

ISCO & THE ISCO NEWSLETTER

The ISCO Newsletter is published weekly by the International Spill Control Organisation, a not-for-profit organisation supported by members in 45 countries. ISCO has Consultative Status at IMO, Observer Status at IOPC Funds and is dedicated to raising worldwide preparedness and co-operation in response to oil and chemical spills, promoting technical development and professional competency, and to providing a focus for making the knowledge and experience of spill control professionals available to IMO, UNEP, EC and other organisation.

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CHALLENGING THE VALIDITY OF RECENT CLAIMS THAT DISPERSANTS SUPPRESS BIODEGRADATION

The previous two issues of ISCO News have carried items titled "CHEMICAL DISPERSANTS CAN SUPPRESS THE ACTIVITY OF NATURAL OIL-DEGRADING MICROORGANISMS" and "NEW STUDY QUESTIONS EFFECTIVENESS OF DISPERSANT AT DWH OIL SPILL". These items stem from published research (paper by Kleindienst et al., 2015) based on attempted laboratory simulation of subsea dispersant use during the Deepwater Horizon (DWH) spill. There was widespread media response to this research, questioning the ability of dispersants to enhance biodegradation of oil. This conclusion was used to imply that significant quantities DWH oil may remain on the seabed.

Kleindienst, S., M. Seidel, K. Ziervogel, S. Grim, K. Loftis, S. Harrison, S.Y. Malkin, M.J. Perkins, J. Field, M.L. Sogin, T. Dittmar, U. Passow, P.M. Medeiros and S.B. Joye. 2015. Chemical dispersants can suppress the activity of natural oil-degrading microorganisms. Proceedings National Academy of Sciences (USA) in press. doi:10.1073/pnas.1507380112

The published paper states that "Our laboratory experiments simulated the conditions of the Deepwater Horizon (DWH) deepwater plume very realistically". Examination of the author's methodology by Alun Lewis reveals this statement cannot be substantiated. The researchers used dispersant concentrations approximately 2,500-4,500 times higher than the maximum measured in the plume at the DWH incident. This invalidates all conclusions made in relation to the real world subsea use of dispersant and related rates of biodegradation. For interested readers a detailed explanation of the paper's dispersant concentration error is included as a contributed article from Alun Lewis on Pages 8-11.

STRENGTHENING OIL SPILL RESPONSE IN AFRICA



November 19 - Oil spill response strategies and challenges have been addressed at a regional conference in Accra, Ghana (16-19 November) which concluded today. The

objectives were to raise awareness of the importance of oil spill preparedness as well as identifying gaps in how to deal with them. Participants from West, Central and Southern Africa were also encouraged to share information and lessons learned on dealing with oil spills in their countries. IMO together with global oil and gas industry stakeholders, is helping the region to enhance its capacity to better prepare and respond to potential marine oil spills. It does so, by organizing training, seminars and deployment exercises.

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International news (continued)

The meeting also approved priority actions for the next biennium with key features to emphasize the promotion of public and private partnership.
Source: IMO Press Release

FLASHBACK HISTORY: PRESTIGE SINKING



November 19 - The Prestige was just another anonymous ship decaying on the high seas until one final storm found it in the world's headlines. The Liberian single hull tanker flying the flag of the Bahamas ran into trouble on November 13, 2002, off northwestern Spain.

On the orders of the government, it was towed around for six days, laden with fuel, to try to distance it from the Galician coast.

On 19 November 2002, the single-hull Aframax tanker PRESTIGE broke in two and sank in waters of the North Atlantic off the northwest coast of Spain. At around 8:00 a.m. on November 19, the ship split in half. The initial release of oil into the sea was over 20 million US gallons (76,000 m3). Click on: [Green4Sea commemorates the anniversary with an article and videos of the event.](#)

US, CUBA DISCUSS HOW TO CONTAIN OIL SPILLS

November 21 - Florida's coral reefs and delicate marine environment could become less vulnerable to pollution from potential oil spills under an agreement taking shape between the United States and Cuba.

The agreement would clear the way for American companies to provide the latest blowout preventers and other pollution controls to help stave off spills in Cuban waters and contain slicks before they ride the ocean currents to Florida.

The breakthrough would ease years of anxiety about oil exploration off the north coast of Cuba and help avoid a giant spill less than 50 miles from the Florida Keys.

Environmentalists and oil-cleanup experts hope the two old adversaries complete the cooperative arrangement before Cuba resumes its hunt for oil late next year or in 2017. *The Charlotte Observer* [Read more](#)

BIODEGRADABLE PLASTICS DON'T WORK AT SEA – SAYS NEW UN STUDY



In the picture: Peter Kershaw, co-author of the report.

November 23 "Don't discard 'Biodegradable' plastics at sea" asks a new report from the United Nations because biodegradable plastics don't disintegrate in the ocean.

Complete degradation of biodegradable plastic occurs when none of the original polymer remains, a process involving microbial action (i.e. it is broken down to carbon dioxide, methane and water) but this process requires microbes found in soil and prolonged temperature above 50°C. Such conditions are rarely met in the marine environment.

"When plastics get in the ocean, the rates of degradation are even lower because UV light penetration and heat are limited," said Peter Kershaw, coauthor of the UN study. "It's cold, there's less oxygen. So it's just going to stay at sea for an extremely time." *gCaptain* [Read more](#)

ADDRESSING ILLEGAL, UNREGULATED AND UNREPORTED FISHING

November 25 - Address navigational hazards and marine pollution problems caused by abandoned, lost, or otherwise discarded fishing gear is among a series of recommendations considered by a working group on Illegal, unreported and unregulated (IUU) fishing.

