



ISCO NEWSLETTER

The Newsletter of the International Spill Response Community
Issue 296, 15 August 2011

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News

USA: AFTER STRING OF PIPELINE SPILLS AND DEADLY BLASTS, CONGRESS EYES NEW SAFETY RULES

Republican and Democratic lawmakers are considering plans that could spur major upgrades to the nation's aging energy pipelines, driven by a string of recent oil spills, deadly natural gas blasts and what they call federal regulators' inaction.

Since last summer, major pipeline accidents have destroyed neighborhoods in California and Pennsylvania and fouled waterways in Montana and Michigan. That's shaken confidence in the system and exposed gaps in oversight of the sprawling network of underground pipelines.

Now, politicians from both parties are pushing measures that would tighten control of the industry, which currently gives companies broad leeway to make sure their pipelines are running safely. The new ideas include using modern technologies to detect leaks and shut down pipes during emergencies, replacing aging cast-iron pipes and tightening rules for pipeline stream crossings, all problems exposed in recent ruptures and explosions.

"The fact of the matter is we have pipelines almost every-damn-where," said Democratic U.S. Rep. John Dingell, who introduced a pipeline safety bill with many of those elements last week with his Republican colleague, Energy and Commerce Committee Chairman Fred Upton, also of Michigan. "They're running through parks and refuges, in rural America and in the middle of cities and in this mobile society the risk grows all the time."

Industry representatives vow to push back against technology mandates they describe as unworkable, and they oppose new rules for tens of thousands of unregulated pipelines in oil and gas fields. [Read more](#)

NIGERIA: UN ENVIRONMENTAL ASSESSMENT OF OGOILAND REPORT



Public meetings staged throughout Ogoniland during each phase of the study helped to build understanding of UNEP's project and to foster community participation

Covering around 1,000 km² in Rivers State, southern Nigeria, Ogoniland has been the site of oil industry operations since the late 1950s. Ogoniland has a tragic history of pollution from oil spills and oil well fires, although no systematic scientific information has been available about the ensuing contamination. With this independent study, conducted at the request of the Federal Government of Nigeria, the United Nations Environment Programme (UNEP) reveals the nature and extent of oil contamination in Ogoniland.

The *Environmental Assessment of Ogoniland* covers contaminated land, groundwater, surface water, sediment, vegetation, air pollution, public health, industry practices and institutional issues. This report represents the best available understanding of what has happened to the environment of Ogoniland – and the corresponding implications for affected populations – and provides clear operational guidance as to how that legacy can be addressed.

Involving desk review, fieldwork and laboratory analysis, the two year study of the environmental and public health impacts of oil contamination in Ogoniland is one of the most complex on-the-ground assessments ever undertaken by UNEP.

UNEP recruited a team of international experts in disciplines such as contaminated land, water, forestry and public health, who worked under the guidance of senior UNEP managers. This team worked side-by-side with local experts, academics and support teams comprised of logistics, community liaison and security staff. The UNEP project team surveyed 122 kms of pipeline rights of way and visited all oil spill sites, oil wells and other oil-related facilities in Ogoniland, including decommissioned and abandoned facilities, that were known and accessible to UNEP during the fieldwork period, based on information provided by the Government regulators, Shell Petroleum Development Company (Nigeria) Ltd (SPDC) and community members in and around Ogoniland.

During aerial reconnaissance missions, UNEP experts observed oil pollution which was not readily visible from the ground, including artisanal refining sites. Information provided by Ogoniland residents about oil contamination in their communities supplemented official oil spill data supplied by the Nigerian Government and SPDC. Following its initial investigations, UNEP identified 69 sites for detailed soil and groundwater investigations. In addition, samples of community drinking water, sediments from creeks, surface water, rainwater, fish and air were collected throughout Ogoniland and in several neighbouring areas. Altogether more than 4,000 samples were analyzed, including water drawn from 142 groundwater monitoring wells drilled specifically for the study, and soil extracted from 780 boreholes. The UNEP project team also examined more than 5,000 medical records and staged 264 formal community meetings in Ogoniland attended by over 23,000 people. [Download the UN Report](#)

Editor: Here are two other interesting articles that are worth reading - [Related article \(1\)](#) [Related article \(2\)](#)

NIGERIA: OGOIS DIVIDED OVER SHELL COMPENSATION

Shell's admission of responsibility for two major oil spills in the Niger Delta region has provoked reactions ranging from jubilation to cynicism.

