ISCO NEWSLETTER

The Newsletter of the International Spill Response Community

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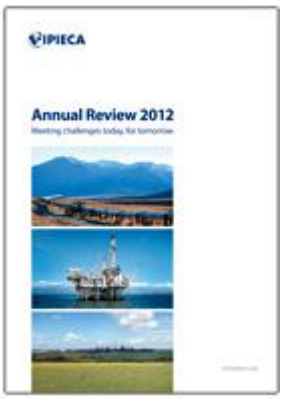
International news

IPIECA RELEASES 2012 ANNUAL REVIEW



IPIECA has just issued its review of 2012, 'Meeting challenges today, for tomorrow'.

The *2012 Annual Review* provides details of the achievements and progress made by the association over the past year in helping to improve the industry's environmental and social performance, and introduces the new strategy for IPIECA's work over the next four years.

IPIECA Chair, Rick Mire (ExxonMobil) said 'I am honoured to present this *Review*, outlining the great breadth and depth of IPIECA's activities during 2012. IPIECA underwent an intensive and thorough strategy review in 2012 resulting in a new strategic direction which will put the association in a better position to provide leadership to for the oil and gas industry and support improvements in environmental and social performance'.

Highlighted in the *Review* is:

- The oil and gas industry's input into the United Nations Conference on Sustainable Development (Rio+20), for which a set of messages and

International news (continued)

- fact sheets were developed demonstrating the industry's commitment to sustainable development, outlining progress to date and describing how further goals can be achieved in the future.

- Expansion of the 'Global Initiative' partnership with the International Maritime Organisation (IMO), which has been building global capability for oil spill preparedness and response since 1996.

- Progress in the second year of the IPIECA Business and Human Rights Project, which provides members with a forum for sharing good practice on human rights due diligence and grievance mechanisms.

IPIECA's position as the global industry reference for good practice in environmental and social issues is thanks to the hard work of its members, the Secretariat and key stakeholders. This collaborative effort contributed to IPIECA's successes throughout 2012 and is outlined in further detail throughout the *Review*. **Download PDF (English, 7.26 MB)**

APRIL 2013 IOPC FUNDS' MEETINGS

The governing bodies of the IOPC Funds held meetings from Monday 22 April to Wednesday 24 April 2013 at the headquarters of the International Maritime Organization (IMO) in London. Sixty-one States, representing 54 Member States of the 1992 Fund, 45 former 1971 Fund Member States and five observer States, as well as 13 observer organisations attended sessions of the 1992 Fund Executive Committee and the 1971 Fund Administrative Council. The sixth and seventh intersessional Working Groups also held their 5th and 2nd meetings respectively. Key issues considered at the meetings included –

Incidents involving the 1992 Fund - Erika (France, December 1999); Prestige (Spain, November 2002); Volgoneft 139 (Russian Federation, November 2007); Hebei Spirit (Republic of Korea, December 2007); JS Amazing (Warri River, Delta State, June 2009); Redfferm (Tin Can Island, Lagos, March 2009); Alfa I (Greece, March 2012).

Incidents involving the 1971 Fund - *Plate Princess* (Bolivarian Republic of Venezuela, May 1997);

Treaty matters - Winding up of the 1971 Fund

Download a brief summary of the key decisions and other meeting reports

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UN CHEMICALS SUMMIT EXPECTED TO ADOPT NEW CONTROLS

April 27 - At the start of a major conference to regulate chemical and hazardous waste safety, top officials voiced optimism Saturday that delegates will approve new international controls on several industrial compounds and agree to clamp down on some cross-border pollution.

The three key international treaties that govern chemicals and hazardous waste, each headquartered in Geneva, are holding an unprecedented joint two-week convention of more than 1,500 delegates from 170 nations that is meant to consider new limits on some substances and look at ways the treaties can be better put to use together.

The conference will culminate in a high-level meeting among about 80 ministers on May 9-10. *NECN.com* Read more

Incident reports

SOUTH KOREA: THREE INJURED IN SAMSUNG GAS LEAK, SECOND TIME THIS YEAR AT HWASEONG PLANT

May 2 - South Korean news agencies are reporting that electronics giant Samsung experienced a toxic gas leak at a manufacturing facility in Hwaseong. Yet another dent in Samsung's increasingly blighted safety record, the resulting gaseous hydrofluoric acid leak injured at least three employees. The severity of those injuries is unknown.

Of its many industrial uses, hydrofluoric acid is used to etch chip wafers and glass. It's also commonly utilized in the removal of oxidization (rust) and other contaminants from materials like steel. *Techspot* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

USA: OFFICIALS RESPOND TO LEAKING OIL PLATFORM OFF TEXAS

May 2 - Federal, state and local agencies and responders were working Wednesday to mitigate possible impact from an oil platform that has a small leak of water coming from a large tank that also contains crude oil and is located about 5 miles off Matagorda Island, Texas.

Tuesday, the Sabco Operating Company notified the Coast Guard of the leak on the bottom of a holding tank on Matagorda Island 629L fixed oil platform. The Coast Guard, partnering with local, state, and federal agencies, stood up an incident management team, to closely monitor the actions being taken by Sabco Operating Company and to ensure any environmental impact is minimized.