The joint Food and Agriculture Organization (FAO)/IMO working group, meeting at IMO Headquarters (16-18 November), also recommended continued efforts to support and facilitate the entry into force of IMO's 2012 Cape Town agreement on fishing vessel safety, as well as the FAO's Port State Measures Agreement.

It also proposed that FAO and IMO consider developing international guidelines on marking fishing gear and suggested considering further expansion of the IMO Ship Identification Number Scheme with a view to achieving phase 1 of the Global Record for Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels, while exploring potential future expansion of the scheme to fishing vessels of less than 100 GT.

Recommendations from the joint group will be forwarded to IMO's Maritime Safety and Marine Environment Protection Committees and the FAO Committee on Fisheries. Representatives of 26 States participated, as well the Secretariats of IMO, FAO, the International Labour Organization and several other stakeholders. [Green4Sea](#) [Read more](#)

Note from Editor – Perhaps you are wondering what this news item has to do with spill response. I am raising the matter because the removal of fuel oil from wrecked or grounded fishing vessels is a task that is often carried out by salvors and oil spill response contractors. However, when a fishing vessel on the rocks is in danger of breaking up in rough weather, oil is not the only pollutant that can be released – fishing nets lost overboard pose a lethal threat to marine mammals, entrapping and killing thousands every year.

Think about this – If you have already been mobilized to remove the oil, it's not a big deal to remove the nets at the same time. If the wreck is in a remote location, you may need to pump the fuel oil into pillow tanks or IBCs for removal by helicopter as an underslung load – nets can be removed in the same way. If the vessel has been declared a constructive total loss another option might be to burn the nets, by setting the vessel on fire (not too difficult if it's a wooden vessel). Generally the additional cost of removing nets is quite marginal if contractor has already been mobilized for fuel oil removal and in our experience insurers are willing to accept this in the interests of protecting marine life. While you're at it consider the environmental (and possibly economic) benefits of removing other polluting materials – for example, the recovery of refrigerant fluid from a wrecked reefer.

OIL SPILLS' ENVIRONMENTAL IMPACT: KNOWLEDGE GAPS CITED IN NEW REPORT

November 25 - Oilsands crude may not be worse than other kinds of oil when spilled, Royal Society finds - A report by the Royal Society of Canada says there are major research gaps when it comes to understanding the environmental impacts of oil spills in water.

The expert panel is calling for a nationally co-ordinated research program involving academia, government and industry that includes studying controlled oil spills in the field. [Read the full report](#) [CBC News](#) [Read more](#)

ITOPF ENVIRONMENTAL AWARD WON BY 'OIL-FREE' PROPELLER SHAFT



Dr Karen Purnell presenting the award to George Morrison of Thordon Bearings Inc (photo courtesy of Tanker Shipping & Trade)

November 26 - The first Environmental Award to be presented at the Riviera Maritime Media's Tanker Shipping & Trade Conference was sponsored by ITOPF and awarded to Thordon Bearings Inc. for its COMPAC system. Dr Karen Purnell presented the award to George Morrison, Thordon Bearings' Regional Manager West Europe and Africa, at the awards ceremony on 19th November, rounding off the two day Tanker Shipping and Trade Conference & Awards.

COMPAC, a seawater lubricated propeller shaft bearing system, prevents the seepage of millions of litres of oil into the world's oceans and reduces ship operating costs associated with aft seals and lubricating oil.

Dr Karen Purnell who sat on the award judging panel, alongside representatives from INTERTANKO, IACS, UK MCA and Scorpio Tankers, said "It is a challenge to identify opportunities that assist shipowners in meeting environmental standards cost-effectively and that don't end up creating new environmental problems. The COMPAC system meets this challenge and it is for that reason - and the system's simplicity - that we were able to present Thordon Bearings with the award."

Other award recipients included ITOPF's Chairman and CEO of Euronav, Paddy Rodgers, who won the Industry Leader Award.

Source: ITOPF Press release <http://www.itopf.com>

UPDATES ON OILED WILDLIFE RESPONSE PREPAREDNESS

November 26 – ISCO Industry Partner, The Sea Alarm Foundation, has published reports on the EUROWA Equipment Inspection and Exercise (Hamburg, Germany, October 2015); Oiled Wildlife Training in Ireland ((OWRN, Ireland), Wildlife Rescue Centre Ostend (WRCO, Belgium) and ProBird (Germany); ‘Joint Industry Project’ explores global oiled wildlife preparedness and response meeting (Brussels, Belgium, September 2015); and Sea Alarm’s assistance to the international response to Flinterstar incident (Belgium and the Netherlands (October 2015). *Sea Alarm Foundation* [Read more](#)

Incident reports from around the world

USA: LAKE ERIE - LIGHTERING OF SUNKEN TANKER BARGE BEGINS



Responders aboard a work barge for the Lake Erie Barge Argo response are shown in Level B Personal Protection Equipment (PPE) as they decontaminate a diver.

November 22 - Lightering operations began over the weekend for the sunken tanker barge Argo in Lake Erie in the U.S. The barge, which sank in a storm in 1937, was discovered to be leaking in October.

The first of Argo’s eight tanks are currently being tapped and offloaded. The product will be pumped into a specialized container on a work barge where it will be run through a series of carbon filters to separate and remove the flammable vapors from the product.

