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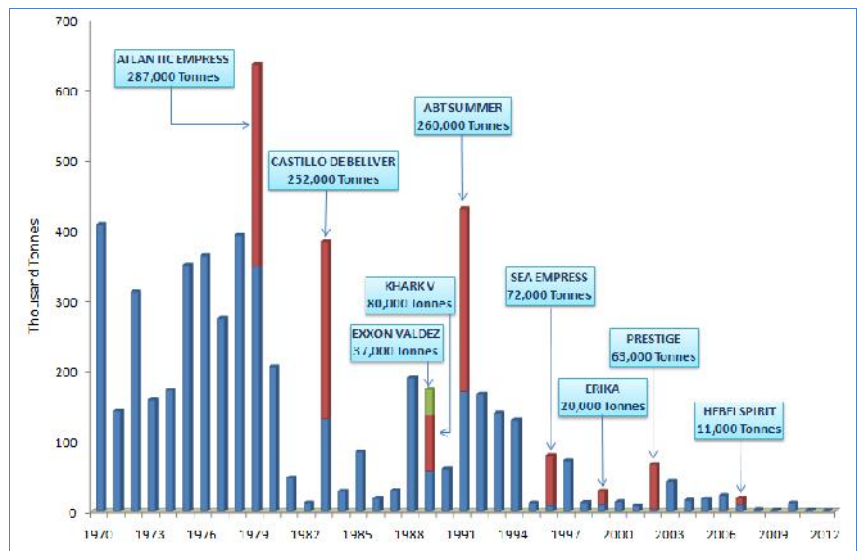
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## International news

### OIL SPILT FROM ACCIDENTS INVOLVING TANKERS IS AT AN ALL TIME LOW



Quantities of oil spilled >7 tonnes (rounded to the nearest thousand), 1970 -2012

Accidental oil spills from tankers now constitute a negligible proportion of oil finding its way into the marine environment, as demonstrated by ITOPF's annual statistics released today. While no accident involving an oil spill should be ignored as both government and industry strive towards 'zero tolerance', to put the figures into perspective, the volume of oil spilled during 2012 represents less than one millionth of the quantity of oil transported by sea. As ITOPF's figures have historically been rounded to the nearest 1,000 tonnes, the volumes spilled recently are now so low that they can be said to be around baseline levels.

In terms of the number of incidents, there were no large spills (>700 tonnes) recorded for 2012 and, although 7 medium sized spills (7-700 tonnes) were recorded, up from 2010 and 2011, they resulted in less oil being spilled overall.

## International news (continued)

These figures are good news for tanker operators and governments alike as they work to continually improve both safety and environmental performance.

Further details on the number and quantity of spills from tanker accidents since 1970, together with figures and tables, are available on the [statistics](#) page of ITOPF's website and in ITOPF's annual [statistics package](#). ITOPF

## Incident reports

### USA: MISSISSIPPI OIL SPILL UPDATES

#### Mississippi River Barge Crash: Barge carrying 80,000 Gallons of Oil hits Railroad Bridge

January 27 - A barge carrying 80,000 gallons of oil hit a railroad bridge in Vicksburg, Miss., on Sunday, spilling light crude into the Mississippi River and closing the waterway for eight miles in each direction, the Coast Guard said. A second barge was damaged.

Investigators did not know how much had spilled, but an oily sheen was reported as far as three miles downriver of Vicksburg after the 1:12 a.m. incident, said Lt. Ryan Gomez of the Coast Guard's office in Memphis, Tenn.

Authorities were still trying to determine the source of the leak, but it appeared to be coming from one or two tanks located at the stern of the first barge, Gomez said. He said there was no indication that any oil was leaking from the second vessel, and said it was still unclear whether the second barge also hit the bridge or was damaged through a collision with the first.

"Investigators are still trying to figure out what happened," he said.

United States Environmental Services, a response-and-remediation company, was working to contain the oil with booms before collecting it and transferring it to one of the barge's undamaged tanks, then ultimately to a separate barge, Gomez said. He could not say how long the river would remain closed in the area. *Huffington Post* [Read more](#)

#### More than 300 barges delayed by Mississippi River closure

January 28 - More than 300 barges were awaiting passage through a closed section of the Mississippi River near Vicksburg, Mississippi, on Monday, a day after two tanker barges struck a railroad bridge and one leaked an unknown amount of oil into the river.

The river was closed between river mile markers 425 and 441 and a queue of 12 northbound vessels containing 142 barges and 12 southbound vessels containing 162 barges was waiting to pass on Monday morning, Coast Guard spokesman Carlos Vega said. *Reuters* [Read more](#)

#### Coast Guard: Damaged Barge Still Leaking Oil into Lower Mississippi

January 28 - A unified command continues to respond to a crude oil spill in the lower Mississippi River near mile marker 434 in Vicksburg, Miss., the U.S. Coast Guard said late Monday.

An update Monday from the Guard Guard said that tank soundings indicated that the barge is still leaking oil into the river. Containment boom has been deployed around the area at the leak and skimmers are being used to recover product, the Coast Guard added. *gCaptain* [Read more](#)

#### Oil leak: Miss. River at Vicksburg remains closed

January 29 - Barges transporting commerce idled among the nearly four dozen vessels stacked up Tuesday along a normally bustling stretch of the Mississippi River, denied transit as crews feverishly sought to clean up leaking oil spilled in a weekend barge accident.