The tank consists of more than 300,000 gallons of medium crude oil product sitting on more than 150,000 gallons of water that acts as a buffer to prevent the release of product in the event a leak. Water is currently being pumped into the tank faster than the estimated three-gallon-per-minute release rate from the partially plugged half-inch size hole. *The Maritime Executive* Read more

CANADA: COAST GUARD PINPOINTING OIL SPILL NEAR FOGO ISLAND

Since the end of March, the Canadian Coast Guard has been inspecting land and sea areas around Fogo Island, in an effort to pinpoint the source of the fuel. (Google Maps)

April 27 - The Canadian Coast Guard is taking recent reports of oil spillage near Fogo Island seriously.

There have been hundreds of reports about oiled sea birds since the end of March. Since then, the coast guard has been inspecting the land and sea from the air and on the ground, in an effort to pinpoint the source of the fuel.

Spokesperson Bob Grant said so far, investigators have been able to narrow down the area and the extent of the spill. *CBC News* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

USA: EXXON OFFICIALS RESPOND TO MAYFLOWER OIL SPILL QUESTIONS

April 27 - Officials from ExxonMobil declined to take part in a forum held Wednesday morning at the Log Cabin Democrat, but they did agree to answer several questions regarding the Mayflower oil spill that occurred in late March in Mayflower. The question and answer discussion was done entirely through emails. *Log Cabin Democrat* Read more

Study finds 'soup of toxic chemicals' in the air near Arkansas ExxonMobil spill site

April 30 - While many questions remain following ExxonMobil's March 29 tar sands oil spill in Mayflower, Arkansas, a new independent study has revealed the existence of high levels of cancer-causing chemicals in the area.

The new research, co-published by the Faulkner County Citizens Advisory Group and Global Community Monitor, indicates that the 500,000 gallons of heavy bitumen oil released by a gash in ExxonMobil's aging Pegasus pipeline has released hazardous air pollutants (HAPs) as defined by the 1990 US Clean Air Act.

According to a press release in conjunction with the new study, the total of 30 toxic chemicals include benzene, toluene, ethylbenzene, n-hexane and xylenes. Consequences of exposure to these chemicals include damage to the human nervous system, muscular weakness and blurred vision, while breathing ethylbenzene and benzene in particular can cause cancer and reproductive issues. *RT Live* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

Incident reports (continued)

UK: NEARLY 3,000 BIRDS DIE FROM CHEMICAL SPILL IN ENGLISH CHANNEL

May 3 - Nearly 3,000 birds have been killed or injured by a chemical spill in the English Channel, conservationists said on Friday. The RSPB, RSPCA and local wildlife charities described it as one of the worst UK marine pollution incidents in decades and said it was more devastating than the MSC Napoli disaster six years ago.

About 20 species have washed up covered in a sticky substance on beaches across the south coast of England since February.

The RSPB said the death toll has exceeded the number affected by the MSC Napoli beaching off Devon in 2007. The birds have been affected by the chemical polyisobutene (PIB), a lubricant used to improve engine performance. It can be legally discharged when ships wash out their tanks. Wildlife charities want international action to stop the chemical, which does not break up easily, being discharged into the sea. *The Guardian* Read more

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USA: EXXON'S PEGASUS OIL PIPE SPILLS CRUDE INTO MISSOURI YARD

May 1 - Exxon Mobil Corp's near 70-year-old Pegasus oil pipeline leaked a small amount of crude into a residential yard in Ripley County, Missouri on Tuesday, a month after the same pipe spewed thousands of barrels of crude in Arkansas. *Reuters* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

BELGIUM: TRAIN CRASH: TOXIC CHEMICALS ON FIRE NEAR BELGIUM'S GHENT

Six of the train's 13 cars derailed and three caught fire, setting off a series of explosions

May 4 - Two people died and 14 were injured when a train carrying toxic, flammable chemicals derailed and caused a major fire near the Belgian city of Ghent.

The train was travelling from the Netherlands to Ghent's seaport when it derailed as it changed tracks between the towns of Schellebelle and Wetteren at about 02.00 (00.00 GMT).

Six of the train's 13 cars derailed and three caught fire, setting off a series of explosions.

The commander of the Ghent fire brigade, Christian van de Voorde, said the best way to limit the spread of toxic chemicals had been to let the fire burn out. *BBC News* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

Other news

NORWAY OPENS OIL-SPILL RESPONSE CENTER

May 1 - Norway opened a base of operations to serve as a staging point for equipment used to respond to an offshore oil spill, Energy Minister Ola Borten Moe said.

International consortium Oil Spill Response Ltd. will administer the well-capping system from a base near Stavanger. The Norwegian base is the first of four planned globally.

"It is reassuring to see the industry taking responsibility for improving its emergency preparedness through the development of this well-capping system," Moe said in a statement.

The well-capping system was developed through the Subsea Well Response Project, a project funded by major energy companies like Norway's Statoil, BP and U.S. supermajor ConocoPhillips. *UPI.com* Read more

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USA: BP AGREES TO MORE OIL SPILL RESTORATION PROJECTS IN GULF; TOTAL REACHES $665M

May 3 - BP says the amount of money it will spend on early restoration projects to repair damage to the environment caused by the 2010 Gulf of Mexico oil spill has now reached $665 million, more than half of the up to $1 billion it committed two years ago to spend.