An initial investigation earlier in November showed the tank contained benzene with some toluene, xylene and trace elements of petroleum. Because these materials are not typically shipped on the Great Lakes, the proper equipment to remove it had not been available in the region. *The Maritime Executive* [Read more](#)

CANADA: ONTARIO - PIPELINE SPILL IN PARIS AREA CAUSES SIX NATIONS CONCERN

November 25 - Concern over a potentially leaky pipeline valve in the Paris, Ontario region has Six Nations and local Paris-area residents seeking answers from Enbridge, which owns the pipelines, and Sun-Canadian which transports the petroleum products through their parent company’s pipelines. In this case, the product being carried through the pipeline in question is diesel oil.

The suspected spill may not have been reported at all had a Glen Morris area resident, Steve Charest, not alerted members of the Six Nations Men’s Fire to the possible leakage into the Grand River, which runs close by and supplies Six Nations with drinking water. *Two Row Times* [Read more](#)

FIJI: RO/RO GOES DOWN OFF SUVA

November 25 - The 3,600 grt ro/ro vessel Suilven listed, capsized and sank at the entrance to Suva’s harbor on November 23, within a few cables of its destination. All hands aboard were rescued by the harbor’s pilot vessel, the first on scene, and by local emergency teams. The Suilven had about 30 containers and several trucks aboard. Authorities say that there were no casualties. *The Maritime Executive* [Read more](#)

BRAZIL: MINE SPILL BRAZIL'S WORST ENVIRONMENTAL CATASTROPHE: MINISTER



Image: An aerial view of the Rio Doce (Doce River), which was flooded with mud after a dam owned by Vale SA and BHP Billiton Ltd burst, at an area where the river joins the sea on the coast of Espirito Santo in Regencia Village, Brazil, November 23, 2015. REUTERS/Ricardo Moraes

November 20 - A deadly mine waste spill that buried a village and contaminated a river basin two weeks ago is the worst environmental disaster in Brazilian history, the environment minister said Friday. Izabella Teixeira estimated it would take 30 years to clean up the Doce basin in southeast Brazil, where the spill killed at least 12 people, left 280,000 without water and smothered thousands of fish, turtles and other animals. The disaster struck on November 5, when a dam collapsed at the waste reservoirs of an iron ore mine owned by Samarco, a joint venture between the mining giants BHP Billiton of Australia and Vale of Brazil. *Terra Daily* [Read more](#)

November 22 - Brazil dam toxic mud reaches Atlantic via Rio Doce estuary - A wave of toxic mud travelling down the Rio Doce river in Brazil from a collapsed dam has reached the Atlantic Ocean, amid concerns it will cause severe pollution. The waste has travelled more than 500km (310 miles) since the dam at an iron mine collapsed two weeks ago. Samarco, the mine owner, has tried to protect plants and animals by building barriers along the banks of the river. *BBC News* [Read more](#)

November 27 - Arsenic and mercury found in river days after Brazil dam burst - Illegal levels of arsenic and mercury polluted the Rio Doce river in the days after a dam burst at an iron ore mine in early November in Brazil's worst-ever environmental disaster, according to tests by a state water agency.

The Institute for Water Management in Minas Gerais (IGAM), found arsenic levels more than ten times above the legal limit in one place along the Rio Doce after the dam burst on Nov. 5, killing at least 13 people and flooding thick mud across two states. Mercury slightly above the permitted level was also found in one area. In total, IGAM found unacceptable levels of arsenic on one or more days between Nov. 7 and Nov. 12 at seven places on the Rio Doce, which stretches over 800 km (500 miles) from the mineral-rich state of Minas Gerais to Espirito Santo on the Atlantic coast. *EMTV* [Read more](#)

November 27 - Australia's BHP denies UN report on 'toxic' mine spill from collapsed dam in Brazil - The mining giant said in a statement the waste water in the dam, a by-product of iron ore extraction known as tailings, did not pose any threat to humans. BHP said: "The tailings that entered the Rio Doce were comprised of clay and silt material from the washing and processing of earth containing iron ore, which is naturally abundant in the region." *Merco Press* [Read more](#)

CANADA: OPINION: BAN ON OIL TANKERS? WHAT HAPPENED TO EVIDENCE-BASED POLICY?

November 24 - During the recent election campaign, the new federal government committed to pursuing evidence-based public policy. In the mandate letters delivered to each minister at the end of last week, there is a sentence that states: "Our work will be informed by performance measurement, evidence, and feedback from Canadians."

We applaud that sentiment — the unofficial motto of the Fraser Institute is: "If it matters, measure it."

It is curious, then, why one of the first mandate items that the new minister of transportation will follow is to "formalize a moratorium on crude oil tanker traffic on British Columbia's North Coast." Because any review of the actual data on tanker safety would dispel the idea that this policy is evidence-based. *The Vancouver Sun* [Read more](#)

CANADA: FASTER RESPONSE ON OIL SPILLS NEEDED, SCIENTIST SAYS

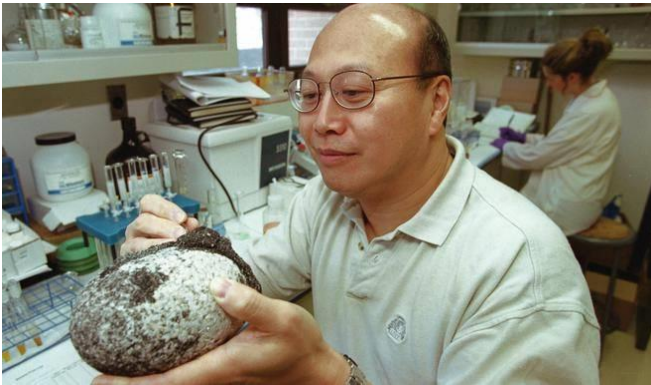


Photo: Former BIO research scientist Ken Lee inspects an oil encrusted stone. Lee has chaired an expert panel researching how oil behaves and affects ecosystems when released into water. (STAFF / File)

November 24 - On Feb. 4, 1970, the tanker Arrow foundered on Cerberus Rock in Chedabucto Bay. Over days of hard weather, it was split in two and most of its 10-million litre cargo of bunker C oil ended up washing ashore along the coastline near the entrance to the Strait of Canso.