The Bodo fishing community had taken the Anglo-Dutch oil giant to court in the UK, claiming oil pollution has left the environment, and their livelihood, in ruins.

Previously Shell has always maintained that oil spills in the Niger Delta were largely caused by sabotage by crude oil thieves and pipeline vandals. However the company finally admitted that two devastating spills in 2008 and 2009 were a result of equipment failure.

This marks a turning point in the chequered relationship between oil companies and their host communities in Nigeria - and opens the way to a huge compensation settlement expected to be around 280 million euros. [Read more](#)

INDIAN COAST GUARD CLEANING UP OIL SPILL OFF MUMBAI COAST



August 8 - Last Thursday afternoon, cargo ship MV RAK sank off the coast of Mumbai, spilling oil while en route transporting coal from Indonesia to the Indian state of Gujarat.

The MV RAK was carrying an estimated 325 tons of fuel oil, as well as 56 tons of diesel. The Defense Ministry released in a statement that the MV RAK is now spilling at about one ton per hour. They commented that from aerial survey results, the oil slick surrounding the vessel has decreased and that the Indian coast guard is working to clean up the spilled oil from the merchant ship. The trail of oil is visible for up to 12 nautical miles, with thick coverings up to 2 nautical miles from where the Panama-flagged RAK sunk.

The coast guard reported that about 80-100 tons of oil leaked from the cargo vessel into the Arabian Sea. Inspector General of the Coast Guard S P S Batra stated that the oil will be reaching coasts between Thal Knob and Alibaug due to wind conditions, but stressed it is unlikely to affect Mumbai. [Read more](#)

Related story – Monitoring the oil spill - [Read this report](#)

Related story – Comment on liability and need for India to ratify HNS Protocol – [Read this report](#)

Related story - Ship accidents in Mumbai / India are resulting in massive oil spills and environmental disaster – [Read this article](#)

CHINA: CONOCOPHILLIPS UPS ESTIMATE OF CHINA OIL SPILL

ConocoPhillips [China](#), a subsidiary of the Houston-based oil company ConocoPhillips, said on Friday that as much as 2,500 barrels of oil and mud leaked from an oilfield in China's northern Bohai Bay.

A recent survey at the C platform of Penglai 19-3 oil field identified more oil-based drilling mud on the sea floor than originally estimated, the company said on its website (www.conocophillips.com.cn), adding that it expected to complete a cleanup by the end of this month.

Last month, ConocoPhillips estimated around 1,500 barrels (240 cubic meters) of oil and oil-based drilling fluids had been released into the sea and that an order to shut down the platforms would result in a temporary output reduction of about 17,000 barrels of oil per day. [Read more](#)

CHINA: OIL SPILL EFFECTS ON FISHERIES

A man moves a stack of dead scallops on July 26 in Laoting county, Hebei province. The province's fisheries have suffered as a result of the oil leaks in Bohai Bay.

The State Oceanic Administration has ordered the company to stop the leaks, contain the oil spills, clean up polluted areas and conduct a thorough investigation to eliminate the possibility of further oil spills before Aug 31. The administration also ordered ConocoPhillips to provide a report by an independent evaluation authority once the leaks have been stopped and the spills contained.

Pollutants from the oil spill have been found on beaches in North China's Hebei province, and fisheries there are complaining that the disaster has caused the death of a large number of scallops.

"According to our statistics, about 70 percent of the scallops have died due to the oil leak, with economic losses reaching at least 200 million yuan (\$30 million)," Yang Jizhen, chairman of the Laoting Fisheries Association, told China Daily.

About 30 boxes of dead scallops have been collected and stored as evidence since July 17, Yang said. [Read more](#) Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group for passing on the link to this report.



JAPAN: REPORT SUGGESTS SECOND MELTDOWN AT REACTOR AT FUKUSHIMA PLANT

August 9 - A second meltdown likely occurred in the No. 3 reactor at the Fukushima No. 1 nuclear power plant, a scenario that could hinder the current strategy to end the crisis, a scientist said.

In that meltdown, 10 days after the March 11 Great East Japan Earthquake, the fuel may have leaked to the surrounding containment vessel, according to a report by Fumiya Tanabe, a former senior researcher at what was then the government-affiliated Japan Atomic Energy Research Institute.

His report will be announced at next month's meeting of the Atomic Energy Society of Japan.

