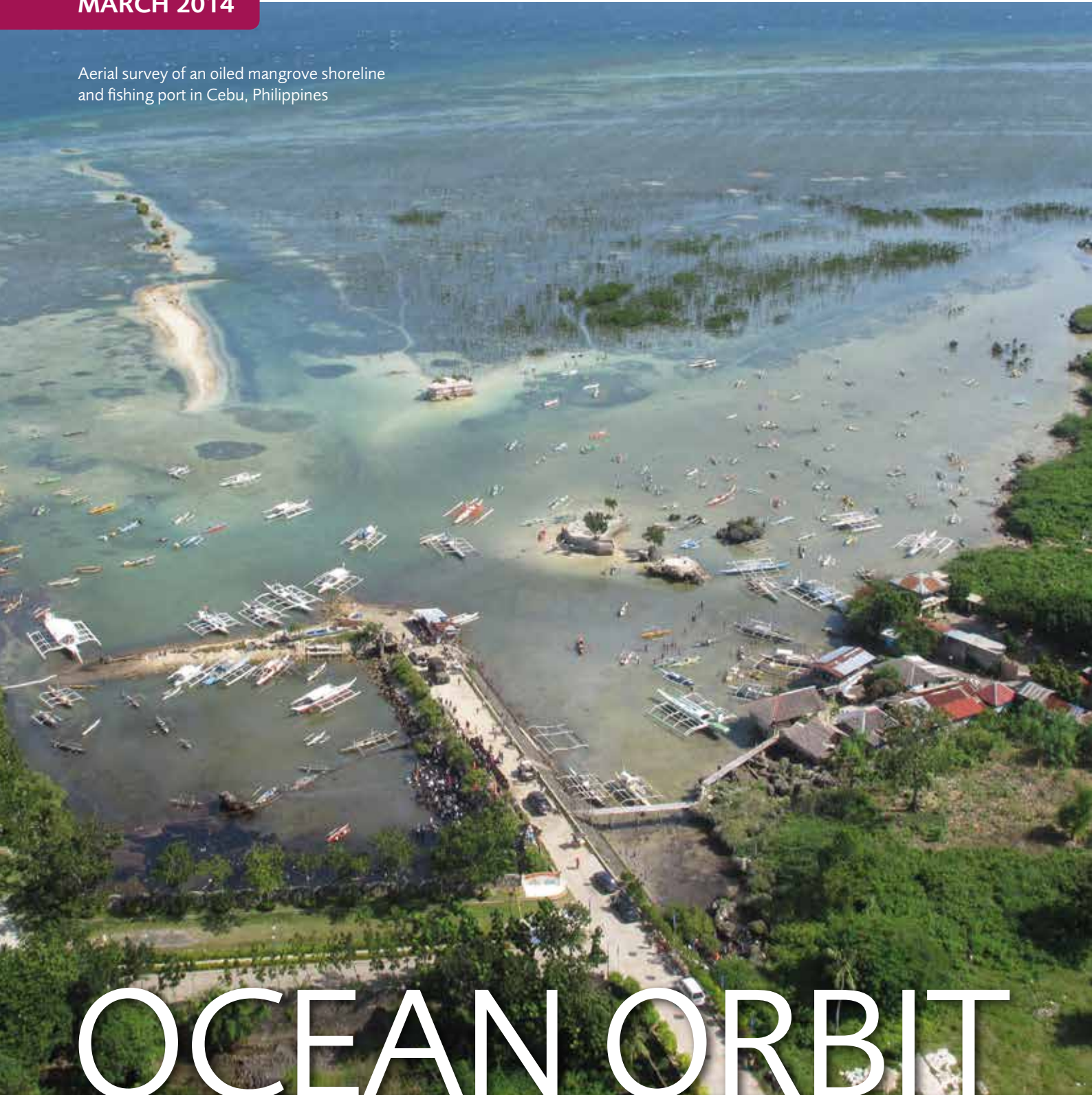


**MARCH 2014**

Aerial survey of an oiled mangrove shoreline and fishing port in Cebu, Philippines



# OCEAN ORBIT

THE NEWSLETTER OF THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED

## In this issue

- Working with our Members & Associates
- Incidents in the spotlight
- Cargo liquefaction
- Update on the Arctic, China & India
- Winners of the ITOPF R&D Award
- ITOPF filming project
- Korean, Russian and French TIPs now available



# Managing Director's review

2014 is the Year of the Horse and, according to Rose, our China Liaison Officer in Shanghai, it signifies energy and speed. Undoubtedly, injecting vibrancy into what has been a sluggish economic recovery will be welcomed by all.

Reflecting on the number of incidents that the team responded to during 2013, we have an expression here in the UK: 'like buses; none and then they all come at once!' 2013 started fairly quietly with six new incidents during the first half of the year then, at the height of the summer holidays and again on the approach to the Christmas holidays, a further 16 incidents occurred in just two seven week periods. Just over a quarter of the incidents attended involved bulk carriers and another quarter involved tankers; container vessels also featured highly with several incidents involving either a spill from, or a collision with, a container vessel. Even as I write, two of our team have just left on the same flight to attend two separate incidents in Singapore, both involving container vessels. Over half the incidents occurred in Asia and by far the largest percentage of all the incidents attended involved heavy, persistent oils. However, in terms of the volume spilt, the



Dr Annabelle Nicolas-Kopec assessing damage to fishing nets with Korean surveyors

incident. There is a growing trend towards more numerous and complex claims for pollution damage that can result in some cases taking more than a decade to settle. What does this mean for ITOPF? Well, it means that our team needs to be equipped to deal with a wide range of issues that could crop up, and not just those related to clean-up of oil spills. This is one of the reasons why ITOPF invests so much time in education and training, thereby forming invaluable relationships with those we can expect to be working alongside during a real incident.