As part of the cleanup effort, bulldozers were brought to some areas to remove oil-soaked sediment. "That actually did more damage to the environment," Kenneth Lee said Tuesday.

The former head of the offshore energy research centre at the Bedford Institute of Oceanography has chaired an expert panel

researching how oil behaves and affects ecosystems when released into water.

The 456-page report, commissioned by the Canadian Energy Pipeline Association and the Canadian Association of Petroleum Producers, comes as Shell begins preparations to drill an exploratory well on the Scotian Shelf.

It recommends the creation of a national database that would help model how different types of oil spills would behave in Canada's varied marine environments. Coupled with this data would be ecosystem information on how different species would be affected. The idea is that when a spill occurs, responders can avoid doing more harm than good. *Chronicle Herald* [Read more](#)

November 25 - Royal Society calls for more research into oil spills' impact on water - A report by the Royal Society of Canada says there are major research gaps when it comes to understanding the environmental impacts of oil spills in water.

The expert panel is calling for a nationally co-ordinated research program involving academia, government and industry that includes studying controlled oil spills in the field.

The report's release comes as Canada's oil producers clamour for ways to get their oil to market and industry critics sound alarms over the safety of moving crude via pipelines, train and tanker.

The panel says the heavy oilsands-derived crude that would move through proposed pipelines like Energy East and the Trans Mountain Expansion has components that are less likely to break down in water than lighter types of oil. But the panel cautions the chemical makeup of the crude is only one variable. Weather conditions and response time are big factors in how environmentally damaging a spill ends up being. *CTV News* [Read more](#)

November 25 - Canada's Oil Spill Response Plans Fragmented and Incomplete: Royal Society of Canada - A lack of reliable scientific information about what happens when crude oil is spilled into rivers or the ocean and a fragmented system of response plans is hindering Canada's efforts to prevent and clean up oil spills, says a major report by the [Royal Society of Canada](#). The lengthy report was written by a panel of seven experts on oil chemistry, behaviour and toxicity.

Case studies, including [B.C.'s Pine River pipeline break](#) and the [April leak of fuel oil into Vancouver's English Bay](#), showed delays in response time were common, with causes ranging from poor communication and coordination among government agencies to lack of preparedness.

But the main problem was an absence of reliable scientific data. "There is a critical need for a coordinated and integrated database of information relevant to the assessment of risk of oil spills in Canada," says the report. *Desmog Canada* [Read more](#)

[Download the Royal Society of Canada Report](#)

GHANA IS PREPARED TO TACKLE OIL SPILL – EPA

November 23 - The Environmental Protection Agency (EPA) is confident Ghana is prepared to tackle any oil spill along its coast.

According to the head of Petroleum at the EPA, Kojo Agbenor-Efunam, Ghana has an updated sensitivity mapping that aids to identify and monitor areas along the coast and it will be heavily affected if there is a spill.

"There is no single country in this world that can protect its entire coast line so you prioritize and know the areas that you can protect," Agbenor-Efunam told Starr Business at the Global Initiative for Western and Central African regional conference in Accra. *StarrOnline* [Read more](#)

INDIA: "TOXIC WASTE AT BHOPAL GAS TRAGEDY SITE WORRISOME"

November 24 - Thousands of tonnes of toxic chemical waste, remnants of the 1984 Bhopal gas tragedy in which over 3,000 people were killed, is still dangerously polluting the area, an expert has warned. Satneesh Shadangi of the Bhopal Group For Information and Action said the pollution due to the toxic material in the Union Carbide premises is steadily rising. However, successive governments have failed to act to contain this, posing a direct threat to life. *Odisha Sun Times* [Read more](#)

Other news reports from around the world (continued)

USA: CALIFORNIA - CHEMICAL LEAK AT LIVERMORE OIL FIELD MAY HAVE CONTAMINATED SOME ALAMEDA COUNTY WATER SUPPLIES

November 24 - A hazardous chemical leak at an oil field in Livermore may have contaminated an underground aquifer used for drinking water, according to inspection reports obtained by the NBC Bay Area Investigative Unit.

E&B Natural Resources, which operates the oil field, failed to quickly notify state and local regulators of the leak, despite legal obligations to report it immediately.

"It was not reported," said Susan Hugo, the head of the Hazardous Materials Division at Alameda County's Department of Environmental Health. "The leak was not reported to us."

Records show E&B discovered the leak at the end of March while removing an unused oil tank. Now, more than seven months later, local and state officials are still waiting on test results to determine whether people might be at risk because of contaminated water supplies.

"I wouldn't say they are at risk or not," Hugo said. "We don't know that yet." *NBC Bay Area* [Read more](#)

USA: 28 MORE OIL TRAINS ACROSS STATE EACH WEEK IF BIG TERMINAL BUILT, STUDY SAYS

November 24 - A major oil terminal proposed for Vancouver, Wash., would bring an additional 28 oil trains per week across the state and launch a new era of oil-tanker traffic down the Columbia River, according to a draft state study released Tuesday.

The primary markets for the oil would be Washington, California, Hawaii and Alaska refineries, according to the study by the state Energy Facility Site Evaluation Council. But the facility also may handle Canadian oil, opening the door for exporting that crude or, if a federal ban was lifted, sending U.S. crude overseas.