Under Tokyo Electric Power Co.'s road map to deal with its crippled nuclear plant, reducing temperatures at the bottom of the core pressure vessel is one objective for bringing the accident under control. But if the fuel burned through the pressure vessel surrounding the No. 3 reactor and dropped into the containment vessel, that plan would be affected. [Read more](#)

UK: SHELL FIGHTS SPILL NEAR NORTH SEA OIL PLATFORM



A plane has been monitoring the water's surface around the platform

Oil giant Royal Dutch Shell has said it is working to stop a leak at one of its North Sea oil platforms.

The leak was found near the Gannet Alpha platform, 180 km (113 miles) from Aberdeen, Scotland.

Shell would not say how much oil had been released so far, merely describing it as "not a significant spill" and saying it had largely stemmed the leak.

One of the wells at the Gannet oilfield has been closed, but the company would not say if production was reduced. The company said it had sent a clean-up vessel to the location and has a plane monitoring the surface. It confirmed the leak was continuing, having been found in a flow line connecting an oil well to the platform. [Read more](#)

USA: SHUTTLE, ROCKET LIFTOFFS LEAVE LEGACY OF COSTLY CLEANUPS AT KSC

NASA will spend millions removing chemicals from deep beneath launch pads - NASA spent decades to send men to the moon, launch the space shuttles and build a laboratory in space, and now it will take a century to clean up the chemical messes left behind.

Plumes of carcinogenic chemicals used in the launching of the space shuttles, Apollo moon shots and other rockets seeped deep into sandy soils beneath launch pads and other structures at Kennedy Space Center and Cape Canaveral Air Force Station.

They form viscous toxic goo that will take \$1 billion in cleanup costs agencywide over many decades, and could bog down funding for next-generation spacecraft.

NASA estimates it will spend \$96 million in the next 30 years at KSC, including \$6 million this year. The Air Force says it will take another \$50 million to get the rest of its cleanups at Cape Canaveral under way by 2017. [Read more](#)

EMERGENCY SPILL RESPONSE EQUIPMENT SUCCESSFULLY TESTED IN UK, SAYS OSPRAG

The Oil Spill Prevention and Response Advisory Group (OSPRAG) said that the UK oil and gas industry has successfully tested its ability to deploy a well capping device in the waters west of Shetland as part of an effort to further strengthen its emergency response capabilities.

The emergency equipment response deployment exercise aimed at simulating the logistical process of transporting a well capping device, loading it on to a vessel and lowering it over the side before fixing it to a specially-built simulated well on the sea floor.

Total E&P UK executed this exercise on behalf of Oil & Gas UK, a representative organisation for the UK offshore oil and gas industry, and ran from 16 to 26 July 2011 at a site in Block 206/4 off Shetland.

This exercise site was prepared by deploying a specially-built landing base to the seafloor at a depth of 300m to accurately simulate a subsea well.

Oil & Gas UK chief executive Malcolm Webb said that the UK oil and gas industry has a very high level of confidence in its ability to prevent blowouts. [Read more](#)

USA: NEW YORK TIMES VS. NATURAL GAS INDUSTRY



A series of critical articles in the paper of record has the natural gas industry fuming as it struggles to persuade the public that hydraulic fracturing is a safe, clean, inexpensive and reliable way of securing the nation's energy supply for decades to come.

The stories from reporter Ian Urbina have spurred federal investigators and caused falling stock prices. They've questioned the environmental impacts of gas drilling on drinking water as well as the economic health of the industry, casting doubt on rosy federal projections of gas's future and using anonymous quotes to compare the shale gas boom to Enron and the dot-com stock bubble.

The gas industry isn't taking this lying down. It's also gained a prominent ally in Times public editor Arthur Brisbane, who twice in three weeks last month used his Sunday column to criticize Urbina's use of redacted emails, anonymous quotes and references to an Energy Department intern as an "official." [Read more](#)

USA: INVENTORY UPDATE REPORTING AND CHEMICAL DATA REPORTING

In August 2011 EPA issued the [final Toxic Substances Control Act \(TSCA\) Chemical Data Reporting \(CDR\) Rule \(PDF\)](#), (244 pp. 1.3 mb, [About PDF](#)), previously referred to as the [Inventory Update Reporting \(IUR\) Modifications Rule](#). The purpose of this program is to collect quality screening-level, exposure-related information on chemical substances and to make that information available for use by EPA and, to the extent possible, [due to data confidentiality claims](#), to the public. The CDR data are used to support risk screening, assessment, priority setting and management activities and constitute the most comprehensive source of basic screening-level, exposure-related information on chemicals available to EPA.

Read information on [new chemicals](#) and on [programs for existing chemicals under TSCA](#).

Thanks to Don Johnston of ISCO Industry Partner, DG & Hazmat Group, for passing on this news.