The British oil giant said Friday it and federal and state officials have reached agreement on 28 additional proposed projects in the Gulf that are expected to cost roughly $594 million. Earlier this week, the total for new projects had reached $340 million. Ten projects were agreed to previously, accounting for the rest of the money to be spent.

The new projects will be located across Texas, Louisiana, Mississippi, Alabama and Florida. Some will involve restoration of dune and seagrass habitats, as well as barrier islands that protect coastal areas from waves and tides. *Fuel Fix* Read more

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INDIA: JAYANTHI WARNS FIRMS OF ACTION FOR OIL LEAKS

April 28 - The government will come down heavily on oil companies violating rules, Union minister for environment and forests Jayanthi Natarajan said on Saturday. Reviewing safety measures adopted by the various companies in the wake of the leak in an Indian Oil Corporation pipeline at Royapuram on Tuesday, she said, "the ministry is prepared to take strict action, including closure of defaulting units."

Frequent leaks from decades-old underground oil pipelines in thickly populated north Chennai have been a concern for long and there have been seven such incidents since August last year. *The Times of India* Read more

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NORWAY: LEAK AT BP PLATFORM COULD HAVE CAUSED "MAJOR ACCIDENT"

April 29 - Last September some 1,600 kilogram's of gas and 125 barrels of oil leaked from the production platform at the Ula field in the Norwegian section of the North Sea, a quantity considered significant by the Petroleum Safety Authority Norway.

"The incident had the potential to become a major accident, with the risk that a number of lives might have been lost and substantial material damage caused," the agency said on Monday.

The watchdog was concerned by the incident as BP had already been told to improve the way it handles maintenance at ageing platforms following a fire at the Valhall field in the North Sea in 2011. The leak at Ula was caused by the fracturing of the bolts holding together a valve in a separator outlet. Production was shut for 67 days. No one was injured. *Reuters* Read more
[Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

UK, NORTHERN IRELAND: TOXIC WASTE DUMPED 10 TIMES IN SAME ROAD IN SOUTH ARMAGH

30 April - Toxic waste from fuel laundering has been dumped along the same road in south Armagh ten times, Stormont's environment minister has revealed.

The environment minister said the situation regarding the use of illegal fuel was "acute" and an escalation in the authorities' response to the problem was required.

Mr Attwood told MLAs: "I have a map, for example, in my department where we have identified those parts of the north, in particular in south Armagh, where there has been multiple occasions where fuel sludge has been abandoned in essentially the same place, for that then to be collected by the relevant authorities. *BBC News* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

CHINA TIGHTENS ROAD RULES FOR HAZARDOUS MATERIALS

A revised Dangerous Cargo Trucking Code will take effect in China on July 1. The new Code spells out detailed requirements in a number of areas, including parking, personnel, truck maintenance and third-party safety assessment

According to China Transport Newspaper, the revised Dangerous Cargo Trucking Code will "ensure that dangerous cargo will be safer on the road". In addition to outlining detailed specifications for trucks allowed to transport dangerous cargo, the revised Code stipulates that parking for trucks carrying dangerous goods should be located in areas that pose no immediate threat to local residents and public safety. Trucks carrying extremely toxic material or explosives must display warning signs while parked. Parking spaces can be leased but only for a maximum period of three years, with individual parking slots clearly specified in the lease contract.

Other news (continued)

The revised Code requires each trucking company to set up a safety management system. This involves creating a proper corporate structure with specially trained staff at different levels of the organisation with clearly defined responsibilities. *HCB* Read more [Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

USA: BILLS WOULD REMOVE OPA '90 LIABILITY CAP

April 30 - Following the third anniversary of 2010's Deepwater Horizon explosion and oil spill, Sen. Robert Menendez (D-NJ) and Rep. Rush Holt (D-NJ) introduced the Big Oil Bailout Prevention Legislation Package on April 25. The two bills are aimed at holding big oil companies accountable for oil spills and improving the federal government's ability to help areas affected by an oil disaster.

"The best way to prevent oil spills is to make sure oil companies pay for all of the damages oil spills cause. This legislation delivers a simple message: If you make a mess, you clean it up. If you hurt small businesses or communities, you fix them. If you hurt someone, you make it right," Menendez, a member of the Senate Banking and Finance Committee said in a release. "This bill removes the $75 million cap on big oil companies' liabilities; helping to make sure those companies do the right thing by the American people when accidents happen." *Work Boat* Read more [Thanks to Marc K. Shaye, Hon.FISCO, Member of the ISCO Executive Committee]

USA: CLEAN GULF TAKES DELIVERY OF SPILL RESPONSE BOATS

March 28 - Clean Gulf Associates recently took delivery of two more 95' Rapid Response Vessels — the Breton Island and Galveston Island — completing an order for three new oil spill response vessels. The new OSRVs were designed and purchased since early last year by Clean Gulf, a non-profit oil spill cleanup consortium. The boats will be homeported along the coast to dramatically improve response times and capabilities.