In addition to the risks of oil trains derailing and causing spills or fires, an analysis in the study says an oil spill can be expected once every 20 years from a marine tanker collision or grounding.

The Vancouver Energy terminal — proposed by Tesoro Corp and Savage — would be the largest of its kind in North America, able to handle an average of 360,000 barrels of oil a day. *The Seattle Times* [Read more](#)

VENEZUELA: OIL STAINS WITHIN THE PORT OF MARACAIBO

November 24 - The Lake Maracaibo is an important loading place for the Venezuelan oil with approximately 11,000 active wells and 45,000 kilometers of underwater pipelines, where about 1.5 million barrels are exported through main terminals located at Puerto Miranda, La Salina and Bajo Grande.

In recent years there has been a recurring problem of oil pollution in the lake that seems to stem from micro-spills from operations at the oil installations. In some terminals controlled by PDVSA as La Salina for example, these frequent operational spills cause staining problems to hulls regularly. Over time that oil has accumulated at many areas of the lake and seasonal phenomena of the lake, as well as currents, heavy rain and the formation of Lemna during summer months, create large assemblies of oiled debris which sometimes can reach other non-oil installations like the commercial port of Maracaibo. Unfortunately, there is no an official statement on the source of these spills.

When this occurs to vessels berthed at the oil terminals, the state oil company PDVSA normally undertakes the cost and logistics for the cleaning, but when it happens at the commercial port it becomes difficult to get the corresponding commitment from PDVSA or Bolipuertos as the agency in charge of the administration of the public port. *Green4Sea* [Read more](#)

ISCO news

ISCO WELCOMES NEW MEMBERS

ISCO is pleased to announce that the following new members have joined the organization –

Foru-Solution BV, based in Harlingen, The Netherlands, has joined as a new Corporate Member. The company is the manufacturer of the FORU (Floating Oil Recovery Unit), a unique high capacity offshore system that operates as an adjustable down-draught system that performs skimming activities. Website: <http://foru-solution.com/index.html>

Leadership Indonesia PT, based in Jakarta, Indonesia, has joined as an Industry Partner. The company is a NI-accredited training organization, also providing consultancy services, including oil spill modelling, contingency planning and environmental sensitivity mapping for its clients which include more than twenty oil companies. Website: <http://www.leadership-indonesia.com/index.php?l=en>

THE EDUCATIONAL ROLE OF THE ISCO NEWSLETTER

The ISCO Newsletter has in the past published excellent serialised articles on such matters as inland spill response, aerial observation of oil spills, in-situ burning, etc. by respected experts including Dr Merv Fingas and Mark Francis. Your editor is currently looking for interesting articles of this kind. If you think you can help, please get in touch. john.mcmurtrie@spillcontrol.org



CHALLENGING THE VALIDITY OF RECENT CLAIMS THAT DISPERSANTS SUPPRESS BIODEGRADATION

Alun Lewis is an authority on oil spill dispersants and other technical aspects of oil spills such as oil 'weathering' and the fate and behaviour of spilled oil and aerial surveillance of oil spills. A graduate chemist, he worked at the BP Research Centre from 1967 until 1992, specializing in oil spill dispersants and other aspects of oil spill response from 1979 onwards. In 1993 he worked at the UK Government's Warren Spring Laboratory and then at SINTEF in Trondheim, Norway until 1997, continuing studies on oil weathering of the use of oil spill dispersants. Alun returned to the UK and worked for AEA Technology until becoming an independent oil spill consultant in 1998. Alun has worked with many organizations, both commercial and government, throughout the world, including IPIECA and OSPRI. He has presented on numerous oil spill response / dispersant training courses over the years.

Comments on the Kleindienst et al paper;

"Chemical dispersants can suppress the activity of natural oil-degrading microorganisms" by Alun Lewis, Independent Oil Spill Consultant

a. Background

The publication on the PNAS web-site on 9th November of the above Kleindienst *et al* (there are 13 other authors) paper certainly created a good deal of media interest on the internet. The principal researcher, Dr. Samantha Joye (who is the Athletic Association Professor in Arts and Sciences in the Department of Marine Sciences in the University of Georgia's Franklin College of Arts and Sciences) was widely quoted in the press: "*The dispersants did a great job in that they got the oil off the surface,*" Joye said. "*What you see is the dispersants didn't ramp up biodegradation.*" In fact, she said she found the oil with no dispersant "*degraded a heckuva lot faster than the oil with dispersants.*"

The publication of the paper was picked up by numerous media outlets in the USA and further afield. In the UK, the Telegraph (and other UK newspapers) picked up the story under the headline "*Half of oil from BP's Gulf of Mexico spill 'may still be on sea floor'*" with quotes such as "*The dispersants did a great job in that they got the oil off the surface,*" Ms Joye said. "*What you see is the dispersants didn't ramp up biodegradation.*" So as the oil wasn't dissipated by the bacteria, Ms Joye said it might still be on the floor of the gulf.

The idea that a very significant proportion of the oil that was released from the Macondo well may be on the seabed has been a constant theme from Dr. Joye and her research group over the last 5 years. This is the latest paper in a series from the research group ECOGIG (Ecosystem Impacts of Oil & Gas Inputs to the Gulf), of which Dr. Joye is the Project Director, which seeks to provide evidence for such an hypothesis.