CASPIAN STATES TO FIGHT AGAINST WATER CONTAMINATION

As part of the third session of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea held in Aktau, its participants signed a Protocol Concerning Regional Preparedness, Response and Cooperation in case of oil spills. It defines the responsibilities of the parties to take coordinated measures to prevent and respond to oil spills. The necessity of signing such a document had been long on the agenda.

The Caspian region, which has eventually turned into one of the world's major centres of hydrocarbon production, is in dire need of mechanisms to protect the ecological security of the Caspian Sea.

So far, all five Caspian littoral states have met to address environmental issues on the sea on their own. Despite the fact that the Tehran Convention was signed by Kazakhstan, Russia, Azerbaijan, Turkmenistan and Iran in 2003, there was a lack of coordinated actions aimed at protecting the marine environment. The coordinated protocol for responding to spills lasted for 8 years. [Read more](#)

USA & CANADA: HAZMAT CHALLENGE WINNERS

Local Emergency Planning Committees (LEPC) are in the business of increasing awareness of hazardous materials (HazMat) in their community and improving response to HazMat incidents. The annual HazMat Challenge has been held at the Los Alamos National Laboratory (LANL) in New Mexico for the last fifteen years. Participating HAZMAT teams have a chance to network with one another, practice technical skills, and learn new HAZMAT techniques under realistic conditions in a safe environment.

The 2011 HAZMAT Challenge concluded with the Farmington Fire Department coming in first overall and first in technical events. Twelve hazardous materials response teams from Missouri, New Mexico, Oklahoma and Texas tested their skills at the 15th annual HAZMAT Challenge, which was held August 2-5. Held at the LANL Technical Area 49, the event challenged participants to respond to a number of simulated hazardous materials emergencies. [Read more](#)

MR WILLEM OOSTERVEEN



The current Director of the International Oil Pollution Compensation Funds (IOPC Funds), Mr Willem Oosterveen, has informed the Chairman of the 1992 Fund Assembly that he does not wish to seek a second term of office. The post of Director of the IOPC Funds will, therefore, become vacant on 1 November 2011.

Willem Oosterveen took up office as the new Director of the IOPC Funds on 1 November 2006. Mr Oosterveen had a long association with the IOPC Funds, having been Chairman of the 1971 Fund Executive Committee from 1995 to 1998 and of the 1992 Fund Assembly from 1999 to March 2005.

As Senior Legal Advisor to the Netherlands Ministry of Justice, he represented the Netherlands in numerous negotiations in a variety of international organisations since 1990, mainly concerning transport, environmental, liability and electronic commerce law. Since 1999, he has also been a part-time judge at the Court of Appeal in The Hague.

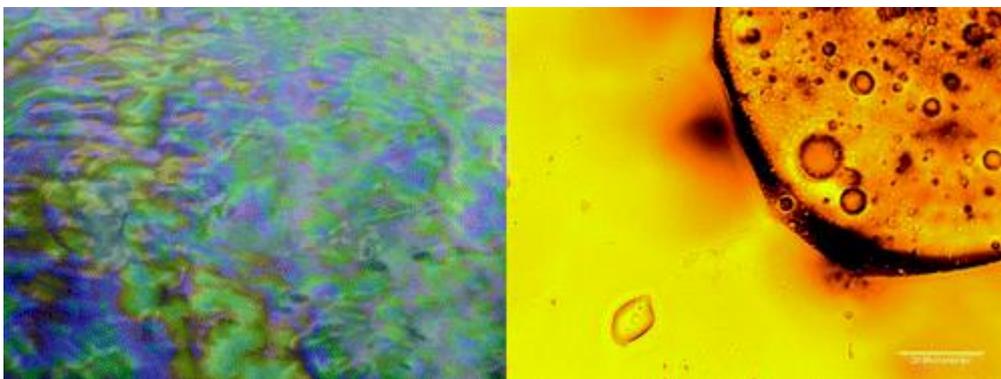
A circular has been issued to all 1992 Fund Member States calling for the nomination for the position of Director:

Science & Technology

OIL BIODEGRADATION AND BIOREMEDIATION: A TALE OF THE TWO WORST SPILLS IN U.S. HISTORY

An article by Ronald M. Atlas, University of Louisville, Louisville Kentucky 40292, United States and Terry C. Hazen Lawrence Berkeley National Laboratory, Berkeley, California 94720, United States

Abstract of Paper Originally published in *Environ. Sci. Technol.*, **2011**, 45 (16), pp 6709–6715



The devastating environmental impacts of the *Exxon Valdez* spill in 1989 and its media notoriety made it a frequent comparison to the BP *Deepwater Horizon* spill in the popular press in 2010, even though the nature of the two spills and the environments impacted were vastly different. Fortunately, unlike higher organisms that are adversely impacted by oil spills, microorganisms are able to consume petroleum hydrocarbons. These oil degrading indigenous

microorganisms played a significant role in reducing the overall environmental impact of both the *Exxon Valdez* and BP *Deepwater Horizon* oil spills.