The first boat, the H.I. Rich, was dedicated in July and is based out of Leeville, La. The new vessels will be stationed in Venice, La., and Galveston, Texas. These vessels represent a $10.5-million investment in new Clean Gulf response resources designated for the Gulf of Mexico. Each vessel is manned by a crew of six specially trained response team members. *Work Boat* Read more

CANADA: GATEWAY SPILL RISKS HIGH: REPORT

The risk of a marine tanker oil spill related to the Enbridge Northern Gateway Project is far worse than estimated by the company, according to a Simon Fraser University report.

The report released Thursday by Dr. Thomas Gunton, SFU's Resource and Environmental Planning Program director, claims it found "28 major deficiencies" in Enbridge's oil spill risk assessment. The analysis was used to supply data to the federal Joint Review Panel assessing Gateway's environmental impact.

"There is a number of deficiencies which they should have addressed and still need to be addressed because the panel … needs the best science and the best information available," Gunton said.

The report said the "probability" of a marine tanker spill during a 50-year period was between 95.5% and 99.9%, while Enbridge has claimed the risk was just 18.2%.

Gunton said Enbridge's methodology is flawed, relying on data that "under-reports" incidents by between 38% and 96%, and spreads the risk numbers out across 250 years, thus lowering the percentage of probability. Instead, Enbridge should be using the Oil Spill Risk Analysis model used by the U.S. government, Gunton said. *24 Hours Vancouver* Read more

ISCO News

AZERBAIJAN: 20TH INTERNATIONAL CASPIAN OIL & GAS EXHIBITION

ISCO Corporate Member, Briggs Environmental Services (BESL), who own and operate a major oil spill response base at Baku, will have a stand in the exhibition area. Captain Bill Boyle, MNI, Hon.FISCO, General Manager of BESL and Member of the Executive Committee will be present. Also attending the event will be Namig Gandilov, Emergency Response Advisor to BP and Member of ISCO Council representing Azerbaijan. Visitors who would like to know more about ISCO or find out how to become a member should make a point of looking out for Bill or Namig. More info

Cormack's Column

In this issue of the ISCO Newsletter we are printing No. 125 in a series of articles contributed by Dr Douglas Cormack.

Dr Douglas Cormack is an Honorary Fellow 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 125: KNOWLEDGE AND COUNTER-BELIEF

Articles 121-124 contrasted knowledge with the counter-beliefs which over-emphasise the impact of releases and emissions on the environment. This article now recalls the extent to which such beliefs prevent restoration of the environment to its pre-incident state as quickly and as cost-effectively as possible and the extent to which they squander on unreal problems resources better spent on real ones.

Thus, we know that WSL was evaluating dispersants for removal of ship-source operational discharges from shorelines pre-1967, while their toxicity was being rendered acceptable at operationally necessary concentrations in seawater by banning needlessly toxic ingredients; and that meanwhile dispersants were being banned wherever belief ran counter to their known non-toxicity at their effective operational concentrations.

Again, we know that in concurrently investigating means of reducing operational oil discharges from ships, WSL found (articles 16-30) that in the four ships investigated the bilge water, beneath its gravity-separated floating layer of waste oil/emulsion, had a droplet content which averaged 21ppm of oil throughout its discharge, though it averaged 56ppm at the onset of discharge until the pipes were cleared of adhering oil/emulsion from contact with the floating layer at termination of the previous discharge; but that counter-belief now bans the decanting of water similarly separated from recovered oil/emulsions in the storage tanks of recovery units, despite its oil content being in the ppm range to which the whole slick is itself dispersing naturally while localised recovery proceeds.

Yet again, despite the ease with which beliefs in species-extinction/ecological-disaster could be reality-evaluated by establishing the effect of the numbers killed by physical coating on population dynamics and by evaluating toxicity against actual exposure-concentrations, we know that reality-evaluation of the belief in anthropogenic global is more difficult. Nonetheless, this task could be broken down to reality-evaluation of specific hypotheses towards quantifying the rates at which the biological and geological carbon cycles respond to changes in the rates of carbon dioxide abstraction and release within one or the other, the rate at which the abstraction of carbon dioxide by either or both responds to release from fossil fuel combustion, and the rate at which global average temperatures would be predicted to rise/fall with net increase/decrease in measured atmospheric carbon dioxide concentrations. In such ways the anthropogenic sensitivity of global warming/cooling mechanisms could be elucidated

However, pending availability of such rate quantifications, believers ought to accept that global temperatures as measured on the Earth's surface are failing to relate to industrialisation's increases in fossil fuel combustion as predicted by their so-called mathematical model; that this failure renders the model unlikely to produce reliable temperature predictions into an otherwise unpredictable future; that, in any case, science takes a lack of model prediction as indicative of incomplete knowledge of the phenomena being modelled while pseudoscience is content to ignore such lack or to cite other possibly unrelated belief-based correlations to obscure it; that science treats correlations as fortuitous or spurious until cause-effect is established and never predicts anything until the cause-effect relationship is quantified, while pseudoscience mistakes correlation for cause-effect and can predict nothing. Indeed, believers give the game away in speaking of belief and disbelief, of conviction and scepticism and of acceptance and denial in thus denoting the absence of science in particular and of knowledge in general.