This edition of *Ocean Orbit* illustrates well the variety of different issues that the team has faced in the last year. The three cases under the spotlight involve three different problems associated with the pollutants on board namely, coal, contaminated water, and bunker fuel from the days of WWII. Another group of cases are captured in the technical article on liquefaction, which is a topic receiving much attention of late. In addition to spill news we are making excellent progress on many of our strategic objectives, particularly the translation of our technical publications into different languages,

completing our series of training videos and augmenting our advisory work in high-risk areas such as China and India. A 'hot' topic at the moment is preparedness and response in the Arctic and ITOPF's advice is increasingly being sought as companies consider the risks involved when operating in this sensitive and remote environment. The article on the Arctic provides not just technical information on the challenges of response in ice-covered regions but also shows what ITOPF is doing to prepare its staff to be able to work safely in such harsh climates. ITOPF's R&D Award has been running for two years now and progress is being made on both of the projects that were chosen as winners of this Award in 2012 and 2013.

Last, but by no means least, we are paying particular attention to ensuring that shipowners are aware of the services that ITOPF offers and, to that end, I appeal to Designated Persons Ashore (DPAs) to register your details with ITOPF. The article on 'Working with our Members and Associates' highlights ways in which shipowners, governments and other organisations can make good use of ITOPF's presence in a country to contribute to seminars, workshops and meetings.

So in the year of the horse we anticipate an energetic but exciting start to 2014. I hope you enjoy this edition of *Ocean Orbit*.



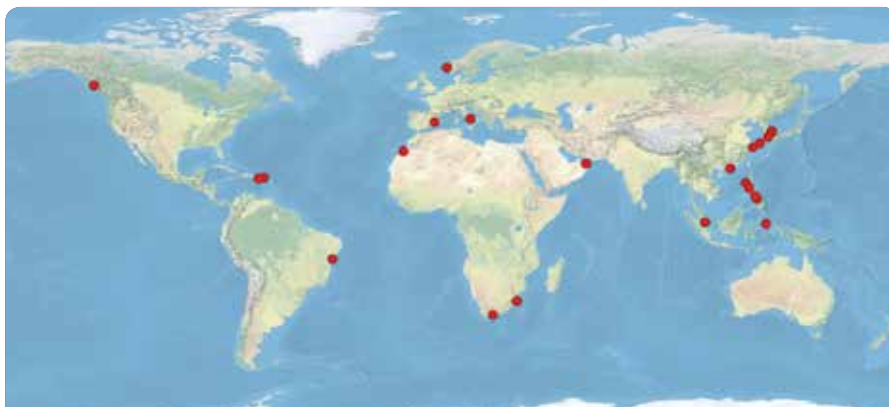
Dr Rebecca Coward discussing response methods with the China Maritime Safety Administration



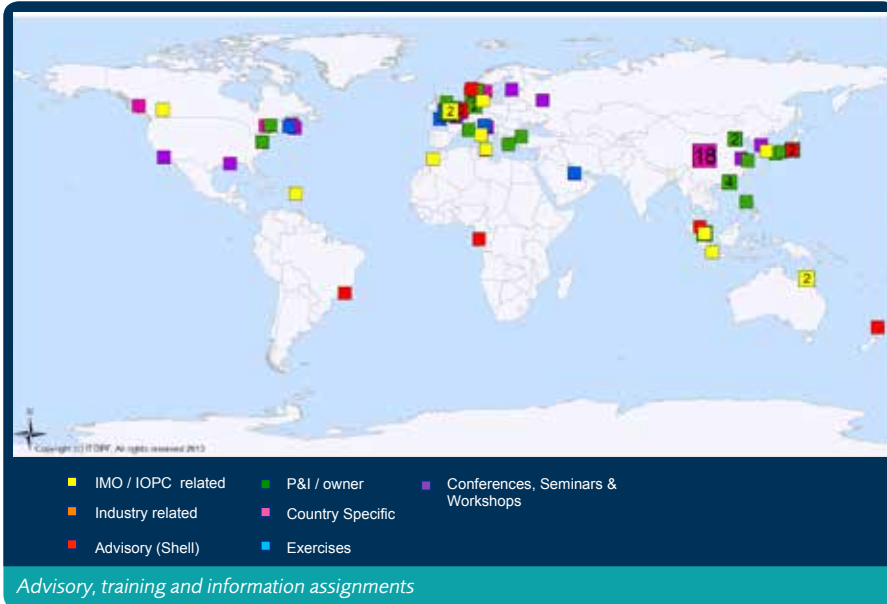
Nicky Cariglia briefing clean-up contractors during an incident in the Philippines

largest was a spill of diesel oil, as shown in our 2013 Tanker Spill Statistics issued in January. Hence, when it comes to planning and preparedness, while much attention is currently focused on preparedness in remote, off-shore locations, care should be taken not to lose sight of the 'most probable' scenarios, which are more likely to occur close to shore, in congested waterways, and involve a variety of different oils and products.

Undoubtedly, over the last 45 years ITOPF has seen changes in the way in which incident response has evolved. Nowadays, the actual clean-up of an oil spill is only a small part of the overall handling of an



Incidents attended on-site by ITOPF during 2013. Copyright © ITOPF, all rights reserved 2014. Background source: US National Park Service



*Balex Delta, Finland: Exercise to test the regional response capability of nine Baltic coastal States. In addition to at-sea response with vessels, the exercise also incorporated wildlife response into the plan*

## Working with our Members and Associates

ITOPF's reputation as technical experts in the field of accidental spills from ships is well established but it is possible that the extent of training and education that ITOPF offers its shipowner Members and Associates is less well known.

So, as the map of activities over the last year above illustrates, ITOPF's staff have been making a conscious effort to be out there working with our Members and Associates around the world in an advisory capacity, making sure that as a shipping industry we are all prepared and ready to respond to minimise the impacts of any spills that do occur.

### Drills & exercises

We have included on this page a selection of exercises that we have been involved in recently. If any of our shipowners are thinking of undertaking either table-top or full drills and exercises during 2014, feel free to contact us if you would like us to participate or think we can help with your scenario planning.