Workers have been skimming oily water around the clock near Vicksburg, Miss., ever since a barge carrying 80,000 gallons of oil struck a railroad bridge and began leaking before dawn Sunday. The accident forced the closure of a 16-mile stretch of the lower Mississippi, a major inland corridor for vessels carrying oil, Midwest grains, goods and other vital commerce. *Times Union* [Read more](#)

#### Coast Guard to release size of Mississippi River oil spill later today

January 29 - A Coast Guard spokesman, Jonathan Lally, told The Associated Press by telephone early Tuesday that 50 barges and other vessels idled as the river remained closed to traffic eight miles north and eight miles south of Vicksburg.

Lally said the Coast Guard would release an estimate of how much oil spilled later Tuesday.

"The reason why the vessels are being held is the sensitive nature of this work," Lally said. "They are concerned with safety of all those working at the site and any transit in the area could cause a wake, which wouldn't be safe for the crews there."

*GulfLive.com* [Read more](#)

## Incident reports (continued)

### Guard lets vessels pass leaking Mississippi River barge

January 30 - The Coast Guard is letting vessels pass through a closed section of the Mississippi River at Vicksburg as it evaluates how traffic would affect efforts to remove and clean up oil from a leaking barge, a Guard spokesman said Wednesday.

*San Francisco Chronicle* [Read more](#)

### 2,300 Gallons of Oil Collected, 55 Vessels Idling Due to Barge Spill on the Mississippi

January 30 - A lightering and salvage plan has been approved and multiple response crews have been dispatched to begin removing oil from the damaged barge.

Response crews have deployed 2,800-feet of boom to contain the source of the oil leak. Skimming vessels have recovered approximately 2,300 gallons of oil-water mixture since the incident occurred. The tank levels are being continually monitored. The leaking tank contained approximately 80,000 gallons of light crude oil. An estimated 7,000 gallons of oil is unaccounted for with an unknown quantity potentially contained in the void spaces of the damaged barge. *The Maritime Executive* [Read more](#)

### Mississippi River Oil Spill Cleanup Limits Barge Traffic

January 31 - Water vessels were moving cautiously Thursday through a section of the Mississippi River where a barge was leaking oil as Coast Guard officials attempted to ease the economic impact of shutting down one of the nation's vital commerce routes.

Crews on Wednesday began pumping oil from the leaking barge onto another barge — a process known as lightering — but the transfer operation is being suspended at night because it's safer and easier to see if any oil is escaping during the day, said Chief Petty Officer Paul Roszkowski. *The Huffington Post* [Read more](#) [Thanks to ISCO Executive Committee Member, Marc Shaye]

### Fuel removed from leaking barge in Vicksburg

February 1 - Response crews removed fuel from the damaged barge MOC-12 after reconfiguring oil-pump equipment. Following completion of the oil removal operations the damaged barge will be inspected and prepared for transit to a maritime facility in nearby Vicksburg. The MOC-15 barge has been moved upriver from the MOC-12 oil removal operation and is waiting for transportation to a maritime facility. *The Maritime Executive* [Read more](#)

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## UK: RESCUE FOR BIRDS COVERED IN 'WAX' IN THE SOUTH WEST

January 31 - Hundreds of seabirds - some dead - have been washed up on England's south west coast, covered in a waxy substance.

The RSPCA said it had rescued more than 100 birds, which had been taken to the West Hatch Animal Centre in Taunton.

Earlier reports suggested the white substance was palm oil, but scientists were unable to confirm this, though they believe it is vegetable-based. *BBC News* [Read news and watch video](#) [Thanks to David at ADR Training]

### Seabird 'Pollution' Substance may be Palm Oil

February 1 - A mysterious sticky substance covering more than 100 birds which washed up on the coast of southern England could be palm oil dumped in the sea.

The Royal Society for the Protection of Birds (RSPB) was called in on Thursday after the troubled guillemots, a member of the auk family, were discovered on Lyme Bay near Weymouth, Dorset.

The seabirds were taken to West Hatch Animal Centre in Taunton, Somerset, but early attempts to clean them have been hampered by not knowing what the thick, white, substance is, said the RSPB's Grahame Madge. *Sky News* [Read more](#)

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## PHILIPPINES: NAVY TO CUT UP SHIP STRANDED ON REEF

January 31 - A 224-foot-long U.S. warship will have to be cut into smaller pieces to get it off a Philippine reef where it grounded two weeks ago, Navy officials said Wednesday.

They said that's the only way to prevent further damage to the Tubataha Reef, a Philippine national park and UNESCO World Heritage site, where the USS Guardian, an Avenger-class mine countermeasures ship, ran aground on January 17.

Crews are now working to remove any hazardous materials from the vessel and will look to save anything that could still prove useful to the Navy. The ship's 15,000 gallons of diesel fuel were removed last week. *CNN* [Read more](#)

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## Incident reports (continued)

### RUSSIA: NOVOROSIYSK CLEANING UP FUEL OIL SPILL

January 31 - Russia's Black Sea port of Novorossiysk is today completing a bunker spill clean-up.

Novorossiysk Commercial Seaport Co, operator of Primorsk and several other Russian ports besides Novorossiysk, blamed crew error for yesterday morning's spill during the refuelling of the asphalt and bitumen tanker Hercules. Fuel oil was spilled onto the deck of the 4,780dwt tanker and into the sea. *HIS Dredging & Port Construction* [Read more](#) [Registration required]

## Other news

### USA: MINOR OIL SPILLS ARE OFTEN BIGGER THAN REPORTED

January 28 - Remote imaging finds official number of Gulf of Mexico slicks is correct, but size not always is.