Thus, we know that current knowledge can produce a cost-effective response plan for marine incidents simply by ignoring counter-beliefs; and that such a plan can restore the environment to its pre-incident condition quickly and cost-effectively without incurring species-extinction/ecological-disaster, because no such extinction/disaster has yet occurred despite belief-based prohibitions of knowledge-based response having been more than enough to cause such extinction/disaster, had oils/HNS releases been inherently capable of causing them.

Again, despite knowing the planet to have experienced many periods of warming and cooling before and after hominid inception, we know that the belief/disbelief debate on AGW can be resolved only by reality-evaluation of specific hypotheses; that meanwhile it could be bypassed by cost-effective increases in engine and hull efficiencies which would decrease carbon dioxide emissions with decreased fuel consumption, whether AGW is believed or disbelieved, while belief itself cannot justify emission-taxation. Meanwhile, it remains unlikely that global temperature can be increased by combusting part of a fossilisation but for which all of it would already be recycling through atmosphere and biomass.

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 feature - Inland spills

RESPONSE TO INLAND OIL SPILLS – PART 19

A short series of articles contributed by Mark Francis of Oil Spill Solutions.

Mark Francis has been involved with the oil industry since 1975. He attended his first oil spill in 1976, the Tanker Elaine V incident. He became head of response for inland spills within the UK for British Petroleum E & P in 1980 for 10 years responding to well, storage tank and pipeline spills throughout the UK. Over the next 20 years he continued to build his international operations experience and has also specialised in spill response training, delivering IMO and other courses in more than 20 countries. Mark's website is at http://www.oilspillsolutions.org

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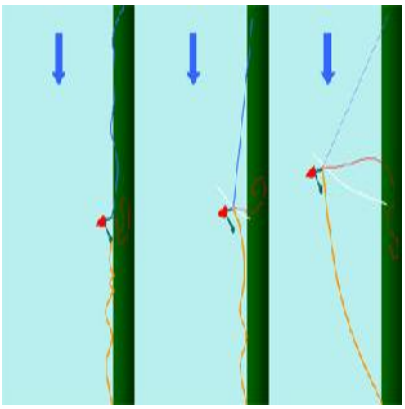
Rivers (continued)

The Boom Vane© is simply a series of vertical vanes which drive into the current. The boom is attached to a towing bridle which is towed behind. The main tethering rope is anchored on the river bank upstream of the recovery point, when the Boom Vane is launched it drives into the current on an arch as in the diagram. The faster the current the tighter the angle of the boom.

There is a serious safety issue with this equipment, dependent on whether it is fitted with a spring on the rudder or not. If the spring is fitted then a sharp tug on the thin red line will stop it in mid-stream and start to return to the original bank. It can be stopped and started again which is useful if boat need to pass during operations. If the spring is not fitted it cannot be stopped until it reaches its stopping point. If someone gets the rope around his foot he is going with it until it stops and there will be no slack in the rope to escape until that point.



The system can be operated in rivers with heavy traffic as the Boom Vane control rudder allows for speedy and effortless retrieval from midstream.

Standard version:
The BoomVane is 1.1m high and was constructed as a cascade of vertical wings mounted in a rectangular frame. Powered by the current flow, the BoomVane, held by a single mooring line only, swings out towards the opposite shore with the oil boom in tow.

Shallow version:
This version is .55m high and was designed for operations in shallow waters (less than 1 m / 3'). It may also be deployed off a towing vessel to reach near the shoreline with booms and absorbents, where it is too shallow for the vessel to go.

To make things difficult for people using this equipment for the first time, the colour code is wrong, this has been reported to the manufacturer but nothing has changed. It can be put together to work from both banks of a river or from both sides of a vessel.

The colours are red and green which are maritime colours for port and starboard unfortunately they are the wrong way around. It would be easy to deploy it from the port side using the red indicators but for it to work they need to be green. It's not difficult to get the paint out and change it, but some people do and others don't which just leads to even more confusion.

Having said this it is a very good piece of equipment, they come in various sizes 0.5m and 1m for rivers. The bigger the size the faster the current needs to be for it to work correctly. There is also an open sea version where the vessel provides the current speed. This should dramatically reduce the damage to offshore booms as only one vessel is needed.

I have used the boom vane in sheltered bays and close to the shore with good results. .Video of boom vane click here.

Special feature - Inland spills (continued

These boom deflectors act like the boom vane but are smaller and fit in between the boom sections, each one drives into the current removing the need for anchors. This is particularly useful in shallow rivers.

These types of inventions reduce the manpower requirements and response times but mainly the need for anchor points and the amount of rope required for the deployment. *Photos courtesy of Seacor*

To be continued

Special feature – In situ burning

IN SITU BURNING: CHAPTER 17

A short series of articles on In Situ Burning 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.

Summary of the Serial

This is the 17th of a series of articles on in-situ burning of oil spills. This series will cover in-situ burning step-by-step and will present the latest in knowledge on the topic.