*CANUSLANT: Joint exercise between the US and Canadian Coast Guards to test the management and deployment of resources in a cross-border oil pollution incident*



*Barents Sea (Arctic Ocean) Exercise: Joint exercise between Russia and Norway to address emergency response issues in the Barents Sea, often with low temperatures*



*NOWPAP (North West Pacific Action Plan): Joint oil spill exercise between the Korea Coast Guard and China Maritime Safety Administration*



*IMCMEX (International Mine Countermeasures Exercise): A multi-national defence exercise, with associated workshops and symposia, in the Arabian Gulf. This focused on maritime infrastructure protection and included an oil spill response discussion with industry representatives (Official US Navy imagery)*





*ITOPF has been assisting with Shell's review of its global oil spill response capabilities. Photo courtesy of Shell International Ltd*

## Company level contingency planning and advisory services

In addition to facilitating drills and exercises, ITOPF can also assist with the preparation or review of company oil spill contingency plans. For example, we have been working with Shell on their "Deep Dive" programme to review the contingency plans for their oil and gas operations around the world.

## Training courses and seminars

We have had the pleasure of meeting many of our shipowners during the

year when we teamed up with two spill management teams, Gallagher Marine Services and ECM Maritime Services, on their annual seminar series for shipowners based in countries around the world who have a port of call in the USA. As a result, we have been able to talk to around 1,000 shipowners over the last year. However we do appreciate that with a membership comprising over 90% of the world's shipping fleet, even that is only a small fraction of our potential audience.

An efficient way to make best use of ITOPF's expertise is often through small gatherings of like-minded shipowners and their partners at seminars and workshops. If this is of interest please give us plenty of notice and we will work with you to schedule a visit where one of our team will



*Dr Ann Zhang presenting at the Gallagher Marine Services Seminar in London, November 2013*

bring preparedness and response to oil and chemical spills to life with stories and pictures of some of the 700 incidents we have been involved in over our 45 year history.

In short, our aim is to ensure that our shipowners are aware of the services that ITOPF offers its Members and Associates and to establish more regular contact. Please let us know of opportunities and venues where we can do this more effectively by dropping us a line at [central@itopf.com](mailto:central@itopf.com).



*Tim Wadsworth was one of the speakers at a seminar arranged by the Hong Kong Shipowners Association, in conjunction with China Marine Pollution Protection Consortium (CMPPC), September 2013*



*Dr Joe Green assisting at an IMO OPRC Level 2 Training Course, Busan, South Korea, February 2013*



*Dr Rebecca Coward presenting at the RAC-REMPEITC Caribe National Workshop on Oil Spill Preparedness and Response, Saba, November 2012*

# Incidents in the spotlight

## SMART

ITOPF was attending on-site at a spill in the Republic of South Africa when it received notification of a second incident in the country involving the bulk carrier, SMART (DWT: 151,279; built: 1996), on 19th August 2013. SMART, fully laden with 147,650 tonnes of coal, had just started its voyage to China when it ran aground on sandbanks during severe weather outside the harbour of Richards Bay, on South Africa's east coast. The vessel sustained serious structural damage and subsequently broke in two, resulting in the loss of an estimated 50,000 tonnes of coal.

## Risk of an oil spill

Although the incident occurred outside a largely industrial area, which is home to the largest coal export facility in the world, it is surrounded by areas of rich biodiversity, including a mix of mangroves, marshes and mudflats, as well as popular bathing beaches. Just south of the grounding site is the marine sanctuary of Mhlatzu, a spawning area for fish and an important habitat for many species of birds.

The vessel had just refuelled and was carrying almost 1800 m<sup>3</sup> of heavy fuel oil (HFO) and 129 m<sup>3</sup> of diesel at the time of the incident, which raised concerns for a major oil spill and the potential for significant environmental damage. Initial response efforts focused on minimising the risk of oil leaking from the vessel, with the priority being to remove all the bunker fuel on board. While salvage operations were put in place, measures were taken to protect

environmentally sensitive sites identified by oil trajectory modelling as being potentially at risk. Booms and other equipment were put on standby at each location and ITOPF contributed to discussions on proposed shore protection booming arrangements in the event of an oil spill. Most of this equipment was demobilised once salvors had successfully pumped off all the oil on board without spillage.

## Coal cargo

The risk to the environment from the cargo was another area of concern. Steam coal, also known as thermal coal, is used for power generation. It is non-soluble and, depending on the size of the coal particles, will either rapidly sink or disperse in the marine environment. Steam coal is recognised as being non-toxic to marine life and humans.

Coal plumes were observed emanating from the vessel and, given the large quantity of coal that was spilled, there was a potential that eventually this could wash up on nearby beaches.

ITOPF undertook beach surveys with representatives from local environment/wildlife groups to assess the level of contamination on the coastline. Lumps of what appeared to be consolidated coal were found on some beaches, however these were later confirmed to be variously titanium oxide or lignite peat, both of which can be found naturally. No coal was found at any of the locations ITOPF surveyed.

While on-site, ITOPF provided a report to the environmental authorities on the potential environmental impacts of the

Here we highlight three very different cases that occupied the technical team during 2013 – a coal spill in South Africa, the refloating of the COSTA CONCORDIA and the recovery of bunker fuel and pollutants from a sunken World War II supply ship.

coal cargo and plume. An environmental monitoring programme was initiated by the Department of Environmental Affairs (DEA) to monitor the impacts of coal and ITOPF was able to discuss the results of the study with local authorities and stakeholders at regular meetings.

Following the removal of bunkers from tanks located in the vessel's stern, the aft section of the ship was towed offshore by salvors and scuppered in deep water. ITOPF will provide technical assistance to all parties involved, including the vessel's P&I insurer and the South African environmental authorities, as they prepare to remove the fore section of the ship.

## COSTA CONCORDIA

ITOPF returned to the site of the COSTA CONCORDIA incident during salvage activities in 2013. As has been well documented in the media, this cruise ship (GT: 114,147, Built: 2006) struck a reef near the island of Giglio, off the coast of Tuscany, Italy on 13th January 2012. Heavily damaged, it started to take on water and subsequently came to its final resting place on two rocky pinnacles, outside the port of Giglio, listing heavily to starboard. Though most of the passengers and crew made it off the vessel safely, 32 people lost their lives. No oil pollution resulted from the incident,



What appeared to be coal was in fact titanium oxide...



... sometimes in large chunks known as lignite peat





Boom surrounding the COSTA CONCORDIA as the parbuckling operation gets underway

but due to the substantial damage to the vessel, the risk of a major pollution incident was significant and ITOFF was requested to attend on-site by the P&I Club to provide advice on oil spill preparedness and any other environmental concerns.