The 6 pages of dense text of the Kleindienst *et al* paper describes some sophisticated techniques, such as gene sequencing and measuring the rate of hydrocarbon oxidation and enzyme activities, to present the proposition that the evolution of microbial populations in the 'microcosms' were altered by the presence of dispersant. The paper concludes: "*Extrapolating this comprehensive dataset to real world scenarios questions whether dispersants stimulate microbial oil degradation in deep ocean waters and instead highlights that dispersants can exert a negative effect on microbial hydrocarbon degradation rates.*"

If this were the case, the rationale of using dispersants could be questioned, but is that what these results actually show?

b. The thesis of the paper

The very first sentence in the paper is: "*During the Deepwater Horizon oil well blowout in the Gulf of Mexico, the application of 7 million liters of chemical dispersants aimed to stimulate microbial crude oil degradation by increasing the bioavailability of oil compounds.*" From a microbiologist's viewpoint, this may seem to be the aim of using dispersants in oil spill response. From an oil spill responder's viewpoint, the perspective is rather different. The primary purpose of using dispersant application is to stop the oil released subsea from getting to the sea surface by dispersing it into the sea before it could do so (subsea dispersant addition), or by spraying dispersant onto spilled oil on the sea surface to transfer into the underlying water column. The primary aim of dispersant use is to prevent oil on the sea surface from subsequently drifting ashore and contaminating sensitive shoreline habitats such as salt-marshes and mangroves.

The initial consequence is that dispersed oil will be rapidly diluted to low concentrations in the water that are too low to cause significant toxic effects to marine organisms. If that dilution cannot be achieved, for example if the water is not

deep enough, the rationale of using dispersant may be at question. The eventual consequence is that the subsequent biodegradation of the oil will be more rapid if it has been dispersed, than if it has not been dispersed. Some recalcitrant residue may remain.

The required chronological sequence is to (i) disperse the oil (by addition of dispersant), (ii) the dispersed oil to be diluted to low concentration of oil in water (dependent on prevailing currents and water depth) and (iii) the majority of the dispersed oil to be subsequently biodegraded by naturally-occurring microorganisms that are already present in the sea. Dispersant use facilitates the biodegradation of the oil by making it much more available to the existing microorganisms, but does not cause it. The biodegradation of oil will occur much more rapidly if it is dispersed, than if it is not dispersed.

The paper states. *“In response to oil spills, chemical dispersants are applied to the oil-contaminated seawater to disperse surface slicks into smaller droplets that are presumed to be more bioavailable to microorganisms. We provide evidence that chemical dispersants applied to either deep water or surface water from the Gulf of Mexico did not stimulate oil biodegradation.”*

c. Key questions about the paper

The paper states in the introduction: *“In laboratory experiments, we **simulated** environmental conditions comparable to the hydrocarbon-rich, 1,100 m deep plume that formed during the Deepwater Horizon discharge.”* On page 2 it is stated *“Experimental conditions (SI Appendix, Table S1) **mimicked** those prevailing in the DWH deep-water hydrocarbon plume (6–13, 18), the chemistry of which varied substantially over space and time (18).”*

The key questions to be asked are:

- Precisely what was done in these experiments?
- How closely did these experiments resemble the actual conditions that prevailed in the plume of dispersed oil that was presents at a water depth of 1,100 metres at the Deepwater Horizon incident?

An accurate simulation of the subsea release of a very large volumes of gas and crude oil into the sea at a depth of 1,520 metres (where the pressure is 150 atmospheres) would be exceedingly difficult to simulate in a laboratory experiment.

The description given in the **Materials and Methods, Microcosm Setup and Sampling** section (on page 5 of 6) is brief:

“Setup and sampling of microcosms are described in detail in [SI Appendix, SI Materials and Methods](#). In brief, 72 2-L glass bottles (1.8-L sample per bottle) were incubated on a roller table ([SI Appendix, Fig. S2](#)). Treatments (WAF, dispersant-only, and CEWAF ± nutrients) and controls (abiotic and biotic) were run in triplicate for each time point. Sampling (except for the CEWAF + nutrients treatment) was performed after 0 d (T0), 1 wk (T1), 2.5 wk (16 d; T2), 4 wk (T3), and 6 wk (T4); CEWAF + nutrients treatments were sampled at T0, T1, and T4. CEWAFs were prepared by mixing pasteurized seawater with oil and/or dispersants for 48 h at room temperature and subsequently subsampling CEWAFs, excluding contamination by oil or dispersants phases ([SI Appendix](#)).”

At the bottom of page 1 it says: This article contains supporting information online at: www.pnas.org/lookup/suppl/doi:10.1073/pnas.1507380112/-/DCSupplemental.

This is a 13.6 Mb download of 58 pages, but for ISCO readers interested in this topic it is well worth the slight effort of obtaining this document. The first paragraph of the SI Appendix unequivocally states:

*“Our laboratory experiments simulated the conditions of the Deepwater Horizon (DWH) deepwater plume **very realistically.**”*

And then continues:

“The dispersant dilutions were 1:60,000 (v/v) in Corexit 9500 (‘dispersant-only’) treatments and 1:30,000 (v/v) in the chemically enhanced water-accommodated fraction (CEWAF) treatments ([SI Appendix Fig. S1 and S2](#)). These dilutions resulted in dispersant concentrations (~19 µg/L) that were comparable to concentrations observed in the DWH plume in situ (below detection to 12 µg/L) (1).”