Petroleum hydrocarbons in crude oils, such as those released into marine ecosystems by the *Exxon Valdez* and BP *Deepwater Horizon* spills, are natural products derived from aquatic algae laid down between 180 and 85 million years ago. Crude oils, composed mostly of diverse aliphatic and aromatic hydrocarbons, regularly escape into the environment from underground reservoirs. Because petroleum hydrocarbons occur naturally in all marine environments, there has been time for numerous diverse microorganisms to evolve the capability of utilizing hydrocarbons as sources of carbon and energy for growth. Oil-degrading microorganisms are ubiquitous, but may only be a small proportion of the prespill microbial community. There are hundreds of species of bacteria, archaea, and fungi that can degrade petroleum.

Most petroleum hydrocarbons are biodegradable under aerobic conditions; though a few compounds found in crude oils, for example, resins, hopanes, polar molecules, and asphaltenes, have practically imperceptible biodegradation rates. Lighter crudes, such as the oil released from the BP *Deepwater Horizon* spill, contain a higher proportion of simpler lower molecular weight hydrocarbons that are more readily biodegraded than heavy crudes, such as the oil released from the *Exxon Valdez*. The polycyclic aromatic hydrocarbons (PAHs) are a minor constituent of crude oils; however, they are among the most toxic to plants and animals. Bacteria can convert PAHs completely to biomass, CO₂, and H₂O, but they usually require the initial insertion of O₂ via dioxygenase enzymes. Anaerobic degradation of petroleum hydrocarbons can also occur albeit at a much slower rates. Petroleum hydrocarbons can be biodegraded at temperatures below 0 °C to more than 80 °C. Microorganisms require elements other than carbon for growth. The concentrations of these elements in marine environments—primarily nitrates (NO₃⁻), phosphates (PO₄³⁻), and iron (Fe)—can limit rates of oil biodegradation. Having an adequate supply of these rate limiting nutrients when large quantities of

Science & Technology (continued)

hydrocarbons are released into the marine environment is critical for controlling the rates of biodegradation and hence the persistence of potentially harmful environmental impacts. Bioremediation, which was used extensively in the *Exxon Valdez* spill, involved adding fertilizers containing nitrogen (N) nutrients to speed up the rates of oil biodegradation.

Most petroleum hydrocarbons are highly insoluble in water. Hydrocarbon biodegradation takes place at the hydrocarbon–water interface. Thus the surface area to volume ratio of the oil can significantly impact the biodegradation rate. Dispersants, such as Corexit 9500, which was used during the BP *Deepwater Horizon* spill, increase the available surface area and, thus, potentially increase the rates of biodegradation.

Overarching Differences Between the Two Spills

Once the BP *Deepwater Horizon* oil leak started, the public and the popular media began to compare it to the *Exxon Valdez* spill which had been up until that time the largest marine spill in the United States. The public notoriety of *Exxon Valdez* spill was dramatic due to its impact on Alaska wildlife and the long litigation process, which is still seeing court action. However, the *Exxon Valdez* and BP *Deepwater Horizon* oil spills were vastly different in terms of the volume of oil, the nature of the oil, and the environments impacted (Table 1). The BP *Deepwater Horizon* oil spill was more than an order of magnitude greater in total volume of oil than the *Exxon Valdez* spill; the BP spill also released considerable amounts of natural gas (methane (CH₄)). The *Exxon Valdez* spill occurred near shore and occurred as a surface slick, while the BP *Deepwater Horizon* spill was a leak from a well 5000 ft (1500 m) below the ocean surface as both a deep-sea “cloud” or “plume” and a surface water slick, more than 50 mi (80 km) from the nearest shore. The BP *Deepwater Horizon* spill was a light crude and more inherently biodegradable initially than the *Exxon Valdez* heavy crude from the North Slope of Alaska. The environments impacted were also very different in terms of climate, weather, and ecosystems, with the *Exxon Valdez* spill occurring in a sub-Arctic region and the BP *Deepwater Horizon* spill occurring in a subtropical region, although the deepwater region directly impacted by the BP spill was cold (<5 °C). The Gulf of Mexico has lots of natural seeps of oil and there have been other spills from drilling rigs, such as the *IXTOC* well blowout of 1979. This is in contrast to the relatively pristine conditions of Prince William Sound which is much more enclosed and shallower than the more open ocean environment where the BP *Deepwater Horizon* spill occurred in the Gulf of Mexico. Indeed the treatments used were also quite different.