The subsequent salvage operation, one of the largest in maritime history, culminated in a successful parbuckling operation (righting the sunken vessel using rotational leverage) in September 2013. Here we highlight some of the lesser known environmental aspects of the salvage.

## Wreck site

The wreck of the COSTA CONCORDIA lay within the Tuscan Archipelago National Park, which forms part of the extensive Pelagos marine sanctuary, established for the protection of Mediterranean cetaceans (whales and dolphins). The waters around Giglio Island are home to many endangered and protected species and habitats, such as the Mediterranean eel grass (*Zostera marina*), the noble pen shell (*Perna nobilis*)

and soft coral habitats. The island is also a very popular tourist destination for both day trippers and holiday makers.

## Wreck removal – environmental considerations

Once bunker removal operations had been completed, the next challenge was to remove the wreck. Six tenders were submitted by some of the major international salvage companies. Eventually a consortium of Titan/Micoperi won the tender for the removal work, which involved the parbuckling and subsequent refloating of the wreck.

In order for the project to go ahead, the Italian authorities required that certain environmental concerns be addressed. This included the implementation of a comprehensive oil pollution contingency plan, involving a considerable quantity of boom and standby response vessels.

Concerns were raised over the impact



The righted cruise ship

of the salvage operation on whales and dolphins in the sanctuary and therefore a whale watch programme was implemented.

Unavoidably, some seagrass beds in the vicinity of the wreck were destroyed and it is likely that a restoration plan will be initiated once the wreck is removed.

The salvage operation required anchor points to be drilled into the seabed in an area where the endangered noble pen shell was present. Before drilling commenced, 200 of these shells (that can grow up to a metre in length) were transplanted to a safe area.

A comprehensive water quality monitoring plan was in place throughout the wreck removal operation. The authorities were particularly concerned about the relatively stagnant waters inside the wreck, which would gradually be released into the marine environment during the parbuckling

and refloat operations. Due to the limited water exchange inside the wreck, the quality of this water had deteriorated over time as a result of decomposing food materials and leaching of heavy metals from various components inside. Modelling was undertaken to determine the impact of various scenarios for the release of this water. Although this showed that impacts would be minimal and that the water quality would rapidly return to background levels, some 2000 m<sup>3</sup> of the waters were pumped out of the wreck and removed by barge to the mainland for disposal.

## ITOPF's role

ITOPF provided advice on many aspects of this incident, from oil spill contingency planning through to the effects of contaminated waters on the marine environment and possible mitigation measures. This was not a traditional case for ITOPF, but it highlights how our role now

extends beyond oil spills to providing advice on a wide range of environmental impacts.

## BRIGADIER GENERAL M.G. ZALINSKI

In September 2013, ITOPF was engaged by the Minister for the Department of Fisheries and Oceans in Canada to provide technical advice on a project to recover the bunker fuel and pollutants from the wreck of a World War II US supply vessel, BRIGADIER GENERAL M.G. ZALINSKI.

ZALINSKI ran aground during a storm and sank in the Grenville Channel, British Columbia in September 1946. It was carrying a variety of general goods and munitions and was estimated to have up to 700 tonnes of Bunker C on board at the time of the incident. The vessel now lies upside down on a steep underwater cliff in about 30 metres of water.

For the past decade, the Canadian

Coast Guard has been involved with patching up small leaks from the vessel. However, due to its deteriorating condition and the growing risk of hull failure, a more permanent solution was sought to prevent the potential release of large volumes of oil.

Salvage crews were employed to remove most of the remaining bunker fuel on the ship using pumps and diver operated suction hoses. The Coast Guard, together with the Western Canada Marine Response Corporation (WCMRC), provided a response capability in the event that any oil leaked from the vessel as the operation progressed. ITOPF's role was to provide technical advice to all parties involved with the project on spill response planning and preparedness.

The first phase of the oil recovery operation was completed in December 2013; a second phase to assess and recover any oil that has accumulated over winter will take place in spring.

*A 'current buster' boom being deployed from a WCMRC-contracted vessel as a precautionary measure during the ZALINSKI oil recovery operation*





# Cargo liquefaction: a hot topic

ITOPF statistics have reported the decade-on-decade reduction in the frequency of oil spill incidents from tankers, combined carriers and barges.<sup>1</sup> However, a recent trend which contrasts sharply with this is the increasing number of oil spills ITOPF has attended where the root cause of the incident is thought to be cargo liquefaction or where the cargoes involved have the potential to undergo liquefaction. Four main cargo types have the potential to undergo liquefaction (the ores of iron, nickel and aluminium and coal). Of the 28 incidents involving such cargoes for which ITOPF has provided advice in the last 15 years, 13 incidents (so only just under 50%) have been in the last three years. These incidents include remote advice where ITOPF provided guidance on minimising impacts without attending the scene of the incident.

One of the key drivers for this increase

in the frequency of ITOPF's involvement has been the rapidly growing market for mineral ores in China and also the increased export of ores from Asian countries, like Indonesia, the Philippines and India. Hence it is no surprise that in 2013 the two incidents ITOPF attended that are thought to have arisen from liquefaction of nickel ore cargo were in Asian waters; HARITA BAUXITE off the north-west coast of the Philippines and TRANS SUMMER in the waters off Guangdong province, China.

As is so often the case with cargo liquefaction, rapid movement of the cargo caused the casualties to sink quickly, and tragically, both these incidents involved the loss of life at sea. In the case of HARITA BAUXITE, 14 out of the 24 crew were lost.