By analysing satellite images, oceanographers have found that small oil spills in the heavily drilled northern Gulf of Mexico are often much larger than reported. The researchers presented their results last week at the Gulf of Mexico Oil Spill and Ecosystem Science Conference in New Orleans, Louisiana.

Small oil spills — ranging from oil-drilling mishaps to ships discharging fuel — occur with surprising regularity, and tend to escape the public's attention that follows big spills. When someone spills petroleum or derived products in US waters, the accident must be reported to the US Coast Guard's National Response Center in Washington DC. Those who report such spills are required to provide their own estimates of the area affected. *Nature* [Read more](#)

## RECENT NEWS STORIES FROM NIGERIA

### Nigeria to tackle worst ever lead poisoning this week

January 28 - Nigeria will release funds this week to tackle the world's worst lead poisoning outbreak which has killed at least 400 children, a senator said on Monday, ending months of official inaction in which 1,500 more children were put at risk.

In May last year the government pledged 850 million naira (\$5.4 million) to help clean up the lead and treat the thousands poisoned by contamination from an artisan gold mine in the Bagega area of northern Zamfara, but medical charity Doctor's Without Borders (MSF) said the money never materialized. *Reuters* [Read more](#)

### Nigeria spill fines on Shell, Chevron, not backed by law

February 1 - Fines amounting to \$8 billion sought by Nigeria from Royal Dutch Shell Plc (RDSA) and Chevron Corp. (CVX) for oil spills are not backed by law, said Bukola Saraki, chairman of the country's Senate Committee on Environment.

"Under the existing law, there is no penalty for oil spills apart from just to clean it up," Saraki, a senator representing the ruling People's Democratic Party from central Kwara state, said in an interview in Abuja on Jan. 29. "You only pay 1 million naira (\$6,362) for late reporting."

Without the backing of law it is difficult for the National Oil Spill Detection and Response Agency, or Nodra, to enforce fines levied on oil companies, he said. Lawmakers have moved to amend the law and stipulate tougher penalties, according to Saraki. *Fuel Fix* [Read more](#)

### Shell Nigeria case: Court acquits firm on most charges

January 30 - A Dutch court has rejected four out of five allegations against Anglo-Dutch oil giant Shell over oil pollution in Nigeria's Niger Delta region.

But it found a subsidiary of the firm, Shell Nigeria, responsible for one case of pollution, ordering it to pay compensation to a Nigerian farmer. *BBC News* [Read more and watch video](#)

### Nigeria: Dutch Court Indicts Shell Nigeria for Oil Spills



Picture: Environmental damage from an oil spill in Kegbara-Dere in the Ogoni district of the Niger Delta.

January 30 - Shell's parent company cannot be held liable for oil spills in the Niger Delta, says Dutch Court. However, Shell's subsidiary in Nigeria is partly liable for damages and will pay compensation to one farmer, the court ruled Wednesday.

Four Nigerian farmers had sued Shell for polluting and destroying their farmlands and rivers.

This was the first time in Dutch history that victims from Shell's host countries have pursued a civil liability claim in the country where Shell has its headquarters, the Netherlands. *Leadership* [Read more](#)



## USA: FEDERAL JUDGE ACCEPTS \$4 BILLION BP GUILTY PLEA FOR DEEPWATER HORIZON OIL DISASTER

Photo: Fireboats try to extinguish the blaze on the Deepwater Horizon oil rig south of Venice after an explosion on Wednesday, April 21, 2010. The explosion killed 11 workers on the rig. (Photo by Michael DeMocker, NOLA.com | The Times-Picayune)

January 29 - A federal judge on Tuesday [approved a plea agreement between the U.S. government and global oil giant BP](#) that requires the company to pay \$4 billion in fines to settle criminal charges stemming from the explosion of the Deepwater Horizon drilling rig in April 2010. The disaster killed 11, injured dozens more and led to worst oil spill in U.S. history, with 4.1 million barrels of [oil gushing into the Gulf of Mexico](#) from the company's Macondo well.



**U.S. District Judge** Sarah Vance agreed to accept the company's offer to plead guilty to 11 counts of felony manslaughter, one count of felony obstruction of Congress and a variety of environmental crimes, after listening to BP officials and attorneys from the Justice Department defend their joint agreement. *The Times Picayune* [Read more](#)

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## CANADA: RESPECTED SCIENCE JOURNAL URGES KEYSTONE APPROVAL, SAYS OILSANDS NOT THAT DIRTY

January 31 - A prestigious science journal has gone to bat for TransCanada's Keystone XL pipeline, urging the White House to greenlight the controversial project and arguing that Alberta's oilsands aren't as "dirty" as some contend.

"The administration should face down critics of the project, ensure that environmental standards are met and then approve it," Nature said in an editorial this week.

The editorial, entitled "Change For Good," argued that the pipeline won't determine whether the oilsands are developed. "Nor is oil produced from the Canadian tarsands as dirty from a climate perspective as many believe (some of the oil produced in California, without attention from environmentalists, is worse)," the editorial reads. *The Vancouver Sun* [Read more](#)

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## CANADA: CANADA'S ARCTIC LEADERSHIP STINT WORRIES DRILLERS, SHIPPERS AND ENVIRONMENTALISTS

Canada will begin a two-year stint at the helm of the eight-nation Arctic Council amid a clamour of competing calls for leadership, as the ice recedes and the race heats up to extract resource riches while protecting a fragile and now-exposed environment.