Summary

Exxon Valdez and BP *Deepwater Horizon* oil spills provide a number of lessons regarding the role of microbial biodegradation in determining the fate of the spilled oil. Biodegradation and other natural weathering processes will remove most of the contaminating hydrocarbons but it can take months to years in areas of high oil concentrations. Such was the case for oil on shorelines impacted by the *Exxon Valdez* oil spill. The major focus of biodegradation for the *Exxon Valdez* was on the shorelines—oil moved on the surface and while there were studies on decreasing concentrations of oil in the water column no specific biodegradation studies were conducted as they were for the BP spill with its unique deep-water cloud of dispersed oil. Also the advanced molecular techniques for characterizing microbial communities were not available at the time of the *Exxon Valdez* spill; given the advances in molecular biology over the past two decades it is not surprising, therefore, that extensive molecular analyses of microbial communities have been performed in the Gulf of Mexico following the BP *Deepwater Horizon* spill.

When oil is highly dispersed in the water column and where microbial populations are well adapted to hydrocarbon exposure, such as in Gulf of Mexico waters, biodegradation of oil proceeds very rapidly. Bioremediation through fertilizer addition can be an effective means of speeding up rates of oil biodegradation in some situations. One should, however, not expect 100% removal of oil by biodegradation—patches of highly weathered oil likely will remain in some environments. Decisions as to whether or not to rely upon microbial oil biodegradation, including whether to apply bioremediation, should be driven by risk and not just the presence of detectable hydrocarbons. In the case of the BP *Deepwater Horizon* spill, the leak was capped on July 15; by the first week of August, no surface oil slick was observed and concentrations of detectable oil in the water column were greatly diminished.(33) The natural rapid attenuation of oil in the BP *Deepwater Horizon* spill is due to a number of parameters, for example, type of crude, offshore, jetting of the oil in to the deep-sea, rapid dissolution, and microbial adaption. The Gulf of Mexico has more natural seeps of oil than any marine area in North America, contributing more than 400000 barrels of oil a year to the Gulf of Mexico.(37) In the Gulf of Mexico the microbiota are likely to be better adapted to oil because of natural seeps and offshore drilling then almost anywhere else in the world. Thus, it is not surprising that bacteria in the Gulf of Mexico responded rapidly to the influx of oil.

In conclusion, the fate of all oil spills will depend upon a unique set of circumstances that will govern risk and impacts, including the volume of oil spilled, the chemical nature of the oil, and the ecosystems with their specific environmental conditions impacted by the spilled oil. However, one common denominator is the cosmopolitan nature of oil-degrading microbes. Natural and enhanced biodegradation greatly reduced the concentrations of oil following both the *Exxon Valdez* and BP *Deepwater Horizon* oil spills. It was the unseen microbes that were largely responsible for the disappearance of the spilled oil that had spread into the environment. Responders to future spills would do well to mobilize as rapidly as possible a scientific understanding of the unique conditions of the spill, that is, to determine both natural and enhanced biodegradation and what the best possible approach will be to minimize the risk and impact of the spill on the environment.

Note for Editor – Because of space limitation only the beginning and the end of the abstract has been reproduced above.

To read the complete abstract please click [HERE](#)



In this issue of the ISCO Newsletter we are printing No. 38 in a series of articles contributed by Dr Douglas Cormack.

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

KNOWLEDGE OF THE FATE OF RELEASED OIL / HNS (CHAPTER 38)

The previous review of oil slick combustion suggests that smoke (soot) is the most significant product. The smoke yield from experimental fires directly determined by use of filters, indicate 10 -15% yields from large fires which thus produce highly visible (optically dense) plumes for which opacity $K = kV/m$ where k is the light extinction coefficient per metre, V the volumetric flow rate through a duct above the combustion area, and m is loss rate of fuel mass. The consequence of this relationship is that were smoke produced by 1gm of combustible to be collected over an area of $1m^2$, the light incident on this area would be completely blocked for $K=1m^2g^{-1}$. On this basis the average value of K for Alberta Sweet crude was found to be $0.87 m^2g^{-1}$ and for Prudhoe Bay crude it was $0.96 m^2g^{-1}$. However, while smoke production increases with decrease in air supply, measurement on heptane pool fires of diameter 0.3 to 6.0 metres suggest that from base to flame tip the entrained air is five times the requirement for complete stoichiometric combustion.