17. Oil Properties and Conditions

Oil spilled on water undergoes several changes with time. The processes that cause these changes include emulsification, evaporation, and spreading. In order to determine the effectiveness of in-situ burning for a particular oil slick, it is important to understand how these processes change the properties of spilled oil and ultimately affect the oil's ability to ignite and sustain burning.

Slick thickness

Over the years, a wide variety of oils has been burned in tests and at actual spills. Research has shown that virtually all oils will burn on water if the slick is thick enough. In general, slicks should be 0.5 to 3 mm thick or thicker in order to be ignited and to sustain quantitative burning and a burn will be extinguished once the slick becomes less than approximately 0.5 to 1 mm thick.[1] This thickness is required for heat transfer to take place. It should be noted that this thickness is not as binding a rule as once thought. As the slick becomes very thin, the heat generated by burning is lost to the water below the slick, resulting in insufficient available heat to vaporize the constituents of the oil required to sustain combustion.[1] An oil spill containment boom or other containment method is often used to increase a slick's thickness or to maintain it at the thickness where efficient burning takes place. In some circumstances, e.g., on dry sand or grass, oil can sometimes be ignited at lower thicknesses.

Oil weathering/volatile content

As a rule, the greater the percentage of volatile compounds in an oil, the more easily it will ignite and continue to burn. It can therefore be difficult to ignite weathered oils and heavy crude oils (No. 5 and above) and higher ignition temperatures, primers and/or longer ignition exposure times may be required.[1] During one burn test, it was found that weathered oils actually burned with an average 7% greater efficiency than fresh oils.[1]

Heavy oils

Heavy oils were thought to burn poorly if at all, however results in recent years shows that these will burn quite well under most circumstances.[41] Studies in the past decade have shown much more potential for burning these oils than was previously thought.[41] Burning tests of bitumen, a very heavy oil, along with water have been conducted and shown useful removal potentials. The burning of heavy oils has been studied by Environment Canada over a period of 5 years.[1, 41] Figure 18 shows the ignition of a heavy oil.

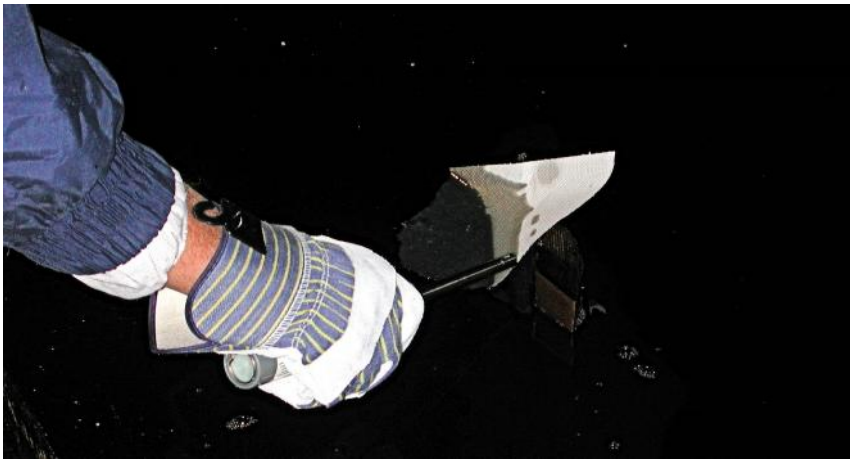


Figure 18 *The ignition of a heavy oil. This is easily carried out by adding a small amount of primer such as diesel fuel (about 20 mL), and adding a small wick such as cardboard or paper towel*

Heavy oils such as Bunker C burn quite well but yield a highly-viscous residue. This high-viscosity residue has a high asphaltene and resin content. There is no evidence of the presence of soluble components, thus the residue should exhibit low aquatic toxicity. Examination of the SARA content shows that the values of SARA for the residue can be used to predict burn efficiency. There appears to be a consistent reduction of saturate and aromatic content in an oil with increasing burn efficiency. This is based on values from 10 burn experiments and 4 oil types.

The prediction equation is: Burn Efficiency (%) = -23000 +230*Aromatic % + 227*Saturate (1) +254*Resin% +218*Asphaltene%

It is interesting to note that Orimulsion (a mixture of bitumen with about 30% water) burning efficiency averages about 40 to 60% (excluding the water content of 30%), bunker C burning averages about 65% and burning bitumen averages about 12 %. Orimulsion has certain peculiar burning characteristics such as popping when the water is explosively released.[1,41] It is suggested that burning of Orimulsion actually takes place as a two-step process: first vaporization and water release and secondly, the actual combustion. Extremely weathered oils such as the bunker test oil would not burn and analysis of this showed that its calculated burn efficiency as per the equation above was calculated to be about zero. The burn rate for Orimulsion was found to be between 0.5 and 2 mm/min.[41] It was found that the burn rates for heavy oils varied from 1 to 2 mm/min.[41]

Emissions from these heavy oil burns showed very low emissions compared to crude oils and in particular there were few volatiles and few PAHs measured in the air. The residues from all the burns were highly viscous. When cooled, all residues were solid and even 'glassy' in some cases. Analysis of the residues showed some concentration of higher-molecular weight pyrogenic PAHs.