While there's near-unanimity that Canada will need to lead when it takes over from Sweden in May, the direction and pace remain in sharp dispute. The oil industry wants to get busy drilling; ocean shippers are eyeing cost-saving shortcuts across long-frozen seas, while environmentalists fear the melting polar pack leaves the Arctic vulnerable to unrestrained ravage.

Most expect, and some fear, the Conservative government will tip towards development. *The Globe & Mail* [Read more](#)

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## ECUADORIAN TRIBE GETS REPRIEVE FROM OIL INTRUSION

January 17 - Residents of Sani Isla have built up an arsenal of weapons to fend off Petroamazonas, in a confrontation which did not take place as expected.

## Other news (continued)



*A Kichwa family by Napo River, Amazon rainforest, Ecuador. Photograph: Ragnar Th Sigurdsson/Alamy*

An indigenous community in the Ecuadorian Amazon has won a reprieve after building up an arsenal of spears, blowpipes, machetes and guns to fend off an expected intrusion by the army and a state-run oil company.

The residents of Sani Isla expressed relief that a confrontation with Petroamazonas did not take place on Tuesday as anticipated, but said the firm is still trying to secure exploration rights in their area of pristine rainforest.

"We have won a victory in our community. We're united," said the community president, Leonardo Tapuy. "But the government and the oil company won't leave us alone"

The Kichwa tribe on Sani Isla, had said they were ready to fight to the death to protect their territory, which covers 70,000 hectares. More than a quarter of their land is in Yasuni national park, the most biodiverse place on earth. *The Guardian* [Read more](#)  
[Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group]

## People in the news

### NEW TECHNICAL MANAGER AT OIL SPILL RESPONSE LTD.



Paul Foley has been appointed as Technical Manager at OSRL.

This is a promotion after 10 years with Oil Spill Response Ltd. Having started in 2003 as Junior Technician in the Operations department with a Masters in Environmental Engineering, Paul progressed through the organisation, attending many notable spills, from tanker groundings in Karachi, inland well blowouts in Georgia, Tank farm releases in the UK and most recently Macondo.

He has recently returned from a 2 years overseas assignment in Singapore as OSRL's deputy Operations Manager and a year on secondment to ExxonMobil as its Asia Pacific Emergency Preparedness and Response Advisor. Now, as OSRL's Technical Manager, he picks up a lot of Dave Salt's old focus, especially with respect to Technical Development and Quality Assurance.

## ISCO news

### REBUILDING THE ISCO WEBSITE – NEW FEATURES BEING INTRODUCED

After about eight years the software programme used in the ISCO website is creaking at the seams and in desperate need of overhaul.

Work on rebuilding the site has begun and is progressing "behind the scenes". The new website won't be "switched on" for about two weeks and, even after the switchover, some work will be continuing. Enhanced functionality will make many improvements possible. Some details may be subject to change as the task progresses, but I can give you a preview of some of the new features.

#### New Country Pages

By logging in and using a "drop-down" menu, all members will be able to access the new country pages.

Thus, for example, members in Brazil will be able to click on "Brazil" to view the country page for Brazil – and members in all countries can find their own country pages in a similar way or select and view pages for other countries.

Each country page will provide details and contact information for members in the selected country. This information, which will be password protected, will help members to network, facilitating the organisation of in-country meetings, seminars and other events.

Members of ISCO Council (or their nominated deputies) will be enabled with editing rights for their own country pages.

Country pages will also contain up-to-date information on in-country resources for pollution response. It is planned that information on available equipment, materials and, most importantly, individuals with relevant knowledge and experience, will be presented in a way that is harmonised with the international Response Resource Inventory (RRI) initiative being worked on by the IMO OPRC-HNS Technical Group. This feature will be an invaluable source of information for improving rapid and effective response to larger Tier 2 / Tier 3 pollution events.

## ISCO news (continued)

It is anticipated that the enhanced functionality of the site will also make it possible to enable members to update their own information. Thus, for example, members will be able to correct changed telephone numbers or addresses, or update information on available spill combat resources.

This development will be extremely useful for governments and other authorities that have responsibilities for maintenance of contingency plans.

It is also proposed that each country page will have a "Notice Board" where news of in-country meetings, seminars, and other matters of mutual interest can be posted.

### ISCO Website Calendar of Scheduled Training Courses

In order to reduce the workload of the ISCO Secretariat, leading providers of Training Courses are going to be enabled to directly post information on their upcoming training courses.

Two of the world's largest training organisations, Oil Spill Response Ltd. and Texas A&M University have already indicated their interest in using this facility to disseminate information on their training courses for oil and chemical spill response.

### Opportunities for Expert Volunteers to participate in enhancing the value of the website

Moves to accept offers of help from interested members in maintaining some parts of the website have up to now been stymied by an inability to enable third party editing access. With enhanced functionality this is now possible.

Due to Secretariat work overload, some pages – for example, "Useful Downloads", "New Technology", "Technical and Reference", "Links", etc. have not been as regularly updated and continuously improved as we would wish.

It will now be possible to assign editing rights to suitably qualified members who are willing to accept responsibility for particular pages.

Being a member of an organisation like ISCO isn't just a matter of what you can get out of it – it's also about the contribution you can make.

Together, we can make a difference and help move forward in realising ISCO's objectives.