For readers unfamiliar with the terminology being used, ‘water-accommodated fraction’, or WAF, is the water obtained after stirring oil into water and then letting the oil float out. The idea is to leave the partially water-soluble, and potentially toxic, chemical compounds from the oil in the water. CEWAF is the same thing, but using oil and dispersant.

d. Units of concentration of dispersant in seawater - that is the question

Sharp-eyed ISCO readers may have noticed something odd about the mixture of units used to express the concentration of the dispersant diluted into the seawater. The dispersant volume to seawater volume (v/v) ratios of 1:60,000 and 1:30,000 are said to produce dispersant concentrations of ~19µg/L in seawater. (L is used in the USA to

represent litre.) It is not clear where the ~19 µg/L dispersant concentration in water comes from; it is only mentioned once in the paper and without a supporting reference. The maximum concentration of Corexit 9500 actually measured in the seawater of the deep plume at the DWH incident was somewhat lower at 6µg/L (Gray et al, 2014).

The units used are very important. A µg is a microgram, a millionth of a gram. 19 µg of dispersant (which has a density of about 0.95 gm/ml) in one litre, that is 1,000 mls, of seawater (seawater a density of 1.025 gm/ml), is about 18 parts per billion of dispersant in seawater. The actually measured maximum dispersant concentration in the water of the plume at DWH, based on measurement of the DOSS in water concentrations, was 6 parts per billion of dispersant in seawater

But - and this is an important point - v/v ratios of dispersant to water of 1:60,000 and 1:30,000 are much, much higher than concentrations expressed as µg/L or parts per billion. 1:60,000 v/v is one volume of dispersant in 60,000 volumes water and that is 16.7 volume of dispersant in 1,000,000 seawater equals 16.7 parts per million (ppm). 1:30,000 v/v dispersant to seawater is 33.3 parts per million (ppm).

e. What were the concentrations of dispersant in the seawater used in the microcosms?

The “**Water-accommodated fractions**” section of the SI give the details of the dilutions used to produce the seawater that was used in the microcosms:

Preparation	Volumes used			
	Oil (mls)	Dispt (mls)	Water (mls)	Total (mls)
WAF	150	0	850	1,000
Dispersant only	0	15	850	865
CEWAF	150	15	850	1,015

The oil and water (and dispersant in the CEWAF) were mixed with a 600 rpm magnetic stirrer for two days, allowed to settle for an hour then sub-sampled. The important thing about WAF is that only a very small proportion of oil is present as partially water-soluble chemical compounds, so only a small proportion of the ‘oil’ ends up in the WAF. However, being composed of a lot of surfactants and solvents, the majority of the dispersant will end up in the “dispersant only solution” and in the CEWAF.

It is noteworthy that a dispersant to oil ratio (DOR) of 1:10 was used in these experiments when the actual subsea dispersant treatment rate at the DWH incident was at DORs of between 1:100 and 1:200. The experimenters chose to use a dispersant treatment rate that was 10 to 20 times higher than that used at the DWH incident.

The “**Setup and sampling of microcosms**” section describes how these materials were further diluted for use in the microcosms:

Next, 0.4 L of sterile WAF, dispersant-only, or CEWAF (±nutrients) was added to 1.4 L seawater. To achieve comparable addition of dissolved organic carbon across treatments, the prepared solutions were diluted with an appropriate volume of sterile seawater (0.2 µm filtered and pasteurized for 2 h at 65°C). Dispersant was much more soluble in water than oil; to generate 0.4 L of diluted solutions, only 1.56 ml of original dispersant-only solution or 3.26 ml of CEWAF (±nutrients) was added. For WAF, 0.4 L of undiluted WAF was added.

Microcosm	Aliquot taken		Seawater in microcosm		Dispersant concentration in microcosm		
	Aliquot Taken (mls)	Contains Dispt (mls)	Made up to (mls)	Add 1,400 (mls)	mls Dispersant / ml seawater	ppm	v/v ratio
WAF	400	0	400	1,800	0	0	0
Dispersant only	1.56	0.02705 <i>($\frac{1.56}{865} \times 15$)</i>	400	1,800	0.00001503 <i>($\frac{0.02705}{1800}$)</i>	15.0	1:66,538
CEWAF	3.26	0.04818 <i>($\frac{3.26}{1,015} \times 15$)</i>	400	1,800	0.00002677 <i>($\frac{0.04818}{1800}$)</i>	26.8	1:37,362

(I ask ISCO readers to use their pocket calculators to check through these very simple calculations.)

These dilutions resulted in dispersant in seawater concentrations of 1:66,538 v/v and 1:37,362 v/v which are 15 parts per million and 26.8 parts per million.

The dispersant in seawater concentrations used in the microcosms are **790** and **1,410** times higher, respectively, than the 19 µg/L (19 parts per billion) said in the paper to be “*comparable to concentrations observed in the DWH plume*”. These dispersant concentrations are also **2,500** and **4,466** times higher than the maximum of 6 µg/L (6 parts per billion) of dispersant in seawater measured in the deep water plume at the DWH incident.

The dispersant in water concentrations used in the experiments are patently **not** “*very realistic*” in “*simulating the conditions of the Deepwater Horizon (DWH) deepwater plume*” and this undermines the purpose (and results) of the study.

f. Consequences and Conclusions

Because of the apparent error in calculating the dilutions of the dispersant in seawater, the ‘microcosms’ contained far too much dispersant, by factors of approximately **2,500** to **4,500**, compared the dispersant concentrations in the deep water plume that were actually measured at the DWH incident. This compounded the intentional decision to use a dispersant treatment rate in the experiments with a DOR of 1:10, which is 10 to 20 times higher than was actually used for subsea dispersant use at the DWH incident.