So far we have been reviewing knowledge of combustion products close to the source where their effects are most intense. Assessment of the environmental effect, however, requires consideration of the subsequent transportation and associated dilution of these initial effects as their plume moves down wind from its source. This smoke plume has a circular or elliptical cross-section as it rises above the combustion zone because of its buoyancy which in turn is caused by its gas/vapour density and soot content. However, as the plume rises its buoyancy decreases because it entrains the surrounding cooler air until finally at a certain height it begins to fall as cooling continues while it moves downwind from its source. During this period, crosswind vortices within the plume distort its circular/elliptical cross-section into a kidney shape while its crosswind vertical width continues to increase until its lower regions make contact with the sea or land surface.

Computer simulations show that the area of surface contact may extend over hundreds of kilometres for a burn area of $100m^2$. For meso-scale burns, air contamination by combustion gases were found to reach acceptable levels at 500 metres downwind while particle contamination levels were acceptable 150 metres downwind, though deposition of particles within that distance is far from uniform with local deposition rates being correspondingly difficult to predict. However, with smoke particles below 10 microns attracting much attention because of their ability to deposit in the lower respiratory regions efforts have been made to reduce smoke formation in the intentional burning of oil slicks.

To this end, laboratory experiments have shown that chemicals such as ferrocene (bis-cyclopentadienyl iron) and its derivatives reduce smoke formation by 70 - 94% when added to oil to the extent of 2 - 4% by weight depending on oil type. Thus, while the soot production from burning hydrocarbons is highest for aromatics and decreases from them through branched paraffins, cycloalkanes and straight-chain paraffins, soot reduction by ferrocene is highest for aromatics and branched paraffins. However, ferrocene additions < 2 - 4% are ineffective because it sublimes at $100^\circ C$ and so is lost at burning oil temperatures which are typically in the range $150 - 450^\circ C$. Nonetheless some derivatives such as butyl and pentyl ferrocenes are already more convenient to use in being liquids dissolvable in kerosene to the density of the oil to be combusted and are excellent soot reducers though still expensive.

The mechanism of soot reduction appears to depend on the catalytic oxidation of carbon to carbon dioxide by iron according to: $2Fe_2O_3 + 3C = 4Fe + 3CO_2$, a mechanism supported by observation of combustion particles consisting of a core of iron oxide surrounded by a carbon layer. Thus far, ferrocene type compounds remain the most effective soot reducers.

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.

Training

AUSTRALIA: MELBOURNE BULK TANKER EMERGENCY RESPONSE DAY

September 8, 2011. This is the third annual Bulk Tanker Emergency Response Day under the banner of sharing lessons and improving outcomes. Jointly hosted by the National Bulk Tanker Association (NBTA) and the Australasian Fire and Emergency Service Authorities Council (AFAC) the day focuses on how to better manage emergency response with a focus on bulk tanker incidents. [More information](#)

Events

HELCOM TO STAGE A DISASTER RESPONSE OPERATION OFF BORNHOLM

The Helsinki Commission for the protection of the Baltic marine environment will conduct its annual maritime exercise BALEX DELTA 2011 on 30 August off the Danish island of Bornholm to test the Baltic Sea countries' preparedness to jointly respond to a major oil spill accident at sea.

This operational exercise, the largest maritime emergency and counter-pollution drill of its kind in the Baltic Sea area and one of the largest worldwide, will involve the release of simulated oil, the deployment of pollution response vessels from the coastal countries, the establishment of a unified command structure and communication system, and a full-scale oil recovery operation at the site of the accident, including actual deployment of oil containment booms and skimming equipment. Additionally, the exercise will include oiled wildlife response and shoreline clean-up part.

It is expected that 14 oil-pollution-combating ships and smaller vessels from eight HELCOM countries - Denmark, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden, as well as a Danish pollution patrol aircraft will take part in the exercise. Also, the European Union (which is one of the HELCOM Members) will be represented by one response vessel chartered by the European Maritime Safety Agency (EMSA). In addition, over 20 observers from all the Baltic Sea countries, as well as EMSA will be monitoring the actions of the response units. The Exercise Evaluation Team will consist of representatives of Denmark, Finland and Lithuania. [More information](#)

Products and services

ISCO MEMBER, POWER PLUS CLEANING SOLUTIONS INC. REPORT FROM JAPAN

On July 2nd, 2011, Powerplus Cleaning Solutions presented to the Japanese government its proof of concept in decontaminating radiation levels. In short, it was both a success and learning experience.