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### IMO OPRC-HNS TECHNICAL GROUP – CHANGE OF MEETING DATE

The following message was received from Patricia Charlebois on Thursday 31 January –

"The Secretariat wishes to inform you that the dates of the fifteenth session of the OPRC-HNS Technical Group, which had originally been scheduled from 6 to 10 May 2013, have been modified in consultation with the Chairman, due to the fact that Monday, 6 May 2013 is bank holiday in the United Kingdom.

In this regard, the Secretariat has issued a corrigendum to Circular Letter 3323, which is enclosed in this email, providing information on the new dates of the fifteenth session of the OPRC-HNS Technical Group, which will be now held from Tuesday, 7 May to Friday, 10 May 2013.

Since the next session of the meeting will be one day shorter than the one originally scheduled, the Secretariat has issued a revision of the Annotations to the Provisional agenda and provisional Timetable, which you can find also enclosed in this correspondence. We will not amend the provisional agenda, as the only change would be to the start date of the meeting".

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### NEXT DEADLINE FOR RECEIPT OF APPLICATIONS FOR PROFESSIONAL RECOGNITION

Applicants should send in their completed forms and documentation by the end of this month if they wish to be assessed in the next group of applicants to be considered by the Membership Committee. [More info](#) [Application form](#)

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### NIGERIA: CHIEF KOLA AGBOKE

The ISCO Secretary has for quite a long time been trying to contact ISCO Member, Chief Kola Agboke, by email.

All messages are being bounced and we are becoming very concerned.

Members in Nigeria are requested to help by making enquiries and relaying news to [john.mcmurtrie@spillcontrol.org](mailto:john.mcmurtrie@spillcontrol.org)

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In this issue of the ISCO Newsletter we are printing No. 112 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 112: KNOWLEDGE OF THE SEA EMPRESS INCIDENT

In this and subsequent articles, I review the fate of the total releases of Forties crude and heavy fuel oil at the *Sea Empress Incident*, by computing the percentage volatile loss, the amounts of crude and fuel oil emulsions subsequently created, the half-life-dependent rates of natural dispersion to be expected for these emulsions, the amounts of identified releases likely to strand after wind- and tide- dependent time lapses at sea, and the amounts naturally dispersed after stranding, in order to quantify the individual time-dependent fates of releases amounting to 72,000 tonnes.

If the loss of volatiles was 40% as claimed by the MPCU Report rather than 32% as earlier measured for the similar Ekofisk oil, then of the 72,000 tonnes released in total, only 43,200 tonnes of non-volatiles would remain (rather than 48,960 tonnes) from which we have to deduct the amounts recovered at sea (2,000 tonnes) and dispersed by dispersants (5,515 tonnes) to leave either 35,685 or 41,445 tonnes to form emulsions of about 107,335 or 124,055 tonnes to disperse naturally or to come ashore in time lapses insufficient for complete dispersion. The simplest way to compute the amount remaining after different periods of natural dispersion for any release is to reduce it by half for each successive half-life. Thus, for 40% evaporative loss and an initial emulsion of 107,055 tonnes we see that the successive amounts for half-lives of 30, 36 and 42 hours are as shown below (articles 31-46).

Half-life 30 hours			Half-life 36 hours			Half-life 42 hours		
Hours	Days	Tonnes	Hours	Days	Tonnes	Hours	Days	Tonnes
0	0	107,055	0	0	107,055	0	0	107,055
30	1.25	53,527	36	1.5	53,527	42	1.75	53,527
60	2.50	26,763	72	3.0	26,763	84	3.50	26,763
90	3.75	13,381	108	4.5	13,381	126	5.25	13,381
120	5.00	6,690	144	6.0	6,690	168	7.00	6,690
150	6.25	3,345	180	7.5	3,345			
180	7.50	1,672						

Thus, for example, were 107,055 tonnes of emulsion to be at sea for 6 days (144 hours) with a half-life of 36 hours, the amount potentially stranding would be reduced by natural dispersion to 6,690 tonnes, such a half-life being in the middle of the Group III range of 24 - 48 hours as appropriate for the physicochemical properties of Forties oil. Again, were it to remain at sea for 7.5 days (180 hours), only 3,345 tonnes would remain to strand. The above table also indicates the time-dependent sensitivity of this approach to variation in half-life from one oil to another within this moderately high half-life range.

However, while some emulsion came ashore with an average age of 1.5 days during the 3-day period of onshore winds of 15-18 February, that which subsequently came shore in the onshore winds of the 6-day period from 22-27 February was 6 days old on average, because the intervening 3-day period of offshore winds from 19-21 February kept it dispersing at sea prior to the resumption of onshore winds of 22-27 February thus further aging it by 3 days before coming ashore on average on 24 February within this 6-day stranding period which terminated with the onset of offshore winds for the period 28-29 February after which no significant amount came ashore. However, computation of the total amount which did strand in the period 15-27 February, requires the half-life concept to be applied to the released quantities which actually attained the average ages of 1.5 and 6 days prior to stranding.

As to the heavy fuel oil, concerning which we have neither reports of solidification nor of viscosity, I allocated the median viscosity range of 5,000 -10,000 cSt at 15°C and the median half-life of 4 - 6 days to this Group IV oil (articles 31-46). On this basis, the 320 tonnes reported as having been released would have formed a 50% oil-water emulsion of which 320 tonnes would have stranded after 4 - 6 days on the above totalised approach. However, with no reported breakdown of the quantities and timings of these comparatively small releases, we need say no more than that if half had been released in the first onshore wind episode almost all of this would have gone ashore while the half released in the second episode would have been reduced to a quarter, so that three quarters of the 360 tonnes might have stranded overall as a 50% emulsion containing 270 tonnes of fuel oil.