The main legislation governing safe carriage of solid bulk cargoes is the International Maritime Solid Bulk Cargoes (IMSBC) Code, which became mandatory on 1st January, 2011. The Code, for example, includes a new schedule for nickel ore which was agreed in principle by IMO in 2012 and is expected to enter into force in 2015 providing the international framework to save lives and reduce pollution. This is supplemented with bulletins and pre-loading advice notices issued by the

P&I Clubs and articles from other key maritime information sources, such as the International Chamber of Shipping (ICS)<sup>3</sup> and Lloyd's List<sup>4</sup>, which warn of the dangers (see example listings below). There is also the mandatory notification to the Club when vessels intend to carry nickel ore cargoes from a port in Indonesia or the Philippines. Finally, there are now new ship types starting to enter the cargo vessel fleets specially designed for the carriage of cargoes that may liquefy.<sup>5</sup>

However, cargo liquefaction remains an area where expert on site advice given by a cargo surveyor is essential. Knowing which cargoes are prone to liquefaction is important. However, as well as knowing the mineral composition, the specifics of the mineral processing is important. So, for example, Bauxite is not a cargo one would ordinarily expect to be prone to liquefaction based on a moisture content between 0% and 10%. However, as reported by the London P&I Club<sup>6</sup>, the practice of using water cannons to wash Bauxite fines and lumps through sieves in mines in Indonesia significantly increases the moisture content of the cargo, reportedly to approximately 15% by the time the Bauxite is placed in the storage area. This changes the properties

## What is cargo liquefaction?

The main cargoes in question are: iron ore (hematite and magnetite), nickel ore (primary ones are pentlandite, pyrrhotite and garnierite), aluminium ore (bauxite) and coal. Although they often appear dry at the time of loading, these cargoes contain moisture in the spaces between the particles to some degree. During ocean transport, cargoes are exposed to agitation in the form of engine vibrations, ship's motions and wave impact, resulting in compaction of the cargo. If the moisture level is greater than the Threshold Moisture Limit (TML) the effect of this agitation can be a transition from a solid state to a viscous fluid state in which all or part of the cargo can flatten to form a fluid surface.



Iron fines before and after liquefaction<sup>2</sup>  
(Photos courtesy of Brookes Bell)



TRANS SUMMER sank in the waters off Guangdong province, China during Typhoon Utor, August 2013

<sup>1</sup> <http://www.itopf.com/information-services/data-and-statistics/statistics/index.html>

<sup>2</sup> [http://www.gard.no/ikbViewer/page/preventing-losses/article?p\\_document\\_id=20651747](http://www.gard.no/ikbViewer/page/preventing-losses/article?p_document_id=20651747)

<sup>3</sup> <http://www.ics-shipping.org/key-issues/safety-and-environment/cargo-liquefaction>

<sup>4</sup> <http://www.lloydslist.com/ll/sector/ship-operations/article430943.ece>; <http://www.lloydslist.com/ll/sector/dry-cargo/article435680.ece> (subscribers only)

<sup>5</sup> <http://www.missiontoseafarers.org/uploads/pdfs/media-centre/jan-feb13.pdf>

<sup>6</sup> <http://www.londonpandi.com/article/803/liquefaction-potential-dangers-of-indonesian-bauxite/>



of the cargo from one with a low moisture content that is not ordinarily prone to liquefaction, to a cargo which may liquefy during a voyage.

In contrast to the example above of a cargo that would not normally be expected to liquefy but is prone to liquefaction because of the way in which it is processed, some cargoes with a high goethite content (an iron bearing oxide mineral well known since prehistoric times for its use as a pigment; for example, it was used in the caves of Lascaux in France) can have properties which in effect act as a binding agent that make a cargo less likely to liquefy. Hence, there is an exemption for these goethite containing iron ore fines based on goethite content and the shipper's declaration.

These exceptions to the general rule on moisture limits and liquefaction go to illustrate how expert advice given by a cargo surveyor is needed.

But as ICS notes in its web page dedicated to cargo liquefaction<sup>7</sup>: "The issues are complex, but the root of the problem would seem to be the refusal of some shippers to allow the appointment of independent surveyors to conduct cargo testing in accordance with IMO requirements, plus the commercial pressure placed on Masters to accept potentially

unsafe cargoes at what are often remote and poorly policed locations".

We are highlighting cargo liquefaction in this issue of Ocean Orbit as it is translating this existing framework into good practice on the ground, especially in remote locations, that is key. The following statement, made in the wake of the HARITA BAUXITE incident, helps to put cargo liquefaction into context: "In just under fourteen months, sixty-six mariners died in the Indonesia to China nickel ore trade. By January of 2012, that trade made up only .06% of bulk cargo shipments worldwide, but accounted for 80% of the fatalities in bulk shipping."<sup>8</sup>

Saving seafarers lives is the main reason why ITOPF would like to join organisations such as IMO, ICS and the UK Chamber of Shipping in spreading this key message throughout the shipping industry of the dangers associated with cargo liquefaction. We also hope to see fewer incidents where ITOPF's advice is needed in relation to the threat of damage caused by the fuel oil carried on these vessels.

<sup>7</sup> <http://www.ics-shipping.org/key-issues/safety-and-environment/cargo-liquefaction>

<sup>8</sup> <http://gcaptain.com/bulk-trade-off-indonesia/>

## Information sources

Specific guides are available such as:

**Nickel Ore: Stop, Think, Verify!**  
Intercargo Guide for Safe Loading of Nickel Ore:

[http://www.intercargo.org/pdf\\_members/fs-nickelore%20final.pdf](http://www.intercargo.org/pdf_members/fs-nickelore%20final.pdf)

**Skuld Pocket Guide for Masters and Officers: Bulk Mineral Cargo Liquefaction:**

[http://www.skuld.com/Documents/Library/Books/Bulk%20Mineral%20Cargo%20Liquefaction\\_A4.pdf?epslanguage=en](http://www.skuld.com/Documents/Library/Books/Bulk%20Mineral%20Cargo%20Liquefaction_A4.pdf?epslanguage=en)

In addition, a number of P&I Clubs have provided information notices, including:

[http://www.american-club.com/files/files/MA\\_020613\\_Liquefaction\\_of\\_Bulk\\_Bauxite\\_Cargoes.pdf](http://www.american-club.com/files/files/MA_020613_Liquefaction_of_Bulk_Bauxite_Cargoes.pdf)

[http://www.gard.no/ikbViewer/page/preventing-losses/article?p\\_document\\_id=20651747](http://www.gard.no/ikbViewer/page/preventing-losses/article?p_document_id=20651747)

<http://www.nepia.com/cache/files/4453-1297093224/LPBriefing-CargoLiquefaction.pdf#zoom=70>

## Responding to Arctic spills

As the average sea ice cover in the Arctic decreases, northern seaways are opening up, offering alternative trade routes between Asia and Europe. The Northern Sea Route (NSR) shows particular promise, being considerably shorter than the Suez route. In 2010, just 4 international transits were undertaken; by 2012 this had increased to 46 and in 2013 this grew further to 71. In September 2013 the North West Passage through Canada's Arctic waters – considered to be more challenging than the NSR to navigate and less commercially viable – was used by the ice-class bulk carrier NORDIC ORION to carry coal from Vancouver to Finland. This route is 1,000

nautical miles shorter than the Panama Canal route, and allowed 25% more cargo to be carried. Intra-Arctic shipping is also likely to increase with mining and oil and gas developments. The potential for an oil spill in the Arctic is therefore an increasing concern.