After arriving in Japan, our team set up the equipment at a local baseball field. Many spectators brought meters that measured only Gamma Radiation, reflecting the public's sole concern with the one type of radiation. However, Alpha and Beta radiation are an even great threat.

The team first attempted to decontaminate an area of grass just outside the bleachers. After a single pass, the amount of radiation actually increased. We now know that an area requires multiple passes to remove radiation from grass. While we found many areas with doses around 220-240cps (which is about triple the normal amount for that area) we also found "hot-spot" areas with biological mass (i.e. moss and mold) with levels in excess of 16,000cps!

Overall, we recorded 50 – 96.7% drops in radiation levels! We even experienced some instances of cleaning to below normal levels of radiation. A representative announced these results over the loudspeaker to the sounds of "oooo" and "ahhhh" from the gathered crowds.

The next day, we decontaminated a tennis court. The first section was cleaned slowly and methodically. When reminded of the time deadline, the team turned the machine way up and dramatically sped up the process; however, the results for the remaining sections achieved readings identical to the first section.

Since our trip, we have developed other methods and technologies that will greatly improve our results. Among these improvements are two new wands specifically designed for faster decontamination and better yield. Additionally, we created a decontamination platform that can be driven.

If you think that this is the end of the story, guess again! Powerplus has again been requested to demonstrate for another group in Japan in the coming weeks. We are confident that we will far exceed our results from the last trip and prove to Japan and the world that we are the leading cleaning solution. [Full report available on ISCO Downloads Page](#)



UK & IRELAND: 24-7 RESPONSE - LEVEL 1 RESPONSE NOW AVAILABLE FROM OHES

24-7 Response provides specialist advice over the telephone, 24 hours a day, on how to handle emergency situations involving spillages and hazardous goods.

Our Incident Advisors are all qualified chemists, they understand supply and transport legislation and are experienced in providing advice to those dealing with emergencies. At the time of a call they would ask the caller questions to build up a picture of the situation, then use their expertise, product information (e.g. Safety Data Sheets) and other sources to advise the caller on the best actions to take to minimise the risk to people, the environment and property.

Products and services (continued)

The emergency numbers that are displayed on Hazchem placards of bulk fuel and chemical tankers are often checked by authorities. If there is a “no response” or “inadequate response” when the number is called, the guidance is for the vehicle to be issued with a Prohibition Notice. It can be difficult for operators to ensure that specialist advice is available at all times when their vehicles are on the road. 24-7 Response offers a cost-effective and reliable solution, providing clients with a telephone number that can be displayed on their vehicles, on depot signage, in drivers' procedures and on Safety Data Sheets.

For incident response there are three recognised stages:

- Level 1 - Specialist advice given over the telephone
- Level 2 - Specialist advice given at the scene
- Level 3 - Clean-up and incident resolution

Clients insured with OAMPS Petrochemical already automatically benefit from Level 2 & Level 3 response as part of their insurance programme. Now you can take advantage of an integrated incident response and purchase your Level 1 response through 24-7. [More information](#)



ISCO Announcements

ISCO LAUNCHES ITS OWN FORUM ON LINKED IN

For quite a long time ISCO has been considering the provision of a forum facility that would enable members and their friends to exchange thoughts, ideas, and information. Initially, the plan was to create the forum on the ISCO website but there was a concern that providing the facility could create a lot of extra work.

Recently, your editor joined Linked-in Group called Oil Spill Professionals and, having found that the matter of posting news or starting a discussion is very easy, has now set up the ISCO Forum on Linked-in.

Joining the ISCO Forum is very simple - and it's free !

If you're not a member of Linked in –

Just Google “Linked in” and follow the “Join Linked” in instructions.

If you are already a member of Linked in -

- (1) Click on <http://www.linkedin.com/groupsDirectory>
- (2) On the left hand side of the page type ISCO in the “keywords” box
- (3) Click on “Search”
- (4) You will see the ISCO logo and “International Spill Control Organization”
- (5) Click on “Join Group” and follow instructions.

Alternatively, just drop me a line at john.mcmurtrie@spillcontrol.org and I'll send you an invitation to join the ISCO Group

When you receive the invitation, just click “Accept”

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