1 The *Rational Trinity: Imagination, Belief and Knowledge*, D.Cormack, Bright Pen 2010 available at [www.authorsonline.co.uk](http://www.authorsonline.co.uk)

2 *Response to Oil and Chemical Marine Pollution*, D. Cormack, Applied Science Publishers, 1983.

3 *Response to Marine Oil Pollution - Review and Assessment*, Douglas Cormack, Kluwer Academic Publishers, 1999.



RESPONSE TO INLAND OIL SPILLS – PART 7

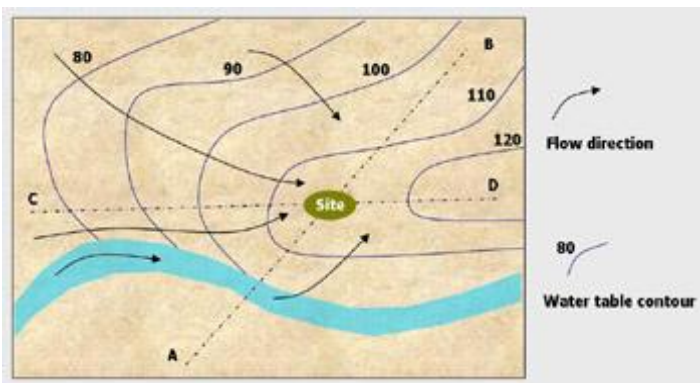


A short series of articles contributed by Mark Francis of Oil Spill Solutions.

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>

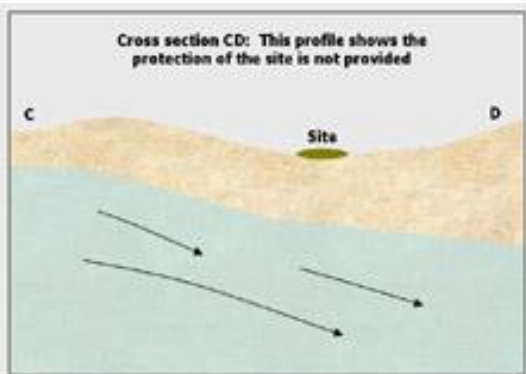
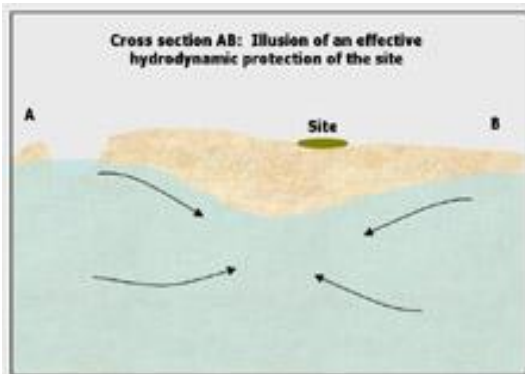
Spills on Permeable Surfaces (continued)

Piezometric (water table) monitoring



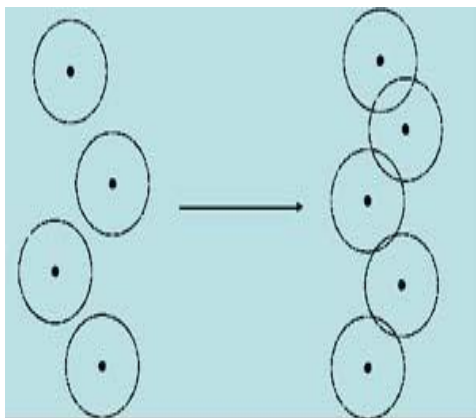
This involves a network of observation wells which allow the sector to be adequately monitored by observing fluctuations in the groundwater levels:

1. In the case of hydrodynamic protection, it is absolutely necessary to have available a piezometric map updated 2 to 4 times per year, or after exceptional weather conditions.
2. Fluctuation may be due to natural phenomena such as variations in rainfall, or to artificial phenomena such as intensive pumping in the proximity of the site.



3. The use of one single profile such as A to B may be misleading as shown left so various cross sections have to be made to give a true picture of what is really happening.

Recovery of oil from wells



The principal factor to be considered when recovering free oil is to use an existing gradient or induce one. The required total pumping rate to create the cone or cones of depression will depend on the characteristics of the aquifer. These characteristics are found from separate pumping tests. If the pumping rate is too high for one well the required rate can be obtained by installing more wells.

More rapid removal of oil is obtained in the early stages of recovery when several wells are used and additional soil contamination is kept to a minimum as the water table is lowered.

The correct spacing between the wells to ensure adequate overlapping between the cones of depression needs to be determined by to avoid oil bypassing the cones.

This is why this type of response is very much a long term project and also very costly.

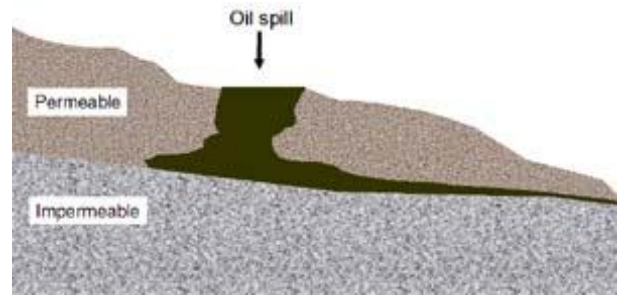
In some cases the clean-up can be completed only to find oil in a stream weeks later.