Low temperatures will affect the fate and behaviour of spilled oil in a number of ways, some aiding and some hindering our ability to respond. Standard oil fate and trajectory models for open water spills do not apply in ice-covered waters: oil trapped within or under fast ice is likely to remain relatively stationary, but in the highly dynamic pack ice zone oil drift



Shipping traffic has increased significantly in the Arctic (Photo courtesy of Sovcomflot)

may be considerable and unpredictable. Although various techniques for detecting and tracking oil in ice have proven successful in certain conditions, there is currently no universally applicable tool to address what remains a major technological challenge for

Factor	Effect	Implications
Extreme cold	Reduces the rate of natural weathering processes such as evaporation and biodegradation; increases oil viscosity	Oils will be more persistent
Pack ice	Dampens wave energy and reduces natural dispersion and emulsification	Increased window of opportunity for chemical dispersion and in-situ burning
Fast ice	Oil may become encapsulated within or trapped underneath ice	Difficult to detect, track, and recover oil

*Effects of Arctic conditions on oil fate and behaviour*



Members of our technical team taking part in an Arctic survival course

the spill response community in the Arctic.

The main at-sea response options for the Arctic are mechanical recovery, chemical dispersion, and in situ burning. Although ice and low temperatures will restrict the spreading and emulsification of oil, mechanical recovery could be challenging due to increased oil viscosity and if ice is present. The availability of suitable equipment, vessels and storage/disposal facilities are also key considerations in remote Arctic locations. Dispersants have the advantage of treating oil in situ rather than recovering it for subsequent disposal. Limited weathering and emulsification of oil in cold waters may extend the window of opportunity for dispersant application to days or even weeks, but treatment of oil trapped among ice floes would be difficult, and the dampening effect of sea ice means

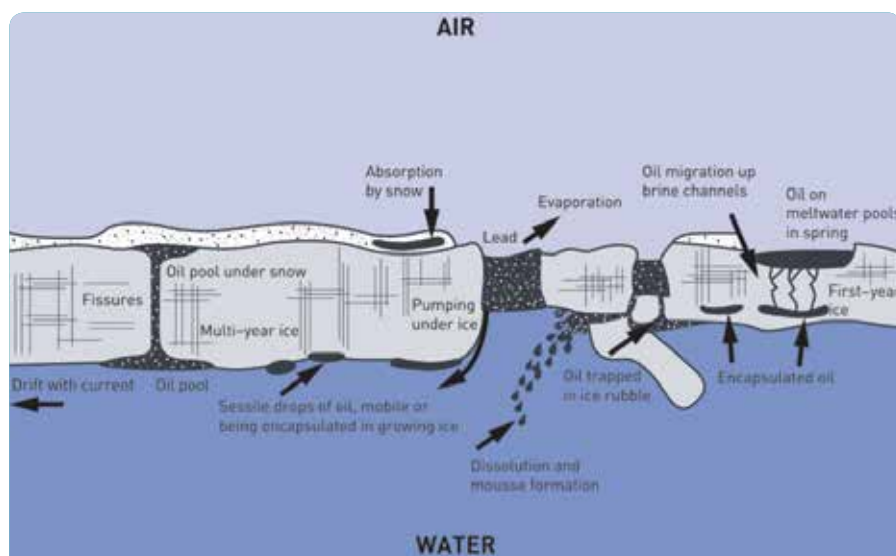
that additional actions such as propeller wash to provide local targeted bursts of energy may be necessary. Dispersant use is not pre-approved in Arctic waters, and is unlikely to be permitted in shallow, nearshore waters or in the vicinity of sensitive benthic resources or fish spawning grounds. In situ burning of oil is also capable of removing large volumes of oil from the water surface with minimal waste generation. In the Arctic the minimum slick thickness required to sustain an efficient burn may be achieved by containment in ice, but while experimental burns have reported oil removal efficiencies in excess of 90%, tar-like residues with a tendency to sink may be produced on occasion, particularly with heavier oils. The toxicity and the impact of physical smothering of such residues on Arctic flora and fauna have not yet been tested. In situ burning is

also not pre-approved for the Arctic states.

While these response techniques have proven successful in laboratory and controlled field experiments in Arctic conditions, they are yet to be tested in a full-scale incident, which, due to remoteness, lack of infrastructure, and inhospitable environmental conditions, would bring significant logistical and operational challenges.

## ITOPF in the Arctic

In response to the increasing focus on Arctic shipping, ITOPF has formed an internal Arctic Response Working Group which is working to identify the technical challenges an incident in the far North would bring, and improve preparedness to respond. From our own perspective, this has included ensuring that our technical advisers have the necessary skills to attend on site in cold climates. In early 2013, three of our technical team travelled to northern Sweden to learn how to survive and work in Arctic conditions. With temperatures ranging from +4 to -30° C, valuable first-hand experience was gained of the unpredictability of the Arctic environment, which can make even basic tasks such as keeping warm and dry, finding food, water and shelter, and moving around challenging. A further two staff members rose to the challenge in February 2014 with three more on the way in March 2014.



Interactions between sea ice and spilled oil. From: Dickens, D. (DF Dickens Associates) (2011) Behavior of oil spills in ice and implications for Arctic spill response. OTC 22126. Paper presented at Arctic Technology Conference, Houston, Texas, USA, 7-9 February 2011. Derived from an original sketch by Al Allen



# Update on China

ITOPF continues to focus its attention on developments in spill preparedness and response-related activities in the People's Republic of China (PRC). This is due both to the increased risk of spills in China and the new regulations on ship-sourced pollution that require shipowners to pre-contract a Ship Pollution Response Organisation (SPRO) within each port of call in the PRC.