The differences in results obtained by comparing the WAF and CEWAF experiments could be due to many reasons. The Span™ and Tween™ surfactants in the dispersant, being composed of sorbitan (a hexitol (sugar) derivative), esterified with fatty acids (from vegetable oil) and with a polyoxyethylene chain are readily biodegradable (as the paper acknowledges). The microbial populations in the microcosms containing dispersant therefore rapidly developed to preferentially biodegrade the surfactants in the ‘nutritious soup’ of the excess of dispersant; the oil component was minor in the CEWAF.

Comparisons of the results from the WAF ‘microcosm’ (with no dispersant) and the CEWAF ‘microcosms’ (with a vast excess of dispersant), normalised on the basis of dissolved organic carbon (DOC), can therefore **not** be interpreted as indicating what may have happened at the DWH incident. The results obtained are an artefact of the methods used to obtain them and say very little about real world dispersant use.

References

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Publications

POLLUTION & REMEDIATION: RECENT PUBLICATIONS FROM SPRINGER

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Links for recent issues of other publications (in alphabetical order)

AMSA Aboard	News from the Australian Maritime Safety Authority	November 2015 issue
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	October 2015
Celtic Biogenie enGlobe Newsletter	Latest Remediation and related technology news	Autumn 2015 issue
CROIERG Enews	Canberra & Regions Oil Industry Emergency Response Group	Current issue
EMSA Newsletter	News from the European Maritime Safety Agency	November 2015 issue
Energy Institute eBulletin	News from the Energy Institute	April 2015 issue
Environmental Technology Online	Environmental Monitoring, Testing & Analysis	November 2015 issue
IMO News Magazine	News from the International Maritime Organization	No 3, 2015
IMO Publishing News	New and forthcoming IMO publications	November 2015
Intertanko Weekly News	International news for the oil tanker community	No 48 2015
IPIECA eNews	Int'l Petroleum Industry Environmental Conservation Assoc'n	February 12 issue
JOIFF "The Catalyst"	Int'l Organisation for Industrial Hazard Management	October 2015 issue
MOIG Newsletter	News from the Mediterranean Oil Industry Group	Most recent Issue
NOAA update	Oil spill response news from NOAA OR&R	April 2015
OCIMF Newsletter	News from the Oil Companies International Marine Forum	October 2015 issue
Pollution Online Newsletter	News for prevention & control professionals	November 25 issue
Sea Alarm Foundation Newsletter	Oiled wildlife Preparedness and Response news from Sea Alarm	Autumn 2015 issue
SAC News	Oil spill related and other news from Alaska	Nov 17 issue 2015
Technology Innovation News Survey	From US EPA - Contaminated site decontamination	October 1-15, 2015
The Essential Hazmat News	Alliance of Hazardous Materials Professionals	October 19 issue
Transport Canada Newsletter	News and articles re transport of dangerous goods in Canada	Winter 2014 issue
USA EPA Tech Direct	Remediation of contaminated soil and groundwater	Nov 1, 2015 issue
USA EPA Tech News & Trends	Contaminated site clean-up information	Summer 2015 issue
WMU Newsletter	News from the World Maritime University	October 2015 issue

Your editor depends on regular receipt of updated links for listed publications. If these are not received, relevant entries may be discontinued.

Events

UPCOMING EVENTS SUMMARY

COUNTRY	2015	TITLE OF EVENT	LOCATION
For more information click on Title of Event			
BELGIUM	Dec. 7	MSP & Marine Env. Conference	Brussels
UK	Dec. 7-11	Salvage & Wreck Removal Conference	London
UK, N. IRELAND	Dec. 15	ISAA Meeting and Christmas Luncheon	Hillsborough
2016			
USA	Jan. 4-6	No Spills Annual Conference	Acme, Michigan
UK	Feb 9	UK Spill Members' Meeting and Dinner	London
UK	Feb 15-19	IMO Pollution Prevention & Response S/C'ttee.	London
UK	Feb 17-18	Society of Maritime Industries Conference	Hull
SAUDI ARABIA	Feb 22-24	PetroEnvironment 2016	Dammam
CANADA	Mar 23-24	8th Arctic Shipping Summit	Montreal
NIGERIA	Mar 29-31	Clean Niger Delta Conference	Abuja
UK	April 18-22	IMO Marine Environment Protection Committee	London
AUSTRALIA	May 2-6	Spillcon 2016	Perth, WA
CROATIA	May 10-12	ADRIASPELLCON 2016	Opatija
UAE	May 17-18	Offshore Arabia Conference & Exhibition	Dubai
USA	June 21-23	Clean Pacific Conference & Exhibition	Seattle, WA
CANADA	July 7-9	AMOP Technical Seminar	Halifax
To request posting of an event of interest to the Spill Response Community please send details to the Editor			

Training

UK: NEWCASTLE - FUTURE DATE ANNOUNCED FOR GIS TRAINING

Newcastle University has set a future date for its 2 day course in Introduction to GIS using ArcGIS, scheduled to take place on 9 – 10 February 2016. [More info on this and other courses](#)

Company news

SWIRE PACIFIC OFFSHORE (SPO) WINS THE ENVIRONMENT PROTECTION AWARD AT THE SEATRADER MARITIME AWARDS ASIA 2015 HELD IN HONG KONG



November 24 - Swire Pacific Offshore Operations (Pte) Ltd (SPO) won the Environment Protection Award at the 8th Seatrade Maritime Awards Asia awards ceremony and gala dinner held on Monday, 16 November 2015 in Hong Kong.

Organised by Seatrade, the event was attended by close to 400 key representatives from over 70 companies.

ISCO Corporate Member, Swire Emergency Response Services (Pte) Limited [SERS] is a fully owned subsidiary of Swire Pacific Offshore Operations (Pte) Limited.

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