## Special feature - Inland spills (continued)

In some cases oil may travel great distances underground without affecting ground water before resurfacing this may be because of impermeable layers or in agricultural land drainage systems.

In the case of land drains the system will need to be removed cleaned or replaced and so the cost rises again.

It cannot be stressed enough that when an incident happens, a response needs to be mounted immediately and major efforts are made to stop the penetration. If oil does penetrate into the soil there is a need to remove it as soon as possible to save time and money as well as the complicated work that will have to be undertaken.



*To be continued*

## Special feature – In situ burning

### IN SITU BURNING: CHAPTER 4



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](mailto:fingasmerv@shaw.ca)

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

#### Summary of the Serial

This is the fourth 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.

#### 4. The Science of Burning (*Continued*)

The residue from oil spill burning is largely unburned oil with some lighter or more volatile products removed. When the fire ceases, unburned oil is left that is simply too thin to sustain combustion. In addition to unburned oil, oil is also present that has been subjected to high heat and is thus weathered. Heavier particles are re-precipitated into the fire. Highly efficient burns of some types of heavy crude oil may result in oil residue that sinks in sea water.

Soot is formed in all fires. The amount of soot produced is not precisely known because there is no direct means of measuring soot from large fires. It is believed that the amount of soot ranges from about 0.3 to 3% for crude oil fires and about 3 to 8% for diesel fires.<sup>22</sup> An additional consideration is that the soot precipitates out at a rate equal to approximately the square of the distance from the fire. Thus a constant percentage of soot for a whole fire may be irrelevant. A recent study shows that overall soot percentage is most probably between 0.3 and 1% for a light crude.<sup>22</sup>

Soot consists of agglomerates of spherical particles. Several scientists measured soot agglomerates and found that the individual spheres had radii of 5 to 25 nm (1 nm = 1000  $\mu$ m).<sup>1</sup> Soot particles were aggregates of 50 to 250 spheres and the aggregation could be described as a fractal dimension of 1.7 to 1.9. Others studied soot particles and found that the aggregates ranged from 50 nm to 400  $\mu$ m with a fractal dimension of 1.8.<sup>1</sup> The primary particle size was found to be 5 nm with the smallest typical aggregation being 10 to yield the smallest typical diameter of 50 nm. A recent study of soot particles noted that small spherical particles are formed ranging in size from 200 nm to about 3  $\mu$ m.<sup>1</sup> These are called plerospheres. These small particles contain large amounts of trace metals as found in the originating oils.

The total heat radiated by a given burn has been measured as 1.1 MW/m<sup>2</sup>.<sup>1</sup> Evans calculated that the heat required to vaporize the oil was 6.7 KW/m<sup>2</sup> and the heat lost from conduction through the slick to the underlying water was 2.5 KW/m<sup>2</sup>.<sup>1</sup> The fraction of heat released that was radiated back to the pool was about 0.02 at the rim of the pool and 0.045 at the centre. Other researchers report a re-radiated heat fraction between 0.01 and 0.02 (1 to 2%).<sup>3</sup> Others calculated that 1% of heat was radiated back to the surface.<sup>1</sup>

Thermal radiation is always an issue with fires, in the past several models for predicting radiation from hydrocarbon fires were developed.<sup>1</sup> Alaska North Slope oil showed a heat release rate of 176 KW/m<sup>2</sup>, diesel fuel 230 KW/m<sup>2</sup>, and propane, 70 KW/m<sup>2</sup>. The heat radiated by a liquid propane fire enhanced by air flow and increased pressures was 180 KW/m<sup>2</sup>.<sup>1</sup> The heat flux on booms as a result of these fires was reported as 140 to 250 KW/m<sup>2</sup> for crude oils, 120 to 160 KW/m<sup>2</sup> for diesel fuel, 60 to 100 KW/m<sup>2</sup> for propane, and 100 to 160 KW/m<sup>2</sup> for enhanced propane burning.<sup>1</sup>

## Special feature – In situ burning (continued)

Flame spreading rates have been measured at several fires.<sup>3,23</sup> Flame spreading rates do not vary much with fuel type, but vary significantly with wind, especially as this relates to up and down wind. Flame spreading rates range from 0.01 to 0.02 m/s (0.02 to 0.04 knots). Downwind flame spreading rates range from 0.02 to 0.04 m/s (0.04 to 0.08 knots), and up to 0.16 m/s (0.3 knots) for high winds. One scientist measured flame velocities as a function of external heat fluxes and found these to vary from 0.01 to 0.16 m/s (0.02 to 0.3 knots), depending on the heat flux.<sup>1</sup> Higher heat fluxes yielded high flame spread rates. Flame velocities did not change when oil was thicker than 8 mm. Fingas and coworkers measured the flame spread rates in burning several heavy oils and Orimulsion and found that the rate was an average of 0.045 m/sec.<sup>23</sup> These rates ranged from 0.003 to 0.14 m/sec. It should be noted that all these rates are for flame spread on the ground and not through vapor clouds. It has been noted that at spills of gasoline, that fires have been noted as spreading through vapor clouds as fast as 100 km/hour. This is typical of flame spread through vapor clouds.