Oil emulsification

In general, unstable oil emulsions can be ignited and will sustain burning because the emulsion is quickly broken down during the burning process.[1] By contrast, stable oil emulsions are difficult to ignite because a large amount of energy is required to heat the water and therefore, additional energy is required to vaporize the oil in the emulsion before the burning is sustained. Test burns have shown that once an emulsified oil is ignited and has burned long enough, the heat from the burn sometimes breaks down the emulsion and allows the slick to continue to burn.[1] This certainly was the case during the Deepwater Horizon spill during which the burns dealt with extensive amounts of emulsified oil.

Strictly speaking, all unstable emulsions can be broken down either by mechanical means or will break down on their own over time. Based on the commonly accepted definition of stable emulsions - an emulsion that persists for at least five days at 15°C - studies have shown that stable and unstable emulsions have different characteristics.[44] The two most obvious characteristics relate to color and viscosity. Stable emulsions are reddish brown whereas unstable emulsions are black. The viscosity of stable emulsions is usually more than three orders of magnitude greater than the oil from which the emulsion was made, whereas the viscosity of an unstable emulsion is less than one order of magnitude greater than the original oil. There is also a middle form or mesostable emulsion which usually is brownish in colour and has a viscosity of about 50 times that of the starting oil. The literature has shown that the stability of an emulsion depends on the concentration of asphaltenes and, to a lesser extent, resins in the oil.[44] These compounds form a viscoelastic film at the oil water interface. As well, oil will not create a stable emulsion with a very low (<30%) or very high (>90%) water content. In general, the water content of stable emulsions ranges from 60 to 75%, although there is no correlation between water content and stability of an emulsion.[44]

References

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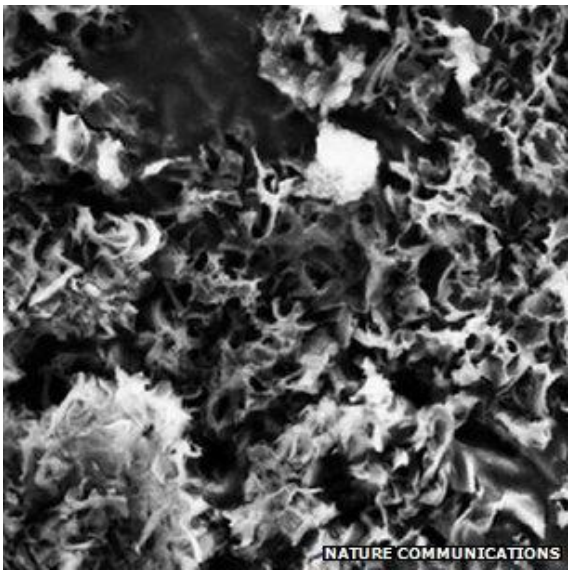
41 *Fingas, M.F., Z. Wang, B. Fieldhouse, C.E. Brown, C. Yang, M. Landriault and D. Cooper, In-situ Burning of Heavy Oils and Orimulsion: Analysis of Soot and Residue, AMOP,333, 2005*

44 *Fingas, M. and B. Fieldhouse, Studies on Crude Oil and Petroleum Product Emulsions: Water Resolution and Rheology, Colloids and Surfaces A: Physicochemical and Engineering Aspects, Vol. 333, 67, 2009*

To be continued

Science and technology

'WHITE GRAPHENE' SOAKS UP POLLUTANTS AND CAN BE RE-USED



Boron nitride outperforms its carbon-based cousin graphene when it comes to soaking up pollutants

May 1 - A next-generation material first earmarked for use in electronics has proven itself a capable clean-up agent for polluted waters.

Boron nitride, or "white graphene", is similar to its namesake: sheets of atoms laid out like a chain-link fence.

A report in Nature Communications shows the material can preferentially soak up organic pollutants such as industrial chemicals or engine oil. However, it is easier to clean and re-use than other such "nanomaterials".

The family of these materials includes much-touted, carbon-based members such as graphene and nanotubes, and are notable in part for their surface area-to-weight ratio. That allows them to take up an incredible amount for their size, making them attractive for the clean-up of pollutants.

The new work suggests that a preparation of boron nitride could outperform many nanomaterials and more traditional approaches.

A team from the Institute for Frontier Materials at Deakin University in Australia and the Pierre and Marie Curie University in France started by making porous boron nitride "nanosheets" - wavy, single-atom layers of the material with holes in them.

These porous sheets, which together form a coarse white powder, vastly outperformed sheets that did not have the pores, and commercially available chunks of boron nitride that is not made up of the tiny sheets.

The porous version exhibited high "selective absorption and adsorption" - preferentially picking up organic pollutants and dyes out of water.

Scanning electron micrograph of boron nitride samples Boron nitride outperforms its carbon-based cousin graphene when it comes to soaking up pollutants

The powder soaked up as much as 33 times its own weight in the chemical ethylene glycol and 29 times its own weight of engine oil. Even still, the saturated powder floats on water.

The pollutants could then be driven out of the nooks and crannies of the material by heating it in a commercial furnace, or by simply igniting it - a trick that other, more established materials could only survive a few times before becoming completely clogged up.