## Building relationships

One of ITOPF's key activities in China is establishing and building relationships with key government authorities, including China Maritime Search & Rescue Center of the Ministry of Transport, the China Maritime Safety Administration (MSA) and the State Oceanic Administration (SOA). Dr Karen Purnell (November 2013), Dr Tim Lunel (May 2013) and several members of the technical team have made visits to China over the past year and the various meetings have provided good opportunities to get to know the government representatives outside the pressurised environment of a spill, and to openly exchange ideas on particular aspects of the situation in China.

We have also been actively seeking opportunities to further contact with our shipowner Members and Associates in China to raise awareness of the benefits that ITOPF membership provides. We have met with shipowner associations and also visited the offices of individual shipowners, offering our services for exercises, drills and training as well as widely distributing our Technical Information Papers in Chinese.

## Ship Pollution Response Organizations (SPROs)

ITOPF continues to assist the International Group of P&I Clubs (IG)



Dr Karen Purnell meeting with the MSA Department of Dangerous Goods Management and Pollution Prevention, Beijing

Pollution Sub-Committee Vessel Response Plan Working Group by providing recommendations on SPRO rates for vessels, equipment, materials and personnel within their response tariffs. We have made visits to a number of SPROs nationwide to gain a greater understanding of their operations. This included tours of stockpiles and response vessels. We will carry on working with the SPROs to facilitate the production of reasonable response tariffs and to follow developments in the region.

## Spills

ITOPF was requested to attend on site at three spills in China in 2013, one from a sunken bulk carrier and two resulting from collisions between bulk carriers and container ships. We have also provided remote advice on an incident involving a loaded product tanker. Cooperation and dialogue between ITOPF and the Chinese authorities has been good during these incidents demonstrating the benefit of ITOPF's capacity-building work over recent years and the efforts of our China Liaison Officer in Shanghai.



SPRO warehouse



Deployment of boom by a SPRO following a spill from a container ship in the East China Sea



"Partnership means that gifts, ideas and perspectives flow both ways" (Mr ZHI Guanglu, Director General, General Operations Office, China Maritime Search & Rescue Center and Dr Karen Purnell, ITOPF)





Clean-up following the MSC CHITRA incident, Mumbai, August 2010

## India: looking forward

ITOPF's 2011-15 Strategic Plan identified India as a priority area, especially in view of the growth of trade in the area and our attendance at incidents such as the MSC CHITRA off the coast of Mumbai in 2010 (above). The seminar we held jointly with Oil Spill Response Limited (OSRL) in New Delhi in November 2013 was an important step towards achieving closer working relationships in the country.

The focus of the seminar was on global good practices and the current state of oil spill preparedness in India, with much of

the credit for its success being due to the degree of engagement and discussion made by the participants. We are already planning to work with OSRL in 2014 to follow up on some of the key themes that emerged during the seminar, which include:

- Mapping the oil spill risk for Indian coastal waters from shipping and oil and gas (O&G) activities to underpin the review of the National Oil Spill Disaster Contingency Plan (NOSDCP) led by the Indian Coast Guard (ICG);

- Developing the concept paper on an Oil Spill Response Organization (OSRO) for India based around Industry-Government collaboration;
- Considering policy and guidelines for dispersant use for oil spills in Indian waters and ensuring that the principles are reflected in the NOSDCP and O&G facility contingency plans;
- Considering the potential added value of a 'pool of experts' which the ICG can call upon in the event of a significant spill;
- Evaluating ways to combine 'at sea' and 'on-shore' response operations in India with active participation of the coastal Pollution Control Boards (PCBs).



Joint ITOPF/OSRL Seminar, New Delhi, November 2013



# ITOPF R&D Award

ITOPF's shipowners and their P&I Clubs recognise the importance of nurturing good quality R&D. Each year the ITOPF Annual R&D Award provides up to £50,000 to fund projects that encourage innovative thinking and provide realistic solutions to the challenges of spill response and environmental monitoring.

## 2013 winner

The 2013 Award went to the Swansea Laboratory for Animal Movement (SLAM) based in Swansea University, UK. It is being used to fund a 1-year post-doctoral study to develop a novel 'back-pack' system to track rehabilitated oiled birds without compromising their wellbeing.

ITOPF decided to fund this research as it recognised that obtaining information about the behaviour of rehabilitated birds after their release is difficult. The main issue is that survival rates can only be determined through long term studies and no reliable systems currently exist that enable electronic tagging devices to be attached to wild birds without affecting their normal behaviour. To address this issue, SLAM has developed a silicone-based harness to attach tags. This has been successfully tested in captivity on a variety of species and is now ready to be used on wild birds.

Direct observations will be carried out on a regular basis to look for behavioural abnormalities. In addition, the birds will be wearing accelerometers which will provide information on their behaviour and

physiology, for example they will assess their energy expenditure to check if the individuals have to work harder with the equipment.

If a system can be designed that enables electronic devices to be attached to wild birds without affecting their normal behaviour, this would increase the possibility of obtaining more reliable and meaningful data. In the future, such a system could provide for better data banks of information to be established, which could aid decision-making on the benefits or otherwise of rehabilitating certain bird species following an oil spill. The project has a strong foundation, with a doctoral thesis and several papers already published in key journals.

## 2012 winner

FishHealth was the recipient of the 2012 Award, a consortium of four research institutes led by LEMAR (Laboratoire des Sciences de L'Environnement Marin, France).

The Award is funding a PhD student who is working with the consortium to



SLAM: Example of a harness with a tag and antenna

study the health and behaviour of fish in the presence of dispersed oil and to provide operational recommendations for using dispersants in coastal waters.

Results to date indicate that 45 days following oil exposure, ecologically-relevant performances such as growth, maximum swimming speed or tolerance to reduced oxygen availability and increased temperature were not affected. However, treating oil with dispersant was associated with reduced growth, swimming capacity and hypoxia tolerance.

Further testing will be carried out to determine whether the dysfunctions observed are maintained over time. Field experiments are also currently underway.

ITOPF is funding this study for 3 years. More details about the project, the methodology used, results and preliminary conclusions are available on our website.