Flame heights have been measured by several authors.<sup>3</sup> While data vary significantly, a rule-of-thumb is that the flame height of a small fire less than 10 m in diameter is about twice that of the diameter of the fire. The flame height approaches the diameter of the pool up to about 100 m in diameter. Thus an estimate of flame height for a fire in a boom with a radius of about 10 to 20 m is about 1.5 times the diameter or 15 to 30 m.

Several workers reported on findings that there is a vigorous burn phase near the end of a burn on water.<sup>3</sup> This is caused by increasing heat transfer back to the water surface with decreasing slick thickness. Significant amounts of heat are transferred to water near the end of a burn when slick thickness approaches 1 mm and this heat ultimately causes the water to boil. The boiling injects steam and oil into the flame giving rise to a 'vigorous' burn with the production of steam. This phenomenon occurs only in shallow test tanks because there is little movement of water under the slick to carry the heat away. During the NOBE burn at sea, no vigorous burning was observed and thermocouple measurements in the water showed no increase in the water temperature.<sup>24</sup> This is due to two factors, first the movement of the slick over the water and secondly, the vast amount of water under the burn. Thus, the phenomenon of the rapid or vigorous burn phase is not relevant to the at-sea situation. Some workers have studied a related phenomenon, sometimes known as boil-over, this occurs when water is entrained in the oil during combustion.<sup>25</sup> Boil-over typically occurs when a fuel layer is thin and is on a water layer. Heat transfer from the boiling liquid and/or flame can heat the water to boiling. When this occurs the burning fuel is ejected and the turbulence of the fire is increased. Ferrero et al. studied this phenomenon with gasoline and diesel fuel and found that it occurs only with diesel fuel.<sup>25</sup> A related phenomenon is when water is entrained in the fuel layer. The entrained water droplets will explode if rapidly heating, thus causing what appears to be rapid boiling or even more violent behavior. This can occur with many oils, but particularly with emulsified oils. Several parties have studied the dynamics of burning and noted the above burn behaviours.<sup>1</sup>



One group of researchers measured the radiative effect of the Kuwait oil fires at a point about 100 km downwind of the fires.<sup>1</sup> They found that the smoke plume absorbed about 78% of the solar radiation and about 8% was transmitted to the land surface. The smoke reached a maximum height of 4.5 km with little penetrating the stratosphere, which indicates that self-lofting did not occur. Self-lofting is a phenomenon that may occur if a plume maintains or increases its buoyancy as a result of heat absorption from the sun.

### To be continued

*Figure 3 Burning of a slick during the Deepwater Horizon spill. Note that the flame has not spread over the entire slick at the time this photo was taken. Also note that part of the slick appears to be a stable emulsion (reddish portion) and this would burn during this particular fire (Photo courtesy of Elastec / American Marine Inc.).*

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### FOR YOUR INTEREST – LINKS FOR RECENT ISSUES OF PERIODICALS

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<a href="#">Intertanko Weekly News</a>	International news for the oil tanker community	No 5, 2013
<a href="#">US EPA Tech Direct</a>	Info on soil, sediment and groundwater remediation	February 1 issue

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### USA: THE PATH FORWARD TO RESTORING THE GULF COAST

January 29 - Today, the Gulf Coast Ecosystem Restoration Council released The Path Forward to Restoring the Gulf Coast: A Proposed Comprehensive Plan.

This document reflects the deliberations of the Council to date in developing a more detailed initial Comprehensive Plan. Our collective focus is on how to ensure the long-term health, prosperity, and resilience of the Gulf Coast.

The Council recognizes this unique and unprecedented opportunity to implement a coordinated Gulf Coast region-wide restoration effort. We are committed to developing a plan in collaboration with the people who live and work in the Gulf Coast region.

As we begin to develop a Comprehensive Plan, we will provide robust opportunities for public engagement so that we hear from people across the region. We hope that you will join us and offer your ideas to this important effort. [Download the proposed plan](#)

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### USA: NEW CONGRESSIONAL REPORT SUMMARIZES BP DEEPWATER HORIZON OIL SPILL ACTIONS

February 1 - The [Congressional Research Service](#) has issued a [new report summarizing information about the BP Deepwater Horizon accident and oil spill](#), including the few actions taken by Congress in its response.

The research arm of Congress does not publicly release its reports, but individual members of Congress often do, and this one appears on a Web site maintained by the [Federation of American Scientists](#). *The Times Picayune* [More info](#)

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### USA: API LAUNCHES OIL SPILL RESEARCH WEBSITE

January 30 - American Petroleum Institute (API) Director of Marine and Security Issues Robin Rorick announced Tuesday the launch of [www.ioscproceedings.com](#), a new website that hosts research papers presented every three years at the International Oil Spill Conference (IOSC).

The site will enable greater sharing of best practices and latest technologies among industry, government and other stakeholders, as well as promote safe operations around the world.

"Safety is the oil and gas industry's number one priority," said Rorick. "The IOSC Proceedings represent more than 40 years of research into oil spill prevention, response and restoration. Putting this treasure trove of information online makes the latest information, data and research available in the widest possible manner."

First held in 1969, the IOSC provides an open public forum for professionals from the international community, the private sector, government, and non-governmental organizations to highlight and discuss innovations and best practices across the spectrum of prevention, preparedness, response and restoration. Peer-reviewed papers presented at each conference are then published in the IOSC Proceedings.

Online for the first time ever, this new database provides free access to more than 3,000 articles containing information and perspectives available nowhere else.

Permanent sponsors of the triennial IOSC include API, the U.S. Coast Guard, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the Bureau of Safety and Environmental Enforcement. *API Press Release*

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