"All these features make these porous nanosheets suitable for a wide range of applications in water purification and treatment," the authors wrote. *BBC News* Read more

Publications

FOR YOUR INTEREST – LINKS FOR RECENT ISSUES OF PERIODICALS

ASME EED EHS Newsletter	News and commentary on HSE issues from George Holliday	Most recent issue
Bow Wave	Sam Ignarski's Ezine on Marine & Transport Matters	Current issue
Cedre Newsletter	News from Cedre in Brittany, France	March 2013 issue
The Essential Hazmat News	Alliance of Hazardous Materials Professionals	March 4 issue
USA EPA Tech Direct	Remediation of contaminated soil and groundwater	May 1 issue
Intertanko Weekly News	International news for the oil tanker community	No 18, 2013
CROIERG Enews	Canberra & Regions Oil Industry Emergency Response Group	May 2013 issue
Soil & Groundwater Product Alert	From Environmental Expert	April 29 issue
Soil & Groundwater Ezine	Articles, papers and reports	May 2013 issue
Soil & Groundwater Newsletter	From Environmental Expert	May 3 issue
Soil & Groundwater Events	Upcoming events compiled by Environmental Expert	April 2013 issue
Technology Innovation News Survey	From US EPA - Contaminated site decontamination	Feb16-28 issue
IMO Publshing News	New and forthcoming IMO publications	April 2013 issue
Pollution Online Newsletter	News for prevention & control professionals	May 1 issue
EMSA Newsletter	News from the European Maritime Safety Agency	April 2013 issue
JOIFF "The Catalyst"	Int'l Organisation for Industrial Hazard Management	April 2013 issue
Int'l Environmental Technology	Environmental Monitoring, Testing and Analysis	April 2013 issue

Events

AZERBAIJAN: 20TH INTERNATIONAL CASPIAN OIL & GAS EXHIBITION

The **20th International Caspian Oil & Gas Exhibition Incorporating Refining and Petrochemicals** will take place on **4 - 7 June 2013** at the Baku Expo Centre in Baku, Azerbaijan.

The adjoining **Caspian Oil & Gas Conference** will be held on **5 - 6 June 2013** at the Jumeirah Bilgah Beach Hotel.

Celebrating its 20th anniversary, Caspian Oil & Gas continues to be the largest and best-attended oil and gas event in the Azerbaijan and the Caspian region. The event is held annually under the patronage of the President of the Azerbaijan Republic, HE Ilham Aliyev and is officially supported by the Ministry of Industry and Energy of Azerbaijan **and** SOCAR**.**

ISCO Corporate Member, Briggs Environmental Services (BESL), who own and operate a major oil spill response base at Baku, will have a stand in the exhibition area. Captain Bill Boyle, MNI, Hon.FISCO, General Manager of BESL and Member of the Executive Committee will be present. Also attending the event will be Namig Gandilov, Emergency Response Advisor to BP and Member of ISCO Council representing Azerbaijan. Visitors who would like to know more about ISCO or find out how to become a member should make a point of looking out for Bill or Namig. More info

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CANADA: AMOP TECHNICAL SEMINAR ON ENVIRONMENTAL CONTAMINATION AND RESPONSE

June 4-6, 2013 at the Lord Nelson Hotel in Halifax, Nova Scotia, Canada - The AMOP Technical Seminar on Environmental Contamination and Response is an international forum on preventing, assessing, containing, and cleaning up spills of hazardous materials in every type of environment. It also deals with solutions for remediating and rehabilitating contaminated sites.

AMOP is organized and sponsored by Environment Canada. More info

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UK: THE 2ND ANNUAL UNCONVENTIONAL GAS & OIL SUMMIT

3 - 6 June 2013 , Hilton London Tower Bridge Hotel - Europe's leading international conference exploring the latest trends in unconventional gas and oil. The agenda has been written by and for the industry after consulting with over 150 unconventionals specialists from around the world. More info

Company news

VIKOMA ESTABLISHES NEW ENTITY IN CHINA

ISCO Corporate Member, Vikoma International Limited, has announced the formal establishment of new Wholly Foreign Owned Enterprise (WFOE) in China.

The WFOE will trade under the name Vikoma Oil Pollution and Environmental Equipment Trading (Shanghai) Co., Ltd. and will be led by incoming Country Manager Richard Kang.

Mr Kang, who joined Vikoma this year from a prominent sorbent firm, will report to Guy Downie, Sales and Marketing Director for Vikoma. A fluent Mandarin speaker, he will be responsible for driving Vikoma's growth and development in China.

More info: jamie.macdonald@bigpartnership.co.uk sales@vikoma.com

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BMT CORDAH – ABERDEEN OFFICE RELOCATION

BMT Cordah has moved to new offices at Broadfold House, Broadfold Road, Bridge of Don, Aberdeen, AB23 8EE. All telephone numbers remain unchanged.

ELASTEC/AMERICAN MARINE: INNOVATION DRIVEN BY DEMAND - OIL SPILL RESPONSE

Oil spill equipment manufacturer Elastec brings new and sophisticated tools to a market in need of better, faster, more efficient and environmentally sound tactics - An article about the company and recent new product developments. *MarineLink* Read more

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