FishHealth: Field experiments are currently underway to determine whether performances observed during standardised tolerance tests in the laboratory are predictive of fish performance in nature (Photo courtesy of Guy Claireaux)



Filming with Dr Franck Laruelle at Amroth beach, Pembrokeshire

## ITOPF filming project

ITOPF is currently producing a series of films to promote good practice in oil spill response. These cover a variety of topics, such as aerial surveillance, at-sea response, and environmental and economic impacts.

The films incorporate footage from actual response operations gathered at the site of several oil spills worldwide since 2005, interwoven with scenes from the

major incidents of the last 45 years. They also include interviews and training exercise footage, shot in the UK, France, Spain and the Republic of Korea in 2013 and 2014.

The films are being made with the involvement of key partners around the world, including IMO, CEDRE, SINTEF, EMSA, OSRL, KOMOS, International Group of P&I Clubs and IOPC Funds, highlighting the importance of international collaboration

for a successful response.

The seven film series will be launched from the end of April to June 2014 and will include presentations in London and also at the International Oil Spill Conference in Savannah, Georgia in May.

Excerpts from the series will be made available on our website to raise awareness across a wider audience of some of the issues involved in oil spill response.

So keep an eye on our website for details of the various events worldwide in 2014 where the new film series will be featured.



Presenter Joe Crowley interviewing Bernd Bluhm during a training exercise with EMSA in Ferrol, Northern Spain



Dr Annabelle Nicolas-Kopec demonstrating how different oils behave at CEDRE's facilities in France





ITOPF was presented with the NAMEPA Marine Environmental Protection Award by NAMEPA's Chairman, Clay Maitland, in recognition of its work to preserve the marine environment in October 2013

## Designated Person Ashore

Members and Associates have first call on ITOPF's services but this is not always fully appreciated by those within the technical departments of shipowning or ship management companies who might be in the frontline at the time of a spill. A key group of individuals with whom we would like to establish closer contact is the Designated Person Ashore (DPA). Under the International Safety Management (ISM) Code, the DPA is responsible for monitoring the safety and pollution prevention aspects of the operation of their ships and for ensuring that adequate resources and shore-based support are available.

Over the past year we have continued to contact designated persons through our shipowners, their agents or ship management companies and we have had the opportunity to meet DPAs at various seminars throughout the year. We have collected the details for over 400 Designated Persons so far, which have been entered into our DPA Database.

Developing our relationship with DPAs has enabled us to establish a point of contact in the event of a spill, as well as helped us to increase awareness of ITOPF and the services we provide. Furthermore, it will make it easier for us to invite DPAs to events that they may find informative in their role and to assist with planning bespoke drills and exercises. If you are a DPA, please help us help you by completing a survey, which can be found on our website.

We appreciate that for many DPAs this designation can be just one aspect of their overall job. Hence, we are considering setting up a "web forum" to help those DPAs on our database to contact each other for mutual support and exchange of ideas. If you are a DPA and think this would be useful then please do let us know at [DPA@itopf.com](mailto:DPA@itopf.com).



An oil spill containment and clean-up exercise held on board a tanker

## Korean, Russian and French TIPs now available

Making ITOPF's knowledge and technical expertise available in multiple languages is a key priority, so we are pleased to report that the full series of Technical Information Papers is now available in Korean, Russian and French. This is in addition to the Chinese and English versions that are freely available

on our website.

We thank the Korea Coast Guard, the Korea Marine Environment Management Corporation (KOEM) and the Korea Institute of Ocean Science & Technology (KIOST) for translating the series into Korean for ITOPF. Other languages are due to follow later in 2014.



# Work experience students

We were pleased to be able to offer three university students work experience during the summer. Over a 2-week period, students studying Earth Sciences, Biochemistry and Chemistry each undertook projects that combined their study discipline and interests with topics of relevance to ITOPF.

One student examined whether a process known as Oil Mineral Aggregate (OMA) formation could be enhanced and used as an oil spill countermeasure in Arctic waters. She concluded that it had potential although more work would be required to assess the transport and fate of OMA in low temperatures. Another student used his knowledge to update ITOPF's team on the availability of new or alternative biomarkers to identify the source of oil following an incident. Our third student was interested in 'magnetic soaps' as an innovative technique for oil spill clean-up. Spending time with the team at ITOPF allowed him to learn about the practical challenges of responding to spills at sea and the need to ensure that new technologies are cost effective. The students presented their findings to our technical team, which allowed for a useful exchange of ideas and the opportunity to gain confidence reporting their work.

If you are interested in undertaking a short work experience placement with ITOPF in 2014, please contact Carol Remnant ([carolremnant@itopf.com](mailto:carolremnant@itopf.com)). Opportunities are limited due to the nature of our work.

If you would like to be added to our mailing list for *Ocean Orbit*, or wish your details to be amended, please email us at [terrygoodchild@itopf.com](mailto:terrygoodchild@itopf.com), indicating your preference for a printed or electronic version or both. A PDF version of *Ocean Orbit* is also available on our website.



Melanie Keeble and Jayne Foster

## Staff news

In November 2013, Dr Michael O'Brien left ITOPF after 12 years' service to take up a position in Perth, Australia with the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the national regulator for health and safety, well integrity and environmental management for offshore oil and gas operations. He is replaced as Technical Team Manager for the Americas by Dr Mark Whittington, who has been with ITOPF since 2007.

Jayne Foster, who previously worked for ITOPF from 1999-2005, rejoined the team as Secretary to the Technical Director in December 2012. Jayne has a BA Honours in design and has previous experience of running a family business.

Melanie Keeble joined ITOPF in January 2014 as Secretary to the Support and Development Director. She has previously worked for several years supporting Directors and their teams in charities and non-profit organisations. Melanie replaces Carla Smith who left ITOPF in November to take up a project coordinator role for a leadership and development training company.



Karen Purnell receiving Freedom of the City of London prior to becoming a Liveryman of the Worshipful Company of Shipwrights in October 2013



## THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED

1 Oliver's Yard, 55 City Road, London EC1Y 1HQ

Tel: +44 (0)20 7566 6999

Fax: +44 (0)20 7566 6950

24hr: +44 (0)7623 984 606

E-mail: [central@itopf.com](mailto:central@itopf.com)

Web: [www.itopf.com](http://www.itopf.com)