acoustic measurements can track the droplet size for a subsurface release of oil."

The next step, says Panetta, is to "take these data and turn them into a measurement method that would tell us exactly what the droplet size is. That would be valuable to the people spraying the dispersants, and valuable to the people modeling the fate of the oil, because during the cleanup of an oil spill, the size of the oil droplets affects everything."

Panetta and Friedrichs say their ultimate goal is to partner with the private sector so that commercial sonar manufacturers can adapt the new technology to their existing instruments for use by the oil and gas industry. "That's the longer term technology plan," says Panetta, "but we obviously have to first figure out the science behind it to make it work. We have to solve the physics problem—to figure out which signals to analyze and how to interpret them so we can get a quantitative measure of the oil-droplet size." *R&D* [Read more](#)

Publications

LAUNCH OF CASUALTY MANAGEMENT GUIDELINES BY THE NAUTICAL INSTITUTE AND THE INTERNATIONAL SALVAGE UNION

The Nautical Institute and the International Salvage Union (ISU) has launched Casualty Management Guidelines aimed at providing practical guidelines to help seafarers during a casualty, when demands can be confusing, contradictory, unclear or a combination of all three.

In the book Masters and crew members are told what to expect from people or organisations that might be involved as the casualty unfolds. Chapters are presented, describing how Masters should expect to deal with different people, from owners to government officials, insurance representatives and salvage experts. It will give all involved an idea of the job each may be undertaking, together with priorities and responsibilities. The Chapters have been authored by experts in these fields, who have casualty experience to share.

In a Foreword to the book, Koji Sekimizu, Secretary General of the International Maritime Organization, said Casualty Management Guidelines "should become recommended reading for all those who may find themselves in a position of responsibility during a maritime casualty – preferably well in advance of the event." *Ship Management International* [Read more](#)

ISCO member John Noble is the technical editor of the publication. Chapter headings and contributors are – Introduction: *John Noble*; The Shipmaster in a casualty: *Capt. Paul Voisin MNI*; The Shipowner or manager: *Capt. Peter Cooney*; The Harbour Master: *Capt. Mark Andrews*; The Salvage Industry: *Kees van Essen and Eric Johnson*; Command and Control: *Toby Stone AMSA* *MERCOP*, *Hugh Shaw UK SOSREP*; *Capt. James W. Calhoun USCG (retd) Manager, Regulatory Affairs, T&T Bisso., Stephen Clinch*; Insurance issues: *Steve Roberts, Paul Bo Lange and the Joint Hull Committee*; The lawyers perspective: *Charles Low and Richard Gunn*; *The special casualty representative or casualty consultant's point of view: David Pockett and Nick Haslam*; The role of the classification societies: *Rossen Panev, Jan Solum and Mark Irvine*; The media: *James Herbert*; The role of ITOPF in casualty response: *Dr Karen Purnell*.

ARTICLE IN BIOSCIENCE: RESEARCHERS CALL FOR A NEW DIRECTION IN OIL SPILL RESEARCH

Understanding oil movement at depth, microbial action, and deep sea ecology will be essential for responding to future spills

Inadequate knowledge about the effects of deepwater oil well blowouts such as the Deepwater Horizon event of 2010 threatens scientists' ability to help manage and assess comparable events in future, according to an article that a multi-author group of specialists will publish in the May issue of *BioScience*. Even federal "rapid response" grants awarded to study the Deepwater Horizon event were far more focused on near-surface effects than on the deepwater processes that the BioScience authors judge to be most in need of more research.

The article, by a team led by Charles H. Peterson of the University of North Carolina, argues that a fundamentally new approach to the study of deepwater oil spills is needed. Previous research has focused mainly on effects on organisms found near the sea surface and on coasts. The new approach would also stress how oil and associated gas released at depth move through the sea and affect subsurface and bottom-dwelling organisms. The new approach is all the more important because the oil industry is now putting most of its exploration efforts into deep water.

Publications

Peterson and his colleagues point out that existing policies and legislation have notably failed to provide for research initiated promptly after a spill has been detected. This has prevented studies that might have guided emergency response procedures two years ago, in particular studies of the effects of chemical dispersants. These were used extensively while the Deepwater Horizon spill was in progress, although there is little consensus on their effectiveness.

There remain "serious gaps" in background information needed for longer-term assessments of comparable spills, according to Peterson and his coauthors. Much more information is needed about deep-sea ecology and the processes by which oil released at depth is degraded by microbes, for example. The gaps impede not only litigation and improvement of government policy, but also attempts to restore damaged ecosystems. *Eureka Alert* [Read more](#)

“THE GOOD OIL” IS A NEW E-NEWSLETTER DESIGNED TO KEEP PEOPLE IN TOUCH WITH WHAT’S HAPPENING IN THE OIL SPILL RESPONSE AREA OF MARITIME NEW ZEALAND (MNZ).

The first issue contains an excellent account of the Rena incident plus other interesting reports and news from New Zealand. [Download and read the first issue of “The Good Oil”](#)

Events

CLEAN PACIFIC 2012 - GET THE TOOLS YOU NEED TO HELP PREVENT, PREPARE AND RESPOND TO AN OIL SPILL OR MARITIME INCIDENT

Staying up-to-date on regulations, best practices and new technologies is extremely important to anyone who prepares, prevents or responds to an oil spill. Attend the CLEAN PACIFIC Conference & Exhibition, May 16-17, 2012, in Long Beach, California, and stay abreast of these important issues and address new updates you need to know in order to stay successful in your role in the oil spill response industry.

CLEAN PACIFIC addresses the topics most important to emergency responders!

- Is it Yours, Mine or Ours? Addressing Transboundary Issues During Response
- View the digital version of the conference program
- Non-Mechanical Response Techniques
- Advancing Technologies
- Maritime Risk Assessments
- ICS for the 21st Century
- Advances in On Water and Subsurface Recovery
- Submerged Wrecks, Derelict & Abandoned Vessels
- And much more!

Included in your registration: Networking with industry leaders and technical experts at the opening night reception

20+ conference sessions covering planning/preparedness, response/operations, emerging issues and prevention

Tradeshow floor featuring 80+ suppliers of new products/solutions for the oil spill response industry

Register today and get the training you need to help you prepare, prevent & respond to a spill or maritime incident!

For more information please contact Gail Sommer at 713-343-1901

Editor : Once again, we’ve run out of space – We do aim to limit the size of the Newsletter to 8 – 10 pages ! Some items will be carried forward for the next issue.

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